Strengthening Pre-service Pharmacy Training on Rational Medicine Use and Antimicrobial Resistance

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The goal of the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program is to assure the availability of quality pharmaceutical products and effective pharmaceutical services to achieve desired health outcomes. Toward this end, the SIAPS result areas include improving governance, building capacity for pharmaceutical management and services, addressing information needed for decision-making in the pharmaceutical sector, strengthening financing strategies and mechanisms to improve access to medicines, and increasing quality pharmaceutical services.

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Key Words

Pre-service education, curriculum reform, pharmacy training, rational medicine use, antimicrobial resistance, self-directed learning

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ACRONYMS

AMR	antimicrobial resistance
RMU	rational medicines use
MoHSS	Ministry of Health and Social Services
SDL	self-directed learning
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
SOP	School of Pharmacy
UNAM	University of Namibia
WHO	World Health Organization

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BACKGROUND

According to the World Health Organization (WHO), irrational medicine use is a chronic and major global problem.[1] As much as 50 percent of medicines are prescribed, sold, or used inappropriately worldwide, the consequences of which lead to poor treatment outcomes, a high rate of adverse events, waste of financial and other resources, and the development of antimicrobial resistance (AMR). Given the scale of inappropriate medicine use and the harmful consequences that result, applying various remedial interventions, such as sensitization during pre-service education, is crucial.

Pre-service education is a cost-effective and sustainable intervention that strengthens health systems. Adequate pre-service exposure to topic areas related to rational medicines use (RMU) during early and formative learning periods enables students to graduate with the necessary competence and confidence for practice in the real world. The WHO recommends pre-service education as a key intervention to improve medicine use.

Many issues relating to RMU that are of significant public health importance are not covered well in pre-service curricula for health professionals.[2] Traditional pharmacy curricula are predominantly science-based and give very little attention to practical RMU themes. The University of Namibia's (UNAM) 2011 Undergraduate Pharmacy (BPharm [hons]) Curriculum[3] addresses this deficiency by including several topics on RMU in its prospectus and Pharmacy Practice II Study Guide.[4]

> The Pharmacy Practice II Study Guide emphasizes the need to include case-based, self-directed, and experiential learning processes alongside traditional didactic pedagogy. It states that, "One of the attributes of a 7 star pharmacist is being a lifelong learner. To resolve the learning outcomes, students are expected to individually spend time to read on their own, consult fellow students or lecturers or reference texts. This approach to learning will enhance self-learning, a key skill in continuing professional development and to resolve challenges." Additionally, in highlighting the importance of case studies, the guide asserts that, "The use of case studies are aimed at the development and enhancement of skills important in the pharmacy practice including: critical thinking, communication, leadership, team playing and multidisciplinary learning."

In education, the focus is gradually shifting from "what is taught" to "what is learned." To support this process, learner-centered techniques are being advocated for instead of traditional teacher-centered methods. Favorable teaching-learning environments need to be created whereby students actively build or construct their own knowledge through constructivist learning. Because UNAM's Pharmacy Practice II Study

[1] WHO. Medicines: Rational Use of Medicines, Fact Sheet No. 338, May 2010.
[2] Systems for Improved Access to Pharmaceuticals and Services (SIAPS). 2013. Revising Preservice Curriculum to Incorporate Rational Medicine Use Topics: A Guide. Submitted to the US Agency for International Development by the SIAPS Program. Arlington, VA: Management Sciences for Health.
[3] University of Namibia. 2011. *Curriculum for the Bachelor of Pharmacy Degree B. Pharm (Hons).*
[4] University of Namibia School of Pharmacy. 2013. *Pharmacy Practice II, Study Guide.*

Guide adopts a learner-centered method, the UNAM School of Pharmacy (UNAM-SOP) collaborated with the US Agency for International Development-funded Systems for Improved Access to Pharmaceuticals and Services (SIAPS) program to develop a RMU curriculum implementation design that focuses primarily on methods consistent with self-directed learning (SDL). This technical report describes the design of the RMU theme within the Pharmacy Practice II Module, illustrates the materials that were developed, and outlines the next steps.

METHODOLOGY FOR DEVELOPING CURRICULUM IMPLEMENTATION FRAMEWORK AND TRAINING MATERIALS

Curriculum implementation requires a logical, coordinated, and system-based approach—merely developing a printed curriculum does not ensure its proper implementation. Traditionally, little emphasis has been placed on the deliberate design and monitoring of curriculum implementation to confirm that the intended objectives are met. More recently, however, there has been a growing recognition of the need to view a curriculum as a process, rather than a simple printed product. A set of systems, tools, and processes are required to ensure that the "intended or declared curriculum," the "enacted or taught curriculum," and the "learned or tested curriculum" are properly aligned. Carefully designing the curriculum implementation plan, overseeing its actual implementation, and continually reviewing, reflecting, and refining it are critical for success. Such an approach keeps the curriculum relevant, alive, and dynamic.

Recognizing the importance of this approach, UNAM-SOP collaborated with SIAPS to systematically design the implementation of the RMU curriculum. A strong enabling environment exists at UNAM as demonstrated by its solid leadership, commitment, and enthusiasm on the part of educators to embrace SDL methods; access to a library and electronic resources that promote eLearning approaches; and effective collaboration with the Ministry of Health and Social Services' (MoHSS) National Health Training Center and National Medicines Policy Coordination, a subdivision of the Division of Pharmaceutical Services at the MoHSS responsible for coordinating pharmaceutical services in the country.

Keeping the end goal in mind, the team adopted a process of backward design to develop the curriculum implementation framework, instructional delivery design, and teaching-learning materials. UNAM-SOP and SIAPS organized a consultative stakeholder workshop at UNAM from June 24 to 26, 2014, to validate the materials developed for the RMU theme.

At the outset, the team reviewed the exit learning outcomes listed in the Pharmacy Practice II Study Guide. Through task analysis, the team re-grouped the exit learning outcomes into four sub-thematic areas:

- Session 1: *Recognizing the problems* of irrational medicine use and AMR
- Session 2: *Applying methods to diagnose* medicine use problems
- Session 3: *Implementing strategies and interventions to correct* medicine use problems
- Session 4: *Reviewing selected interventions* that are highly relevant for pharmacy graduates in the local context

Then, for each of the four sub-thematic areas, the team developed expanded learning objectives using clear action verbs (annex A on pages 8 to 17). Through careful review, the team ensured that the learning objectives correspond directly to the regrouped exit learning outcomes (annex A on pages 8 to 17).

The team crafted a series of tasks for each session to engage, involve, and stimulate students to achieve their learning objectives through SDL. Some tasks were designed to be completed in the

classroom, while others encourage exploration outside the classroom. These tasks were deliberately designed to help students meet their objectives as active participants in their learning rather than passive recipients of pre-packaged information coming from the teacher. Session 1 contains three tasks, and sessions 2, 3, and 4 each contain four tasks (annex A pages 8 to 17).

Most of the tasks require students to read real-life case studies or relevant Internet-based documents. Use of the Internet fosters eLearning, a process which is rapidly becoming a significant and widespread mode of learning in many academic settings around the world. Each task comes with a list of key references that directs students to reputable sources as they conduct SDL. Providing students with a reference list minimizes the time spent searching for information and maximizes the use of credible sources (annex A pages 8 to 17).

SDL tasks require active participation, group interaction, and team work. Processes that are active, participatory, and oriented toward self-exploration help students activate prior knowledge and process new information in a contextualized manner, leading to a greater appreciation and understanding of new information. Active SDL processes enable better comprehension, interpretation, and real-life application of newly acquired knowledge.

In addition to the SDL tasks, PowerPoint® (PPT) presentations and session handouts were developed as part of the training materials. The PPT presentations summarize the key take-home messages of each session and are delivered by the instructor to reinforce the contents of the session (annex C on pages 28 to 52). The session handouts directly address learning objectives and provide a complete summary of the session.

After these training materials were created, the team developed an instructor's guide to help steer the effective implementation of each session. The guide includes the instructional delivery design and resources needed for all four sessions. It details the steps, methods, instructions, and time needed to complete the various components of each session (annex B on pages 18 to 27).

INSTRUCTIONAL DELIVERY DESIGN

The RMU theme runs for five weeks. The first four weeks consist of four sessions, with each session lasting a week. The fifth and final week consists of self-study by students, followed by a viva voce (oral exam) at the end.

Each of the four weekly sessions involves five hours of classroom interaction. The total amount of contact time between students and their instructor across these 4 sessions is 20 hours. The viva voce administered in the fifth week lasts two hours. The total amount of contact time between students and their instructor for the 5-week RMU theme is 22 hours. Aside from 22 hours of class time, students invest additional time between classes to carry out self-directed learning in order to complete their assigned tasks.

The five-hour classroom-based interactions for each weekly session are split into an introductory class (two hours), a post-SDL class (two hours), and a wrap-up class with an exam (one hour), as described below.

- **Introductory class:** At the beginning of each session, students assemble for an introductory class. The instructor presents the learning objectives and introduces students to new concepts through classroom-based group activities. At the end of the introductory class, students receive a series of SDL tasks to complete outside of the classroom.

- **SDL activities:** Following the introductory class, students are given a series of tasks that they complete through SDL, either individually or in groups.

- **Post-SDL class:** Students re-assemble in the classroom for a post-SDL class to report back on the new information they have acquired. Once students have finished reporting back, the instructor delivers a summary PPT presentation that focuses on the key take-home messages for the session. At the end of the class, each student receives a handout, the contents of which address all of the learning objectives of the session. Students will have one full day to review the handout before taking a written exam.

- **Wrap-up class:** During the third and final classroom interaction, the learning objectives are revisited to ensure that they were achieved. Following that, the students take a written exam consisting of multiple choice, true/false, and matching questions. Administering class tests at the end of each weekly session keeps students alert and reduces the burden and risk of relying solely on heavily weighted final exams with few or no continuous in-class assessments. Ongoing assessments also allow for almost real-time and constructive feedback so that students can challenge themselves and improve as they continue the course.

The days of the week on which the three classroom interactions will fall were deliberately chosen to allow students enough time to carry out SDL, review the handouts, and prepare for the written exam. The introductory class occurs on Friday, which allows students to complete their assigned SDL tasks over the weekend and the following Monday. The post-SDL class occurs on

Tuesday, during which the instructor distributes the session handout to students. The wrap-up class, which consists of a written exam, occurs on Thursday. This schedule allows students to review the handout on Tuesday evening and Wednesday in preparation for the exam on Thursday. The next session begins the following day, Friday, and follows the same cycle. Table 1 presents the timetable for the entire RMU theme.

Table 1. RMU Theme Timetable

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
				Week 1: Introductory class	Complete SDL	Complete SDL
Complete SDL	**Week 1**: Post-SDL class	Review handout	**Week 1**: Wrap-up class	**Week 2**: Introductory class	Complete SDL	Complete SDL
Complete SDL	**Week 2**: Post-SDL class	Review handout	**Week 2**: Wrap-up class	**Week 3**: Introductory class	Complete SDL	Complete SDL
Complete SDL	**Week 3**: Post-SDL class	Review handout	**Week 3**: Wrap-up class	**Week 4**: Introductory class	Complete SDL	Complete SDL
Complete SDL	**Week 4**: Post-SDL class	Review handout	**Week 4**: Wrap-up class	Revision	Revision	Revision
Revision	Revision	Revision	**Viva voce**			

NEXT STEPS

UNAM-SOP, in collaboration with SIAPS, plans to accomplish the following short- and medium-term steps.

- Obtain approval from higher authorities, as needed, and offer the newly designed RMU curriculum implementation framework and associated instructional delivery design and materials to third-year BPharm students at UNAM.

- Carry out monitoring and evaluation through (1) self-reflection by teachers post-implementation and (2) student performance and feedback. This built-in monitoring and evaluation process will help to identify existing strengths, weaknesses, constraints, and barriers, along with suggestions on how to reduce or remove them. It will also provide a mechanism that continually feeds into the University's curriculum revision process, which has already started.

- Construct an operational research design to document results from this pilot activity. Publish the findings in journals and present the findings at conferences. Disseminate the experiences and lessons learned to UNAM's policy authorities, and help mainstream the innovation gradually to other thematic areas and modules of the pharmacy course, and eventually to other academic disciplines within UNAM.

ANNEX A. UNAM UNDERGRADUATE PHARMACY CURRICULUM–EXPANDED LEARNING OBJECTIVES AND INSTRUCTIONAL DESIGN

Rational Use of Medicines Theme within the Pharmacy Practice II Module

Session 1: *Recognizing the problems* of irrational medicine use and AMR	
RMU exit learning outcomes and content areas[5]	Demonstrate understanding of the medicines use process Demonstrate understanding of the rational use of medicines concept Demonstrate understanding consequences of irrational use of medicines
Expanded learning objectives	At the end of this session, students will be able to— • Define rational medicine use • List the key processes involved in medicine use • Briefly describe, with examples, the global problem of irrational medicine use • Identify factors underlying the irrational use of medicines • Describe the consequences of irrational medicine use • Illustrate examples of irrationalities pertaining to the use of antimicrobials, including those used in the treatment of HIV and AIDS and TB • Give an overview of the problem of antimicrobial resistance (AMR) and explain the factors contributing to AMR, including irrational use of antimicrobials • Discuss briefly the problem of drug resistance in HIV/AIDS and TB

Task 1 *(classroom task):*

Look at Figure 27-1 reproduced from page 27.3 in MDS-3: *Managing Access to Medicines and Health Technologies* and recognize the key steps involved in the medicine use process. Discuss the following points in your group for 35 minutes and be prepared to share:

1. At least three examples of what your group considers to be common irrationalities that can occur in each of the four steps shown in the diagram
2. Factors contributing to irrational (inappropriate) medicine use
3. Consequences of irrational medicine use

Task 2 *(self-directed learning followed by classroom discussion):*

"More than 50% of all medicines are prescribed, dispensed or sold inappropriately, and half of all patients fail to take medicines correctly." This statement was made by the World Health Organization (WHO). Find out more and elaborate on the global problem of irrational medicine use, citing additional data and examples. Carry out additional self-directed learning to answer the following questions in preparation for the next class:

1. How does WHO define rational medicine use?
2. List the various types of irrational medicine use. State at least two types of irrationalities that can occur in the use of TB medicines and at least two types of irrationalities that can occur in the use of HIV and AIDS medicines.
3. State at least four factors that contribute to irrational medicine use.
4. Articulate the consequences of irrational medicine use.
5. Succinctly summarize at least four data-based examples of irrational antimicrobial use that are published in reputable literature—one related to prescribing, one to dispensing, one to medication

[5]University of Namibia School of Pharmacy. 2013. *Pharmacy Practice II, Study Guide*

non-adherence by patients, and one related to the unregulated sale of antimicrobials.

Key references

- Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.
- WHO. 2010. Medicines: Rational Use of Medicines. *Fact Sheet N^{o} 338*.

Task 3 *(self-directed learning followed by classroom discussion):*

Read Addie Rerecich's story at the Infectious Diseases Society of America (IDSA) website: http://www.idsociety.org/Addie_Rerecich/

Also review the extracts from Namibia's National Institute of Pathology (NIP) database on urine culture and sensitivity from 2009 to 2013 (provided by the instructor).

Then search for and retrieve more information that will enable you to respond to the following questions during the next class:

1. Define AMR and multi-drug resistance (MDR).
2. Discuss the global problem of AMR.
3. Give at least three data-based examples of the problem of AMR from three different countries. List at least five multi-drug resistant pathogens.
4. Briefly discuss the problem of AMR in HIV and AIDS.
5. Define MDR and extensively drug-resistant (XDR) tuberculosis (TB). Briefly discuss the scale of drug-resistant TB in the world and in Namibia. State what percentage of patients in Namibia has HIV/TB co-infection. What are the risk factors for drug-resistant TB, as listed in the Ministry of Health and Social Services National Tuberculosis and Leprosy Programme's 2012 National Guidelines for the Management of Tuberculosis?
6. Present available data on the problem of AMR in HIV and AIDS and TB in Namibia.
7. List the factors that drive AMR. Discuss the role of irrational antimicrobial use in the development of AMR?
8. List the WHO World Health Assembly Resolutions passed since 2005 relating to AMR and rational medicine use. Which resolution emphasizes that AMR cannot be contained without attention to rational use?

Key references

- Cosgrove SE and Y Cameli. 2003. *The impact of AMR on health and economic outcomes.* Clinical Infectious Diseases. 36:1433-1437.
- Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.
- Okeke, I.N, R Laxminarayan, Z A Bhutta, et al. 2005. Antimicrobial Resistance in Developing Countries. Part I: Recent Trends and Current Status. *Lancet Infectious Diseases* 5 (8): 481–93.
- UNAIDS. 2012. *Namibia: HIV and AIDS estimates)*.http://www.unaids.org/en/regionscountries/countries/namibia/
- WHO. 2010. *Multidrug and extensively drug-resistant TB. (M/XDR TB): 2010 Global Report on Surveillance and Response*.http://whqlibdoc.who.int/publications/2010/9789241599191_eng.pdf
- WHO. 2012. *WHO HIV Drug Resistance Report 2012*.http://www.who.int/hiv/pub/drugresistance/report2012/en/

Session 2: *Applying methods to diagnose* medicine use problems

RMU exit learning outcomes and content areas[6]	Design and conduct an indicator based medicine use survey ***Medicine use surveys and evaluations:*** Diagnosis of the medicine use problem ***WHO Medicine use indicators****:* Prescribing, dispensing and patient care indicators ***Consequences of medicine use surveys:*** ABC analysis Describe how you would carry out a medicine use survey Describe the importance of the following parameters in rational use of medicines: ○ ABC analysis ○ Adherence indicators *(covered in session 4)* ○ Prescribing indicators ○ Dispensing indicators
Expanded learning objectives	At the end of this session, students will be able to— • Depict a graphic framework for the process of identifying and changing medicine use problems • Enumerate the key methods used to conduct quantitative and qualitative studies • Summarize how indicator-based data methods can be used to *identify and quantify* medicine use problems • Briefly explain the use of qualitative methods to identify *why* documented medicine use problems occur • Apply ABC analysis as a tool to help identify and address medicine use problems • Recognize the value of the VEN classification system in improving medicine use

Task 4 *(classroom task):*

Read the 12 core medicine use indicators recommended by WHO for outpatient settings in primary health care facilities. Then, review Figure 1.3 reproduced from page 7 of the WHO document, *World Medicines Situation 2011: Rational Use of Medicines* (WHO/EMP/MIE/2011.2.2). Also review Table 8.2 and its associated text reproduced from page 82 of the WHO document, *World Medicines Situation 2004* (WHO/EDM/PAR/2004.5).

In your group, discuss for 25 minutes the significance of patient care indicators related to dispensing and counseling to the class. Also summarize the group's interpretation of the data presented in the figures extracted from the two WHO *World Medicines Situation* publications. What major medicine use problems do these indicators data point to?

Task 5 *(self-directed learning followed by classroom discussion):*

Review the graphic framework (provided by the instructor) that depicts the process of changing medicine use. Then, gather additional information on the WHO medicine use indicators reviewed earlier in the class. Be prepared to respond to the following questions when you come to the next class:

1. Succinctly describe the individual values of Steps 1 and 2 of the graphic framework and explain how these steps complement each other.
2. Outline at least two methods for conducting quantitative studies and at least two methods for conducting qualitative studies.
3. Recall the 12 core medicine use indicators recommended by the WHO.

[6]University of Namibia School of Pharmacy. 2013. *Pharmacy Practice II, Study Guide*

4. List the steps to perform the WHO indicator study.
5. Recall the name of the WHO document that describes the details of conducting a medicine use indicator study in a health facility.

Key references

- Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.
- WHO 1993. *How to Investigate Drug Use in Health Facilities: Selected Drug Use Indicators.* WHO/DAP/93.1

Task 6 *(self-directed learning followed by classroom discussion):*

Read the following case studies:

- *Using ABC analysis to control AMR in Kenya* (country study 40-3 on page 40.15 of MDS-3)
- *Pharmacists' Forum 2010, Ohangwena Expenditure and ABC Analysis Presentation, 19 July - 23 July.* (PowerPoint presentation provided by instructor)

Read on and search for additional information on ABC analysis, including how it is performed.

Come to the next class prepared to respond to the following questions:

1. What is ABC analysis?
2. What are the steps to perform an ABC analysis?
3. Drawing lessons from the Kenya case study, explain how ABC analysis can: (a) enhance rational medicine use and (b) save costs.
4. Briefly describe the actions taken by Ohangwena Region based on the 2009/2010 analysis

Key references

- Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.

Task 7 *(self-directed learning followed by classroom discussion):*

Review column 6 (VEN) in the latest Namibia Essential Medicines List (NemList, 5th edition, May 2012). Then, carry out additional self-directed learning on VEN analysis. Be prepared to respond to the following questions:

1. What is VEN analysis?
2. How is VEN analysis performed?
3. What are the major applications of VEN analysis?

Key references

- Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.
- Republic of Namibia Ministry of Health and Social Services. 2012. *Namibia Essential Medicines List: Fifth Edition.*

Session 3: *Implementing strategies and interventions to correct* medicine use problems

RMU exit learning outcomes and content areas[7]	Design and implement strategies for promotion of rational use of medicines ***Strategies for RMU:*** Educational, economic, managerial, and regulatory strategies Outline the steps you would take to resolve an antibiotic use problem at a hospital Adapt and innovate strategies to promote the rational use of medicines Implement the medicines policies and regulations for rational medicine use
Expanded learning objectives	At the end of this session, students will be able to— • Articulate the importance of educational, economic, managerial, and regulatory interventions to improve medicine use • Name and briefly explain the key interventions under each of the above four categories of strategies • Outline the key strategies and interventions to improve antiretroviral therapy (ART) and anti-TB treatment • Define medicine use evaluation (MUE) and outline the steps you would take to resolve an antibiotic use problem at a hospital using MUE methodology • Recognize the key strategies and interventions for rational use of antibiotics in hospitals • Summarize the strategies recommended for the containment of AMR and reiterate the significance of antimicrobial stewardship in preserving the effectiveness of antimicrobials • Briefly describe Namibia's recent coalition building efforts and other initiatives to combat AMR • State the benefits of standard treatment guidelines and demonstrate familiarity with the major STGs in Namibia (National STG, ART Guideline, TB Treatment Guideline)

Task 8 *(classroom activity):*

Review *Case Study 8 - Up scaling zinc in diarrhoea treatment (Bangladesh)* on page 40 of the WHO report, *The Pursuit of Responsible Use of Medicines* (WHO/EMP/MAR/2012.3).

Once you have reviewed the case study for 20 minutes, explain to fellow students the strategies/interventions used in Bangladesh to scale up (increase) zinc use in diarrhea. What lessons did you learn from this successful case study? List what your group considers as key strategies and interventions to improve medicine use.

Task 9 *(self-directed learning followed by classroom discussion):*

Look at Step 3 of the graphic framework that depicts the process of changing medicine use (provided by the instructor in session 2). Then review World Health Assembly resolution 60.16 on rational medicine use. Apply additional self-directed learning to explore strategies recommended to promote and enhance the rational use of medicines. Be prepared to respond to the following questions during the next class:

1. Outline the four strategies recommended for promoting rational medicine use.
2. Identify and list at least two examples of interventions suggested under each of these four types of strategies.
3. Briefly discuss the strategies and interventions for rational medicine use in HIV/AIDS treatment.

[7]University of Namibia School of Pharmacy. 2013. *Pharmacy Practice II, Study Guide*

4. Briefly discuss the strategies and interventions for rational medicine use in TB treatment.
5. Outline key strategies and guidelines that can be used to enhance rational use of antibiotics in hospitals.
6. Describe policies related to rational medicine use as stated in the Namibia National Medicines Policy.
7. List the 11 core WHO recommended national policies to promote rational medicine use.

Key references

- Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.
- Republic of Namibia Ministry of Health and Social Services. 2012. *National Medicines Policy: Second Edition.*
- WHO. 2010. Medicines: Rational Use of Medicines. *Fact Sheet N^{o} 338*.
- WHO. 2011. *Step-by-step approach for development and implementation of hospital and antibiotic policy and standard treatment guidelines.* http://apps.searo.who.int/PDS_DOCS/B4691.pdf?ua=1

Task 10 *(self-directed learning followed by classroom discussion):*

Familiarize yourself with the following:

- Namibia National STGs, 1st ed., 2011
- National Guidelines for Antiretroviral Therapy, 4th ed., 2014
- National Guidelines for the Management of Tuberculosis, 3rd ed., 2012

Then, retrieve and read more information on STGs from reputable sources on the Internet. Come to the next class prepared to respond to the following questions:

1. What is an STG? What are the benefits of using STGs? How are Essential Medicines Lists (EML) and STGs interrelated? How does a Formulary complement these two documents? For future reference, access the latest WHO Model Formulary here: http://apps.who.int/medicinedocs/en/m/abstract/Js16879e/
2. State the first- and second-line regimens used to treat HIV/AIDS in Namibia. What standard ARV dispensing practices are recommended in the National ART Guideline?
3. State the first- and second-line regimens used to treat TB in Namibia.
4. What does the Namibia STG recommend for managing patients with a history of penicillin allergy?
5. Restate what you consider to be the winning strategies and interventions used to scale up zinc use in diarrhea among children under 5 in Bangladesh.

Key references

- Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.
- Republic of Namibia Ministry of Health and Social Services. 2011. *Namibia Standard Treatment Guidelines.*
- Republic of Namibia Ministry of Health and Social Services. 2012. *National Guidelines for the Management of Tuberculosis: Third Edition.*
- Republic of Namibia Ministry of Health and Social Services. 2014. *National Guidelines for Antiretroviral Therapy: Fourth Edition.*

Task 11 *(self-directed learning followed by classroom discussion):*

Review the AMR policy package published by WHO at World Health Day 2011: http://www.who.int/world-health-day/2011/policybriefs/en/

Read the *AMR/RMU call-to-action* document and the AMR intervention model that were developed in Namibia during the 2013 stakeholders' forum on RMU and workshop on AMR. Also read the article "*Let's*

join hands to improve medicine use and tackle drug resistance" which appeared in *The Namibian* on 20 September, 2013.

Carry out additional self-directed learning on strategies/interventions for AMR containment and antimicrobial stewardship programs in hospitals, including antimicrobial (medicine) use evaluations. Be prepared to answer the following questions during the next class:

1. List the WHO-recommended strategies/interventions for the containment of AMR and explain the importance of rational medicine use in preserving the effectiveness of antimicrobials.
2. Briefly explain the importance and elements of hospital-based antimicrobial stewardship programs.
3. What treatment is recommended for community-acquired bacterial pneumonia in the 2013 Antibiotic Guidelines developed by Namibians Against Antimicrobial Resistance (NAAR).
4. List at least 5 actions committed to in the Namibia *AMR/RMU Call-to-Action* document of July 2013.
5. What is a medicine use evaluation (MUE)? Outline the steps you would take to resolve an antibiotic use problem at a hospital using MUE methodology.

Key references

- Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.
- WHO. 2001.WHO Global Strategy for Containment of Antimicrobial Resistance. http://www.who.int/drugresistance/WHO_Global_Strategy_English.pdf
- WHO. 2011. *Step-by-step approach for development and implementation of hospital and antibiotic policy and standard treatment guidelines.*http://apps.searo.who.int/PDS_DOCS/B4691.pdf?ua=1

Session 4: *Reviewing selected interventions* that are highly relevant for pharmacy graduates in the local context

RMU exit learning outcomes and content areas[8]	***Therapeutic Committees:*** Functions, duties and roles of the pharmacist • Perform duties of a secretary of the therapeutic committee at a hospital • Describe the role of a pharmacist as a secretary of the therapeutics committee • Appreciate the pharmacovigilance and medicines information systems ***Pharmacovigilance*** and therapeutics information reporting systems • Describe the importance of the following parameters in rational use of medicines: ○ Pharmacovigilance signal • Use HMIS and PMIS to promote rational use of medicines • Use the PMIS such as the EDT to collect data on medicine use indicators ***PMIS:*** Practical training on the use of EDT and extracting the indicators
Expanded learning objectives	At the end of this session, students will be able to— • Enumerate key functions of a medicines and therapeutics committee (MTC) in a hospital setting • State the typical composition of a MTC and the role of a pharmacist as the secretary of the committee • State the terms of references for therapeutics committees (TCs) at various levels in Namibia • Demonstrate familiarity with the functions of the Ministry of Health and Social Services (MoHSS) Therapeutics Information and Pharmacovigilance Center (TIPC) in Namibia • Discuss the importance, scopes, and goals of pharmacovigilance, including ADR and medication error reporting • Briefly describe the use of the Electronic Dispensing Tool (EDT) in Namibia, including its application in capturing data on HIV Drug Resistance Early Warning Indicators (HIV-DR EWIs) • List commonly used methods to measure medication adherence • Enumerate common barriers to medication adherence • Articulate strategies that can be used to enhance medication adherence among patients, including those on antiretroviral therapy (ART) or anti-TB treatment • List at least three indicators recommended by the International Network for the Rational Use of Drugs (INRUD) to measure adherence to ART

Task 12 *(classroom task):*

Read *Circular 24,* released in 2011 by the Office of the Permanent Secretary of MoHSS, that pertains to the 'revision of the terms of reference (TOR) for TCs and the regular monitoring of TC activities'. Then, spend 20 minutes with your group discussing what you consider to be the typical functions and composition of a MTC. Also discuss which member of the MTC typically assumes the role of secretary and what his/her responsibilities are. Be prepared to share the group's thoughts on these points.

After both groups have shared and discussed their thoughts, review the TORs for referral hospital, district, and regional-level TCs in Namibia (provided by the instructor).

Task 13 *(self-directed learning followed by classroom discussion):*

[8]University of Namibia School of Pharmacy. 2013. *Pharmacy Practice II, Study Guide*

Become familiar with the Namibia MoHSS TIPC website:
http://www.nmrc.com.na/TIPC/tabid/1339/language/en-US/Default.html?link=1339&tabid=677

Then, click the *TIPC Publications* link and review the *Adverse Reaction Reporting Form* provided through that link. In addition, read the 1-page sheet on the active surveillance pharmacovigilance system within the antiretroviral therapy program (provided by the instructor).

Also visit the following link to review the *Medication Error Reporting Form* available at the Namibia MoHSS TIPC website:
http://www.nmrc.com.na/LinkClickea90.pdf?fileticket=ge2pogUnJTs%3d&tabid=1350&language=en-US

Click on the following link to read the ***abstract and conclusion*** of an article on the burden of adverse events during treatment of drug-resistant tuberculosis in Namibia:
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3471190/pdf/smr-05-006.pdf

In addition, click the following link to review the ***abstract*** of an article on resolving errors related to antiretroviral medicines:
http://www.ncbi.nlm.nih.gov/pubmed/22345421

Carry out additional self-directed learning and come to the next class prepared to respond to the following questions:

1. What are the functions of the MoHSS TIPC in Namibia?
2. What is pharmacovigilance? What are the scopes, goals, and importance of pharmacovigilance? Define passive and active surveillance pharmacovigilance.
3. List the types of information the reporter is requested to complete when filling out the Namibia Adverse Drug Reaction Reporting Form.
4. Define medication error and briefly describe the burden and causes of this problem.
5. Enumerate the common types of medication errors.
6. List at least five medicines that are frequently involved in medication errors.
7. List the interventions recommended to prevent medication errors and briefly describe each of them.
8. List the types of information the reporter is requested to complete while filling the Namibia Medication Error Reporting Form.

Key references

- Garb, M. and Joshi, M. 2012. *Technical Assistance for the Development of Instructor's Guides for Implementing Pre-service and In-service Curricula on Pharmacovigilance in Vietnam*. Submitted to the U.S. Agency for International Development by the Strengthening Pharmaceutical Systems (SPS) Program. Arlington, VA: Management Sciences for Health
- Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.
- Republic of Namibia Ministry of Health and Social Services Therapeutics Information and Pharmacovigilance Center. http://www.nmrc.com.na/TIPC/tabid/1339/language/en-US/Default.html

Task 14 *(self-directed learning followed by classroom discussion):*

Read the Early Warning Indicators (EWIs) section on pages 5 to 8 of *Namibia MoHSS's HIV Drug Resistance Surveillance Strategy 2013*. Also review *Case Study 10 – Antiretroviral Supply and Adherence Monitoring (Namibia)* from the WHO document *The Pursuit of Responsible Use of Medicines*. Then, carry out additional self-directed learning on the Internet and be prepared to respond to the following questions during the next class:

1. What are HIV Drug Resistance Early Warning Indicators (HIV-DR EWIs)? List the HIV-DR EWIs recommended by the WHO.
2. Briefly describe the Electronic Dispensing Tool (EDT) and how it is being used in Namibia.
3. Which HIV-DR EWIs are included in the EDT in Namibia?

Key references

- Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.
- Systems for Improved Access to Pharmaceuticals and Services.*EDT*.http://siapsprogram.org/tools-and-guidance/edt/
- WHO. 2012. Meeting Report on Assessment of World Health Organization HIV Drug Resistance Early Warning Indicators: Report of the Early Advisory Indicator Panel Meeting, 11-12 August 2011. Geneva, Switzerland.

Task 15 *(self-directed learning followed by classroom discussion):*

Carry out self-directed learning on medication adherence and be prepared to respond to the following questions during the next class:

1. Enumerate commonly used methods to measure medication adherence. List at least three indicators recommended by the International Network for the Rational Use of Drugs (INRUD) to measure adherence to antiretroviral therapy.
2. List at least four common factors that contribute to poor or non-adherence to medication by patients?
3. State at least five strategies to enhance medication adherence by patients.

Key references

- Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.
- WHO and Management Sciences for Health. 2011. *How to Investigate Adherence to Antiretroviral Treatment: An Indicator-Based Approach.*

ANNEX B. UNAM UNDERGRADUATE PHARMACY CURRICULUM— INSTRUCTOR'S GUIDE FOR CREATING THE TEACHING-LEARNING EXPERIENCE

Rational Use of Medicines Theme within the Pharmacy Practice II Module

- The RMU theme runs for five weeks and is split up into four sessions and a final oral exam (viva voce). Each session lasts seven days, beginning on Friday of one calendar week and ending on Thursday of the following calendar week.
- The total amount of contact between students and their instructor during each session is five hours, which is split up into three classroom interactions: an introductory class (2 hours); a post-self-directed learning (SDL) class (2 hours); and a wrap-up class (1 hour). Students are expected to accomplish a series of tasks using SDL between the introductory class and the post-SDL class.
- Underlined text in the table serves as a signal to the instructor to distribute materials to the students.

Class or SDL activity	**Instructional delivery design:** steps, methods, and approximate time needed for each task	**Resources required**
Session 1a: Introductory class on Friday [2 hours]	• Tell students at the beginning of the class that for the next five weeks, they will undergo a learning experience as part of the *rational use of medicines (RMU)* theme within the Pharmacy Practice II Module. Explain that there will be four sessions during the first four weeks, and the fifth and final week will be devoted to revision and a final oral exam. **Estimated time:** 5 minutes • Start the session by projecting and reading the contents of the PowerPoint (PPT) slides that list the expected learning objectives of session 1. **Estimated time:** 5 minutes • Hand out a worksheet with Figure 27-1, reproduced from MDS-3, and **Task 1** to each student. **Estimated time:** 5 minutes • Ask students to read the contents of the worksheet individually for 5 minutes. **Estimated time:** 5 minutes • Then, ask students to split up into two groups and have each group select one facilitator and one rapporteur. **Estimated time:** 5 minutes • Ask each group to discuss Task 1, generate their responses, and note them down. Tell students that it is okay to make mistakes; this is a non-judgmental environment, and an open learning space. **Estimated time:** 35 minutes • Ask students to reassemble as one class and then instruct each group's rapporteur to spend 10 minutes reporting on their responses to Task 1. **Estimated time:** 10 x 2 = 20 minutes • Encourage and elicit any additional responses from the students. **Estimated time:** 10 minutes • Appreciate the students' efforts and tell them that they will have an opportunity to learn more about these concepts through SDL and interactions in subsequent classes. **Estimated time:** 5 minutes • Then hand out **Task 2** and **Task 3** to each student, and ask	• Classroom with space to divide students into two groups • PPT slides with expected learning objectives for Session 1 • MDS-3 • Worksheet with Figure 27-1, from MDS-3, and Task 1 • Desktop/laptop • LCD Projector • Worksheet with Task 2 and Task 3

Class or SDL activity	**Instructional delivery design:** steps, methods, and approximate time needed for each task	**Resources required**
	them to read the worksheets individually. **Estimated time:**10 minutes • Check with students to see that they have understood these two tasks and answer any questions they may have. Then, tell them to carry out SDL and come prepared for the next class. Tell them that, in the next class, each group will have 25 minutes to present their responses to Task 2 and Task 3 through PPT presentations. Remind them to keep their presentations brief and to-the-point to address all the questions in Tasks 2 and 3. Additionally, highlight that, although both groups will be presenting on the same two tasks, it will be good to see how the two groups prepare, organize, and deliver their respective presentations. Also reiterate that hearing the same information twice from both groups will help them to better acquire and retain knowledge. Let them know that three members of each group are expected to deliver the presentation in a coordinated manner. Also let them know that, each week, three new members of the group who have not presented before will present. This way, each student will have had a chance to participate by the end of the RMU theme. After that, dismiss the class. **Estimated time:** 10 minutes	
SDL by students between Friday and Tuesday	• Students discuss and strategize in their respective groups, carry out SDL individually or in sub-groups, and work together as a group to assemble the pieces of information and come prepared with their PPT presentation for the next class.	• Library • Desktop/laptop • Internet access • CD or flash stick • PPT slide sets prepared by students
Session 1b: Post-SDL class on Tuesday [2 hours]	• Ask each group to deliver their PPT presentation with responses to Tasks 2 and 3. Limit presentation time to a maximum of 25 minutes. Reinforce that three members of the group should make the presentation on behalf of their entire group. Emphasize the need to rotate presenters within the group to give all members of the group a chance at presenting. **Estimated time:** 25 x 2 = 50 minutes • At the end of the two presentations, ask the members of each group to provide constructive feedback on the contents and style of the presentation made by the other group. After that, encourage students to make additional individual comments. **Estimated time:** 10 x 2 = 20 minutes • Appreciate the SDL carried out by students, and the presentations and comments made by both groups. Share any brief comments you may have on the two presentations. Then say that you are now going to summarize the key take-home messages of session 1 in the next 30 minutes through a PPT presentation. Inform students that, at the end of this summary presentation, you will be distributing a handout to each student that succinctly describes key points that address all of the expected learning objectives for the session. **Estimated time:** 10	• Desktop/laptop • LCD projector • PPT presentations prepared by students • Instructor's PPT presentation • Session 1 Handout

Class or SDL activity	**Instructional delivery design:** steps, methods, and approximate time needed for each task	**Resources required**
	minutes • Give a succinct presentation focusing on the key take-home messages of the topics discussed in session 1. **Estimated time:** 30 minutes • Then, distribute the **Session 1 Handout** to each student, **Estimated time:** 5 minutes • After ensuring that each student has received the handout, encourage students to read it at home and in their free time at school, in preparation for the wrap-up class on Thursday. Inform students that they will be tested during the next class to assess what they have learned, and that this examination will contribute towards their final grade. Thank the students once again and dismiss the class. **Estimated time:** 5 minutes	
Session 1c: Wrap-up class on Thursday [1 hour]	• Revisit the PPT slides with the expected learning objectives that were shown at the beginning of the session. Project these and check with students that these objectives have been met. **Estimated time:** 5 minutes • Then, distribute an exam that consists of multiple choice, true/false, and matching questions. **Estimated time:** 50 minutes • At the end of the class, thank the students for their active and participatory involvement in creating a teaching-learning experience for session 1 of the RMU theme. Mention that the results of the exam will be announced at some point during the course. Also thank them for their team spirit and coordinated group performance. Tell them to come the following day (Friday) to begin Session 2. **Estimated time:** 5 minutes	• Classroom • PPT slides with expected learning objectives for Session 1 • Desktop/laptop • LCD projector • Exam
Session 2a: Introductory class on Friday [2 hours]	• Greet your students and tell them that *Session 2* starts today. Project and read the PPT slides that list the expected learning objectives of the session. **Estimated time:** 5 minutes • Then, ask the students to get into their groups. **Estimated time:** 5 minutes • Hand out the following worksheets to each student: ▪ 12 core medicine use indicators recommended by the World Health Organization ▪ Figure 1.3 reproduced from page 7 of the WHO document, *World Medicines Situation 2011: Rational Use of Medicines* ▪ Table 8.2 and its associated text reproduced from page 82 of the WHO document, *World Medicines Situation 2004* ▪ **Task 4** (**Estimated time:** 5 minutes) • Ask students to read the contents of the worksheets individually for 15 minutes. **Estimated time:** 15 minutes • Then, ask students to start their group work. Each group begins by selecting one facilitator and one rapporteur. **Estimated time:** 5 minutes • Tell each group to discuss Task 4, generate their	• Classroom with space to divide students into two groups • Desktop/ laptop • LCD Projector • PPT slides with expected learning objectives for session 2 • Task 4 worksheet, medicine use indicators, and the figures from the World Medicines Situation reports (see Task 4) • Worksheets for

Class or SDL activity	**Instructional delivery design:** steps, methods, and approximate time needed for each task	**Resources required**

	responses, and note them down. **Estimated time:** 25 minutes
	• Ask students to reassemble as one class and then instruct each group's rapporteur to spend 10 minutes reporting on their responses to Task 4. **Estimated time:** 10 x 2 = 20 minutes
	• Encourage and elicit any additional responses from the students. **Estimated time:** 10 minutes
	• Appreciate the students' efforts and tell them that they will have an opportunity to learn more about these concepts through SDL and interactions in subsequent classes. **Estimated time:** 5 minutes.
	• Then, hand out worksheets for **Task 5, Task 6,** and **Task 7** to each student, along with the following:
	  ◦ A graphic framework for the process of changing medicine use
	  ◦ Country study 40-3 (Using ABC analysis to control AMR in Kenya) from page 40.15 of MDS-3.
	  ◦ Namibia ABC Analysis 2009/2010 (PPT Presentation)
	  ◦ Namibia Essential Medicines List (NemList, 5th edition, May 2012) (**Estimated time:** 5 minutes)
	• Ask students to spend 10 minutes reading the tasks individually. **Estimated time:**10 minutes
	• Check with students to see that they have understood these three tasks and answer any questions they may have. Then, tell them to carry out SDL and come prepared for the next class. Inform them that you will spend about 20 minutes in the next class assessing preparedness and knowledge acquisition for Task 5 among both groups. Tell them that, once this initial question-answer session is over, each group will have 15 minutes to present their responses to Tasks 6 and 7 through a PPT presentation. Remind them to keep their presentations brief and to-the-point to address all the questions from both tasks. Additionally, highlight that although both groups will be presenting on the same two tasks, it will be good to see how the two groups prepare, organize, and deliver their respective presentations. Also reiterate that hearing the same information twice from both groups will help them to better acquire and retain knowledge. Let them know that three members of each group are expected to deliver their presentation in a coordinated manner. Remind them that, each week, three new members of the group who have not presented before will present. This way each student will have had a chance to participate by the end of the RMU theme. Once you have given these instructions, dismiss the class. **Estimated time:** 10 minutes
		Task 5, Task 6, and Task 7
		• Sheet that depicts a graphic framework for the process of changing medicine use
		• ABC analysis stories or examples (as indicated in Task 6)
		• NemList 2012

SDL by students between	• In their respective groups, students discuss and propose a strategy on whether SDL will be carried out individually or in sub-groups. Students must then work together as a group	• Library • Desktop/laptop • Internet access

Class or SDL activity	**Instructional delivery design:** steps, methods, and approximate time needed for each task	**Resources required**
Friday and Tuesday	to assemble the pieces of information and come prepared with their PPT presentation for the next class.	• CD or flash stick • PPT slides prepared by students
Session 2b: Post-SDL class on Tuesday [2 hours]	• To begin, spend about 20 minutes assessing students' preparedness and knowledge acquisition by asking questions at random based on Task 5. **Estimated time:** 20 minutes • Then, ask each group to deliver their PPT presentation with responses to Tasks 6 and 7. Limit presentations to a maximum of 15 minutes. Reinforce that three members of the group should make the presentation on behalf of their entire group. **Estimated time:** 15 x 2 = 30 minutes • At the end of the two presentations, ask the members of each group to provide constructive feedback on the contents and style of the presentation made by the other group. After that, encourage students to make additional individual comments. **Estimated time:** 10 x 2 = 20 minutes • Appreciate the SDL carried out by students, and the presentations and comments made by both groups. Share any brief comments you may have on the two presentations. Then summarize the key take-home messages of session 2 in the next 30 minutes through a PPT presentation. Inform students, at the end of this summary presentation, you will be distributing a handout that succinctly describes key points that address all of the expected learning objectives for the session. **Estimated time:** 10 minutes • Give a succinct summary presentation focusing on the key take-home messages of the topics discussed in session 2. **Estimated time:** 30 minutes • Then distribute the **Session 2 Handout** to each student, **Estimated time:** 5 minutes • After ensuring that each student has received the handout, tell them that they are expected to read it at home and in their free time at school, in preparation for the wrap-up class on Thursday. Inform students that they will be tested during the next class to assess what they have learned, and that this exam will contribute towards their final grade. Thank all the students once again and dismiss the class. **Estimated time:** 5 minutes	• Classroom • Desktop/laptop • LCD projector • PPT slides prepared by students • Instructor's PPT presentation • Session 2 Handout
Session 2c: Wrap-up class on Thursday of week 3 [1 hour]	• Revisit the PPT slides with the expected learning objectives that were shown at the beginning of the session. Project these and check with students that these objectives have been met. **Estimated time:** 5 minutes • Then, distribute an exam that consists of multiple choice, true/false, and matching questions. **Estimated time:** 50 minutes • At the end of the class, thank the students for their active and participatory involvement in creating a teaching-learning experience for session 2 of the RMU theme.	• Classroom • PPT slides with expected learning objectives for session 2 • Desktop/laptop • LCD projector • Exam

Class or SDL activity	**Instructional delivery design:** steps, methods, and approximate time needed for each task	**Resources required**
	Mention that the results of the exam will be announced at some point during the course. Also thank them for their team spirit and coordinated group performance. Tell them to come the following day (Friday) to begin Session 3. **Estimated time:** 5 minutes	

Session 3a: Introductory class on Friday
 	
[2 hours]
	• Greet your students and tell them that *Session 3* starts today. Project and read the PPT slides that list the expected learning objectives of the session. **Estimated time:** 5 minutes
	• Then, ask the students to get into their two groups. **Estimated time:** 5 minutes
	• Hand out the following worksheets to each student:
	  ○ **Task 8**
	  ○ Case study 8—Upscaling zinc in diarrhea treatment (Bangladesh) starting of page 40 of the WHO book, *The Pursuit of Responsible Use of Medicines* (WHO/EMP/MAR/2012.3) (**Estimated time:** 5 minutes)
	• Ask students to read Task 8 and the Bangladesh case study individually for 15 minutes. **Estimated time:** 15 minutes
	• Then, ask students to start their group work. Each group begins by selecting one facilitator and one rapporteur. **Estimated time:** 5 minutes
	• Tell each group to discuss Task 8, generate their responses, and note them down. **Estimated time:** 20 minutes
	• Ask students to reassemble as one class and then instruct each group's rapporteur to spend 10minutes reporting on their responses to Task 8. **Estimated time:** 10 x 2 = 20 minutes
	• Encourage and elicit any additional responses from the students. **Estimated time:** 10 minutes
	• Appreciate the students' efforts and tell them that they will have an opportunity to learn more about these concepts through SDL and interactions in subsequent classes. **Estimated time:** 5 minutes
	• Then, hand out worksheets for **Task 9, Task 10,** and **Task 11** to each student. **Estimated time:** 5 minutes
	• Ask students to spend 15 minutes reading the tasks individually. **Estimated time:** 15 minutes
	• Check with students to see that they have understood these three tasks and answer any questions they may have. Then, tell them to carry out SDL and come prepared for the next class. Inform them that in the next class you will be assessing preparedness and knowledge acquisition for Tasks 9 and 10 among both groups**. Estimated time**: 30 minutes
	• Tell them that, once this initial question-answer session is over, each group will have 15 minutes to present their responses to Tasks 11 through a PPT presentation. Remind them to keep their presentations brief and to-the-
		• Classroom with space to divide students into two groups
		• Desktop/ laptop
		• LCD Projector
		• PPT slides with expected learning objectives for session 3
		• Task 8 worksheet
		• Case Study 8– Upscaling zinc in diarrhoea treatment (Bangladesh) from the WHO book, *The Pursuit of Responsible Use of Medicines*
		• Worksheet that contains Tasks 9, 10, and 11
		• Worksheet that depicts a graphic framework for the process of changing medicine use
		• Namibia STG 2011
		• Namibia ART Guideline 2014
		• Namibia TB Guideline 2012

Class or SDL activity	**Instructional delivery design:** steps, methods, and approximate time needed for each task	**Resources required**
	point to address all the questions in Task 11. Additionally, highlight that, although both groups will be presenting on the same two tasks, it will be good to see how the two groups prepare, organize, and deliver their respective presentations. Also reiterate that hearing the same information twice from both groups will help them to better acquire and retain knowledge. Let them know that three members of each group are expected to deliver their presentation in a coordinated manner. Remind them that, each week, three new members of the group who have not presented before will present. This way each student will have had a chance to participate by the end of the RMU theme. Once you have given these instructions, dismiss the class. **Estimated time:**10 minutes	
SDL by students between Friday and Tuesday	• Each student does individual SDL to complete Task 9 and Task 10. • To accomplish Task 11, students discuss and propose a strategy on whether SDL will be carried out individually or in sub-groups. Students must then work together as a group to assemble the pieces of information and come prepared with their PPT presentation for the next class.	• Library • Desktop/laptop • Internet access • CD or flash stick • PPT slides prepared by students
Session 3b: Post-SDL class on Tuesday [2 hours]	• To begin, spend about 30 minutes assessing students' preparedness and knowledge acquisition by asking questions at random based on Tasks 9 and 10. **Estimated time:** 30 minutes • Then, ask each group to deliver their PPT presentation with responses to Task 11. Instruct them not to present beyond a maximum of 15 minutes. Reinforce that three members of the group should make the presentation on behalf of their entire group. **Estimated time:** 15 x 2 = 30 minutes • At the end of the two presentations, ask the members of each group to provide constructive feedback on the contents and style of the presentation made by members of the other group. After that, encourage students to make additional individual comments. **Estimated time:** 9 x 2 = 18 minutes • Appreciate the SDL carried out by students, and the presentations and comments made by both groups. Share any brief comments you may have on the two presentations. Then say that you are now going to summarize the key take-home messages of session 3 in the next 30 minutes through a PPT presentation. Add that, at the end of this summary presentation, you'll be distributing to each student a handout that succinctly describes key points that address all of the expected learning objectives for the session. **Estimated time:** 5 minutes • Give a succinct summary presentation focusing on the key take-home messages of the topics discussed in session 3. **Estimated time:** 30 minutes • Then, distribute the **Session 3 Handout** to each student	• Classroom • Desktop/laptop • LCD projector • PPT slides prepared by students • Instructor's PPT presentation • Session 3 Handout

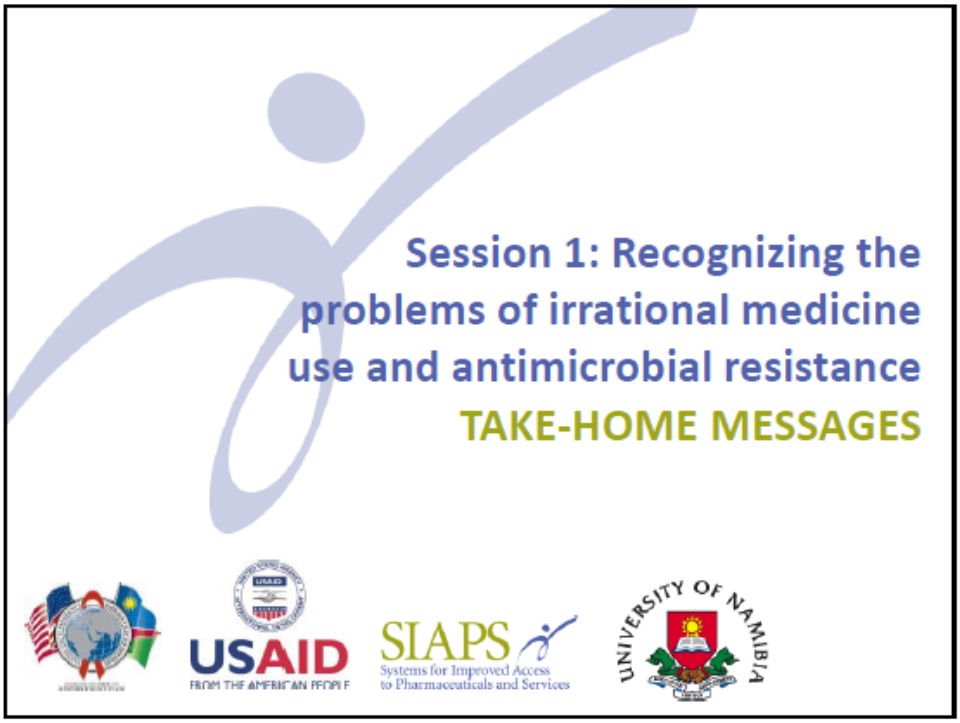
Class or SDL activity	**Instructional delivery design:** steps, methods, and approximate time needed for each task	**Resources required**
	Estimated time: 2 minutes • After ensuring that each student has received the handout, tell them that they are expected to read it at home and in their free time at school, in preparation for the wrap-up class on Thursday. Inform students that they will be tested during the next class to assess what they have learned, and that this exam will contribute towards their final grade. Thank all the students once again and dismiss the class. **Estimated time:** 5 minutes	
Session 3c: Wrap-up class on Thursday [1 hour]	• Revisit the PPT slides with the expected learning objectives that were shown at the beginning of the session. Project these and check with students that these objectives have been met. **Estimated time:** 5 minutes • Then, distribute an exam that consists of multiple choice, true/false, and matching questions. **Estimated time:** 50 minutes • At the end of the class, thank the students for their active and participatory involvement in creating a teaching-learning experience for session 3 of the RMU theme. Mention that the results of the exam will be announced at some point during the course. Also thank them for their team spirit and coordinated group performance. Tell them to come the following day (Friday) to begin Session 4. **Estimated time:** 5 minutes	• Classroom • PPT slides with expected learning objectives for session 3 • Desktop/laptop • LCD projector • Exam

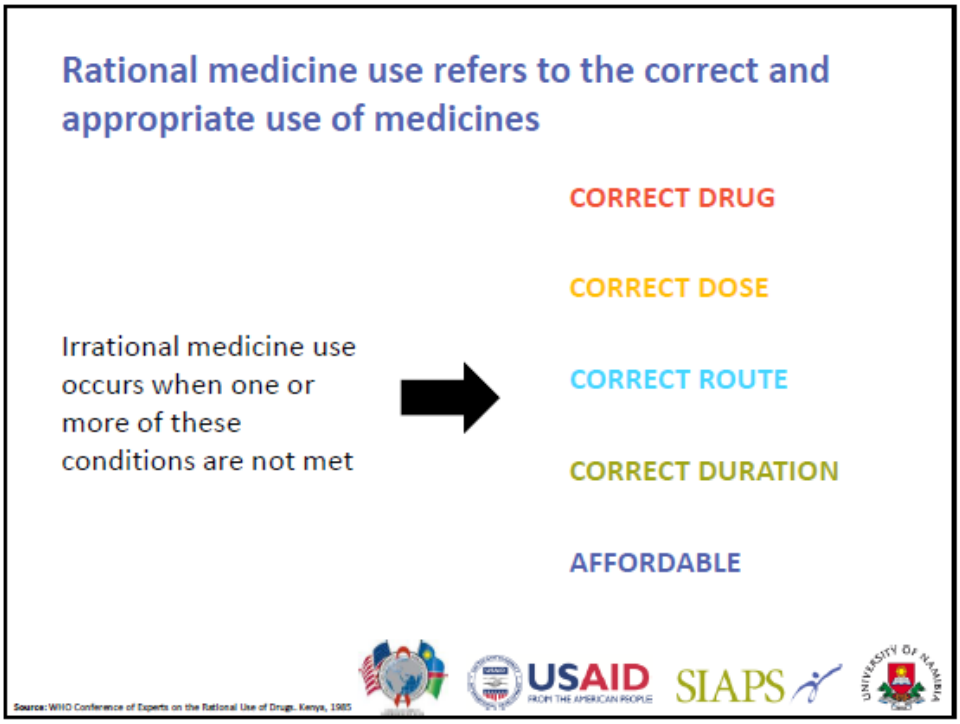
Session 4a: Introductory class on Friday
 	
[2 hours]
	• Greet your students and tell them that *Session 4* starts today. Project and read the PPT slides that list the expected learning objectives of the session. **Estimated time:** 5 minutes
	• Then, ask the students to get into their two groups. **Estimated time:** 5 minutes
	• Hand out the following worksheets to each student:
	  ▪ **Task 12**
	  ▪ Namibia MoHSS Circular 24 of 2011 on Therapeutics Committees (**Estimate time:** 5 minutes)
	• Ask students to read Task 12 and the circular individually for 10 minutes. **Estimated time:** 10 minutes
	• Then, ask students to start their group work. Each group begins by selecting one facilitator and one rapporteur. **Estimated time:** 5 minutes
	• Tell each group to discuss Task 12, generate their responses, and note them down. **Estimated time:** 20 minutes
	• Ask students to reassemble as one class and then instruct each group's rapporteur to spend 10 minutes reporting on their responses to Task 12. **Estimated time:** 10 x 2 = 20minutes
	• Encourage and elicit any additional responses from the students. Then appreciate and thank them for their group effort. **Estimated time:** 10 minutes
	• Then, hand out the TORs for referral hospital, district, and
		• Classroom with space to divide students into two groups
		• Desktop/ laptop
		• LCD Projector
		• PPT slides with expected learning objectives for session 3
		• Task 12 worksheet
		• Namibia MoHSS Circular 24 of 2011 on TCs
		• TORs for referral hospital, district and regional TCs
		• Worksheet with Tasks 13, 14 and 15

Class or SDL activity	**Instructional delivery design:** steps, methods, and approximate time needed for each task	**Resources required**
	regional Therapeutics Committees (TCs) to each student. • Ask each student to spend the next 15 minutes reading the TORs individually. **Estimated time:** 15 minutes • Following that, ask a few questions to students at random on the functions, composition, and procedures of TCs at different levels in Namibia. **Estimated time:** 15 minutes. • Then hand out worksheets for **Task 13, Task 14,** and **Task 15** to each student. **Estimated time:** 5 minutes • Check with students to see that they have understood these three tasks and answer any questions they may have. Then, tell them to carry out SDL and come prepared for the next class. Inform them that you will spend about 30 minutes in the next class assessing preparedness and knowledge acquisition for Task 13 among both groups. Tell them that, once this initial question-answer session is over, each group will have 15 minutes to present their responses to Tasks 14 and 15 through a PPT presentation. Remind them to keep their presentations brief and to-the-point to address all the questions in Tasks 14 and 15. Additionally, highlight that, although both groups will be presenting on the same two tasks, it will be good to see how the two groups prepare, organize, and deliver their respective presentations. Also reiterate that hearing the same information twice from both groups will help them to better acquire and retain knowledge. Let them know that three members of each group are expected to deliver their presentation in a coordinated manner. Remind them that, each week, three new members of the group who have not presented before will present. This way each student will have had a chance to participate by the end of the RMU theme. Once you have given these instructions, dismiss the class. **Estimated time:** 10 minutes	
SDL by students between Friday and Tuesday	• Each student does individual SDL to complete Task 13. • To accomplish Tasks 14 and 15, students discuss and propose a strategy on whether SDL will be carried out individually or in sub-groups. Students must then work together as a group to assemble the pieces of information and come prepared with their PPT presentation for the next class.	• Library • Desktop/laptop • Internet access • CD or flash stick • PPT slides prepared by students
Session 4b: Post-SDL class on Tuesday [2 hours]	• To begin, spend about 30 minutes assessing students' preparedness and knowledge acquisition by asking questions at random based on Task 13. **Estimated time:** 30 minutes • Then, ask each group to deliver their respective PPT presentation with responses to Tasks 14 and 15. Instruct them not to present beyond a maximum of 15 minutes. Reinforce that three members of the group should make the presentation on behalf of their entire group. **Estimated time:** 15 x 2 = 30 minutes • At the end of the two presentations, ask the members of each group to provide constructive feedback on the	• Classroom • Desktop/laptop • LCD projector • PPT slides prepared by students • Instructor's PPT presentation • Session 4 handout

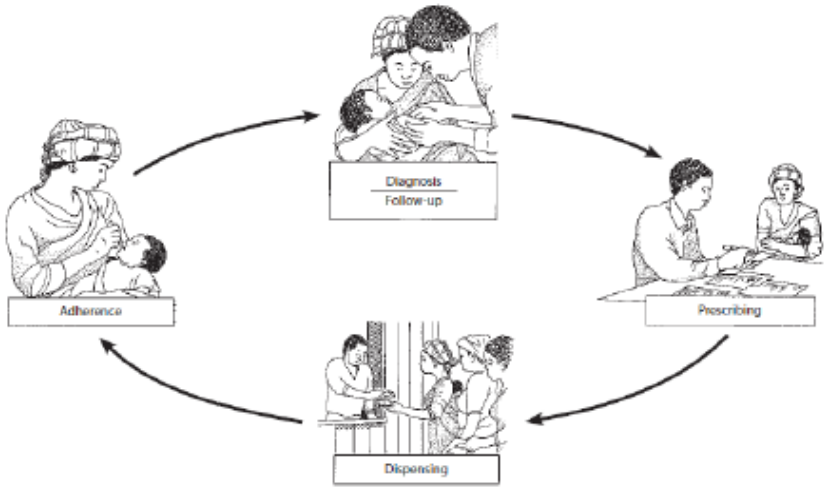
Class or SDL activity	**Instructional delivery design:** steps, methods, and approximate time needed for each task	**Resources required**
	contents and style of the presentation made by members of the other group. After that, encourage students to make additional individual comments. **Estimated time:** 5 x 2 = 10 minutes • Appreciate the SDL carried out by students, and the presentations and comments made by both groups. Share any brief comments you may have on the two presentations. Then say that you are now going to summarize the key take-home messages of session 4 in the next 30 minutes through a PPT presentation. Add that at the end of this summary presentation, you'll be distributing to each student a handout that succinctly describes all the key points that address all the expected learning objectives for the session. **Estimated time:** 10 minutes • Give a succinct summary presentation focusing on the key take-home messages of the topics discussed in session 4. **Estimated time:** 30 minutes • Then distribute the **Session 4 Handout** to each student **Estimated time:** 5 minutes • After ensuring that each student has received the handout, tell them that they are expected to read it at home and in their free time at school, in preparation for the wrap-up class on Thursday. Inform students that they will be tested during the next class to assess what they have learned, and that this exam will contribute towards their final grade. Thank all the students once again and dismiss the class. **Estimated time:** 5 minutes	
Session 4c: Wrap-up class on Thursday [1 hour]	• Revisit the PPT slides with the expected learning objectives that were shown at the beginning of the session. Project these and check with students that these objectives have been met. **Estimated time:** 5 minutes • Then, distribute an exam that consists of multiple choice, true/false, and matching questions. **Estimated time:** 50 minutes • At the end of the class, thank the students for their active and participatory involvement in creating a teaching-learning experience for session 4 of the RMU theme. Mention that the results of the exam will be announced before the course ends. Also thank them for their team spirit and coordinated group performance. Inform students that next week is reserved for revision and studying outside of class to prepare for a viva voce (oral exam). Three instructors will be present so that more than one student can be evaluated at once. Each student will be evaluated for 10-15 minutes in one of 3 workstations. The final oral exam will last for two hours. **Estimated time:** 10 minutes	• Classroom • 2 PPT slides with Session 4 objectives • Desktop/laptop • LCD projector • Exam

ANNEX C. POWERPOINT PRESENTATIONS ON TAKE HOME MESSAGES FROM THE FOUR RMU/AMR SESSIONS





Diagnosis, prescribing, dispensing, adherence, and follow-up are key processes of medicine use



Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.

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Irrational medicine use can occur during any step of the medicine use process

Category	Examples of irrational medicine use
Diagnosing	Inadequate examination of patient; incomplete communication between patient and provider; lack of documented medical history
Prescribing	Under-prescribing; incorrect prescribing; over-prescribing
Dispensing	Incorrect interpretation of the prescriptions; retrieval of wrong ingredients; inaccurate counting, compounding, or pouring; inadequate labeling; unsanitary procedures
Packaging	Poor quality packaging materials; odd package size (may require re-packaging); unappealing package
Patient adherence	Poor labeling; inadequate verbal instructions; inadequate counseling to encourage adherence; inadequate patient follow-up or support; treatment or instructions that are not sensitive to patient beliefs, environment, or culture

Ndyanabangi, Banset. *Rational Use of Medicines in ART Programs* [PPT]. Washington, DC. 2006

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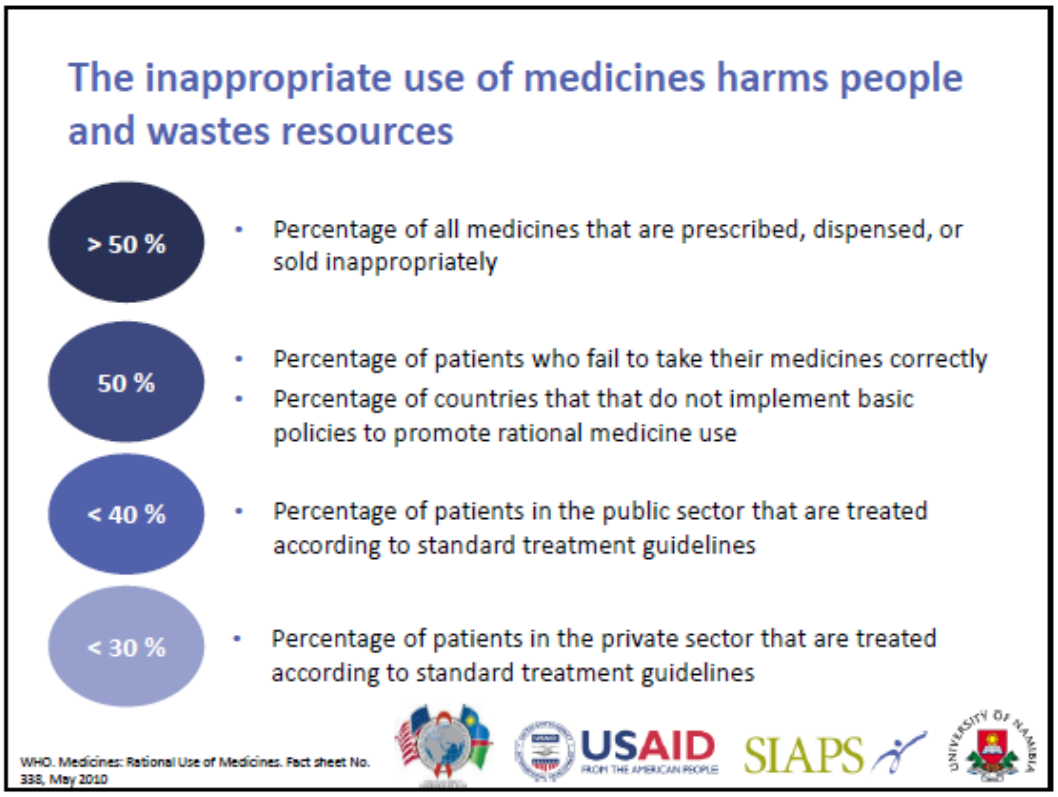
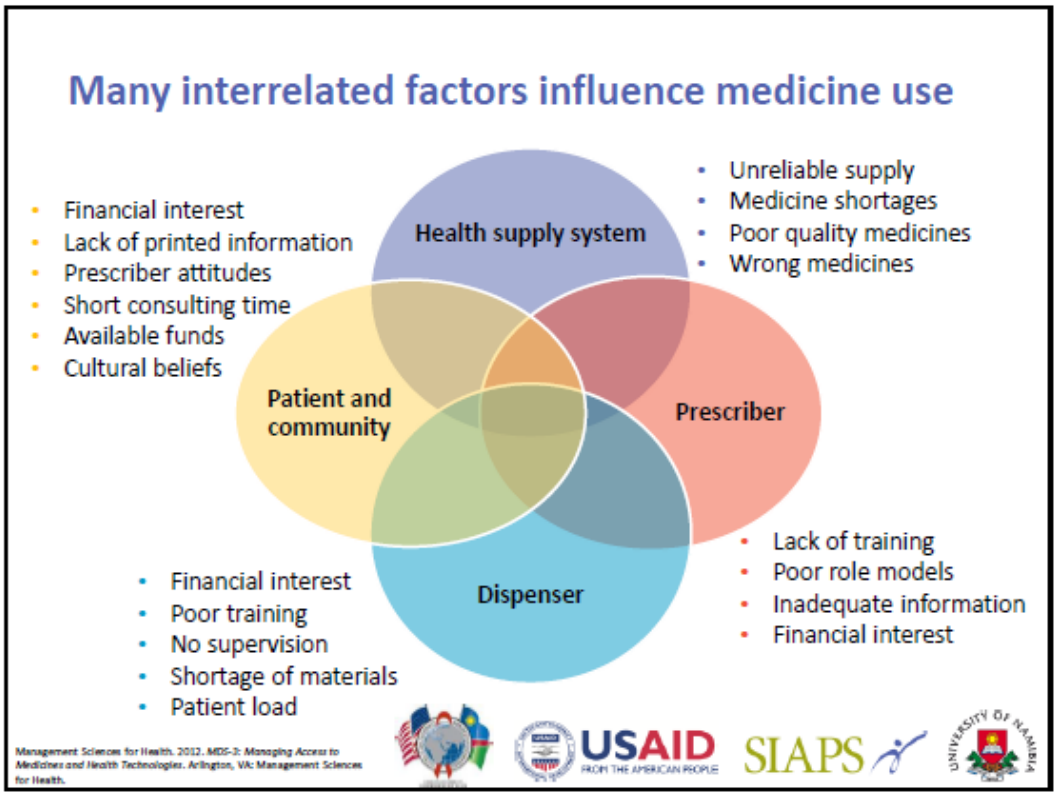

The inappropriate use of medicines harms people and wastes resources
> 50 %
Percentage of all medicines that are prescribed, dispensed, or sold inappropriately
50 %
Percentage of patients who fail to take their medicines correctly
Percentage of countries that that do not implement basic policies to promote rational medicine use
< 40 %
Percentage of patients in the public sector that are treated according to standard treatment guidelines
< 30 %
Percentage of patients in the private sector that are treated according to standard treatment guidelines
WHO. Medicines: Rational Use of Medicines. Fact sheet No. 338, May 2010
USAID
SIAPS


Many interrelated factors influence medicine use
Financial interest
Lack of printed information
Prescriber attitudes
Short consulting time
Available funds
Cultural beliefs
Health supply system
Unreliable supply
Medicine shortages
Poor quality medicines
Wrong medicines
Patient and community
Prescriber
Dispenser
Financial interest
Poor training
No supervision
Shortage of materials
Patient load
Lack of training
Poor role models
Inadequate information
Financial interest
Management Sciences for Health. 2012. MDS-3: Managing Access to Medicines and Health Technologies. Arlington, VA: Management Sciences for Health.
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The overuse, underuse, and misuse of medicines are types of irrational use

- Polypharmacy
- Medicine used when not needed
- Wrong medicines
- Ineffective medicines and medicines with doubtful efficacy
- Unsafe medicines
- Underuse of available effective medicines
- Incorrect use of medicines

Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.

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Irrational antimicrobial use is a global challenge

- About two thirds of global antibiotic sales occur without any prescription*
- 15 billion injections are administered per year, half of which are performed with unsterile needles or syringes. Up to 90 percent of injections are unnecessary.**

- Globally, 1.3 to 2.1 billion people do not have access to essential medicines*
- 20 to 50 percent of antimicrobial use in humans in unnecessary, and 40 to 80 percent of antimicrobial use in animals is highly questionable ***

* The World Medicines Situation, WHO, 2004.
** Holloway K. Slide presentation on promoting rational use of medicines in developing countries, WHO, 2007.
*** Wise et al. *British Medical Journal* 1998; 317(7159):609–10.

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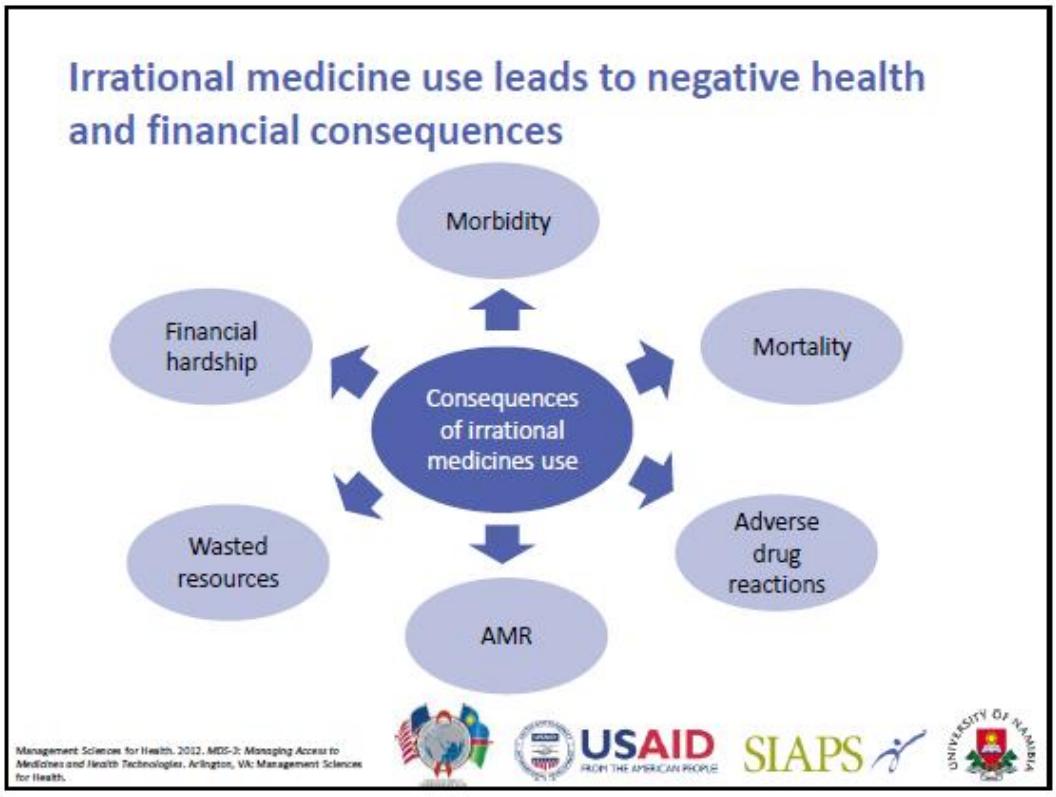
Irrational medicine use leads to negative health and financial consequences
Morbidity
Financial hardship
Mortality
Consequences of irrational medicines use
Wasted resources
Adverse drug reactions
AMR
Management Sciences for Health. 2012. MDS-3: Managing Access to Medicines and Health Technologies. Arlington, VA: Management Sciences for Health.
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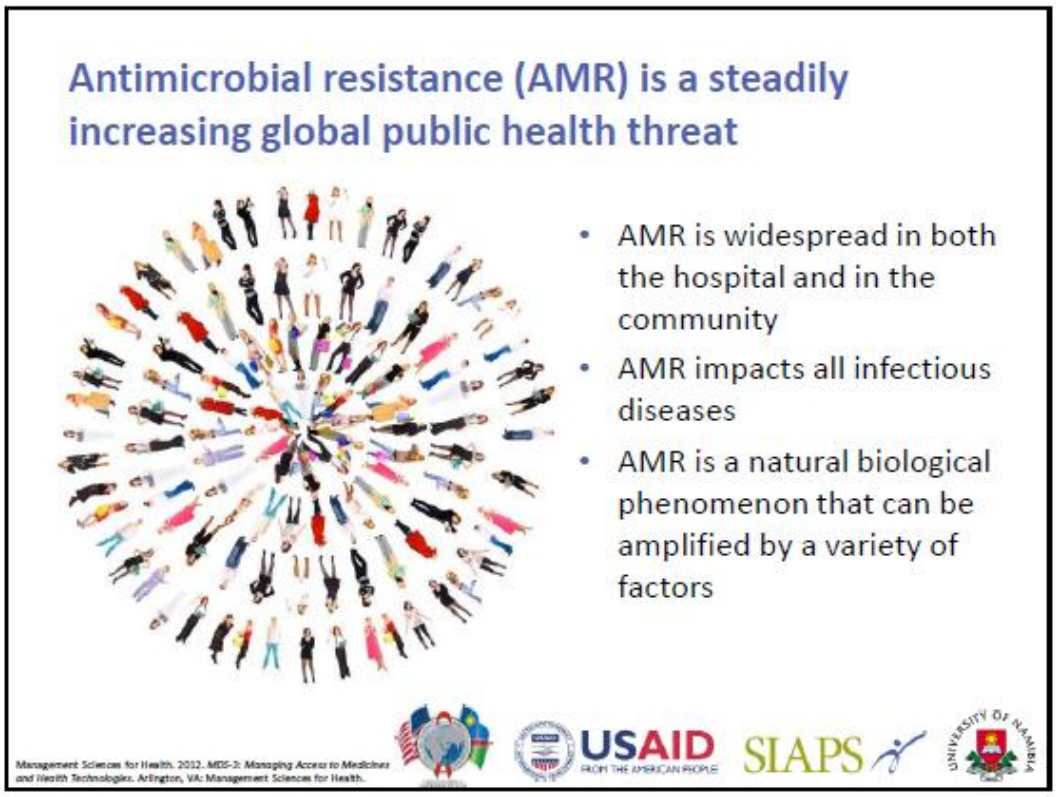
Antimicrobial resistance (AMR) is a steadily increasing global public health threat
AMR is widespread in both the hospital and in the community
AMR impacts all infectious diseases
AMR is a natural biological phenomenon that can be amplified by a variety of factors
Management Sciences for Health. 2012. MDS-3: Managing Access to Medicines and Health Technologies. Arlington, VA: Management Sciences for Health.
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Global prevalence rates of AMR for several infections are on the rise

Malaria	• Chloroquine resistance in 81 of 92 countries
Tuberculosis	• 0 to 17 percent primary multidrug resistance
HIV/AIDS	• 0 to 25 percent primary resistance to at least one antiretroviral drug
Gonorrhea	• 5 to 98 percent penicillin resistance in *Neisseria gonorrhoeae*
Pneumonia and bacterial meningitis	• 0 to 70 percent penicillin resistance in *Streptococcus pneumoniae*
Shigellosis	• 10 to 90 percent ampicillin resistance • 5 to 95 percent co-trimoxazole resistance
Hospital infections	• 0 to 70 percent resistance of *Staphylococcus aureus* to all penicillins and cephalosporins

Holloway, K.A. 2005. *Rational Use of Drugs: An Overview*. Paper presented at the WHO/UNICEF Technical Briefing Seminar on Essential Medicines Policies, September 18-22, Geneva

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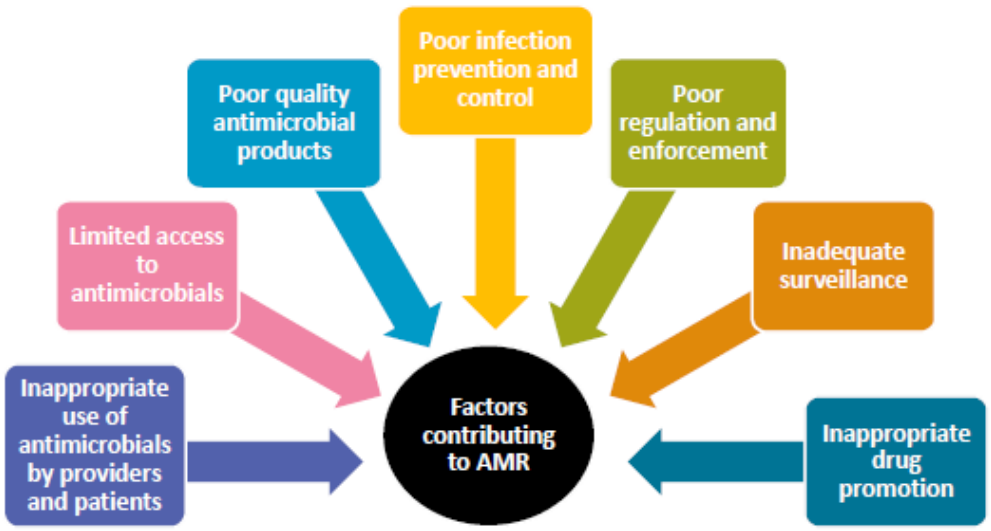
Several factors contribute to the development and spread of AMR



Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.

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Resistance to first- and second-line HIV medicines has developed

Region	% Resistance to any ARV
North America	11.4
Europe	10.6
East Asia	7.4
Latin America	6.4
Southeast Asia	5.7
Africa	5.5

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.

Drug-resistant tuberculosis is becoming widespread

MDR-TB does not respond to isoniazid and rifampicin

Roughly 450,000 cases of MDR-TB emerged around the world in 2012

Of these, about 10 percent were cases of XDR-TB

Multidrug-resistant TB (MDR-TB) is caused by organisms that are resistant to at least the two most effective anti-TB drugs, isoniazid and rifampicin.

Extensively drug-resistant TB (XDR-TB) is a form of TB caused by organisms that are resistant to isoniazid, rifampicin, any fluoroquinolones, and any of the second-line anti-TB injectables

WHO. *Multidrug-resistant tuberculosis (MDR-TB): October 2013 update.* www.who.int/tb/challenges/mdr

Antimicrobial resistance has a significant impact on individuals and the public health

- Prolonged illness
- Increased mortality
- Prolonged periods of infectiousness with increased risk of transmission of resistant pathogens to others
- Indirect costs (e.g., prolonged absence from work)
- Increased direct costs (e.g., extended hospital stays, use of more expensive second- and third-line medicines)

Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.

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Session 2: Applying methods to diagnose medicine use problems
TAKE-HOME MESSAGES

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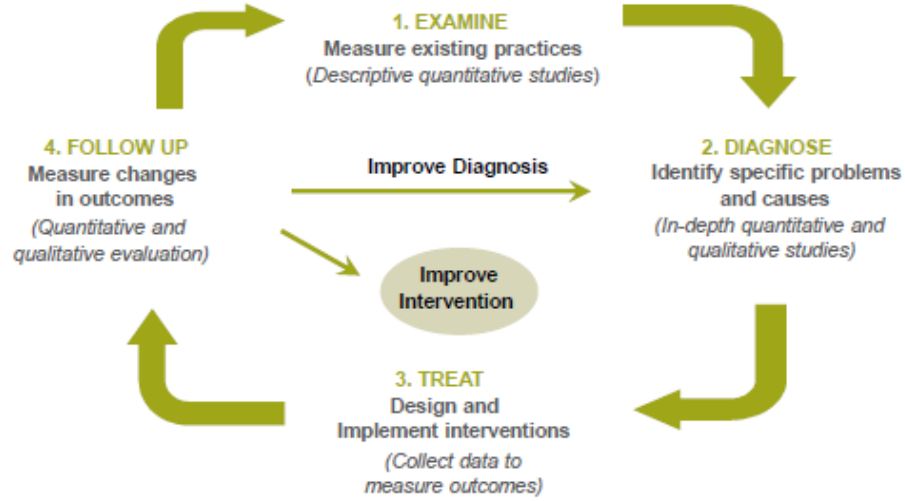
Identifying and changing medicine use problems requires examination, diagnosis, treatment, and monitoring of the problem



Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies.* Arlington, VA: Management Sciences for Health.

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Quantitative data answer the "what?" and qualitative data answer the "why?"

Quantitative Methods

- Indicator study methods
- Aggregate data methods (e.g., ABC analysis, defined daily dose [DDD])
- In-depth quantitative investigation (e.g., prescription audit, medicine use evaluation)

Qualitative Methods

- Key informant interviews
- Structured questionnaires
- Focus group discussions
- Structured observations

Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.

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WHO's 12 core medicine use indicators can identify problems in prescribing and quality of care in health facilities, particularly primary care facilities

No.	Category	Type	Indicator
1	CORE	Prescribing	Average number of medicines per encounter
2			Percentage of medicines prescribed by generic name
3			Percentage of encounters with an antibiotic prescribed
4			Percentage of encounters with an injection prescribed
5			Percentage of medicines prescribed from essential medicines list or formulary
6		Patient care	Average consultation time
7			Average dispensing time
8			Percentage of medicines actually dispensed
9			Percentage of medicines adequately labeled
10			Patients' knowledge of correct dosage
11		Facility	Availability of copy of essential medicines list or formulary
12			Availability of key medicines

WHO 1993. *How to Investigate Drug Use in Health Facilities: Selected Drug Use Indicators*. WHO/DAP/93.1

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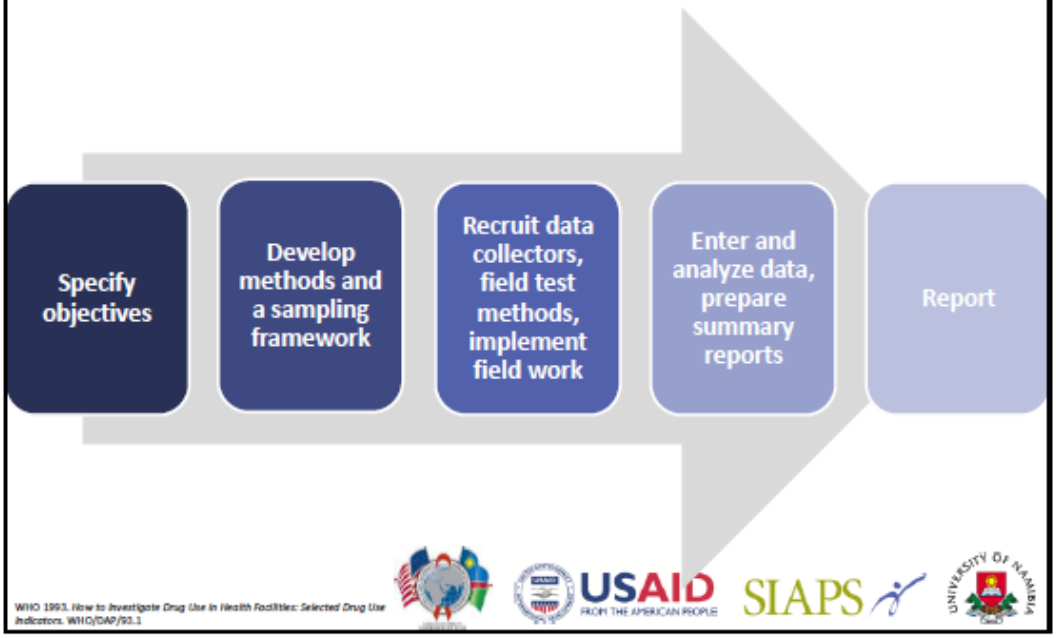
A medicine use indicator study can be performed by following a simple series of steps



WHO 1993. *How to Investigate Drug Use in Health Facilities: Selected Drug Use Indicators.* WHO/DAP/93.1

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ABC analysis is a tool to enhance rational medicine use and save costs

Class A medicines
- Highest annual usage
- Represent 10 to 20% of items and account for 75 to 80% of funds

Class B medicines
- Represent 10 to 20% of items and account for 15 to 20% of funds

Class C medicines
- Represent 60 to 80% of items and account for 5 to 10% of funds

- Examines medicine consumption and procurement expenditures by dividing the medicines consumed into three categories
- Determines where procurement money has actually been spent, allowing managers to focus on high-cost and high-use medicines
- Review of high-use medicines may suggest areas of over-use and under-use

Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies.* Arlington, VA: Management Sciences for Health.

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An ABC analysis can be performed in eight basic steps

1. List all items purchased or consumed and enter the unit cost
2. Enter consumption quantities
3. Calculate the value of consumption
4. Calculate the percentage of total value represented by each item
5. Rearrange the list
6. Calculate the cumulative percentage of total value for each item
7. Choose cutoff points for class A, B, and C medicines
8. Present the results graphically

Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.

To improve medicine use, VEN analysis categorizes medicines by their relative public health value

V — **Vital:** These medicines are potentially life-saving and are crucial to providing basic health services

E — **Essential:** These medicines are effective against less severe, though significant, forms of illness, and are not absolutely vital to providing basic health care

N — **Non-essential:** These medicines are used for minor or self-limited illnesses and have a comparatively high cost for a marginally therapeutic advantage

Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.

ABC and VEN analyses have major applications for ensuring efficient health systems

Type of Analysis	Major applications
ABC analysis	• Selection • Procurement • Distribution and inventory management • Use
VEN analysis	• Selection • Procurement • Use • Inventory management • Pricing in pharmaceutical sales programs

Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.

Educational, managerial, economic, and regulatory strategies can be used to improve medicine use

Type of strategy	Examples of interventions
Educational	• Pre- and in-service prescriber training • Printed materials • Approaches based on face-to-face contact
Managerial	• Monitoring, supervision, feedback • Selection, procurement, distribution • Prescribing and dispensing approaches • Controlling pharmaceutical promotion • Avoiding perverse economic incentives
Economic	• Price setting • Capitation-based budgeting • Reimbursement and user fees • Insurance
Regulatory	• Medicines registration • Limited medicines lists • Prescribing and dispensing restrictions • Regulation of pharmaceutical promotion

Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.

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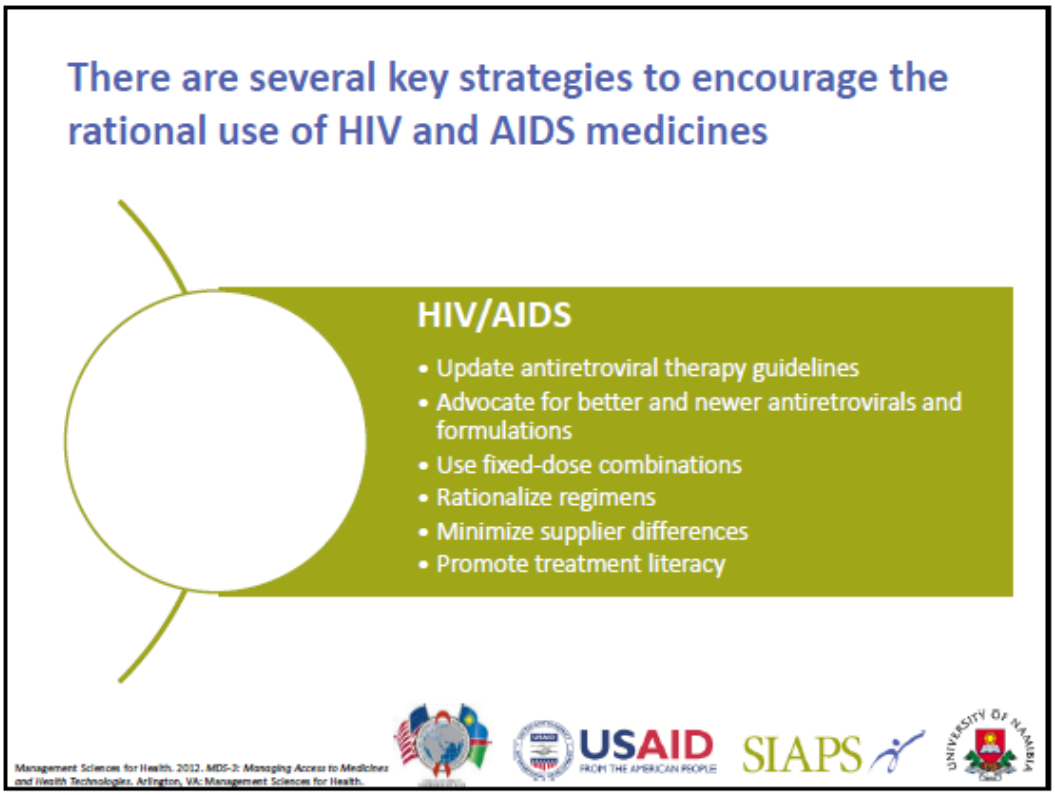
There are several key strategies to encourage the rational use of HIV and AIDS medicines
HIV/AIDS
• Update antiretroviral therapy guidelines
• Advocate for better and newer antiretrovirals and formulations
• Use fixed-dose combinations
• Rationalize regimens
• Minimize supplier differences
• Promote treatment literacy
Management Sciences for Health. 2012. MDS-3: Managing Access to Medicines and Health Technologies. Arlington, VA: Management Sciences for Health.
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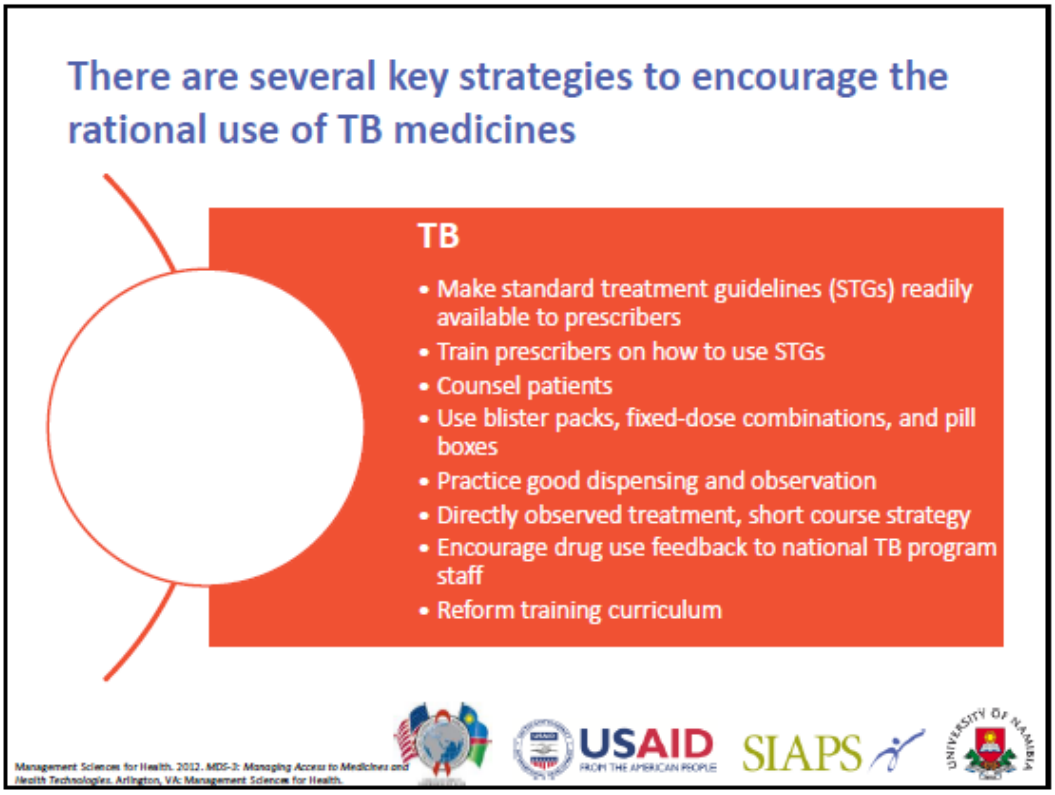
There are several key strategies to encourage the rational use of TB medicines
TB
• Make standard treatment guidelines (STGs) readily available to prescribers
• Train prescribers on how to use STGs
• Counsel patients
• Use blister packs, fixed-dose combinations, and pill boxes
• Practice good dispensing and observation
• Directly observed treatment, short course strategy
• Encourage drug use feedback to national TB program staff
• Reform training curriculum
Management Sciences for Health. 2012. MDS-3: Managing Access to Medicines and Health Technologies. Arlington, VA: Management Sciences for Health.
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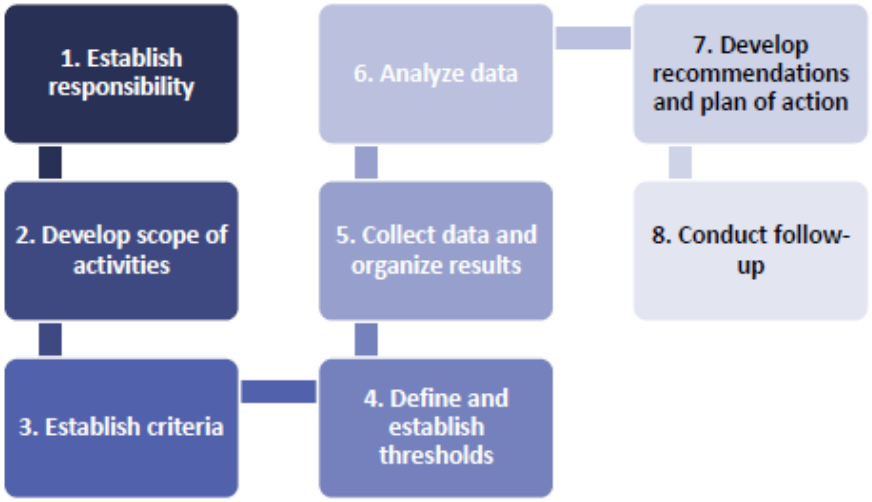
A medicine use evaluation is a quality improvement mechanism to resolve identified medicine use problems



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Hospitals can apply several key strategies to improve antibiotic use

- Develop antibiotic standard treatment guidelines or protocols
- Optimize use of antibiotic formulary
- Review and document indication, dose, route, and duration of antibiotic therapy
- Optimize antimicrobial prophylaxis for operative procedures
- Monitor and provide feedback on antibiotic prescribing and resistance patterns
- Adopt educational, managerial, and administrative approaches to improve antibiotic use

"To achieve these [strategic approaches], a comprehensive approach through a hospital policy on the rational use of antibiotics is essential."
WHO, SEARO (SEA-HLM-414), http://apps.searo.who.int/PDS_DOCS/B4691.pdf?ua=1

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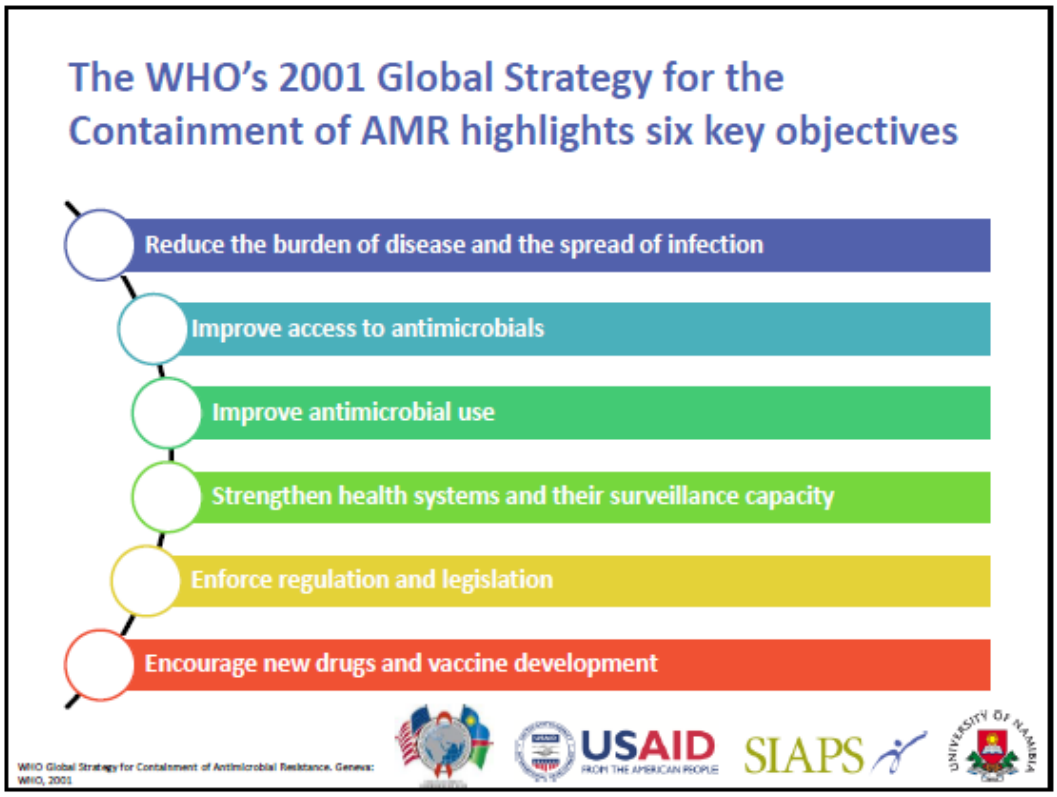
The WHO's 2001 Global Strategy for the Containment of AMR highlights six key objectives
Reduce the burden of disease and the spread of infection
Improve access to antimicrobials
Improve antimicrobial use
Strengthen health systems and their surveillance capacity
Enforce regulation and legislation
Encourage new drugs and vaccine development
WHO Global Strategy for Containment of Antimicrobial Resistance. Geneva: WHO, 2001
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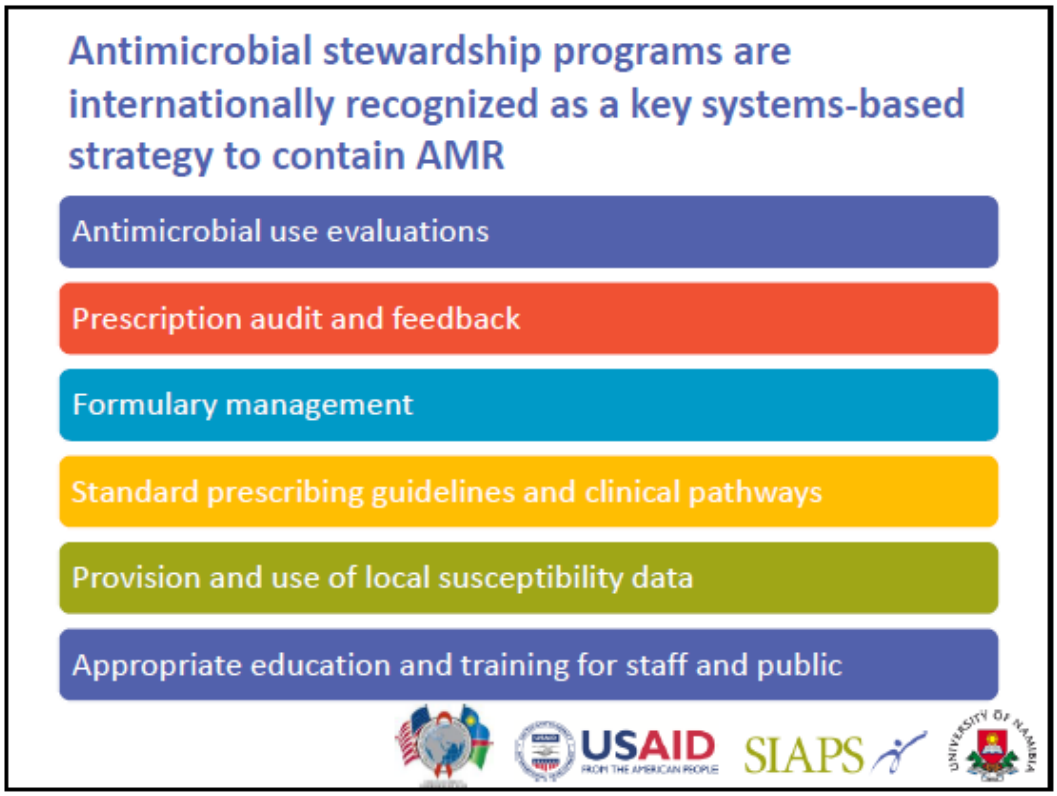
Antimicrobial stewardship programs are internationally recognized as a key systems-based strategy to contain AMR
Antimicrobial use evaluations
Prescription audit and feedback
Formulary management
Standard prescribing guidelines and clinical pathways
Provision and use of local susceptibility data
Appropriate education and training for staff and public
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Namibia recently made efforts to build coalitions to combat AMR

AMR/RMU stakeholders' workshop and forum, September 2013

National call-to-action and multi-stakeholder AMR intervention model

Pharmacy Week (in-service education, newspaper articles, television show broadcast), September 2013

Namibians Against Antibiotic Resistance (NAAR) first annual Antibiotic Forum, November 2013

Building coalitions for AMR advocacy and containment

CPD = Continuing Professional Development

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An article on AMR was published in the Namibian and Republikein newspapers during Pharmacy Week 2013

Let's join hands to improve medicine use and tackle drug resistance

get your hands on namibian

Tender Invitation

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The development and implementation of standard treatment guidelines carries numerous benefits

Patients	Providers	Supply managers	Health policy makers
Provide greater consistency and treatment efficacy	Provide standardized guidance Improve diagnostic accuracy Promote effective and safe therapy Provide a basis for monitoring	Improve the predictability of demand Provide a standardized basis for forecasting, ordering, and purchasing medicines	Provide focus for the therapeutic integration of special programs and promote the efficient use of funds

Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.

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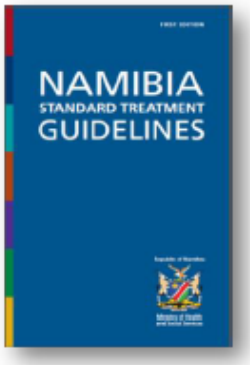
Namibia has published several standard treatment guidelines



National STGs
First Edition, 2011

National Guidelines for Management of TB
Third Edition, 2012

National Guidelines for Antiretroviral Therapy
Fourth Edition, 2014

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The WHO recommends a set of 11 core national policies to promote more rational medicines use

- Multidisciplinary national body
- Evidence-based standard treatment guidelines
- Essential medicines list
- Medicines and therapeutics committees
- Problem-based training in preservice education
- Continuing medical education
- Publicly available unbiased medicine information
- Public education about medicines
- Elimination of perverse financial incentives
- Appropriate and enforced regulation
- Sufficient funding for medicines and health personnel

WHO. 2010. *Fact Sheet № 338.*

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Rational medicines use is an integral part of Namibia's National Medicine Policy Framework

3.4.5. RATIONAL USE OF MEDICINES

3.4.5.1. Preamble

Rational Use of Medicines (RUM) requires that patients/clients receive medicines appropriate to their clinical needs, in doses that meet their individual requirements for an adequate period of time, and at the lowest cost to them and the community, along with the requisite information. Irrational use of medicines may unnecessarily prolong or even cause ill-health and suffering, and result in a waste of limited resources.

The need for rational use holds good for all medicines, but it is especially necessary in certain situations, e.g.:

i. the use of antibiotics, where reckless use will promote the development of antimicrobial resistance
ii. the treatment those conditions such as HIV/AIDS, demanding the lifelong use of combination therapy
iii. the use of medicines with a potential for abuse or dependence, or those to which tolerance may develop.

Republic of Namibia Ministry of Health and Social Services. *National Medicines Policy: Second Edition.* September 2012. DRAFT

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Session 4: Reviewing selected interventions that are highly relevant for pharmacy graduates in the local context
TAKE-HOME MESSAGES
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Systems for Improved Access to Pharmaceuticals and Services
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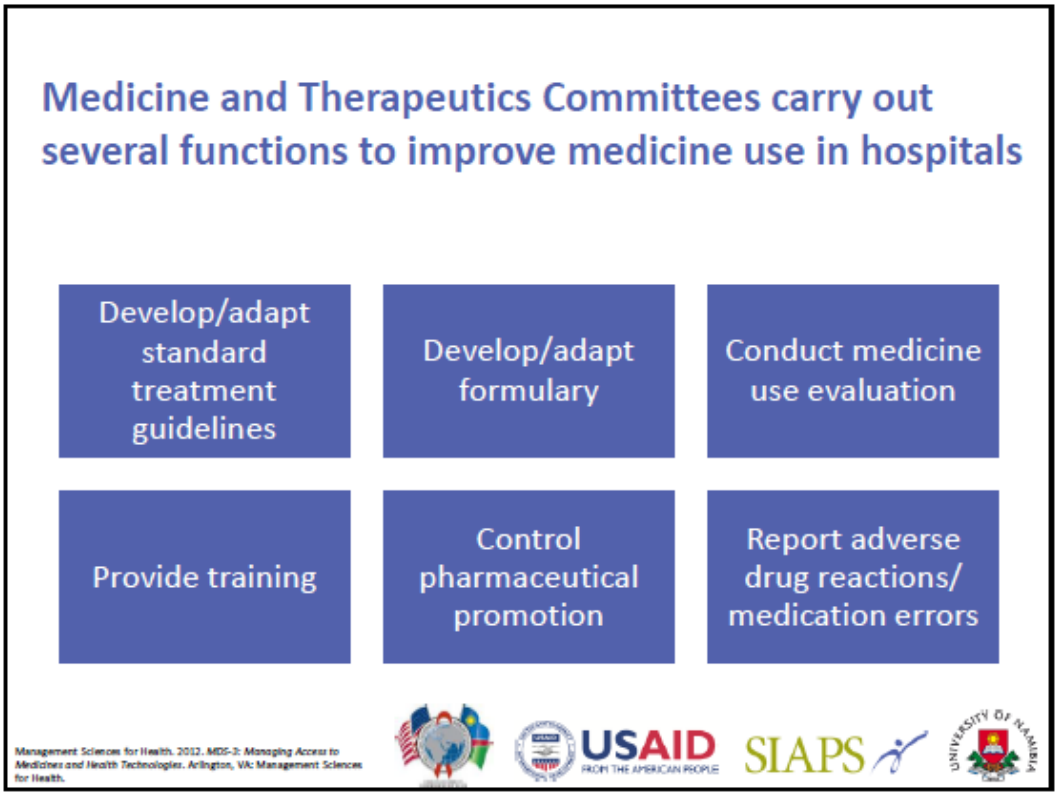
Medicine and Therapeutics Committees carry out several functions to improve medicine use in hospitals
Develop/adapt standard treatment guidelines
Develop/adapt formulary
Conduct medicine use evaluation
Provide training
Control pharmaceutical promotion
Report adverse drug reactions/ medication errors
Management Sciences for Health. 2012. MDS-3: Managing Access to Medicines and Health Technologies. Arlington, VA: Management Sciences for Health.
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A medicine and therapeutics committee is a multidisciplinary body of health care professionals

In Namibia, a referral hospital therapeutics committee is made up of:

- all heads of clinical departments
- senior nursing staff
- all pharmacists

  (chief pharmacist serves as secretary)
- infection control nurse
- physiotherapist
- chief control officer
- representatives from laboratory, radiographic, and dental services

Republic of Namibia Ministry of Health and Social Services. *Terms of Reference for Referral Hospital Therapeutics Committee.*

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Pharmacovigilance activities are designed to monitor, detect, report, evaluate, document, and disseminate medicine safety data

SCOPE

- Adverse drug reactions
- Medication errors
- Treatment failure
- Product quality

Goals

- Safeguard public health
- Enhance rational medicine use

Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.

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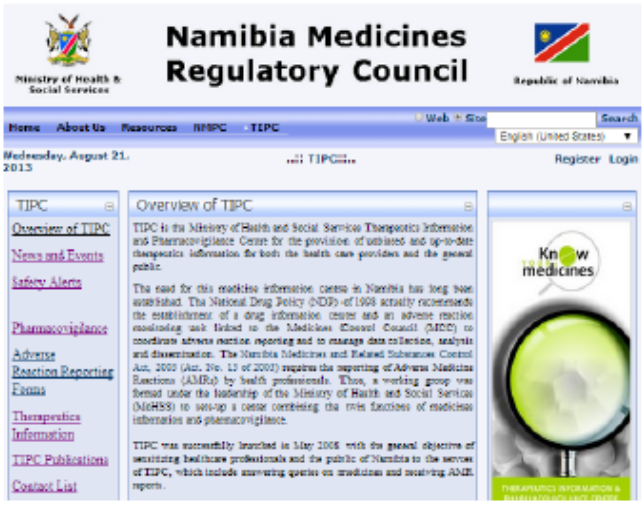
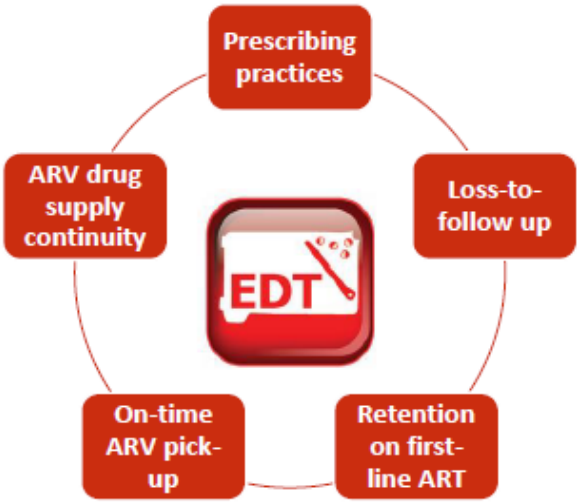
Namibia's Therapeutics Information and Pharmacovigilance Center provides medicine information and monitors the safety of medicines

- Medicine safety services
- Therapeutic information
- *Namibia Medicines Watch*
- Spontaneous reporting



Namibia's Electronic Dispensing Tool platform is used to monitor 5 HIV drug resistance early warning indicators



Republic of Namibia Ministry of Health and Social Services. *The Republic of Namibia HIV Drug Resistance Surveillance Strategy* 2013.

Health facilities use a variety of methods to measure and quantify adherence

- Self-report
- Pharmacy refill records
- MEMS
- Pill count
- Visual Analog Scale
- Biological markers

MEMS = Medication Events Monitoring System

Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.

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Multiple factors contribute to medication non-adherence


Lack of ready access to care


Poor communication between patients and providers


Lack of resources for medicines and treatment visits


Lack of appointments


Inadequate counseling


Complexity and duration of treatment


Lack of access to information

Management Sciences for Health. 2012. *MDS-3: Managing Access to Medicines and Health Technologies*. Arlington, VA: Management Sciences for Health.

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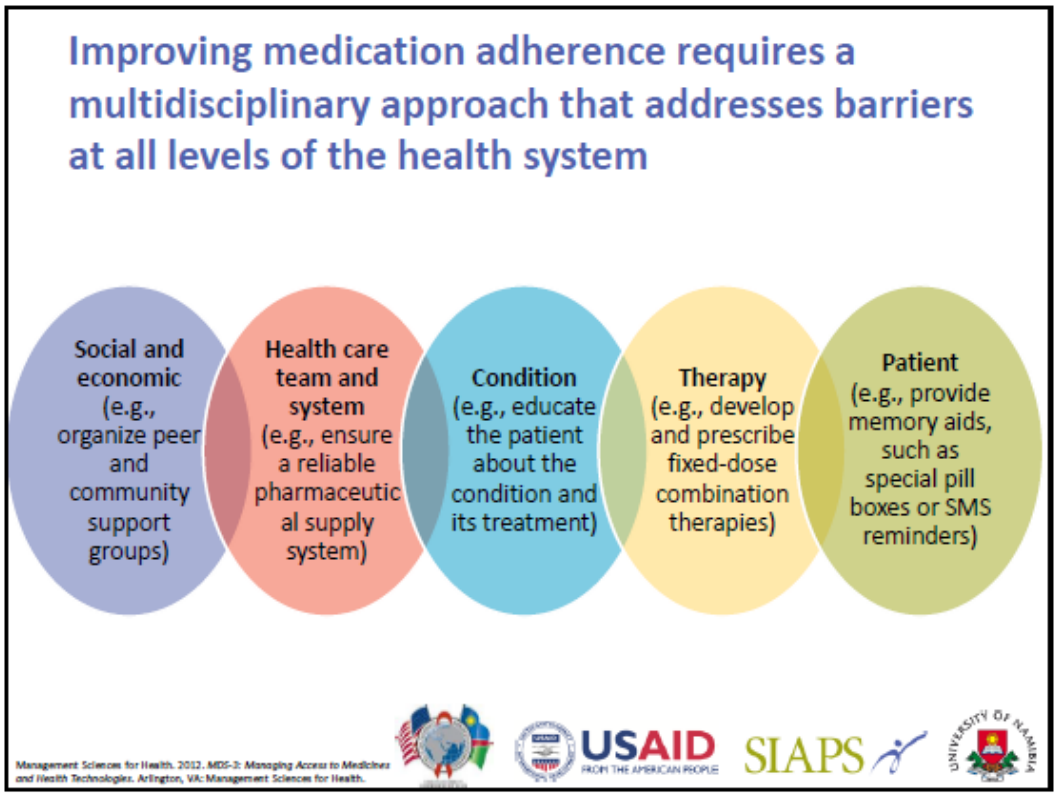
Improving medication adherence requires a multidisciplinary approach that addresses barriers at all levels of the health system
Social and economic (e.g., organize peer and community support groups)
Health care team and system (e.g., ensure a reliable pharmaceutical supply system)
Condition (e.g., educate the patient about the condition and its treatment)
Therapy (e.g., develop and prescribe fixed-dose combination therapies)
Patient (e.g., provide memory aids, such as special pill boxes or SMS reminders)
Management Sciences for Health. 2012. MDS-3: Managing Access to Medicines and Health Technologies. Arlington, VA: Management Sciences for Health.
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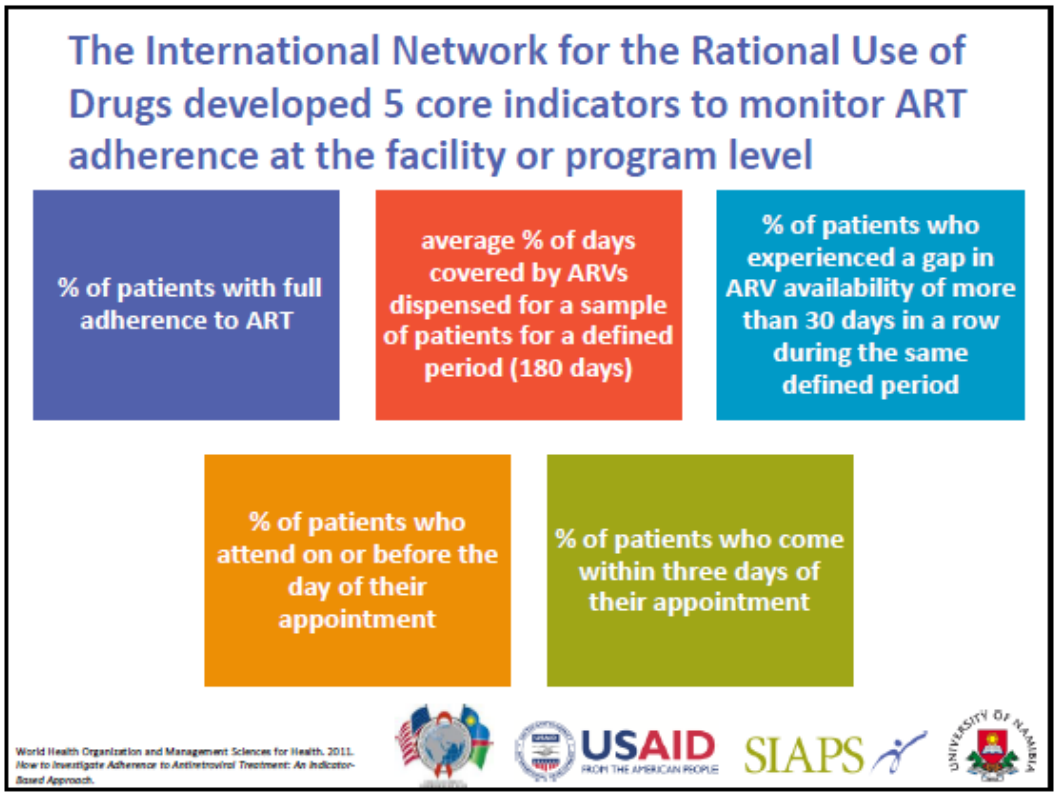
The International Network for the Rational Use of Drugs developed 5 core indicators to monitor ART adherence at the facility or program level
% of patients with full adherence to ART
average % of days covered by ARVs dispensed for a sample of patients for a defined period (180 days)
% of patients who experienced a gap in ARV availability of more than 30 days in a row during the same defined period
% of patients who attend on or before the day of their appointment
% of patients who come within three days of their appointment
World Health Organization and Management Sciences for Health. 2011. How to Investigate Adherence to Antiretroviral Treatment: An Indicator-Based Approach.
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