LESOTHO

Antibiotic Prescribing Patterns at Six Hospitals in Lesotho

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Masoko Ntšekhe
Nomaphuthi Hoohlo-Khotle
Momo Tlali
Dinah Tjipura

July 2011

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

This report is made possible by the generous support of the American people through the US Agency for International Development (USAID), under the terms of cooperative agreement number GHN-A-00-07-00002-00. The contents are the responsibility of Management Sciences for Health and do not necessarily reflect the views of USAID or the United States Government.

About SPS

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

Recommended Citation

Ntšekhe M., N. Hoohlo-Khotle, M. Tlali, and D. Tjipura. 2011. *Antibiotic Prescribing Patterns at Six Hospitals in Lesotho.* Submitted to the US Agency for International Development by the Strengthening Pharmaceutical Systems (SPS) Program. Arlington, VA: Management Sciences for Health.

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

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ABBREVIATIONS AND ACRONYMS

AIDS	Acquired immune deficiency syndrome
CDC	Centers for Disease Control
DTC	Drugs and therapeutics committee
EML	Essential medicines list
HIV	Human acquired immune deficiency virus
HPTC	Hospital pharmaco-therapeutic committee
MOHSW	Ministry of Health and Social Welfare
MSH	Management Sciences for Health
NMP	National medicines policy
NPTC	National pharmaco-therapeutic committee
OPD	Outpatient department
RMU	Rational medicine use
SADC	Southern Africa Development Community
SPS	Strengthening Pharmaceutical Systems
STGs	Standard treatment guidelines
URTI	Upper respiratory tract infection
USAID	United States Agency for International Development
WHO	World Health Organization

ACKNOWLEDGMENTS

The Ministry of Health and Social Welfare would like to thank the Strengthening Pharmaceutical Systems Program, managed by Management Sciences for Health, for its continued support toward strengthening pharmaceutical systems and the country and improving patient outcomes.

The Ministry of Health and Social Welfare would also like to extend its gratitude to the United States Agency for International Development, which has provided funding for SPS activities in Lesotho, including implementation of this study.

The efforts of the hospital staff who participated in this study and who facilitated data collection are also appreciated. Special mention here goes to the district medical officers and heads of pharmacy departments at the six study sites.

EXECUTIVE SUMMARY

The 1985 World Health Organization (WHO) conference on rational medicine use (RMU) marked the beginning of efforts to improve the use of medicines, especially in developing countries. The First International Conference on Improving Use of Medicines, held in Thailand in 1997, identified the need for a set of indicators and appropriate methodology to assess the use of medicines, particularly antimicrobials, in hospitals. The Second International Conference on Improving Use of Medicines confirmed the need for medicine use indicators to measure trends in pharmaceutical management, prescribing, and dispensing in the public and private sectors. The detection of problems with the use of antimicrobial medicines in hospitals is the first step in evaluating the underlying causes and taking remedial action (SPS, 2008).

The Ministry of Health and Social Welfare (MOHSW) has been actively assessing the state of pharmaceutical management and use of medicines since 2007, by conducting the Medicines Access Surveys (2007 and 2009). Because the management and use of antimicrobials has clinical, economic, and environmental implications and because, in many countries, antimicrobials are the most frequently prescribed therapeutic agents accounting for 30–50% of prescriptions for medicines, MOHSW decided to carry out a more focused assessment on the use and management of antibiotics at six hospitals in Lesotho.

The study sought to answer a number of questions relating to antibiotic prescribing patterns at these six hospitals. Quantitative data was collected, counted numerically, and used to identify the prescribing patterns within the six hospitals. The qualitative data was used to measure the quality of prescribing patterns and to determine the reasons behind the identified prescribing patterns. Three core, one patient, and three complimentary medicine use indicators from the WHO Drug Use Indicators (Outpatient Facilities) list were assessed.

Sample selection was convenient, focusing on hospitals that were already supported by the Strengthening Pharmaceutical Systems (SPS) Program of MOHSW. During sampling, we considered supporting hospital pharmaco-therapeutic committees (HPTCs) and data management with RxSolution, an electronic pharmaceutical data management tool developed by Management Sciences for Health. Data collectors were trained and the data collection tools were piloted at the main referral hospital in Lesotho, Queen Elizabeth (QE) II Hospital.

The results indicate that polypharmacy may be a problem in Lesotho in outpatient settings because the average number of medicines prescribed per encounter is 3.8; of these, 37.6% are antibiotics. Adherence to STGs stands at 42.8%, and 79% of the prescribed medicines were from the EML. Generic prescribing is a serious gap, with only 35.6% of the prescriptions issued being generic. Supply chain management, however, is a strong area of the system, with over 89% of the prescribed medicines being available and actually dispensed.

The use of tools, structures, and systems, such as STGs, HPTCs, and facility-specific RMU programs, needs to be strengthened to improve use of antibiotics at hospitals.

BACKGROUND

Lesotho has an estimated population of almost 1.9 million people. Males account for 48.7% of the total population and females constitute 51.3% (BOS, 2007). The Kingdom of Lesotho has been facing a crisis caused by the nexus of high HIV prevalence, deep-rooted poverty with chronic food insecurity since 2001, and weakened governance systems, which adversely affect public service delivery capacity (UN, 2009)

The formal system of Lesotho health facilities is divided into the national (tertiary), district (secondary), and community (primary) levels. The community level includes both health posts and health centers. The district level comprises hospitals that receive patients referred from the community level and filter clinics. The national level consists of one referral and two specialized hospitals. Ownership of the health facilities is as follows—42% of the health centers and 58% of the hospitals are government owned, 38% of the hospitals and 38% of the health centers fall under the control of the Christian Health Association of Lesotho (CHAL), and the remaining facilities are either privately owned or operated by the Lesotho Red Cross. There is also an extensive network of private surgeries, nurse clinics, and pharmacies providing care and/or medicines (Takwonda, 2010). This is typical of arrangements for health services, as depicted in Figure 1 below.

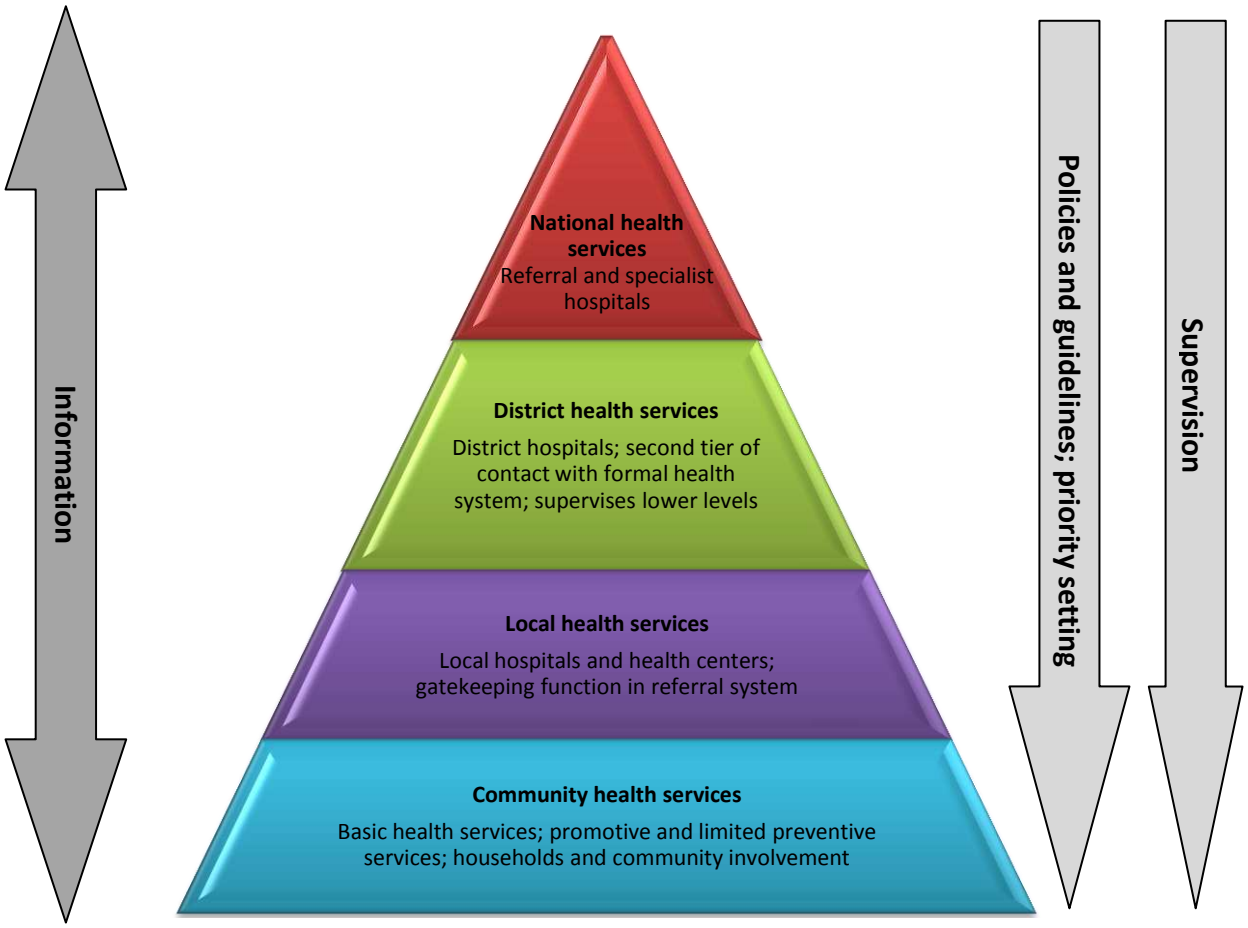

Figure 1. Typical arrangement of country health delivery systems (adapted from MOHSW, Essential Services Package, 2005[a])

[a] http://www.mca.org.ls/documents/Health/ESSENTIAL%20SERVICE%20PACKAGE.pdf

The US Agency for International Development (USAID)-supported SPS Program in Lesotho, which started in 2008, has been providing support to the Ministry of Health and Social Welfare (MOHSW) to build capacity for the effective provision and management of all aspects of the pharmaceutical system, including initiatives focused on HIV/AIDS prevention, treatment, and care. SPS activities have focused on improving pharmaceutical management by strengthening the central pharmaceutical department in providing strategic direction on pharmaceutical issues and to build capacity at facilities to enable them to improve commodity management and patient care. Emphasis has been placed on improving inventory management of pharmaceuticals and laboratory commodities, improving use of medicine at facilities supported by the program, and building capacity of pharmacy personnel to provide good quality pharmaceutical services.

A cross-cutting issue for all activities is improvement of strategic information management at both facility and central levels, thus strengthening the sector's capacity to optimally utilize data generated by the pharmaceutical management information system for improved HIV and AIDS service delivery and better patient care.

SPS's approach to improving medicine use is through the establishment of drugs and therapeutic committees (DTCs), initially at the central MOHSW level, with the goal of developing a plan for eventual rollout to the lower levels when appropriate. The development and dissemination of standard treatment guidelines (STGs) for primary health care is also a high-priority activity for rational medicine use (RMU).

MOHSW had already established a national pharmaco-therapeutic committee (NPTC) as well as hospital pharmaco-therapeutic committees (HPTCs). The review of the current STGs and essential medicines list (EML) was discussed in the NPTC, and there was a great deal of enthusiasm and energy about reviewing these guidelines in Lesotho.

Agreement was also reached for conducting an RMU study to help describe and understand medicine use in hospitals and primary health care facilities and to estimate the extent of irrational medicine use. This report presents the results and analysis of this study on medicine use in Lesotho, focusing on antibiotics.

INTRODUCTION

Antibiotics are among the most widely used medicines in the world. A large portion of antibiotic use appears to be for viral or spontaneously resolving bacterial infections. The Centers for Disease Control and Prevention (CDC) estimates that about 100 million courses of antibiotics are prescribed by office-based physicians each year, and that approximately one-half of those prescriptions are unnecessary (Dowell et al, 1998). Studies evaluating physicians' prescribing patterns have found that almost 50% of office visits for colds and upper respiratory tract infections (URTIs) and 80% of visits for acute bronchitis are treated with antibacterial agents. This prescribing pattern persists despite the fact that antibacterial agents have no significant benefit for the resolution of viral diseases, such as the common cold (Fahey et al, 1998).

Sometimes doctors say that they prescribe antibiotics to patients because patients demand them, so they are compelled to satisfy patients (Sivagnanam et.al, 2004). Patient satisfaction surveys indicate that patients do not acknowledge putting such pressure on their physicians. One survey indicated that although 65% of patients expected to receive an antibiotic for treatment of a URTI, there was no correlation between patient satisfaction and receipt of an antibiotic prescription. Instead, patient satisfaction correlated highest with the quality of the physician–patient interaction. Results from focus groups indicate that patients would be satisfied if an antibiotic was not prescribed as long as the physician explained the reasons for the decision to withhold antibiotics (Hamm, Hicks, & Bemben, 1996).

Inappropriate use of antibiotics is not only giving an antibiotic where or when it is not indicated. It can also be giving the correct antibiotic for an incorrect duration, i.e., too long or too short a time. In some cases, the correct antibiotics can be given in combination with medicines that interact with the antibiotic, in which case the therapeutic benefits are minimized (University of Washington, 2000).

There are many consequences that result from the inappropriate use of antibiotics; one of them is the development of antibiotic resistance. Microorganisms are no longer killed by antibiotics that used to kill them. Higher doses need to be employed to achieve minimum inhibitory concentrations. Another important consequence is increased costs incurred by government, patients, insurance schemes, or other third-parties when antibiotics are misused. Governments spend a lot of money to treat resistant strains because they lead to prolonged hospital stays, prolonged antibiotic treatment and use of more expensive antibiotics, and so on. It is for these reasons that it is vital to employ the most appropriate antibiotics for the infectious conditions.

Antibiotic Resistance

Antibiotic resistance is a global problem, affecting both developing and developed countries. An article by the University of Washington (University of Washington, 2000) lists several factors that contribute to the increase in resistance to antibiotics—overprescribing of antibiotics even for viral infections, over-usage and incomplete duration of antibiotics, over-the-counter availability of antibiotics, inadequate patient counseling, and patients buying only as many tablets as they can afford. This is usually the case in developing countries such as Lesotho, where legislative controls are often very weak and are not adhered to. Patients are

dispensed antibiotics, sometimes by people who are not pharmacy personnel, and there is not enough counseling done to emphasize the importance of adherence and completing the course. Lastly, another factor that leads to resistance is monotherapy of some infections when combinations are required. This can be as a result of financial constraints on the part of the patients if they have to pay for the medicines themselves. It can also be a result of not enough mentoring or education to prescribers on how some conditions should be treated. Whatever the cause of antibiotic resistance, there are far reaching consequences for the public and therefore the government.

Consequences of Antibiotic Resistance

Infections associated with resistant microorganisms result in increased morbidity and mortality (Hellinger, 2000). Patients infected with microorganisms that are resistant to antibiotics are likely to be treated or hospitalized for longer periods, which means that there will be more costs incurred by these patients than by patients infected with susceptible microorganisms (Gleckman, 2004). These costs will be due to prolonged hospital stays, therefore more work for health personnel, and more resources, such as food and more expensive medicines, spent on these patients. In 1993, it cost the United States $200 million in the form of expensive antibiotics and $30 billion a year for longer hospital stays (Garett, 1994). For a country such as Lesotho, the total per capita expenditure on pharmaceuticals (at average exchange rate) is $4, whereas the average for the Southern Africa Development Community (SADC) region is $9.87. The total expenditure on pharmaceuticals in Lesotho is 12.1% of the total expenditure on health, whereas the SADC regional average stands at 27.52% (WHO, 2004). It is imperative that these meager resources are utilized effectively and efficiently. In some cases, the beds are not sufficient to accommodate all the patients.

Patients who are hospitalized for prolonged periods are more at risk of acquiring nosocomial infections, which are also very difficult to treat and leads to increased treatment costs. It also means the use of reserved and more expensive antibiotics which may not be readily available. Some of these second-line antibiotics are not necessarily more efficacious than first-line agents, but are the last line of defense. The courses of treating resistant microorganisms are usually longer than the courses of treating susceptible microorganisms. An example is the treatment of resistant strains of tuberculosis, which may require up to a year of treatment.

It is clear that in Lesotho, one of the least developed countries and with financial constraints, the emergence of resistant strains of microorganisms would put a huge burden on already limited finances. The best approach would be to avoid the situation in the first place.

Managing Antibiotic Resistance

It seems that antibiotic resistance is an inevitable problem (Colgan & Powers, 2001). The more microorganisms are exposed to antibiotics, the more resistance emerges. Rationalizing and managing prescribing patterns of antibiotics is one way that the process can be slowed. Some of the approaches that have been proven to work are the following.

Use of and Adherence to STGs

Studies have shown that when STGs are used and adhered to, resistant microorganisms

decline in numbers (Raymond & Pelletier, 2002). For them to work well, the relevant stakeholders need to be involved and committed. The HPTCs have to provide support and mentorship to the prescribing doctors. They need to educate them and make the STGs available. There also has to be consistent monitoring of adherence to STGs as this also reduces the hospital costs related to pharmaceuticals. A World Health Assembly resolution (WHA60.16) emphasized RMU as an important intervention to contain antimicrobial resistance (AMR). DTCs have been cited as a critical intervention to improve the use of medicines in hospitals and primary care clinics (WHO, 2001).

Formulary Restrictions

Limit access to certain antibiotics, especially broad-spectrum antibiotics. Only a certain category of doctors should be allowed to prescribe those antibiotics that are controlled (Raymond & Pelletier, 2002). This restriction can also be instituted by the HPTC and continuously evaluated to see if it is being adhered to.

Antibiotic Rotation

This means that a medicine or a class of antibiotics is withdrawn for a specified period and then reintroduced again later (Weinstein, 2001), resulting in a continuous, successive alteration in antibiotic selection pressures. The rotation can be done between two classes of antibiotics with different mechanisms of action.

OBJECTIVES AND METHODOLOGY

Statement of the Problem

Antibiotics are among the most widely used and misused medicines in the world. This misuse has led to antibiotic resistance and increased cost of treatment. For a country such as Lesotho, where infectious diseases are among the top four causes of morbidity and within the top ten causes of mortality (Takwonda, 2010), proper management of antibiotic prescribing patterns is crucial to minimize the risk, extent, and rate of antibiotic resistance. To ensure that antibiotics are prescribed rationally, antibiotic use reviews need to be conducted regularly by pharmacy departments in facilities (Management Sciences for Health and World Health Organisation, 1997).

Main Objective

The aim of the study was to investigate antibiotic prescribing patterns at six hospitals in Lesotho listed below. The goal was to investigate whether doctors are prescribing according to the STGs or empirically. It also investigated whether prescribers are aware of the STGs.

Specific Objectives

- Record antibiotic prescription patterns at outpatient departments (OPDs) at the following six hospitals in Lesotho—

    - Botha Bothe Government Hospital
    - Motebang Hospital
    - Berea Government Hospital
    - Ntšekhe Hospital
    - Quthing Government Hospital
    - Tebellong Hospital

- Record the number of specimens sent to the laboratory for microbiological and sensitivity tests
- Determine if doctors adhere to the STGs when prescribing antibiotics
- Determine the number of antibiotics prescribed per encounter and how many of the prescribed antibiotics are from the EML
- Determine the cost associated with antibiotic use at the six hospitals
- Determine if the doctors have the STGs in their consultation rooms
- Find out from doctors how active they feel the HPTCs are in their hospitals

Study Design

There are three broad reasons for investigating usage of medicines—to describe current patterns of medicine use, to correct specific medicine use problems, and to monitor medicine use over time. Investigation of use of medicines in a specific context can be accomplished through a number of activities, starting with assessing current patterns of medicine use;

defining standards of appropriate practice and identifying the specific problems and their causes; designing and implementing interventions to tackle the identified problems; and evaluating patterns following implementation of interventions (Management Sciences for Health and World Health Organisation, 1997).

Quantitative and qualitative techniques can be employed to evaluate patterns of medicine use, and these can answer different questions relating to determination of the patterns as well as the reasons behind these patterns.

Quantitative data was collected, counted numerically, and used to identify the prescribing patterns within the six hospitals. The qualitative data was used to measure prescribing patterns and to provide answers relating to the reasons behind the identified prescribing patterns.

Seven medicine use indicators—three core, one patient, and three complimentary indicators—from the WHO Drug Use Indicators (Outpatient Facilities) list (Management Sciences for Health and World Health Organisation, 1997) were assessed. These indicators assess performance of district-level health care facilities.

Core Indicators

- Average number of medicines per encounter
- Percentage of medicines prescribed by generic name
- Percentage of medicines prescribed from the EML or formulary

Patient Indicator

- Percentage of medicines actually dispensed

Complimentary Indicators

- Average medicine cost per encounter
- Average medicine cost spent on antibiotics per encounter
- Percentage of prescriptions in accordance with treatment guidelines

Sampling

Sample selection was convenient, focusing on the six hospitals, which are supported technically by the SPS Program. Such a targeted selection of hospitals where SPS is already collaborating was made because the subsequent planning, design, and implementation of interventions to address problems or constraints identified by the study would be easier.SPS considered that selecting these hospitals would make it more convenient and practical to build on the existing platform of its support for HPTCs and RxSolution at these sites and integrate the remedial interventions that the current study would help identify.

Piloting of the Tools and Data Collection

- The study tools were piloted at QE II Hospital on April 7, 2011, at the pharmacy department.

- The actual study was conducted April 11–21, 2011.
- All patients that were seen from the medical OPDs of these hospitals and who were put on antibiotics on April 11–21, 2011, were enrolled in the study.
- The patients' information was taken from their medical files when they presented to the pharmacy department to collect their medication.
- Information about their presenting medical conditions was recorded in data collection sheets (Annex 2).
- Antibiotics prescribed for these patients were recorded in the data collection sheets (Annex 2).
- The antibiotics prescribed were checked for appropriateness and whether they had been prescribed according to the STGs.
- The number of patients enrolled in the study who had specimens sent to the laboratory for investigation was recorded.
- The availability of STGs in the consulting rooms and the rate of reference and adherence to these guidelines by the prescribing doctors in the medical OPDs were also assessed.

Ethical Considerations

Ethical clearance was obtained from the Ethics and Research Committee of MOHSW before the study was conducted. The names of the patients were not recorded and the patients' identities were not included anywhere in the data collection sheets to maintain confidentially. Patients and prescribers were asked to sign consent forms prior to enrolling them into the study (Annexes 3and 4).

RESULTS AND ANALYSIS

All patients presenting to the pharmacy April 12–21, 2011, with a prescription containing an antibiotic were enrolled in the study, a total of 1528 patients. Of these, 39% were male and 61% were female (Figure 2).

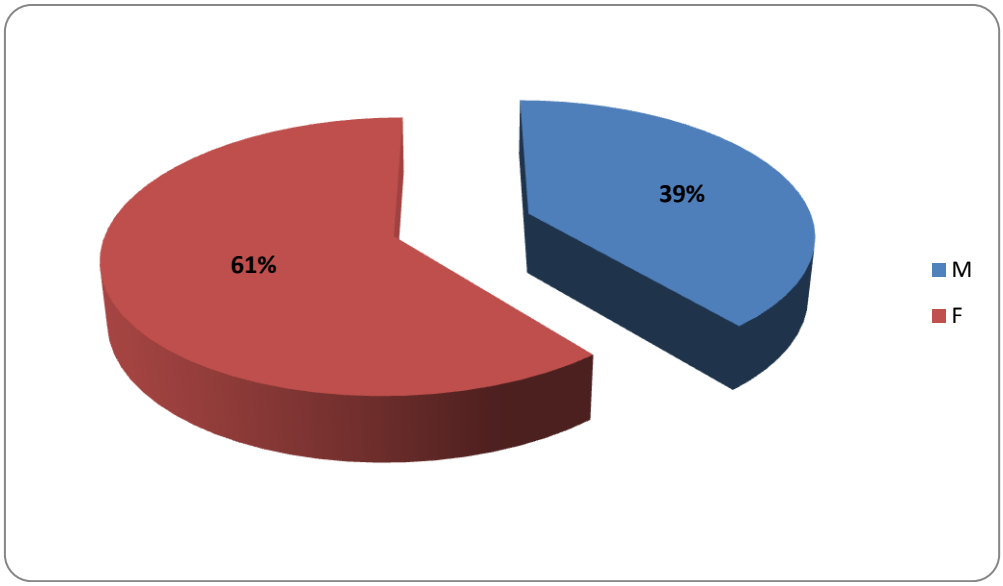

Figure 2. Gender distribution of patients enrolled in the study

Average Number of Medicines per Encounter

The average number of medicines per encounter across all six facilities was 3.8. Berea Hospital had the highest figure at 4.4 and Ntšekhe Hospital the second highest at 4.3. Botha Bothe Hospital had the lowest at 3.3 (Figure 3).

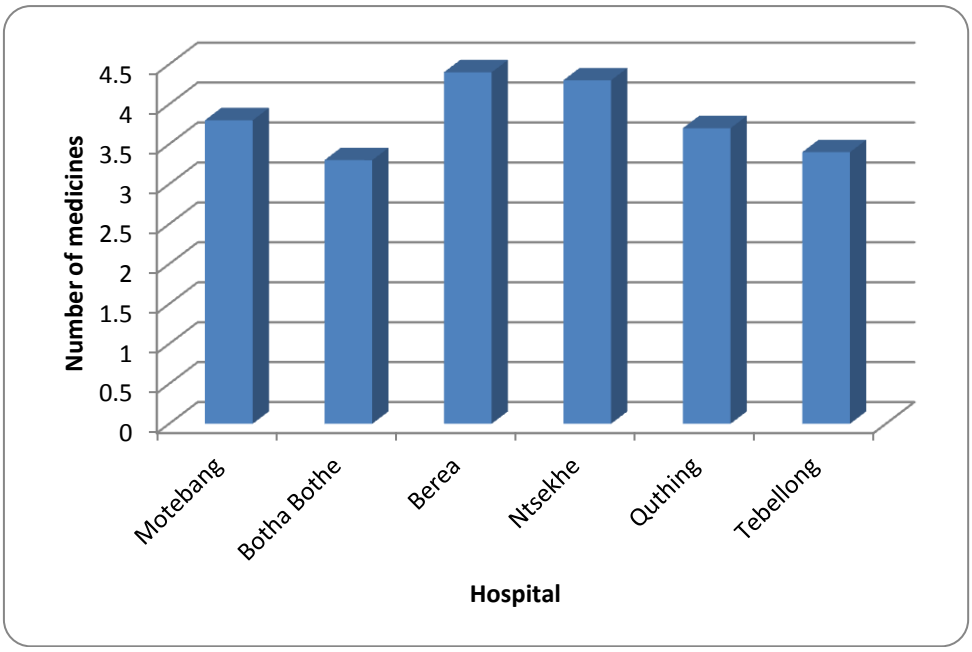

Figure 3. Average number of medicines per encounter

The average number of medicines per encounter is higher than the range of 1.3–2.2 found in similar studies in other countries conducted at district or regional levels, either at hospitals or health centers (WHO, 1993). The 2009 Medicines Access Survey indicated that on average 3 medicines are prescribed per encounter in Lesotho (MOHSW, 2010). This could indicate a need to educate prescribers on RMU and the consequences of polypharmacy on the hospitals' medicine budget and patients' clinical outcomes. However, more targeted examination into this apparent polypharmacy may be necessary to inform design of appropriate interventions.

Percentage of Medicines Prescribed by Generic Name

On average, 35.6% of the prescriptions were generic. Tebellong Hospital was the facility with the highest generic prescribing rate, with 44.2% of the prescribed medicines being generic. It was followed by Ntšekhe Hospital at 43.9%; Botha Bothe Hospital had the lowest generic prescribing rate at 24.7% (Figure 4).

Similar studies by WHO in other countries have shown that generic prescribing levels as high as 82–93% can be reached (WHO, 1993).

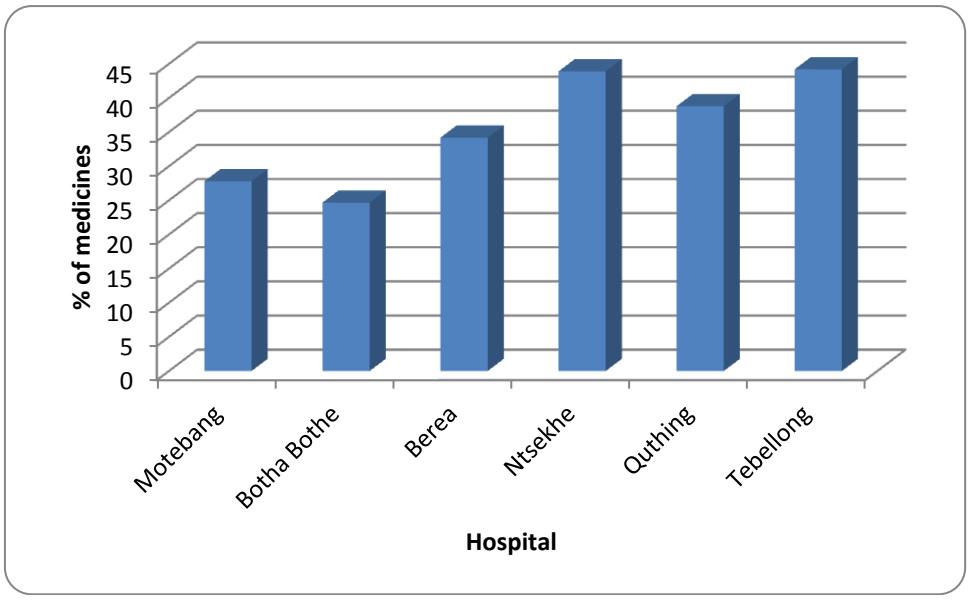

Figure 4. Generic prescribing patterns

Percentage of Antibiotic Prescribing

Since this study only enrolled those patients who had been prescribed antibiotics, the value of this indicator is to assess the relative use of antibiotics as a total of all prescribed medicines, and it attempts to do this by determining the number of antibiotics prescribed as a percentage of the total number of medicines prescribed for the same encounters.

As Figure 5 illustrates, Motebang Hospital had the highest rate of antibiotic prescribing at 39% and Ntšekhe Hospital the lowest at 34.8%. There was not much interfacility variation, however, and the average rate of antibiotic prescribing across all six hospitals was 37.6%, which is lower than the 45.5% indicated in the 2009 Medicines Access Survey, and within the range of 29–43% determined in a number of previous similar studies (WHO, 1993).

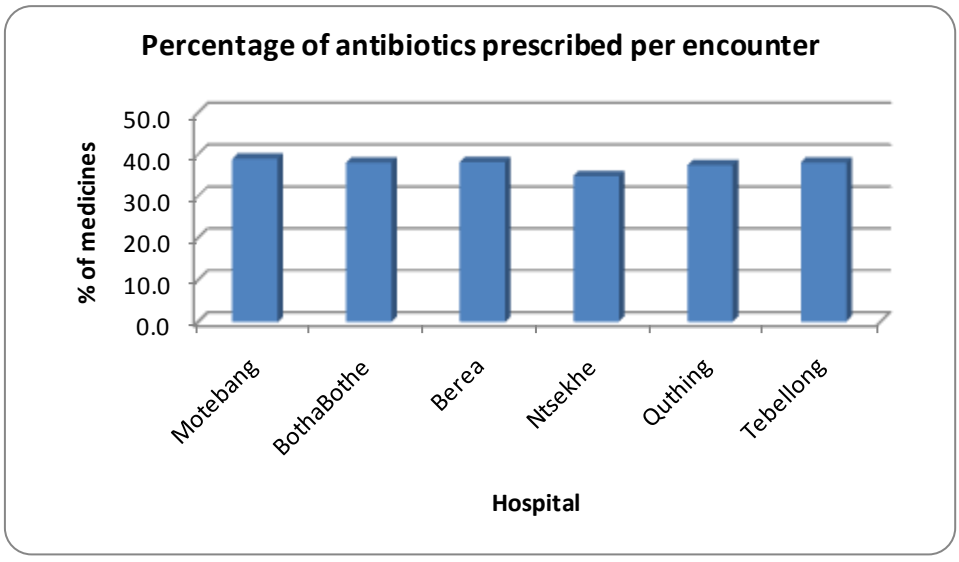

Figure 5. Percentage of antibiotics prescribed per encounter

Of the 5650 medicines prescribed, a total of 37.6% were antibiotics (Figure 6).

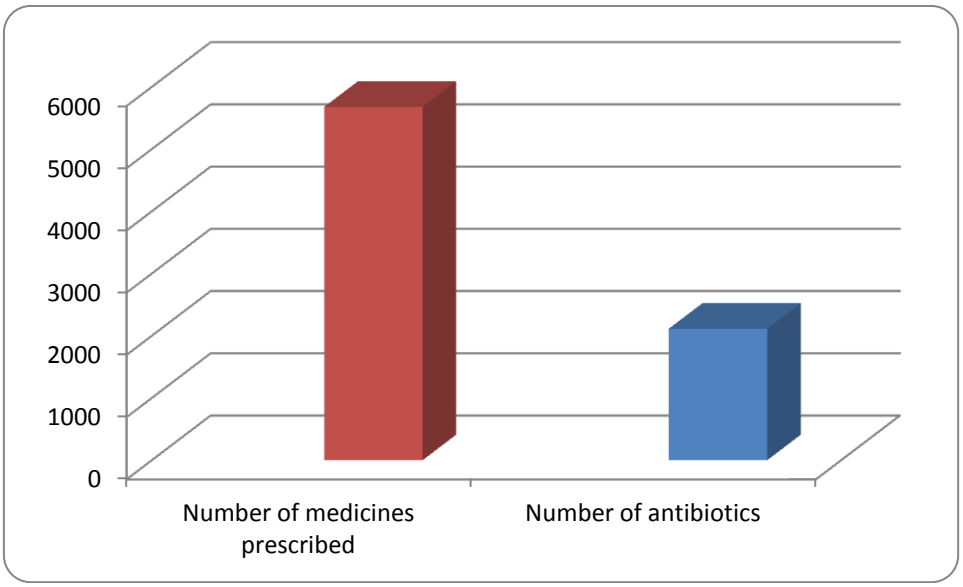

Figure 6. Number of antibiotics in relation number of all medicines prescribed

Cost of Antibiotic Treatment

The total cost of medicines prescribed at all six study sites is M 31,164.01, which is approximately $24,549.49[b]; the average cost per encounter is M 21.57, which is roughly $3.15.

Even though antibiotics account for approximately 37.6% of all prescribed medicines, in terms of cost, they account for a much larger share, being responsible for 69.1% of the total expenditure of medicines across the six hospitals during the study period (Figures 7 and 8). Typically, antimicrobials account for 20–40% of the hospitals' medicines expenditures. Therefore, these results indicate that the cost associated with antibiotic use at the six study hospitals is unacceptably high. RMU interventions should focus on improving antimicrobial use patterns at these hospitals.

[b] At M 6.85 = $1 exchange rate (July 2011)

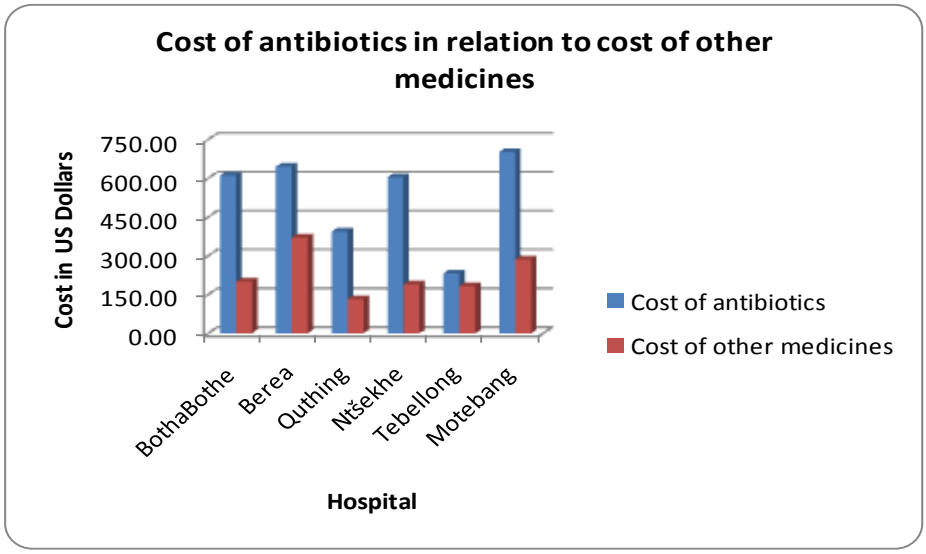

Figure 7. Cost of antibiotics in relation to cost of other medicines

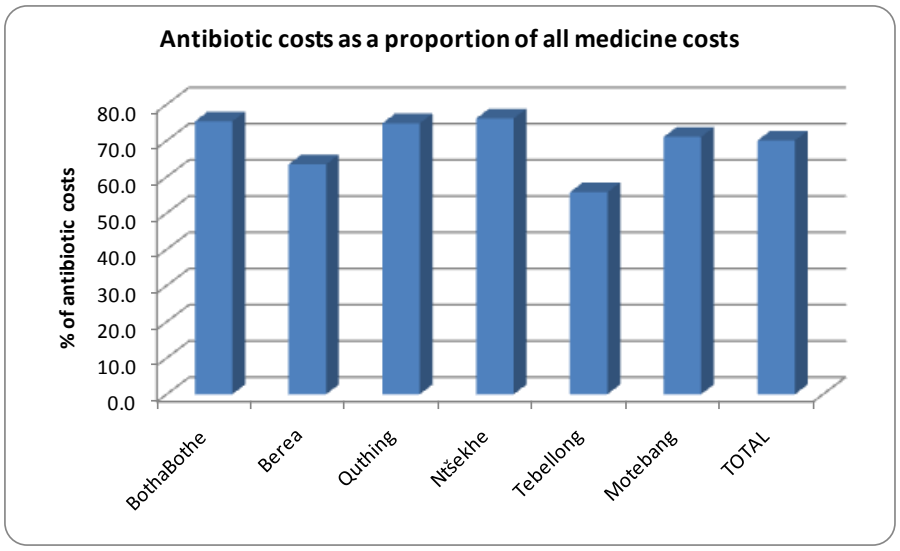

Figure 8. Antibiotic costs as a proportion of all medicines costs

Percentage of Prescribed Medicines from the EML

On average, 79% of the prescribed medicines across all six hospitals were from the EML (Figure 9). When the data is disaggregated by hospital, Ntšekhe Hospital is the one with the best performance on this indicator with 86% of all the prescribed medicines from this hospital on the EML. Tebellong Hospital is the worst performing hospital with 71% of the medicines prescribed on the EML.

When these results are compared against those from other studies, the results seem to be lower than practices in other regions, with the WHO study showing that the adherence to the EML in Tanzania was 88% (Ofori-Adjei, 1992) and in Nepal 86% (Kafle et al, 1992).

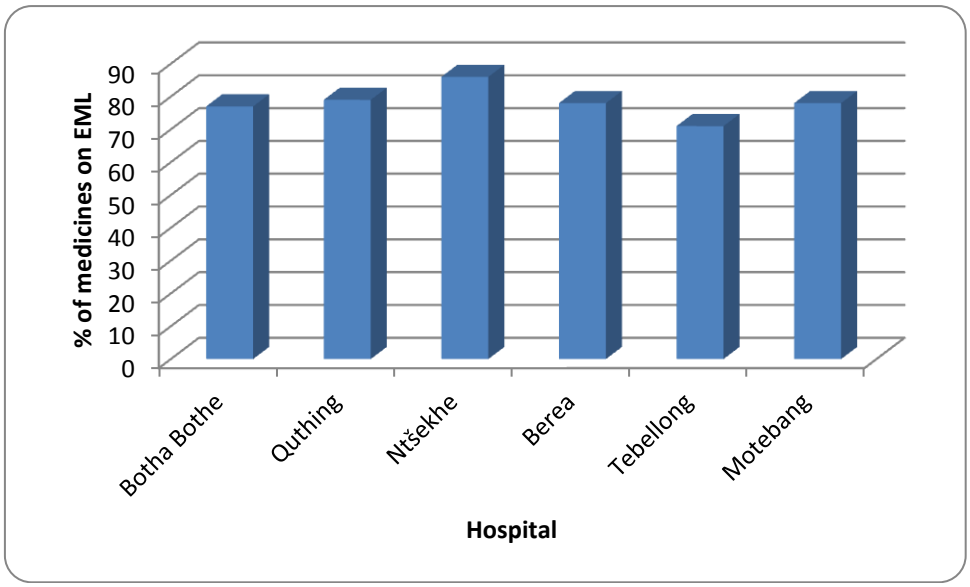

Figure 9. Percentage adherence to the EML

Percentage of Prescribed Medicines Actually Dispensed

Of the 5,650 prescribed medicines, 5,050 were actually dispensed. When the data is disaggregated by facility, it indicates that Berea Hospital is the facility with the lowest rate, with only 64.2% of the prescribed medicines being dispensed. Botha Bothe was the best performing facility with 99.8% of the prescribed medicines actually dispensed (Figure 10).

This indicator is an important measure of availability of medicines and therefore serves as a proxy indicator for the supply chain's efficiency. At 89.4%, the indication is that the performance of the system is quite high and essential medicines are generally available for the patients' use. The results, however, show that there may be potential challenges within the supply chain system at Berea Hospital, as only 64.2% of the prescribed medicines were actually dispensed, which may indicate a low rate of availability of essential medicines at this facility. A more focused assessment may need to be undertaken to determine the causative factors of this low rate at Berea Hospital.

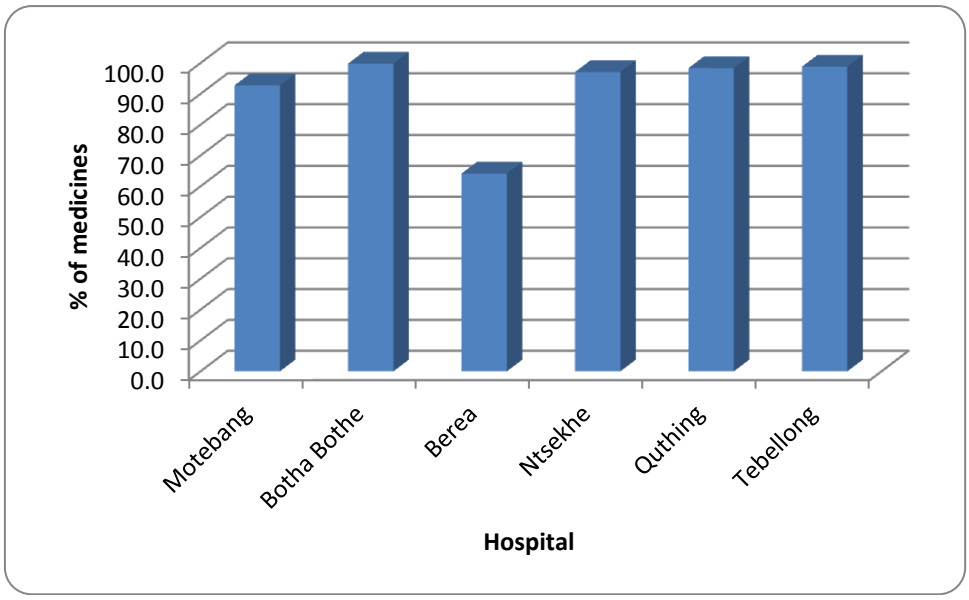

Figure 10. Percentage of prescribed medicines actually dispensed

Percentage of Prescriptions in Accordance with Treatment Guidelines

For settings that have a set of treatment guidelines nationally, measuring adherence to the guidelines is an important indicator for RMU. During this assessment, adherence to the national STGs was measured per encounter and the results indicate that there is generally a low adherence to the STGs at the survey sites. Tebellong Hospital had the highest adherence rate with 59.2% of the prescriptions in accordance with the STGs, followed by Motebang Hospital at 51.3%. Quthing Hospital had the lowest adherence rate with only 28.3% of the prescriptions in accordance with the STGs. On average, the adherence rate to STGs at the six hospitals was 42.8%. This is a low adherence to STGs, and thus represents an important area that warrants educational and managerial interventions that the HPTC can support.

In addition, quite a significant number of encounters in which no diagnosis was indicated were found, with 34.8% of encounters at Ntšekhe Hospital indicating no diagnosis at all. This poses a serious challenge for monitoring RMU at facilities. Figure 11 illustrates percentage adherence to STGs across all six hospitals surveyed.

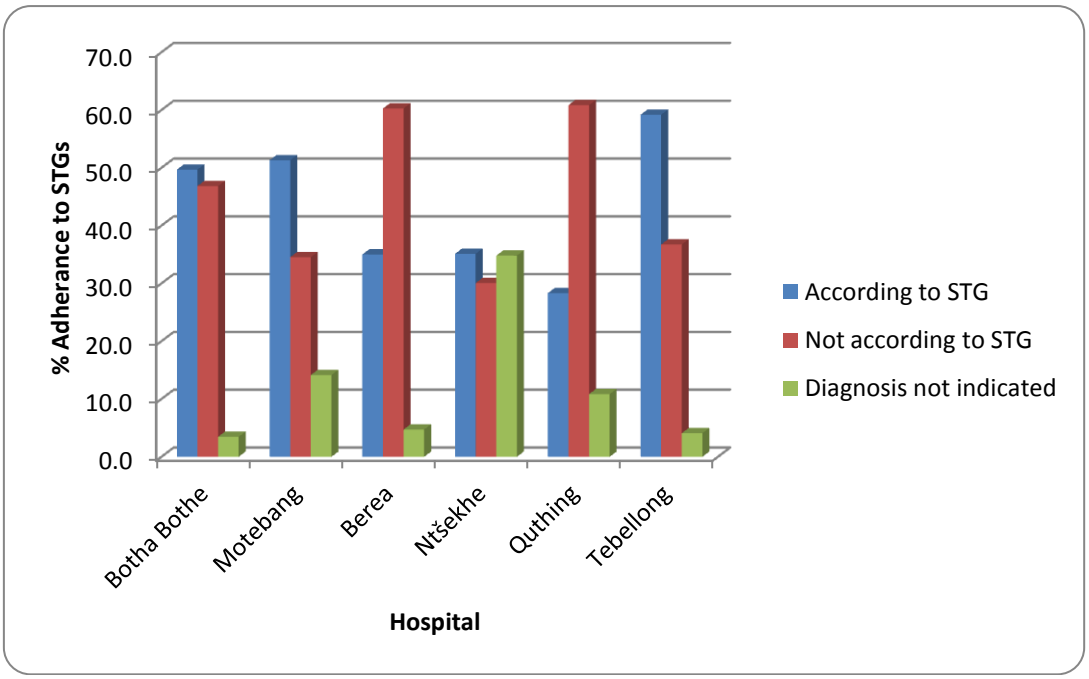

Figure 11. Percentage of prescribers adhering to STGs

Percentage of Encounters in Which Specimens Were Collected and Sent to the Laboratory

The use of effective antimicrobial therapy depends on knowing the sensitivity of infectious microorganisms to possible therapeutic agents. The frequency of sensitivity tests performed is a measure of the hospitals' ability to provide rational antimicrobial therapy (SPS, 2008).

Specimens were collected and sent to the laboratory for microbiological tests in only 2% of the patient encounters (Figure 12). Careful interpretation of this result is necessary as it represents the OPD, whereby prescribers typically do not seek antibiograms because of the mobility of the population going through that department. Therefore, although this figure is low, when taken into this context, it may not present a serious challenge. However, even at the OPD, antibiograms can still be of significant value in determining sensitivity patterns and therefore, development of hospital lists or formularies.

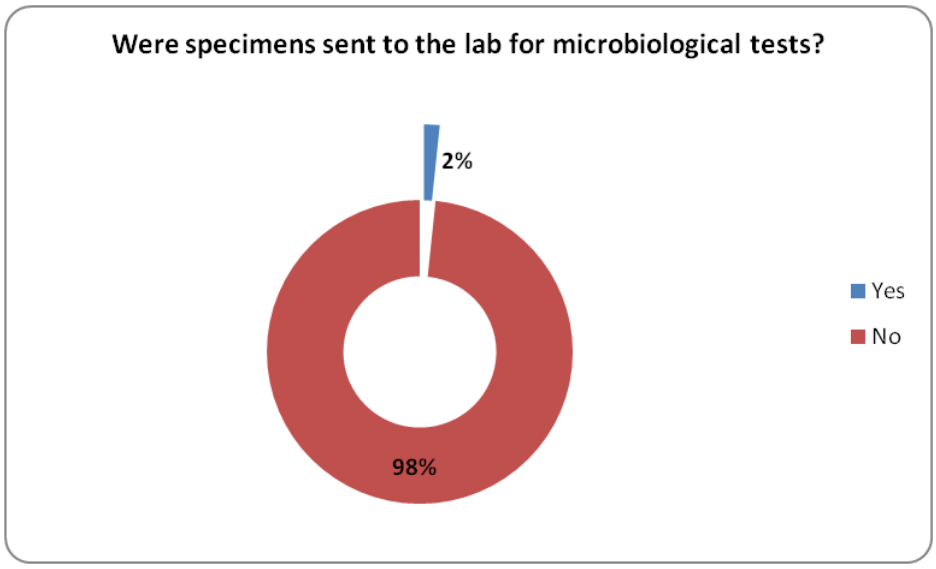

Figure 12. Use of laboratory facilities for culture and sensitivity testing

Prescribers' Awareness of Structures that Promote RMU

The following indicators are based on the responses of the prescribers at the different facilities, and the indicators attempt to describe the prescribers' opinions about the state of supportive structures for RMU at the facilities. Prescribers' opinions are believed to have a direct effect on use of these structures and their impact on RMU at these facilities (SPS, 2008).

Figure 13 illustrates the general state of RMU structures and systems at the six study sites. The figure reflects the prescribers' responses to the questions related to their awareness of structures and tools that promote RMU, as well as their opinion about improvement of antibiotic prescribing habits at the six hospitals.

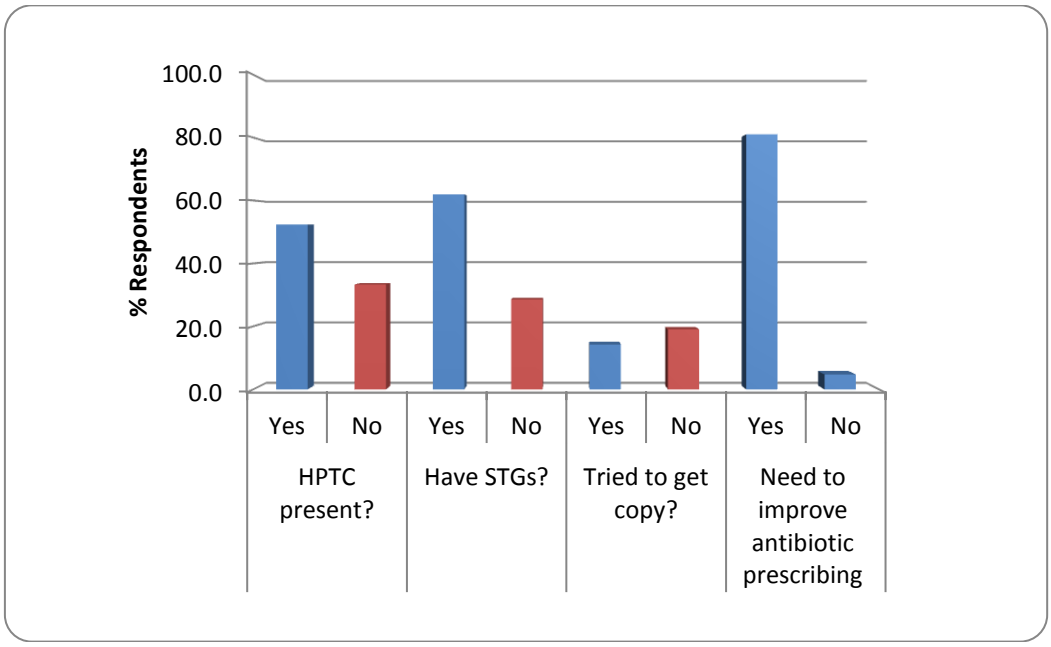

Figure 13. RMU structures and systems at the six hospitals

Presence of an HPTC

HPTCs are central to the control of use of antibiotics, and more broadly, RMU at hospitals. Therefore, the existence of this structure at a hospital is seen as an indicator of the facility's commitment to improving and encouraging RMU and patient outcomes.

When the prescribers at the six study sites were asked if they knew of the existence of this structure, an average of 33.3% said it does not exist and 52.4% said there is one at their facility. A total of 4.8% of the prescribers across all the study sites did not know if one existed or not.

This indicator is a good sign of whether the structure is functional; the expectation is that, if it is fully functional, all prescribers at the hospital would know of its existence. They are also expected to be active participants in the structure's deliberations on the use of medicines at the facility. The results therefore indicate that, generally, HPTCs are present at the facilities; however, there may be challenges in relation to their functionality because approximately a third of the prescribers were not aware of its existence.

A total of 61.9% prescribers had a copy of the STGs, and of those who did not have them, only 14.3% had ever tried to obtain a copy. The 81% majority of prescribers indicated that there is a need to improve antibiotic prescribing habits at their facilities.

When analysis of the data is disaggregated by hospital, it becomes evident that Ntšekhe and Tebellong Hospitals are the best performing in terms of having an established HPTC that is seen as functional by prescribers. Figure 14 demonstrates that 100% of the prescribers at both these hospitals indicated that an HPTC exists, although one prescriber at Ntšekhe expressed concern that the interventions developed by the HPTC were not implemented. Only 33% of the prescribers said that HPTCs exist at Botha Bothe and Quthing Hospitals.

Availability of STGs

On availability of STGs, 100% of the prescribers at Ntšekhe and Tebellong Hospitals each had a copy of the STGs. None of the five prescribers at Quthing Hospital had a copy of the STGs, and only a third of them had tried to obtain a copy. It is interesting to note that it is only at Quthing Hospital that some prescribers believed that there is no need to improve antibiotic prescribing patterns, with a total of 33% indicating that there is neither a need for STGs nor implementation of interventions to improve antibiotic prescribing at the hospital. Figures 15 and 16 illustrate prescribers' responses to whether they have copies of STGs and whether they had ever tried to obtain a copy.

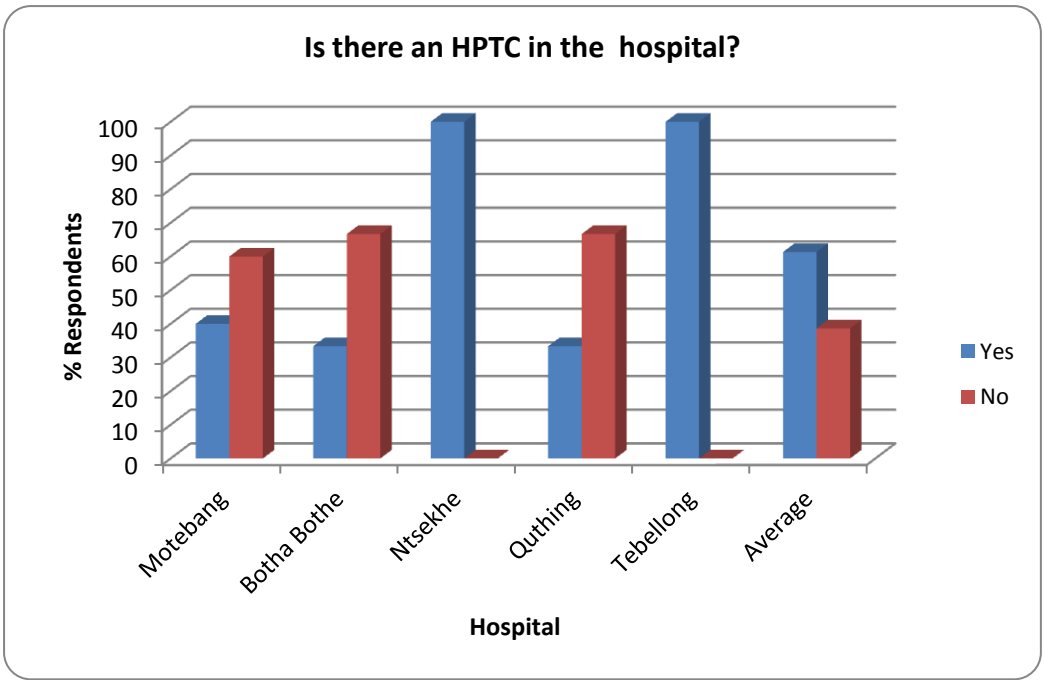

Figure 14. Existence of an HPTC

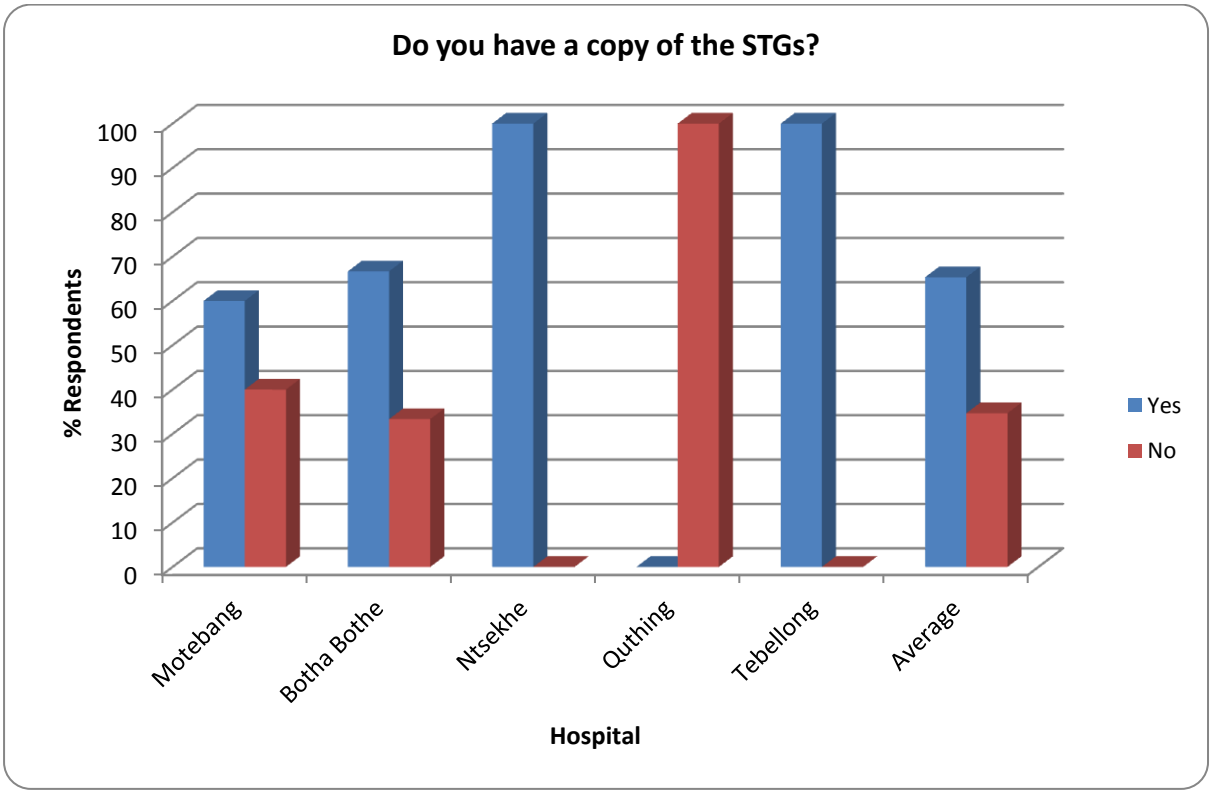

Figure 15. Availability of STGs

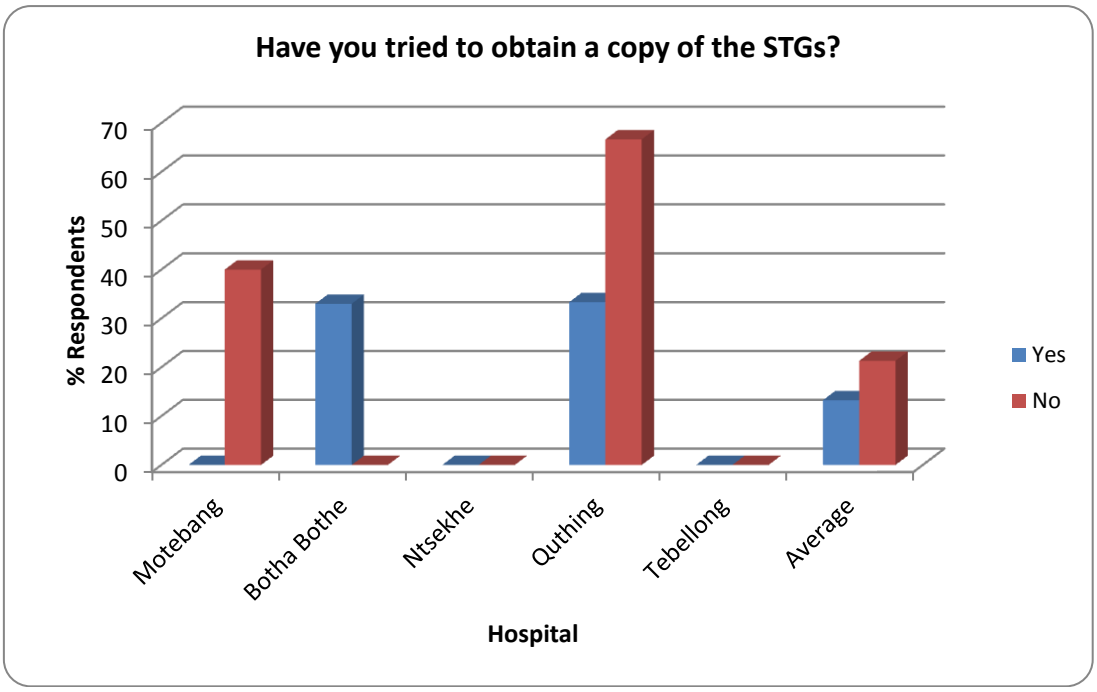

Figure 16. Dissemination of STGs

Is There a Need to Improve Antibiotic Prescribing at Hospitals?

Figure 17 illustrates how prescribers feel about the need to improve antibiotic prescribing at their hospitals.

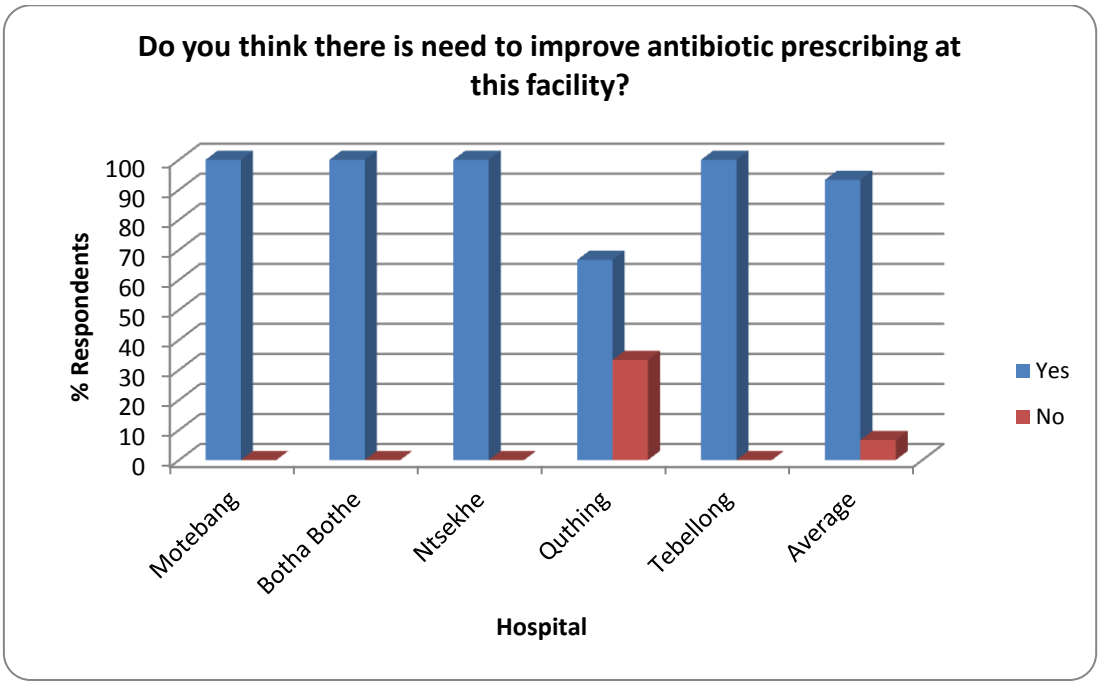

Figure 17. RMU of antibiotics

In general, prescribers believe that STGs and HPTCs were critical tools for improving RMU at the hospitals, and particularly antibiotics to prevent emergence of resistance. The prescribers felt that the pharmacy should play a more active role in dissemination of the STGs and ensuring that HPTCs are functional at the hospitals. Some indicated that there should be improvement on implementation of interventions developed by the HPTCs, as some of the decisions made by these committees are never implemented.

The limited choice of medicines at the hospital, as determined by the EML and STGs, as well as frequent stock outs of medicines at the pharmacy, were also cited as having a great impact on adherence of prescribers to the guidelines. Prescribers felt that the current STGs and EML are outdated and do not conform to current practices and available information. Thus, in pursuit of best clinical outcomes, it becomes difficult for them to adhere to the documents. Some therefore advised that the documents should be regularly reviewed to take advantage of the latest information on patient management.

Limited laboratory facilities were also cited as being prohibitive to improving rational use of antibiotics at the hospitals. The prescribers also indicated that they need training on the use of the STGs and that patient education programs for improved use of medicines should be implemented.

CONCLUSIONS

Polypharmacy may be a concern at the six study hospitals, because on average, 3.8 medicines were prescribed per encounter within the outpatient setting. In addition, generic prescribing is an area that requires development of appropriate interventions because only 35.6% of the prescriptions adhered to the National Medicines Policy's (NMP) recommendation for generic prescribing.

The fact that only 42.8% of the prescriptions were in adherence to the STGs, and just below 80% of the prescribed medicines were on the EML, may indicate a need for revision of the STGs and EML to better respond to the current needs at hospitals and utilize new information about the management of common illnesses. This low adherence may also reflect the need for educational and managerial interventions by HPTCs.

The supply chain seems to be performing well, as over 89% of the prescribed medicines were actually dispensed. The NMP sets a target of 80% availability of essential medicines at public facilities, and the results of this study indicate that the supply chain system is performing well.

Cost impact of use of antibiotics at the hospitals is astronomical. Although antibiotics constitute 37.6% of the total medicines that were prescribed at the six hospitals, their contribution to the total medicine expenditure was 69.1%. Although this does not have a direct impact on the patient (because the Government subsidizes health care at this level), it has a huge bearing on the contribution of the pharmaceutical expenditure to the general health expenditure. This may indicate a need to examine the supply chain system, in particular, the purchasing prices of commodities at the central level, the National Drug Services Organization, should be examined.

The use of tools, structures, and systems, such as STGs, HPTCs, and facility-specific RMU programs, should be strengthened to improve use of antibiotics at hospitals.

RECOMMENDATIONS

1. Further probe identified areas that need improvement to determine causal effects and to inform the design of appropriate interventions.

2. Have the central level provide targeted support to HPTCs and infection prevention and control committees for RMU and infection prevention and control activities.

3. Encourage systematic monitoring of antibiotic use at facilities through the institution of RMU programs at hospitals.

4. Encourage functioning HPTCs and consistent use of/adherence to STGs and the EML by including these indicators as part of the facility accreditation process.

5. Revise STGs regularly (according to WHO recommendations) and establish hospital lists in all facilities (from the EML). Make the documents widely available at facilities.

6. Establish a national center to disseminate objective, evidence-based medicine information and sources.

7. Encourage continuous professional development and institute in-service training programs on RMU and supply chain management at facilities.

8. Strengthen supportive supervision and mentoring of facility staff by the central and district levels.

ANNEX A. DATA COLLECTION SHEET

1. Name of hospital: _____

2. Patient number: _____ Gender: _____ Date of birth/age: _____

3. History of present illness:

_____
_____
_____

4. Presenting symptoms:

_____
_____
_____

5. Has the patient ever presented with the same condition before this visit?
Yes ☐ No ☐

If 'Yes', what medication was prescribed to them the previous time?

Rx: a) _____ c) _____
b) _____ d) _____

6. Present provisional diagnosis:

_____

List of medicines prescribed, (strength, dosages, duration and route of administration)

Rx: a) _____ d) _____
b) _____ e) _____
c) _____ f) _____

7. What is the number of medicines prescribed by generic name? _____

8. What is the number of medicines dispensed? _____

9. Have specimens been sent to the lab for microbiological tests? Yes ☐ No ☐

Medicine Therapy Assessment Worksheet

Patient number _____

Type of problem		**Assessment**
Correlation between medicine therapy and medical problem	1. Are there antibiotics without medical indication?	
	2 Are there any untreated medical conditions?	
	3. If 'yes' do they require medicine therapy?	
Medicine regimen	4. Has the antibiotic regimen been prescribed according to the STGs?	
	5. Are the prescribed doses and dosing frequency appropriate considering this patient and their factors (e.g., age)?	
	6. Are doses scheduled to maximize therapeutic effects and minimize adverse effects?	
	7. Is the length or course of antibiotic therapy appropriate?	
	8. How many antibiotics are prescribed for this patient?	
Therapeutic duplication	9. Is there antibiotic duplication (e.g., combinations of antibiotics that have the same mechanism of action and are not to be used together)?	
Interactions	10. Are there medicine–medicine interactions that are clinically significant?	
	11. Are there any antibiotics contraindicated given the patient's characteristics of medical conditions?	
Laboratory information	12. Has a specimen been sent to the laboratory?	
	13. Is the antibiotic indicated for the condition or the organism?	

ANNEX B. PRESCRIBER QUESTIONNAIRE

Study to Investigate Antibiotic Prescribing Patterns at Six Selected Hospitals in Lesotho

1. a) Is there an HPTC in this hospital? Yes ☐ No ☐

b) If yes, on a scale of 1-5, how active is it **in your opinion**? (5 being very active and 1 being not active at all)

2. a) Do you have a copy of the STGs in your consultation room? Yes ☐ No ☐

b) If no, why not?

_____

c) Have you tried to get a copy? Yes ☐ No ☐

d) If yes, how often do you ever refer to the STGs when you prescribe antibiotics? ☐

(Please indicate how often on a scale of 1-5, with 5 being always and 1 being you never refer to them.)

3. Do you think there is a need to improve the prescribing of antibiotics in this hospital?

Yes ☐ No ☐

Any other comments?

ANNEX C. PRESCRIBER CONSENT FORM

Study to Investigate Antibiotic Prescribing Patterns at Six Selected Hospitals in Lesotho

Investigator: _____

Purpose of the study: The purpose of this study is to investigate the antibiotic prescribing patterns at six hospitals in Lesotho. It is to investigate whether doctors prescribe according to the STGs or not.

Methodology: The medical conditions that patients present with and the antibiotics that are prescribed for those conditions are recorded in data collection sheets. The antibiotics prescribed are checked to see if they are according to the STGs.

Confidentiality: The information gathered during this interview will remain confidential. Only the researchers will have access to the study data and information. There will not be any use of the prescribers' names and prescribers will be identified by their initials. Data from this study will be kept in a safe cabinet.

Before agreeing to this study, it is important that the purpose of the study has clearly been explained to you and that you have understood. This agreement states that you have understood all the information that has been explained to you and that you agree to participate in this study.

Prescriber's signature: _____ **Date**: _____

ANNEX D. PATIENT CONSENT FORM

Study to Investigate Antibiotic Prescribing Patterns at Six Selected Hospitals in Lesotho

Investigator: _____

Purpose of the study: The purpose of this study is to investigate the antibiotic prescribing patterns at six hospitals in Lesotho. It is to investigate whether doctors prescribe according to the STGs or not.

Methodology: The medical conditions that patients present with and the antibiotics that are prescribed for those conditions are recorded in data collection sheets. The antibiotics prescribed are checked to see if they are according to the STGs.

Confidentiality: the information gathered from your files will remain confidential and only the researchers will have access to it. Your name will not be used anywhere in the study and you will only be identified by your initials. Data gathered from this study will be kept in a safe cabinet.

Before agreeing to this study, it is important that you have clearly understood the purpose of the study. This agreement states that you have understood everything about the study and that you are giving us permission to use information from your patient file for the study.

Patient's signature: _____ **Date**: _____

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