USAID
FROM THE AMERICAN PEOPLE

SPS Strengthening Pharmaceutical Systems

BUILDING LOCAL COALITIONS FOR CONTAINING DRUG RESISTANCE: A GUIDE

SEPTEMBER 2011

Building Local Coalitions for Containing Drug Resistance: A Guide

September 2011

This report is made possible by the generous support of the American people through the U.S. Agency for International Development (USAID), under the terms of cooperative agreement number GHN-A-v-07-00002-v. The contents are the responsibility of Management Sciences for Health and do not necessarily reflect the views of USAID or the United States Government.

About SPS

The Strengthening Pharmaceutical Systems (SPS) Program strives to build capacity within developing countries to effectively manage all aspects of pharmaceutical systems and services. SPS focuses on improving governance in the pharmaceutical sector, strengthening pharmaceutical management systems and financing mechanisms, containing antimicrobial resistance, and enhancing access to and appropriate use of medicines.

Recommended Citation

Management Sciences for Health. 2011. *Building Local Coalitions for Containing Drug Resistance: A Guide.* Submitted to the U.S. Agency for International Development by the Strengthening Pharmaceutical Systems (SPS) Program. Arlington, VA: Management Sciences for Health.

Strengthening Pharmaceutical Systems
Center for Pharmaceutical Management
Management Sciences for Health
4301 North Fairfax Drive, Suite 400
Arlington, VA 22203 USA
Telephone: 703.524.6575
Fax: 703.524.7898
E-mail: sps@msh.org
Web: www.msh.org/sps

TABLE OF CONTENTS

ACKNOWLEDGMENTS

As part of its Infectious Disease Initiative, the US Agency for International Development (USAID) supports efforts to raise awareness of drug resistance and to limit its emergence and spread by decreasing the use of antimicrobial medicines when they are not required, improving their use when they are required, and improving the quality and supply of medicines. A key first step was supporting the development of the World Health Organization *Global Strategy for the Containment of Antimicrobial Resistance.* The Global Strategy provides a comprehensive set of evidence- and consensus-based recommendations for antimicrobial resistance (AMR) containment through interventions that target various stakeholders, including health providers, patients, governments, and health systems. This guide builds on the Global Strategy by offering a practical approach to operationalize the strategy at the local level and by making tools and approaches readily available to support advocacy and coalition building around the issue and act accordingly.

The first version of this guide, *Workbook for Building Local Support for Containing Drug Resistance,* was developed in 2004 by the Academy for Educational Development (AED) through the Behavior Change Innovation: State of the Art Activity (CHANGE) Project, the Harvard Drug Policy Research Group through the Applied Research on Child Health Project, Management Sciences for Health (MSH) through the Rational Pharmaceutical Management (RPM) Plus Program, and the Alliance for the Prudent Use of Antibiotics funded through RPM Plus.

The guide was updated in 2008 by the RPM Plus Program. It was based largely on the initial version and modified on the basis of feedback from users.

This newly revised version has been published by the Strengthening Pharmaceutical Systems (SPS) Program, which is a follow-on to RPM Plus. Updates reflect additional work since the 2008 publication, particularly related to regional AMR advocacy and coalition building. This guide also includes examples of activities, tools, and templates to enhance its practical applicability in the field.

Anthony F. Boni (USAID) provided the initial vision for this effort and continuous support for the overall approach described in this guide. The main contributors to the 2008 guide were Nancy Pollock (AED/CHANGE) and Maria Miralles, Nick Nelson, and Mohan P. Joshi (MSH/RPM Plus). Reviewers included Anthony F. Boni and Marni Sommer (USAID);

Susan Zimicki (AED); Marisabel Sanchez (Links Media); Chifumbe Chintu (AMR Advocacy Working Group in Zambia); and Beth Yeager, Wonder Goredema, and Oliver Hazemba (MSH/RPM Plus).

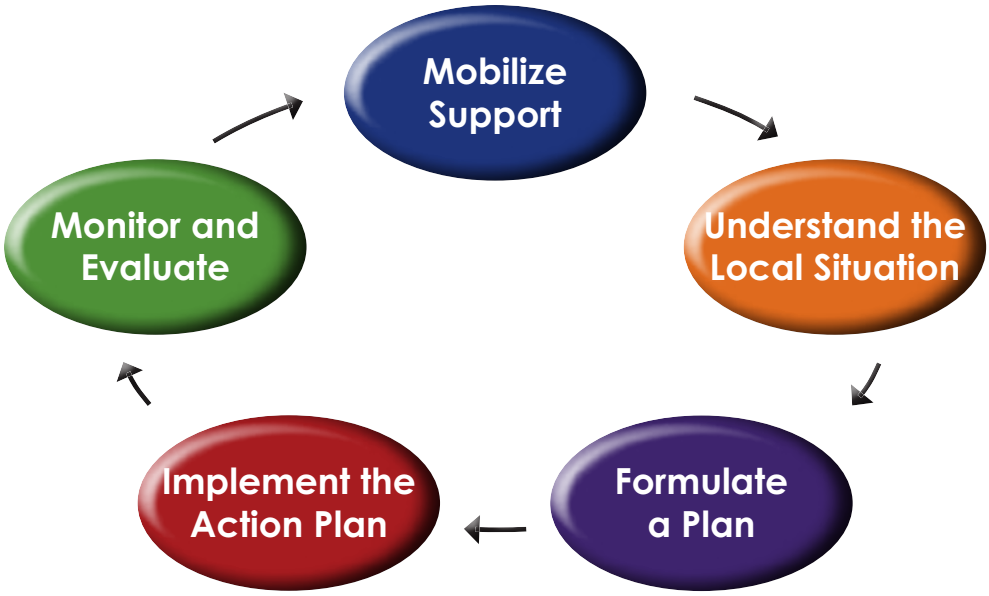
Mohan P. Joshi (MSH/SPS) and Martha Embrey (MSH/Center for Pharmaceutical Management) contributed to the 2011 revision.

ACRONYMS AND ABBREVIATIONS

AED	Academy for Educational Development
AMR	antimicrobial resistance
ARI	acute respiratory infection
AWG	advocacy working group
BUFMAR	Bureau des Formations Médicales Agréées du Rwanda
CBoH	Central Board of Health (Zambia)
CDC	US Centers for Disease Control and Prevention
CHANGE	State-of-the-art Behavior Change Project
CPE	continuing professional education
DACA	Drug Administration and Control Authority
DFID	Department for International Development (UK)
DTC	Drug and Therapeutics Committee
EML	Essential Medicines List
EPN	Ecumenical Pharmaceutical Network
ECSA	East, Central, and Southern Africa
FMOARD	Federal Ministry of Agriculture and Rural Development
FMOH	Federal Ministry of Health
ICC	Infection Control Committee
ICQI	infection control quality improvement
ITGs	Integrated Treatment Guidelines for Frontline Health Workers (Zambia)
M&E	monitoring and evaluation
MDR-TB	multidrug-resistant tuberculosis
MoH	Ministry of Health
MSH	Management Sciences for Health
NGO	nongovernmental organization
RPF	Regional Pharmaceutical Forum
RPM Plus	Rational Pharmaceutical Management Plus [Program]
SMART	specific, measurable, achievable, realistic, time-related
SPS	Strengthening Pharmaceutical Systems [Program]
STGs	standard treatment guidelines
STI	sexually transmitted infection
SWOT	strengths, weaknesses, opportunities, threats
TB	tuberculosis
TOR	terms of reference

UNICEF	United Nations Children's Fund
USAID	US Agency for International Development
WHO	World Health Organization
XDR-TB	extensively drug-resistant tuberculosis

INTRODUCTION



Antimicrobial Resistance Containment Coalition

Overview of the Problem of Drug Resistance

Drug resistance is not new, but there is a new urgency for containing it. Resistance occurs when microbes causing infections develop the ability to withstand the effects of the medicines intended to disable them. This becomes a particularly threatening challenge when alternate medicines are not available or not affordable to treat such infections. Drug use is the key driver of drug resistance. Misuse of medicines through overuse, underuse, and unnecessary use accelerates the development of resistance.

Drug resistance, also known as antimicrobial resistance (AMR) (Box 1), is complicating the treatment of major infectious diseases such as pneumonia, gonorrhea, cholera and dysentery, malaria, tuberculosis (TB), and HIV/AIDS and undermining disease control efforts. Lifesaving medicines used to treat malaria, TB, and AIDS are at risk of losing effectiveness due to drug resistance. Compounding the problem is that finding new medicines to replace those that are no longer effective is a long, expensive process with no guarantee of success, so the pipeline for such new medicines is often empty.

Box 1. Drug Resistance Terminology

In this workbook, the terms *drug resistance* and *antimicrobial resistance* are used interchangeably.

Antimicrobial resistance: AMR is the ability of a microbe to withstand the killing or disabling effect of an antimicrobial agent.

Antimicrobials: Antimicrobials are medicines that specifically kill or inhibit the growth of disease-causing microbes (including bacteria, viruses, fungi, and protozoa). The terminology is generic and includes antibiotics and other antibacterials, antivirals, antiprotozoals, and anthelmenthic medicines. Antimalarials, anti-TB agents, and antiretrovirals are specific terms for antimicrobials used to treat malaria, TB, and HIV/AIDS.

In addition to increasing morbidity, mortality, and the transmission of treatment-resistant disease in the community, AMR greatly increases costs for patients and for public health programs. Such costs include those related to providing treatment, such as increased hospital stays and the need to switch to second-line drug regimens and implement special infection control measures.

Drug resistance is a complex problem. Contributing factors include pharmaceutical management and medicine supply, medicine use behaviors, drug resistance information and surveillance capacity, and stakeholder interest and support. Containing drug resistance requires strengthening within these systems and coordination across these factors. Stakeholders are needed from a wide variety of sectors to gather and use information on these factors and coordinate a response.

The World Health Organization's (WHO) 60th World Health Assembly report on Resolution 58.27, *Improving the Containment of AMR,* noted the limited progress due to low investment across health systems. Weak health systems escalate the threat of AMR, and in turn, AMR's

consequences further weaken the health system. The emergence of extensively drug-resistant tuberculosis (XDR-TB) is one example of how weak health systems contribute to AMR. The WHO says of XDR-TB[1]—

> "It is created primarily by inadequate health systems and the resulting failures in program management, especially poor supervision of health staff and of patients' treatment regimens, disruptions in drug supplies, and poor clinical management, all of which can prevent patients completing courses of treatment."

Although drug resistance is a global problem, it requires local solutions because the various factors are context-specific. Known interventions can target these different factors, but coordination among the interventions is necessary to achieve the critical mass of activity required to contain resistance. For example, providing treatment guidelines and supporting related training will not change prescribing practices if the appropriate medicines are not available. Similarly, changing the medicine treatment policy and ensuring the supply of the correct pharmaceuticals may not result in appropriate treatment if prescribers are not familiar with the corresponding treatment guidelines.

In 2001, WHO published the *Global Strategy for Containment of Antimicrobial Resistance,* a document that represents global consensus on proven interventions, research gaps, and appropriate approaches for containing drug resistance. At the country level, these interventions involve consumers, prescribers, dispensers, other stakeholders, hospitals, national governments, and health systems (Annex A).

Those with a stake in AMR containment include individuals affected by AMR and people whose actions contribute to its spread. They include physicians, nurses, pharmacists, and other health professionals in the public and private sectors; also included are professional societies, researchers, pharmaceutical companies, consumers and community members, academics, the government, journalists, donors, and nongovernmental organizations (NGOs). AMR stakeholders can be interested in one specific condition, such as malaria, TB, acute respiratory infections (ARIs), sexually transmitted infections (STIs), diarrhea, or AIDS; in one aspect of AMR, such as irrational drug use or infection control; or in AMR in general.

Interventions and investments to strengthen overall health system capacity, particularly pharmaceutical management, can provide a lasting contribution to AMR containment. Glaring lessons learned by losing chloroquine and other inexpensive, first-line medicines for malaria that were once highly effective should compel all stakeholders to make investments to preserve the effectiveness of remaining antimicrobials.

Table 1 illustrates examples of interventions that address the different factors of drug resistance. In addition to helping contain AMR, these cross-cutting interventions also contribute to a broader health-system strengthening strategy.

Table 1. Interventions Supporting the Different Factors of Drug Resistance

Factors of drug resistance	Possible interventions
Pharmaceutical management and infection control	• Develop, disseminate, and implement standard treatment guidelines (STGs) • Develop formularies and essential medicines lists (EMLs) • Develop Drug and Therapeutics Committees (DTCs) • Strengthen pharmaceutical management practices • Develop and implement infection control programs
Medicine use behaviors	• Develop pre-service education to address AMR training for future health care providers • Develop an in-service training program on appropriate use of antimicrobials and AMR • Develop printed education materials for drug sellers on appropriate dispensing of antimicrobials • Prepackage medicines to improve the case management of infectious diseases • Educate the public through information campaigns
Drug resistance information and AMR surveillance capacity	• Strengthen AMR surveillance infrastructure • Improve AMR surveillance capacity

Purpose of the Guide

This guide aims to help AMR stakeholders organize a collaborative effort to locally address drug resistance. The priority interventions outlined in the WHO Global Strategy are coupled with advocacy efforts to achieve the critical mass of activity needed for a coordinated, multidisciplinary, coalition-based approach to containing drug resistance.

The guide is based on the following observations and guiding principles—

- Much is already known about the causes of AMR and what can be done to contain and prevent it; we do not need to wait for more information to act immediately.
- Action must focus on realistic local strategies that capitalize on existing initiatives, resources, and activities while generating a catalyst for new ones.
- In many countries, little information exists about the nature of the AMR problem in their specific context; when information is available, it is not widely shared or discussed among stakeholders.
- Mobilizing local stakeholders around the common issue of drug resistance is important for coordinated and collaborative action.
- The initiative to contain and prevent AMR must be seen as adding value to existing health programs, such as programs to control malaria, HIV/AIDS, and TB, and not as a competing vertical program.

This guide presents key elements of a systematic approach to building an AMR coalition and provides users with practical guidance on how to—

- Initiate the process, identify key issues and processes, and mobilize local support around drug resistance through leadership of a local champion group
- Gather feasible but credible evidence and build consensus among AMR stakeholders regarding priority actions based on the degree of relevance and feasibility
- Implement the identified actions and continue expanding the coalition base
- Monitor and evaluate the coalition's AMR advocacy and containment actions

The figure shows a graphic representation of the above steps.

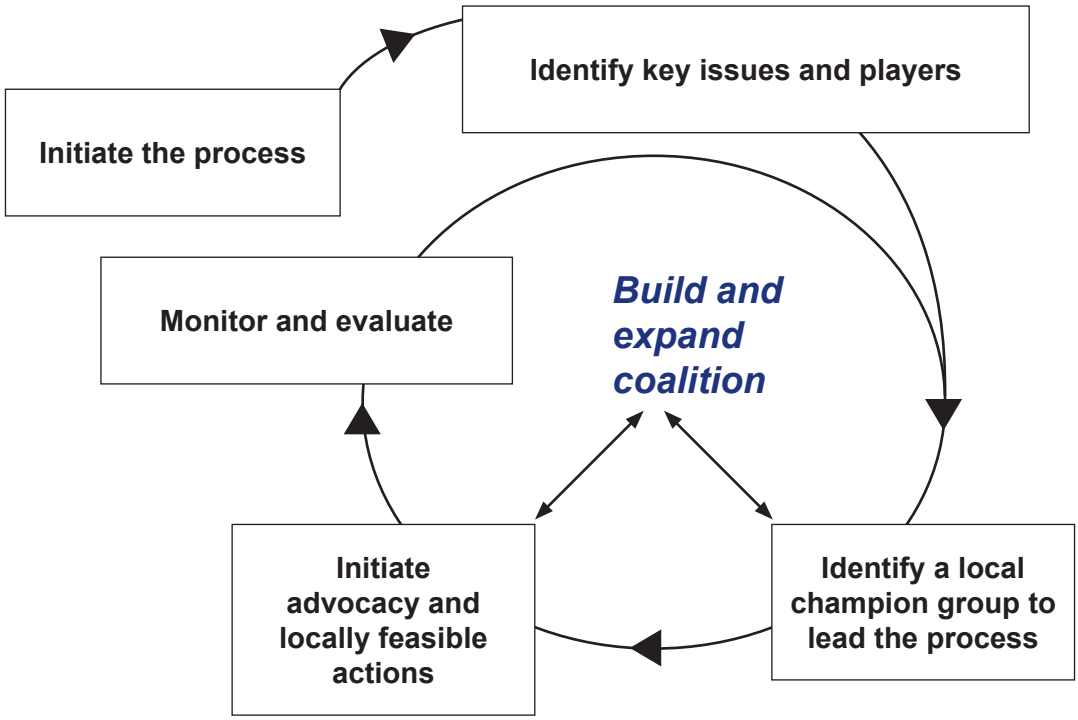


Figure 1. Key elements of a systematic approach to building an AMR coalition

A Coalition-Based Approach

Coalition building is the foundation of the approach. It begins with a core working group of stakeholders and grows as more stakeholders are drawn into the process during the different phases. The process can be jump-started at any level and in a wide range of contexts, from a single institution to a multi-country region. Initial efforts will focus on strengthening the coalition, but over time, the coalition will be able to turn outward to focus on its mission of containing AMR. The coalition's role is not strictly to implement containment interventions, but also to coordinate and advocate for their implementation by other key stakeholders.

Mobilize support—The first step is to mobilize support among key stakeholders. Initial investigations include determining who these people, institutions, and agencies are and initiating a dialogue about the need for a concerted effort to address AMR. A small group of committed stakeholders should emerge to lead the stakeholders toward coalition building.

Understand the local situation—During this phase, stakeholders focus on compiling information to guide the development of strategies for advocacy, intervention, and research by using existing information and key informant interviews to understand the local context and to determine what data needs to be collected about AMR surveillance capacity and drug policy management.

Formulate a plan—Convene a stakeholder meeting to increase awareness of drug resistance, review local information compiled on AMR, and develop a collaborative plan for addressing drug resistance.

Implement an action plan—Implement interventions, mobilize interest and resources, and conduct necessary research to fill critical information gaps.

Monitor and evaluate—Evaluate the effect of advocacy and containment efforts and disseminate findings; use evaluation findings to reassess the containment strategy and make changes to increase effect and reach.

Continue the cycle—The process will continue as the coalition gains firm footing. With increased resources and support and successful activities, the coalition will shift and expand to focus on different dimensions of AMR. This effort will require renewed and focused attention to each element above.

Why Focus on Coalition Building?

Because AMR is complex, one organization or group cannot tackle it alone. Efforts must be synergized to maximize the effectiveness of all available resources. Additionally, in successful coalitions, participation benefits members as well as the overall coalition. When coalition members collaborate, they can prioritize and coordinate activities to increase their effect, address strategic gaps in coverage, and mutually reinforce existing activities. Potential advantages and achievements for different types of coalition members include the following—

- For consumers
    - New, improved services are delivered to more consumers.
    - Consumers are empowered to take action on their own behalf to ensure access to appropriate treatment recommendations and medicines.
    - Enhanced treatment effectiveness occurs as a result of better prescribing practices and increased availability of recommended medicines.

- For organizations
  - Coordination across programs adds value to existing activities.
  - Information access and use is increased.
  - Organizational reach is increased through collaboration with other groups.
  - Collaborating with other groups achieves the critical mass of activity needed to achieve program objectives.
- For coalitions
  - Information base informs advocacy and coalition building, and intervention development is expanded.
  - Technical expertise and best practices are increased.

The goal of collaboration is to share decision making through a knowledge-sharing process that leads to the development of lasting and positive relationships among diverse AMR stakeholders. These relationships are developed through communication, but can be hindered by power struggles and lack of trust. An unsuccessful collaboration reduces the potential for change and devalues the work.

What Are the Advantages of This Approach?

Key advantages of this coalition-building approach are that it is—

- **Sustainable**—Coalition-building activities increase the momentum around the issue of drug resistance and provide opportunities and resources for expanding the scope and breadth of activities.
- **Synergistic**—Broad-based coalitions provide a forum for the multidisciplinary collaboration necessary to build activities that increase impact, reduce costs, and add value to programs.
- **Multifaceted**—A behavior-change approach helps build strategies across the drug-resistance factors that provide an enabling environment for behavior change through policy, management, and educational activities tailored to the local situation.
- **Manageable**—Intervention planning keeps the focus on feasibility, effectiveness, and available resources.
- **Flexible**—Implementation strategy is tailored to the local context to increase impact.

Who Should Use This Guide?

Anyone concerned about drug resistance can use this guide, such as—

- Medical, pharmaceutical, or other health professionals
- NGOs
- Disease control programs
- Academic institutions
- Service facilities (for example, hospitals and clinics)
- Ministries of Health (MoHs)
- Consumer advocacy groups

How Should This Guide Be Used?

This guide is organized according to the phases of coalition building, activity planning, and implementation. The user should become familiar with all the sections before initiating any activity. As the coalition building progresses, the user may wish to share the concepts and methods with the other stakeholders. The individuals who eventually form the core working group should also have access to this guide.

Each section is structured in a similar way and begins with an overview of the purpose and contents. Because each section involves some activity, tools are provided to help guide the activity. Users should keep in mind that the tools provided at the end of this guide are meant to serve as examples that should be adapted to the local context as necessary. For example, if computers and people with database skills are readily available, some of the tools developed for manual use may be automated.

The feasibility, degree of relevance, and priority of the activities that this guide describes will depend on the in-country needs and resources. The best approach is to work toward a systematic and comprehensive AMR advocacy and containment initiative; however, if conditions do not allow for such a comprehensive approach, implementing selected individual interventions can help make a difference.

The initial launch of the AMR advocacy and containment approach that is detailed in the following pages has been implemented in several countries, including Ethiopia, Rwanda, and Zambia. Many of the lessons learned from these countries' experiences have shaped this guide. Likewise, the AMR advocacy working groups (AWGs) used many of the assessment tools offered in this guide to conduct a rapid appraisal of the AMR situation in the country and were able to get a clear picture of the existing gaps and priority areas for intervention.

Adapting the Coalition-Building Approach for Different Contexts

The approach, although designed initially for country-level implementation, has shown itself to be readily adaptable to the regional context. Such a regional approach can build a multi-country platform to—

- Recognize and address the common problem of AMR
- Create and expand advocacy and coalition
- Share expertise, experience, lessons learned, best practices, and resources
- Disseminate available AMR data and improve networking of existing surveillance
- Motivate each other and strengthen overall South-South collaboration

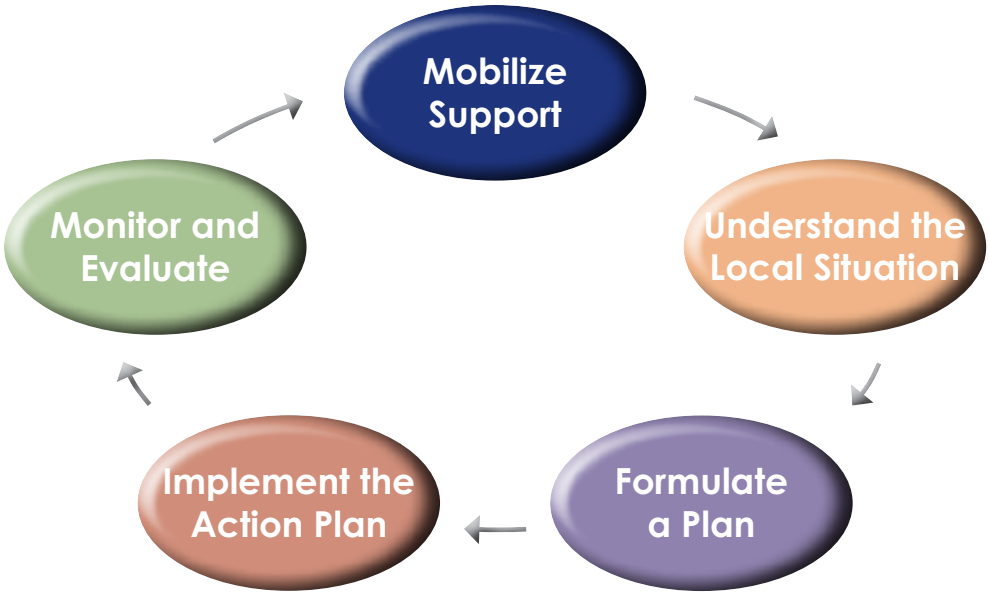
Two regional organizations, the faith-based Ecumenical Pharmaceutical Network (EPN) and a government-affiliated Regional Pharmaceutical Forum (RPF), serving the East, Central, and Southern African (ECSA) Health Community, are initiating widespread AMR advocacy and calls-to-action in Africa. Strengths of taking a regional approach include the presence of representatives from member countries, an existing organizational structure, experience with work plan development, experience working at the regional level, acknowledgement of the importance of advocacy, and experience with wide dissemination of important documents.

As part of these regional efforts, the Strengthening Pharmaceutical Systems (SPS) Program and its partners have conducted four regional AMR and infection control meetings in Kenya,[2] Rwanda,[3] Tanzania,[4] and Uganda[5] for Anglophone and Francophone participants from more than 20 countries. The participants have returned home and generated impressive results; for example, in less than a year, participants at the Tanzanian meeting had initiated more than 40 AMR-related activities in their facilities.

Other notable events have included EPN's *Fight AMR Campaign* around the 2009 Global Health Assembly in Geneva and the Regional Pharmaceutical Forum's explicit inclusion of AMR components into its five-year regional pharmaceutical strategy. The RPF and EPN initiatives show that existing regional organizations can be mobilized to expand the scope and impact of AMR initiatives and that such initiatives bring stakeholders from multiple countries to a single common platform to generate a shared vision, build widespread coalitions, and mount organized actions to contain AMR.

In addition, a subregional AMR containment strategy in Peru, Bolivia, and Paraguay has been developed through the South American Infectious Diseases Initiative; for example, SPS and its predecessor Rational Pharmaceutical Management (RPM) Plus helped AMR working groups in Peru and Paraguay conduct AMR assessments, establish and strengthen a medicine information center network, and create communication campaigns targeting prescribers, dispensers, and patients.

MOBILIZE SUPPORT



Antimicrobial Resistance Containment Coalition

Overview

The first step is to mobilize support. During this initial phase, stakeholders are identified and informed of the intent of the initiative. From these stakeholders, a core group will organize into a working group to plan and begin building the coalition. If the interest and concern are not sufficient to catalyze the group or engage the stakeholders considered critical, it may be necessary to conduct advocacy activities to form the core group or to reduce barriers to progress.

Sections 2–5 contain Tools, Knowledge and Skills, and Product summaries

They list—

- Tools (forms) available in this guide that can be used to perform the activities described in the section (the forms are found at the end of the manual)
- Skills helpful in carrying out the activity
- Products that can be developed either during the training or in the future

Remember, the tools should be adapted for local use and can be used by either individuals or groups.

Also, coalition building and AMR containment are ongoing activities with short- and long-term goals. The products mentioned in this guide can be produced in any order and as time and resources allow.

Keep in mind that new coalitions benefit from structure early on. Developing terms of reference (TOR), a document that describes the purpose and structure of a project and a scope of work, will provide a sense of shared and clear purpose. As the coalition begins to form, be explicit about how decisions are made and roles and responsibilities assigned. As the coalition grows and new members are added, you will need to nurture continued consensus on the mission and vision.

This section presents guidance on how to identify stakeholders and mobilize an AWG to address the multifaceted factors that affect AMR. The steps include the following—

- Identify key stakeholders
- Kick off the initiative
- Organize an AWG
- Establish group procedures and begin defining the key issues
- Move the advocacy process forward

Tools, Knowledge and Skills, and Products

Tools	• Form 1. Stakeholder Identification Worksheet (page 72) • Form 2. Stakeholder Contact List (page 74) • Form 3. Stakeholder Interview Guide (page 75) • Form 4. Sample Invitation for Kickoff Meeting (page 77) • Form 5. Sample Agenda for Kickoff Meeting (page 78)
Knowledge and skills	• Understand AMR and able to articulate related issues • Understand AMR containment in both local and global contexts • Able to articulate goals of initiative and benefits of coalitions as opposed to individual actions
Products	• List of drug-resistance stakeholders and their contact information • TOR for AWG

Identify Key Stakeholders

Develop an initial list of stakeholders. Brainstorming with colleagues who have different expertise and networks is an efficient way to develop the initial list. Drug-resistance stakeholder groups come from multiple sectors and disciplines.

Box 2. Who Are AMR Stakeholders?

AMR stakeholders are key players affecting or impacted by drug resistance. They include WHO; MoH; donors; public, private, and mission health sectors; NGOs; consumers; professional societies; the pharmaceutical industry; academics; and the media. AMR stakeholders can be interested in one condition, such as malaria, TB, ARIs, STIs, diarrhea, or AIDS; in one aspect of AMR, such as irrational medicine use or infection control; or in AMR in general.

Contact key potential stakeholders (Box 2) either through visits or by telephone or e-mail to explain the initiative. If they express interest, follow up with further information about the initiative and, if possible, set up an interview to discuss their possible participation in the AMR coalition (Form 3. Stakeholder Interview Guide).

Use Form 1. Stakeholder Identification Worksheet as a guide to ensure that stakeholders represent a broad spectrum of AMR interests and concerns. The form helps identify which of five AMR-related areas a stakeholder may best represent—pharmaceutical management, medicine use, laboratory services and surveillance, infection control and disease prevention, and advocacy.

Determine whether groups with compatible goals already exist. Professional societies representing physicians, pharmacists, nurses, public health professionals, or infectious disease specialists, and those societies with a broad membership, including the local chapter of the International Network for the Rational Use of Drugs or the Alliance for the Prudent Use of Antibiotics, might be interested in initiating the process.

Below is an example of the stakeholder identification process that was part of the AMR coalition-building activity in Rwanda.

Country Example 1. Stakeholder Identification Worksheet: Rwanda

Stakeholder category	Potential stakeholders within these categories	Stakeholder groups identified	Dimension				
			Pharmaceutical management	Medicine use	Lab services & surveillance	Infection control & disease prevention	Advocacy
Decision makers and politicians	MoH	• Pharmacy Task Force	X	X			
		• Quality care desk				X	X
		• Hygiene desk				X	X
		• Decentralization desk					X
	Ministry of Commerce and Industry	Rwanda Bureau of Standards					X
	Center for Treatment and Research on AIDS, Malaria, Tuberculosis, and other Epidemics (TRAC Plus)	• Malaria		X	X		X
		• TB		X	X		X
		• HIV		X			X
		• Epidemiology				X	X
	Maternal and child health	• Immunization program		X		X	X
		• Community desk		X		X	X
		• Reproductive health program		X			X
Donor	Multilateral	• WHO	X	X	X	X	X
		• United Nations Children's Fund (UNICEF)			X		X
		• United Nations Population Fund	X				X
	Bilateral	• USAID/US Centers for Disease Control and Prevention (CDC)	X		X		X
		• UK Department for International Development (DFID)			X		X
Global partnerships	Global Fund country coordinating mechanism			X	X		
NGOs/private voluntary organizations (local and international)	Health and development organizations	• PSI/Rwanda	X	X	X		
		• Catholic Relief Services	X	X			
		• International Center for AIDS Care and Treatment Programs		X	X	X	
		• University of Maryland		X			
		• Family Health International	X	X	X		
		• Supply Chain Management System	X	X			
		• USAID | DELIVER					
	Community activists	• Diabetes Association					X
		• People Living with HIV/AIDS					X

Stakeholder category	Potential stakeholders within these categories	Stakeholder groups identified	Dimension				
			Pharmaceutical management	Medicine use	Lab services & surveillance	Infection control & disease prevention	Advocacy
Health practitioners and providers (public and private sectors)	Organized health/ insurance systems	• Rwandaise d'Assurance Maladie	X	X			
		• MoH/Mutuelle desk					X
	Professional organizations (medical, microbiology, pharmacy, nursing—local and international affiliates)	• Rwanda Medical Association					X
		• Association of Pharmacists in Rwanda					X
		• Rwanda National Association of Nurses					X
	Employers providing health care for employees	• BRALIRWA		X			
		• Banque Commerciale du Rwanda		X			
		• National Bank of Rwanda		X			
		• Bank of Kigali		X			
	DTCs	• Kabutare Hospital	X	X	X	X	
		• Ruhengeri Hospital	X	X	X	X	
		• Gisenyi Hospital	X	X	X	X	
		• Rwinkwavu Hospital (Partners In Health)	X	X	X	X	
Laboratory services and AMR surveillance	National-level resources	National Reference Laboratory		X	X	X	X
	Academic institutions	• National University of Rwanda (pharmacy and medical schools)					X
		• School of Public Health					X
		• Kigali Health Institute nursing school					X
	Public and private sector laboratories	• Bugando Medical Centre		X	X	X	
		• University Teaching Hospital of Kigali	X	X	X	X	
		• Centre Hospitalier Universitaire de Butare	X	X	X	X	
		• King Faysal	X	X	X	X	
		• Polyclinique la Croix du Sud	X	X	X	X	
		• Polyclinique la Medicale	X	X	X	X	
Educators[a]							
Pharmaceutical industry	Multinational and local pharmaceutical industry	• Pharmaceutical Laboratory of Rwanda	X			X	X
		• Centrale d'Achats des Médicaments Essentiels du Rwanda	X	X			X
	Pharmaceutical importers	• Bureau des Formations Médicales Agréées du Rwanda	X	X			X
		• Kibogora Hospital	X	X			X
General public	Consumer groups	Consumers Association					X
News media and journalists	Health reporters, radio stations, newspapers and columnists, television stations, and foreign correspondents	• Radio/TV Rwanda					X
		• Salus Radio					X
		• Contact FM Radio					X
		• Rwanda Health Communication Center/MoH					X
		• WHO/Information Desk					X

[a] Includes research institutions, professional training institutions and councils, and health education and training organizations.

Use Form 2. Stakeholder Contact List for follow-up and reference purposes. It can also be distributed to the group to encourage information sharing among stakeholders.

Use Form 3. Stakeholder Interview Guide to facilitate the flow of discussion during the interview. The guide is designed to ensure that basic information on stakeholders' knowledge, thoughts, and concerns about AMR is obtained. This information will help gauge their interest and potential participation level in the AWG. It will also help you begin to get ideas about priority AMR issues in your country. The example below lists the results of interviews with health facility stakeholders in Rwanda.[6] Select responses are listed by how often they were mentioned.

During the interview, bring up current or pressing AMR issues or changing circumstances to catalyze action. Examples of potential catalysts are the introduction of a new drug policy or new medicines, availability of funding, or the occurrence of deaths attributed to resistant organisms.

Country Example 2. Top Responses from Interviews with Health Facility Stakeholders in Rwanda

What are the most significant concerns that you have with respect to treating infectious diseases in your country?
Poor patient compliance
Unknown or poor quality of drugs, no quality control lab
Irrational prescribing
Lack of availability of antibiotics

Do you know if anything is being done about these concerns?
STGs developed
Students provide patient training

What do you see as the main causes of drug resistance?
Inadequate infection control
Poor prescribing practices
Poor patient compliance

What are the best solutions to the problem of drug resistance?
Education for physicians
Strengthen policies and enforcement on prescribing (including use of STGs)
Train pharmacists

Where do you get information on new medicines and their use?
Online drug information sources
Textbooks

What kinds of information regarding new medicines and their use or drug resistance do you need that you are not getting?
Drug resistance data for Rwanda
Comparative information regarding new medicines
Clinical trials
Advantages and disadvantages of new medicines

Is your organization planning trainings, surveys, or public education campaigns on AMR in the next year?
Pharmaceutical management training
Students will provide training to patients

Kick Off the Initiative

Start with the people already working on drug resistance issues. Invite them to participate in an AWG kickoff meeting and ask them for names of others who may want to participate. You can do this during the round of visits and contacts made in the previous step.

Use Form 4. Sample Invitation for Kickoff Meeting to guide drafting an invitation letter to potential participants.

Form 5. Sample Agenda for Kickoff Meeting provides an idea of the structure and content of a kickoff meeting for AMR stakeholders. The stakeholders' meeting will kick off the AMR coalition initiative and motivate them to participate in the AWG. The objectives of the meeting should be clear—

- Review the goals of the AMR initiative
- Introduce stakeholders and their concerns
- Confirm the need for action
- Identify other potential stakeholders and partners
- Achieve consensus on the approach to be taken
- Plan for next steps, such as forming a working group and developing its TOR

Below is an example of part of the agenda for the kickoff meeting in Ethiopia.

Country Example 3. Sample Agenda for Kickoff Meeting

Initiative to Contain Antimicrobial Resistance in Ethiopia (Addis Ababa)
First Stakeholders' Meeting | March 2, 2006 (10:30 am–1:30 pm)

Agenda		
10:30 am to 10:40 am	Welcome	Abraham G/Giorgis, Drug Administration and Control Authority (DACA)
10:40 am to 11:00 am	Introductions	All
11:00 am to 11:10 am	Review of objectives of the meeting 1. Inform stakeholders of the AMR initiative 2. Confirm the need for action 3. Identify other potential stakeholders and partners 4. Achieve consensus on approach and plan for next steps	Dr. Maria Miralles, MSH/RPM Plus
11:10 am to 11:30 am	Background: AMR in the world and in Ethiopia and why we are here today	Dr. Mohan Joshi, MSH/RPM Plus
11:30 am to 12:00 pm	Open discussion 1. Validity of the issue 2. Relevance for stakeholders 3. Identification of other stakeholders	All Facilitator: Dr. Negussu Mekonnen, MSH/RPM Plus
12:00 pm to 12:30 pm	Planning for next steps 1. Need for a working group 2. Call-to-action 3. Communications strategy a. Within groups b. Between groups networking c. Media	All Facilitator: Dr. Mohan Joshi, MSH/RPM Plus
12:30 pm to 1:30 pm	Lunch	All

Organize an AMR Working Group

The working group should include people who bring technical expertise in a variety of AMR areas and people who have authority and influence in key stakeholder institutions. Stakeholders may volunteer to participate in the AWG or may be nominated during the kickoff meeting.

The TOR for the working group will help define the group members. The TOR may be drafted in advance of the kickoff meeting and finalized as part of that meeting, or they may be drafted following a series of meetings to develop them. Box 3 shows a sample TOR.

Box 3. Sample TOR for the AMR Working Group

- Move forward AMR advocacy process over the next __ months.
- Participate in meetings and workshops (about one per month) at crucial decision-making points in the process.
- Review and provide comments on tools, collected information, and data analysis, as needed, to formulate a call-to-action to guide stakeholder actions.
- Identify potential new stakeholders and implementation partners.
- Demonstrate leadership in promoting the initiative.

One of the initial responsibilities of the AWG is to compile, update, and use information about AMR in the local context (Section 3. Understand the Local Situation). The information should then be used at a stakeholders' meeting to reach consensus on the priorities for containing and preventing AMR. Then a call-to-action document can be prepared that represents the consensus among stakeholders (Section 4. Formulate a Plan).

Establish Group Procedures and Begin Defining the Important Issues

- Convene a meeting in which AWG members decide how they plan to work and begin to define the key issues.
- Establish how decisions are made, what is considered confidential, how information is distributed, and other procedural guidelines.
- Through discussion and sharing of experiences, begin to create a common vision and agree on the direction of the group.
- Obtain agreement on the next steps, including information gathering, followed by a consensus workshop and assignment of roles and responsibilities.
- Develop a timetable for activities and products, including preparing and presenting results from information collection efforts, drafting and finalizing a call-to-action document, and holding a public event to present the call-to-action (Section 4. Formulate a Plan).

Move the Advocacy Process Forward

Organize advocacy activities and provide relevant information to promote active participation in the planned stakeholder meetings. Some advocacy and coalition-building materials are included in this guide. Annex B and Annex C contain a WHO fact sheet and sample slides on AMR. Possible activities/strategies include the following—

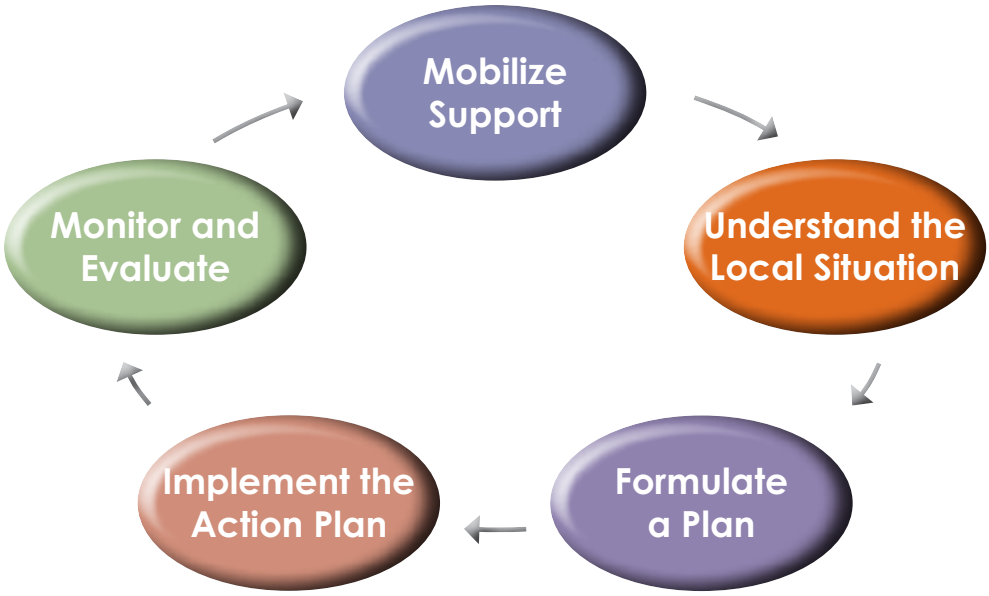
- Organize a national AMR stakeholders' call-to-action meeting with other key individuals or groups, such as MoH, to increase participation and credibility (Section 4. Formulate a Plan). Not all AMR stakeholders may have been identified initially. This meeting is an opportunity to get all stakeholders on board, commit to action against AMR, and raise the visibility of the initiative.
- Develop a call-to-action or a similar advocacy document to disseminate during the coalition-building process. Also look for opportunities to distribute the document by piggy-backing onto in-country meetings organized for other purposes. Actual examples of such documents developed by country- and regional-level groups appear in Annex D. Annex E includes an advocacy tool designed for infection control in hospitals. Note that some of them include messages for specific audiences. Including such targeted messages can improve the chances of engaging specific groups.
- Develop a contact list of stakeholders (Form 2. Stakeholder Contact List) and disseminate information on drug resistance and relevant activities to them. Include interested community leaders and invite them to join. Although they may not be able to actively participate, their support is important.
- Convene a workshop to sensitize donors. Mobilizing funding for coalition support and AMR interventions is important (Section 5. Implement the Action Plan). Making sure various donors are aware of the problem of AMR and how it will impact their existing programs will help rouse their support. Framing AMR interventions as "value added" to their programs is one way of demonstrating their potential role in AMR containment activities.
- Sponsor events to increase awareness of AMR and the initiative. These activities will involve working with the media. (See the "Media Presence and Communication Channels" activity in Section 3. Understand the Local Situation for more on how to identify media partners.)
- Capitalize on opportunities to provide an AMR perspective to existing and planned information and education activities.
- Provide technical expertise in the area of AMR to local groups.
- Facilitate transfer of information among different groups.
- Interact with stakeholders during the evidence-gathering phase (Section 3. Understand the Local Situation) to engage them in the process.

A Note on Building and Sustaining a Coalition

As with other coalition-building efforts, AMR coalition building involves a certain amount of activism and requires certain leadership skills. Working with the media is a valuable skill as well. The following free references may be useful for those lacking experience with advocacy or coalition-building activities and may also improve the abilities of those with previous experience.

- Gordon, G. 2002. *Advocacy Toolkit: Practical Action in Advocacy.* UK: Tearfund. http://tilz.tearfund.org/webdocs/Tilz/Roots/English/Advocacy%20toolkit/Advocacy%20toolkit_E_FULL%20DOC_Part%20C.pdf
- Sharma, R. R. 1997. *An Introduction to Advocacy.* Washington, DC: Academy for Educational Development, Support for Analysis and Research in Africa Project, USAID's Africa Bureau, Office of Sustainable Development, Health and Human Resources Analysis for Africa Project. http://www.aed.org/Publications/upload/PNABZ919.pdf
- Sprechmann, S., and E. Pelton. 2001. *Advocacy Tools and Guidelines: Promoting Policy Change.* Atlanta, GA: CARE. http://www.care.org/getinvolved/advocacy/tools.asp
- WHO/StopTB Partnerships. 2007. *Advocacy, Communication and Social Mobilization (ACSM) for Tuberculosis Control: A Handbook for Country Programmes.* Geneva: WHO. http://www.stoptb.org/assets/documents/resources/publications/acsm/ACSM_Handbook.pdf
- The Community Anti-Drug Coalition of America publishes resources and tools to help coalitions whose goal is to reduce illicit drug and alcohol use. Although written specifically for this topic, many of the tools and strategies can be adapted for AMR advocacy.
    - *Strengthening Partnerships: Linking National Organizations and Local Coalitions.* This toolkit is designed to help coalitions secure the commitment of important local partners. http://www.cadca.org/resources/detail/strengthening-partnerships-toolkit
    - *Research Into Action—Effective Meetings Can Increase Your Coalition's Volunteers.* For coalitions, meetings provide the venue for strategic planning, collaboration, and overall preparation. Those in charge of organizing coalition meetings should learn the key design issues that promote meeting effectiveness. http://www.cadca.org/resources/detail/research-action-effective-meetings-can-increase-your-coalitions-volunteers
    - *Telling the Coalition Story: Comprehensive Communication Strategies* http://www.cadca.org/resources/detail/telling-coalition-story-comprehensive-communication-strategies
    - *Sustaining the Effort—Sustainability Resources* http://www.cadca.org/resources/detail/sustaining-effort-sustainability-resources

UNDERSTAND THE LOCAL SITUATION



Antimicrobial Resistance Containment Coalition

Overview

Local information is critical for understanding the drug resistance problem, identifying solutions, and capitalizing on opportunities. It can inform advocacy and communication strategies and can help prioritize and design containment interventions for drug resistance.

This section describes methods and tools that can be used to compile, analyze, and present information about the local AMR situation. Information gaps should be assessed to determine whether additional research is needed. This information gathering and analysis activity can start during the creation of the AWG and then be completed by the group as the primary users and sharers of the results.

This section provides guidance on exploring and documenting information on the following AMR initiative topics—

- Pharmaceutical management information
- Medicine use behaviors
- Surveillance capacity
- Stakeholder analysis
- Media presence and communication channels

The first three deal with analyzing the AMR situation and identifying gaps in containment activities. The last two examine stakeholders and the media, which will provide insight into how to advocate for the priority issues identified by the first set of topics.

These topics are interrelated; therefore, information about several of them may be found in the same source. Although information on all the preceding areas is necessary for a complete picture, the AWG may need to prioritize what it can do initially based on available resources. The results from an initial attempt to collect information can help leverage more resources to collect any remaining information.

Gathering information may be delegated to different individuals or agencies, or to a single individual, provided he or she has the required skills. The methodology used for these information-gathering exercises consists of document reviews and key informant interviews. Basic guidance on these methods is presented in Annex F.

Stakeholders of the country-level AMR advocacy and containment initiative in Ethiopia conducted a baseline assessment to map the magnitude of AMR and contributing factors to inform further actions. Country Example 4 gives a summary of the methods and results of this assessment.[7] This exercise paved the way for the development of a context- and evidence-based action plan to build advocacy and actions around the issue of AMR in Ethiopia.

Country Example 4. Methods and Results of a Baseline Assessment of AMR in Ethiopia

Methods

- Reviewed research literature on infectious diseases, antimicrobial prescribing, and usage practices in humans and animals
- Reviewed content of health professionals' courses on AMR containment
- Interviewed in-charges and made observations of cross-sectional survey of AMR containment practices in 73 public health facilities
- Interviewed 675 health practitioners from the 73 health facilities to study their antimicrobial prescribing and dispensing practices
- Performed exit interviews with 1,761 clients on their knowledge on medicines dispensed and perceptions of antibacterial use
- Reviewed 5 years of 52,682 culture and antibacterial sensitivity records
- Assessed antibacterial prescribing from surgical and medical wards and outpatient prescriptions from systematic samples of 100 records per each health facility

Results

- Out of 52,682 culture and antibacterial sensitivity records, 35.1 percent showed growth of microorganisms with varying levels of resistance—Escherichia coli were resistant to amoxicillin (70 percent), tetracycline (75 percent), and penicillin G (88 percent); Staphylococcus aureus were resistant to vancomycin (18.3 percent).
- Pre-service course content review of health professionals' AMR training showed gaps that can be improved.
- Availability of key antibacterials, infection prevention materials, and STGs in health facilities was 73.0 percent, 82.9 percent, and 61.0 percent, respectively.
- Antibacterial prophylaxis was prescribed for 75.9 percent of surgical procedures in more doses and for a longer duration than is normally recommended.
- Antibacterials were prescribed to 70.6 percent of medical inpatients.
- Providers' adherence to STGs for treating pneumonia was only 19.6 percent.
- Providers have reported the existence of nosocomial infection but actions to contain are very limited.
- Patients' knowledge (about route, dose, frequency, and duration of administration) about the dispensed antibacterials was 82 percent, whereas 40.2 percent and 36.3 percent knew that antibacterials are not used for watery diarrhea and common cold, respectively.

Pharmaceutical Management Information

Information about AMR and how it relates to the pharmaceutical management system includes examining health and pharmaceutical policies and the supporting legal framework for selecting medicines to be used in the health system, procurement and drug quality practices, and prescribing and dispensing practices.

Tools, Knowledge and Skills, and Products

Tools	Form 6. List of Documents for Review (page 79) Form 7. Document Review Template (page 80) Form 8. Questions for Document Review and Interviews (page 81) to guide collecting information on pharmaceutical management issues that relate to AMR
Knowledge and skills	• Experience and skill in conducting key informant interviews • Adequate depth of knowledge of the pharmaceutical sector • Creating an environment that will allow senior MoH staff to feel comfortable sharing information
Product	A report summarizing findings, including gaps and priority areas for action

Most of the information is obtained by reviewing existing documents and conducting key informant interviews. Interviewees should include representatives from MoH, including the national drug regulatory authority and local health management teams; infection control specialists; managers of infectious disease control and essential medicine programs; members of professional organizations, academic institutions, and pharmaceutical manufacturers' associations; representatives of private health care facilities; and any other country-specific players in the pharmaceutical arena.

Guidance for Data Collection

Use Form 8. Questions for Document Review and Interviews. Note that some information may not be readily available and you may need to complete the collection effort in phases as information becomes available. Also note when information is not available— that in itself may be an important finding!

Sources vary for information on the various subtopics within pharmaceutical management. Use Form 6. List of Documents for Review and Form 7. Document Review Template to find and organize existing data. Keep in mind that informants are likely to be spread over various institutions and agencies. Therefore, the list of questions in Form 8. Questions for Document Review and Interviews should be used as a question bank from which you can take questions on different topics to create your own document review or interview guides for specific topics.

Product Preparation

Use Form 8. Questions for Document Review and Interviews as a guide to structure a report to cover the main areas of pharmaceutical management—selection, procurement, use, and policy and legal framework.

See Annex G for a report of the findings on pharmaceutical management assessment conducted as a part of the country-level AMR advocacy and containment initiative in Zambia.

Highlight potential opportunities for action. These opportunities may be further differentiated according to the following categories—

- Easy to address, with few or no additional resources or discussion
- Requires some discussion with stakeholders, with few or no additional resources
- Will take more time and resources to address
- Not feasible to address in the short or medium term but should not be forgotten

Distribute the report among all the AWG members for review and discussion. The findings should guide thinking on priorities and next steps.

Country Example 5 gives a summary of the priority actions and corresponding stakeholders that the Zambia AWG identified after reviewing and discussing their pharmaceutical management rapid assessment.

Country Example 5. Priority Activities Based on Rapid Assessment in Zambia

- Incorrect prescribing and dispensing of antimicrobials is often due to diagnostic limitations and unavailability of recommended drugs.

  STGs, formulary management, and DTCs are useful tools for promoting rational prescribing. These interventions have been introduced in Zambia. However, further action is needed to improve on their usefulness; for example by—
  - Evaluating the performance of existing DTCs and reducing barriers to their effective performance (action: MoH/Central Board of Health [CBoH])
  - Developing and implementing a dissemination plan for STGs and essential drugs lists in the public and the private sectors (action: MoH/CBoH)
  - Ensuring that health workers at all levels are trained (pre-service and in-service) on the use of STGs, EMLs, and AMR (action: University of Zambia, Chainama College of Health Sciences, General Nursing Council, Medical Council of Zambia, Evelyn Hone College, and other training institutions for health workers)
  - Strengthening the drug supply systems to ensure regular supply of good quality, essential drugs, including development of a long-term financial sustainability plan (action: MoH/CBoH)

- Self-medication for some common problems is taken inappropriately for various reasons including, lack of knowledge, convenience, and cost. It is very likely that, as a result, people are taking the wrong drugs, including antimicrobials, in incorrect doses for the wrong duration. To preserve the effectiveness of these drugs it is necessary to—
  - Educate the public about the risk of developing resistance due to inappropriate drug use through media campaigns, school activities, and other behavior change communication activities (action: MoH/CBoH, health professional bodies, and all health workers)
  - Encourage patients to adhere to prescribed and dispensed medicines (action: all health workers)
  - Encourage drug vendors to adhere to regulations (action: MoH/CBoH, Pharmacy and Poisons Board)

Table 2 presents the key concepts, rationale, and broad outline of the topics covered by the pharmaceutical management and supply assessment.

The next steps are elaborated in Section 4. Formulate a Plan.

Table 2. Key Pharmaceutical Management Concepts, Rationales, and Common Factors

Key concept	Rationale	Common factors relevant to the key concept
Medicine policy	Drug policies, particularly treatment and medicine selection guidelines, are a core component of any AMR containment strategy. The policies should accurately reflect local resistance levels and trends.	Existence of— • National medicine policy • National STGs, including mechanisms for updating STGs; guidelines for treatment failures and drug resistance; guidelines prepared for different levels of care • National EML • Information sources used in developing medicine policies • Stakeholders involved in developing medicine policies
Regulatory environment	Legislation and regulatory authorities support and enforce implementation of the medicine policy.	• Existence of legislation or regulations covering selection, procurement, use, and promotion of medicines • Agencies enforcing regulations and evidence of enforcement
Selection and procurement	The selection of medicines influences medicine supply; medicine quality influences treatment effectiveness.	• Whether the national EML is based on national STGs • Whether a policy limits pharmaceutical procurement in the public and private sectors to medicines based on the EML • Whether recommended first-line medicines for treatment of key infections are included in the EML • Whether recommended second-line medicines for treatment of key infections are included in the EML • Pharmaceutical quality assurance strategies
Management support	Management support enhances pharmaceutical management capacity.	• Existence and function of a separate body or committee (national or ad hoc) for containment of AMR • Existence of infection control strategies in primary care settings • Existence and functions of DTCs • Existence and functions of drug information center(s) • Existence and functions of adverse drug reaction monitoring systems • Existence and functions of infection control committees in hospitals
Education and training on use	Education can promote appropriate medicine use. Education and the availability of unbiased information on medicines may counteract inappropriate drug promotion activities.	• Whether continuing education is provided for health professionals and whether antimicrobial use and resistance issues are addressed • Whether rational antimicrobial use and AMR topics are adequately addressed in the curricula for medical, pharmacy, pharmacy assistants, nurses, and health workers • Whether and what types of provisions exist for public education on antimicrobial use, AMR, and the link between the two

Medicine Use Behaviors (Prescribers, Dispensers, Consumers)

Medicine use is the key driver of drug resistance. Antimicrobial medicines are used to treat a range of infections that are managed in different ways and in different settings in the health system. These include common infections, such as ARIs, diarrhea, malaria, sexually transmitted diseases, HIV/AIDS, and TB managed at health facilities and specialized clinics, and more serious infections that may require hospitalization, such as sepsis, severe malaria, and pneumonia. The dynamics and determinants of AMR differ across the spectrum of infections. It is important to understand these dynamics to design effective strategies to contain AMR.

Tools, Knowledge and Skills, and Products

Tools	• Form 3. Stakeholder Interview Guide (page 75) • Form 7. Document Review Template (page 80) • Form 8. Questions for Document Review and Interviews (page 81) • Form 9. Document Review Guide for Drug Use Behaviors and Underlying Causes (page 89)
Knowledge and skills	• Experience in collecting data (conducting interviews, reviewing documents), analyzing data, and writing reports • An understanding of medicine use behavior, assessing behavior, and identifying inappropriate behaviors
Product	A report on medicine use behaviors of prescribers, dispensers, and consumers

Five main behaviors must occur to achieve appropriate treatment with antimicrobials and reduce the potential for developing AMR. They include prescriber, dispenser, and consumer/caretaker behaviors—

- Prescriber assesses treatment and counsels patient/caretaker appropriately.
- Dispenser has appropriate medicines available and accessible (right medicine, good quality) and counsels patient/caretaker while dispensing.
- Consumer acquires/purchases correct medicine.
- Consumer/caretaker follows/administers the appropriate regimen (dose, frequency, duration).
- Consumer/caretaker seeks appropriate referral/follow-up if treatment fails.

These behaviors are influenced by the following factors—

- Resources, services, and supervision
- Availability/access/quality of medicines and health services
- Consumption of antimicrobials
- Knowledge/training and attitudes
- Price/economic incentives
- Industry/marketing
- Regulation/enforcement

Although the pharmaceutical management and supply assessment characterized many of these factors, they may not have been examined from the perspective of their influence on medicine use behavior per se. Table 3 presents key concepts in understanding medicine use behavior, its relevance, and the corresponding factors that commonly contribute to the behaviors.

Table 3. Key Medicine Use Behavior Concepts, Rationales, and Common Factors

Key concepts	Rationale	Common factors relevant to the key concept
Drug use behaviors	• Assessing the way that actual patterns of treatment for the target infections differ from recommended or reported treatments can highlight key problem areas. • All health providers who treat the target infections should know the recommended treatments. • Antimicrobials are often available without prescription. Staff in private retail outlets should know and recommend appropriate treatments.	• Antimicrobial treatment reported as usually used for patients with a common symptom or for the target infections • Reported frequency of use of STGs, formulary, generic medicines, and recommended antimicrobials for target infections • Lab tests and antimicrobial treatment used for a sample of cases seen with each common diagnosis or symptom scenario for the target infections • Self-medication practices
Resources and services	Lack of availability of certain resources (supervision, key committees, EML, formulary, STGs) or lab services will limit the likelihood of adequate treatment in health facilities.	• Presence of infectious disease specialist, and availability and frequency of meeting of infection control and DTC committees • Availability of EML, formulary, STGs, and appropriate lab services for the target conditions • Supervision of prescribing practices
Availability of key antimicrobials	Unreliable availability of the antimicrobials for target infections in health facilities and pharmacies can lead to inappropriate treatment.	• Current availability of recommended first-line and other antimicrobials commonly used to treat the target infections • Recent availability of key recommended antimicrobials • Common sources for antimicrobials
Consumption of key antimicrobials	Data on relative volumes of use of different antimicrobials can point to problems in underuse or overuse of specific medicines.	• Volume used in previous year • Relative purchase levels in previous week • Most commonly sold antimicrobial for treating target infections
Knowledge and attitudes about AMR	All health providers and staff in private retail outlets should have a basic knowledge about the existence, causes, and consequences of AMR.	• Awareness of AMR, attitude about its importance, opinion about causes, and perceptions about treatment failure • Prior training on appropriate antimicrobial use and AMR • Communication channels

Guidance for Data Collection

Use Form 9. Document Review Guide for Drug Use Behaviors and Underlying Causes to categorize relevant information from the documents and interviews already conducted. Identify gaps in the information for follow-up.

Product Preparation

Summarize the information in Form 9. Document Review Guide for Drug Use Behaviors and Underlying Causes to answer the following questions—

- For each of the five behaviors, what factors are influencing medicine use behavior positively? What factors are negatively affecting medicine use behavior?
- What are the information gaps? Are there behaviors for which there is insufficient or no data? Is enough known about important population groups?
- Where possible, make distinctions for type of prescriber and sector and infection/condition treated to better frame the AMR picture in your context.
- From the data you have, do any trends suggest that some behaviors play a more important role than others regarding the AMR situation? Which behaviors? What roles? What does this information imply in terms of an AMR strategy?
- Discuss limitations of the data; for example, by conditions represented, by sectors, by level of care (including self-medication), by geographical location, by age group, and by population. Which information was available but not sufficient? Summarize the recommendations found in studies that were reviewed.
- Does the synthesis of reviewed studies' information give a different impression than the individual studies or the disease-specific studies?

Examples of Potential Action Points

These potential action points may be seen as long-term projects, such as—

- Develop and implement a continuing medical education program on appropriate use of antimicrobials and AMR
- Develop printed educational materials for medicine sellers on appropriate antimicrobial dispensing
- Prepack medicines to improve case management of infectious diseases

Surveillance Information and Capacity Assessment

Functioning AMR surveillance systems provide data that guide development of treatment guidelines and signal the need to change treatment guidelines as they identify potential epidemics involving resistance infections. AMR levels are locality specific, so it is important to know what local AMR levels are for key infections.

Major concepts relevant to AMR containment and prevention from the perspective of surveillance are presented below (Table 4).

Tools, Knowledge and Skills, and Products

Tools	Annex H. Data Collation Tables (page 166) Form 10. Antimicrobial Resistance Levels and Trends (page 91) Form 11. Interview Guide on AMR Surveillance (page 92) Form 12. Interview Guide for Reference Laboratories (page 93) Form 13. Interview Guide for Microbiology Laboratories (page 96)
Knowledge and skills	• Understand and interpret information on AMR levels and trends • Familiarity with which pathogens are being tested for resistance and which laboratories are conducting the susceptibility testing • Knowledge of sources of local surveillance data and surveillance methodologies
Product	A report that briefly describes AMR surveillance activities in your country

Table 4. Key Surveillance Information and Capacity Concepts, Rationale, and Common Factors

Key concept	Rationale	Common factors relevant to the key concept
AMR levels and trends	Correct treatment and appropriate medicine selection guidelines should reflect local resistance levels.	• AMR levels and trends (published and unpublished sources) for key infections
Laboratory capacity	The ability to generate quality data is necessary to support AMR surveillance.	• Availability of public and private laboratories conducting antimicrobial susceptibility testing on key pathogens • Use of laboratory quality standards • Communication between laboratories • Training
Reference laboratory	Reference laboratories are important for coordinating data collection and ensuring data quality across laboratories; these efforts provide data that can be used for decision making.	• Existence of reference laboratories for key pathogens
Use of data	If data are collected, they should be used to reinforce future data collection activities. Data utility can be improved through improved data quality or presentation.	• Quality and use of AMR data • Aggregation of data from other laboratories

Guidance for Data Collection

Transfer the results of your literature search on AMR levels and pathogens trends to Form 10. Antimicrobial Resistance Levels and Trends. Note that the pathogens may vary by country, so be sure to replace the ones on the form with the ones that are appropriate to your context.

Conduct interviews with surveillance and laboratory experts. You may start by asking WHO staff, university teaching hospital faculty, the chief microbiologist at the government's central laboratory, and the directorate of clinical and diagnostic services to determine who would be the best persons to meet.

Complete interviews using Form 11. Interview Guide on AMR Surveillance; Form 12. Interview Guide for Reference Laboratories; and Form 13. Interview Guide for Microbiology Laboratories.

Annex I has a report of the findings on AMR surveillance information and capacity assessment conducted as a part of the country-level AMR advocacy and containment initiative in Zambia.

Product Preparation

Prepare a report that briefly describes AMR surveillance activities in your country. Include important contributions as well as limitations. Also include whether the role of antimicrobial surveillance is changing because of new concerns about resistance. The report should cover laboratory and surveillance structure, process, and outcome/impact.

Structure: Discuss the existence and role of reference laboratories. Include information on laboratories participating in surveillance activities (public and private). Note whether there are laboratories that are not currently part of these networks (public and private) but that could potentially be included. Discuss laboratory policies or guidelines and their implementation by public and private microbiology laboratories.

Process: Discuss participation in internal and external quality control programs by microbiology laboratories in the public and private sectors. Describe the programs. Discuss the training providers and their capacity to train laboratory workers, trainings held, and training needs. Discuss problems that laboratories in the public and private sectors have maintaining equipment and supplies.

Outcome/impact: Document and summarize data on the type, volume, and quality of data generated from reference and other laboratories. Document and summarize data on quality assurance activities. Discuss kinds of surveillance data generated, dissemination strategies (data type, mechanisms, and target audiences), and whether and how the data are used.

In addition to the above, provide an overall impression about local antimicrobial surveillance information and capacity (diagnostic capacity, surveillance capacity, quality assurance, training, and supplies and equipment). Discuss existing strengths and opportunities and existing weaknesses/constraints and their underlying factors. Mention any critical information gaps that currently exist, and outline possible strategies to gather further information to narrow these gaps.

Examples of Potential Action Points

- Strengthen AMR surveillance infrastructure
- Improve AMR surveillance capacity

These potential action points are discussed further in Section 4. Formulate a Plan, Country Example 10.

Stakeholder Analysis

Understanding your stakeholders is required for strategic planning for advocacy and building a strong coalition. Country Example 1 presented an example of a stakeholder identification worksheet filled out to map the existing AMR-related players in Rwanda.

Start by reviewing a list that has already been developed and the interviews that might already have been conducted. If additional stakeholders have been identified during the interview process, they should be added to the list of potential interviewees.

Tools, Knowledge and Skills, and Products

Tools	Form 1. Stakeholder Identification Worksheet (page 72) Form 3. Stakeholder Interview Guide (page 75) Form 14. Stakeholder Prioritization Worksheet (page 99)
Knowledge and skills	• Experience extracting information from documents and reports • In-depth interviewing skills (ability to probe for information) • A broad perspective of drug resistance
Product	A report that describes the main characteristics of key stakeholders

Guidance for Data Collection

Insights on stakeholders can be obtained by "mapping" them according to important characteristics or qualities. With the information that has already been collected as part of the stakeholder identification exercise (Form 1. Stakeholder Identification Worksheet) and the interviews already conducted (Form 3. Stakeholder Interview Guide), you can begin to identify individuals who directly affect or are affected by AMR and who have significant resources or influence that could be applied to AMR containment activities.

Country Example 6 below contains key characteristics of some major stakeholders in Zambia that the rapid assessment and stakeholder analysis identified in 2004.

Country Example 6. Key Stakeholder Characteristics Related to AMR in Zambia

Stakeholdler	Role in AMR	Interest in AMR	Knowledge of the issues and solutions	Position	Perceived impact of issue on stakeholder	Area of influence
National Malaria Control Center	Leadership, provide data	High	High	Supportive	High	Advocacy, technical
WHProvide evidence and other technical support and leadership	High	High	Supportive	High	Advocacy, technical, finance	
Faculty of General Practitioners	Peripheral	Medium	Medium	Non-mobilized	Medium	Technical, advocacy
Pharmacy & Poisons Board	Regulatory, provide data	High	High	Supportive	High	Advocacy, implementation of interventions, regulatory
Central Board of Health (CBoH)	Leadership, provide data, lend authority to decisions and actions	High	High	Supportive	High	Advocacy, implementation of interventions
Madison Insurance	Pressure insurers to take interest and act on AMR	Medium	Low	Non-mobilized	Medium	Advocacy, implementation of interventions
National HIV/AIDS/STI/TB Council	Leadership, develop guidelines	Low	High	Non-mobilized	Low	Advocacy, development and implementation of interventions
Alliance for the Prudent Use of Antibiotics	Provide data and other technical support, advocacy	High	High	Supportive	High	Advocacy, peer guidance, research
UNICEF	Provide data, leadership	High	High	Supportive	High	Advocacy, technical, finance
Interchem	Pharmaceutical supply and management, technical support	Medium	Low	Non-mobilized	Medium	Pharmaceutical supply and quality
Churches Health Association of Zambia	Pharmaceutical supply management, technical support, provide data	High	High	Supportive	High	Advocacy, pharmaceutical supply, implementation of interventions

Note that some of the stakeholders with high influence may not consider AMR an urgent problem and that other stakeholders are very concerned about AMR, but have less influence. Although Form 14. Stakeholder Prioritization Worksheet assesses influence and urgency, you can use other variables as well. For example, look at the stakeholders who were considered essential to see how many of them thought AMR was urgent. Another topic to map might be the degree of motivation by stakeholders and availability of resources (people, funds, materials, etc.).

Product Preparation

The result of this activity will be a report that describes the main characteristics of key stakeholders according to important criteria. It should answer the following questions—

- Which groups think AMR is a problem?
- Which consider it an urgent problem?
- Are stakeholders making the link between drug resistance and their activities?
- Who is making the link?
- Who is not?
- What advocacy and information strategies does this suggest?

This report should also—

- Recommend opportunities to build on or strengthen existing initiatives or ongoing activities or those already in the planning stages and suggest strategies for how the project might be able to capitalize on these opportunities
- Identify critical information gaps and suggestions for filling them that could engage additional stakeholders in the process
- Recommend strategies to link stakeholders to strengthen their ability to address AMR

Distribute the report to all AWG members for review and discussion. The findings should guide thinking on priorities and next steps.

Annex J contains a summary report of the interviews conducted to identify stakeholder perceptions regarding the issue of AMR in Zambia.

Examples of Potential Action Points

- Advocate for preventing and containing AMR in professional meetings, policy discussions, and public events.
- Coordinate and collaborate with other stakeholders on activities relevant to AMR.

Media Presence and Communication Channels

Part of coalition building and mobilizing for action is being able to inform and inspire present and future stakeholders and partners through effective communications activities and the appropriate use of media. Because the AMR issue has a broad base of stakeholders from diverse backgrounds who have a variety of roles, advocacy activities should follow a strategy that incorporates different modes of communications, matching the message with the intended audience, and use of appropriate technologies. Messages can include general information and educational messages about AMR for professionals and laypersons; communications can include what has been done and what is planned for funders, partners, and the general public.

Annex K shows examples of messages and related actions developed by workshop participants for different audiences, namely, the public, health institutions, and health systems.

The media can play a large part in effective advocacy. When advocates are in a position to make a pitch to decision makers, the message must still reach the community, especially when the issue takes place in the context of public health and human services. To attain the goal of containing AMR, consumers must be on board because they are the end users of medication. When patients, providers, health systems, and the pharmaceutical industry are involved, issuing edicts from the top down alone does not guarantee that every player will be on board. Education, public engagement, and behavior change are needed as well.

Assessing media resources and information and communication channels will help the AMR initiative develop optimal advocacy and communication strategies. By using it, appropriate communication channels for information dissemination can be identified, the role of the media in delivering health information in your country can be analyzed, and the information needs of the media can be understood. The rationales for examining information and communications channels and including the media are presented in Table 5.

Tools, Knowledge and Skills, and Products

Tools	Form 3. Stakeholder Interview Guide (page 75) Form 7. Document Review Template (page 80) Form 15. Interview Guide for Media Contacts (page 100)
Knowledge and skills	• Experience with information, education, and communication or social marketing campaigns related to public health • In-depth interviewing capability (ability to probe for information, broad perspective of drug resistance) • Ability to think strategically about the potential role of media for containing and preventing AMR
Products	• An advocacy tool that lists stakeholder groups and messages developed specifically for them • A report that describes the different kinds of communication channels in your country and the audiences they serve

Table 5. Key Concepts in Communications, Rationale, and Common Factors

Key concept	Rationale	Common factors relevant to the key concept
Information needs and information channels	Strategies will try to improve the use of existing information on drug resistance and existing information channels to increase the transfer of information and expand its utility.	• Whether stakeholders have enough information on AMR • Their information sources • Credibility of information • Which types of information stakeholders are not getting
Media presence	The media is an important channel for getting the message out.	• Information needs for the media and interest in health issues in general and drug resistance in particular • Populations reached by the media

Guidance for Data Collection

Review the completed Form 3. Stakeholder Interview Guide and Form 7. Document Review Template, and extract information relevant for your assessment of the presence of the media and functioning of communications channels. Select media stakeholders with the largest population coverage to interview. Also take into account the different target populations they reach. For example, radio tends to have the broadest reach and is a good way to get information to most rural areas; print media will reach only the literate segment of the population. Consider telephone interviews for those organizations located outside your area. Review newspaper articles and radio programs addressing health issues. Most donors and implementing organizations use communication strategies. Look for studies, reports, program, and donor documents, and MoH reports and strategies.

Product Preparation

- Draft a report that describes the different kinds of communication channels in your country and the audiences they serve. Include information on the role of the media in disseminating health messages by geographic reach, frequency of messages, and type of content. Highlight other successful health communication/advocacy initiatives and the communication strategies they used.
- Assure that the report also discusses the media's interest in addressing drug-resistance issues and their information requirements for doing so.
- Discuss information needs or challenges reported by stakeholders. Identify existing or planned activities to build on by adding an AMR component.
- Discuss the potential role of the media and other communication avenues in disseminating information on drug resistance and the AMR coalition initiative.
- Identify critical information gaps and propose mechanisms for filling them that could engage additional stakeholders in the process.
- Conclude the report by identifying some opportunities for disseminating information about AMR and activities undertaken by the AMR coalition using existing channels. Identify potential strategies for capitalizing on them.

- Share the report with the AWG members to consider when developing a communications strategy, including information and educational campaigns, to support the AMR initiative's goals and objectives.

Annex L contains extracts from interviews conducted with ten media members representing newspapers, magazines, radio, and television in Zambia. The objective was to gather information on media presence and communication channels to help develop advocacy and communication strategies that optimally engage the media.

Examples of Potential Action Points

- Create a communications plan/strategy
- Create a media plan
- Create an advocacy strategy

Table 6 provides some examples of advocacy activities and products that you might want to prepare to support AMR advocacy activities.

Table 6. Identifying Products Needed for Different Activities[8]

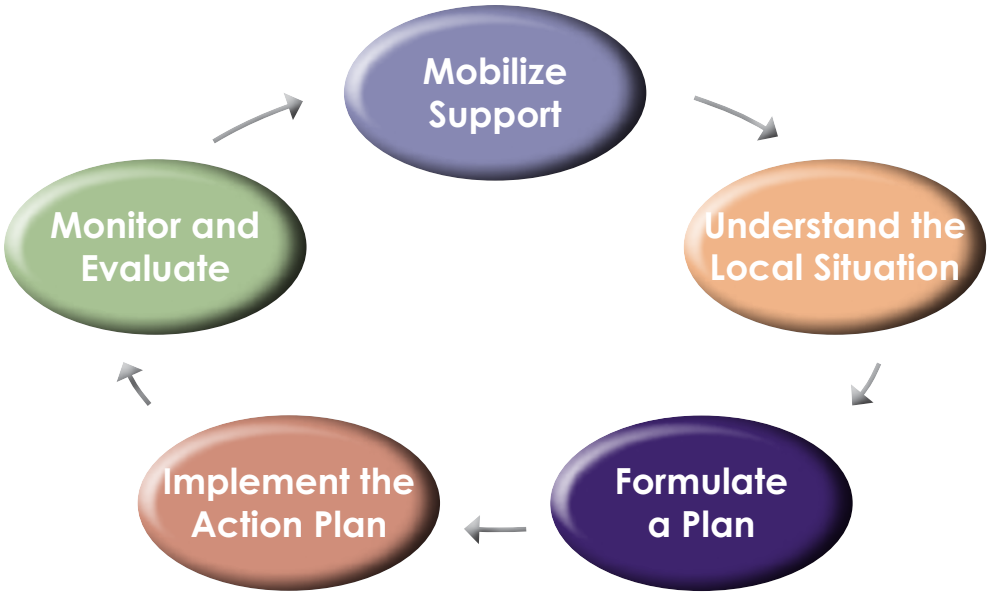
Activities	Advocacy products
Meetings with policy makers (e.g., meetings with law makers to advocate for increased AMR funding)	• Fact sheets • Presentations, other visual aids such as slides, photos, posters • Letters • Briefs that summarize data
Outreach to media (e.g., to promote AMR awareness campaign)	• Letters to the editor • Opinion-editorial write-ups • Press releases • Public service announcements, live-read scripts/ announcements • Summaries of key findings, articles (and authors)
Public awareness activities (e.g., increase awareness about AMR and appropriate medicine use)	• Informational booklets, leaflets/flyers, posters Radio and television spots (live-read scripts or produced public service advertisements)
Peer education and training (e.g., for health care workers and communities to identify AMR drivers and change behavior to help contain AMR and improve medicine use)	• Training modules • Fact sheets • Flip charts/flannel boards • Instructional posters/wall paintings/job aids • Videotapes/CD-ROMs
Presentations at seminars or other gatherings (e.g., with decision makers or health care professionals)	• Presentation slides or other visual aids such as photos or CD-ROMs • Displays including posters, photographs, real objects, models

These potential action points are discussed further in Section 4. Formulate a Plan.

Disseminating the Findings

The gathering and analysis of information can have no effect unless it gets into the hands of the stakeholders. The reports produced from each of the areas of research must be disseminated to each member of the AWG. Section 4. Formulate a Plan describes the process of holding a consensus-building workshop for the AWG to discuss the results presented in the reports and to identify and prioritize interventions and next steps. The reports, however, should be disseminated to all members before the meeting with enough time for them to review the findings. Having the reports (or summaries) or their results appear in the media can also be an effective form of advocacy that will raise awareness of AMR and may spur stakeholders who had been reluctant or skeptical to join the coalition.

FORMULATE A PLAN



Antimicrobial Resistance Containment Coalition

Overview

Using the information obtained from the exercises carried out with guidance from Section 3. Understand the Local Situation, the AMR AWG can now discuss the findings and plan strategically for what can be done about the identified problems (Box 4). This includes reaching consensus on the key issues; determining priorities and selecting which partners and stakeholders should address them; and discussing concerns about feasibility—all leading to action.

Tools, Knowledge and Skills, and Products

Tools	Annex A. WHO AMR Intervention Prioritization (page 108) Annex C. Global AMR Situation PowerPoint Slides (page 115) Annex D. AMR Call-to-Action Documents (page 142) Form 16. AMR Intervention Prioritization Worksheet (page 103)
Knowledge and skills	The participation of the entire AWG is critical for this phase of coalition building. The information that will be discussed as part of the priority-setting exercise will need to be defended and challenged. The discussion will benefit from the contributions of various perspectives. Although gaining consensus for these documents within the AWG is important, they should still be circulated to experts and potential stakeholders not yet in the AWG and be discussed and amended at the call-to-action meeting.
Products	• A call-to-action document for stakeholders • Prioritized action plan of key intervention areas to contain AMR

Box 4. Guiding Principles for AMR Country-Level Advocacy and Containment

- Act immediately to deal with AMR—waiting for new findings can slow efforts. Generally, what causes, prevents, and contains AMR is known. Use global and available local information to initiate activities. Future research on AMR can be incorporated into ongoing and new efforts.
- Focus action on realistic local strategies that capitalize on existing initiatives and resources, while at the same time generating new initiatives and resources.
- Mobilize local stakeholders around the common issue of drug resistance to generate coordinated and collaborative action.
- Promote the initiative as adding value to existing health programs rather than as a separate, vertical, and competing activity.[9]

Steps

- Convene a consensus-building workshop for current AWG members
- Develop organizational and advocacy materials
- In advance, be sure that all AWG members have received copies of the various reports obtained from the information-gathering exercises
- Prepare an agenda that specifies the following activities—
    - Reviewing reports
    - Identifying key issues
    - Prioritizing issues
    - Drafting a call-to-action (Annex D)
    - Planning for next steps

Support Staff

Consider having someone available to assist with note taking and recording the discussions. Also consider inviting a facilitator to help ensure that the discussions cover all the various topics and that all AWG members have an opportunity to make observations, ask questions, and contribute to the development of the product.

Activities

Present findings from the assessments and identify priority issues. Stakeholders should discuss and prioritize interventions. Table 7 provides examples of some potential action points that address gaps that may have been identified in the analysis in Section 3. Understand the Local Situation. Additionally, the WHO global strategy provides detailed descriptions of recommended interventions and the rationale behind their development. Use Form 16. AMR Intervention Prioritization Worksheet to help think through which issues or intervention to address first.

Table 7. Examples of Potential Action Points for Containing AMR

Pharmaceutical management and infection control	**Develop, disseminate, and implement STGs** The establishment of standard treatment promotes therapeutically effective and economically efficient prescribing. The goal of STGs is to develop a list of the preferred drug and nondrug treatments for common health problems experienced by people in a specific health system and to implement use of those treatments. **Develop formularies and EMLs** The goal of formulary development and management is to develop a list of medicines that an institution will procure and use for the health problems experienced by people treated in those facilities. **Develop DTCs** DTCs composed of physicians, pharmacists, nurses, and other health officials are formed to improve antimicrobial selection and use in hospitals and clinics through management of medicine formularies and medicine use. **Strengthen pharmaceutical management capacity** Effective pharmaceutical management is critical for improved availability and use of good quality antimicrobials. Pharmaceutical management is a specialized professional activity that requires a combination of knowledge, skills, and experience. **Develop and implement hospital infection control programs** Infection control programs provide a link to laboratory data and between physicians, nurses, hospital administrators, quality improvement managers, and pharmacists to facilitate the use of data for action (e.g., improving the use of antimicrobials and responding to outbreaks of hospital infections).
Medicine use behavior	**Develop and implement a continuing medical education program on appropriate use of antimicrobials and AMR** Interactive continuing medical education programs provide up-to-date knowledge about which antimicrobials are recommended to treat specific infections and about factors that contribute to AMR. They enhance skills to overcome barriers to the appropriate use of antimicrobials. **Develop printed educational materials for drug sellers on appropriate dispensing of antimicrobials** AMR dispensing practices and the rationale for these practices are assessed and a multidisciplinary working group develops printed educational materials for drug sellers to improve these practices. **Prepackage medicines to improve case management of infectious diseases** Prepackaging medicines for the treatment of infectious diseases increases appropriate prescribing by health workers and enhances the ability of patients to understand and adhere to treatment recommendations.
Surveillance	**Strengthen AMR surveillance data** Public and private laboratories performing antimicrobial susceptibility testing can form networks to increase data quality, data representation, and data utility for policy. **Improve AMR surveillance capacity** This intervention aims to improve standards for antibiotic susceptibility testing and provide policy makers and prescribers with access to reliable data on prevalent antibiotic-resistant pathogens.

Stakeholder analysis	**Advocate for preventing and containing AMR in professional meetings, policy discussions, and public events** The AWG members in particular and stakeholders in general can act as catalysts for action by virtue of their legitimate concern for and expertise in AMR. **Coordinate and collaborate with other stakeholders on activities relevant to AMR** Stakeholders may capitalize on initiatives and activities initiated under the banner of specific health programs. For example, malaria, TB, and HIV programs are all concerned about providers prescribing appropriately, having the right medicines available, and adherence to treatment.
Media and communication channels	**Create a media and communications strategy** This plan should describe regular interaction with the media about interesting, important, or newsworthy AMR-related stories and events and activities of the working group that will be important to advocacy.

Develop an Action Plan

An action plan will begin to form at the consensus meeting as participants identify issues and the interventions needed to address them. The action plan should consider how AMR interventions can be integrated into existing public health programs and other ongoing activities (Box 5). This step may also reveal possible stakeholders that had not previously been considered. Additional elements should be added to the plan to guide the next steps of the AWG. The plan should have three main elements—

- Prioritized interventions (Form 16. AMR Intervention Prioritization Worksheet)
- Research needed to fill critical research gaps
- An advocacy strategy developed as part of the overall strategy

Box 5. Examples of Interventions That Can Fit into Existing Public Health Programs

- Antimicrobial policies
- DTCs
- Rational drug use trainings
- Drug use studies with remedial measures
- STGs/EMLs
- Pharmaceutical management improvements
- Infection control in health care facilities
- Drug quality assurance
- Curriculum reform
- Information, education, and communication materials and counseling for consumers
- Public-private partnerships for AMR awareness and advocacy

The following additional coalition-building activities and communication activities can be considered—

- A media and communication strategy
- Forums to exchange ideas
- Sponsoring speakers at local, regional, and international conferences and meetings

Once the plan is finalized, responsible parties should be identified (subgroups may be formed at this point). Below is an example of a draft action plan developed at a regional AMR workshop for EPN members.

Country Example 7. Action Plan: Christian Health Association of Nigeria Medi-Pharm

Issue	Activity	Indicator	Resources	Time frame
AMR advocacy and awareness	Feedback to Christian Health Association of Nigeria on workshop agenda and draft action plan	Feedback session held	Office supplies	November 2008
	Report writing/ finalizing EPN call-to-action	Workshop report call-to-action	Office supplies, emails	December 2008
	Share report and EPN call-to-action	Number of stakeholders receiving report and/or call-to-action	Office supplies, emails	December 2008
	Local pilot step-down in one hospital	Step-down meeting held	Office supplies, accommodations, food, transport, projector	November 2008
	Prepare proposal for step down workshop in three regions	Proposal document available	Time, office supplies	December 2008
	Secure funding for regional step down	Funding available	Time	January 2009
	Undertake first regional workshop	Region A workshop held; training report available	Office supplies, accommodations, food, transport, projector	February 2009
	Undertake second regional step down	Region B workshop held; training report available		March 2009
	Undertake third regional step down	Region C workshop done; training report available		April 2009
Infection control	Carry out a baseline study on hand washing	Study complete	Financial	September 2009
	Carry out a baseline survey on waste management	Study complete		December 2009

Disseminate the Workshop Report and Action Plan

A report on the proceedings, outcomes, and decisions reached at the consensus meeting should be prepared for all stakeholders involved. This report should be disseminated along with the action plan. This information will give stakeholders in the AWG a sense of accomplishment, an idea of where the AWG is in the process, and some idea of where the AWG needs to go.

Plan for AMR Call-to-Action Stakeholders Meeting

A call-to-action meeting is in itself an advocacy activity and a critical step in building the coalition beyond the AWG. The meeting will raise awareness of AMR, mobilize people and resources for containment activities, gain wider consensus for the AMR action plan, and bring commitments from participating organizations to act on specific items (Country Example 8).

Country Example 8. Examples of Personal Action Commitments

Florence C. Najjuka, Faculty of Medicine, Makerere University, Uganda
I will urge the MoH [quality assurance department, infection control unit, and injection safety project] to work on standard treatment guidelines and an infection control strategy. I will also lobby with the Private Practitioners Association, the Uganda Medical Association and the Nursing Council, and any others involved in curriculum development to include issues of infection control and AMR in preservice training.

Eugene Conteh, CHASL, Sierra Leone
I will circulate the EPN call-to-action document to the Pharmacy Board in the country, medical institutions, professional associations and medical and dental college as a starting point to building a local coalition for AMR work.

Maurice Audi, Mission for Essential Drugs and Supplies, Kenya
I will share with the training manager at MEDS [Mission for Essential Drugs & Supplies], the idea to include an AMR module in the continuing medical education workshops that MEDS run.

There are no hard and fast rules for call-to-action meetings; however, some useful tips include the following—

Before the meeting

- Develop an extensive list of stakeholders to invite to the meeting, including representatives from across a wide array of sectors.
- Develop a draft call-to-action document that can then be revised and amended according to the specific proceedings of the meeting (Annex D).
- Arrange media coverage of the meeting.
- Invite opinion leaders from various sectors to give short presentations on the impact of AMR in their area and what is being done to contain it.

At the meeting

- Make a strong case for the importance of addressing AMR and the role that everyone must play if it is to be contained. Highlight the global and local AMR situations (see Annex C for examples of slides about the global AMR situation).
- Use break-out groups to facilitate discussion of what individual participants can do in their areas to help contain AMR (Country Example 8).
- Lead an open discussion among stakeholders to elicit opinions on the country's AMR-related issues (Country Example 9).
- Allow ample time for discussion to encourage stakeholder buy-in.

Encourage stakeholders to take charge of AMR-related activities in their areas.

After the meeting

- Disseminate the meeting report, the finalized call-to-action document, and an action plan outlining immediate and long-term plans and who the responsible parties are to all stakeholders who attended. Also distribute packets of this information for those unable to attend the meeting.
- Provide regular updates to participants as activities are implemented to encourage the increased participation of others.

Country Example 10 summarizes the call-to-action meetings from three countries.

Country Example 9. Stakeholders' Opinions on AMR-Related Issues in Rwanda

- Widespread lack of training for physicians leads to irrational prescribing of antimicrobials
- Little regulatory enforcement contributes to availability of antimicrobials and other medicines without a prescription
- Poor communication about AMR in health centers and hospitals—need to understand the current AMR situation and what drugs to use when resistance is considered significant
- Inadequate information from laboratories on test results; teswting is not the same from lab to lab
- Lack of training for laboratory personnel
- Need for DTCs to monitor medicines use and antimicrobial management
- Improved infection control in hospitals needed to control the emergence of nosocomial infections
- Poor quality drugs in the community
- Non-licensed persons providing medical services
- Poor patient adherence to medical treatment
- Insurance not paying for some important medicines
- Inadequate storage conditions in the home which degrades some drug products
- Health facilities giving partial treatments because of poor availability of antimicrobials
- Shared drugs in the community
- High patient-demand for antimicrobials

Country Example 10. AMR Call-to-Action Meetings in Zambia, Ethiopia, and Rwanda

Zambia

At a planning meeting held in October 2004, the Zambian AWG took several important steps to focus its mission and plan for a call-to-action meeting. Specific planning steps for the meeting included—

- Prioritized specific activities to focus on
- Identified key decision makers to invite to the meeting
- Mapped out resources available for advocacy activities and the call-to-action meeting

The AMR stakeholders call-to-action meeting took place in November 2004.[10] Seventy participants attended the one-day meeting; they represented various sectors, including government, service providers, academia, professional societies, pharmaceutical companies, consumers, journalists, media, private sectors, and NGOs. In breakout sessions, the participants discussed how AMR was affecting their professions and what their role could be. At the end of the meeting, the call-to-action document, developed by the AWG was presented to the group for consensus approval. The document called all those concerned with the health and well-being of Zambians to come together to address the problem of the failing effectiveness of medicines.

The meeting was also used to introduce the new STGs developed by the Zambia National Formulary Committee. This was a strategic way to advocate for STG use and galvanize cooperation with the government.

Ethiopia

The AMR Advocacy Coalition formed in March 2006.[11] A task force was formed to plan an AMR call-to-action meeting. The task force met regularly over several months, working out the details for the meeting that included objectives, participant list, agenda items, and outputs. The call-to-action was held in Adama in November 2006.[12] The call-to-action was a three-day meeting with presentations from representatives of major sectors, including national infectious disease programs, academia, regulatory bodies, practitioners, media, and NGOs. The presentations covered—

- Global and local problems of AMR
- Impact of AMR on specific infectious disease programs
- Response of different sectors to AMR
- Gaps in knowledge of AMR

Following the presentations, the participants had a day to work in breakout groups. The groups discussed and prioritized the issues and strategies for interventions in their sectors. Each group produced an action plan and recommendations. The task force used the recommendations to create a call-to-action document that was approved by all the participants. It highlighted the recommendations and necessary intervention areas. The task force also used the action plans of the various groups to create a national AMR action plan for the AMR Advocacy Coalition to use as a guide.

Rwanda[13]

An AMR awareness and advocacy meeting in Rwanda was conducted in October 2009 for 40 stakeholders from MoH, academic institutions, professional associations, procurement and wholesale medicine agencies, public and private health facilities, donor organizations, NGOs, and others. The meeting agenda was guided by the results of in-depth interviews with major stakeholders, which had been conducted in advance.

The meeting objectives included—

- Informing stakeholders of the serious nature of AMR in Rwanda and countries worldwide
- Advocating for a nationwide response to AMR situation
- Identifying and confirming the need for a nationwide response to AMR
- Identifying potential stakeholders for a campaign to address AMR
- Obtaining consensus on approach and action plan

The participants drafted a call-to-action document for the proposed AMR working group. The draft document included the following elements—

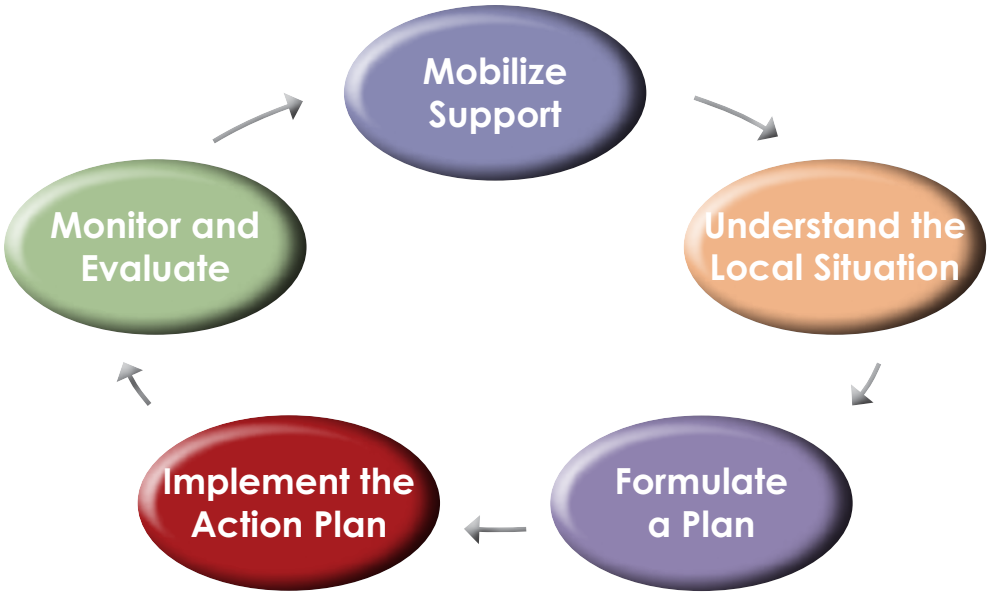
- Finalize AWG structure and membership
- Finalize TOR for the AWG
- Obtain approval from MoH for AWG
- Conduct limited AMR assessment to include key informant interviews, AMR and rational use document review, drug use studies in selected hospitals, and review of national laboratory and hospital laboratory data on AMR
- Finalize the call-to-action document
- Plan a national stakeholders meeting to introduce the AMR initiative in Rwanda

Expand AWG Membership

Additional stakeholders may emerge from the AMR call-to-action meeting who may be motivated to take the lead in certain areas. Those who are should be brought into the regular AWG workings. The point at which the AWG changes from a working group to an actual coalition may be hard to determine but will probably take time. Increasing the active membership will be an important step in reaching this point.

Section 5. Implement the Action Plan discusses the skills and tools necessary for the AWG to begin drafting specific work plans for items on the action plan and to begin implementing those activities.

IMPLEMENT THE ACTION PLAN



Antimicrobial Resistance Containment Coalition

Overview

Action plans are not executed automatically. Moving an activity from a line item on an action plan to an actual program takes planning and organization. The AWG must consider and plan for technical and logistical management issues. Implementation is the process of managing these factors. Implementation continues throughout the life of the project and cycles through monitoring and progress reviews. This section provides you with some of the tools necessary to effectively implement your plan of AMR advocacy and containment activities formed in Section 4. Formulate a Plan.

Tools, Knowledge and Skills, and Products

Tools	Form 1. Stakeholder Identification Worksheet (page 72) Form 14. Stakeholder Prioritization Worksheet (page 99) Form 17. SWOT Analysis Template (page 104) Form 18. Gantt Chart Template (page 105) Form 19. Implementation Plan Template (page 106)
Knowledge and skills	Budget planning and tracking, environmental analysis, resource mapping, organization
Products	Work plans, implementation plan

Steps

- Assess and describe the AMR working group's resources and environment
- Create work plans
- Develop an implementation plan

Assess and Describe AWG's Resources and Environment

Before developing specific work plans and strategizing the intermediate steps toward completing the action plan objectives (developed in the previous section), the working group must clearly understand what resources it has available and the environment in which it will be working. Although some of this information may have been reviewed initially, the situation may have changed since the initiative began as more awareness is raised and more stakeholders are brought in. This assessment does not require complex forms and/or surveys, but rather a working group planning meeting and brainstorming session to map out these resources.

Mapping Products and Resources

Successful implementation will require careful planning and effective resource management. Map out the planned products, financial resources, and human resources before initiating the action plan.

Planned Products

- Identify the final deliverable products required to meet the goals and objectives of the action plan.
- Identify the intermediate deliverable products required to progress toward the final deliverable products.
- Set priorities based on feasibility given available resources.

Financial Resources

The main questions to answer are what funding is already available, what is needed, and how additional funding can be mobilized (Box 6). Then, identify the resources required to produce the products.

- Prepare a budget
- Determine available funding sources for the action items on the plan
- Identify gaps in funding
- Strive for financial sustainability

Box 6. Planning for Financial Sustainability

Financial sustainability can be defined as the ability to mobilize and efficiently use domestic and supplementary external resources on a reliable basis to achieve current and future targets.[14]

The four basic questions to ask when planning for financial sustainability are—

- How much does it cost to achieve our targets?
- How much funding is currently available and will be available in the near future?
- How do the funds flow from the source to its use?
- How are the funds used to meet targets?

The long-term success of the working group depends on answering these questions. The main challenges to financial sustainability are—

- The money doesn't reach where it is needed.
- The program doesn't do as much as it could with the money.
- There is not enough money to meet the program's objectives.[15]

Human Resources

- Create a detailed breakdown of activities and tasks and subtasks within the activities from the plan developed in Section 4. Formulate a Plan.
- Identify who is most capable to take the lead on these tasks.
- Review who is already in the working group and who or what skills may need to be brought in. Form 1. Stakeholder Identification Worksheet, Form 14. Stakeholder Prioritization Worksheet, and the stakeholder mapping exercise in Country Example 1 can be used to assist in this review.

Risk Assessment

All members of the working group should have a sense of "where the AWG is" and "where it wants to go." Most members will have a clear idea of where the working group is headed; that was made clear in the action plan. Box 7 describes some key lessons learned from implementing country-level AMR containment programs that may be helpful to consider during these exercises. To get a clear picture of where the working group is starting, try to work through the exercises described below—a strengths, weaknesses, opportunities, threats (SWOT) analysis and identification of barriers and threats.

Box 7. Lessons Learned in AMR Advocacy and Containment at the Country Level

- To ensure support, promote AMR as value-added rather than as competing with existing health programs as a separate vertical activity.
- To sustain activities, seek diversified donor and programmatic support from the beginning; emphasize the continuous nature of the AMR containment process.
- To increase impact, make advocacy a central strategy, but use it to support objectives, rather than as an end in itself.
- To ensure results, include respected and influential opinion leaders in the local working group, clearly articulate the group's objectives from the outset, and have the group play the role of catalyst rather than the "one and only action body."
- To increase effectiveness of messages, consider replacing the term "antimicrobial resistance" with the term "drug resistance" or reframe it in more locally meaningful terms. In Zambia, the term "preserving drug effectiveness" worked as a unifying concept for ownership of a shared vision by stakeholders.[16]
- Focus initial information gathering on identifying key issues and stakeholders to provide the basis for quickly starting the national-level process for AMR containment.
- Focus action on realistic regional and local strategies that capitalize on existing initiatives and resources.
- Identify and work with a suitable local champion group that can lead the in-country or regional process.[17]
- Emphasize the continuous nature of the national AMR containment process.

Strengths, Weaknesses, Opportunities, Threats Analysis[18]

Use Form 17. SWOT Analysis Template to brainstorm with the working group members to clearly understand the group's current position and environment. Strengths and weaknesses are usually factors of the working group, whereas opportunities and threats to the working group are external and associated with the environment in which the working group operates.

Identify Barriers and Threats

- Using the weaknesses cell and the threats cell from the SWOT analysis, do a more in-depth analysis of possible barriers and threats toward achieving the action plan's goals and objectives.
- Create a contingency plan.
- Strategize ways to neutralize the identified threats and barriers.

Country Example 11 presents the SWOT analysis done by the Zambia's AMR AWG during their strategic focus workshop in 2004.[19]

Country Example 11. Zambia SWOT Analysis

Strengths	**Weaknesses**
• Diversity – understanding • Credibility • Team members representing general practitioners' groups • Professional expertise • Group members are concerned (committed) • Professional training (of group members) • Team members are volunteers (thus committed) • Support team available (MSH, consultants) How do we maximize our strengths? *We need to utilize the support group.*	• The group does not have enough time • Members of the group all have day jobs • Inconsistency of group members (not attending meetings, etc.) • Volunteers (no one gets paid) • Lack of commitment from some team members • Limited resources How do we minimize our weaknesses? *By sharing the load (presentations, etc.) among all members of the group and by recruiting (at least 2) additional group members who are enthusiastic and committed*
Opportunities	**Threats**
• Possibility of success • Reduction of AMR problem • External support (the environment is conducive) • Access to information • Facilitate the implementation of WHO guidelines	• Other special interested groups • Pharmaceutical companies • No control over stakeholders • Limited government money • Lack of government support on AMR at the moment • Cultural barriers (resistance to change/family influence) • Lack of knowledge by the external bodies (media) to make sure the message is loud and clear

Documentation

Documentation goes beyond mere record keeping. Logistical decisions will need to be made on who will collect what data or record what information, where the information will be kept, how it will be kept, and how it will be disseminated and used. Some of these issues are covered in more detail in Section 6. Monitor and Evaluate. Information to develop, collect, and store includes the following—

- **Indicators for success of coalition activities**—These carefully crafted statements are used in the monitoring process (Section 6. Monitor and Evaluate) to determine progress and make judgments on necessary changes to the action plan. Monitoring has a central role in the day-to-day implementation process and should be intentionally planned in conjunction with implementation rather than as an afterthought after the implementation process has already advanced.
- **Meeting minute**s—These will form a historical record of the working group's activities that can be used to chart progress and serve as evidence of action. Additionally, they can serve as useful reference materials for the coalition.
- **Lessons learned**—As the implementation process continues, lessons learned, both successes and failures, should be recorded to ensure that successes are replicated and failures are not repeated.

Create Work Plans

Work plans differ from the action plan developed in Section 4. Formulate a Plan. Work plans are more specific with respect to outputs, responsibilities, time frames and deadlines, and budget requirements.

Write performance objectives for specific activities in the upcoming year. Performance objectives are the results the AWG hopes to achieve through its planned activities. Writing good objectives for the working group's activities should be one of the first priorities early in the implementation phase. A significant amount of time should be spent on crafting objectives, and is should be done with the working group's input. A useful guide for creating objectives is the acronym SMART.

SMART objectives are[20]—

- **Specific**—Objectives should specify exactly what they want to achieve to avoid differences in interpretation.
- **Measurable**—You should be able to measure whether you are meeting the objectives or not.
- **Achievable**—The objectives should be achievable and attainable.
- **Realistic**—The objectives should be realistic and feasible given the resources.
- **Time-related**—The objectives should have a time element in them to guide implementation and give deadlines to maintain accountability.

Set targets and indicators for each objective. The performance objectives developed will guide the evaluation process (Section 6. Monitor and Evaluate) and inform the development of program/process indicators. Process indicators in turn play a key role in monitoring activities.

Participants at the EPN regional workshop on AMR held in Moshi in 2008 collaborated on the following indicators to use for AMR advocacy and containment (Box 8).[21]

Box 8. Sample Indicators for AMR Advocacy and Containment Objectives

Institutional indicators

- Number of institutions with active DTCs
- Number of days antibiotics were out of stock
- Number of hospitals with infection control policies and procedures
- Number of activities on AMR that are taking place in the institution
- Number of policies on infection control that are displayed in the institution
- Availability of focal persons on infection control
- Availability of top ten diseases list in the institutions and their treatment guidelines
- Number of audits conducted on AMR

National/network indicators

- Number of registered medicine outlets
- Number of institutions involved in AMR
- Number of hours of media coverage on AMR
- Number of AMR meetings and activities conducted at regional/national level with relevant people
- Number of focal persons in the network who are reference persons for AMR activities
- Percentage of functional laboratories that can do culture and sensitivity within the network
- Number of information, education, and communication materials that have been distributed
- Number of research publications on AMR

Participants representing BUFMAR (Bureau des Formations Médicales Agréées du Rwanda) at the Moshi workshop developed the following short-term action plan that includes process indicators (Country Example 12).

Country Example 12. Action Plan: BUFMAR/Kibogora Hospital, Rwanda

Issue	Activity	Indicator	Resources	Time frame
Irrational use of antimicrobials	Add a session on AMR to the planned continuing professional development in December	Number of persons trained	Translation of training module, supplies for the workshop	March–May 2009
	Contact the health center communication to run a program on radio or TV about rational use of medicines	Number of programs broadcast	Money to pay for radio/TV airtime	February–March 2009
	Publish the EPN call-to-action in the medical journal of Rwanda	Status of publication	Funds to translate into French and Kinyarwanda	January–March 2009
	Make a presentation on AMR in a meeting that includes health workers at district level	Number of participants at the meeting	Refreshments, LCD projector	December 2008
	Make a presentation on AMR for staff of Kibogora Hospital		Refreshments, LCD projector	December 2008
Infection control	Conduct an assessment of hand washing practices at the health facilities under Kibogora Hospitals	Number of facilities included in the assessment	Supplies, transport	January–March 2009

Targets are the measurable intermediate progress points.[22] Indicators help measure change directly or indirectly and assess the extent to which targets and objectives are met.[23]

List major activities for each objective. Prepare an activity-time chart (Form 18. Gantt Chart Template). This diagram provides a clear, concise summary that communicates the responsibility and timing to all working group members and is useful in monitoring progress.

Review and prepare the annual budget for the final package of immediate activities.

*A Gantt chart is a planning tool that shows the project activities by length of project and shows what should have been completed at a certain point in time. Gantt charts can be created at different levels of activity (at working group level or for intermediate steps at the activity level) and at different levels of time detail (monthly by year, quarterly by week, etc.). Below is an example of a Gantt chart. See Form 18 for a template.

Activity	Responsible person	2011											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec

* For more information, visit www.ganttchart.com

Develop an Implementation Plan

Compile the objectives, activities, indicators, and the Gantt chart information into the implementation plan (Form 19. Implementation Plan Template). The implementation plan gives an overall picture of the implementation process and serves as a management tool to help monitor progress. It should include three main sections—introduction, strategic approach, and the implementation plan itself. The sections should contain the following information[24] —

- Introduction—Description of the context of the activities and the AMR situation. A summary of the research findings can be presented here.
- Strategic approach (the what, why, and how)
  - Overall objectives
  - Objectives for each activity
  - Strategies being used to contain AMR (interventions)
- Implementation plan (the what, when, where, who, and how much)
  - Communication and advocacy activities
  - Work plans
  - Management: people responsible for activity/work plan completion
  - Monitoring and evaluation: performance targets and indicators
  - Budget

The implementation plan will serve as a useful reference as AMR advocacy and containment activities are carried out.

Country Example 13. AMR Advocacy and Containment Actions Carried Out by EPN and its Member Organizations from November 2008 to May 2011

Democratic Republic of Congo

- Conducted a retrospective study of culture and sensitivity results over a one-year period.
- Reviewed, analyzed, and used the Infection Control Assessment Tool in various departments of a hospital to evaluate practices and define corrective actions.
- Conducted sensitization in Kananga town by using the local Catholic women's group to mobilize community members to change practices that promote the spread of resistant organisms.

India

- Educated 1,371 children in 11 schools on the dangers of AMR, the need to use medicines correctly, and on health promotion. The students were between 14 and 18 years old. Pre- and post-intervention assessments indicated that their knowledge level increased from 29 to 66 percent.

Nigeria

- Conducted an AMR advocacy workshop for high-level stakeholders including the commissioner of health for Plateau State and other government officials, the general secretary of Evangelical Church of West Africa, and representatives of the private sector, the medicines regulatory agency, and the pharmaceutical professional associations. In addition to the good turnout, the workshop was covered on both radio and television.

Tanzania

- Assessed AMR knowledge among high school students in Arusha and found that few students knew about AMR; developed modules on infection control and AMR for onsite training; and lobbied for the inclusion of AMR in secondary school curriculum.

Togo

- Held a workshop for prescribers and journalists to raise awareness of AMR.
- Set up a waste management system for a health facility, Kpele Eleme.

Zimbabwe

Nhowe Mission Hospital—

- Used the Infection Control Assessment Tool modules on labor and delivery and infection control
- Introduced a policy to use alcohol-based antiseptics
- Constructed a pit for medical waste disposal
- Purchased protective clothing for staff
- Made plans to set up a microbiology lab and institute a medicines and therapeutics committee

Country Case Study—Implementation in Zambia

In March 2004, a group of key AMR stakeholders met in Zambia to form an AWG.[25] The AWG first conducted a rapid appraisal survey to understand the existing situation. The rapid assessment followed the guidelines presented in Section 3. Understand the Local Situation. The final report of the rapid appraisal was disseminated to the AWG members at a meeting held to plan implementation of next steps and circulated among stakeholders to raise awareness of AMR. The results of the rapid appraisal sparked discussion of the major areas for action.[26]

Following the meeting, a task force of AWG members prepared a call-to-action document to mobilize stakeholders and resources for action on AMR. Another task force prepared work plans with time lines for AWG activities, including a large call-to-action stakeholders meeting.

At a planning meeting held in October 2004, the AWG took several important steps to focus its mission including[27]—

- Prioritized specific activities
- Conducted a stakeholder analysis and identified key decision makers at whom to target advocacy activities
- Defined indicators for successful AWG activities
- Mapped out resources available for advocacy activities and the call-to-action meeting
- Mapped out a strategic approach to advocacy by defining the target audiences for the short, medium, and long term and by describing what their message was going to be to different stakeholders
- Conducted a SWOT analysis and discussed how to minimize weaknesses and neutralize threats

Through this process, the AWG was able to develop locally relevant solutions to fill gaps identified in the appraisal.

The call-to-action meeting took place in November 2004. Seventy participants attended the meeting, representing public and private sectors including government, service providers, academia, professional societies, pharmaceutical companies, consumers, journalists, and NGOs. In breakout sessions, the participants discussed how AMR was affecting their professions and what their role could be. At the end of the meeting, the call-to-action document, developed by the AWG, was presented to the group for consensus approval. The document called all those concerned with the health and well-being of Zambians to come together to address the problem of the failing effectiveness of medicines. Several members of the news media covered the call-to-action event and used the information to create and publish AMR-related news items.[28] Annex M includes an example of such news coverage.

The AWG's advocacy strategy focused on targeting decision makers, promoting use by prescribers of new integrated treatment guidelines, encouraging prescribers to adhere to recommended treatments, and including drug resistance topics in health professionals'

training curricula. To further this strategy, the AWG held a series of workshops to develop messages, media, and materials related to these issues.[29] A total of six advocacy strategies was developed along with two radio spots targeting the consumer, two print materials and one radio spot targeting the prescriber, and one print piece for the provider to display.

The AWG also sponsored a workshop for physicians on implementing and using STGs for infectious diseases of major public health importance.[30] From this workshop came recommendations for revising and implementing STGs. This inspired the support of the Zambia National Formulary Committee to review the infectious disease components of the national STGs to promote rational use of antimicrobials to preserve their efficacy.[31] The AWG continued to collaborate with the formulary committee and MoH during the review process. The revised STGs were finalized and published in 2008.[32]

In 2006, the AWG took time to do an interim monitoring assessment of its activities. Through RPM Plus, Links Media conducted a rapid assessment of AWG program achievements and provided recommendations for future advocacy strategies.[33]

The AWG organized local consultants to assess AMR content in both in-service and pre-service training curricula for health professionals and identify gaps and make recommendations for improving coverage of AMR topics in these training programs.[34, 35, 36] The AWG disseminated these findings and successfully advocated for making AMR a priority issue in the subsequent medical school curriculum review at the University of Zambia School of Medicine. The University of Zambia embraced the suggestions, and working through the various revision steps, incorporated locally relevant AMR, rational medicine use, and pharmacovigilance topics[37] in the revised undergraduate medical curriculum that was finalized and published in 2010.[38]

The AWG collaborated with the Zambian Pharmaceutical Regulatory Authority and other key stakeholders to strengthen the pharmaceutical quality assurance system in Zambia.[39] The AWG also helped produce three TV segments on AMR and rational use of medicines for a MoH program called “Your Health Matters.” The AWG leveraged funding from a partner organization and used the existing program to create these awareness messages which were broadcast over the course of two months during primetime television.

Regional Case Study—Ecumenical Pharmaceutical Network's AMR Campaign

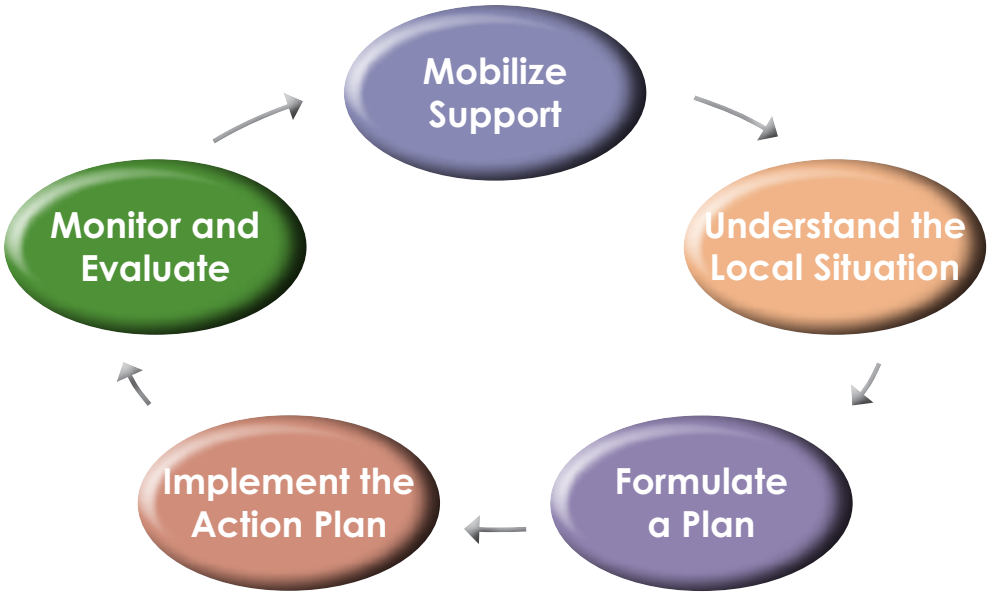
In 2008, the SPS Program collaborated with EPN to help initiate AMR-related activities among EPN's members. EPN is a faith-based regional network with member organizations in multiple countries, mainly in Africa. EPN embraced the role of advancing AMR advocacy and containment among its constituencies as a way to add value to the Network's key goal of promoting appropriate medicine use. EPN and SPS collaborated to present a regional AMR workshop in Moshi, Tanzania, in November 2008.[40]

Following this jump-start, EPN members in many countries began implementing AMR-related advocacy and actions. EPN has continued to motivate its member organizations to carry out advocacy and interventions, and has also been successful in leveraging funding from international partner organizations to support AMR activities.

EPN's AMR campaign, "Fight AMR! Save Medicines for our Children," focuses on infection control, promoting effective diagnosis, improving prescribing practices, and encouraging optimal use of antimicrobial agents. EPN has created a website with multiple resources and tools for members (http://www.epnetwork.org/illustrations-and-comic-strips). EPN also participates in and promotes AMR related events, such as WHO's World Health Day and the first Global Forum on Bacterial Infections.

Country Example 13 includes a summary of activities and accomplishments of EPN and its member groups; Annex N includes a more comprehensive list of EPN member activities.

MONITOR AND EVALUATE



Antimicrobial Resistance Containment Coalition

Overview

Monitoring and evaluation (M&E) are the final considerations in the coalition-building cycle. Although often overlooked by program planners, M&E is nevertheless an integral part of the growth and survival of a coalition. The M&E process is the link between planning and implementation.

Although often used interchangeably, the terms monitoring and evaluation refer to different processes with different purposes.

- **Monitoring** is the continuous review process which determines the degree to which activities are completed and targets and deadlines have been met.
- **Evaluation** is an activity which takes place at a certain point in time to analyze progress towards goals and objectives. It provides feedback on reasons for success and failure and direction for future action.

Although an in-depth discussion of the "how to" of M&E is beyond the scope of this guide, numerous materials on it exist. This section will focus mainly on the monitoring activities which will be part of the day-to-day management of the working group and play a role in the implementation process. This section provides basic information and tools to—

- Determine if activities are being carried out as planned
- Measure achievements of targets
- Identify implementation problems
- Identify and reinforce good performance
- Identify and strengthen weak performance
- Assess whether activities are having their expected effect
- Periodically review and revise the priorities and plans of the overall drug resistance containment strategy
- Disseminate findings and use them to inform actions and future iterations of the process
- Engage additional stakeholders through involvement in these processes

Monitoring

Designing the System

The principles for designing a monitoring system are to[41]—

- Focus on key indicators
- Keep data collection to a minimum
- Develop practical procedures for managing the information
- Use information for timely feedback and follow up

The biggest failures in routine monitoring/reporting are over-design and under-implementation. An overwhelming amount of data often results in too little analysis. Likewise, overly complex reporting systems can result in poor compliance.[42]

Crafting and Using Indicators

Reliable monitoring depends on having standards to judge performance and progress. To determine if these targets have been achieved, the working group must know what is expected. Indicators are direct or indirect measures to assess the extent to which the coalition's targets are met.

Examples of types of performance indicator monitoring include —

- Monitoring program plans and work plans implementation
- Evaluating achievement of long-term goals
- Assessing the individual units' performance
- Identifying relative strengths and weaknesses
- Measuring impact of policies or systems
- Self-monitoring to improve performance
- Demonstrating needs to donors and funders
- Reporting on progress to the working group, donors, and other stakeholders

Criteria for good indicators are[43]—

- **Clarity**—Indicator must be easily understood and calculated
- **Usefulness**—Indicator must reflect an important dimension of performance
- **Measurability**—Indicator must be defined in quantitative or qualitative term
- **Reliability**—Indicator must provide consistent assessment over time and among different observers
- **Validity**—Indicator must be a true measure of what it is meant to measure

Implementation monitoring looks at inputs, processes, and outputs associated with specific implementation activities. Incorporating suitably selected indicators right from the outset and periodically measuring them will help track progress and also offer valuable evidence in the longer term for evaluation of the program.

Implementing Monitoring

Periodically review the overall AMR containment plan to determine whether it is necessary to[44]—

- Revise priorities and budget allocations
- Seek additional information to clarify and focus intervention and advocacy priorities

- Define potential methods for obtaining additional information
- Focus on strengthening specific recommendations in the plan
- Review program implementation information to inform the planning process and revise priorities (e.g., progress reports, program evaluations, surveys, or annual reports). These reviews may result in additional objectives for the working group and an updated AMR containment plan.

Program monitoring, evaluation data, and other relevant data can be used to improve the next round of planning, and to update the AMR plan as needed. Findings from M&E activities can be disseminated for advocacy and resource mobilization activities.

Country Example 14 shows a monitoring plan for a Togolese hospital's interventions to increase infection control.[45]

Country Example 14. Hospital Monitoring Plan for Infection Control Activities in Togo

				Indicators			Results of the exercise	
Specific objective	**Planned activities**	**Person in charge**	**Time period**	**What will be measured?**	**How will it be measured?**	**When will it be measured?**	**Before the intervention**	**After the intervention**
Establish an annual training program for the staff on waste management at the center from now until June 30, 2010	Sensitize the staff to become aware of the scope of the problem	President of the center's ICQI[a] office	Once a week	Inventory of the center's departments	With the waste management tool and its grading sheet	Daily, from 7:30 to 9:00, beginning January 2, 2010	Center generally dirty and mixture of waste in the departments	Condition of departments is very clean, with correct management of waste by category
	Provide training and refresher training to the staff	Senior nursing officer of the center	Once every 6 months	Number of staff trained and retrained	Training register	March 15, 2010 September 13, 2010	Number of staff not trained	Number of staff trained at the end of the year
Give the center maintenance and infectious waste management equipment in January 2010	Supply the center with maintenance and waste management equipment	Senior Nursing Officer of the center	Once a month	Maintenance and waste management equipment available	Review the order and delivery sheets	The first of every month	Lack of maintenance and waste management equipment	Permanent availability of maintenance and waste management equipment
Establish a formalized operating procedures manual for infectious waste management at the center, now through March 2010	Form a committee to establish this procedures document	President of the center's ICQI office	One month	Operating procedures manual available at the center	Work sessions and register of meeting minutes	March 22, 2010	No formalized operating procedures manual for waste management at the center	Effective availability of the formalized operating procedures manual for waste management at the center

[a] These activities will be measured by the infection quality control improvement (ICQI) team.

Evaluation

While monitoring is an ongoing process during implementation, evaluation takes place at a point in time and looks at the big picture. Monitoring typically focuses on program activities that are completed; evaluation focuses on objectives that are fulfilled (Box 9). There are two types of evaluation—

- **Formative evaluation** takes place during the implementation phase and assesses progress towards objectives so that mid-course corrections and improvements can be made in a program.
- **Summative evaluation** takes place when the program is completed and measures its impact and success by looking at outcomes.

Box 9. Questions for Formative and Summative Evaluations

- Is the program relevant and appropriate to the in-country context?
- Is the program effective? (Is it achieving its objectives? Why or why not?)
- Do the results from the monitoring system represent the actual situation?
- Is the program efficient?
- Is the program sustainable?
- Is the program having the intended impact?
- What future changes should be made?

Outcome Indicators for Advocacy

There are six categories of outcomes that represent the changes in lives, health sector conditions, institutions, and health systems that result from advocacy work.[46]

- Shifts in social norms
- Strengthened organizational capacity
- Strengthened alliances
- Strengthened base of support
- Improved policies
- Changes in impact[47]

Table 8 contains a "menu of outcomes" for AMR advocacy and containment work based on these six categories. These may help you think about appropriate outcomes for the AWG activities which can be evaluated.

Table 8. Examples of Outcomes for AMR Advocacy and Containment Work[a]

Shift in social norms	Strengthened base of support
• Changes in awareness of AMR and related issues • Changes in beliefs about medicine use • Changes in attitudes about medicine use • Increased alignment of AWG objectives and core societal values • Changes in public behavior	• Increased public involvement in AMR issues • Increased level of actions by champions of AMR issues • Increased breadth of partners supporting AMR related activities • Increased media coverage • Increased awareness of AMR and AWG messages among key groups of people • Increased visibility of AWG activities
Strengthened organizational capacity	**Improved policies**
• Improved management of AWG organizational capacity • Improved strategic abilities • Improved capacity to communicate and promote AMR advocacy messages • Improved stability of the AWG	• Policy development • Policy implementation • Policy enforcement
Strengthened alliances	**Changes in impact**
• Increased number of AWG stakeholders • Increased level of collaboration and coordination on AMR issues • Improved alignment of partnership efforts (shared priorities, objectives, etc) • Strategic alliances with important partners • Increased ability of the AWG to work towards policy change and other AMR containment issues	• Improved containment practices and reduced AMR levels

[a] Adapted from: Reisman, J. 2007. A Guide to Measuring Advocacy and Policy. *The Evaluation Exchange* XIII: I. and Organizational Research Services. 2007. A Guide to Measuring Advocacy and Policy. Prepared for the Annie E. Casey Foundation: Baltimore, MD.

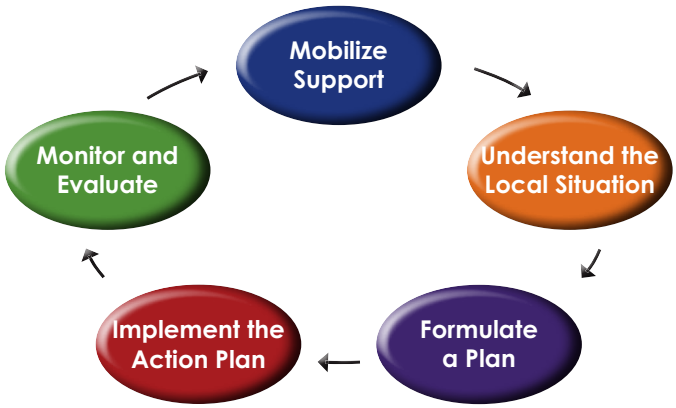
Evaluation Resources

Evaluation will often take more time, money, and staff than normal monitoring efforts. Like research projects, evaluations require considerations of design and collection and analysis of data. Also, if complete objectivity is required, consider using the services of an outside evaluator. Funds to cover evaluation costs should be included in the initial budget. If funds are included only as an afterthought, the evaluation quality may suffer.

Continuing the Cycle

Over time, the AMR coalition will grow, expand, and shift its focus. As the initial priority areas are addressed, others will come to the forefront. This will require renewed effort at mobilizing resources and perhaps even further research to understand the problems in that area.

Whereas the first turn of the cycle is focused mostly on building the coalition and getting organized, subsequent turns will be more outward focused because the coalition itself will be stabilized. But ensuring the coalitions' sustainability[48] will require continued attention to funding sources, advocacy and communication to maintain public visibility, and stakeholder involvement to maintain momentum and relevance in the field of AMR.



Antimicrobial Resistance Containment Coalition

Because AMR is a multifaceted, complex, and overarching problem, it requires consistent vigilance, a multidisciplinary and multifaceted approach, and long-term commitment. All too often AMR is pushed to the back of minds and agendas when seemingly more immediate threats arise. However, the coalition can motivate, guide, and coordinate to synergize the efforts of stakeholders. Therefore, it is the coalition's charge to keep AMR in the public's eye and on the agenda of all stakeholders.

FORMS

Form 1. Stakeholder Identification Worksheet

Use this worksheet to identify key stakeholder groups and assess representation across key AMR-related areas. Some groups may address more than one contributing factor. The types of potential stakeholder groups are listed, but their identification as a key stakeholder in this area will depend on their focus and how influential they are.

The main AMR-related areas to consider are pharmaceutical management, medicine use, laboratory services and AMR surveillance, infection control and disease prevention, and advocacy. Once stakeholders and stakeholder groups have been identified, obtain individual names and contact information, and record the information onto the stakeholder identification worksheet.

Stakeholder Identification Worksheet

Stakeholder category	Potential stakeholder groups within these categories (examples)	Stakeholder groups identified	Dimension[a]				
			PHM	USE	LAB	IDP	ADV
Decision makers and politicians	• Ministries of health, finance, education, agriculture, regulatory bodies • Program managers (HIV/AIDS/STIs, malaria, TB, integrated management of childhood illnesses, control of diarrheal diseases, essential medicines, ARIs, expanded program on immunization, reproductive health, health services)						
Donors	• Multilateral (e.g., UNAIDS, WHO, World Bank, UNICEF) • Bilateral (USAID, Sida, DFID, etc.)						
Global partnerships	Roll Back Malaria, Stop TB, Global Fund country coordinating mechanism, etc.						
NGOs/private voluntary organizations (local and international)	• Relief organizations • Health and development organizations • Community activists						
Health practitioners and providers (public and private sector)	• Organized health and insurance systems • Professional organizations (medical, microbiology, pharmacy, nursing—local and international affiliates) • Employers providing health care for employees						
Laboratory services and AMR surveillance	• National reference laboratory • Academic institutions • Public and private laboratories						
Educators	Research institutions Professional training institutions/councils Health education and training organizations						
Pharmaceutical industry	• Multinational and local pharmaceutical industry • Pharmaceutical importers/retailers						
General public	Consumer groups						
News media and journalists	Health reporters, radio stations, newspapers/ columnists, television, foreign correspondents						

[a] PHM, pharmaceutical management; USE, medicine use; LAB, laboratory services and surveillance; IDP, infection control and disease prevention; ADV, advocacy

Form 2. Stakeholder Contact List

Add names and contact information as new stakeholders are identified through document reviews and interviews.

Stakeholder name	Organization	Address	Phone	Email

Form 3. Stakeholder Interview Guide

Interviewer: _____
Date: _____
Name: _____ Title/Position: _____
Organization: _____

Some countries are experiencing problems treating and controlling infectious diseases. We are interested in learning about these issues in our country. The following questions will help me understand the situation better. Thank you for taking the time to answer them.

1. Can you describe your activities in the field of public health or health care service delivery? (include coverage/membership/sector, as appropriate)

2. What are the most significant concerns that you have with respect to treating infectious diseases in our country? Do you know if anything is being done about these concerns? If so, what?

3. Do you think that drug resistance is a problem in our country? (If no, go to question 11. If yes, ask respondent to describe the problem of drug resistance. Allow respondent to discuss drug resistance. Probe for the following if not mentioned.)

4. How big is the problem of drug resistance?

5. Where does it occur?

6. What do you see as the main causes of drug resistance in our country?

7. What factors contribute to the problem?

8. What is the best solution to the problem of drug resistance? For example, would you say that we need better policies, better supply systems, better training, or more guidelines? What is MOST needed?

9. Who is in a position to implement this solution? And what should be the role of each body/organization involved in the solution?

10. In your view, who is most concerned about the problem of drug resistance? Who is not concerned?

11. If no, do you think drug resistance may become a problem in the future? Explain (probe).

12. Who will it affect?

13. What will be the main causes?

14. How serious could it become?

15. Is the problem of or prevention of drug resistance specifically addressed in your objectives, strategies, or work plans? If yes, please explain in what way.

Now I'd like to ask you a few questions on information sources such as journals, newspapers, columnists, etc.

16. Where do you get information on new medicines and their use?

17. If you had information on new medicines, their use, or drug resistance that you wanted your colleagues to get or thought they needed to know, what are the main ways you would get this information to them?

18. If you had medicine-related information that you wanted the public to get or thought they needed to know, what are the main ways you would get this information to them?

19. What kinds of information regarding new medicines and their use or drug resistance do you need that you are not getting?

20. Do you have any reports (studies, surveys, evaluations, etc.) addressing issues surrounding drug resistance in our country?

21. Is your organization planning trainings, surveys, or public education campaigns on AMR in the next year? If yes, please describe what you have planned.

22. We would like to put your organization on our mailing list to receive information on drug resistance. Can you suggest other names or organizations to add?

23. (Ask this question only of respondents you think you may want to interview again.) We will be reviewing these documents along with others collected. Who would be the best person to meet with if we have more questions on specific items related to (*insert area of expertise of respondent*)?

Do you have any questions? Thank you for your time.

Form 4. Sample Invitation for Kickoff Meeting

Date:

To: (refer to stakeholder contact list)

RE: Invitation to attend a forum to discuss an initiative to contain antimicrobial resistance (AMR) in our country/region/city.

Dear friends and colleagues,

Preserving the effectiveness of antimicrobial medicines is an immediate concern for us all. When medicines are no longer effective, people remain sick for longer periods of time, treatment costs increase, and more people die from otherwise curable diseases.

As you know, the use of antimicrobials is widespread in our country. Many of us have direct involvement with the use of these medicines. We know that resistance to these drugs often develops as a result of inappropriate prescribing and dispensing practices, suboptimal treatment- seeking behavior, and poor drug quality. There is evidence of growing resistance in our country to first-line treatments.

Preserving drug effectiveness requires different actions from different stakeholders, including our country's Government, donors and implementing partners, health professionals, media and communications professionals, and consumers—people like you!

It's important that we all explore how we can work together to promote the containment of antimicrobial resistance in our country. We are inviting you to attend a kickoff meeting on *insert day, time, location* to discuss the potential of starting an initiative against AMR. Specifically, we hope to—

- Inform stakeholders of the AMR initiative
- Confirm the need for action
- Identify other potential stakeholders and partners
- Achieve consensus on the proposed approach and plan for next steps

Resistance to antimicrobials affects all of us, and each of us has a potential role to contain it. I look forward to seeing you. Please respond with your intention to come—either by telephone at **enter phone number here** or by e-mail at **email address here**.

Sincerely,

Attachment: Agenda

Form 5. Sample Agenda for Kickoff Meeting

Initiative to Contain Antimicrobial Resistance Kickoff Meeting

Date/Place

Agenda

10:30 am to 10:40 am	Welcome	Facilitator: *insert name*
10:40 am to 11:00 am	Introductions	All
11:00 am to 11:10 am	• Review of objectives of the meeting • Inform stakeholders of the AMR initiative • Confirm the need for action • Identify other potential stakeholders and partners • Achieve consensus on approach and plan for next steps	Facilitator:
11:10 am to 11:30 am	Background: AMR in the world and in our country and why we are here today	Facilitator:
11:30 am to 12:00 pm	Open discussion: • Validity of issue • Relevance for stakeholders • Identification of other stakeholders	All Facilitator:
12:00 pm to 12:30 pm	Planning for next steps: • Need for a working group • Call-to-action • Communications strategy • Within groups • Between groups networking • Media	All Facilitator:
12:30 pm to 1:30 pm	Lunch	All

Form 6. List of Documents for Review

No.	Title	Author(s)	Type of publication or journal name	Brief description of contents	Location where archived
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Form 7. Document Review Template

Use the following template for reviewing documents. Use a separate form for each document reviewed. Be sure to fill in as much information as possible so others can find the publication.

Full reference (including name of author or organization that produced the document if no author); year published; title of document, book, journal, article; volume and page numbers if journal; publisher (and location of publisher) if book, report, proceeding or any other type of document and web URL, if possible.

Example: Malhotra-Kumar, S., C. Lammens, S. Coenen, K. Van Herck, H. Goossens. 2007. Effect of Azithromycin and Clarithromycin Therapy on Pharyngeal Carriage of Macrolide-Resistant Streptococci in Healthy Volunteers: A Randomised, Double-Blind, Placebo-Controlled Study. *The Lancet.* Vol. 369, Issue 9560; Pages 482-490.

Key information areas: (e.g., drug policy, regulation, selection, procurement, distribution, quality, availability, use, management support, education/training, surveillance, advocacy, media)

Key findings: (briefly summarize the major findings for each key information area)

Comments: (include any other interesting/relevant notes)

Name of reviewer:

Date of review:

Form 8. Questions for Document Review and Interviews

This form provides questions to help you gather *detailed information on pharmaceutical management* through document reviews and key informant interviews. The questions are divided by topic (selection, procurement, use, and policy and legal framework). Pharmaceutical management is such a large area that you will be gathering information from several documents and sources; some will focus only on selection, others on pharmaceutical use, etc.; others will have overlap of several areas. Select only those from the following set of questions to create a document review and interview guide that best fits your source, local context, and type of information that is relevant.

Selection

Questions on pharmaceutical selection focus on two important documents—standard treatment guidelines (STGs) and essential medicines lists (EMLs).

STGs

1. Do STGs exist for the management of infectious diseases? (Yes/No. If yes, go on to the STG follow-up questions listed below starting at 1.A. If no, go on to questions about EMLs).

   1.A What was the process of their development?

   1.B How often revised? When last revised?

   1.C Do STGs exist for different levels of health care practice?

   1.D Are prescribers (of different levels) trained on the use of and adherence to the STGs? If yes, training given to what kind of prescribers and how regularly?

   1.E Are health students (medical, pharmacy, nursing, community health workers) trained on the importance of STGs?

   1.F Has the availability of STGs in health facilities been evaluated?

EMLs

2. Is there an EML that includes antimicrobials (antimicrobials include antibiotics, antifungals, antivirals, and antiprotozoals)? (Yes/No. If yes, go on to the EML follow-up questions listed below starting at 2.A. If no, go on to additional questions if any.)

   2.A What was the process of selecting the antimicrobials included in the EML?

   2.B How often is the EML revised? When was it last revised?

   2.C Are the antimicrobials listed and applied according to the levels of health care delivery?

   2.D Are the antimicrobial medicines included in the EML consistent with those in the STG for infectious diseases?

2.E Are health care providers trained on the concept of EMLs?

2.F Are students of medical, pharmacy, nursing, and other paramedic courses trained on the concept of EMLs?

2.G Any data on the extent of availability of EML in health facilities?

2.H Any survey data on the availability of drugs (including antimicrobials) included in the EML in health facilities?

Procurement

For the purposes of this assessment, suggested questions regarding pharmaceutical procurement focus primarily on pharmaceutical product quality and the utilization of EML.

1. What quality assurance mechanisms are in place in the public and private sectors to ensure the quality of antimicrobials marketed in the country?

2. How many public and private laboratories are capable of testing antimicrobial quality?

3. Which of the mechanisms listed below are in place to ensure antimicrobial quality?

   - □ Prequalification of suppliers
   - □ Supplier submits registration form
   - □ Physical inspection of drug samples
   - □ Laboratory analysis of drug samples
   - □ Specific drug reports requested, such as bioavailability
   - □ Informal information gathered from other procurement programs
   - □ Tender/order documents specify which pharmacopeia standards are acceptable
   - □ Good Manufacturing Procedures certification
   - □ Monitoring of quality of the marketed product
   - □ Inspection at the point of importation
   - □ Inspection at the retail/wholesale pharmacies
   - □ Lab testing of the samples obtained from drug outlets
   - □ Supplier performance M&E
   - □ Others

4. To what extent are the above mechanisms/regulations enforced?

5. Any data on the proportion of inspected antimicrobials that was substandard in the last two years?

6. Any documented report of counterfeit antimicrobials?

7. Is there a policy of using the EML antimicrobial list for procurement of antimicrobials? (Yes/No. If yes, ask the following follow-up questions listed below starting at 7.A. If no, go on to any additional questions)

   7.A Does this policy exist in the public sector (Yes/No)

7.B Does this policy exist in the private sector (Yes/No)

7.C Is there any data on the level of adherence to the policies?

Pharmaceutical Use

The following questions on pharmaceutical use focus on three key areas—in-service and pre-service training of health professionals and appropriate use by prescribers, dispensers, and patients.

In-Service Training

1. Is in-service training/continuing education provided to health professionals on the importance of appropriate antimicrobial use and containment of AMR (ask for both public and private sectors)? (Yes/No. If yes, go on to the follow up questions listed below starting with 1.A. If no, go on to any additional questions).

   1.A What continuing education activities have been carried out in the medical, nursing, pharmacy, and paramedical sectors during the last two years?

   Please record—

   - Number of prescribers trained
   - Topics included
   - Hours of exposure
   - Methodology of training
   - Organizations providing training
   - Whether counted as a continuing professional development credit
   - Any other relevant information

   1.B Any data on the impact of these trainings on knowledge and practice regarding microbials?

Pre-service Training

1. Are separate topics on appropriate antimicrobial use and AMR included in undergraduate and postgraduate curricula (medical, pharmacy, nursing, paramedical)? For example, problem of overuse/irrational use of antimicrobials/antibiotics, problem of drug resistance, strategies to improve antimicrobial use, strategies to contain AMR. Record any other curricular inclusion on appropriate antimicrobial use and AMR.

2. Which curricula do include topics and which don't? (Include information on the identified topics, hours of exposure, methodology of teaching/learning. Document any other relevant information.)

3. Any data/impression on how much of what is advised in the curriculum is actually being followed?

4. Are topics on appropriate antimicrobial use included in the examinations?

5. Are topics on AMR included in the examinations?

Appropriate Use by Prescribers, Dispensers, and Patients

1. Do any studies/reports on the level of appropriateness of antimicrobial prescribing and dispensing? Record key findings of all the relevant documents available.

2. Have public education campaigns on appropriate antimicrobial/antibiotic use and drug resistance been carried out in the last two years? (Yes/No. If yes, ask the follow up questions listed below starting with 2.A. If no, go on to next question.)

   2.A What kind of campaigns and how frequent?

   2.B Who conducted these education campaigns?

   2.C Are there education campaigns relating to prevention of infection (e.g., hand hygiene, food hygiene, vector control, immunization)?

   2.D Are there education campaigns relating to appropriate use of antimicrobials/antibiotics and sensitization of AMR issues?

   2.E Any data on the impact of these measures?

3. Are schoolchildren educated/informed about infection prevention (e.g., hand hygiene, food hygiene, vector control, immunization) and rational use of medicines, including antibiotics? (Yes/No. If yes, go to question 3.A. If no, go on to next question.)

   3.A Describe the activities in detail.

   3.B Are they already a part of the existing curricula or are they carried out just as additional educational efforts?

   3.C Any data on the impact of these measures?

4. Any data on the use of antimicrobials by the public (including level of appropriateness of use)?

Medicine Use Policies/Regulation

STGs

1. Is there a policy/recommendation guiding the use of STGs? (Try to gather information for all levels of prescribing and for all the different STGs that exist in the country.)

2. What policies/recommendations are in place (e.g., mandatory or voluntary adherence to STGs in a hospital setup, availability of those medicines recommended in the STG in the hospital pharmacy)

3. Is there a mechanism to monitor adherence to STGs?

4. Any data on the level of prescribing adherence to STGs in the public sector and in the private sector?

DTC, ICC, or AMR Containment Committees

1. Is there a separate body or committee for containment of AMR (national or ad hoc)? (Yes/No. If yes, go to 1.A. If no, go on to question 2.)

   1.A What are the responsibilities of this body/committee?

   1.B What activities has it carried out so far?

   1.C Any funding allocated by the government for AMR activities?

   1.D Any data on the impact of activities carried out by this body/committee?

2. If no separate body or committee exists for AMR, is there an already existing body that considers resistance issues? (Yes/No. If yes, go to 2.A. If no, go on to next question.)

   2.A What body or committee considers resistance issues?

   2.B What AMR-related activities has this body carried out so far?

   2.C Any data on the impact of activities carried out by this body/committee?

3. Do any of the existing disease-specific programs (HIV/AIDS, TB, malaria, and others) in the country have AMR containment program? (Yes/No. If yes, try to gather more information about their activities/programs, including information about whether recent global efforts such as the Presidential Emergency Plan for AIDS Relief, prevention of mother-to-child transmission, and Global Fund are incorporating or initiating any AMR-related issues within their activities.)

4. Do hospitals have infection control committees (ICC)? If yes, what proportion of tertiary and secondary hospitals has ICCs?

5. Do ICCs have developed infection control programs? (Yes/No. If yes, go to 5.A. If no, go on to the next question.)

   5.A What is the level of their implementation?

   5.B How many times do the ICCs meet during the year?

   5.C Any data on impact of the ICC activities?

6. Are there infection control/prevention activities at primary care level? (Yes/No. If yes, describe the plans and activities over the past two years. Document any impact of these activities.)

7. Do hospitals have Drug and Therapeutics Committees (DTC)? (Yes/No. If yes, go to question 7.A. If no, go on to any additional questions.)

   7.A What proportion of sampled tertiary and secondary hospitals have DTCs?

7.B Please indicate what the DTCs have accomplished in the last two years?

- □ Selection/formulary management of antimicrobials for use in hospital
- □ Reserve antibiotics (e.g., some antibiotics reserved for treating only certain diseases, or restricted to be prescribed only by a certain category or level of prescribers)
- □ Prescriber and patient education on antimicrobial use and AMR
- □ Antimicrobial use evaluation program
- □ Provision of independent drug information service (including information on antimicrobials)
- □ Provision of adverse drug reaction monitoring (pharmacovigilance) service, including that on antimicrobials
- □ Control of promotion of antimicrobials in the hospital by the drug industry

7.C Are there any other activities carried out by the DTC in the last two years with regard to antimicrobial use and AMR?

7.D How many times did the DTC meet during the past 12 months?

7.E Any data on the impact of DTC activities?

7.F Ask whether the respondent feels that the DTC has performed different activities normally expected of such a committee. If the answer is "no," ask what could be the underlying factors.

Policy and Legal Framework

1. Is there a national medicines policy? If yes, when was it adopted?

2. Is there an antimicrobial/antibiotic policy? (Yes/No. If yes, ask the follow up questions listed below starting with question 2.A. If no, go on to next question.)

   2.A When was the policy adopted?

   2.B Is the policy a part of the national medicines policy or a separate policy?

   2.C What are the essential elements of the policy?

3. Is there a regulation limiting antimicrobials to prescription-only-medicines status? (Yes/No. If yes, go to question 3.A. If no, go to next question.)

   3.A Are there exceptions?

   3.B What processes are adopted to oversee enforcement of this regulation?

   3.C Any data on the level of enforcement of this policy?

4. Is there a regulation on the use of antimicrobials in food animals? (Although not a mandate for the current activity, this is an important part of the country picture.) (Yes/No. If yes, ask the follow up questions listed below starting with question 4.A. If no, go on to next question.)

    4.A What regulations are in place?

    4.B Are mechanisms in place to monitor implementation of these regulations?

    4.C Are any data available on the level of implementation of the regulation?

    4.D Are any data available on the impact of these regulations?

5. Are there any guidelines to regulate the promotional activities of pharmaceutical companies? (Yes/No. If yes, ask the follow up questions listed below starting with question 5.A. If no, go on to next question.)

    5.A What regulations are in place?

    5.B Are any data available on the level of enforcement of the regulations?

    5.C Are any data available on impact of the regulations?

6. Is there a policy regarding antibiotic prescribing? (Yes/No. If yes, ask the follow up questions listed below starting with question 6.A. If no, go on to next question.)

    6.A Are certain antimicrobials defined and kept as "reserve" agents (e.g., some antibiotics reserved for treating only certain diseases or restricted to be prescribed only by a certain category or level of prescribers)?

    6.B Have levels of antimicrobial prescribing authority been defined?

    6.C Which levels of prescribers can prescribe antimicrobials? (Gather information on which antimicrobials nurses can prescribe [if authorized], which clinical officers can prescribe, and which medical officers can prescribe.)

    6.D Are any new policies being planned to allow prescribing rights to a wider group of health professionals?

    6.E Any other regulations on prescribing of antimicrobials?

    6.F What is the level of implementation of these policies?

    6.G Are any data available on impact of these policies?

7. Is there a regulation requiring registration of drugs used in the country? If yes, what is the level of enforcement?

8. Is there a regulation requiring registration of pharmacies by the Drug Regulatory Authority? If yes, what is the level of enforcement?

9. Is there a regulation requiring registration of pharmaceutical personnel by the Practitioners Registration Authority? If yes, what is the level of enforcement?

10. Is there a national adverse drug reaction monitoring (pharmacovigilance) service? If yes, describe its activities over the past 12 months. If no, is there any plan to start such a service?

11. Is there a national independent drug information service? If yes, describe its activities over the past 12 months, including the number of enquiries answered. If no, is there any plan to start such a service?

12. What is the number of antimicrobial products registered (including all branded antimicrobials)?

13. What is the number of antimicrobial agents (unique chemical entities, not counting the different brands) registered?

14. What percentage of drugs (in terms of monetary value) used in the country is contributed by the private sector and what percentage by the public sector? What proportion of this is for antimicrobials (find out for both public and private sectors)?

15. What percentage of drugs used in the country are manufactured locally? (If possible, also find out what percentage of antimicrobials used in the country are manufactured locally.)

16. Are any price controls or drug financing mechanisms (e.g., cost sharing, insurance schemes) in place? (Ask for both public and private sectors.)

Form 9. Document Review Guide for Drug Use Behaviors and Underlying Causes

Complete the following worksheet for each desired behavior:

1. Prescriber assesses treatment appropriately
2. Dispenser keeps appropriate drugs available and accessible (right drug, good quality)
3. Consumer acquires correct drug
4. Consumer/caretaker follows/administers the appropriate regimen (dose, frequency, duration)
5. Consumer/caretaker seeks appropriate referral/follow-up for treatment failure)

Document Review Guide for Drug Use Behaviors and Underlying Causes (Continued)

Record information extracted from the review in these columns							
Behaviors noted (desired and inappropriate)	**Contributing factors or causes (positive)**	**Contributing factors or causes (negative)**	**Condition/ disease studied**	**Population sample, level of care, etc.[a]**	**Where was the population studied?**	**What are the study recommendations?**	**Reference from document review list**

[a] For example, a sample of 50 patients seeking care at 3 public health facilities.

Form 10. Antimicrobial Resistance Levels and Trends

Transfer the results of your literature search on AMR levels and trends of key pathogens to the table below (pathogens may vary by country). Add more lines as needed. Note key pathogens for which no data were available (insert "NA" in column two).

Key pathogen tested	Resistance levels (range)	Record any information on the quality of the data	Date	Population	Location	Reference
Mycobacterium tuberculosis						
Plasmodium falciparum						
Neisseria gonorrhoeae						
Streptococcus pneumoniae						
Haemophilus influenzae						
Shigella spp.						
Vibrio cholerae						
HIV						
Other						
Other						
Other						
Other						

Form 11. Interview Guide on AMR Surveillance

Name: _____
Position: _____
Contact information: _____

Do guidelines exist regarding the recommended level of microbiological laboratory services for the different levels of hospitals (e.g., secondary, tertiary)?

Is AMR surveillance considered a component of the infectious disease surveillance system?

If no, are there any plans to incorporate AMR surveillance into the infectious disease surveillance system? If so, describe.

If yes, which pathogens are tested?

Is the data being used to inform policy and other actions? Give examples.

What percentage of private sector laboratories in the country conducts antimicrobial susceptibility testing?

What are the main pathogens tested? List.

Are data being used to inform policy and other actions? Give examples.

What is the role in AMR surveillance for private-sector laboratories?

Is there a national medical laboratory quality assessment scheme? (Get a copy if possible.)

Has there been any antimicrobial surveillance-related training available in the last 2 years?

Are there any surveillance networks in the country or the region that are successful? Which ones? What has helped their success?

Are you aware of any new support for or interest in AMR surveillance activities as a result of global initiatives such as the Global Fund to Fight AIDS, Tuberculosis and Malaria and the President's Emergency Plan for AIDS Relief? What kind of support/interest?

Which donors are supporting AMR surveillance activities?

Describe the type of support (technical assistance, training, supplies and equipment).

Do you anticipate any new support for AMR surveillance? From which sources? Why is there this new interest?

Form 12. Interview Guide for Reference Laboratories

Respondent's name: _____
Position: _____
Phone number/email: _____
Address: _____

Level of laboratory

- □ Health facility
- □ District
- □ Provincial/state/regional
- □ National

Affiliation

- □ Public
- □ Private
- □ Academic institution
- □ NGO/religious institution
- □ Private research institute

What are your funding sources? What type of funding is most difficult to obtain? Are the trends in funding AMR surveillance changing? In what ways?

Does this laboratory participate in internal or external quality control programs? Why or why not? Describe level of participation.

What are the key problems experienced in obtaining data quality consistently?

Does this reference laboratory have access to a computer?

Which software are you using for the resistance data?

Have your staff members participated in any trainings in the last 2 years? (Describe topics covered, audience, etc.)

Have you sponsored any trainings in the last 2 years? (Describe topics covered, audience, reach, etc.)

Are there any laboratories that you know of that could be submitting isolates to this reference laboratory that are not currently doing so? Why not?

Does this laboratory feed resistance data to relevant bodies? If yes,

To whom?

How frequently?

Is the surveillance data routinely published (list source)?

How is it used? Give examples.

If not feeding data to relevant bodies, what are the main barriers?

Do you have contact information for someone at the laboratories that you just mentioned?

Complete the form below.

Interview Guide for Reference Laboratories (continued)

Organism tested for resistance	Is reference laboratory doing primary isolation of the organism?	# Labs submitting isolates for specific organism (list labs on a separate form)	# Isolates processed per year by the reference lab	# Isolates tested for resistance per year	Laboratory method used for testing resistance (for each organism)	Are all isolates received tested or is a sample of isolates tested?
Mycobacterium tuberculosis (TB)						
Plasmodium falciparum (malaria)						
Neisseria gonorrhoeae (STI)						
Streptococcus pneumoniae						
Haemophilus influenzae						
HIV						
Other (e.g., *Shigella spp., Vibrio cholerae*)						
Other						
Other						

Form 13. Interview Guide for Microbiology Laboratories

Respondent's name: _____

Position: _____

Phone number/email: _____

Address: _____

Level of laboratory
- □ Health facility
- □ District
- □ Provincial/state/regional
- □ National

Affiliation
- □ Public
- □ Private
- □ Academic institution
- □ NGO/religious institution
- □ Private research institute

What are your funding sources? What type of funding is most difficult to obtain? Are the trends in funding AMR surveillance changing? In what ways?

Does this laboratory have access to a computer?

Which software are you using for the resistance data?

Has anyone from this laboratory received training in the last 2 years? What type of training? Who sponsored the training?

Does this laboratory participate in internal or external quality control programs?

What are the key problems experienced in obtaining data quality consistently?

Is this lab currently submitting isolates to a reference laboratory?

How is the data coming out of this laboratory used? Can you give some examples?

Complete the table below.

Interview Guide for Microbiology Laboratories (continued)

Organism tested for resistance	Is this laboratory doing primary isolation of the organism?	Number of isolates processed per year by the lab	Number of isolates tested for resistance per year	Laboratory method used for testing resistance (for each organism)	Are all isolates received tested or is a sample of isolates tested?
Mycobacterium tuberculosis (TB)					
Plasmodium falciparum (malaria)					
Neisseria gonorrhoeae (STI)					
Streptococcus pneumoniae					
Haemophilus influenzae					
HIV					
Other (e.g., *Shigella spp., Vibrio cholerae*)					
Other					
Other					

Form 14. Stakeholder Prioritization Worksheet

Review the stakeholders identified in Form 1 and map them on the grid below according to high influence but low urgency, high influence and high urgency, low influence and low urgency, and low influence but high urgency.

	Perceive AMR as low urgency	Perceive AMR as high urgency
High- influence stakeholder		
Low- influence stakeholder		

Form 15. Interview Guide for Media Contacts

We are interested in speaking with media people who deal with health and medical issues to get some idea of their needs, sources, and issues. Information from these interviews will help to develop advocacy and communication strategies to generate more interest in particular health and medical issues.

Pre-Interview Information Gathering

Before the interview, try to gather as much information about the media source as possible. You can contact the representative or the media station or go to their website if one is available. The following website is one useful tool for gathering information on print resources: http://www.newspapers.com

Useful information to find includes—

- □ Description of your media source (radio/TV station/program)
- □ How much health and medicine-related topics the media source covers (what % of time, articles/programs are related to health/medicine)?
- □ The main target audience of the health/medical-related work (public, decision makers, urban, etc.)
- □ The reach of the column/program (or relevant local area)? What about countrywide?

If this information cannot be found from other resources, ask the interviewee.

Interview Questions

1. Tell me a little about what you do.

2. Where do you get your information on health/medical topics that you report on? What other sources? Any others?

3. Which of these sources for health/medical information do you find the most reliable/credible sources? What others (*list first three responses*)?

4. If no local sources included above, ask: Which are your most reliable local sources for health/medical information? What others (*list first three responses*)?

5. Why do you consider these sources to be the most credible/reliable?

Now I'm going to ask you for your opinion about how the public finds out about certain topics—that is, their sources of information.

6. How do you think the public finds out about (*read one line from left column of table below*) _____? Record response, and ask:

From what other sources might the public learn of this topic? (*Record first three responses in the table below. Repeat above questions for next topic.*)

	Source 1	Source 2	Source 3
The new medicines for malaria?			
Medical treatment for pneumonia?			
HIV/AIDS drug treatment?			

7. What particular media do you find to have the most credibility on health/medical issues with the public? Could you please specify names of papers, columnists, radio stations, announcers, programs, journalists, etc.

8. What particular media do you think have the most impact with government decision-makers? Could you please specify names of papers, columnists, radio stations, announcers, programs, journalists, etc.

9. What about with decision makers in the business community? Could you please specify names of papers, columnists, radio stations, announcers, programs, journalists, etc.

10. I'm going to mention some topics. For each one, could you please tell me if you remember having seen or heard any media reports about it in the last year?

Mark Y for each seen/heard in first blank column, then ask—

Can you remember where you saw or heard reports on this topic? [Mark answers in second column. Check rightmost column if they say they/their organization did it. Then ask about the next topic.)

Topic	Yes/No	Where did you see or hear the report?	I/we did article or program on it
Quality of medicine or counterfeit medicines			
Safety or side effects of medicines			
Availability and affordability of medicines			
New medicines available for treatment of illnesses			
Need to finish the full course of medical treatment			
Drug resistance			

11. How important do you think it is that the public get information on these drug-related topics, as compared to other health/medical issues?

___ Most/more important than other issues
___ About the same
___ Least/less important than other issues

Which other health/medical issues are more important? Why do you believe that?

12. If you had access to reliable information on these drug-related topics, how likely would you/your organization be to disseminate it using your regular channels?

    ____ Very
    ____ Somewhat
    ____ Not very likely
    ____ Not at all

13. What would make it more likely for you/your organization to disseminate information related to these drug-related topics?

14. What kind of specific information would you most need on these topics to be able to use it in your regular channels?

15. In what context, if any, have you heard the term “antimicrobial resistance”?

If never heard the term, skip to question 17, otherwise ask—

16. How would you explain what the term means to someone who hadn’t heard it?

17. In what context if any, have you heard the term “drug resistance”?

18. How would you explain what the term means to someone who hadn’t heard it?

Thanks for your help.

Form 16. AMR Intervention Prioritization Worksheet

Intervention	Cost/available resources	Expected impact	Feasibility	Sustainability

Form 17. SWOT Analysis Template

Strengths	Weaknesses
Opportunities	**Threats**

Form 18. Gantt Chart Template

Activity	Responsible person	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Form 19. Implementation Plan Template

Activities and objectives	Indicators	Group with primary responsibility	Resources needed	Gantt chart for year____											
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

ANNEXES

Annex A. WHO Recommendations for AMR Interventions

(Excerpt reprinted from WHO's *Global Strategy for the Containment of Antimicrobial Resistance.* 2001. Geneva: WHO.)

Recommendations for intervention

1. PATIENTS AND THE GENERAL COMMUNITY

Education

1.1 Educate patients and the general community on the appropriate use of antimicrobials.

1.2 Educate patients on the importance of measures to prevent infection, such as immunization, vector control, use of bednets, etc.

1.3 Educate patients on simple measures that may reduce transmission of infection in the household and community, such as handwashing, food hygiene, etc.

1.4 Encourage appropriate and informed health care seeking behaviour.

1.5 Educate patients on suitable alternatives to antimicrobials for relief of symptoms and discourage patient self initiation of treatment, except in specific circumstances.

2. PRESCRIBERS AND DISPENSERS

Education

2.1 Educate all groups of prescribers and dispensers (including drug sellers) on the importance of appropriate antimicrobial use and containment of antimicrobial resistance.

2.2 Educate all groups of prescribers on disease prevention (including immunization) and infection control issues.

2.3 Promote targeted undergraduate and postgraduate educational programmes on the accurate diagnosis and management of common infections for all health care workers, veterinarians, prescribers and dispensers.

2.4 Encourage prescribers and dispensers to educate patients on antimicrobial use and the importance of adherence to prescribed treatments.

2.5 Educate all groups of prescribers and dispensers on factors that may strongly influence their prescribing habits, such as economic incentives, promotional activities and inducements by the pharmaceutical industry.

Management, guidelines and formularies

2.6 Improve antimicrobial use by supervision and support of clinical practices, especially diagnostic and treatment strategies.

2.7 Audit prescribing and dispensing practices and utilize peer group or external standard comparisons to provide feedback and endorsement of appropriate antimicrobial prescribing.

2.8 Encourage development and use of guidelines and treatment algorithms to foster appropriate use of antimicrobials.

2.9 Empower formulary managers to limit antimicrobial use to the prescription of an appropriate range of selected antimicrobials.

Regulation

2.10 Link professional registration requirements for prescribers and dispensers to requirements for training and continuing education.

3. HOSPITALS

Management

3.1 Establish infection control programmes, based on current best practice, with the responsibility for effective management of antimicrobial resistance in hospitals and ensure that all hospitals have access to such a programme.

3.2 Establish effective hospital therapeutics committees with the responsibility for overseeing antimicrobial use in hospitals.

3.3 Develop and regularly update guidelines for antimicrobial treatment and prophylaxis, and hospital antimicrobial formularies.

3.4 Monitor antimicrobial usage, including the quantity and patterns of use, and feedback results to prescribers.

Diagnostic laboratories

3.5 Ensure access to microbiology laboratory services that match the level of the hospital, e.g. secondary, tertiary.

3.6 Ensure performance and quality assurance of appropriate diagnostic tests, microbial identification, antimicrobial susceptibility tests of key pathogens, and timely and relevant reporting of results.

3.7 Ensure that laboratory data are recorded, preferably on a database, and are used to produce clinically- and epidemiologically-useful surveillance reports of resistance patterns among common pathogens and infections in a timely manner with feedback to prescribers and to the infection control programme.

Interactions with the pharmaceutical industry

3.8 Control and monitor pharmaceutical company promotional activities within the hospital environment and ensure that such activities have educational benefit.

4. USE OF ANTIMICROBIALS IN FOOD-PRODUCING ANIMALS

This topic has been the subject of specific consultations which resulted in "WHO global principles for the containment of antimicrobial resistance in animals intended for food"*. A complete description of all rec-

* http:// www.who.int/emc/diseases/zoo/who_global_principles.html

ommendations is contained in that document and only a summary is reproduced here.

Summary

4.1 Require obligatory prescriptions for all antimicrobials used for disease control in food animals.

4.2 In the absence of a public health safety evaluation, terminate or rapidly phase out the use of antimicrobials for growth promotion if they are also used for treatment of humans.

4.3 Create national systems to monitor antimicrobial usage in food animals.

4.4 Introduce pre-licensing safety evaluation of antimicrobials with consideration of potential resistance to human drugs.

4.5 Monitor resistance to identify emerging health problems and take timely corrective actions to protect human health.

4.6 Develop guidelines for veterinarians to reduce overuse and misuse of antimicrobials in food animals.

5. NATIONAL GOVERNMENTS AND HEALTH SYSTEMS

Advocacy and intersectoral action

5.1 Make the containment of antimicrobial resistance a national priority.

- Create a national intersectoral task force (membership to include health care professionals, veterinarians, agriculturalists, pharmaceutical manufacturers, government, media representatives, consumers and other interested parties) to raise awareness about antimicrobial resistance, organize data collection and oversee local task forces. For practical purposes such a task force may need to be a government task force which receives input from multiple sectors.
- Allocate resources to promote the implementation of interventions to contain resistance. These interventions should include the appropriate utilization of antimicrobial drugs, the control and prevention of infection, and research activities.
- Develop indicators to monitor and evaluate the impact of the antimicrobial resistance containment strategy.

Regulations

5.2 Establish an effective registration scheme for dispensing outlets.

5.3 Limit the availability of antimicrobials to prescription-only status, except in special circumstances when they may be dispensed on the advice of a trained health care professional.

5.4 Link prescription-only status to regulations regarding the sale, supply, dispensing and allowable promotional activities of antimicrobial agents; institute mechanisms to facilitate compliance by practitioners and systems to monitor compliance.

5.5 Ensure that only antimicrobials meeting international standards of quality, safety and efficacy are granted marketing authorization.

5.6 Introduce legal requirements for manufacturers to collect and report data on antimicrobial distribution (including import/export).

5.7 Create economic incentives for appropriate use of antimicrobials.

Policies and guidelines

5.8 Establish and maintain updated national Standard Treatment Guidelines (STGs) and encourage their implementation.

5.9 Establish an Essential Drugs List (EDL) consistent with national STGs and ensure the accessibility and quality of these drugs.

5.10 Enhance immunization coverage and other disease preventive measures, thereby reducing the need for antimicrobials.

Education

5.11 Maximize and maintain the effectiveness of the EDL and STGs by conducting appropriate undergraduate and postgraduate education programmes of health care professionals on the importance of appropriate antimicrobial use and containment of antimicrobial resistance.

5.12 Ensure that prescribers have access to approved prescribing literature on individual drugs.

Surveillance of resistance, antimicrobial usage and disease burden

5.13 Designate or develop reference microbiology laboratory facilities to coordinate effective epidemiologically sound surveillance of antimicrobial resistance among common pathogens in the community, hospitals and other health care facilities. The standard of these laboratory facilities should be at least at the level of recommendation 3.6.

5.14 Adapt and apply WHO model systems for antimicrobial resistance surveillance and ensure data flow to the national intersectoral task force, to authorities responsible for the national STGs and drug policy, and to prescribers.

5.15 Establish systems for monitoring antimicrobial use in hospitals and the community, and link these findings to resistance and disease surveillance data.

5.16 Establish surveillance for key infectious diseases and syndromes according to country priorities, and link this information to other surveillance data.

6. DRUG AND VACCINE DEVELOPMENT

6.1 Encourage cooperation between industry, government bodies and academic institutions in the search for new drugs and vaccines.

6.2 Encourage drug development programmes which seek to optimize treatment regimens with regard to safety, efficacy and the risk of selecting for resistant organisms.

6.3 Provide incentives for industry to invest in the research and development of new antimicrobials.

6.4 Consider establishing or utilizing fast-track marketing authorization for safe new agents.

6.5 Consider using an orphan drug scheme where available and applicable.

6.6 Make available time-limited exclusivity for new formulations and/or indications for use of antimicrobials.

6.7 Align intellectual property rights to provide suitable patent protection for new antimicrobial agents and vaccines.

6.8 Seek innovative partnerships with the pharmaceutical industry to improve access to newer essential drugs.

7 PHARMACEUTICAL PROMOTION

7.1 Introduce requirements for pharmaceutical companies to comply with national or international codes of practice on promotional activities.

7.2 Ensure that national or internationally codes of practice cover direct-to-consumer advertising, including advertising the Internet.

7.3 Institute systems for monitoring compliance with legislation on promotional activities.

7.4 Identify and eliminate economic incentives that encourage inappropriate antimicrobial use.

7.5 Make prescribers aware that promotion in accordance with the datasheet may not necessarily constitute appropriate antimicrobial use.

8. INTERNATIONAL ASPECTS OF CONTAINING ANTIMICROBIAL RESISTANCE

8.1 Encourage collaboration between governments, non-governmental organizations, professional societies and international agencies to recognize the importance of antimicrobial resistance, to present consistent, simple and accurate messages regarding the importance of antimicrobial use, antimicrobial resistance and its containment, and to implement strategies to contain resistance.

8.2 Consider the information derived from the surveillance of antimicrobial use and antimicrobial resistance, including the containment thereof, as global public goods for health to which all governments should contribute.

8.3 Encourage governments, non-governmental organizations, professional societies and international agencies to support the establishment of networks, with trained staff and adequate infrastructures, which can undertake epidemiologically valid surveillance of antimicrobial resistance and antimicrobial use to provide information for the optimal containment of resistance.

8.4 Support drug donations in line with the UN interagency guidelines*.

8.5 Encourage the establishment of international inspection teams qualified to conduct valid assessments of pharmaceutical manufacturing plants.

8.6 Support an international approach to the control of counterfeit antimicrobials in line with the WHO guidelines**.

8.7 Encourage innovative approaches to incentives for the development of new pharmaceutical products and vaccines for neglected diseases.

8.8 Establish an international database of potential research funding agencies with an interest in antimicrobial resistance.

8.9 Establish new, and reinforce existing, programmes for researchers to improve the design, preparation and conduct of research to contain antimicrobial resistance.

---

* *Interagency guidelines. Guidelines for Drug Donations*, revised 1999. Geneva, World Health Organization, 1999. WHO/EDM/PAR/99.4.

** *Counterfeit drugs. Guidelines for the development of measures to combat counterfeit drugs.* Geneva, World Health Organization, 1999. WHO/EDM/QSM/99.1.

Annex B. WHO AMR Fact Sheet

(Reprinted from http://www.who.int/mediacentre/factsheets/fs194/en/)

Fact sheet No.194
Revised February 2011

Antimicrobial resistance

Key facts

- Infections caused by resistant microorganisms often fail to respond to conventional treatment, resulting in prolonged illness and greater risk of death.
- About 440,000 new cases of multidrug-resistant tuberculosis (MDR-TB) emerge annually, causing at least 150,000 deaths.
- Resistance to earlier generation antimalarial medicines, such as chloroquine and sulfadoxine-pyrimethamine, is widespread in most malaria-endemic countries.
- A high percentage of hospital-acquired infections are caused by highly resistant bacteria such as methicillin-resistant *Staphylococcus aureus* (MRSA).
- Inappropriate and irrational use of antimicrobial medicines provides favourable conditions for resistant microorganisms to emerge, spread and persist.

What is antimicrobial resistance?

Antimicrobial resistance (AMR) is resistance of a microorganism to an antimicrobial medicine to which it was previously sensitive. Resistant organisms (they include bacteria, viruses and some parasites) are able to withstand attack by antimicrobial medicines, such as antibiotics, antivirals, and antimalarials, so that standard treatments become ineffective and infections persist and may spread to others. AMR is a consequence of the use, particularly the misuse, of antimicrobial medicines and develops when a microorganism mutates or acquires a resistance gene.

Why is antimicrobial resistance a global concern?
AMR kills

Infections caused by resistant microorganisms often fail to respond to the standard treatment, resulting in prolonged illness and greater risk of death.

AMR hampers the control of infectious diseases

AMR reduces the effectiveness of treatment because patients remain infectious for longer, thus potentially spreading resistant microorganisms to others.

AMR threatens a return to the pre-antibiotic era

Many infectious diseases risk becoming uncontrollable and could derail the progress made towards reaching the targets of the health-related United Nations Millennium Development Goals set for 2015.

AMR increases the costs of health care

When infections become resistant to first-line medicines, more expensive therapies must be used. The longer duration of illness and treatment, often in hospitals, increases health care costs and the financial burden to families and societies.

AMR jeopardizes health care gains to society

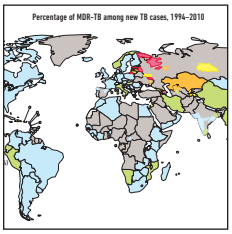
The achievements of modern medicine are put at risk by AMR. Without effective antimicrobials for care and prevention of infections, the success of treatments such as organ transplantation, cancer chemotherapy, and major surgery would be compromised.

AMR threatens health security, and damages trade and economies

The growth of global trade and travel allows resistant microorganisms to be spread rapidly to distant countries and continents.

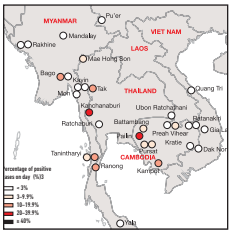
Facts on antimicrobial resistance

About 440,000 new cases of multidrug-resistant tuberculosis (MDR-TB) emerge annually, causing at least 150,000 deaths. Extensively drug-resistant tuberculosis (XDR-TB) has been reported in 64 countries to date.



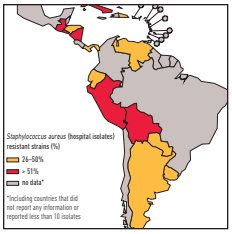
Percentage of MDR-TB among new TB cases, 1994–2010
pdf, 730kb

Resistance to earlier generation antimalarial medicines, such as chloroquine and sulfadoxine-pyrimethamine, is widespread in most malaria-endemic countries. *Falciparum* malaria parasites resistant to artemisinins are emerging in South-East Asia; infections show delayed clearance after the start of treatment (indicating resistance).



Percentage of patients with P. falciparum parasitaemia on day 3 after treatment with an artemisinin-based combination therapy (2006–2010)
pdf, 530kb

A high percentage of hospital-acquired infections are caused by highly resistant bacteria such as methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant enterococci.



Staphylococcus aureus (hospital isolates): percentage of methicillin-resistant strains, 2007, Latin America and the Caribbean
pdf, 151kb

Resistance is an emerging concern for treatment of HIV infection, following the rapid expansion in access to antiretroviral medicines in recent years; national surveys are underway to detect and monitor resistance.

Ciprofloxacin is the only antibiotic currently recommended by WHO for the management of bloody diarrhoea due to *Shigella* organisms, now that widespread resistance has developed to other previously effective antibiotics. But rapidly increasing prevalence of resistance to ciprofloxacin is reducing the options for safe and efficacious treatment of shigellosis, particularly for children. New antibiotics suitable for oral use are badly needed.

AMR has become a serious problem for treatment of gonorrhoea (caused by *Neisseria gonorrhoeae*), involving even "last-line" oral cephalosporins, and is increasing in prevalence worldwide. Untreatable gonococcal infections would result in increased rates of illness and death, thus reversing the gains made in the control of this sexually transmitted infection.
New resistance mechanisms, such as the beta-lactamase NDM-1, have emerged among several gram-negative bacilli. This can render powerful antibiotics, which are often the last defence against multi-resistant strains of bacteria, ineffective.

What drives antimicrobial resistance?

Inappropriate and irrational use of medicines provides favourable conditions for resistant microorganisms to emerge and spread. For example, when patients do not take the full course of a prescribed antimicrobial or when poor quality antimicrobials are used, resistant microorganisms can emerge and spread.
Underlying factors that drive AMR include:

- Inadequate national commitment to a comprehensive and coordinated response, ill-defined accountability and insufficient engagement of communities
- Weak or absent surveillance and monitoring systems
- Inadequate systems to ensure quality and uninterrupted supply of medicines
- Inappropriate and irrational use of medicines, including in animal husbandry
- Poor infection prevention and control practices
- Depleted arsenals of diagnostics, medicines, and vaccines as well as insufficient research and development on new products

Combat drug resistance: no action today, no cure tomorrow

The emergence of AMR is a complex problem driven by many interconnected factors; single, isolated interventions have little impact. A global and national multi-sectoral response is urgently needed to combat the growing threat of AMR.

WHO's response

WHO is engaged in guiding the response to AMR through—

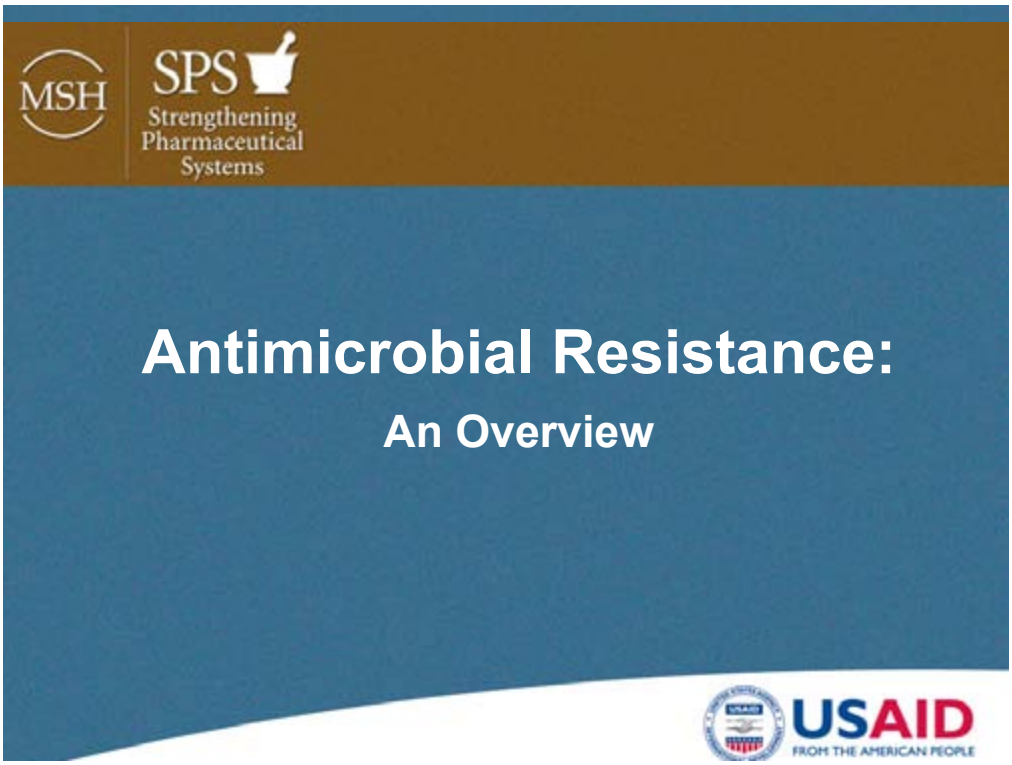
-
- Policy guidance, support for surveillance, technical assistance, knowledge generation and partnerships, including through disease prevention and control programmes
- Essential medicines quality, supply and rational use
- Infection prevention and control
- Patient safety
- Laboratory quality assurance

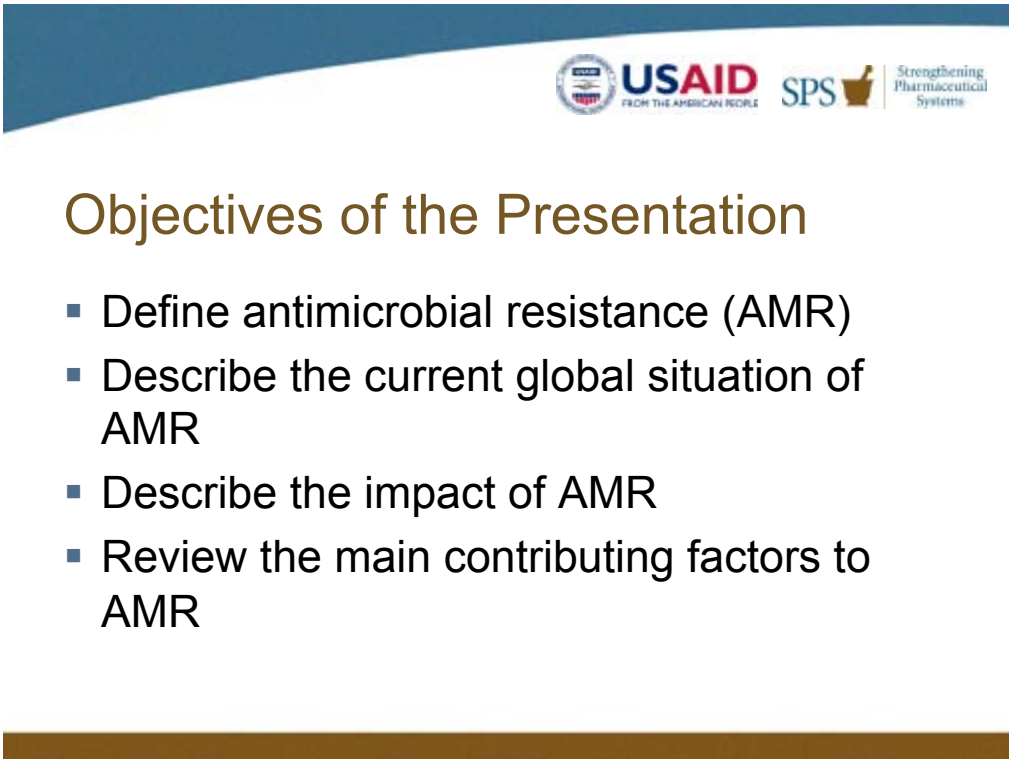
WHO has selected combating antimicrobial resistance as the theme for World Health Day 2011. On this day, WHO issues an international call for concerted action to halt the spread of antimicrobial resistance and recommends a six-point policy package for governments.

WHO calls on all key stakeholders, including policy makers and planners, the public and patients, practitioners and prescribers, pharmacists and dispensers, and the pharmaceutical industry, to act and take responsibility for combating antimicrobial resistance.

Annex C. Global AMR Situation PowerPoint Slides

The following PowerPoint slides contain examples of global and country-level data on AMR. They follow a logical sequence and cover the major points necessary in an overview of AMR. A presentation (or presentations) covering these topics will be helpful at any meeting at which people may not be familiar with AMR or be aware of the extent of the problem. However, the slides can be used in any way that may be helpful to you.


MSH
SPS
Strengthening
Pharmaceutical
Systems
Antimicrobial Resistance:
An Overview
USAID
FROM THE AMERICAN PEOPLE


USAID
FROM THE AMERICAN PEOPLE
SPS
Strengthening
Pharmaceutical
Systems
Objectives of the Presentation
Define antimicrobial resistance (AMR)
Describe the current global situation of AMR
Describe the impact of AMR
Review the main contributing factors to AMR

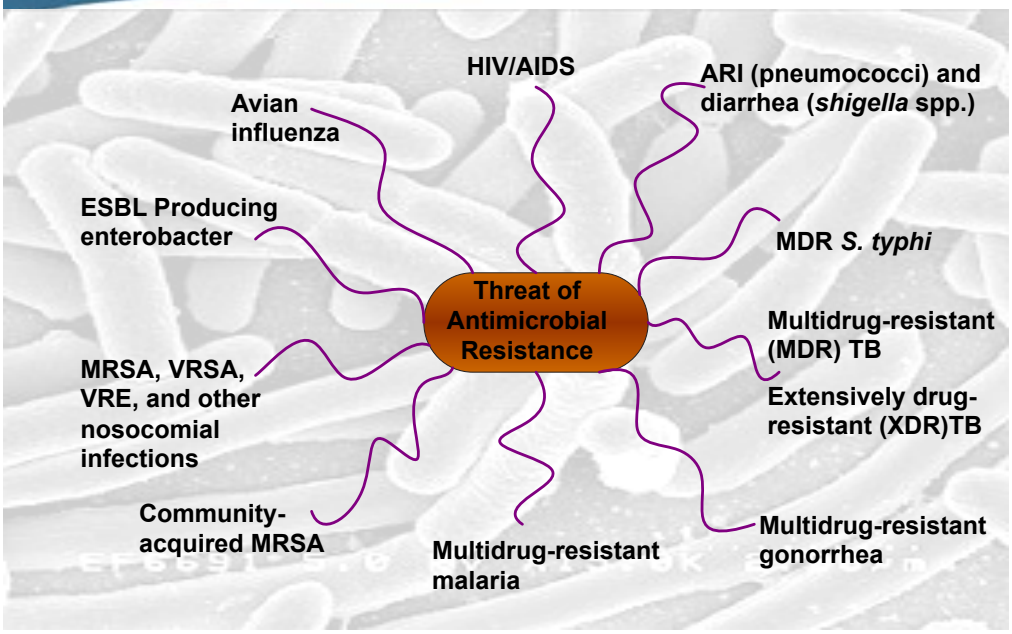
The Global Threat of Antimicrobial Resistance (1)

- Infectious diseases kill 11 million people annually, 95% of whom live in resource-constrained countries
- The major life-saving intervention for infectious diseases is *antimicrobial treatment*
- But AMR is rapidly reducing the effectiveness of antimicrobials

The Global Threat of Antimicrobial Resistance (2)

AMR is

- A steadily increasing global public health threat
- Widespread in both the hospital and community
- Rapidly making many 1st line treatments ineffective
- Impacting all infectious diseases, including HIV/AIDS, TB and malaria



ARI: acute respiratory infection
MRSA: Methicillin-resistant *Staphylococcus aureus*
TB: tuberculosis
VRE: vancomycin-resistant enterococci
VRSA: vancomycin-resistant *S. aureus*

USAID FROM THE AMERICAN PEOPLE SPS Strengthening Pharmaceutical Systems

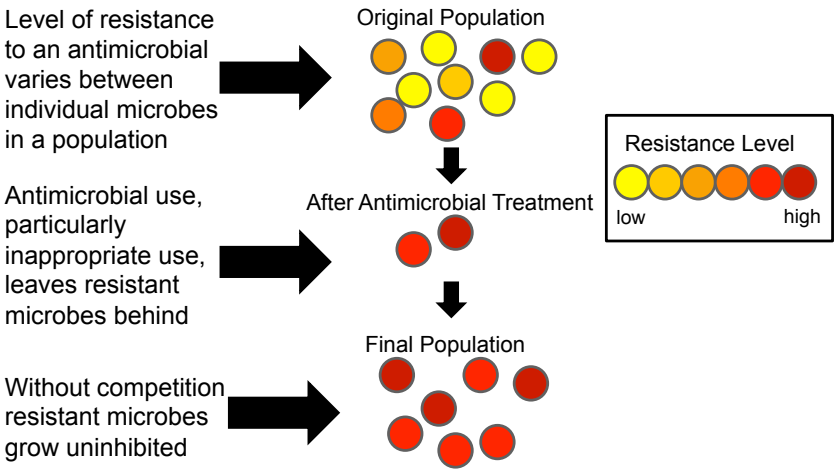
What is AMR?

Definition

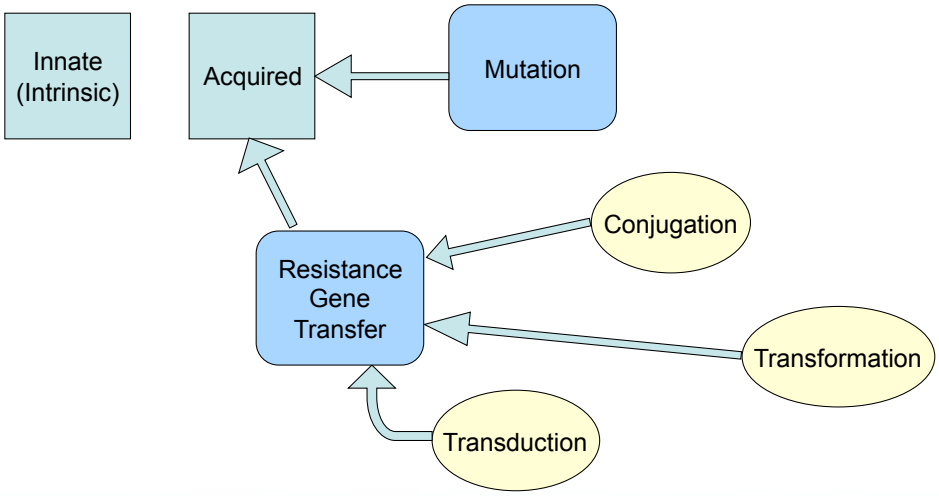
"Ability of a parasite [microbe] strain to survive and/or multiply despite the administration and absorption of a drug given in doses equal to or higher than those usually recommended but within tolerance of the subject." (WHO, 1973)

Translation: the recommended antimicrobial medicine is no longer effective for treating an infectious disease

Selection Pressure



Types of Antimicrobial Resistance



How serious is AMR?

Global Examples of AMR – HIV/AIDS

- Resistance to any ARV
  - Africa – 5.5%
  - East Asia – 7.4%
  - S.E. Asia – 5.7%
  - Latin America – 6.4%
  - N. America – 11.4%
  - Europe – 10.6%

From WATCH reports, cited in: Maglione, M, et al. 2007. *Antiretroviral (ARV) Drug Resistance in the Developing World. Evidence Report/Technology Assessment No. 156*. AHRQ Publication No. 07-E014. Rockville, MD: Agency for Healthcare Research and Quality.

Global Examples of AMR – TB

- 400,000 cases of MDR-TB emerging every year
- A 2006 global study found 20% of TB isolates were MDR and 2% XDR[1]
- XDR-TB identified in every region of the world[2]

1. Emergence of Mycobacterium tuberculosis with extensive resistance to second-line drugs-worldwide, 200-2004. *Morbidity and Mortality Weekly Report*, 2006, 55(11):301-305

2. WHO. 2007. The Global MDR-TB and XDR-TB Response Plan 2007-2008. Geneva, WHO.

Global Examples of AMR – Malaria

- Resistance to Cholorquine and SP are highly prevalent in most malaria-endemic areas[1]
- ACT remains the *last option* for treatment in many areas
- Resistance to even ACTs has been reported in South East Asia[2]

1. Boland. P.B. 2001. *Drug Resistance in Malaria*. Geneva, WHO.
2. SEARO and WRPO. 2007. Containment of Malaria Multi-drug Resistance on the Cambodia-Thailand Boarder: Report of an Informal Consultation, Phnom Penh, Cambodia, 29-30 January, 2007. Geneva, WHO.

Global Example of AMR: *S. pneumoniae*

Prevalence not susceptible to any three drug classes (including penicillin), Alexander Project 1998–2000

- Italy (22.4%)
- Saudi Arabia (23.5%)
- US (25.8%)
- Mexico (31.1%)
- Spain (32.9%)
- South Africa (33.5%)
- Singapore (39.9%)
- France (49.1%)
- Japan (63.1%)
- Hong Kong (79.3%)

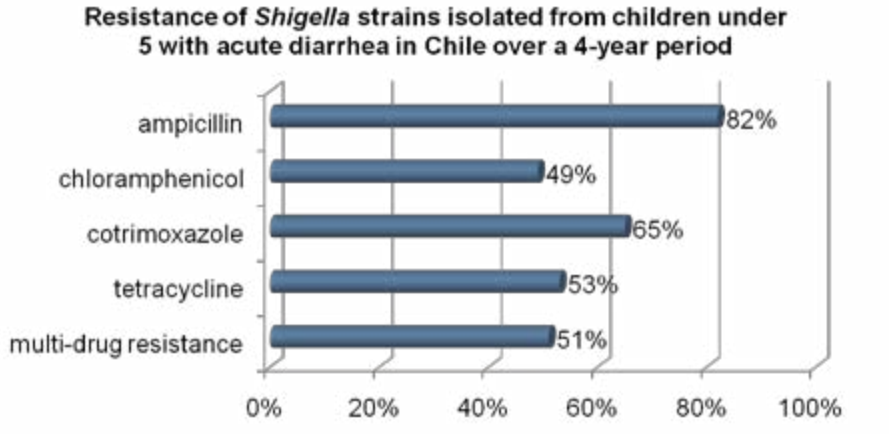
Adapted from: Jacobs and Others 2003. *Quoted in:* Laxminarayan and colleagues. Drug resistance (Chapter 55, Pages 1031-1051) In: Disease Control Priorities in Developing Countries, 2006.

Global Examples of AMR: Sexually Transmitted Infections

- Current range of penicillin resistant gonorrhea—9-90% in Asia and more than 35% in Sub-Saharan Africa and the Caribbean[1]
- *N. gonorrhoeae* isolates in Guangzhou in China during a 6-year period from 1996 to 2001—from 57.2% to 81.8% for penicillin G and from 17.6% to 72.7% for ciprofloxacin[2]

1. Okeke et al. *Lancet Infect Dis* 2005; 5: 481-93
2. Zheng et al. *Sex Transm Infect* 2003; 79(5): 399-402

Global Examples of AMR: Shigella



Fulla N et al. *Am J Trop Med Hyg* 2005; 72(6): 851-854

Is AMR getting worse?

AMR on the Rise (1)

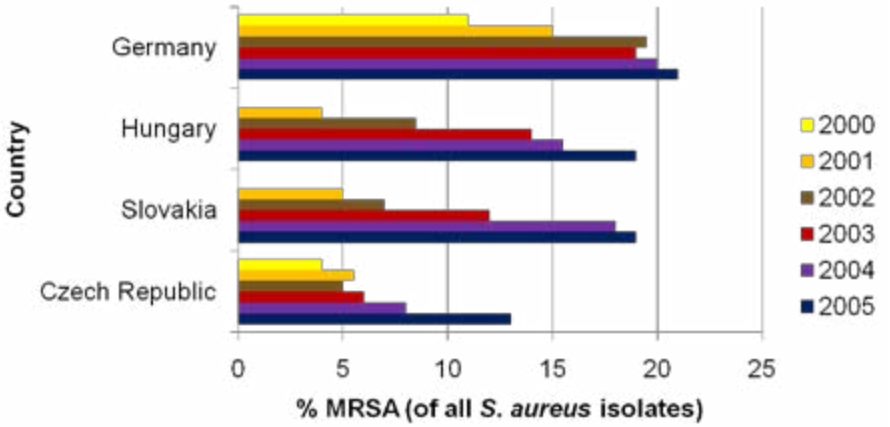
1981-1999 Surveillance data on nosocominal infections at National Taiwan University Hospital showed a great increase in the incidence of some drug resistant pathogens

Pathogen	Incidence in 1981-1986	Incidence in 1993-1998
Methicillin-resistant *Staphylococcus aureus*	4.3%	58.9%
Cefotaxime-resistant *Escherichia coli*	0%	6.1%
Cefotaxime-resistant *Klebsiella pneumoniae*	4%	25.8%

Source: Hsueh et al. *Emerg Infect Dis* 2002; 8(1): 63-8

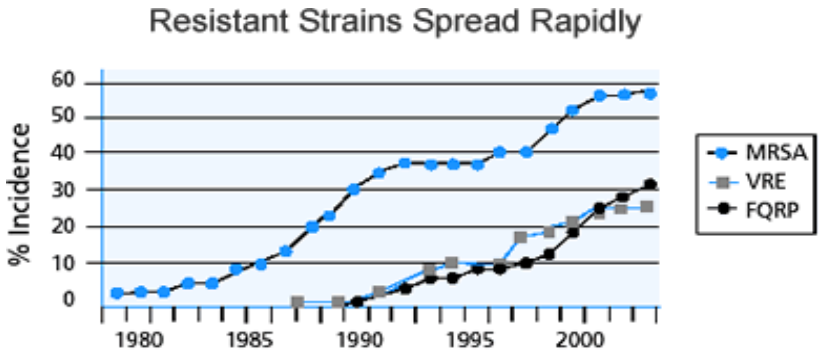
AMR on the Rise (2)

Trends in MRSA in European countries between 2000 and 2005.



European Antimicrobial Resistance Surveillance System (EARSS). 2005. EARSS Annual Report:2005. Bilthoven, The Netherlands: EARSS.

AMR on the Rise (3)



Source: Centers for Disease Control and Prevention

MRSA = Methicillin-resistant *Staphylococcus Aureus*
VRE = Vancomycin-resistantant Enterococci
FQRP = Floroquinolone-resistant *Pseudomonas aeruginosa*

What is the impact of AMR?

Impact of AMR

Huge individual as well as public health consequences in terms of

- Prolonged illness
- Increased mortality
- Prolonged periods of infectiousness with increased risk of transmission of resistant pathogens to others
- Indirect costs (prolonged absence from work, etc)
- Increased direct cost (longer hospital stay, use of more expensive 2nd or 3rd line drugs)

Impact of AMR: Cost implications (1)

Disease	Avg. First-Line Cost (USD)	Avg. Second-Line Cost (USD)	Increase
HIV/AIDS[1]	482/patient/year	6,700/patient/year	6,218/patient/year (~14x more)
TB[2]	20/course	3,500/course	3,480/course (~175x more)
Malaria[3]	0.10–0.20/adult course (Chloroquine/ sulfadoxine-pyrimethamine)	1.20–3.50/adult course (artemisinin-based combination therapy)	1-2.20/adult course (~6–35x more)

1. Revenga, A. et al. 2006. *The Economics of Effective AIDS Treatment: Evaluating Policy Options for Thailand*. Washington, DC: The World Bank.
2. http://www.upmc-cbn.org/report_archive/2006/11_November_2006/cbnreport_111006.html
3. Yeung, S. et al. 2004. *Am J Trop Med Hyg*.71(Suppl. 2): 179-86.

Impact of AMR: Cost Implications (2)

Primary blood stream infections due to nosocomial MRSA caused about 3-fold increase in cost and hospital stay when compared with infections due to MSSA

Pathogen	Median hospital stay (days)	Median total cost (US $)
Methicillin-**sensitive** *Staphylococcus aureus*	4	9,661
Methicillin-**resistant** *Staphylococcus aureus*	12	27,083 ← **3x more**

Source: Abramson and Sexton. *Infect Control Hosp Epidemiol* 1999; 20(6): 408-11

Impact of AMR: Cost Implications (3)

Because of failing treatment with chloroquine or SP, most malaria-affected African countries have changed to ACT-based regimen, which has significant cost implications

Drug	Cost for an adult treatment course (US$)[1]
Artemether-lumefantrine (Coartem)	2.4 ← 18x more
Chloroquine	0.13
Sulfadoxine-pyrimethamine (SP)	0.14

Source: 1. Omari et al. *Tropical Medicine and International Health* 2004; 9(2): 192-199

Impact of AMR: Reduced Effectiveness of Medical Technology

- Antimicrobials compliment many other medical technologies which require the drugs to ward off infection such as –
  - Transplants
  - Chemotherapy
  - Surgery
- Ineffectiveness of antimicrobials has indirect costs by limiting the value of these technologies.

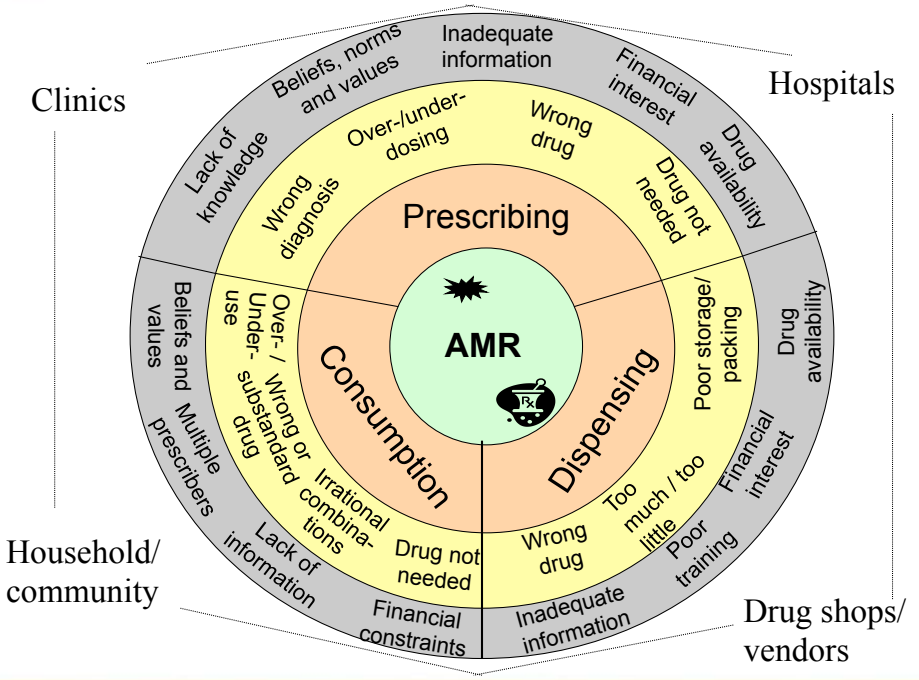
What are the key factors contributing to AMR?

Inappropriate Use of Antimicrobials

- Antimicrobials are one of the most widely used and misused agents
- 20–50% of human use UNNECESSARY
- Inappropriate use includes the prescriber, dispenser and patient/consumer

Wise et al. *British Medical Journal* 1998; 317(7159): 609–10.

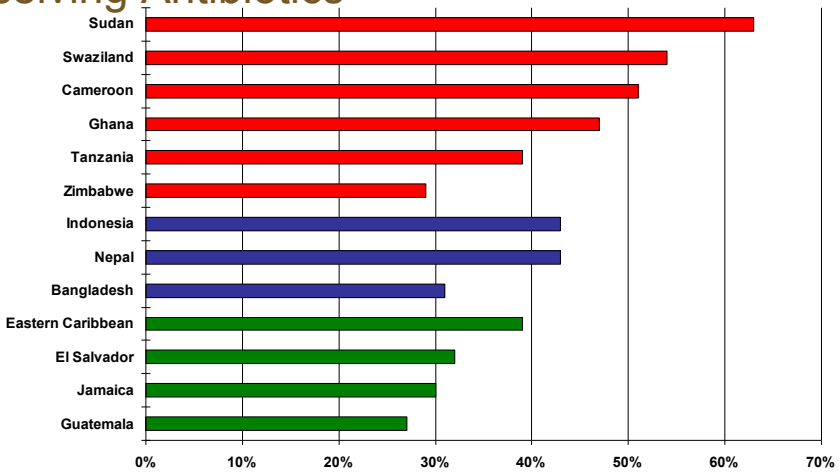
Real World Factors Impacting Use



Antimicrobial Use in Hospitals and Primary Health Care

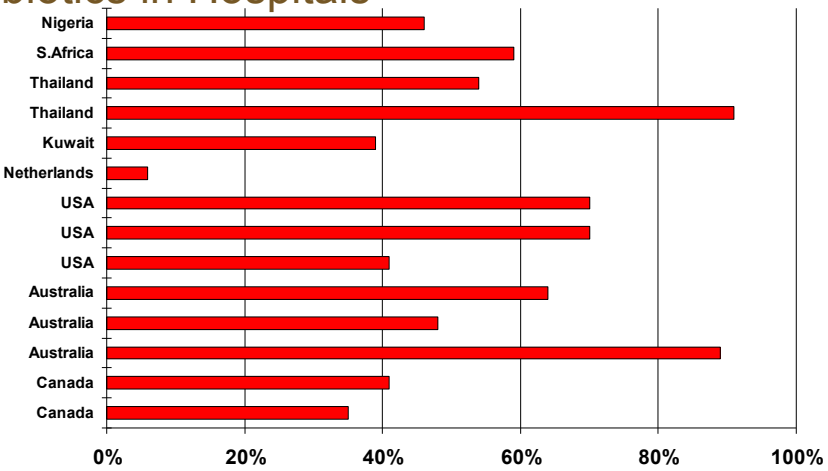
- Every 2nd patient in acute care hospitals receives antibiotics
- 30–60% patients given antibiotics in primary health care. This is perhaps twice what is clinically needed
- Up to 10% of admitted patients get hospital-acquired infections
  - 60% of hospital-acquired infections are drug-resistant

Percent of Primary Health Care Patients Receiving Antibiotics



Sources: Management Sciences for Health and WHO. 1997. *Managing Drug Supply*. 2nd ed. West Hartford, CT: Kumarian Press; WHO. 2000. *Essential Drugs Monitor*. No. 28 - 29.

Percent of Patients Receiving Inappropriate Antibiotics in Hospitals



Adapted from: Hogerzeil HV. *British Journal of Clinical Pharmacology* 1995; 39(1):1–6.

Antimicrobial Use in Animals

- 50% of use in developing countries is in animals (large proportion of which is for growth promotion)
- 40–80% of animal use HIGHLY QUESTIONABLE *
- Irrational use in animals can contribute to resistance in human pathogens

* Wise et al. *British Medical Journal* 1998; 317(7159): 609–10.

Poor Infection Prevention and Control

- Common modes of transmission include hands and medical devices (catheters, ventilators, etc.)
- Lack of or poor adherence to effective infection control protocols
- Fewer infections in a hospital setting means less need for antimicrobial use and therefore a lower selective pressure for infectious agents to develop resistance

Poor Regulation and Enforcement

- Control of supply, distribution and sales
  - Antimicrobials sold through unofficial retail outlets or street vendors.
  - Antimicrobials sold without requiring a prescription (“over the counter”) or in incomplete doses.

Poor Quality Antimicrobial Products

- Counterfeit and substandard drugs
  - Lack the stated active ingredient, contain the wrong active ingredient, or have an insufficient level of active ingredient
  - The US FDA estimates that 10% of drugs worldwide are counterfeit and in some countries more than 50% of the drug supply is fake
- Sub-therapeutic levels of a drug in the patient results in treatment failure and growth of resistant strains

Inadequate Surveillance in Resource-Constrained Countries

- Inadequate data to guide policy, use, and impact measurement
- Quality and dependability of data can be of concern even where available
- Lack of standardization & reporting process so comparison & recommendations not easy

Weak Pharmaceutical Management

Deficiencies in pharmaceutical management manifest in such ways as

- Inappropriate selection and use
  (due to lack of policies and guidelines such as STGs, EMLs, and inadequate pre and in-service trainings)
- Undependable supply (stock-outs, etc)
- Poor storage practices

Drug Advertising and Promotion

- Direct-to-consumer Ads
  - Markets medicines directly to the public
  - Stimulated demand for the “latest” medicine
- Pharmaceutical Promotion
  - Target prescribers
  - Use of a host of “incentives”- gifts, free samples, speaking engagements, etc

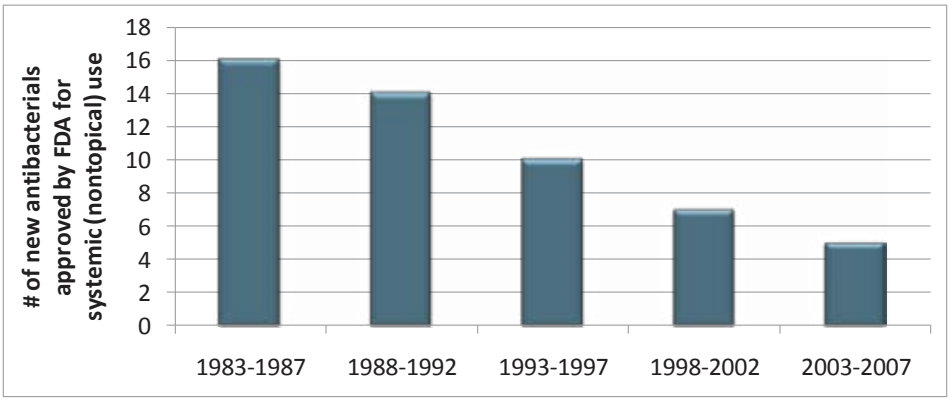
Why Is It More Acutely Urgent Now To “Preserve the Effectiveness of Currently Available Antimicrobials”?

Because First-Line Treatments Are Failing

Infectious Disease	AMR Global Prevalence Rates
Malaria	Chloroquine resistance in 81/92 countries
Tuberculosis	Up to17% primary multi-drug resistance
HIV/AIDS	Up to 25% primary resistance to at least one antiretroviral agent
Gonorrhea	5-98% penicillin resistance and 1-50% fluoroquinolone resistance in *Neisseria gonorrhoeae*
Pneumonia and bacterial meningitis	Up to 70% penicillin resistance, 6-43 % ampicillin resistance, and 11-72% Macrolide resistance in *Streptococcus pneumoniae*
Diarrhea: shigellosis	10-90% ampicillin resistance 5-95% cotrimoxazole resistance
Hospital infections	Up to 70% resistance of Staphylococcus aureus to all penicillins and cephalosporins

Source: WHO country data, 2000-03 and APUA.2005. Global Advisory on Antibiotic Resistance DATA (GAARD Report). Boston, APUA.

Because the Antimicrobial Pipeline Is Dwindling (1)



Spellberg *et al.* Clinical Infectious Diseases 2008;46:155-64.

Because the Antimicrobial Pipeline Is Dwindling (2)

New antimicrobial agents approved between 1998-2003

Drug	Year Approved	Novel Mechanism
Rifapentine	1998	No
Quinupristin/dalfopristin	1999	No
Moxifloxacin	1999	No
Gatifloxacin	1999	No
Linezolid	2000	Yes
Cefditoren pivoxil	2001	No
Ertapenem	2001	No
Gemifloxacin	2003	No
Daptomycin	2003	Yes

Recreated from: Spellberg, B., et al. 2004. *CID*. 38:1279-86 (1 May).

Because the Flow of Medicines Is Substantially Increasing

- Multifold increase in supply of medicines through recent global health initiatives (GFATM, US Presidential Initiatives, GDF, etc)
- Resistance likely to escalate rapidly if strategies to strengthen pharmaceutical management and contain AMR not implemented

What Can "Superbugs" Do?

Simon's Story: The Real Impact of AMR on a Family

- Simon, a 15-month old child recovering from a cold, awoke with a high fever on the morning of April 16, 2004.
- His parents took him to the ER where the standard tests (chest X-ray, oxygen level) were run.
- It was speculated that he could be asthmatic. He was discharged at 1:30 PM.
- Once home, Simon began vomiting, became cold to the touch, his lips turned blue and he was breathing very heavily. He was rushed to the hospital again and sent to the ICU where he soon fell into a septic coma.
- The doctors could not diagnose Simon's infection, and **all of the treatments they tried failed**. On April 17, 2004, Simon was pronounced dead at 12:45 p.m.

Simon's Story…

Two months later

- The autopsy confirmed that Simon died from **methicillin-resistant *Staphylococcus aureus* (MRSA)**
- Most likely the "community-acquired" strand rather than the hospital-based one.

Adapted from *My Son, My Sun—A Mother's Story of Tragedy in the Face of MRSA* Posted: 3/1/06 http://www.idsociety.org/Content/NavigationMenu/News_Room1/Bad_Bugs_Need_Drugs/My_Son,_My_SunandNum8212;A_Mother%E2%80%99s_Story_of_Tragedy_in_the_Face_of_MRSA.h

A Glimpse of the Past (1)

Case 1: Policeman, aged 43

- The patient was discharging pus on his face and scalp and in both eyes, which had started a month earlier from a sore at the corner of his mouth. The primary infection was Staph. aureus; the secondary was Strep. pyogenes.
- Sulphapryridine was given to him from December 12 to 19 with no improvement, and he developed a drug rash. On January 19, incisions were made on multiple abscesses on his face and scalp, and resulted in arm abscess that produced Staph. aureus pus. A general infection of the left eye developed and the cornea perforated. The eye was removed.
- On February 12, all of his incisions were producing pus, on the scalp and face, both eyes, and right arm. The lungs became involved, filling with pus containing both the pyogenic cocci.
- As a last resort, doctors tried penicillin and noted "striking improvement" after 24 hours. The scalp discharge stopped, and the pus formation in the right eye was reduced. On February 16, he was much improved, with the right eye being almost normal. By February 17, the patient felt much better with no fever, improved appetite, and resolution of infections in the face, scalp, and right eye.

Adapted from Abraham, Chain et al. 1941. *The Lancet*. Found in Laxminarayan, R., et al. 2007. Extending the Cure. Washington, DC: Resources for the Future.

A Glimpse of the Past (2)

Case 2: Canadian boy, 17

- A previously healthy high school student was taken to the ER with fever, shortness of breath, and a dry cough that had started 2 days earlier. He had temperatures up to 39.5 ºC and extensive bilateral lung infiltrates. He developed respiratory distress and became hypotensive.
- Within 12 hours of ICU admission, he required ventilation to help him breath. He needed significant inotropic support . A bronchoscopy was performed, which revealed patches of dead tissue suggestive of a necrotizing pneumonia.
- The patient was treated with **numerous antimicrobial medicines** during the first 24 hours, including azithromycin, ceftazidime, ciprofloxacin, clindamycin, cloxacillin, and vancomycin. **Despite this aggressive care, the patient's status continued to deteriorate, and he died** on the fifth day after admission.
- Cultures yielded both MRSA and influenza A virus.

Adapted from Adam, H. et al. 2006. Fatal case of post-influenza, community-associated MRSA pneumonia in an Ontario teenager with subsequent familial transmission. *Candaian Communicable Disease Report.* Vol 33.No. 4.

A Glimpse of the Past (3)

- Both cases describe *S. aureus* infection
- Case 1 – Policeman, from 1941 at the dawn of the antibiotic era
- Case 2 – Canadian boy, from 2006 in the twilight of the antimicrobial era?

We Act Now or We Lose

- Some 60 years ago we, were in a

  PRE-antimicrobial era

- We are in impending danger of going into a POST-antimicrobial era
- So we must act NOW to preserve the effectiveness of antimicrobials that work

Annex D. Example of Country- and Regional-Level Call-to-Action Documents

Preserving the Effectiveness of Drugs: A Call for Action in Zambia

The Advocacy Working Group for antimicrobial drug resistance, working in close collaboration with the Central Board of Health, calls all those concerned with health and the well-being of the Zambians to come together and address the problem of failing effectiveness of drugs.

More than 4 million Zambians were reported by the Central Board of Health (CBoH) to have suffered from malaria in 2003. Over 2 million of these cases would not have recovered if they were treated with chloroquine, the drug of choice for treating malaria over the last four decades. TB, which affects more than 50,000 Zambians, can no longer be treated with only one drug. Effective TB treatment now requires a combination of antibiotics. In this era of the HIV/AIDS pandemic, there are new concerns. If nothing is done, treatment failure with antiretroviral drugs (ARVs) due to drug resistance is imminent.

Resistance to antimicrobial drugs, a global threat that has existed since the 20th century, presents a growing peril for Zambia and requires urgent action by every Zambian.

It is gratifying to note that some significant developments to combat drug resistance have been initiated. In 2003, when chloroquine no longer worked, the Ministry of Health (MOH) introduced Coartem, an artemesinin-based combination therapy (ACT). Treatment for sexually transmitted infections (STIs) and cholera has also changed because drug resistance to the common drugs including penicillin and tetracycline has developed.

Replacing ineffective drugs is an important and necessary strategy for improving drug effectiveness. However, because of limited treatment options, it is critical that we act to preserve the effectiveness of existing drugs. While the action being taken is commendable and indeed desirable, evidence available indicates that the problem of drug resistance in Zambia is growing. Parasite resistance to the malaria drug, sulphadoxine-pyrimethamine (commonly known as Fansidar) has now reached unacceptable levels in some parts of Zambia. A similar trend has been observed in TB where multi-drug resistance (MDR) is reported to be developing. There is also evidence that drugs used for treating pneumonia, typhoid, and dysentery are losing their effectiveness.

When drugs are no longer effective, people remain sick for longer periods of time, treatment costs increase, and more people die from otherwise curable diseases. Preserving the effectiveness of antimicrobial drugs should therefore be an immediate concern for all.

The use of antimicrobials is widespread in Zambia. Resistance to these drugs often develops as a result of bad prescribing and dispensing practices, self-medication, and poor drug quality. Evidence shows irrational prescribing and dispensing of antibiotics in Zambia for treatment of viral infections, diarrhea, and malaria. Irrational prescribing means recommending the wrong drug, the wrong amount, or the wrong length of treatment. Many Zambians treat themselves and obtain their medicines from unauthorized sources. This promotes development of resistance to drugs. Poor drug quality may also promote the development of drug resistance. Although drug quality is not tested regularly in Zambia, it is known that some of the drugs used in Zambia do not meet the minimum standards stipulated by the Pharmacy and Poisons Board.

Preserving drug effectiveness requires different actions from different stakeholders. Stakeholders include the Government of the Republic of Zambia, the media, cooperating partners, health professionals, and consumers.

- **This "Call for Action" draws attention to actions that should be taken to preserve the effectiveness of existing drugs.**

Incorrect prescribing and dispensing of antimicrobials is often due to diagnostic limitations and unavailability of recommended drugs. Drug availability has increased in many areas and tools for promoting rational prescribing such as STGs, formulary management, and Drugs and Therapeutics Committees (DTCs) have also been introduced in Zambia. Further action is needed to ensure drug availability and improve the usefulness of tools for promoting rational prescribing. In this regard, there is need to:

- Evaluate the performance of existing DTCs and reduce barriers to their effective performance. (Action: MoH/CBoH)

- Develop and implement a dissemination plan for STGs and Essential Drugs Lists in the public and the private sectors. (Action: MoH/CBoH)

- Ensure that health workers at all levels are trained (pre-service and in-service) on the use of STGs, the Essential Medicines List, and antimicrobial resistance (AMR). (Action: University of Zambia, Chainama College of Health Sciences, General Nursing Council, Medical Council of Zambia, Evelyn Hone College and other training institutions for health workers)

- Strengthen the drug supply systems to ensure regular supply of good quality, essential drugs, including development of a long-term financial sustainability plan. (Action: MoH/CBoH, CHAZ, and other health care providers)

Self-medication is a common problem that contributes to drug resistance. Some of the reasons people treat themselves without professional advice are lack of knowledge, inconvenience, and high cost of drugs and health services. When people treat themselves, they often take the wrong drug or unnecessary drugs. When they obtain the correct drug, they often take the wrong amount or stop taking the medicine too soon. To preserve the effectiveness of drugs it is necessary to:

- Educate the public about the risk of developing drug resistance due to inappropriate drugs. Use media campaigns, school activities, and other community-based organization (CBOs) activities. (Action: MoH/CBoH, Ministry of Education, media communications, Consumer Association of Zambia, health professional bodies, and all health workers)

- Encourage patients to adhere to prescribed and dispensed medicines. (Action: Consumer Association of Zambia, media communications, caregivers, and all health workers)

- Encourage drug vendors to adhere to regulations. (Action: MoH/CBoH, Pharmacy and Poisons Board and health professional bodies)

Poor quality drugs impact on treatment effectiveness and development of resistance. The drug quality control systems in Zambia currently require improvement, thereby providing opportunities for poor quality drugs to be used. To prevent development of antimicrobial resistance due to poor quality drugs, the following needs to be done:

- Establish a National Drug Quality Control Laboratory without delay. (Action: MoH and Pharmacy and Poisons Board and cooperating partners)

- Establish a pharmacovigilance system that will monitor drug quality. (Action: MoH, Pharmacy and Poisons Board, and all health institutions)

- Educate the public about the risks associated with poor quality drugs. (Action: Pharmacy and Poisons Board, media communications, Pharmaceutical Society of Zambia and other health regulatory and professional bodies)

Preserving drug effectiveness requires effective surveillance strategies and mechanisms to facilitate the collection and management of information for appropriate action. The following needs to be done:

- Collect information on drug resistance and make it available to the body designated to spearhead the implementation of drug-resistance containment strategies. (Action: all institutions providing health care services)

- Be vigilant and report cases where patients do not respond to treatment as expected, especially for such diseases as TB, malaria, and HIV/AIDS. (Action: all health workers and patients)

- Develop good network and feedback systems in order to enhance the use of information on drug resistance. (Action: institutions such as TDRC, CDL, Virology and Microbiology Laboratories and NMCC, and all health institutions)

- Strengthen existing laboratory capacities to support diagnosis and conduct surveillance and improve intra and external supervisory capacity of reference laboratories. (Action: MoH/CBoH)

- Include the private sector in the dissemination of information and materials. For example, standard operating procedures and capacity-building activities for laboratories (including quality control) should be availed to the private sector. (Action: MoH/CBoH and private sector)

ANTIMICROBIAL RESISTANCE

¡Save medicines for our children!

Call for Action

Just and compassionate quality pharmaceutical services for all

USAID FROM THE AMERICAN PEOPLE

SPS Strengthening Pharmaceutical Systems

EPN

Save medicines for our children

The Ecumenical Pharmaceutical Network (EPN) is a Christian Organisation with membership in over 30 countries. EPN supports churches and church health systems provide and promote just and compassionate quality pharmaceutical services. Over the last several years, EPN has been involved in promoting access to and rational use of medicines.

In recognition of the growing phenomenon of antimicrobial resistance brought about by irrational and indiscriminate use of antimicrobial agents among other factors, EPN organized a 5 day workshop in 2008 in Moshi, Tanzania attended by experts from 16 countries in Africa and other parts of the world.[1] The participants undertook an in-depth evaluation of studies and evidence available on the extent of the problem in parts of Africa and concluded that urgent concerted action was required by all affected by or working towards combating diseases.

Why should we pay attention to Antimicrobial Resistance (AMR)?

Globally, infectious diseases kill 11 million people annually, 95% of whom live in resource constrained countries. The major life-saving intervention for infectious diseases is antimicrobial treatment. However, antimicrobial resistance is rapidly reducing effectiveness of these life-saving medicines. The problem has rendered many first line treatments ineffective. This is impacting on all infectious diseases including HIV, TB and Malaria.

In 2006, a global study found 20% of TB isolates were Multi Drug Resistant (MDR) and 2% were Extremely Drug Resistant (XDR)[2]. In the same year, an XDR-TB strain in South Africa killed 52 of 53 identified cases, causing widespread concern in the public health community.[3] Resistance to chloroquine and sulphadoxine/ pyrimethamine are highly prevalent in most malaria-endemic areas.[4]

Resistance to these medicines often develops as a result of poor prescribing and dispensing practices, inappropriate use by patients, and poor medicine quality. Research shows that half of medicines used in Africa are irrationally used and up to 2/3 of antimicrobials, which are normally prescription-only medicines are supplied over the counter.[5] The increased use of antimicrobials in animals has also been shown to contribute to the development of AMR. In North America and Europe, an estimated 50% in tonnage of all antimicrobial production is used in food-producing animals and poultry.[6] Furthermore in Africa, weak pharmaceutical management and inadequate regulation and enforcement are major challenges. This results in the proliferation of unlicensed outlets selling substandard and/or indiscriminate use of medicine by the public or our children.

The impact of AMR includes enormous individual as well as public health consequences. These include increased morbidity and mortality, prolonged periods of infectiousness with increased risk of transmission of resistant pathogen to others, increased direct cost (longer hospital stay, use of more expensive 2nd or 3rd line medicines) and indirect costs such as prolonged absence from work.

We the participants in the Moshi meeting,[1] representing various churches involved in healthcare in Africa, recognize and commend the actions by various local, national and international players in the fight against

Call for Action

antimicrobial resistance. Noting that a number of low cost effective antimicrobial agents have already been lost and realizing the danger of further losses if the situation is not contained, we hereby call for action from Faith Based and other Non-Profit Health Institutions, Ministries of Health, Medicines Regulatory Agencies, Associations of Health Professionals, Mass Media Agencies and Political Leaders to work together in a concerted manner to contain this threat to health and prosperity of current and future generations.

Political Leaders and Policy Makers

- Political leaders work to provide a conducive environment that facilitates control and regulation of medicines
- Ministries of Health enforces the policies and guidelines that support appropriate use of antimicrobial agents
- Associations of Health Professionals support their members to uphold professional ethics and standards in their practice
- Medicine Regulatory Agencies (MRA) strengthen their mechanisms to enforce regulations to ensure sale of good quality medicines to the public and to establish functional Quality Control laboratories at national level.
- Networks /collaborations for information sharing and technical assistance for containment of AMR be developed with development partners and health care practitioners

Health Care Institutions

- Create functioning laboratories for appropriate investigations and encourage their use
- Provide written guidelines, facilities and materials for implementation of proper hygiene, infection control and waste management
- Promote rational prescribing and dispensing and ensure availability of good quality medicines
- Regularly collect information on AMR and submit to relevant authorities for action
- Support Drug and Therapeutics Committees (DTCs) to draw up and/or enforce use of Standard Treatment Guidelines (STGs) and adherence to treatment protocols

Health Training Institutions

- Incorporate AMR in the curricula for training all health professionals
- Provide training on infection control to health care workers and the community
- Conduct Continuous Medical Education (CME) courses on AMR

Heath Care Providers

- Instruct patients on the correct usage of the medicines prescribed and dispensed
- Prescribe medicines rationally and keep abreast of developments in their professional area
- Educate patients about the dangers of self medication
- Practice proper hygiene including correct hand washing

Save medicines for our children

Patients

- Follow the instructions given by the health practitioners on medicine use and obtain more information on the dangers of self medication

General Public

- Proactively learn about proper hygiene and waste management from health professionals and other qualified institutions, and put into practice what they have learnt

Media

- Pay more attention to issues of medicine use and initiate health education programs in collaboration with the appropriate ministries and other partners to encourage proper use of medicines among the public

EPN
Ecumenical Pharmaceutical Network
Réseau Pharmaceutique Œcuménique

For more information contact:

Ecumenical Pharmaceutical Network
CHAK Complex Musa Gitau Road, Off Waiyaki Way
P. O. Box 749-00606 Sarit Centre, Nairobi, Kenya,
Tel: 254-20-4444832/4445020 | Fax: 254-20-2678147,
Email: info@epnetwork.org, | Web site: www.epnetwork.org

Source

[1] *AMR workshop List of participants, http://www.epnetwork.org/moshi-workshop*
[2] *Emergence of Mycobacterium tuberculosis with extensive resistance to second-line drugs-worldwide, 200-2004. Morbidity and Mortality Weekly Report, 2006, 55(11):301-305*
[3] *Singh et al. PLos Med 2007; 4 (1):e50*
[4] *Boland. P.B. 2001. Drug Resistance in Malaria. Geneva, WHO.*
[5] *Wise et al. British Medical Journal 1998; 317(7159): 609–10.*
[6] *Antimicrobial resistance Fact Sheet, http://www.who.int/mediacentre/factsheets/fs194/en/.*

EPN 2011 (Revised from 2009)

Illustration by ***David Radoli****, Kenya*

These materials were developed with support from the USAID funded SPS Program

Call for Action

Adama Declaration: Declaration of the Call-to-Action National Workshop on Antimicrobial Resistance Containment, Nov. 16–18, 2006, Adama, Ethiopia

Background:

Sixty-five participants from the Federal Ministry of Health (FMOH), Drug Administration and Control Authority (DACA), Federal Ministry of Agriculture and Rural Development (FMOARD), regional health bureaus, academic and research institutions, developmental partners, importers/wholesalers, local pharmaceutical manufacturers, hospitals, professional associations, and mass media agencies assembled for three days at the Adama Mekonen Hotel, Adama, from November 16–18, 2006, to deliberate on antimicrobial drug use and resistance situation and call-to-actions to be taken by all concerned bodies in Ethiopia.

Coordinated by the DACA and the Antimicrobial Resistance Taskforce, the participants were briefed on the current situation of treatment protocols of major diseases, regulatory activities including efforts to promote rational use, quality of health professionals training curricula in light of containing AMR, research activities in the area, and international interventions as well as experiences of other countries. In between the presentations, the participants had discussed issues of concern and had opportunities to recommend possible interventions to contain AMR in the public and animal health sectors.

To enable in-depth discussion and to come up with pertinent recommendations and an implementable plan of action on the major agenda items including drug regulation, research, training, drug supply, and rational use, the participants were assigned to four groups. At the end of the three-day intensive workshop, the following declaration was released.

We the participants:

- Commend the current initiative being undertaken by the Federal Ministry of Health, the Drug Administration and Control Authority AMR Taskforce, and partners to bring the issue to the attention of concerned bodies.
- Realized that effective regulation and quality use of antimicrobial drugs are key instruments to alleviate the major health problems of the country and in the creation of healthy population.
- Are aware that efforts to monitor antimicrobial drugs' effectiveness have been under way and served as the corner stone for changing treatment protocols.
- Also recognized the availability of data and information on the prevalence of AMR in the health service which can serve as input to take policy measures to contain AMR
- Also are aware that the issue of rational use of antimicrobial drugs is adequately addressed in the curricula of some health professionals' training institutions, however, learned that more has to be done in the emerging as well as some existing universities.
- Recognize that even though concerned bodies including the Federal Ministry of Health, Federal Ministry of Agriculture and Rural Development, the Drug Administration and Control Authority of Ethiopia, the Ethiopian Health and Nutrition Research Institute, academic institutions, and partners have been striving to regulate, monitor efficacy, and promote the quality use of antimicrobial drugs, we have identified that there is an urgent need to assure that realistic commitment is in place and that coordinated efforts and result-oriented interventions are considered by all concerned bodies.

We therefore recommend that:

- The AMR Advocacy and Containment activities be officially inaugurated.
- The AMR advisory committee, in collaboration with governmental agencies and other partners, devise mechanisms to conduct a national base line survey on the current situation of antimicrobial drug supply management, research, regulation, and use as well as other parameters to facilitate for further action.
- Based on available data and information and with due consideration of the results of the envisaged baseline survey, the Federal Ministry of Health, Federal Ministry of Agriculture and Rural Development, and the Drug Administration and Control Authority, in collaboration with the AMR advisory committee, develop a national program for AMR containment.
- The health professionals training higher education institutions assess their curricula in terms of its contribution to ensure containment of AMR and take measures to address any identified gaps, including the promotion of attitudinal change among graduates.
- Professional associations to collaborate with concerned bodies on AMR and ensure that their members participate in relevant continuing education programs.
- Recognizing the complexity of the issue and its multidimensionality in involving stakeholders, FMOH, FMOARD, and DACA, should create an enabling environment and foster cooperation among local and international partners, who have interest in and potential to contribute towards the shared vision.
- The FMOH, FMOARD, and DACA should intensify surveillance on the safety, efficacy, and quality of antimicrobial drugs in the market and take prompt corrective action accordingly and communicate so to stakeholders. This activity should not be limited to urban areas of the country.
- Public and private drug manufacturing and procuring agencies should work closely with public and animal health institutions to ensure the antimicrobials supplied reflect realistic needs of the country.
- Health institution infection control systems be set up.
- Disease prevention campaigns and activities be strengthened.

And call upon:

- The DACA to strengthen its regulatory mechanisms and quality use promotion strategies to ensure that the antimicrobial drugs used in the Ethiopian public and animal health sectors are safe, effective, and of good quality.
- The FMOH, FMOARD, and DACA, and other governmental and nongovernmental agencies to provide and/or facilitate capacity building (i.e., technical support, management and organizational development training, logistics, etc.) for all stakeholders and in different parts of the country.
- Development partners to work closely with government agencies, training institutions, research institutions, and the mass media to provide technical and financial support.
- Research institutions to intensify research on antimicrobial traditional medicines used for the preservation of human and animal health.
- All concerned organizations to exchange information regarding research outputs, reports on antimicrobial use, and other related fields.
- Public and private higher education institutions to train adequate and qualified professionals to alleviate the current serious shortage at public and animal health facilities.

- The mass media to give more attention to the area and initiate new health education programs and collaborate with FMOH, FMOARD, DACA, and other partner organizations to discourage current inappropriate self-medication practices among the general public.

We commit ourselves to:

- Mobilize our colleagues collaboratively to
  - Create awareness on the need to contain AMR in our settings
  - Share the plan of action developed at the workshop and play our part in its implementation.
  - Educate the patients and animal owners on the harm of inappropriate self-medication
  - Organize ourselves to better work with our partners
  - Work in collaboration with mass media agencies in building awareness on the rational use of drugs
  - Link AMR containment activities and support other health interventions and sectors/areas.

The way forward:

We, the workshop participants, mandate the FMOH and DACA in collaboration with the AMR Task Force to:

- Develop a proposal and coordinate to conduct a national baseline survey on antimicrobial supply, regulation, research, use, etc., and develop a national AMR containment program document
- Formally launch a national program for the containment of AMR
- Ensure the participation of all concerned bodies and funding for the program

East, Central, and Southern Africa (ECSA) Health Community
Regional Pharmaceutical Forum
Call-to-action for Antimicrobial Resistance Advocacy and Containment

Antimicrobial resistance (AMR), or drug resistance, is a major threat to health around the world. If we don't act now to preserve the effectiveness of antimicrobial medicines, AMR will severely undermine global efforts towards managing infectious diseases and meeting the Millennium Development Goals by 2015. The East, Central, and Southern Africa (ECSA) region is no exception. We have seen chloroquine treatment for malaria become ineffective. If AMR is not addressed urgently, we will lose the benefits attained so far in treating diseases of public health importance, including HIV/AIDS, TB, and malaria. Access to the essential medicines for these diseases has significantly increased in the ECSA region, but resistance threatens their continued usefulness. Therefore, it is of paramount importance that all stakeholders work together to combat this problem.

Collaboration within the region is vital. We must communicate to share expertise, experience, lessons learned, best practices, and resources. No individual country or group can successfully contain AMR alone. Therefore, it is crucial that strategic coalition and partnerships at regional, country, and local levels are established to advance sustained AMR advocacy and containment actions.

Inappropriate use of antimicrobials, poor infection control, poor regulation and enforcement, poor quality antimicrobial products, and weak pharmaceutical management are key factors contributing to the emergence and spread of AMR. A number of interventions and tools are available to address these factors. Comprehensive sets of AMR containment interventions are outlined in the *WHO Global Strategy for the Containment of Antimicrobial Resistance.* Because AMR is a complex and multifaceted problem, interventions need to be multifaceted and coordinated. Activities such as pre-service and in-service trainings; information, education, communication (IEC) strategies to raise awareness; drug and therapeutics committees; standard treatment guidelines and essential medicines lists; infection control; surveillance; and promotion of rational use of medicines have been shown to be effective and must be strengthened by AMR stakeholders.

The Regional Pharmaceutical Forum (RPF) is an established mechanism within the ECSA health community to improve pharmaceutical management in the region. Therefore, RPF is well placed within the region to champion AMR and rational medicines use issues. RPF has contributed to AMR containment by developing a generic medicines policy; harmonizing standard treatment guidelines and formulary for HIV/AIDS, TB, and malaria; and strengthening medicines and therapeutics committees. RPF will continue to work towards AMR containment through sustained advocacy and packages of interventions including those related to medicines and therapeutics committees, pharmacovigilance, drug information service, and IEC.

The RPF acknowledges that many AMR containment activities are being implemented, but are often uncoordinated at the local, national, and regional levels. All stakeholders including government, academia, regulatory authorities, professional associations, donor groups, civil society, media personnel, and industry must forge strong alliances and coordinate advocacy and actions for maximum impact and sustainability. AMR containment is our collective responsibility, so we all need to work together. If we neglect action now, future generations will lose out on all the benefits we have enjoyed. Therefore the RPF makes this Call-to-action to all the players to join hands against this common threat and start immediate advocacy and containment actions.

Annex E. Advocacy Tool for Infection Control in Hospitals

Infectious diseases kill 11 million people globally each year, 95% of which live in countries with limited resources. The principal life-saving intervention for infectious diseases remains antimicrobial treatment. However, antimicrobial resistance (AMR) is rapidly reducing the effectiveness of these vital medicines. This problem has rendered many first-line treatments ineffective. This has an impact on all infectious diseases, in particular HIV, tuberculosis and malaria.

Antimicrobial resistance often develops due to poor prescribing and dispensing practices, improper use by patients self-medication, and the poor quality of medicines.

Antimicrobial resistance has severe consequences for public health, including increased morbidity and mortality linked to infections, higher treatment costs, long infectious periods with an increased risk of transmitting resistant pathogens to other people, extended hospital stays, prolonged absence from work, and a reduced list of effective antimicrobials.

For example, MDR tuberculosis treatment is 100 times more expensive than the treatment for drug-sensitive tuberculosis. Even for malaria, the cost of chloroquine-resistant malaria treatment is 6 to 35 times more expensive than treatment for infections with drug-sensitive parasites. With regard to HIV treatment, it has proven necessary to preserve the medicines that are available, because in 4 to 5 years, the cost of providing second-line treatments could require up to 90% of the budgets available to fund antiretroviral medicines. This could seriously compromise access to care if several patients must be treated with second-line regimens.

There are two basic pillars for containing AMR, specifically, sensitization activities and containment activities, which are carried out on two levels: rational use of medicines and infection control.

According to the *World Health Organization (WHO) Global Strategy for Containment of Antimicrobial Disease,* infection control is a key intervention for hospitals and health care facilities because it reduces the disease burden and spread of infection.

Nosocomial infections are a frequent problem with an approximate prevalence of 9% (WHO/CDS/CSR/EPH/2002.12). In some regions of sub-Saharan Africa, this rate is as high as 40%. However, most of these infections could be avoided through the low-cost strategies available. This involves compliance with infection control strategies, in particular, washing hands and wearing gloves, as well as effective decontamination and proper waste management.

It is our opinion that in order to achieve this, different stakeholders in health care from different countries must emphasize infection control and prevention in health care facilities.

Efforts are already under way in this area to raise the awareness of health care professionals of the importance of the fight. This is the case of the *Francophone Workshop on Antimicrobial Resistance and Infection Control in Health Care Facilities* held in November 2009 in Kigali by EPN in collaboration with the MSH/SPS program. This workshop brought together 30 professionals from seven Central and West African Francophone countries: Cameroon, Togo, Benin, CAR, DRC, Chad, and Rwanda.

This fight is not the prerogative of health care employees solely, but requires multidisciplinary collaboration involving all stakeholders, notably Ministries of Health, health care facilities, churches and faith-based organizations, health care training organizations, associations of health care professionals, health care providers, and mass media agencies, as well as the entire population.

Political leaders and decision makers

- Support and be actively involved in infection control and AMR activities.
- Establish, disseminate, put into general use, and enact standards and guidelines on infection control in hospital environments.
- Ensure the strict application of policies and laws governing the health sector.
- Sensitize international partners so that they comply with national policies and standards.
- Improve the working conditions of health care professionals with regard to infrastructure, equipment, materials, and continuing training.

International partners

- Respect the laws, health policies, and guidelines in different countries.

Organizations and associations of health care professionals

- Take the appropriate steps to ensure compliance with ethics rules relative to infection control and the rational use of medicine.
- Promote an atmosphere of collaboration among health care professionals and create networks related to infection control and antimicrobial resistance (AMR).

Managers of health care facilities

- Establish and disseminate to all parties concerned the policies, procedures, and guidelines for infection control and ensure their enforcement.
- Establish and support hygiene and/or infection control committees and drug and therapeutics committees (DTC).
- Provide the infrastructure and equipment necessary to prevent nosocomial infections (for example, equipment for hand hygiene, waste management, etc.).
- Set up laboratories and/or make them operational for appropriate research on infections.
- Establish mechanisms for monitoring and evaluation relative to infection control and the appropriate use of antimicrobials.
- Collect information regularly on infections and submit it to the competent officials for action.
- Plan and organize continuing training sessions for health care staff on infection control activities.
- Ensure the availability and accessibility of good quality pharmaceutical products and their rational use.

Managers of health training organizations

- Include and strengthen the aspect of infection control in hospital environments in training programs.
- Support the Ministry and health facilities in the organization and validation of continuing training on infection control for health care professionals.
- Promote research projects on infections and publish them.

Health care providers (advocate a multidisciplinary team approach)

- Practice proper hand hygiene in your daily performance.
- Periodically train on/inquire about developments in infection control and prevention science.
- Use the standard treatment guide for antimicrobials when treating infections.
- Train patients and the public on general hygiene and infection prevention on the individual and community levels.
- Train patients on the correct use of medicines and the dangers of self-medication, especially with antimicrobials.

Patients

- Relentlessly perform hygiene measures to prevent infection.
- Consult a medical professional immediately when sick and avoid as much as possible spreading germs to others.
- Follow the instructions given by the health care staff when taking medicines.
- Do not self-medicate, especially with antibiotics.

General public

- Practice daily hand hygiene with clean (running) water and soap.
- Keep household waste in appropriate locations.
- Do not self-medicate with antibiotics or buy medicine on the street.
- Consult health care professionals for the correct information on infection control.

Media

- Become actively involved in disseminating sensitization messages on infection control, antimicrobial resistance, self-medication, and hygiene in general.

This document was prepared by the participants at the *Francophone Workshop on Antimicrobial Resistance and Infection Control in Health Care Facilities,* which took place in Kigali, Rwanda, November 23–27, 2009.[49]

Annex F. Information Collection Activities

How to Conduct a Document Review and an Interview

Document Reviews

Information sources: check the sources outlined in the guidelines for each assessment to get a sense of the kinds of documents to gather and the kind of information to extract from the documents.

Tools

Form 1. Stakeholder Identification Worksheet
Form 3. Stakeholder Interview Guide
Form 5. Sample Agenda for Kickoff Meeting
Form 6. List of Documents for Review
Form 8. Questions for Document Review and Interviews
Form 14. Stakeholder Prioritization Worksheet

Collect all relevant documents (policy, published, and unpublished articles, curricula, media articles, etc.). Broad categories include—

- Identification of new stakeholders
- Communication channels
- Key organizations, programs, initiatives involved in relevant activities
- Pharmaceutical management
- Drug selection and procurement
- Training and education on appropriate use (including curricula)
- Management support
- Policy and legal framework
- Drug use behaviors among prescribers, dispensers and consumers
- Antimicrobial resistance levels and trends

Document sources. Use Form 6. List of Documents for Review to record the name, source, and other identifying factors. Record relevant information to describe the key conceptual areas contained in each document. Data collection instructions for each of the studies will describe what type of information to extract from the documents that have been assembled.

Map key programs and new stakeholders identified during your review to the Form 1. Stakeholder Identification Worksheet. Remember that this worksheet should be considered a living document to be continuously updated.

Conducting an Interview

- Identify and interview stakeholders (the AWG should be involved in this activity).
- Prioritize stakeholders for interviewing using Form 14. Stakeholder Prioritization Worksheet. This involves transferring the names of stakeholders from Form 1. Stakeholder Identification Worksheet.
- Prioritize by identifying those stakeholders that bring leadership and technical and financial resources. Not all the stakeholders that fall into this category will necessarily be supporters of the activity or interested in AMR at the time of the interview.

- Be sure to include key stakeholder programs, initiatives, organizations, and donors identified in the inventory of programs.
- Schedule an interview after AWG members have reviewed the list.
- Review and adapt tools.
- Use Form 3. Stakeholder Interview Guide for interviewing all drug resistance stakeholders selected (excluding the media).
- Review interview guidelines to assess whether questions need to be adapted to fit the specific aspects of the drug resistance issues being assessed.
- When you have finished adapting the interview guidelines, pretest them with nonpriority stakeholders (those identified on the initial list but not considered priority stakeholders) to determine whether—

    - Interviewers are comfortable with the questionnaire
    - The stakeholder interviewed understands the questions
    - The interview does not take more than one hour
    - Interviewers adhere to the established protocol

Conduct Interviews

Interviews might be best conducted with two people as it is easier to document the information, one to take notes and one to interview. Using two people also helps prevent bias. When the two people have different backgrounds, they may interpret the information differently.

Review Box F-1 for general tips on in-depth interviewing. In addition to these general tips, note that in this document, we use the terms antimicrobial resistance and drug resistance interchangeably. However, many people use the term antimicrobial resistance differently. In some areas and in some fields, it is not used at all. A person's response to interview questions will reflect their interpretation of resistance (e.g., only antibiotic resistance). Or, if the person is not sure what the term means, they may feel uncomfortable answering questions. This can affect their answers or even their participation in the interview. Because we are most interested in what stakeholders know about drug resistance, we recommend this term be used during the interviews.

When the interview has been completed, check it off the stakeholder contact list. You can see at a glance how many interviews remain.

Identify new stakeholders. Rely on stakeholders interviewed to add names to the list of key stakeholders. Go through the same process described above to determine whether these stakeholders will be interviewed. Remember to add all the newly identified stakeholders to the contact list, even those you do not think you will need to interview.

Review notes. As soon as possible after the interview, the interviewers should review their notes to ensure they are understandable. Record the responses on the interview form, either by hand or on a computer. The aim is to record as closely as possible what respondent said, not what the interviewer thought he was 'trying' to say. Otherwise, you will not get a clear picture of the situation.

Box F-1. Tips on how to conduct in-depth interviews

Do's

- Do begin the interview with a friendly and familiar greeting.
- Impress upon the respondent that his/her opinion is important. This can be repeated during the interview. People enjoy expressing their opinion about an issue once they are assured that it is important and legitimate.
- Do listen attentively to capture every piece of information from respondents.
- Do explore key words, phrases, idioms, and terms as they occur in the discussion.
- Do listen to impressions, topics avoided by the informant, deliberate distortions, and misconceptions or misunderstandings. Take prompt action to explore each of these. Where appropriate, use probing questions to get more details.
- Do ensure a natural flow of discussion by guiding the informant from one topic to the next.
- Do be silent to give the respondent plenty of time to talk.
- Do be open to unexpected information.

Don'ts

- Don't influence or bias responses by introducing one's own perceptions or asking leading questions which encourage a particular response.
- Don't move too quickly from one topic to the next.
- Don't interrupt the informant.
- Don't mislead about the subject matter in order to obtain information.

Adapted from *How to Use Applied Qualitative Methods to Design Drug Use Interventions,* Produced by the International Network for the Rational Use of Drugs Scientists Working Group, Working Draft, December 1996.

Guidelines for Interviewers

Wherever possible, first carry out as comprehensive a document review as possible on the related topics before interviewing the key informants. This provides information on what is already available; possessing such background information/facts by the interviewer facilitates the interviewing process, increases credibility, and saves time. The data tables in Annex H may be used to record information.

Depending on how much information is gathered, there may be a need to identify more key informants, as a second step, and interview them to gather adequate information. Always note the name and contact information for anyone recommended during the interview process.

Before going for the interview of an identified key informant, make sure that the set of questions relevant for that informant is ready.

Ask relevant questions of all the stakeholders identified in the questions below, even if you think you already have adequate information from one or two informants. This increases the level of dependability of the information, helps get detailed responses, and may help get names of new informants/documents.

Adopt a flexible approach during the interview. Don't interrupt the flow of the informant. Just ensure that all relevant questions are covered by the end of the interview—the order of the questions is not critical. If, during the process of interview, a new but relevant issue emerges, ask more questions about that issue to capture adequate information.

If you think you are not receiving adequate information for a particular issue, try probing or exploring further by asking supplementary questions that are outside the list of questions provided below. Certain questions may be omitted if the situation so requires. (For example, the informant has already provided a response to an issue while answering a previous question or the informant refers you to a subordinate for more in-depth information.)

By the end of the interview, ensure that you have asked the informant about relevant documents pertaining to the issue(s) discussed and the sources for obtaining them. If you are made aware of a document that you have not reviewed, try to obtain a copy and then review it. (Keep copies of all the reviewed documents properly archived for future reference.)

Box F-2. Potential sources of information on AMR

Internet document searches

Internet search by topic
- USAID document clearinghouse—http://dec.usaid.gov/
- WHO website—http://who.int
- U.S. National Library of Medicine PubMed—http://www.ncbi.nlm.nih.gov/sites/entrez

Structural indicators

Basic structural indicators of health, education, access to services, etc., can usually be obtained from—

- Health information services
- Demographic and health surveys
- National health policy and strategy documents

Disease burden and drug resistance levels

- Health information services
- Ministry of health
- Burden of disease studies
- Program statistics
- National reference laboratory
- Published/unpublished studies
- Laboratory annual reports

Policies, guidelines, and curricula

- Drug policy documents, including antibiotic policy
- National standard treatment guidelines, the national essential drug list and national formulary, disease-specific or program-specific treatment guidelines
- Copies of relevant legislation supporting the drug policy
- Infection control program guidelines
- Laboratory guidelines
- Ministry reports, five-year plans, and annual work plans
- Relevant curricula from medical, pharmacy, and nursing schools

Medicine use practices

- Demographic and health surveys
- Program surveys and studies
- Published and unpublished studies
- Provider surveys
- Service delivery statistics
- Program surveys and studies
- Published studies

Service utilization and drug supply

- Health information services
- Provider surveys
- National policy/strategy documents

Health financing and resource allocation

- Government budget
- Expenditures of public financing agencies
- Pharmaceutical procurement reports
- National health accounts
- Public expenditure reviews
- Household surveys

Available media

Newspapers, magazines, newsletters, radio

International development/donor priorities/ programs

Search websites for project reports, studies, and development assistance strategies.

- http://www.usaid.gov/
- http://www.dfid.gov.uk/
- http://WHO.int
- http://UNICEF.org
- http://UNAIDS.org
- http://www.worldbank.org
- http://sida.se
- http://www.jica.go.jp/english/index.html
- www.cdc.gov
- www.msh.org/rpmplus
- www.apua.org
- www.reactgroup.org

Annex G. Findings from the Pharmaceutical Management Assessment in Zambia in 2004[50]

Area of practice	Findings	Source of data
Selection and procurement of antimicrobial agents		
Treatment guidelines	*Existence* Different guidelines exist. STGs and integrated treatment guidelines for frontline health workers (ITGs) are for all common diseases in Zambia while there are also disease-specific guidelines for malaria, ART, and TB. *Development and revision* All are developed by consensus of experts and key opinion leaders in the various conditions covered in the guidelines and approved by the Zambian National Formulary Committee. There is no set period for revision but the committee aims at revision every 3–4 years. Some programs (e.g., Family Health Trust) have developed guidelines (syndromic management of STIs) for specific programs. *Guidelines for different levels of care* Guidelines stipulate care to be provided at different levels.	• CBoH (Pharmacy Unit-Zambian National Formulary Committee secretariat) • STGs • ITGs • *Guidelines for the Diagnosis and Management of Malaria* • *Integrated Management of Childhood Illness Guidelines* • *Infection Prevention Guidelines* • *TB Manual* • *ART: A Reference Manual* • *Management of Opportunistic Infections: A Reference Manual*
	Availability and adherence to STGs There is no data on the national availability of STGs. One study found that approximately 50% of selected health facilities in Lusaka had ITGs in the screening room. CBoH is in the process of establishing a drug management system that will incorporate collection of such data. DTCs at the facility level are responsible for promoting health workers adhering to recommended treatment protocols.	• CBoH-Essential Drug Program • Literature search • Report of survey during training for DTCs, April 2001
Essential drug list	*Existence* An EDL exists with 200–300 drugs, including antimicrobials. The new STGs include an EDL and essential laboratory supplies. *Selection process* EDLs are selected on the basis of the treatments recommended. They consist of largely first-line drugs, with some second-line drugs. The Zambian National Formulary Committee is responsible for selection. *Revision* There is no set period of revision but the Zambian National Formulary Committee aims to revise the list every 3–4 years. The last revision (2003) was done after 4 years.	• EDL • STGs • EDL • STGs • CBoH-Essential Drug Program • EDL • CBoH-Essential Drug Program

Area of practice	Findings	Source of data
	Listing according to levels of care Antimicrobials and other drugs are listed according to levels of care at which there is expected to be competence to administer the drugs. *Availability* There is no data on the availability of EDLs in health facilities. CBoH is in the process of establishing a system that will incorporate collection of such data. *Availability of drugs on EDL in facilities* No data exists for the country-wide situation. A survey on drug availability at 12 sites in Lusaka by the district health management team found 70% of facilities had certain selected tracer drugs. The same survey indicated an average stock out rate of 16% of the tracer drugs.	• EDL • Literature search • Literature search • Drug supply and use review in Lusaka urban district, 2002
Policy and legal framework		
National Drug Policy	The National Drug Policy was adopted by the government in 1999. *Antibiotic policy* There is no national antibiotic policy. The use of antibiotics is restricted by statute (Therapeutic Substances Act and Pharmacy and Poisons Act) to prescription-only medicines. The Pharmacy and Poisons Board is responsible for enforcing the laws. There is no "reserve list" of antibiotics in Zambia. *Prescribing restrictions* Antibiotics can only legally be prescribed by medical practitioners and dental surgeons registered with the Medical Council of Zambia, veterinary surgeons, and other categories of practitioners authorized by the act. A new law aims at authorizing a limited range of medicines to be prescribed by nurses. Clinical officers in the public sector may prescribe drugs authorized for the level of care at which they practice. Veterinary antibiotics are regulated under the same laws. *Drug promotion* The promotion of medicines, including antibiotics, is guided by the Standards of Pharmaceutical Practice in Zambia. *Enforcement capacity* Data is not available on the implementation or impact of these laws and regulations. However, it is generally accepted that the capacity for effective regulation of medicines and pharmacy practice is lacking in Zambia for various reasons. Pharmacy and medicines regulations are currently being reviewed and new legislation is expected to be enacted soon to correct this situation.	• CBoH-Essential Drugs Program • National Drug Policy • Pharmacy and Poisons Board • Medical Council of Zambia • Standards of Pharmaceutical Practice

Area of practice	Findings	Source of data
	Product registration All medicines intended for the Zambian market must be registered with the Pharmacy and Poisons Board. Medicines, except general sale list medicines in their original packs, may only legally be sold in pharmacies registered with the Pharmacy and Poisons Board. The number of antimicrobials registered is not available. Regulation of pharmaceutical personnel Pharmaceutical personnel are registered with the Medical Council of Zambia, including pharmacists and pharmacy technicians.	• Medical and Allied Professions Act
Education, training, and capacity building		
In-service training/ continuing professional education (CPE)	Statutory professional registration bodies (Medical Council of Zambia, General Nursing Council) require professionals to earn CPE points to retain their registered status. The Medical Council of Zambia does not conduct CPE activities, but the General Nursing Council does organize some CPE/in-service training activities. Professional bodies, such as the Faculty of General Practitioners and the Pharmaceutical Society of Zambia, are more active in organizing CPE activities. Topics for CPE programs vary and include some AMR-related issues. There is no data available on topics (from the Pharmaceutical Society of Zambia and the Medical Council of Zambia) covered by Medical Council of Zambia registered professionals in CPE. There is no data available on the impact of such activities. Opportunities exist for including AMR topics in CPE programs for nurses and pharmacists. There is no data available on the appropriateness of dispensing and prescribing. CBoH, through the District Integrated Logistics Self-Assessment Tool, has incorporated collection of such data.	• Medical Council of Zambia • Pharmaceutical Society of Zambia • General Nursing Council
	There is no training provided to health workers on the use of STGs, but training has been provided by TB, HIV/AIDS, and malaria programs on the use of disease-specific guidelines. The training is for all categories of health workers.	University of Zambia School of Medicine (Department of Pharmacy), General Nursing Council
	The quality assurance program within the CBoH provides training and technical support for quality assurance in district health management teams and health centers. Directorate of Monitoring and Evaluation provides training and oversight. CBoH monitors quality by quarterly performance audits, supervision visits by district health management teams, and health management information systems. The new health management information system was piloted in 15 districts and is being established nationwide. CBoH developed a manual of standards for priority health areas—reproductive health and family planning; HIV/AIDS and STIs; child health and nutrition; TB; water and sanitation. A total of 85 quality assurance teams operate in 95% of the districts.	Marquez, L., and Madubuike, C., 1999

Area of practice	Findings	Source of data
Pre-service training	Curricula for nurses, pharmacy, and biomedical sciences were reviewed. Only the nursing curriculum (3 categories of nurses) had specific AMR topics outlined. The other curricula did not specifically list AMR-related topics. The review did not include any of the syllabi, which could have AMR-related topics in the detail. There is no data to demonstrate that what is taught as per curriculum is practiced. AMR topics may be included in the biomedical sciences, nursing, and pharmacy curricula without going through the normal, long bureaucratic process, according to the respective heads of the training institutions.	Curricula for nursing, pharmacy, and biomedical sciences General Nursing Council, University of Zambia (School of Medicine)
	The pre-service curricula for nurses and pharmacy students do not include treatment guidelines. Curricula for medical students and clinical officers were not obtained.	University of Zambia School of Medicine (Department of Pharmacy), General Nursing Council
	Of the curricula reviewed for institutions training health workers, only the nurses' curriculum includes the EDL.	Curricula for pharmacy, nurses, and biomedical sciences
Public education campaigns	There have been Many campaigns organized to promote the correct use of medicines, including antibiotics. Many messages in such campaigns focus on antimicrobial use. The Pharmacy and Poisons Board and Pharmaceutical Society of Zambia jointly organized one such campaign in 2000–2001. The National Malaria Control Center, as part of the Roll Back Malaria activities, participates in the annual Southern African Development Community (November) and Africa Malaria Days (April). Appropriate use of antimalarial drugs is one of the aspects promoted during these events. Such campaigns include promotion of infection prevention strategies such as use of insecticide-treated nets. The National Malaria Control Center is planning an intensive awareness campaign (starting September) as part of the plan for rolling out the treatment policy.	Pharmacy and Poisons Board report on the public awareness campaign, 2001 National Malaria Control Center

Area of practice	Findings	Source of data
Capacity building	*Infection prevention committee* Some hospitals in the public sector have infection prevention committees. No data is available on how many such committees exist in the country. No data is available on how many of such committees exist in the private sector. CBoH, with funding from JPHIEGO, is in the process of providing orientation to health workers on infection prevention. *Infection prevention guidelines* Guidelines have been developed and health facilities are being trained on how to implement the guidelines. *DTCs* All public sector facilities are expected to have a functional DTC. However, not all do. No data is available on how many do and do not. No data is also available on what the DTCs (where they exist) have done about AMR containment; DTCs are supposed to report to the Zambian National Formulary Committee.	JPHIEGO, University Teaching Hospital Microbiology Laboratory CBoH-Essential Drugs Program
Quality		
Quality assurance mechanisms	In the private sector, there is no standard mechanism. Some companies have developed in-house mechanisms. No data was collected from the private sector on this aspect. A number of private sector importers and manufacturers have quality control facilities in which drug quality may be tested. The EDL is not strictly applied for procurement in the private sector, although it has some effect because it influences public sector demand. In the private sector, procurement is also influenced by product licensing requirements. Only licensed products may be marketed in Zambia. In the public sector, procurement of antimicrobials is largely based on the EDL. The National Drug Policy stipulates that procurements must be based on EDL. In the public sector, prequalification of suppliers is applied for some products. There is no public drug quality control laboratory for routine testing of drugs for the public sector. Product licensing requirements are quite effectively enforced although no data exists to determine compliance. No data exists on the proportion of antimicrobials found to be substandard or counterfeit.	• CBoH • Literature search • Pharmacy and Poisons Board

Annex H. Data Collation Tables

This section contains charts and tables to collate data collected during the document reviews and interviews as part of the stakeholder analysis, pharmaceutical management assessment, the drug use review, and the surveillance information and capacity assessment.

Burden of Disease

Because the volume of medicine use may be difficult to measure, the number of illness episodes (outpatient cases and hospital admissions) can give an idea of what infections that may be at risk for developing resistance to drugs due to high volume of drug use. This information can be found in several places, such as health information systems and disease control programs. Data may not be complete or may not include the private sector. Data do not need to be perfect to get a rough indicator. If errors or limitations in data are known, these must be indicated. For example, if data represent only partial coverage, record the information you have and note that it is incomplete.

Table H-1. Complete the Table for the High-Burden Infectious Diseases in Your Country

	Mortality rates			
	Total population	**Data source/data quality**	**Children under the age of five**	**Data source/data quality**
TB				
Malaria				
STIs				
Diarrheal disease				
ARI				
HIV/AIDS				

For each condition in the table below, record the percentage of total admissions that the condition represents in the appropriate column, depending on the sector. Information from the private sector may not be available in some countries.

Table H-2. Health Service Burden: Percentage of Total Hospital Admissions

	Public	**Private**	**Both**	**Data source/data quality**
TB				
Malaria				
STIs				
Diarrheal disease				
ARI				
HIV/AIDS				

For each condition in the table below, record the percentage of total outpatient visits that the condition represents in the appropriate column, depending on the sector. Information from the private sector may not be available in some countries.

Table H-3. Health Service Burden: Percentage of Total Outpatient Visits

	Public	Private	Both	Data source/data quality
TB				
Malaria				
STIs				
Diarrheal disease				
ARI				
HIV/AIDS				

AMR Surveillance Information and Capacity

Transfer the results of the literature search on AMR levels and trends of key pathogens to the table below (pathogens may vary by country). Add more lines as needed. If AMR surveillance is being conducted, there may be reports from which data can be obtained. Note key pathogens for which no data were available (insert NA in column 2). Data quality of reported results may vary.

Table H-4. Antimicrobial Resistance Levels and Trends

Key pathogen tested	Resistance levels (range)	Record any information on data quality	Date	Location	Population	Information source
Mycobacterium tuberculosis						
Plasmodium falciparum						
Neisseria gonorrhoeae						
Streptococcus pneumoniae						
Haemophilus influenzae						
Shigella spp.						
Vibrio cholerae						
HIV						
Other						

Summarize the range of resistance levels and the periods covered in Table H-4 in the table below. Note key pathogens for which no data were available (insert NA in column 2). Data quality of reported results may vary.

Table H-5. Antimicrobial Resistance Levels and Trends Summary Tables

Key pathogen tested	Resistance levels (range)	Record any information on data quality	Dates covered	Locations covered	Populations covered
Mycobacterium tuberculosis					
Plasmodium falciparum					
Neisseria gonorrhoeae					
Streptococcus pneumoniae					
Haemophilus influenzae					
Shigella spp.					
Vibrio cholera					
HIV					
Other					

Annex I. Summary of AMR surveillance and capacity assessment in Zambia, 2004[51]

Condition	AMR levels/treatment failure	Location	Population	Reference
Enterobacteria from AIDS patients	• *Nontyphoidal salmonellae* (resistance to treatment 6-92%) • *Shigella flexneri* (6-100%) • *S. dysenteriae* (0-100%)	Lusaka	124 adults, 105 children	Mwansa, J., Mutela, K., Zulu, I. et al. *Emerging Infectious Diseases* 8.1 (2002): 92-93
Malaria	Clinical failure: chloroquine: 31-48% Clinical failure: sulfadoxine-pyrimethamine: 3-17%	6 sites	300 febrile children <5 years	Barat, L. M., Himonga, B. et al. (CDC) *Tropical Medicine & International Health* 3.7 (July 1998): 535-42
Malaria	Clinical failure: sulfadoxine-pyrimethamine: 0 Clinical failure: chloroquine: 25%	Lundazi District Hospital	169 children <5 years with slide-confirmed uncomplicated malaria	Williams, H. A., Kachur, S., et al. (CDC, Tropical Disease Research Centre, Zambia) *Tropical Medicine & International Health* Vol. 4(10) October 1999
Malaria	Chloroquine resistance: 58% Sulfadoxine-pyrimethamine resistance: 26%	Kaoma District	70 patients with uncomplicated falciparum malaria; sulfadoxine-pyrimethamine given to those patients who had received chloroquine prior to enrollment	H. M. Bijl et al. (Kaoma (District Hospital, Zambia, Dept. of Internal Medicine, Groningen University Hospital, The Netherlands) *Tropical Medicine & International Health* 5.10 (October 2000): 692-95
Streptococcus pneumonia	Overall resistance: 34.1% • Tetracycline: 23.0% • Penicillin: 14.3% • Sulfamethoxazole + trimethoprim: 12.7% • Chloramphenicol: 3.9%	Zambia	260 children <6 years	Woolfson, A., Huebner, R. et al. (University of Oxford) *Bull World Health Org* 75.5 (1997): 453-62.

Surveillance Capacity

Background

Data obtained through AMR surveillance is used for decision making at various levels; within institutions (e.g., University Teaching Hospital) and at the national level for policy decisions and development of evidence-based treatment guidelines. The malaria treatment policy, TB guidelines, and STI and antiretroviral therapy protocols were influenced by available surveillance data. The cholera treatment policy has, since the early 1990s, been influenced by such data. Several drug resistance stakeholders interviewed reported on the need for more geographically representative data.

University Teaching Hospital–Microbiology, University Teaching Hospital–Virology, and the Tropical Diseases Research Center are WHO regional reference centers. Data on the number of health facilities with functioning laboratories in the country is not available. However, it is estimated that only about 33% of health facilities in Zambia have the capacity to carry out microscopy. There are five reference laboratories in Zambia—University Teaching Hospital Microbiology Laboratory, University Teaching Hospital Virology Laboratory, National Malaria Control Center, Tropical Diseases Research Center, and Chest Diseases Laboratory. The National Malaria Control Center and Chest Disease Laboratory specialize in malaria and TB, respectively. All are involved in surveillance activities. The National Malaria Control Center and Tropical Diseases Research Center have set up 10 sentinel sites for malaria at which most of the surveillance activities are undertaken. Mining companies on the Copperbelt have good laboratory infrastructure with the capacity to do surveillance work. Other facilities, such as mission hospitals, defense forces hospitals, and private hospitals, have laboratories which may have surveillance capacity.

Findings from Surveillance Capacity Interviews

Information was obtained through interviewing key informants and reviewing documents. The sample of laboratories (located in Lusaka, Kitwe, and Ndola) interviewed included five national- level reference laboratories and three private laboratories. The sample is not necessarily representative. Private laboratories were interviewed to assess their interest in and capacity to participate in surveillance activities.

Guidelines

Four of five reference labs and one private lab know of guidelines regarding the recommended level of microbiology laboratory services for the different levels of hospitals.

Laboratory Quality Assurance

There was no awareness of a national medical laboratory quality assessment scheme among the private laboratories interviewed. The reference laboratories reported various use of a national laboratory quality assurance scheme at a variety of levels of a laboratory (national, institutional, provincial). One laboratory reported, however, that there was no networking among the laboratories in terms of quality assurance. One of three private laboratories interviewed reported participating in equivalent quality control through CDC. University Teaching Hospital participated in regional quality control and Tropical Diseases Research Center, Chest Disease Laboratory, and University Teaching Hospital–Virology reference laboratories participate in international quality control programs.

Funding Sources

The private sector laboratories interviewed rely on patient subscriptions for support and are not aware of donor support of surveillance activities. Government, WHO, Japanese International Cooperation Agency, USAID, CDC, DFID, and the Global Fund were identified as donors supporting AMR surveillance activities. Two laboratories noted the diseases/program specific nature of surveillance funding. Two laboratories reported that all types of funding were difficult to obtain. Technical training (three labs) and information management (two labs) were mentioned as difficult areas to obtain donor support.

Four out of the five reference laboratories interviewed reported increasing interest in supporting surveillance activities as well as new donor involvement (Gates Foundation for TB surveillance and global initiatives for malaria surveillance). Availability of new drugs and changing treatment protocol were mentioned as reasons for increased interest.

Role of the Private Sector in Antimicrobial Resistance Activities

The role of private laboratories in drug resistance surveillance activities was seen as primarily diagnostic by reference laboratories, although one respondent felt they could be contributing much more than they were. Two respondents mentioned that AMR surveillance in the private sector consisted primarily of susceptibility testing and the private labs differ from public laboratories in levels of supervision and standards. Some of the private laboratories interviewed were interested in participating in surveillance activities and felt they had human and infrastructure resources to contribute. However, they currently had no relationship with the public sector laboratories, nor access to standard operating procedures and other materials provided by the public sector. More private sector laboratories would need to be assessed to fully understand the potential role they could play in AMR surveillance.

Use of Data

Respondents were asked how data collected are being disseminated and used. Diagnostic information is used by clinicians and disseminated through results forms. Data used for surveillance and policy is used by primarily the government (MoH and CBoH) and disseminated through reports and workshops. The questions used did not pick up any information on the role of DTCs in information management, use, and dissemination.

All respondents (except one private laboratory that was not collecting surveillance data) reported they were collecting data that are not being used. The main reasons cited were lack of coordination between laboratory staff and clinicians (three labs). Other reasons mentioned included lack of funding for dissemination and that data are used for research or specific projects and not disseminated further.

Training

All respondents, except one from the private sector, received some training in the past two years. When asked what type of training would be most welcomed, four of six respondents mentioned information management/ computer training.

Information Needs and Information Dissemination

When asked about information they needed but were not getting, five of eight laboratories said they needed general information on drug resistance. Specialized information needs included information on the molecular basis of resistance and atypical mycobacteria.

Primary mechanisms mentioned for dissemination of information among colleagues were meetings and workshops (5), leaflets and circulars (4), and email/Internet (3). Print media, policy makers, and leaflets were most frequently mentioned for dissemination of information to the public.

Data Management

Limited data management capacity was a recurring theme and was cited as affecting data quality and as a barrier to data utilization. Respondents listed data management as an area for which it was difficult to find funding and an area where training would be welcome.

All the reference laboratories had computer access. All were using Epi Info for data management, with one lab also using WHONET software. None of the private laboratories had computer access.

Annex J. Summary of interviews to identify stakeholder perceptions of AMR, Zambia 2004

Analysis of Stakeholder Data

1. Representativeness

Stakeholders	Number
Sector:	
Public	11
Private	1
NGO	1
Industry	2
Academia	0
Cooperating partners/multilateral	3
Specialty:	
Disease control	12
Pharmaceutical management	5
Laboratory/surveillance	1
Total	18

List of groups of stakeholders interviewed

National Malaria Control Center
WHO
Medical and pharmaceutical professional association (Faculty of General Practitioners)
Pharmacy and Poisons Board
Directorate of Public Health Laboratories
CBoH, Essential Drugs Program
CBoH, Directorate of Clinical Care
CBoH, Directorate of Public Health
CBoH, Maternal Child Health
CBoH, TB Program
UNICEF, HIV/AIDS program
Alliance for the Prudent Use of Antibiotics
Pharmaceutical manufacturer and distributor
Health insurance
National HIV/AIDS/STI/TB Council
Churches Health Association of Zambia
General Nursing Council

2. General comments

Magnitude/urgency of the AMR problem
- Serious (big)/urgent attention (6/18)
- Not too bad (3/18)
- Not significant (1/18)
- Others—did not know about problem or did not comment

Hot topics
- Change of treatment policy
- New drugs (antiretrovirals, Coartem) in circulation—new challenge
- Revision of medicines regulations
- Pharmacovigilance
- NDP implementation
- Revision of curricula

Quality control of (new) drugs

Consequences of AMR
- Increased morbidity and mortality
- Economic loss
- Treatment failure
- Need for alternative drugs

Who needs to be concerned/involved
- Community
- Government
- Health professionals
- Policy makers and implementers
- Media
- Multisectoral

Need for information/type of information
- Not enough information
- Local sensitivity/resistance data
- Global resistance data

Limitations
- Need for expertise (surveillance, etc.)
- Financial resources
- Facilities for monitoring

3. General observations

Magnitude of problem
Private sector did not view AMR as big problem.
Public sector respondents viewed it as serious problem (6/12)
Cooperating partners viewed AMR as serious problem (3/3)
Lab experts (director labs/microbiology) considered problem not bad/not out of hand

Hot topics
Identified new drugs as issue requiring special attention (e.g., training) (5/18)
Identified drug quality as topical (2/18)

Consequences of AMR
- Mentioned increased treatment costs as a consequence of AMR (8/11)
- Mentioned increased morbidity and/ mortality as a consequence (4/11)

Who needs to be involved
- Thought health workers should be involved (7/11)
- Thought public should be involved (4/11)
- Thought policy makers should be involved (4/11)

Need for information (type)
- Said not enough information available on AMR in Zambia (11/11)
- Needed information on sensitivity/resistance patterns (2/11)
- Needed local data on AMR (2/11)

Areas of stakeholder contribution
- Leadership
- Providing evidence (data)
- Support to groups doing AMR work
- Regulatory support
- Standardizing guidelines and other technical support
- Information dissemination
- Training of health workers
- Training of students (nurses, pharmacy, biomed sciences)

AMR activities already initiated
- Training in drug supply management
- New malaria policy implementation
- Awareness campaigns

Community support network for patients to assist with compliance
- APUA chapter-promoting prudent use of antibiotics
- ART management guidelines and training
- Revision of STG, ZNF, etc.
- CPE for various health professionals

4. Conclusions

- Awareness of AMR is high among health professionals
- No existing group addressing AMR as cross-cutting issue
- Enough interest exists
- Formation of AWG important step
- Some AMR activities already initiated
- Significant amount of data exists, some of which needs analysis

Annex K. Examples of Messages for Different Audiences[52]

Messages for the public		
AMR message	**Why**	**What action is required**
• Use medicines well in order to save them for our children • Misuse of antimicrobials may cost you or your child's life tomorrow • It is not true that the newest antibiotics are the best for your illness; many times simple antibiotics are just as effective • Antimicrobial agents are a non-renewable resource, which must be preserved	• Proper use of medicine prolongs their useful life • Medicines can be very harmful if used in the wrong way • Irrational use of medicines reduces the treatment options for proper patient care	• Always take your antibiotic medicine as prescribed • Always complete your prescribed treatment • Use antibiotics after consultation with a health worker • Don't share your prescribed medicines with others • Report shortage of important antibiotics to the responsible authorities
Practice a high level of hygiene in your home	• The spread of resistant bacteria can be reduced by good hygiene and sanitation practices • Hand hygiene is the single most important way to cut down spread of infections and can limit the spread of resistant bacteria	• Always wash hands with water and soap before eating, before making food, and after using toilet/latrine • Keep kitchen and cooking utensils clean • Keep your house and surrounding environment clean
Each individual has a role to play in preserving effectiveness of medicines	• The major cause of resistance is overuse and misuse of antibiotics • The more the public uses antibiotics the more they become ineffective	• Avoid the routine use of antimicrobial agents in animals, e.g., poultry
Refuse to be treated with poor quality medicines	Substandard medicines can compromise your return to health	• Buy medicines only from licensed outlets with qualified personnel and always check or ask about the expired date of medicines you buy
You and not your doctor controls your life; get to know about rational use of medicines and antimicrobial resistance	Inappropriate use of medicines (indiscriminate, noncompliant) is dangerous and increases the risk of AMR, which means loss of effective medicines	• Take your medicines as prescribed and follow instructions as given

Messages for health institutions		
AMR message	**Why**	**What action is required**
Keep it simple: use narrow spectrum antibiotics for specific needs—broad spectrum antibiotics may not be best	• Correct use of medicines saves lives and reduces cost of health care • Correct antimicrobial treatment gives life, but inappropriate treatment gives death	• Use available technology to get a definitive diagnosis and as such treat effectively • Make use of available reference materials to keep up to date with current treatment regimens • Promote use of agreed treatment guidelines
Surgical officers and surgeons have to follow agreed evidence-based protocols on surgical prophylaxis	• To reduce the cost of care to the patient and contain the development of AMR • To reduce the facility overhead (e.g., cost of procurement storage)	• Establish the hospital protocol, implement, and monitor practice
Keep up-to-date with the level of antibiotic use in your facility	Development of AMR has a correlation with the level of antibiotic use	• Undertake operational research and surveillance at the facility • Agree on STGs for common conditions the guidelines should be developed by consensus • Conduct baseline studies on antibiotic use in hospitals
Build a AMR network with colleagues at institutional, local, district, regional, and national levels	Building local coalitions is a success factor for AMR containment	• Identify key stakeholders at the institution/district/national level • Regularly share information and support each other in implementing interventions
Infection control must practiced at all levels	Good infection control is a prerequisite to reducing hospital acquired infections	• Define policies on infection control • Inform staff about infection control tools and improve on actual practice • Put in place a comprehensive waste management system • Establish infection control committees • Produce information education materials for staff and organized training sessions
Set up and maintain good bacteriology labs	Proper laboratory diagnosis reduces antimicrobial resistance and reduces the cost of care provision within the institution	• Promote education and communication between clinician and lab staff • Health workers must be committed to make the most of bacteriology and other lab services • Standard guidelines/protocols on investigations
Proper hand washing is critical in the health institutions – no water, no soap, no health	Good hand hygiene is an effective way of controlling the spread of infection in health facilities	• Wash hands the proper way • Provide a regular supply of material for hand washing • Define the hand washing procedure in the facility for both in- and outpatients

Messages for health systems		
AMR message	**Why**	**What action is required**
AMR is a global problem but its cost varies from dollars in the North to lives in the South	AMR increases morbidity and mortality of infections, length of hospital stays, duration of the illness, and costs of treatments up to 10 times	• Develop national plan of action for AMR containment • Set up AMR country working groups to spearhead the AMR advocacy and containment actions
Adopt and adapt WHO Global Strategy and Resolution 60.16 of 2007 on containment of AMR	The global strategy has a wealth of information on causes and possible intervention for AMR containment	• Distribute the WHO Global Strategy and Resolution • Build local capacity to tackle the issue by training health workers and the public • Follow up to ascertain implementation
Health systems should put in place mechanisms to detect AMR	Knowing the situation of antimicrobial use in health facilities is an important point to addressing AMR	• Develop surveillance systems, conduct AMR surveillance, and document any AMR encountered
Health systems should put in place a comprehensive continuous multifaceted/ mechanism to contain AMR	• For certain things prevention is better than the cure: AMR is one of them • It costs money to address AMR but lives not to! • Resistance patterns in rural areas may be different from urban	• Build and equip facilities and provide tools for proper diagnosis (e.g., microbiology laboratories) • Support the establishment of effective DTCs (which can develop guidelines, protocols and monitor medicine use, etc.) and strengthen those that exist
Put in place mechanisms to guarantee rational use of medicines at all levels	Rational medicines use is the core intervention to contain AMR	• Provide guidelines on the use of antimicrobials • The public must be educated on the common diseases in their communities and when there is need for antibiotic treatment • Patients need to be educated on adherence to treatment regimens, especially medicines taken long term (e.g., TB treatment and antiretrovirals)

Annex L. Extracts of interviews with 10 media members in Zambia[53]

Knowledge and perspectives on drug resistance and related issues

- Of all the editors interviewed, only one had heard the term "antimicrobial resistance". He heard the term from an international conference. However, he could not explain what it meant to someone who had not heard it before.
- All editors interviewed had heard the term "drug resistance," but in relation to malaria. They can explain what the term drug resistance means to someone who has not heard it before.
- The editors interviewed said drug resistance is a big problem in Zambia. However, because of a lack of media coverage (as a result of not having information mainly from health experts), it (drug resistance) appears not to be a big problem.
- Death was said to be the ultimate consequence of drug resistance, while self-prescription and failure to finish the full course of medical treatment are said to be some of the causes of drug resistance.

Decision makers

- Editors determine stories to be published or broadcast. However, reporters have the leeway to cover other stories as long as such stories meet the editorial policy of their respective media houses.

Information sources for health stories

- Locally, the MoH, CBoH, hospitals, and clinics are the main sources of health topics often reported in the media while others are WHO, Internet, BBC, and Reuters.
- The most reliable and credible sources of health information to the media include MoH, WHO, BBC, and Reuters. The first two because they have health experts and are involved in health research; the last two because they quote reputable and credible sources in their stories.

Health topics currently covered by the media

- HIV/AIDS is by far the most covered health topic, followed by malaria and tuberculosis in that order.
- Stories about drug donations and drug shortages in public health institutions and quality of medicines or counterfeit medicines also feature prominently in the media.

Communication channels for health information

- Radio, newspapers, television, and word of mouth are ways through which the public learn of such health topics as the new medicines for malaria, medical treatment for pneumonia, and HIV/AIDS treatment.
- The print media in general is said to be the most credible, not only on health/medicine issues, but other issues as well due to its durability and referral advantage.
- Television has the most impact for both government decision makers and the business community because they "like seeing themselves on television."

- The editors suggested that community-based organizations be involved in disseminating information on health issues because of their remarkable outreach capabilities to access nontraditional audiences in suburbs and villages.

Barriers to coverage of drug resistance and related topics

- Limited resources: inadequate number of reporters, transport, computers, and cameras
- Bureaucracy: only official spokespersons are allowed to speak or comment on health stories
- Difficulties to secure expert comments on health information
- None of the media houses covered had health reporters
- Percentage of coverage of health and medicine related data, in terms of time, stories, and programs, could not be estimated because health articles are covered on the basis of the universal news criteria.

Editors' suggestions for facilitating coverage of drug resistance

- Increased access to reliable information—given access to reliable information on drug-related topics, the editors said they would readily disseminate the information using their respective media channels.
- Build relationships—the stakeholders should be encouraged to identify and establish contacts with media reporters who have shown interest in reporting health and drug-resistance topics. Hence, the need to exchange telephone and e-mail addresses with such reporters, so that health information for publication or broadcasting can be sent.
- Contribute to health columns—the editors said health experts/organizations are free to arrange to have a health column or radio/television program and discuss details with the media houses. However, a serious commitment to consistently write such stories must be made because the editorial space/airtime for that purpose will be reserved permanently.
- Provide user-friendly context—the health columns are good, especially when the messages are packaged in a user friendly way without jargon. Such columns in general do increase the newspapers' sales because some readers buy newspapers specifically to read the column.
- Provide logistical assistance—provide transport to journalists so they can cover drug-related issues.
- Sponsor training—empower media personnel with the necessary background information and key concepts about drug resistance.
- Facilitate access—assist the media in obtaining access to health facilities that do not have public relations officers.
- Enhance professional support—the editors suggested the formation of a media health watch group to enhance their ability to access information because of increased legitimacy and opportunities for information exchange.

Annex M. November 20, 2004, article in *Times* of Zambia after an AMR call-to-action meeting in Lusaka[54]

Drug resistance jolts

By A CORRESPONDENT

"I DO not know what is wrong with me. Malaria is refusing to go away although I have been taking chloroquine," a Chawama resident, Ms Mary Zulu, complained to a health worker at Chawama Health Centre in Lusaka where she went to seek health medical attention recently.

What Ms Zulu did not know was that chloroquine, the drug that has been used as the first treatment for uncomplicated malaria for the past four decades, is no longer effective in treating malaria as a result of parasite resistance.

Studies conducted in different parts of Zambia have shown levels of chloroquine resistance that range from 24 per cent to 52 per cent.

To significantly reduce the malaria disease burden, the Government through the ministry of Health adopted the use of anti-malaria combination therapy strategy as a replacement to the monotherapy options in the management of uncomplicated malaria in Zambia.

Available evidence shows that the problem of drug resistance (antimicrobial resistance or AMR) is increasing in Zambia.

At global level, the USAID has been supporting efforts to raise awareness of the problem of AMR and to develop interventions to improve drug use practices and drug quality.

The initial key step was to support the development of global strategy by the World Health Organisation (WHO) for the containment of AMR, which represents global consensus on interventions, research gaps and appropriate approaches for containing drug resistance.

To try and address the problem of AMR, a team of concerned health professionals formed an AMR advocacy-working group (AWG). It should be mentioned that Zambia is the first country in the world to apply the approach.

Professor Chifumbe Chintu, of the University of Zambia (UNZA), is the chairperson of the AWG whose members work on a voluntary basis as they are in full-time employment elsewhere. The group receives support from the cooperating partners, mainly USAID and Central Board of Health (CBoH).

On November 12, 2004, AWG organised an AMR "Call for action" meeting, which was held at Holiday Inn in Lusaka. The forum was the first of its kind in the history of AMR in Zambia. Minister of Health Brian Chituwo officially opened the meeting. The aim of the meeting was to help people become aware about the potential problem of drug resistance in Zambia, to advocate for their participation in addressing the problem and to facilitate the follow-up discussions.

Health experts from diverse medical fields including the microbiology and virology laboratories at the University Teaching Hospital (UTH) and School of Veterinary at UNZA presented papers on AMR during the meeting.

Malaria, TB, pneumonia, dysentery, cholera, HIV/AIDS were among the top public health diseases that were discussed. The impact of antibiotics that are used to treat animals on human beings was also highlighted.

From the presentations, it was clear that if nothing is done to address the problem of AMR, Zambia could be heading for a situation where the hospitals will be full of patients with resistant infections.

What causes this drug resistance? A number of factors contribute to the development of AMR. However, wrong use of drugs is by far the single major contributor.

According to the paper titled 'Preserving the Effectiveness of Drugs: Call for Action' which was distributed to the participants, bad prescription and dispensing, poor quality or substandard drugs and inappropriate treatment-seeking behaviour are some of the factors that cause AMR.

However, each one of these causes happen because of other reasons. For example, poor quality drugs could be caused by lack of a national drug quality control laboratory and pharmacovigilance system

Continued…

experts into action

and inadequate surveillance and supervision.

The consequences of AMR are equally many. The obvious one is that people start dying from otherwise curable diseases, prolonged illness, the danger of AMR spreading to the population, high cost of treatment to the family as well as high cost of drug replacement to the country.

What then should be done in order to preserve the effectiveness of drugs? Taking the correct quantities of drugs, finishing the prescribed course of drugs, going to a health worker for antibiotics, avoiding self-medication and desisting from buying drugs from illegal drug stores.

The participants who attended the AMR "Call for Action" meeting included journalists, consumers, pharmacists, academicians, policy-makers, cooperating partners and medical professionals from all over Zambia. The general atmosphere and quality of contributions at the meeting were encouraging.

"Apart from sharing knowledge and experiences in AMR, the meeting provided me with an opportunity to meet some of my professional colleagues some of whom I last met 10 years ago at medical school," one participant said.

•MINISTER of Health Brian Chituwo chats with Professor Chifumbe Chintu at the AMR meeting in Lusaka.

Dr Chituwo was able to chat with Prof Chintu, who was his lecturer at UNZA some years back.

The AMR meeting was punctuated by the "call for action". The ministry of Health, through CBoH director general Ben Chirwa, seized the opportunity to officially launch the standard treatment guidelines to promote rational prescribing in health institutions.

Source: malaria policy statement

Annex N. Summary of EPN and member group AMR activities, 2008–2011

Armenia

- Coalition of Rational and Safe Use of Medicines conducted a round table on AMR with the Armenian Orthodox Church (November 2010)

Cameroon

- Cameroon Baptist Convention (CBC) set up their health board AMR committee (May 2009)
- CBC held a technical meeting to plan AMR activity in Cameroon (May 2009)
- CBC distributed materials—call-to-action, posters, book marks (July 2009)
- Organisation Catholique pour la Santé au Cameroun sensitized 25 Diocesan coordinators on AMR (December 2009)
- CBC conducted retrospective studies on culture and sensitive tests done in CBC hospitals (multiple 2009)
- Bishops conference adopted an AMR work plan by Organisation Catholique pour la Santé au Cameroun (April 2010)
- CBC implemented various interventions including the provision of personal protective equipment, waste disposal containers, a placenta pit, and training at Mboppi Hospital (November 2010)
- CBC held AMR training/workshop for hospital staff (December 2010)
- Baptist Hospital Banyo carried out continuing education using EPN materials and produced a skit on AMR (April 2011)

Democratic Republic of Congo

- Bon Berger Hospital (BBH) conducted AMR sensitization among women's groups in Kananga (March 2010)
- BBH conducted retrospective studies on sensitivity of isolates for 2008–2009 (April 2010)
- BBH trained 50 hospital staff on hand hygiene (July 2010)
- BBH installed hand wash basins in Berger hospital (September 2010)

Germany

- German Institute for Medical Mission/Medical Mission International held a technical meeting to review bacteriology studies from Ghana (June 2009)

India

- Christian Medical College (CMC) translated call-to-action into Tamil (May 2009)
- Annamalai University (AU)—Dr. Prasad organized an education campaign on AMR for high school children (1372 children in 11 schools) (June 2009)
- AU—Dr. Prasad used infection control assessment tool and implementation of corrective action based on findings (August 2010)
- AU—Dr. Prasad trained 300 hospital staff on infection control (August 2010)
- AU—Dr. Prasad developed STGs for common infectious diseases (October 2010)
- CMC held regular meetings of hospital infection control committee and review— (multiple 2010)
- CMC published and disseminated guidelines for infection control (multiple 2010)
- CMC revamped the antibiotic guidelines policy and antibiotic panel (multiple 2010)

- CMC published a booklet in collaboration with WHO Regional Office for South-East Asia titled, Step by Step Approach for Development and Implementation of Hospital Antibiotic Policy and Standard Treatment Guidelines (multiple 2010)
- CMC conducted research projects on costs of resistance and impact of antibiotic guidelines (multiple 2010)
- CMC trained personnel in hand hygiene and infection control (multiple 2010)

Kenya

- EPN developed AMR campaign image (February 2009)
- EPN raised awareness on AMR among meeting participants (February 2009)
- Mission for Essential Drugs and Supplies published AMR article in their update (March 2009)
- EPN launched the EPN Fight AMR campaign on Facebook (March 2009)
- EPN held a public lecture – AMR sensitization at University of Nairobi (August 2009)
- SPS/Kenya distributed AMR fact sheets for health professionals country wide (September 2009)
- The EPN Secretariat developed a tool to undertake a national study on AMR attitudes (September 2009)
- The EPN Secretariat distributed the AMR advocacy calendar (November 2009)
- EPN and SPS organized a follow-up workshop on AMR (Beyond Awareness: Consolidating Action for AMR Containment) for more than 20 EPN members (May 2010)
- Mission for Essential Drugs and Supplies trained hospital staff on infection control (March 2011)
- EPN participated in World Health Day and published a community action comic strip (April 2011)

Malawi

- Dr. Seke Kayuni sensitized staff in the hospital on AMR (December 2008)
- Christian Health Association of Malawi (CHAM) sensitized their staff on AMR (December 2008)
- CHAM distributed call-to-action and other AMR materials (May 2009)
- CHAM developed a preserving antibiotics poster in Chichewa and distributed it to 45 facilities (May 2009)
- CHAM established DTCs in five hospitals (December 2010)

Moldova

- Coalition of Rational and Safe Use of Medicines (CoRSUM) translated call-to-action into Russian (May 2009)
- CoRSUM organized a performance by children on not taking antibiotics for cold and flu (May 2009)
- CoRSUM held an AMR capacity building workshop for 22 doctors, pharmacists and others (September 2010)
- CoRSUM held an AMR kickoff meeting for stakeholders in Moldova (October 2010)
- CoRSUM conducted a Drug & Therapeutics Committee workshop on AMR (September 2010)
- CoRSUM held a school program for hand washing/hand hygiene in the school (October 2010)
- CoRSUM conducted a workshop in TB hospital on challenges in anti-TB medicines for children (November 2010)
- CoRSUM distributed various materials in hard copy and electronically and designed a website for AMR (Multiple 2010)
- CoRSUM and Association of Pharmacists of Moldova presented an AMR declaration for the Parliamentarian Public Health Group (March 2011)

Moldova, Ukraine, Armenia, Kazakhstan, and Russia

- CoRSUM organized European Antibiotic Awareness Day (November 2010)
- CoRSUM held Skype teleconferences on advocacy in AMR (December 2010-March 2011)

Moldova for Newly Independent States

- CoRSUM translated the "Infection Control Advocacy Tool" into Russian (July 2010)
- CoRSUM designed, printed, and distributed a pamphlet "Antibiotic Resistance is Threatening our Future" into Russian (August 2010)
- CoRSUM organized an campaign on "Global Hand Washing Day" (October 2010)

Moldova, Armenia, and Ukraine

- CoRSUM held an AMR kickoff meeting for stakeholders in Moldova (October 2010)

Network wide

- AMR Call-to-Action circulated to all members (May 2009)
- EPN issued Pharmalink on AMR (September 2009)

Newly Independent States

- Coalition of Rational and Safe Use of Medicines issued MEDEX newsletter with focus on infection control, AMR, and the historical role of Dr. Ignaz Semmelweis, 1847 (November 2010)
- Coalition of Rational and Safe Use of Medicines discussed, adopted, and distributed their declaration on AMR (Multiple 2010)

Nigeria

- Christian Health Association of Nigeria (CHAN) Medi-Pharm sensitized their staff and member hospitals (April 2009)
- CHAN Medi-Pharm organized a media campaign on AMR (May 2009)
- Evangelical Church Winning All (ECWA) distributed 2000 AMR posters (May 2009)
- ECWA held a national call-to-action workshop for key state actors (May 2009)
- CHAN Medi-Pharm held a Scientific Symposium on AMR (May 2009)
- CHAN Medi-Pharm organized an AMR workshop for 10 mission health facilities (August 2009)
- CHAN Medi-Pharm trained health professionals on AMR (August 2009)
- CHAN Medi-Pharm distributed an AMR survey in 10 hospitals (August 2010)
- CHAN Medi-Pharm held hospital practice workshops (multiple 2010)
- CHAN Medi-Pharm distributed information, education, and communication materials to health workers and facilities on a regular basis (multiple 2010)
- ECWA used mass media for publicity radio and TV (May 2011)

Peru

- Provida translated the called to action into Spanish (May 2009)

Rwanda

- Dr. Damien sensitized medical staff of Kibogora hospital on AMR (January 2009)
- Dr. Damien and others sensitized staff in various health centers on AMR (January 2009)
- BUFMAR distributed call-to-action to key stakeholders (June 2009)
- EPN, SPS, and BUFMAR held a Francophone regional AMR workshop (November 2009)
- Kibogora Hospital held a meeting for staff from hospital and satellite clinics on nosocomial infection (December 2009)
- Kiborgora Hospital set up a hospital infection control committee for hospital and satellite clinics (December 2009)
- Musanze District Pharmacy conducted an ABC analysis to determine relative expenditure on antibiotics (December 2009)
- BUFMAR held an AMR workshop for 15 faith-based hospitals and health centers (November 2010)
- Hôpital Kibilizi (HK) implemented a committee in charge of hygiene and a "hygiene officer" (multiple 2010)
- HK assessed the needs to improve hygiene in the hospital (multiple 2010)
- HK installed sinks for hand washing in consultation rooms on the wards (multiple 2010)
- Hôpital Kibilizi introduced alcohol (with glycerin) for hand washing (Multiple 2010)

Sierra Leone

- Christian Health Association of Sierra Leone (CHASL) distributed a work shop report to the pharmacy board (February 2009)
- Eugene Conteh presented at Sierra Leone's pharmacists association meeting (May 2009)
- CHASL presented on AMR at Sierra Leone's pharmacists associate meeting (July 2009)
- Eugene Conteh presented at Sierra Leone's pharmacists association meeting (July 2009)
- CHASL organized an AMR talk for its members attending a general meeting (October 2009)
- CHASL administered an AMR survey in 9 hospitals (August 2010)
- CHASL introduced AMR as a topic in their continuous pharmaceutical education sessions (ongoing)

Switzerland

- EPN's Eva Ombaka participated in an AMR expert working group (rational drug use and drug regulation) meeting of WHO to develop part of the global work plan on AMR (March 2009)
- EPN/ReAct launched EPN's Fight AMR campaign at the World Health Assembly in Geneva (May 2009)

Tanzania

- EPN and SPS conducted a regional AMR workshop in Moshi, Tanzania (November 2008)
- Mission for Essential Medical Supplies (MEMS) sensitized its staff on AMR (December 2008)
- MEMS distributed posters and call-to-action to the public (May 2009)
- MEMS utilized mass media publicity on AMR via Habari Leo (print and web; May 2009)
- MEMS administered a survey on perceptions of high school students on AMR (May 2009)
- MEMS translated call-to-action to Swahili (May 2009)
- MEMS established and strengthened MTC in 6 hospitals (January 2011)

Togo

- APROMESTO (Association Protestante des Oeuvres Médicosociales et Humanitaires du Togo) sensitized the media and prescribers on AMR (May 2009)
- APROMESTO strengthened DTCs in 4 hospitals and 2 health centers (January 2011)

Uganda

- Dr. Najjuka of Makerere University circulate call-to-action to Uganda Medical Association (January 2009)
- Joint Medical Store (JMS) sensitized its staff on AMR (January 2009)
- Dr. Najjuka of Makerere University sensitized Alliance for the Prudent Use of Antibiotics Uganda chapter on AMR call-to-action (January 2009)
- JMS published AMR article in its information bulletin (February 2009)
- JMS sensitized participants at the Joint Medical Store Kampala (February 2009)
- Dr. Najjuka participated in coordinating the kick start of a situation analysis study of AMR in Uganda and Zambia (March 2009)
- JMS held a workshop on rational management of antibiotics for 61 staff (September 2009)
- JMS published AMR messages in the information bulletin and distributed 6000 copies (multiple 2009)
- JMS sensitized health facility staff nationwide at 4 regional customer days (multiple 2009)
- Dr. Najjuka involved students in the administration of the hand hygiene and surgical chemoprophylaxis tools (annually)

Zambia

- Churches Health Association of Zambia (CHAZ) conducted a survey on sensitivity patterns of commonly used antiretrovirals (November 2009)
- CHAZ featured AMR in their annual bulletin (December 2009)
- CHAZ conducted a desk review of potential resistance to co-trimoxazole following use for prophylaxis in HIV and AIDS patients (December 2009)
- CHAZ commemorated Worth Health Day Kenya (April 2011)

Zimbabwe

- Dr. Dhege sensitized Zimbabwe Association of Church Hospitals and hospital staff on use of infection control advocacy tool (December 2008)
- Nhowe Mission Hospital reviewed their infection control policy and introduced alcohol- based antiseptics (February 2009)
- Nhowe Mission Hospital recruited a lab technician to improve diagnosis (April 2009)
- Nhowe Mission Hospital focused on hospital waste management and constructed an Otto waste pit and Blair-type toilets (October 2009)
- Zimbabwe Association of Church Hospitals trained health workers from various hospitals on AMR (November 2009)
- Nhowe Mission Hospital purchased protective clothing for staff as part of a series of infection control measures (December 2009)
- Nhowe Mission Hospital institutionalized a hospital infection control committee (January 2010)
- Dr. Dhege/Nhowe Mission Hospital presented a position paper on AMR at the June 2010 Public Health Advisory Board meeting. The ministry has now taken up training on infection control (June 2010)
- Zimbabwe Association of Church Hospitals conducted an AMR survey in 10 hospitals (August 2010)

Source: EPN

REFERENCES

[1] WHO. 2007. *World Health Report 2007: A Safe Future; Global Public Health Security in the 21st Century*. Geneva: WHO.

[2] Meiburg, A., Kusemererwa, D., Green, T. 2010. *Beyond Awareness: Consolidating Action for AMR Containment.* Workshop Report. Presented by the Ecumenical Pharmaceutical Network and Management Sciences for Health.

[3] Meiburg, A., Goredema, W., and Ntengu, M. 2010. *Atelier francophone sur la résistance aux antimicrobiens et la lutte contre les infections dans les formations sanitaires.* Présenté par le Réseau Pharmaceutique Ecuménique et Management Sciences for Health.

[4] Workshop on Local and Regional Actions to Address Antimicrobial Resistance: 10–14 November 2008, Moshi Tanzania. Nairobi: Organized by Ecumenical Pharmaceutical Network (EPN) with technical support from Strengthening Pharmaceutical Systems (SPS). 2009. http://www1.msh.org/projects/sps/SPS-Documents/loader.cfm?url=/commonspot/security/getfile.cfm&pageid=41114

[5] Joshi, M., Kirika, R., Bura, M., Nelson, N., Goredema, W. 2008. Technical Report of the Regional Pharmaceutical Forum and Antimicrobial Resistance Meeting, Kampala, Uganda: April 28–30, 2008. Developed in collaboration with the Regional Pharmaceutical Forum (RPF) of East, Central, and Southern Africa Health Community (ECSA HC). Submitted to the US Agency for International Development by the Strengthening Pharmaceutical Systems (SPS) Program. Arlington, VA: Management Sciences for Health. http://www1.msh.org/projects/sps/SPS-Documents/loader.cfm?url=/commonspot/security/getfile.cfm&pageid=41121

[6] Green, T., I. Buki Gege, F. Hitayezu, A. Mukerabirori, P. Gaparayi. 2009. Building Coalitions to Contain Antimicrobial Resistance: Report of Start-up Activities in Rwanda, September 26–October 10, 2009. Submitted to the US Agency for International Development by the Strengthening Pharmaceutical Systems (SPS) Program. Arlington, VA: Management Sciences for Health.

[7] Andualem, T., Mekonnen, N., Daniel, G., Joshi, M., Keene, D., Lee, D. Magnitude of and Contributing Factors to Antibacterial Resistance in Ethiopia. 38th Annual International Conference on Global Health organized by the Global Health Council, June 13 to 17, 2011, Washington DC, USA.

[8] Adapted from WHO/StopTB Partnership. 2007. *Advocacy, Communication, and Social Mobilization (ACSM) for Tuberculosis Control: A Handbook for Country Programmes*. Geneva: WHO. http://www.stoptb.org/assets/documents/resources/publications/acsm/ACSM_Handbook.pdf

[9] Joshi, M., C. Chintu, O. Hazemba, and N. Pollock. 2006. Lessons from a Country-level Approach for Advocacy and Containment of Antimicrobial Resistance. Poster no. 68 presented at the Global Health Council 33rd Annual International Conference on Global Health, May 30–June 2, Washington, DC Available at http://www.msh.org/projects/rpmplus/Documents/upload/AMR_Poster_2006-FINAL.pdf

[10] Joshi, M., N. Pollock, and K. Garrison. 2004. *Antimicrobial Resistance Stakeholders' Call for Action: Meeting, Lusaka, November 12, 2004.* Submitted to the US Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: MSH. http://pdf.usaid.gov/pdf_docs/PNADB994.pdf

[11] Joshi, M., and M. Miralles. 2006. *Antimicrobial Resistance Advocacy and Containment in Ethiopia: Report of Initial Activities in February–March, 2006.* Submitted to the US Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: MSH. http://pdf.usaid.gov/pdf_docs/PDACH502.pdf

[12] Goredema, W., N. Nelson, O. Hazemba., A. Sosa, and M. Sanchez. 2006. *A Call-to-Action National Workshop on Antimicrobial Resistance Containment: Adama, Ethiopia, November 16–18, 2006: Trip Report*. Submitted to the US Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: MSH.

[13] Green, T., I. Buki Gege, F. Hitayezu, A. Mukerabirori, P. Gaparayi. 2009. Building Coalitions to Contain Antimicrobial Resistance: Report of Start-up Activities in Rwanda, September 26–October 10, 2009. Submitted to the US Agency for International Development by the Strengthening Pharmaceutical Systems (SPS) Program. Arlington, VA: Management Sciences for Health.

[14] Global Alliance for Vaccines and Immunizations (GAVI). 2004. *Guidelines for Preparing a National Immunization Program Financial Sustainability Plan.* Geneva: GAVI.

[15] Faulkner, D. and R. Fields. 2004. Advocacy for Financial Sustainability (ppt). The Change Project: Academy for Educational Development. Presented at the "Why Invest in Communication for Immunization" Workshop. Washington, DC.

[16] Joshi, M., O. Hazemba, and N. Pollock. 2005. *Supporting Country-level Strategies for Advocacy and Containment of Antimicrobial Resistance.* Paper presented at the Strategies for Enhancing Access to Medicines Conference, June 20–22, 2005, Accra, Ghana. http://www.msh.org/seam/conference2005/pdf/Day1/38_Tr03_Joshi_pres.pdf

[17] Joshi M., Kirika R., Green T. Using Regional Pharmaceutical Organizations as Multipliers in Expanding the Scope and Impact of Antimicrobial Resistance Initiatives. Paper presented at the session on "Combating Antimicrobial Resistance for Patient Safety," organized by FIP together with WHO Patient Safety 69th International Congress of the International Pharmaceutical Federation (FIP), September 3-8, 2009, Istanbul, Turkey. http://www1.msh.org/projects/sps/SPS-Documents/loader.cfm?csModule=security/getfile&pageid=44058

[18] Management Sciences for Health (MSH) and World Health Organization (WHO). 1997. *Managing Drug Supply*. 2nd ed. West Hartford, CT: Kumarian Press.

[19] Joshi M., Pollock N., Garrison K. 2004. Antimicrobial Resistance Stakeholders' "Call for Action" Meeting, Lusaka, November 12, 2004. Submitted to the US Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: Management Sciences for Health. (Page 19) http://pdf.usaid.gov/pdf_docs/PNADB994.pdf

[20] MSH and WHO. 1997. *Managing Drug Supply*. 2nd ed. West Hartford, CT: Kumarian Press.

[21] Workshop on Local and Regional Actions to Address Antimicrobial Resistance: 10-14 November 2008, Moshi Tanzania. Nairobi: Organized by Ecumenical Pharmaceutical Network (EPN) with technical support from Strengthening Pharmaceutical Systems. 2009. http://www1.msh.org/projects/sps/SPS-Documents/loader.cfm?url=/commonspot/security/getfile.cfm&pageid=41114

[22] MSH and WHO. 1997. *Managing Drug Supply*. 2nd ed. West Hartford, CT: Kumarian Press.

[23] Ibid.

[24] Parks, W., and L. Lloyd. 2004. *Planning social mobilization and communication for dengue fever prevention and control.* Geneva: WHO.

[25] Joshi, M., S. Zimicki, M. Sommer. 2004. Initiation of Antimicrobial Resistance Country-level Implementation Pilot in Zambia, March 2–13, 2004: Trip Report. Submitted to the US Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: MSH.

[26] Joshi, M., N. Pollock, and M. Miralles. 2004. *Antimicrobial Resistance Country-level Implementation Pilot in Zambia: Trip Report of a Follow-up Visit in August 2004.* Submitted to the US Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: MSH. http://www1.msh.org/projects/rpmplus/Documents/loader.cfm?csModule=security/getfile&pageid=59977

[27] Joshi, M., N. Pollock, K. Garrison. 2004. *Antimicrobial Resistance Stakeholders' Call for Action: Meeting, Lusaka, November 12, 2004.* Submitted to the US Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: MSH. http://pdf.usaid.gov/pdf_docs/PNADB994.pdf

[28] Ibid.

[29] Soisson, D. and L. Shafritz. 2005. Zambia Trip Report: Message, Advocacy, and Communication Workshops. Washington, DC: Academy for Educational Development.

[30] Joshi, M. 2005. Workshop on Implementation of Standard Treatment Guidelines to Support Antimicrobial Resistance Containment in Zambia: June 27–29, 2005. Submitted to the US Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: MSH. http://pdf.usaid.gov/pdf_docs/PNADF436.pdf

[31] Hazemba, O. 2006. *Review of Standard Treatment Guidelines 2004 Zambia National Formulary Committee Workshop, Lusaka, September 22–24, 2006*. Submitted to the US Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: MSH.

[32] Ministry of Health, Zambia National Formulary Committee. 2008. Standard Treatment Guidelines, Essential Medicines List, Essential Laboratory Supplies for Zambia. 2nd ed. Lusaka, Zambia: Zambia Ministry of Health.

[33] Sanchez, M., and D. Briones. 2006. *Antimicrobial Resistance Country-level Implementation Pilot in Zambia: Rapid Appraisal of Advocacy Activities*. Submitted to MSH/Rational Pharmaceutical Management Plus by Links Media. Gaithersburg, MD.

[34] Banda, S. 2006. Curriculum Review and Interview of Experts to Identify Topics on Antimicrobial Use and Antimicrobial Resistance Included in the Undergraduate Medicine Training Program in Zambia. Submitted to the US Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: MSH.

[35] Moonga, H. 2006. Curriculum Review and Interview of Experts to Identify Topics on Antimicrobial Use and Antimicrobial Resistance in the Undergraduate Pharmacy Training Program, University of Zambia: January 2006. Submitted to the US Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: MSH.

[36] Syacumpi, M. 2006. Preservice and Post-basic Nursing Training Curricula for Registered Nurses in Zambia: Curriculum Review and Expert Interview to Assess Antimicrobial Use and Antimicrobial Resistance Content, March, 2006. Submitted to the US Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: MSH.

[37] Joshi, M. Reforming Pre-Service Curriculum as a Sustainable Low-Cost Intervention to Address Antimicrobial Resistance. Poster presented at the American Public Health Association 138th Annual Meeting & Exposition, Denver, Colorado, November 6–10, 2010. http://apha.confex.com/apha/138am/webprogram/Paper225010.html

[38] University of Zambia, School of Medicine. MB ChB Curriculum, 2010.

[39] Tran, D. and P. Risha. 2007. *Port of Entry Inspection and Mini-Lab Training, 26 February–2 March, 2007, Lusaka, Zambia*. Submitted to the US Agency for International Development by RPM Plus. Arlington, VA: MSH.

[40] Workshop on Local and Regional Actions to Address Antimicrobial Resistance: 10-14 November 2008, Moshi Tanzania. Nairobi: Organized by Ecumenical Pharmaceutical Network (EPN) with technical support from Strengthening Pharmaceutical Systems (SPS). 2009. http://www1.msh.org/projects/sps/SPS-Documents/loader.cfm?url=/commonspot/security/getfile.cfm&pageid=41114

[41] MSH and WHO. 1997. *Managing Drug Supply*. 2nd ed. West Hartford, CT: Kumarian Press.

[42] Ibid.

[43] Ibid.

[44] Ibid.

[45] Meiburg, A., Goredema, W, and Ntengu, M. 2010. *Francophone Workshop on Antimicrobial Resistance and Infection Control in Health Care Facilities*. Presented by the Ecumenical Pharmaceutical Network and Management Sciences for Health.

[46] Reisman, J. 2007. A Guide to Measuring Advocacy and Policy. *The Evaluation Exchange*. Vol XIII No I.

[47] Organizational Research Services. 2007. A Guide to Measuring Advocacy and Policy. Prepared for the Annie E. Casey Foundation: Baltimore, MD.

[48] For more information on sustainability of coalitions see "Sustaining Comprehensive Community Initiatives: Key Elements for Success" by the Finance Project, 2002. http://www.financeproject.org/publications/sustaining.pdf.

[49] Meiburg, A., Goredema, W., and Ntengu, M. 2010. *Francophone Workshop on Antimicrobial Resistance and Infection Control in Health Care Facilities*. Presented by the Ecumenical Pharmaceutical Network and Management Sciences for Health.

[50] Joshi M., Pollock N., Miralles M. 2004. *Antimicrobial Resistance Country-Level Implementation Pilot in Zambia: Trip Report of a Follow-up Visit in August 2004.* Submitted to the US Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: Management Sciences for Health. http://www1.msh.org/projects/rpmplus/Documents/loader.cfm?csModule=security/getfile&pageid=59977

[51] Ibid.

[52] Workshop on Local and Regional Actions to Address Antimicrobial Resistance: 10-14 November 2008, Moshi Tanzania. Nairobi: Organized by Ecumenical Pharmaceutical Network with technical support from Strengthening Pharmaceutical Systems. 2009. http://www1.msh.org/projects/sps/SPS-Documents/loader.cfm?url=/commonspot/security/getfile.cfm&pageid=41114

[53] Mwanza, PD. Report on Media Presence and Communication Channels in Zambia, August 2004. Quoted in: Joshi M., Pollock N., Miralles M. 2004. *Antimicrobial Resistance Country-Level Implementation Pilot in Zambia: Trip Report of a Follow-up Visit in August 2004.* Submitted to the US Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: Management Sciences for Health. http://www1.msh.org/projects/rpmplus/Documents/loader.cfm?csModule=security/getfile&pageid=59977

[54] Article published in *The Times of Zambia*, November 20, 2004. Quoted in: Joshi, M., N. Pollock, K. Garrison. 2004. *Antimicrobial Resistance Stakeholders' Call for Action: Meeting, Lusaka, November 12, 2004.* Submitted to the US Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: MSH. http://pdf.usaid.gov/pdf_docs/PNADB994.pdf