# Containing Antimicrobial Resistance through Rational Antimicrobial Use in Namibia

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# Containing Antimicrobial Resistance through Rational Antimicrobial Use in Namibia

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## Key Words

Antimicrobial resistance (AMR), rational medicine use (RMU), HIV drug resistance (HIV-DR), antibiotics, antimicrobials, antiretrovirals (ARVs), HIV, hospital-acquired infections (HAI), infection control, infection

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AMR | antimicrobial resistance |
| ART | antiretroviral therapy |
| ARV | antiretroviral |
| DAAD | German Academic Exchange Service |
| Div:PhSs | Division of Pharmaceutical Services |
| DSP | Directorate of Special Programs |
| EML | essential medicines list |
| EWI | early warning indicator |
| HAI | hospital-acquired infection |
| HIV-DR | HIV drug resistance |
| IPC | infection prevention and control |
| MDR-TB | multidrug-resistant tuberculosis |
| MoHSS | Ministry of Health and Social Services |
| MSH | Management Sciences for Health |
| MUE | medicine use evaluation |
| MURIA | International Medicines Utilization Research in Africa |
| NAAR | Namibians against Antimicrobial Resistance |
| NIP | National Institute of Pathology |
| RMT | regional management team |
| RMU | rational medicine use |
| SIAPS | Systems for Improved Access to Pharmaceuticals and Services |
| STG | standard treatment guideline |
| TB | tuberculosis |
| TC | Therapeutic Committee |
| TIPC | Therapeutic Information and Pharmacovigilance Center |
| USAID | US Agency for International Development |
| UNAM | University of Namibia |
| UNAM-SOM | University of Namibia School of Medicine |
| UNAM-SOP | University of Namibia School of Pharmacy |
| WHO | World Health Organization |

# EXECUTIVE SUMMARY

In 2012, an assessment of HIV-transmitted drug resistance in Namibia estimated the overall prevalence to be 8.54% (95% plausibility interval 2.66% to 24.2 %).The MoHSS of Namibia was supported by the USAID-funded Systems for Improved Access to Pharmaceuticals and Services (SIAPS) program to design Namibia's approach to preventing the development of AMR, including HIV drug resistance (HIV-DR). Strategic and sustained efforts to create awareness and build coalitions against AMR were designed to initiate and institutionalize Namibia's AMR containment activities in a coordinated manner. The SIAPS-developed AMR coalition-based strategy identifies educational institutions, such as UNAM; therapeutic committees (TCs); and key institutions involved in AMR, such as the National Institute of Pathology (NIP) as key players in the pre- and in-service training of health care professionals to enhance RMU and combat AMR. Lack of participation in AMR activities by educational and other key institutions may hinder progress in combating AMR, including multidrug–resistant tuberculosis (MDR-TB) and HIV-DR. Lack of experience by local institutions in implementing AMR containment activities has also hampered buy-in by these institutions in implementing AMR activities, including conducting operational research on antimicrobial use and resistance patterns.

SIAPS collaborated with key institutions, including the MoHSS, Div:PhSs, UNAM-SOM, UNAM-SOP, NIP, and TCs in the Kunene and Karas regions, in activities to reduce hospital-acquired infections (HAIs); improve infection prevention and control (IPC); and promote RMU in Namibia.

Achievements include the addition of IPC, AMR, and HAI in the curriculum for medical students at UNAM-SOM and the introduction of modules on AMR and RMU in the curriculum for pharmacy students at UNAM-SOP. A steering committee was established to implement HAI, IPC, and AMR activities and to date, this committee has organized four workshops for IPC nurses, other health professionals, and students. With guidance from the HAI, IPC, and AMR steering committee, the MoHSS initiated plans to establish AMR stewardship committees in all regions. SIAPS also supported the MoHSS in a process for developing a National Action Plan for AMR containment in Namibia. The final draft of the plan is awaiting final high-level approval by the MoHSS.

Human resource development through in-service and pre-service collaboration with international partners in HAI, IPC, and AMR is necessary to allow countries such as Namibia to implement multi-stakeholder interventions to improve treatment interventions and prevent HAIs and AMR, including HIV-DR. TCs and antimicrobial stewardship committees can also be used to monitor AMR at health institutions and develop interventions for combating AMR through RMU.

# BACKGROUND

Namibia has a population of approximately 2.11 million people (Government of the Republic of Namibia, 2011) and is among the countries in southern Africa significantly affected by the HIV and AIDS epidemic, with an HIV prevalence rate among adults estimated at 16.9% as of 2014. Namibia has adopted the public health approach to scaling up antiretroviral therapy (ART) that involves the use of standardized and simplified treatment regimens. HIV resistance to antiretroviral drugs (ARVs) is inevitable in patients on lifelong ART. Namibia is one of three countries in Africa (the others are Botswana and Rwanda) that has reached 80% ART coverage of patients (Joint United Nations Program on HIV/AIDS - UNAIDS, 2011). By June 2013, 100,000 patients in the public-sector of Namibia were on ART, and this number grew to more than 160,000 by December 2017. The MoHSS continues to increase access to ART through decentralization and the adoption of the 2013 World Health Organization (WHO) guidelines on the management and treatment of people living with HIV. Namibians continue to have access to medicines for managing a variety of conditions including TB and other communicable and noncommunicable diseases. To ensure availability of and access to these safe, efficacious, and cost-effective antibiotics and antivirals for a large population of patients, it is important to improve RMU to prevent and minimize the risk of AMR (Mabirizi et al., 2013).

AMR threatens other health care gains. For example, co-infection with HIV and antimicrobial-resistant pathogens (e.g., TB, salmonellosis, other sexually transmitted infections) may result in rapid disease progression in the infected individual and has a potential multiplier effect on the dissemination of resistant pathogens to the rest of the population—thereby placing more demands on health care resources.2 In 2012, the prevalence of HIV-DR in Namibia was 8.5%. The emergence of antimicrobial resistance is a complex problem driven by many interconnected factors, in particular the use and misuse of antimicrobials. Antimicrobial use, in turn, is influenced by the knowledge, expectations, and interactions of prescribers and patients; economic incentives; characteristics of the health system; and the regulatory environment. In the light of this complexity, coordinated interventions are needed that simultaneously target the behavior of providers and patients and change important features of the environments in which they interact (WHO 2001).

SIAPS supported the MoHSS to design Namibia’s strategy for advocacy and containment of AMR, including HIV-DR. The AMR intervention model (figure 1) identified UNAM, hospital TCs, AMR stewardship committees, and other institutions as key players in the pre- and in-service training of health care professionals to enhance RMU and combat AMR.

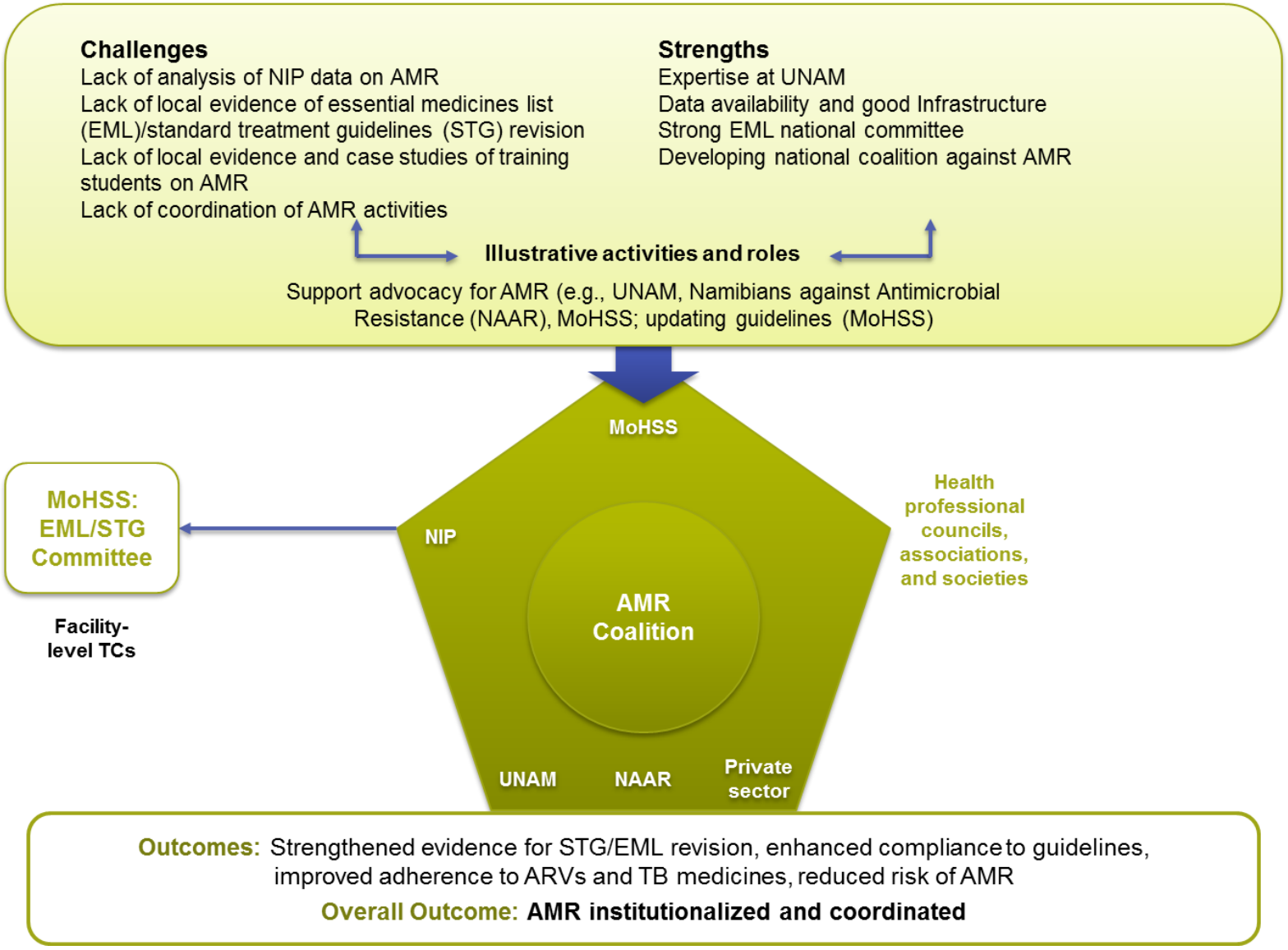


**Figure 1. Proposed approach for advocacy and containment of AMR in Namibia – July 2013**

The AMR intervention model was developed at a 2013 workshop on containing AMR and promoting the rational use of ARVs and TB and other medicines in Namibia. The SIAPS-supported workshop developed the AMR intervention model and the "Call-to-Action for Antimicrobial Resistance Advocacy and Containment", which committed all stakeholders, including government, academia, regulatory authorities, professional associations, donor agencies, civil society, media personnel, and industry to forge strong alliances to:

- Create a national movement to enhance capacity, increase evidence on antimicrobial use, raise awareness about AMR, and support the implementation of effective interventions

- Enhance the engagement of patients and caregivers in making informed choices on adherence to treatment plans through treatment literacy and other interventions

- Support ongoing efforts to reduce the risk of HIV-DR in Namibia, including implementing HIV-DR early warning indicators (EWIs), treatment guidelines, and treatment adherence

- Broaden the focus to include antimicrobials for TB, opportunistic infections, and antibiotics in general use

- Increase private-sector engagement and collaboration with the public sector on RMU/AMR

- Strengthen collaboration between medicine use interventions and laboratory services

- Increase support for community-based interventions on appropriate use of medicines

The call-to-action document called on all players to join together against the threat of AMR and work to engage new partners, strengthen collaboration with existing partners, and advocate for AMR as a local and national priority in Namibia (Mabirizi et al., 2013).

## INTERVENTIONS

SIAPS has used this AMR advocacy and containment model to advise and support MoHSS and other stakeholders to plan and implement interventions to combat AMR and promote RMU in the country. Some examples are elaborated below.

### Collaboration with UNAM-SOM and the University of Bonn, Germany

To consolidate principles of AMR containment in pre- and post-graduate medical student education and to develop their technical capacity in implementing AMR prevention activities, SIAPS supported UNAM-SOM to collaborate with the Institute of Hygiene and Public Health of the German University of Bonn. This collaboration focused on how to prevent HAIs, reduce the development of AMR, and promote RMU. SIAPS support for the project was key as SIAPS has played a major role in shaping Namibia's approach to containing AMR through extensive support to the MoHSS in HIV-DR and IPC activities. Approximately USD 165,000 was requested from and approved by the German Academic Exchange Service (DAAD) through the University of Bonn. The funding was utilized for IPC activities, including implementing practical strategies for reducing HAIs. This initiative, referred to as the DAAD PAGEL Program, included the development of a curriculum for medical students on IPC and HAI, promotion of operational research in AMR, and exchange programs for undergraduate and postgraduate students between UNAM-SOP and the University of Bonn.

The exchange programs included educational tours to selected departments at the Institute for Hygiene and Public Health, the Institute of Clinical Microbiology, and the Gemeinschaftskrankenhaus (community hospital). The purpose of the exchange programs was to demonstrate to the Namibian team the implementation of well-established IPC systems, including functional antibiotic stewardship committees and the activities they oversee. Other activities included drafting an IPC, AMR, and HAI curriculum for UNAM-SOM and conducting workshops for pre- and in-service health professionals in HAI, IPC, AMR, and RMU. The workshops focused on practical skills for reducing the spread of infections, such as proper hand hygiene procedures during invasive procedures. Participants also learned about resistance patterns of microorganisms based on laboratory data from the NIP. SIAPS introduced to the participants the principles of rational use of antimicrobial medicines and provided technical assistance to support initiatives (interventions) for preserving currently used antimicrobials, especially ARVs and TB medicines.

### Development of AMR and RMU Modules for Pharmacy Curriculum

Pre-service education is a cost-effective and sustainable intervention to strengthening health systems. Adequate pre-service exposure to practical topics of importance to public health during early and formative learning periods enables students to graduate with the necessary competence and confidence for practice in the real world (SIAPS, 2013). SIAPS collaborated with UNAM-SOP to strengthen pharmacy education by integrating practical topics relating to RMU, AMR, and pharmacovigilance—areas of high clinical and public health relevance. UNAM-SOP reformed its undergraduate pharmacy course to adequately address RMU and AMR topics. The university began by analyzing the clinical practice needs and required technical competencies for promoting RMU and AMR practices at health facilities. This analysis informed the subsequent development of specific learning objectives, the detailed

course content, the instructional delivery techniques necessary to achieve those objectives, and the associated classroom contact times and student assessment methods. UNAM-SOP heavily emphasized case-based and self-directed learning methodologies to enhance experiential learning. UNAM-SOP, with technical assistance from SIAPS and support from the MoHSS, finalized the curriculum through review meetings and implemented it using detailed trainer guides developed during the reform process (Joshi et al., 2014).

## Supporting TCs to Promote RMU

SIAPS has supported the training of stakeholders in Namibia on strategies to improve RMU and combat AMR. Initial interventions were mainly been done at the national level, and this needed to be taken down to the operational level through TCs. To support the process, SIAPS supported the MoHSS to develop a medicine use evaluation (MUE) guide for TCs to encourage them to document interventions on medicine use. Electronic and hard copies of the MUE guide were shared with the TCs to guide them in conducting medicine use assessments.

SIAPS supported the Div:PhSs to monitor and mentor TCs in conducting medicine use assessments and in measuring and improving indicators for antibiotic prescribing. Antibiotic prescribing was monitored through the pharmacy management information system, which allowed regular review of antibiotic prescribing patterns with recommendations on how to improve the prescribing indicators in the system's feedback reports. TCs were also mentored on conducting MUEs and promoting RMU during SIAPS-supported annual visits to health facilities.

Between 2015 and 2016, SIAPS provided technical assistance for TC trainings in the Kunene and Karas regions with the aim of encouraging RMU and slowing down the development of AMR. The Karas Regional Management Team (RMT) identified inventory management and TC performance as critical prerequisites to achieving RMU. The Kunene region identified overuse of antibiotics and other medicines, such as paracetamol, as a challenge. With SIAPS' help, the two regions trained members of their six district TCs. In addition, SIAPS assisted the Kunene region in conducting an MUE of prescribing patterns of specific medicines. In the Karas region, the TC training was focused on enhancing health workers' capacity in inventory management and providing guidance on the role of TCs in promoting RMU in the region. SIAPS provided technical assistance for the workshops, including workshop material development and facilitating all sessions to train staff from ART sites in the region. The trainings were intended to support the regional health management teams to revive TC activities that promote RMU and prevent the development of AMR, including HIV-DR. Additionally, primary health care facility staff/nurses were trained on good storage practices and inventory control of medicines. Participants in the two workshops included medical officers, nurses, matrons, pharmacist assistants and pharmacists, all of whom represented their district TCs.

## Development of Multisector AMR Action Plan

In 2017, SIAPS supported the MoHSS AMR technical working group in conducting a situational analysis of strategies to combat AMR in Namibia. SIAPS also advised and assisted Namibian institutions and ministries on various activities for containing AMR, including HIV-DR and MDR-TB. The RMU/AMR strategies supported by SIAPS included developing and implementing STGs and IPC guidelines and maintaining Namibia's EML. SIAPS also supported the MoHSS in developing the AMR advocacy strategy and implementing EWIs for

HIV-DR. Presentations on SIAPS activities to promote RMU, combat AMR, and implement IPC activities were key in formulating Namibia's situational analysis of AMR. This analysis was used to determine gaps in AMR containment in all economic sectors (including the agriculture, veterinary, and private sectors) and was the basis for developing an action plan for the multisectoral containment of AMR in Namibia. SIAPS provided technical assistance to the MoHSS AMR technical working group in reviewing drafts of the situational analysis and the multisector action plan. Both were finalized and were awaiting high-level approval from the MoHSS at the time of compiling this report.

## Supporting Operational Research in AMR

The Medicines Utilization Research in Africa (MURIA) group was formed to support operational research in African countries, including facilitating the prevention of AMR in the region. Operational research in antimicrobials is expected to allow African countries to review medicine policies and support the fight to combat the development of AMR. SIAPS has collaborated with UNAM and the MURIA group in activities to promote this research and RMU to combat the development of AMR. SIAPS supported the Kunene regional management team to present a poster and oral presentation on "Promoting Rational Use of Medicines through Therapeutics Committees in Namibia: Evidence from the Kunene Region". The presentation showcased SIAPS-supported work that had been implemented by the Kunene regional management team in promoting RMU through operational research and TC activities.

SIAPS provide technical assistance to UNAM-SOP to organize and host the third MURIA training workshop and symposium in Windhoek in June 2017. The conference was attended by delegates from 16 countries in Africa, Europe, and South and North America. SIAPS provided technical guidance to UNAM students and key managers at the Div:PhSs of the MoHSS on how to prepare abstracts and present operational research on RMU themes, including the use of antimicrobials, STGs, and information for decision making. At this symposium, SIAPS also presented abstracts on "Implementing a Dashboard for Pharmaceutical Information" and "Pediatric ART Uptake, Adherence, Regimen Switches, and Retention in Care in Namibia".

In addition, SIAPS advised and guided the technical working group coordinating the National TB and Leprosy Program's operational research agenda. The operational research technical working group coordinated a workshop to train 26 participants from the DSP and selected regions on the basic principles of operational research. Facilitators at the workshop included stakeholders in Namibian research activities, such as SIAPS, the Centers for Disease Control and Prevention, UNAM-SOP, the National University of Science and Technology, and MoHSS research units. Participants were trained on how to structure and conduct scientific operational research activities in their health facilities, including identifying operational research areas to be developed into scientific operational research topics by the technical working group.

## Implementing Activities to Monitor EWIs for HIV-DR

SIAPS collaborated with the MoHSS's DSP to institutionalize the routine monitoring of EWIs for drug resistance. The MoHSS has been proactive in minimizing preventable HIV-DR. With its national and international partners, the MoHSS publishes annual reports and national plans, following WHO recommendations, for the prevention and assessment of HIV-

DR. The national ART program mandates the use of standardized ART prescribing practices and promotes the use of WHO prequalified drugs. The program has robust and complementary clinical patient care and pharmacy dispensing systems that provide data for essential indicators for the national surveillance of ARV prescribing, dispensing and use by patients. In 2009, Namibia piloted EWI monitoring in nine sites, which led to a revision and improvement of the existing national data capture tools. Moreover, constructive feedback and training was provided for staff at these sites, to improve their EWIs. The 2010 EWI exercise scaled up the monitoring to all main ART sites.

Namibia chose five EWIs based on programmatic relevance and availability of data. These were: 1) ART prescribing practices, 2) patients lost to follow-up 12 months after ART initiation, 3) patients switched to second-line ART during the first 12 months, 4) on time ARV pick-up, and 5) ARV drug supply continuity (Jones et al., 2013). SIAPS has supported the MoHSS in implementing these HIV-DR EWIs at all ART sites in Namibia's 34 districts. The Electronic Dispensing Tool (EDT) has been used to assist in the routine monitoring of HIV-DR EWIs, including those that provide proxy data on adherence to ART. ART facilities report monthly on their data for HIV-DR EWIs, allowing the national level to produce a quarterly feedback report that is used to inform and forewarn decision makers about risks for the development of HIV-DR among patients. SIAPS was instrumental in assisting the DSP to conduct annual analyses of EWIs by extracting and analyzing data from the national Electronic Dispensing Tool database in collaboration with experts from Tufts University.

## RESULTS

Four exchange programs involving MoHSS officials and 13 undergraduate and postgraduate students were conducted between UNAM-SOP and the University of Bonn between 2015 and 2017. The lessons learned during the exchange exercise have enabled the MoHSS and other key stakeholders in Namibia to begin planning for the implementation of modern approaches to containing AMR, such as active surveillance for resistance to antibiotics, use of innovative diagnostic tests to identify and characterize resistant bacteria, and the adoption of protocols for IPC. An IPC/AMR steering committee was established to implement IPC/AMR activities. The committee has conducted three workshops for students and IPC nurses and trained 148 pre- and post-graduate health practitioners on promoting RMU, preventing HAIs, and following good IPC practices. Participants included nurses in charge of infection control at the Intermediate Hospital Katutura and the Windhoek Central Hospital, medical students, and nurses at rural health facilities. The steering committee finalized and incorporated the RMU, HAI, and IPC curriculum into the undergraduate programs for medical students and nurses at UNAM-SOM. This involved departmental meetings to evaluate and revise the medical microbiology curriculum for undergraduate training, getting approval by the school board and the faculty board, and stakeholders meetings, after which the curriculum was presented and approved by the UNAM Senate and by the Health Professionals' Council of Namibia. This ensured that the curriculum is aligned with the Namibian Qualifications Framework.

Since 2012, ten quarterly ART feedback reports and two annual reports on HIV-DR EWI analysis have been disseminated to all 14 regions and program managers. ART retention rates improved from 87% in March 2012 to 95.3% in September 2014, and on time pill pick-up improved from 73% to 86% in the same period. Program managers have acted on the report recommendations to enhance compliance to guidelines and minimize the risk of HIV-DR development. The successful implementation of EWI monitoring in Namibia has largely been due to the government's commitment, support from USAID and partners, and enhanced utilization and validation of routine ART databases (Jones et al., 2014; Mutenda et al, 2016).

At the pre-service level, UNAM-SOP integrated AMR and RMU topics into its bachelor of pharmacy curriculum. The school used a task-oriented approach and self-directed learning as the primary delivery method. Student feedback showed that the method increased self-responsibility, active participation, and self-learning (Joshi et al., 2014). UNAM-SOP has developed 12 modular continuing professional education programs, with module 1 focusing on the appropriate use of antibiotics. Since 2015, the school has collaborated on research on antibiotic use in Namibia and the South African Development Community region under the umbrella of the MURIA group (Joshi et al., 2018). As of summer 2016, three groups of UNAM-SOP students had experience the RMU/AMR curriculum. To obtain student feedback on the new instructional design used for RMU/AMR exposure, UNAM-SOP conducted a qualitative survey with five-level Likert items for each question for scaling responses. Nine (64.3%) of the 14 students who took the course that year responded to the survey; table 1 provides synthesized responses to the questions. Several students commented in the open feedback section of the survey that the new method of teaching-learning gave opportunities for active participation and self-learning but had time management challenges due to the extra workload involved (Joshi et al., 2014).

**Table 1. UNAM-SOP Students' Perception of the Instructional Design Used for Delivering the RMU/AMR Content**

| Statements | Summary of student responses |
|---|---|
| I like this new teaching method | All 9 respondents (100%) either agreed or strongly agreed |
| This method makes me revise better | 8 of 9 (88.9%) respondents agreed or strongly agreed |
| This method wastes my leisure time | 6 of 9 (66.7%) respondents disagreed or strongly disagreed |
| This method burdens students | Mixed response (5 disagreed or strongly disagreed; 3 agreed; 1 was uncertain) |
| This method makes students actively participate | All 9 (100%) respondents agreed, 6 (66.7%) strongly so |
| This method has encouraged me to read on my own | 8 of 9 (88.9%) respondents agreed or strongly agreed |
| Instructions in this method are easy to follow | 7 (77.8%) respondents agreed or strongly agreed |
| I would prefer another teaching method to this one | 7 (77.8%) respondents disagreed or strongly disagreed and the remaining 2 were undecided |
| I would recommend this method for other modules | Mixed response (5 agreed or strongly agreed; 3 disagreed; 1 was undecided) |
| I have an opportunity to express myself | 8 of 9 (88.9%) respondents said they had opportunities to express themselves with this style of teaching-learning |
| I will not be successful in my studies with this method | 7 (77.8%) respondents disagreed or strongly disagreed and the remaining 2 were uncertain |
| The assessments of this method are rigorous | 6 (66.7%) respondents disagreed, 2 agreed, and 1 was uncertain |
| I deserve the marks I obtain under this method | All 9 (100%) respondents either agreed or strongly agreed |
| I take more responsibility for my studies than before | All 9 (100%) respondents either agreed or strongly agreed |
| I have developed more skills/competencies with this method | 7 of 9 (77.8%) respondents agreed, 5 (55.5%) strongly so |

Following the successful workshop for developing Namibia's AMR advocacy strategy, the Pharmaceutical Society of Namibia collaborated with SIAPS and the MoHSS to organize its 2013 Annual Pharmacy Week, which focused specifically on AMR. During the event, the Pharmaceutical Society facilitated an accredited professional development seminar on AMR. Pharmacists in both the public and private sectors reached out to their clients and the community in sending out messages about RMU and preserving antibiotics

To ensure the availability of quality pharmaceutical products and effective pharmaceutical services, SIAPS has been supporting UNAM-SOP in building its capacity to provide pre- and in-service pharmaceutical management training. SIAPS has also supported UNAM-SOP in coordinating operational research by pharmacy students to conduct service quality assessments during their attachments to rural health facilities. Pharmacy students have been conducting MUEs, including patient satisfaction studies with services received at ART facilities in Namibia. The results of the findings collected through SIAPS-supported checklists and operating procedures were presented by students to management at the facilities they have been attached to and to other UNAM-SOP audiences during feedback sessions. Some students have used findings from this operational research to continue with medicine use topics as part of their final-year dissertations.

SIAPS supported the MoHSS and UNAM to participate in AMR activities coordinated by the MURIA group. One of the three abstracts presented by SIAPS at the second annual MURIA conference in Botswana in 2016 was from Namibia:

1. Promoting Rational Use of Medicines through Therapeutics Committees in Namibia. Evidence from Kunene Region. Bayobuya Phulu, SIAPS-Namibia

2. Including Implementation of Standard Treatment Guidelines in Swaziland as well as Feedback on the Recent DU Course. Kidwell Matshotyana and Fola Amu, SIAPS-Swaziland

3. Providing a Study-based Evidence to Advocate for a Large-scale Establishment of Effective Drug and Therapeutic Committees in Referral Hospitals in Democratic Republic of Congo (DRC). Robert Tuala Tuala and Kidwell Matshotyana, SIAPS-DRC and Swaziland

In addition, UNAM-SOP gave four presentations at the conference, all developed by UNAM faculty previously trained on RMU by SIAPS or its predecessor projects, SPS/RPM plus:

1. Antibiotic Research in Namibia Particularly among Public Hospitals. Dan Kibuule (Namibia)

2. An Analysis of Policies for Cotrimoxazole, Amoxicillin and Azithromycin Use in Namibia's Public Sector: Findings and Therapeutic Implications. Dan Kibuule (Namibia)

3. Effect of Changing from First- to Second-line Antiretroviral Therapy on Renal Function. Francis Kalemerra (Namibia)

4. A Pre-service Curriculum for Capacity Development in Medicine Regulation at the University of Namibia: Process and Outcomes. Ester Naikaku (poster presentation)

All the presentations referred to above can be found on the MURIA website at http://muria.nmmu.ac.za/2nd-MURIA-Training-Workshop-and-Symposium,-25-27-J.

Namibia hosted the third MURIA conference in June 2017 to enhance the appropriate use of medicine, particularly antibiotics. The conference was attended by representatives from 16 countries from Africa, Europe, and South and North America, including Namibia. Participants were trained on drug utilization review, with an emphasis on methodologies for operational research, introductory and advanced statistics, research projects and proposal writing, and other topics. The workshop included research presentations on antimicrobials, RMU and medicine availability, antimicrobial governance, regulation and utilization, pricing considerations of medicines across countries, pediatric antiretroviral treatment uptake, and adherence, as well as poster presentations.

As a result of operational research conducted by pharmacy students during their attachment to rural health facilities, a manuscript entitled "A cost-effective model for monitoring medicine use in Namibia: Outcomes and implications" was published in the *African Evaluation Journal* in October 2017. The MURIA group also mentored members on how to design, plan and implement RMU operational research activities in their countries and helped students and lecturers at UNAM compile and publish research activities in recognized journals.

## DISCUSSION OF FINDINGS

The fight against the development of AMR requires the collaboration of all stakeholders involved in the prescribing, dispensing, and use of antibiotics. The multistakeholder and multidisciplinary workshop that SIAPS convened in Namibia was a good starting point to engage stakeholders and start discussions about improving the use of antimicrobials and combating AMR. SIAPS was in a good position to support these initial discussions as the project had been involved globally in RMU activities, including medicine use studies on microbial use and infection control and prevention activities.

The initial workshop was important in bolstering local initiatives and strengthening networks of health professionals interested in preventing the development and spread of AMR, including HIV-DR, TB drug resistance, and resistance to other antimicrobial agents. The workshop was important in establishing UNAM-SOP as a key institution for promoting rational use of ARVs and related medicines. The workshop helped to prepare UNAM-SOP to join the International Network for Rational Use of Drugs (INRUD) and rally key stakeholders in Namibia in developing and implementing an effective strategy to reduce the risk of AMR. The workshop helped Namibia develop a coalition of interested stakeholders committed to discussing and implementing multiple interventions to reduce the negative impact of irrational medicine use and was the starting point from which other AMR containment strategies were developed.

The stakeholder engagement gave responsibility for combating AMR to existing institutions, bodies, and structures, such as TCs in public-sector hospitals, the NIP, and the MoHSS Division of Pharmaceutical Services, and catalyzed the creation of new bodies for combating AMR, such as the antimicrobial stewardship committee of Windhoek Central Hospital and Namibians against Antimicrobial Resistance (NAAR). NAAR is an organization formed by private hospital antimicrobial stewardship bodies to promote RMU and combat AMR primarily in private-sector hospitals. Since its establishment, NAAR has produced materials to promote rational use of antimicrobials, including a handbook of antibiotic guidelines for prescribers based on prevailing antimicrobial sensitivity patterns in Namibia. UNAM and other tertiary training institutions also took responsibility to support operational research on AMR and its containment. As such, UNAM has led the way in operational research on antimicrobials and RMU, including its participation in activities of the MURIA group and presentations of other operational research by students at international conferences and publications in international journals (Kibuule et al., 2017).

UNAM-SOM and UNAM-SOP have incorporated RMU and AMR as part of the curriculum for medical, nursing, and pharmacy students, indicating that education stakeholders in resource-constrained environments are now demonstrating increased leadership to integrate topics of practical, clinical, and public health importance, such as RMU, AMR, and pharmacovigilance, in their pre-service training courses. The collaboration between UNAM and the University of Bonn has exposed undergraduate and post-graduate students to best practices in IPC and HAI and enabled them to appreciate the importance of AMR combating practices, such as active surveillance and antibiotic stewardship. The workshops have also helped medical students and health practitioners appreciate the importance of IPC, preventing HAI, and promoting RMU by following treatment guidelines and protocols.

TCs in the Kunene and Karas regions have led the way in conducting MUEs at their health facilities by using STGs to monitor antimicrobial prescribing patterns, inform their strategies for combating AMR, and promote RMU. MUEs on AMR conducted by TCs are important as the TCs are able to give direct feedback to their prescribers to influence behavior change and promote rational use of antimicrobials. The Kunene region RMT conducted an MUE to better understand medicine prescribing practices in their health facilities and determine whether prescribers were following the STGs in managing common conditions in their regions. The MUE results showed good compliance to STGs and were presented to pharmacists at the national annual pharmacist forum and to delegates at the second MURIA conference in Botswana as poster and oral presentations.

The NIP contributed significantly to research on AMR in the country by availing a wealth of laboratory microbiological data that enabled researchers from the MoHSS and training institutions to rapidly analyze patterns of antimicrobial resistance in Namibia. The EML Committee has also used data from the NIP with the help of the SIAPS-supported Therapeutic Information and Pharmacovigilance Center to conduct operational research on sensitivity patterns to antibiotics and use the results to determine which medicines to add to the national EML for treating meningitis (Mengistu et al., 2013) and urinary tract infections (Mengistu et al., 2014).

## CONCLUSIONS AND RECOMMENDATIONS

Building health worker capacity in IPC and AMR is important in enabling countries such as Namibia to successfully implement interventions to improve the clinical quality of pharmaceutical services and outcomes of therapy and to prevent HAIs and AMR, including HIV-DR. Such should encompass the preservice training of pharmacy, nursing, and medical undergraduates by including RMU and AMR topics in their curricula. Doing so will help them to establish a strong foundation early in their professional career, which will translate to better prescribing, dispensing, or handling of antibiotics in their line of work. Learning from the experience of Namibia, other low- and middle-income countries could meaningfully contribute to preventing and slowing down the emergence of AMR by promoting rational antibiotic prescribing and use that is based on laboratory-confirmed antimicrobial sensitivity patterns incorporated into national clinical guidelines. The Ministry of Health is in the best position to lead and coordinate a multisectorial response to combat AMR. Because AMR is a complex problem, the private sector, agricultural sector, and other sectors need to be involved in the fight against AMR. Multiple strategies are also required. The successful adoption and implementation of these strategies will lead to the conservation of antimicrobials for use by future generations.

## ANNEX A. NAMIBIA'S AMR/RMU CALL TO ACTION DOCUMENT

Republic of Namibia

Ministry of Health and Social

# *Call-to-Action for Antimicrobial Resistance Advocacy and Containment in Namibia*

July 2013

Infectious diseases kill 11 million people around the world every year, 95 percent of whom live in resource-constrained settings. The major life-saving intervention for infectious diseases is antimicrobial treatment, however the problem of antimicrobial resistance (AMR) is rapidly reducing the effectiveness of these life-saving medicines. AMR is a steadily increasing global public health threat that impacts all public health diseases of major significance, including HIV, TB, and malaria. When compared to drug-susceptible infections, drug-resistant infections result in a 1.3 to 2-fold increase in morbidity, mortality, and cost. Other related consequences include prolonged infectiousness, increased risk of transmission of resistant pathogens, extended hospital stay, use of more expensive second- or third-line medicines, reduced productivity, and financial hardships.

Resistance to antimicrobials often develops as a result of poor prescribing and dispensing practices, inappropriate use by patients, and poor medicine quality. Furthermore, weak systems for pharmaceutical management, poor infection prevention and control practices, and inadequate regulation contribute to AMR.

Enhanced availability and use of evidence generated through research, effective advocacy through coalition-building at various levels, and implementation of prioritized containment interventions are vital for an organized, coordinated, and sustained response to the challenge of AMR. AMR is a complex, multi-faceted problem that necessitates a multi-faceted approach. Much is already known about AMR and a number of interventions and tools are available to address and correct factors contributing to AMR, as outlined in the *World Health Organization Global Strategy for the Containment of Antimicrobial Resistance*. Several activities that support AMR containment have been implemented in Namibia: however several gaps remain but at the same time various opportunities also exist to strengthen and enhance a more integrated approach to AMR containment. We must communicate to share expertise, experience, lessons learned, best practices, and resources.

We, the participants of this *workshop on antimicrobial resistance and promoting the rational use of ARVs, anti-TB and other medicines in Namibia* (held at the University of Namibia School of Pharmacy in Windhoek from July 22 to 24, 2013), represent various institutions and stakeholder groups involved in health care in Namibia. We recognize and commend the actions by various local, national and international players in the fight against AMR and view AMR containment as our collective responsibility. We hereby call for action from all stakeholders, including government, academia, regulatory authorities, professional associations, donor agencies, civil society, media personnel, and industry to forge strong alliances to minimize the risk of AMR in Namibia.

We commit ourselves to –

- *Creating a national movement to enhance capacity, increase evidence on antimicrobial use, raise awareness about AMR, and support implementation of effective interventions*
- *Enhancing the engagement of patients and caregivers in making informed choices on adherence to treatment plans through treatment literacy and other interventions*
- *Supporting ongoing efforts to reduce the risk of HIV drug resistance in Namibia, including implementation of HIV drug resistance early warning indicators, treatment guidelines, and treatment adherence*
- *Broadening the focus to include antimicrobials for TB, opportunistic infections, and antibiotics in general-use*
- *Increasing private sector engagement and collaboration with the public sector on Rational Use of Medicines/Antimicrobial resistance*
- *Strengthening collaboration between medicines use interventions and laboratory services*
- *Increasing support for community based interventions on appropriate use of medicines*

If we do not act now to preserve the effectiveness of antimicrobial medicines, the health and prosperity of current and future generations will suffer. We make this call-to-action to all the players to join hands against this common threat and collectively work to engage new partners, strengthen collaboration with existing partners, and advocate for AMR as a local and national priority in Namibia.

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## ANNEX B. PHOTO HIGHLIGHTS

**Participants at the AMR advocacy workshop who came up with the advocacy strategy and the AMR call to action celebrate on July 24, 2013, University of Namibia, Windhoek. Photo credit: SIAPS staff**


**Mr. Emmanuel Ugburo and Mr. Victor Sumbi at the posters area of the workshop**

**A nurse from the Windhoek Central Hospital (in gloves) demonstrates how to maintain an infection-free environment during the insertion of intravenous lines at a workshop for pre- and post-graduates on preventing HAIs and implementing IPC.** ***Photo by SIAPS/Namibia Staff***

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