Drug Supply and Use in Lusaka Urban District, Zambia

September 7–11, 2004: Study Report

Management Sciences for Health
is a nonprofit organization
strengthening health programs

This report was made possible through support provided by the U.S. Agency for International Development, under the terms of Cooperative Agreement Number HRN-A-00-00-00016-00. The opinions expressed herein are those of the author(s)

Oliver Hazemba
Maxwell Kasonde
Caesar Mudondo

May 2006

Drug Supply and Use in Lusaka Urban District, Zambia, September 7–11, 2004: Study Report

Oliver Hazemba
Maxwell Kasonde
Caesar Mudondo

Printed May 2006

Lusaka Urban District Health Management Team
Drug and Therapeutics Committee
Makishi Road
PO Box 50827
Lusaka, Zambia

Rational Pharmaceutical Management Plus
Center for Pharmaceutical Management
Management Sciences for Health
4301 North Fairfax Drive, Suite 400
Arlington, VA 22203 USA

This report was made possible through support provided by the U.S. Agency for International Development, under the terms of cooperative agreement number HRN-A-00-00-00016-00. The opinions expressed herein are those of the author(s) and do not necessarily reflect the views of the U.S. Agency for International Development.

About RPM Plus

RPM Plus works in more than 20 developing and transitional countries to provide technical assistance to strengthen pharmaceutical and health commodity management systems. The program offers technical guidance and assists in strategy development and program implementation both in improving the availability of health commodities—pharmaceuticals, vaccines, supplies, and basic medical equipment—of assured quality for maternal and child health, HIV/AIDS, infectious diseases, and family planning, and in promoting the appropriate use of health commodities in the public and private sectors.

Recommended Citation

The document may be reproduced if credit is given to the Zambia Ministry of Health and RPM Plus. Please use the following citation.

Hazemba, O., M. Kasonde, and C. Mudondo. 2006. *Drug Supply and Use Review in Lusaka Urban District, Zambia, September 7–11, 2004: Study Report.* Submitted to the U.S. Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: Management Sciences for Health, in collaboration with the Zambia Ministry of Health.

Rational Pharmaceutical Management Plus Program
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: rpmplus@msh.org
Web site: www.msh.org/rpmplus

CONTENTS

ACRONYMS

AMR	antimicrobial resistance
ARI	acute respiratory infection
DHMT	District Health Management Team
DMCI	Drug Management for Childhood Illness
DTC	Drug and Therapeutics Committee
IM	intramuscular
IMCI	Integrated Management of Childhood Illnesses
ITGs	Integrated Treatment Guidelines for Frontline Health Workers
IV	intravenous
LDAS	Lusaka Drug Availability Study
LDUS	Lusaka Drug Use Study
LRTI	lower respiratory tract infection
LUDHMT	Lusaka Urban District Health Management Team
ORS	oral rehydration salts
RTI	respiratory tract infection
SP	sulfadoxine-pyrimethamine
STGs	standard treatment guidelines
STI	sexually transmitted infection
TB	tuberculosis
URTI	upper respiratory tract infection

EXECUTIVE SUMMARY

This drug use survey was carried out in Lusaka Urban District, Zambia, September 7–11, 2004, as a follow-up to a survey done in April 2002. The objective was to establish if there had been any change in pharmaceutical management and prescription practices consequent to measures taken after the dissemination of the 2002 survey findings.

The survey involved a physical check of stock records and interviews of health facility personnel by a team of data collectors. The data collectors also gathered information from health workers, who assisted in assessing prescription practices for some of the major infectious diseases in Zambia, including upper respiratory tract infections (URTIs), malaria, diarrhea, and sexually transmitted infections (STIs).

The findings presented a rather mixed picture. Some indicators showed satisfactory results while other aspects studied were disappointing.

Performance on pharmaceutical supply management indicators was overall satisfactory. The majority of the indicator drugs were in stock most of the time, and record keeping was satisfactory in most cases. However, the performance of some individual facilities in pharmaceutical supply management was far from acceptable, and remedial measures are recommended.

The most disappointing aspect regarding prescribing practices was the poor access to treatment guidelines of any kind. Most facilities and health workers did not have access to guidelines. Hence, prescribing practices for some of the diseases varied and were unsatisfactory. For instance, the use of antibiotics for treating diarrhea, malaria, and non-pneumonia coughs was quite common. Some aspects of prescribing practices had improved since the last survey. For instance, the percentage of prescriptions including antibiotics dropped significantly, from 63 to 13 percent between the two surveys. Conversely, the number of prescriptions using generic names dropped between the two surveys, from 50 to 31 percent. The number of medicines per prescription remained virtually unchanged in the two surveys, at just over two.

Some indicators showed deterioration in performance between the 2002 survey and the 2004 survey. The reasons for the deterioration need to be determined—assessors expected that corrective measures had been instituted following the last survey and an intervention workshop on rational use of medicines.

The findings indicate a need for better dissemination of relevant guidelines and more effective performance improvement methods for health workers in pharmaceutical supply management and rational prescribing. The 2004 survey team recommends conducting an additional study to determine if the health workers who had access to guidelines actually found them useful.

INTRODUCTION AND OJBECTIVES

Following up on the workshop held April 7–14, 2002, at Rimo Motel, Kafue, to disseminate the findings from the drug supply and use review previously carried out in Lusaka, a further survey was carried out September 7–11, 2004, with the objective of assessing the impact of any intervention measures effected since April 2002. This report details the findings from this survey.

Objectives of the Study

The study was a follow-up to review practices against indicators designed to assess the pharmaceutical management systems that support medicine use in the Lusaka Urban District clinics and to answer the following questions about medicine availability and patient access.

Drug Availability

- Are the medicines required to treat common conditions available in the health clinics?
- What are the determinants of product availability?
- How well does the pharmaceutical management system perform?

Drug Use

- What are the current general prescribing practices of the clinic staff?
- What are the current antibiotic prescribing practices, particularly regarding Integrated Management of Childhood Illnesses (IMCI) and STI treatment?

METHOD

Various approaches were used to collect data for the rapid assessment of drug availability and use in Lusaka Urban District clinics. To assess drug availability, the data collectors reviewed clinic pharmacy records, particularly stock control cards. They also interviewed clinic staff and made observations of the infrastructure. To assess patient access and drug use, data collectors reviewed outpatient records and outpatient registers and interviewed clinic staff. Data collection sheets were used to enter data for analysis.

Selection and Training of Data Collectors

The head of the pharmacy school at the University of Zambia Medical School selected the students to be trained as data collectors. The students who participated in the previous survey were again requested to participate in this survey. Drug and Therapeutics Committee (DTC) members were again selected to superintend the data collection. This assignment was considered to be essential to build capacity at the district level in data collection for drug use evaluation.

Twelve medical and pharmacy students, six Lusaka Urban District Health Management Team (LUDHMT) DTC members, and the DTC Acting Chairperson (Annex 1) were given a one-day training, held at the Chelstone Clinic conference room, on the purpose and techniques of data collection for the survey. The training presented detailed explanation of the study purpose, rationale for the indicators, data collection methodology, and calculations. A pre-test exercise was conducted at the same clinic to allow the data collectors to experience data collection in a real situation. The DTC participants supervised the students and introduced them to the clinic staff. The experiences of the pre-test were discussed in plenary session, and appropriate revisions were made to prepare for the survey. The participants cited the time taken to collect the data as a main concern.

Data collectors were divided into six groups, with two students and one DTC member designated as the team leaders in each group.

Sampling of Sites

The initial study, done in 2002, covered 12 sites. In the follow-up study, the decision was made to cover 18 sites (17 clinics and one medical store) out of 24 clinics administered under LUDHMT. The sites covered are listed in Annexes 2 and 3. Each group was assigned at least one big clinic and three other clinics. The team leaders were given an introductory letter to the clinic staff signed by the District Health Director.

The data collection sites were chosen to represent a range of socioeconomic strata within the district. These included low-, medium-, and high-income communities.

After three days of data collection at the 18 sites, the data collectors presented their findings to colleagues and supervisors at a plenary session. Further guidance was given regarding the data, calculations, and interpretation of the data. Additional information was sought on the data collection experiences, particularly on the constraints and strengths of clinic management and infrastructure. The data were submitted to the principal investigator. See Annex 3 for a presentation of the data.

Data Cleaning and Computing

One DTC member and a student were appointed to clean the data. They reviewed the data entry classification of illnesses and treatments, and calculations for the indicators. Aggregated data were prepared for the study.

Pharmaceutical System Indicators

Drug Availability

1. Average percentage of stock records that correspond with the physical counts for a set of indicator drugs in the LUDHMT store and health centers

2. Average percentage of a set of unexpired indicator drugs available in the LUDHMT store and health centers

3. Average percentage of time out of stock for a set of indicator drugs in the LUDHMT store and health centers

Drug Use

1. Average number of drugs prescribed per curative outpatient encounter

2. Percentage of drugs prescribed by generic name

3. Percentage of outpatients prescribed injections

4. Percentage of outpatients prescribed antibiotics

5. Percentage of prescribed drugs presented for dispensing that are actually dispensed

6. Percentage of health centers visited that had an official manual of treatment guidelines

7. Percentage of encounters diagnosed as non-pneumonia (cough or cold) in which antibiotics are prescribed

8. Percentage of encounters diagnosed as pneumonia in which appropriate antibiotics are prescribed

9. Percentage of encounters diagnosed as diarrhea in which oral rehydration salts (ORS) are prescribed

10. Percentage of encounters diagnosed as diarrhea in which antidiarrheals are prescribed

11. Percentage of encounters diagnosed as non-dysentery or non-cholera in which antibiotics are prescribed

12. Percentage of encounters diagnosed as malaria in which an appropriate oral antimalarial is prescribed according to treatment guidelines

13. Percentage of encounters diagnosed as genital discharge in which an appropriate antibiotic is prescribed

14. Percentage of encounters diagnosed as genital ulcer in which an appropriate antibiotic is prescribed

General Data Collection Preparation List

The general list of requirements for the data collection teams was as follows—

- Workplan and timeline per data collection team
- Contact information of data collectors
- Copies of Letters of Authorization
- Set of data collection instruments
- Pens and other supplies
- Per diem for local expenses

For the pharmaceutical supply management assessment, the following were needed—

- List of 30 generic indicator drugs to be assessed for availability
- Equivalent trademark or proprietary names of the indicator drugs
- Samples of information source documents (for example, stock control cards, log book)

For the assessment of patient access and drug use, collectors needed—

- A list of medical terms and symptoms used locally for diagnosis (for example, diarrhea, non-pneumonia respiratory infection, genital discharge)

- Samples of information source documents (for example, outpatient record book, prescriptions, in-patient record book)

General Description of Indicators

Drug Availability

1. Average percentage of stock records that correspond with the physical counts for a set of indicator drugs in the LUDHMT store and health centers

Rationale: This indicator is a measure of the quality of the stock record keeping. For the purpose of this study, the indicator will help to identify related problems such as wastage, pilferage, or poor record keeping, which contribute to financial losses.

Data Collection: At each clinic, take a physical count of all 30 tracer essential medicines, by generic name (Annex 4), used to treat common conditions. Ask the staff to show you stock control cards for the tracer list. Ask them to produce their records for any recent issues or receipts that have not yet been entered in the stock control records. Adjust the records and compare the figures found for each medicine with what is written on the stock control card.

For the purpose of computing the data collected, enter the information in the Lusaka Drug Availability Study (LDAS)-1 Inventory Data Form (Table 1). See Annex 5 for complete copies of all data collection sheets used.

Table 1. Sample LDAS-1 Inventory Data Form

Product	Counting Unit	Record Count	Recent Issues	Recent Receipts	Adjusted Total	Physical Count	Discrepancy
Amoxicillin 250 mg tablets	1,000						
Amoxicillin 12 mg/ 5 ml suspension bottle	1						
Co-trimoxazole 480 mg tablets	1,000						
Co-trimoxazole 240 mg/5 ml suspension	1						
Erythromycin 250 mg tablets/capsules	1,000						

Calculation: Perform the following using the data gathered—

Percentage of stock records that correspond with the physical counts =

$$\frac{\text{Number of stock records with no discrepancy}}{\text{Total number of records examined}} \times 100$$

Average percentage of stock records corresponding with the physical counts =

$$\frac{\text{Sum of average percentage for each clinic}}{\text{Total number of clinics surveyed}}$$

2. Average percentage of a set of unexpired indicator drugs available in the LUDHMT store and health centers

Rationale: This indicator measures availability of medicines for effective treatment and management of conditions observed at the clinic. If the medicines are not available, patients may not receive effective treatment. Ensure that you do not count expired medicines, because they are inappropriate for use.

Data Collection: At each clinic, check for the availability of all 30 unexpired tracer generic essential medicines used to treat common conditions. You can find the information on the stock control cards, take a physical count of the tracer drugs, or do both. The denominator for this indicator will be only those drugs that are normally stocked at the clinic or district store.

Enter your findings in the LDAS-2 Stock-Out Data Form (Table 2).

Table 2. Sample LDAS-2 Stock-Out Data Form

Product	Counting Unit	Sept 2003	Oct 2003	Nov 2003	Dec 2003	Jan 2004	Feb 2004	Availability	Total Days Out of Stock
Amoxicillin 250 mg tablets	1,000								
Amoxicillin 12 mg/ 5 ml suspension bottle	1								
Co-trimoxazole 480 mg tablets	1,000								
Co-trimoxazole 240 mg/ 5 ml suspension	1								

Calculation: Perform the following using the data gathered—

$$\text{Percentage of tracer drugs available} = \frac{\text{Number of unexpired tracer drugs in stock}}{\text{Total number of tracer drugs normally stocked}} \times 100$$

$$\text{Average percentage of tracer drugs available} = \frac{\text{Sum of average percentages for each clinic}}{\text{Total number of clinics surveyed}}$$

3. Average percentage of time out of stock for a set of indicator drugs in LUDHMT store and health centers

Rationale: The percentage of time out of stock for a set of tracer essential medicines gives a measure of the procurement and distribution system's capacity to maintain a constant supply of medicines. Effective treatment of diseases and conditions depends on the medicines being available.

"Time out of stock" normally refers to the number of days that a product was not available in the store or clinic for use. For the purpose of the study, a six-month period will be assessed.

Data Collection: Use the stock control card or drug register to count and record the number of days that the selected 30 tracer drugs normally stocked were out of stock in the past six months. Consult the district or clinic staff to determine the normally stocked items from the tracer list.

Enter the data in the LDAS-2 Stock-Out Data Form (Table 2).

Calculation: Sum the total number of days each drug was out of stock in the six months being assessed. Sum the numbers in the "Total Days Out of Stock" column and calculate the average percentage of time out of stock for the set of indicator drugs according to the formula below—

Average percentage time out of stock =

$$\frac{\text{Total number of days out of stock for all stocked tracer drugs}}{\text{182 days – total number of indicator drugs stocked}} \times 100$$

Average percentage of days out of stock of all stocked tracer drugs =

$$\frac{\text{Sum of average percentage time out of stock for each clinic}}{\text{Total number of clinics surveyed}}$$

Drug Use

1. Average number of drugs prescribed per curative outpatient encounter

Rationale: This indicator attempts to describe prescriber behavior. Too high or too low an average number of drugs prescribed per encounter can indicate poor prescribing practices, which can occur for various reasons, such as limited drug information or education and chronic shortages.

Data Collection: Select a sample of 30 outpatient first encounters at each clinic and count the number of drugs prescribed to each patient. Collect the data retrospectively from patient books by sampling five books from the first two weeks of the month for the six months from September 2003 through February 2004.

For each clinic, the indicator is recorded as an average, calculated by dividing the number of different products prescribed by the total number of curative outpatient encounters surveyed.

The overall indicator is an average of these facility-specific averages. The result is expressed as the number of drugs prescribed per encounter. A data collection sheet, the Lusaka Drug Use Study (LDUS)-1 Drug Use Data Form (Table 3), is provided for you to enter information on drug use indicators 1 through 6.

Table 3. Sample LDUS-1 Drug Use Data Form

Patient Name	Age	Drug Prescribed	Dosage Form	Generic	Injection	Antibiotic	Dispensed

Calculation: Perform the following using the data gathered—

Average number of drugs prescribed per curative encounter =

Total number of drugs prescribed in all encounters
Total number of curative encounters surveyed in each clinic

Average number of drugs prescribed per curative encounter in surveyed clinics =

Total number of drugs prescribed in all encounters
Total number of curative encounters for all clinics

2. Percentage of drugs prescribed by generic name

Rationale: Generic drugs are cheaper than branded drugs. If clinicians prescribe generics, controlling drug costs is easier because generic substitution will not be needed.

The indicator measures the percentage of drugs prescribed using generic names, or international nonproprietary names. The availability of generically named drugs at the clinics and in the private sector, as well as information available to prescribers, influences the pattern of prescribing practice.

Data Collection: The data for the indicator are obtained concurrently with that required for indicator 1. Select a sample of 30 patient first encounters at each clinic. Select the first five first attendances per month (September 2003 through February 2004). This data may be collected retrospectively from the outpatient record book. You may also collect data prospectively from observation of patient encounters. For each drug prescribed, the data collector should observe whether the generic name is used for the drug prescribed. Enter the data in the LDUS-1 Drug Use Data Form (Table 3).

For each clinic in the sample, the indicator is recorded as a percentage. The overall indicator is an average of the clinic-specific percentages.

Calculation: Perform the following using the data gathered—

Percentage of drugs prescribed by generic name =

$$\frac{\text{Total number of drugs prescribed by generic name}}{\text{Total number of all drugs prescribed}} \times 100$$

Average percentage of drugs prescribed by generic name for all clinics =

$$\frac{\text{Total number of drugs prescribed by generic name}}{\text{Total number of drugs prescribed at all the clinics surveyed}}$$

3. Percentage of outpatients prescribed injections

See number 4.

4. Percentage of outpatients prescribed antibiotics

Rationale: Injections and antibiotics are costly forms of treatment. Unfortunately, both are so indiscriminately overprescribed that antibiotic resistance to common infections has made some previously useful drugs ineffective. Therefore, it is important to assess the use of these treatments.

For the purpose of this study, the term "injectable drugs" refers to drugs given intravenously (IV) or intramuscularly (IM). You should count only injectable drugs prescribed for curative encounters and not vaccines for immunization.

Antibiotics include antimicrobials such as penicillins, cephalosporins, and aminoglycosides. All tuberculosis (TB) drugs except streptomycin should be excluded from the cluster. The study measures the percentage of outpatient curative encounters in which the therapies are prescribed.

Data Collection: You can find the information in outpatient registers, outpatient record books, and prescriptions where applicable. Use the same 30 patient encounters from each clinic. Use the same first five first attendances per month from September 2003 through February 2004. Count separately the number of patients who are prescribed one or more antibiotics or one or more injections. If a patient receives two or more antibiotics, count them as one instance for this purpose; the same applies to injections.

Enter the data in the LDUS-1 Drug Use Data Form (Table 3).

For each clinic, both indicators are recorded as percentages. The overall indicators are the averages of these clinic-specific percentages.

Calculation: Perform the following using the data gathered—

Percentage of patients prescribed injections = $\frac{\text{Total number of patients prescribed injections}}{\text{Total number of patient encounters surveyed}}$

Percentage of patients prescribed antibiotics = $\frac{\text{Total number of patients prescribed antibiotics}}{\text{Total number of patient encounters surveyed}}$

5. Percentage of prescribed drugs presented for dispensing that are actually dispensed

Rationale: This indicator measures the ability of the district to meet the drug needs of the users by assessing drugs prescribed and actually dispensed from the clinics. It also measures availability of drugs in the clinics.

Data Collection: You will find this information in outpatient cards and record books, prescriptions, and registers. At each of the clinics, examine the same 30 dispensing encounters in a given month. If records are not available, observe 30 dispensing encounters at each clinic. Record the number of drugs prescribed that are presented for dispensing and then record the number of drugs actually dispensed from the 30 encounters in the LDUS-1 Drug Use Data Form (Table 3).

For each clinic, indicators are recorded as percentages. The overall indicator is an average of all the clinics surveyed.

Calculation: Perform the following using the data gathered—

Percentage of prescribed drugs that are actually dispensed =

$$\frac{\text{Number of drugs actually dispensed}}{\text{Number of prescribed drugs presented for dispensing}} \times 100$$

6. Percentage of health centers visited that had an official manual of treatment guidelines

Rationale: This indicator is used to measure the level of access to information to promote effective care and management of patients. It also measures the presence of the current edition of an official manual. For the purpose of this study, information could be accessed from an official manual or standard treatment guidelines (STGs).

In Lusaka, manuals intended as clinical references for health care providers include these five: *Zambia National Formulary, Integrated Treatment Guidelines (ITG) for Frontline Health Workers Manual, IMCI Manual, Treatment of Malaria Guidelines,* and *Guidelines for Treatment of STIs.*

Data Collection: Ask the officer in charge or prescribers at the clinic for the most recent copies. Take note of the number and types of reference manuals shown at each clinic. Enter the data in the appropriate area at the top of the LDUS-1 Drug Use Data Form (Annex 5).

Calculation: Perform the following using the data gathered—

Percentage of facilities with official manuals =

$$\frac{\text{Number of facilities with } \textit{ITG Manual}}{\text{Number of facilities in the clinics}} \times 100$$

For the purpose of this study, the official manual to look for is the *ITG Manual*.

7. Percentage of encounters diagnosed as non-pneumonia (cough or cold) in which antibiotics are prescribed

See number 8.

8. Percentage of encounters diagnosed as pneumonia in which appropriate antibiotics are prescribed

Rationale: Indicators 7 and 8 attempt to measure the degree of adherence to the ITGs. The two indicators measure the positive and negative outcomes of the same prescribing practice in treatment of acute respiratory infection (ARI). For the purpose of this study, ARI was divided into pneumonia and non-pneumonia. Different words used for these conditions in Lusaka Urban District clinics are given in the boxes below.

Pneumonia

This condition refers to respiratory disease caused by bacteria, which needs treatment with antibiotics. For the purpose of this study, a list of antibiotics is provided (for example, penicillins, co-trimoxazole, chloramphenicol). The common words used to refer to pneumonia are—

- ARI
- Lower respiratory tract infection (LRTI)
- Pneumonia
- Respiratory tract infection (RTI)
- Very severe bacterial infection

Non-pneumonia

This condition represents more common, self-limiting infections that are caused by viruses and do not require antibiotics. The common words used for these conditions in clinical practice are—

- Cough/simple cough
- Cold
- Coryza
- Sneezing
- Flu/influenza
- Upper respiratory tract infection (URTI)

Pneumonia is also identified by fast breathing or difficulty breathing, crepitations, chest in-drawing, and dyspnea. Absence of these symptoms is an indication for non-pneumonia. The appropriate treatment of pneumonia is either benzylpenicillin or co-trimoxazole, or amoxicillin or penicillin V.

Data Collection: You can find this information in outpatient record books. Ask the clinic staff to give you access to the books. For the purpose of this study, only encounters involving children under five seeking curative care should be collected and entered in the data collection sheet in the LDUS-2 Medical Records Review Form (1) (Table 4).

For indicator 7, select 30 encounters in which antibiotics were prescribed for pneumonia or its related terms listed in the box above. All drugs prescribed should be recorded on the data collection form. Identification of the antibiotics should be done during the data analysis. If a patient receives two or more antibiotics in one encounter, this counts as one incidence.

For indicator 8, select 30 encounters in which children under five were diagnosed as having non-pneumonia or its related terms listed in the box above, and count the number of antibiotics prescribed. If fewer than five encounters per month are available, stop and move on to the next indicator. Again, all the drugs prescribed should be recorded on the data collection sheet. Identification of the drugs shall be done during the data analysis.

Table 4. Sample LDUS-2 Medical Records Review Form (1)

Encounter No.	Age in Months	Sex (M/F)	Diagnosis/ Symptoms	Date	Prescriber Type	Name of Drug and Strength	Dosage Form	No. of Units

Calculation: Perform the following using the data gathered—

For each clinic, both indicators should be recorded as percentages.

Percentage of pneumonia encounters in which antibiotics are prescribed =

$$\frac{\text{Total number of pneumonia encounters in which appropriate antibiotics are prescribed}}{\text{Total number of pneumonia encounters surveyed}} \times 100$$

Percentage of non-pneumonia encounters in which antibiotics are prescribed =

$$\frac{\text{Total number of non-pneumonia encounters in which antibiotics are prescribed}}{\text{Total number of non-pneumonia encounters surveyed}} \times 100$$

9. Percentage of encounters diagnosed as diarrhea in which ORS is prescribed

See number 11.

10. Percentage of encounters diagnosed as diarrhea in which antidiarrheals are prescribed

See number 11.

11. Percentage of encounters diagnosed as non-dysentery or non-cholera in which antibiotics are prescribed

Rationale: Indicators 9–11 are meant to measure the degree of adherence and nonadherence with the ITG protocols. They are grouped here because they all measure treatment of diarrhea—either positive or negative outcomes.

The indicators measure the percentage of diarrhea encounters in which ORS, antidiarrheals, or antibiotics are prescribed. ORS is the recommended treatment of choice. In general, antidiarrheals are not recommended for treating childhood diarrhea. Antibiotics are appropriate only when diarrhea is caused by cholera or dysentery. In Lusaka Urban District clinical practice, diarrhea is usually indicated as chronic diarrhea, gastritis, enteritis, loose stool, or dysentery.

Data Collection: This information can be collected from outpatient record books. Ask the clinic staff for the books.

Collect 30 encounters in which children ages two months to five years were prescribed ORS, and from the same sample count the number of encounters in which antidiarrheals were prescribed. Also count the number of encounters in which antibiotics were prescribed. Enter the data in the LDUS-2 Medical Records Review Form (1) (Table 4).

All three indicators are recorded as percentages for each clinic.

Calculation: Perform the following using the data gathered—

Percentage of encounters in which ORS is prescribed for diarrhea =

$$\frac{\text{Total number of encounters in which ORS is prescribed for diarrhea}}{\text{Total number of diarrhea encounters surveyed}} \times 100$$

Percentage of encounters in which antidiarrheals are prescribed for diarrhea =

$$\frac{\text{Total number of encounters in which antidiarrheals are prescribed for diarrhea}}{\text{Total number of diarrhea encounters surveyed}} \times 100$$

Percentage of encounters in which antibiotics are prescribed for diarrhea =

$$\frac{\text{Total number of encounters in which antibiotics are prescribed for diarrhea}}{\text{Total number of diarrhea encounters surveyed}} \times 100$$

12. Percentage of encounters diagnosed as malaria in which an appropriate oral antimalarial is prescribed according to treatment guidelines

Rationale: This indicator measures the degree of adherence with IMCI treatment guidelines and the ITGs. In these guidelines, any fever is considered to be malaria and should be treated accordingly. Various terms are used to describe malaria in Lusaka Urban District clinical practice, including—

- Fever
- Body hotness
- Joint pains
- Malaise
- Lethargy
- MPS+ (malaria parasite slide–positive, a severe febrile illness)
- Parasitemia
- Plasmodiasis

According to the *ITG Manual* in use at the time, appropriate antimalarials of first and second choice are chloroquine and sulfadoxine-pyrimethamine (SP), respectively. If the patient is chloroquine-resistant, SP is the drug of choice. Quinine is recommended for severe malaria.

Data Collection: Collect data from outpatient cards or books. If no written data exist, collect data prospectively by observation. Select 30 encounters diagnosed as malaria from each clinic and enter the data in the LDUS-2 Medical Records Review Form (1) (Table 4).

Calculation: For each clinic, the indicator is recorded as a percentage of the total number of patient encounters surveyed. The overall indicator is the average of clinic-specific percentages.

Percentage of malaria encounters in which an appropriate antimalarial was prescribed =

$$\frac{\text{Total number of malaria encounters in which an appropriate antimalarial was prescribed}}{\text{Total number of malaria encounters surveyed}} \times 100$$

13. Percentage of encounters diagnosed as genital discharge in which an appropriate antibiotic is prescribed

See number 14.

14. Percentage of encounters diagnosed as genital ulcer in which an appropriate antibiotic is prescribed

Rationale: These two indicators measure the degree of adherence with the guidelines for the syndromic approach to treatment of STIs. Lusaka Urban District clinic staff were trained to diagnose and treat STI conditions using this approach, in which conditions are grouped

according to symptomatic similarities when availability of confirmatory laboratory diagnostics is limited. Indicator 13 on genital discharge and indicator 14 on genital ulcer refer to the cluster of diseases presented in the boxes below.

Genital Discharge

- Gonorrhea
- Chlamydia infections
- *Trichomonas vaginalis*
- Candidiasis
- Bacterial vaginosis
- Vaginal discharge
- Urethral discharge
- Pelvic inflammatory disease
- Nonspecific urethritis
- Vaginal discharge syndrome
- Urethral discharge syndrome
- STI

Genital Ulcer

- Syphilis
- Chancroid
- Granuloma inguinale
- Genital herpes simplex
- Genital ulcer disease
- STI

Correct treatment for genital ulcer disease is benzathine penicillin + erythromycin and doxycycline. For genital discharge in males, use kanamycin, gentamicin, or doxycycline. For genital discharge in females, use kanamycin, erythromycin, metronidazole, or nystatin.

Data Collection: Collect data from outpatient registers, outpatient cards, prescription pads, or all three. If data from the first two weeks are inadequate, look for the whole month or collect data prospectively by observation. Select 30 encounters diagnosed as genital discharge and genital ulcer (or any of the terms in the boxes above) from each clinic. Enter the data in the LDUS-3 Medical Records Review Form (2) (Table 5).

Table 5. Sample LDUS-3 Medical Records Review Form (2)

Encounter No.	Sex (M/F)	Diagnosis/ Symptoms	Date	Prescriber Type	Name of Drug and Strength	Dosage Form	No. of Units

Calculation: For each clinic, each indicator is recorded as a percentage of the total number of patient encounters surveyed. The overall indicator is the average of clinic-specific percentages.

Percentage of encounters in which an appropriate antibiotic is prescribed for genital discharge =

$$\frac{\text{Total no. of encounters in which appropriate antibiotic is prescribed for genital discharge}}{\text{Total number of genital discharge encounters surveyed}} \times 100$$

Percentage of encounters in which an appropriate antibiotic is prescribed for genital ulcer =

$$\frac{\text{Total no. of encounters in which appropriate antibiotic is prescribed for genital ulcer}}{\text{Total number of genital ulcer encounters surveyed}} \times 100$$

RESULTS

This assessment was conducted to measure impact from interventions made to address study findings from 2002. Therefore, the 2004 findings have been presented as they relate to 2002 findings. However, not all the same sites were assessed in 2002 and 2004. The following list of sites serves as a key for Figures 1–16. Data for each facility is presented for each year in which data was collected. See Annex 2 for a list of sites covered in each assessment. The last pair of bars on the right in Figures 1–16 shows the average value for all facilities assessed in 2002 and all facilities assessed in 2004.

Key for results shown in Figures 1–16

1. Matero Reference Centre in 2002 and 2004
2. Chipata Clinic in 2002 and 2004
3. George Clinic in 2004
4. Mandevu Clinic in 2004
5. Chilenje Clinic in 2002 and 2004
6. Kabwata Clinic in 2002 and 2004
7. Civic Centre Clinic in 2002 and 2004
8. Central Prisons Clinic in 2004
9. Kamwala Prison Clinic in 2004
10. Kanyama Clinic in 2002 and 2004
11. Chawama Clinic in 2002 and 2004
12. Kalingalinga Clinic in 2004
13. Mtendere Clinic in 2002
14. Bauleni Clinic in 2002 and 2004
15. Chainda Clinic in 2002 and 2004
16. Chainama Clinic in 2004
17. Makeni Clinic in 2002 and 2004
18. Chilenje Main Medical Store (only drug availability data) in 2002 and 2004
19. Kamwala Clinic (only drug use data) in 2004
20. Average value from all facilities in 2002 and 2004, respectively

Drug Supply Management

See Annex 2 for a list of clinic sites covered in the initial and follow-up surveys.

1. On average, 63 percent of the stock records (Figure 1) in the facilities surveyed corresponded with the physical counts for indicator drugs. However, levels varied widely, from 93 percent for Chawama Health Centre (key–11) to 17 percent for Chilenje Main Store (key–18). This compares unfavorably with 75 percent for the first survey.

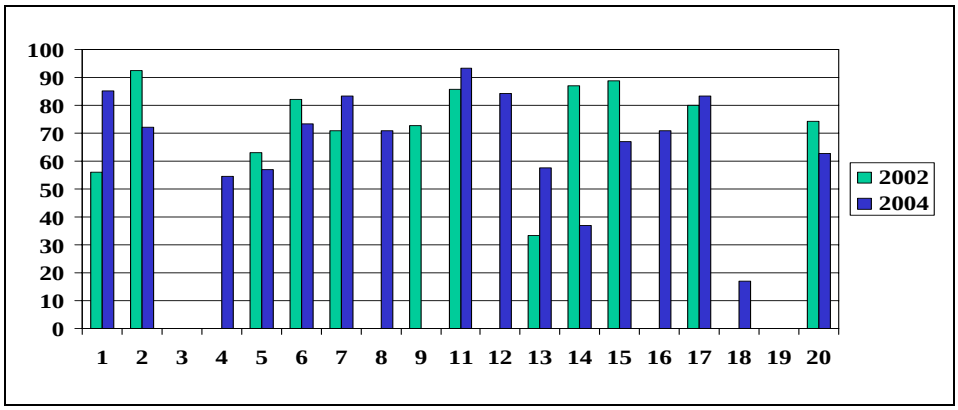

Figure 1. Percentage of stock records corresponding to physical count

2. In 2004, 57 percent of a set of unexpired indicator drugs were available at any one time in the facilities surveyed (Figure 2). Again, variation between the highest availability of 94 percent for Chilenje Clinic (key–5) and the lowest of 28 percent for Bauleni (key–14) was unacceptably large. On an encouraging note, for this indicator 12 out of 18 facilities surveyed recorded more than 50 percent availability. However, overall performance on this indicator was better at the time of the earlier study, when availability was 70 percent. In 2004, the figure obtained dropped to 57 percent.

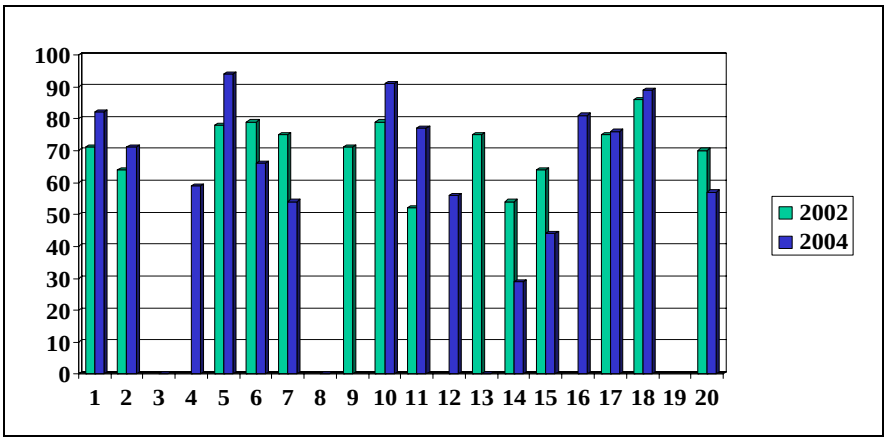

Figure 2. Percentage availability of unexpired drugs

3. In 2004, indicator drugs were found to be out of stock on average 10 percent of the time, compared to 16 percent of the time in 2002 (Figure 3). Facility performance varied from 0.4 percent for Chainama (key–16) to 45 percent for Central Prisons (key–8). Amoxicillin tablets and suspension, co-trimoxazole tablets and suspension, erythromycin tablets and suspension, and doxycycline tablets were out of stock more commonly than other indicator drugs.

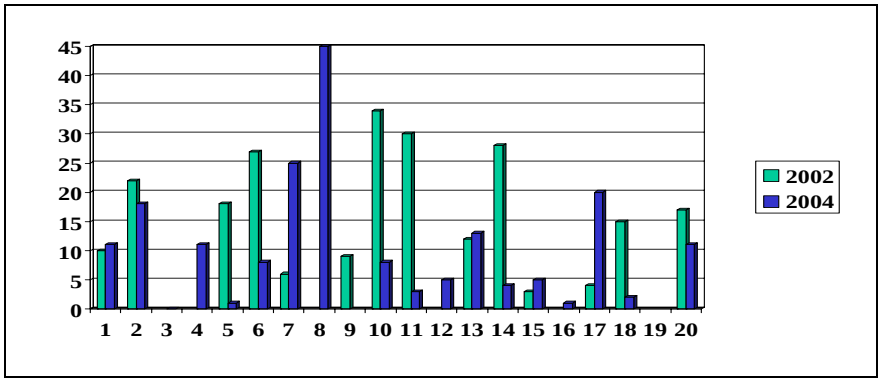

Figure 3. Percentage time out of stock

Drug Use

Drug use indicators measure the extent to which drugs are used correctly in a given setting. The study assessed for possible improvement in how drugs were used. See Annex 2 for a list of clinic sites surveyed in the initial and follow-up assessments. *Note: Drug use data was not collected at Chilenje Medical Store.*

1. The average number of drugs per prescription was 2.5 (Figure 4), matching the 2002 figure. This number appears within acceptable limits, and is consistent with past surveys. However, on further analysis, some prescribing combinations were found to be irrational. For instance, data collectors often found a prescription for treatment of malaria that combined an antimalarial with an antibiotic such as amoxicillin or co-trimoxazole.

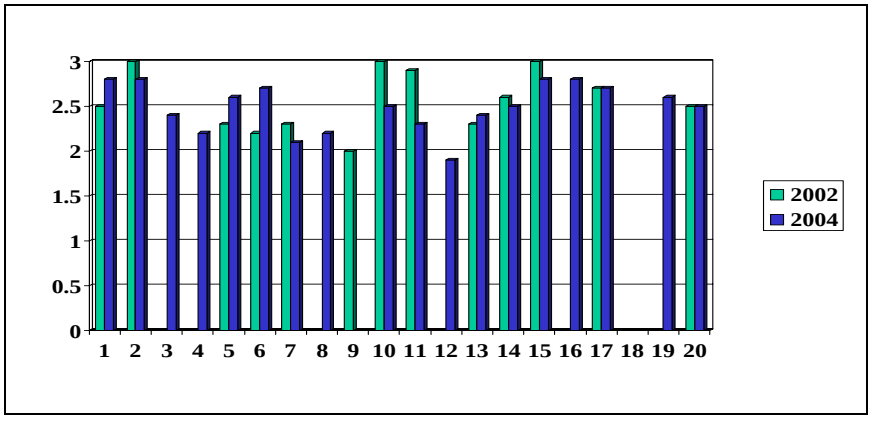

Figure 4. Number of medicines prescribed

2. Indicator 2 measured adherence to generic prescribing. In 2004, about 31 percent of drugs in the facilities were prescribed by generic name (Figure 5). This is a drop from 50 percent in the 2002 survey. However, the practice of prescribing generics was more common at some facilities than others. For example, just 5 percent of prescriptions at Chawama (key–11) were issued using generic names, compared to 73 percent for Bauleni (key–14).

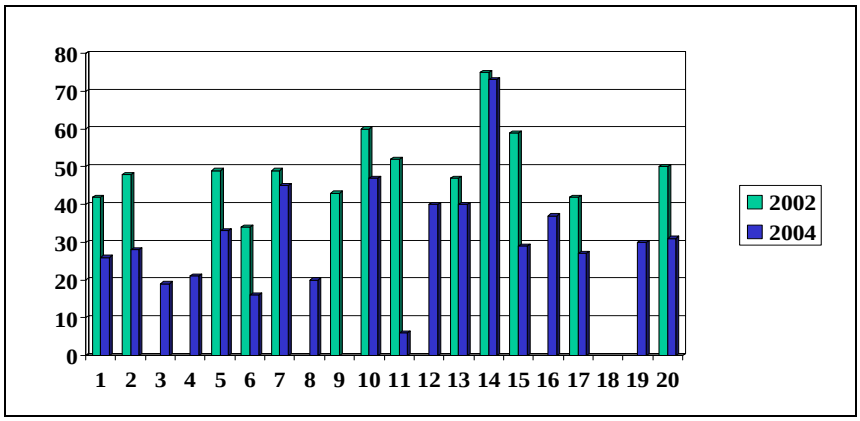

Figure 5. Percentage of drugs prescribed by generic name

3. In 2004, 67 percent of outpatients in the facilities were prescribed injections, compared to 17 percent in the earlier study in 2002 (Figure 6).

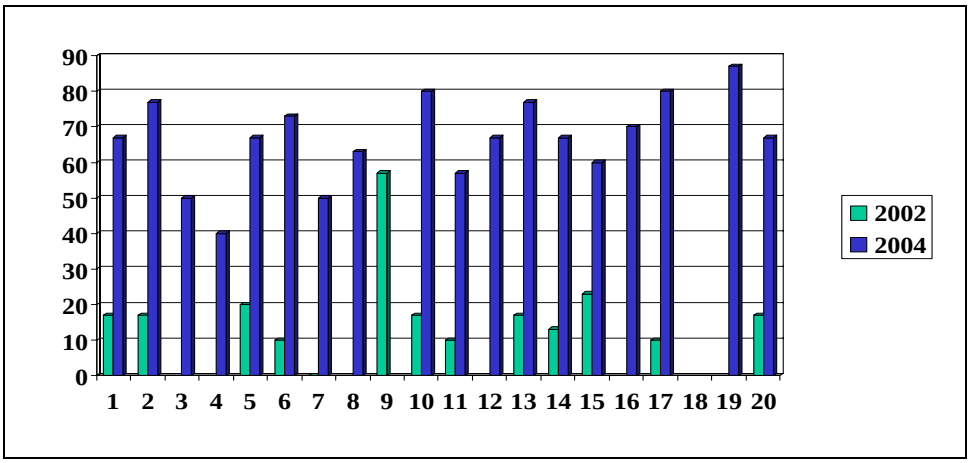

Figure 6. Percentage of patients prescribed injections

4. The 2004 survey found that 13.3 percent of patients were prescribed antibiotics (Figure 7). This was a big improvement from of an average of 63 percent in 2002. However, although this percentage (13.3) may not seem high, a number of conditions for which antibiotics were prescribed did not merit the drugs. Examples include antibiotics prescribed for diarrhea, malaria, and non-pneumonia coughs.

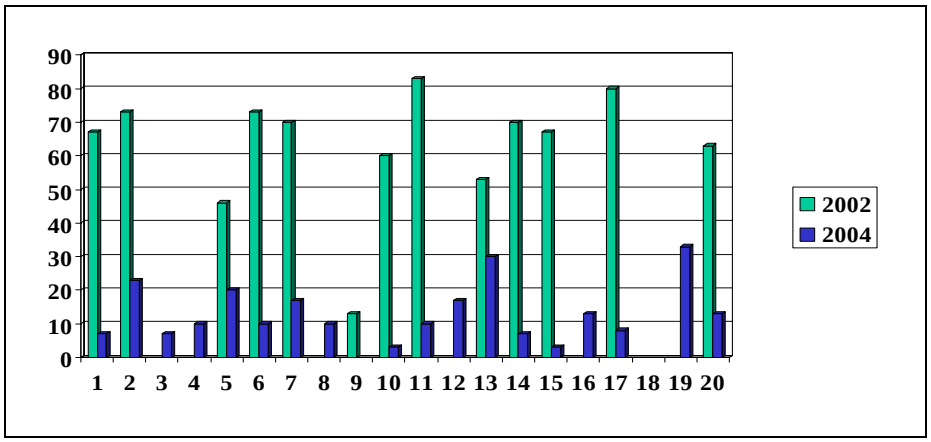

Figure 7. Percentage of patients prescribed antibiotics

5. In 2004, 85 percent of drugs presented for dispensing were actually dispensed at the centers, compared with 76 percent in 2002 (Figure 8). The 2004 result is not surprising considering that the facilities recorded being a 10 percent stock-out rate for tracer medicines. Not surprisingly, facilities that had high stock-out rates in 2004 were unable to dispense all drugs prescribed. For instance, Civic Centre (key–7), which recorded a 25 percent stock-out rate, dispensed only 50 percent of its prescriptions, compared with Chainama, which had a 0.4 percent stock-out rate, and dispensed 81 percent of its prescriptions. Overall performance on this indicator is significantly better than during the 2002 survey.

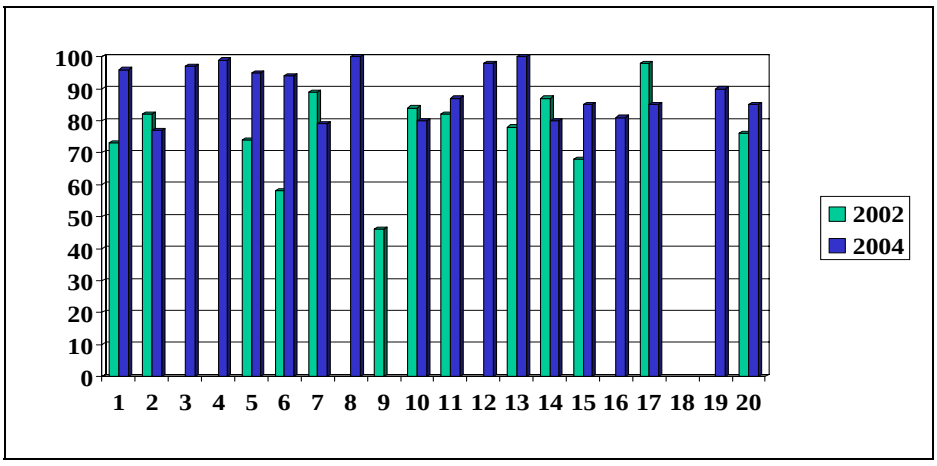

Figure 8. Percentage of prescribed drugs actually dispensed

6. Indicator 6 assessed access to nonbiased drug information for health workers. In 2004, only 36 percent (as compared to 58 percent in 2002) of the facilities surveyed had official treatment guidelines (Figure 9). The survey did not list the details of the guidelines found. Some facilities had more than one while six others had none available for use.

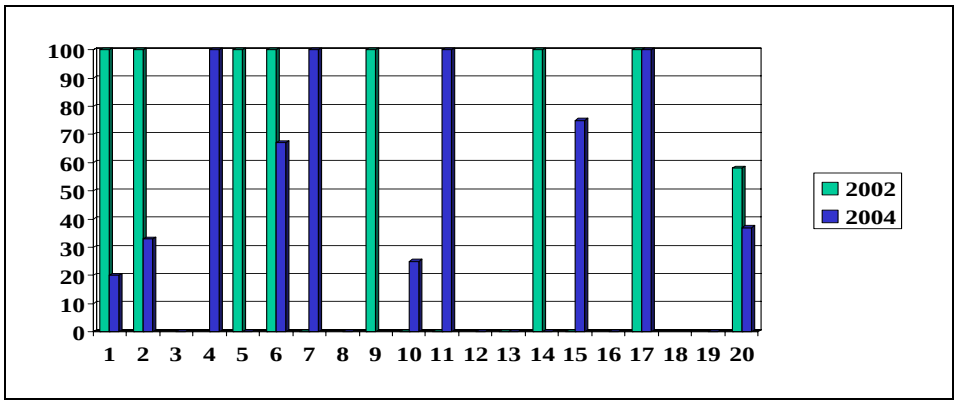

Figure 9. Percentage of centers with treatment guidelines

7. In 2004, 75 percent of encounters diagnosed as non-pneumonia cough or cold were prescribed antibiotics, compared with 76 percent in 2002 (Figure 10). The antibiotics included amoxicillin, erythromycin, and co-trimoxazole. These prescriptions were often in addition to other drugs, such as paracetamol. In 2004, facilities such as Mtendere (key–13) and Chainama (key–16) recorded 100 percent compliance for this indicator. Civic Centre and Makeni, which had recorded 100 percent compliance in 2002, dropped slightly, to 98 and 80 percent, respectively. Performance on this indicator shows that practice has not changed from the last survey, which found it to be recorded 76 percent.

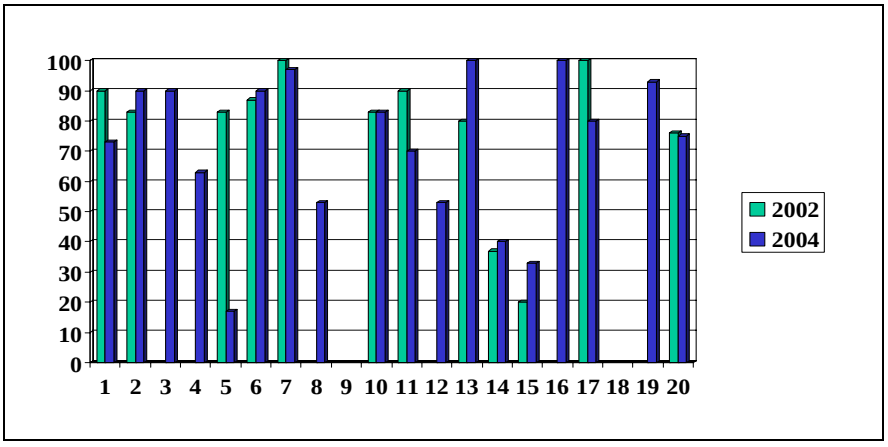

Figure 10. Percentage of non-pneumonia encounters prescribed antibiotics

8. Indicator 8 measures the percentage of encounters diagnosed as pneumonia that were prescribed appropriate antibiotics. In 2002, appropriate prescribing was found for 90 percent of these encounters. In 2004, this figure dropped to 74 percent of encounters (Figure 11). No data were obtained for two of the facilities.

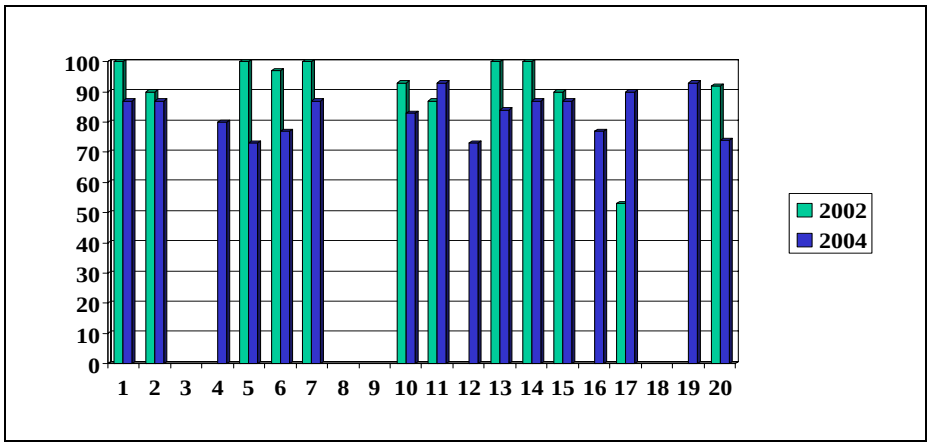

Figure 11. Percentage of pneumonia encounters prescribed appropriate antibiotics

9. Diarrhea is a common condition in the district, and the DTC assessed for its appropriate management. In 2002, the average percentage of encounters diagnosed as diarrhea that were prescribed ORS was 90 percent. This figure dropped down to 78 percent in 2004 (Figure 12). No data were obtained for one of the facilities. Most facilities recorded high compliance (in excess of 80 percent) for this indicator.

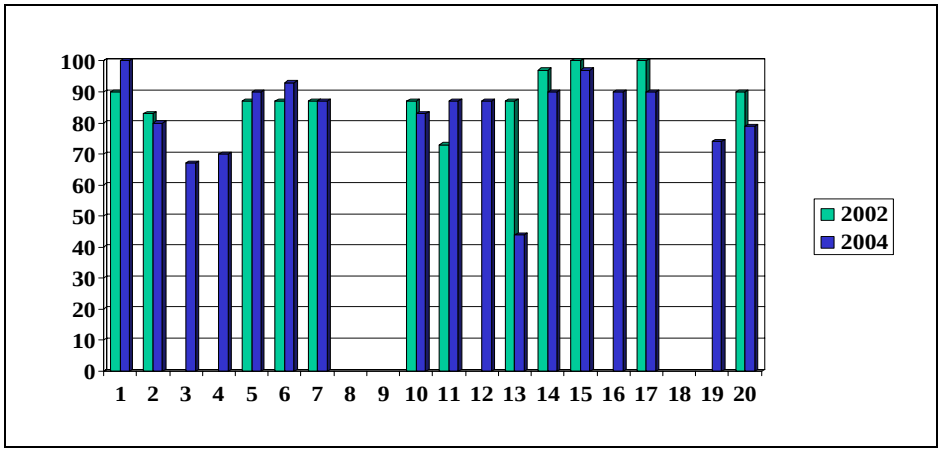

Figure 12. Percentage of diarrhea encounters prescribed ORS

10. Just as in 2002, no instances were found of encounters diagnosed as diarrhea that were prescribed antidiarrheal drugs in 2004. Apparently, health workers in the public sector do not use antidiarrheals for treatment of the disease.

11. Indicator 11 assessed the use of antibiotics in non-dysentery or non-cholera diarrhea. In 2004, 48 percent of encounters diagnosed as non-dysentery or non-cholera diarrhea were prescribed antibiotics, as compared with 90 percent in 2002 (Figure 13). Many facilities

(seven) performed badly (below 50 percent) for this indicator. No data were obtained for one facility.

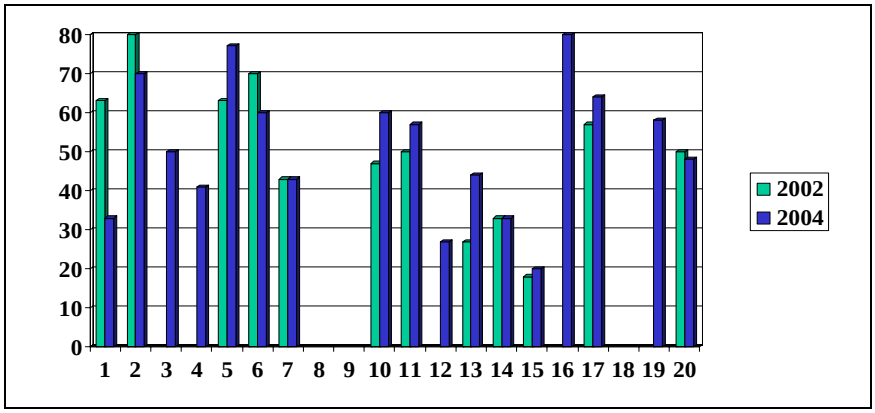

Figure 13. Percentage of non-dysentery and non-cholera diarrhea encounters prescribed antibiotics

12. Indicator 12 assessed management of malaria, which is the most common disease in the district. In 2002, the percentage of malaria encounters prescribed appropriate antimalarials in the sites assessed was found to be 60 percent. In 2004, there was only a slight improvement, of 3 percent, bringing the rate up to 63 percent of encounters diagnosed as malaria prescribed an appropriate oral antimalarial, in accordance with treatment guidelines (Figure 14). There was improvement at all sites, though, except for three (Bauleni, Chilenje, and Mtendere) whose performance declined. The survey did not assess the extent to which other inappropriate drugs were prescribed with the antimalarials, a practice that was observed.

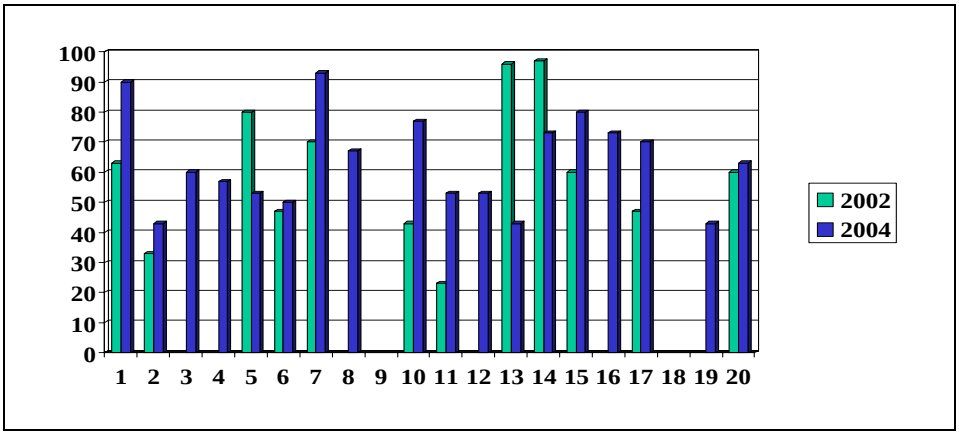

Figure 14. Percentage of malaria encounters prescribed appropriate antimalarial

13. In 2004, the percentage of encounters diagnosed as genital discharge that were prescribed an appropriate antibiotic was 47 percent, compared with 23 percent in 2002 (Figure 15). One facility (an upgraded health center) had just 8 percent compliance for this indicator. No data were obtained for two facilities (Central Prisons and Chilenje Main Store).

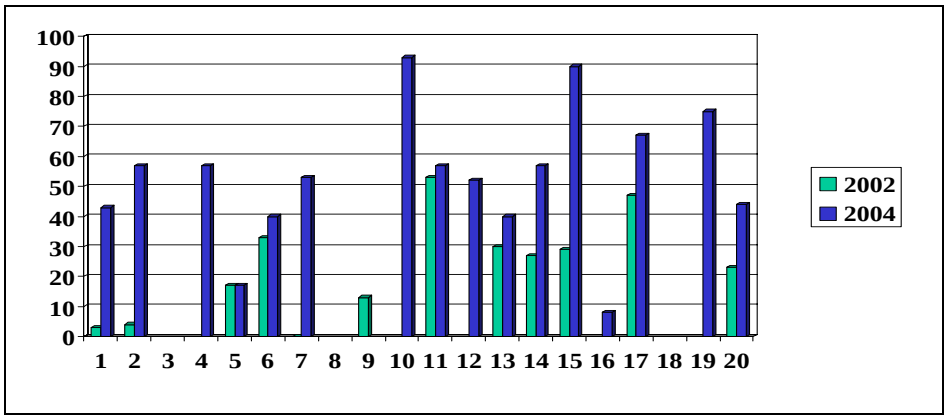

Figure 15. Percentage of genital discharge encounters prescribed appropriate antibiotic

14. In the 2004 survey, the percentage of encounters diagnosed as genital ulcers that were prescribed an appropriate antibiotic was 35 percent, compared with 37 percent in 2002 (Figure 16). Three of the facilities surveyed prescribed the wrong antibiotics for all patients whose records were checked for this indicator. No data were obtained for three facilities.

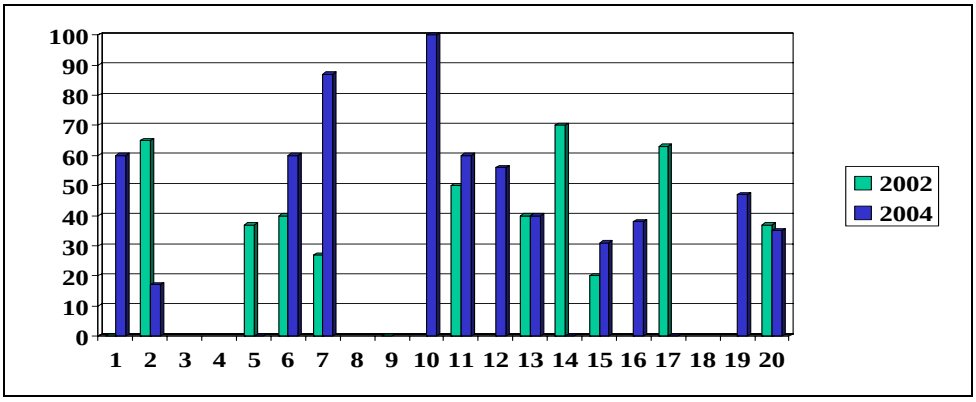

Figure 16. Percentage of genital ulcer encounters prescribed appropriate antibiotic

DISCUSSION

Drug Supply Management

The 2004 follow-up assessment was done to ascertain the status of health facilities' improvements in drug management following the interventions of 2002–2003. Prospective and retrospective assessment of stock records, interviews of health workers, and observation were done. For drug supply management, three indicators were applied. Indicator 1 was designed to determine how well the records corresponded with the physical stock. Pharmaceutical supplies are a key component of the health delivery system. Failure to provide adequate and efficacious medicine supplies has a negative effect on the facilities' ability to provide health care.

Although most facilities performed satisfactorily for this indicator, some (at least 40 percent) were well below average. Six facilities fell below this standard. Further investigation is necessary to determine why performance levels exhibit such wide disparity; it would be assumed that LUDHMT provides similar orientation in pharmaceutical supply management to all its facilities. Determining why performance showed an overall deterioration since the 2002 survey would also be useful.

Apart from Chainda (44 percent) and Bauleni (28.5 percent), all facilities surveyed had more than 50 percent of the selected drugs available. There is a need to find out why the two centers performed so badly, particularly considering that they both performed well in 2002 (64.2 and 54.1 percent, respectively). One note of encouragement is that some facilities, such as Chawama, Chilenje, Kanyama, and Matero, showed significant improvement (from 51.7, 77.7, 78.5, and 71.4 percent to 77, 94.2, 90.6, and 82.4 percent, respectively).

Civic Centre (25.1 percent), Central Prisons (45 percent), and Makeni (20.2 percent) performed badly on this indicator. Chilenje (1.1 percent), Main Store (2.1 percent), and Chainama (0.43 percent) did extremely well. Bauleni (27.6 percent) performed equally badly in the last survey, but Civic Centre (5.8 percent) was much better last time. Chilenje Main Store showed an improvement from 15.4 percent. Again, the reasons for this disparity need to be assessed. The shortfalls are not likely due to shortages at the LUDHMT or Main Medical Stores; if they were, the problem would be generalized across all facilities.

Drug Use

The survey also assessed drug use practices among health workers. The assessment looked at prescribing practices as well as the availability of guidelines, because guidelines are a factor in prescribing practices.

In all facilities surveyed, the prescribers were either clinical officers or nurses.

In both assessments (2002 and 2004), the number of drugs per prescription was generally uniform. All facilities registered less than three drugs per prescription, with the minimum being

1.9 and the maximum being 2.8. There was little change for any of the facilities since the 2002 survey.

In 2004, all facilities, without exception, prescribed fewer drugs by generic name than during the 2002 assessment. Chawama, for instance, dropped from 51.8 percent in 2002 to only 5.7 percent in this survey. Bauleni recorded a slight drop, from 75.3 to 73.3 percent.

All facilities recorded higher use of injections than during the 2002 survey. Some increased substantially, such as Kabwata, which went from 10 percent to 73 percent, and Makeni, which went from 10 percent to 80 percent. Assuming that all prescribers were given orientation on rational prescribing, this sizable increase calls for explanation.

The percentage of outpatients prescribed antibiotics fell from an average of about 63 in 2002 to 13 percent in 2004. This significant drop, which appears to indicate greater appreciation of the need to reserve use of antibiotics for appropriate encounters, was registered by all facilities.

Unlike in 2002, in the follow-up assessment, 85 percent of medicines prescribed were dispensed at the facilities (an increase from 76 percent in 2002). Performance on this indicator is good and represents an improvement by most facilities. It probably confirms a general improvement in stocking by LUDHMT.

In the 2004 survey, it was found that about one-third of facilities visited had treatment guidelines on the premises. A number of guidelines are available for use in the Zambian health sector. The following are some of the guidelines that should be readily accessible to health workers in the public sector—

- *Zambia Standard Treatment Guidelines* 2004
- *Integrated Treatment Guidelines for Frontline Health Workers Manual*
- Integrated Management of Childhood Illnesses (IMCI) guidelines
- *Zambia Treatment of Malaria in Guidelines*

All have been recently updated. The malaria guidelines and STGs were disseminated throughout the country in late 2004, and should be readily available. The purpose of guidelines in the health system is to standardize the management of patients. If health workers followed the guidelines in circulation, the incidence of health workers using antimalarials or antibiotics inappropriately would be reduced. Unfortunately, some facilities do not keep guidelines within easy access of the frontline workers.

The use of antibiotics in non-pneumonia and pneumonia encounters seems to be quite rational. In more than 70 percent of non-pneumonia encounters, health workers are not using antibiotics, and in more than 70 percent of pneumonia encounters they are using appropriate antibiotics. The performance has been consistent over the two surveys.

The most impressive performance in both surveys is in the management of diarrhea. Neither survey has a single recorded use of antidiarrheals. That could be because LUDHMT no longer supplies antidiarrheals to the facilities.

The management of genital discharge has shown improvement, with no significant change in the management of genital ulcers (average of 23.2 to 44.1 percent and 37.4 to 35 percent, respectively). However, the overall performance for both types of encounter is unsatisfactory. Some facilities, such as Kanyama (with 100 percent compliance for genital ulcers), appear to manage the conditions much better than do others—such as Bauleni, Makeni, and Chilenje (with 0 percent compliance for genital ulcers). This finding indicates another wide disparity in practices that requires investigation.

The 2004 findings also suggest the need for further orientation of health workers on the management of infectious diseases such as genital ulcers, genital discharge, and malaria. Reexamining the mode and methods of orientation/training may also be necessary, because in some areas, health worker performance seems to have worsened—that is, irrational prescribing was more commonly found than during the 2002 survey.

The inappropriate management of infections is costly for the health system because it results in wastage, and worse still, could contribute to the development of antimicrobial resistance (AMR). The need for action to correct this practice is, therefore, urgent.

Conclusion

The 2004 assessment survey reveals an unresolved problem with drug management at the facility level. The cause needs to be established and appropriate remedial measures must be taken. The dramatic disparity in competence levels among facilities suggests that the appropriateness of training of staff responsible for drug management must be assessed as a possible cause.

Guidelines have been disseminated and should now be readily available at the facilities. The fact that they are not accessible to frontline health workers at most facilities, however, needs to be investigated, and corrective action must be taken. Guidelines are costly to develop and produce. They are useful and essential for health workers at the health center level. When properly used, they assure standardization of patient management.

Recommendations

1. The results of this survey should be disseminated to the facilities involved and to LUDHMT, highlighting areas of major concern.

2. A further survey to assess the cause of poor drug supply management should be done, and plans should be devised to correct the problem.

3. Frontline health workers should receive regular training in the management of key infectious diseases. The high rate of staff turnover in many of these facilities means that disease management has sometimes been left in the hands of new, untrained personnel.

BIBLIOGRAPHY

Central Board of Health (CBoH)/Zambia. 2000. District Integrated Logistics Self-Assessment Tool (DILSAT). Lusaka: CBoH.

Gabra, M., and O. Hazemba. 2001. *Zambia Assessment [2000]: Drug Management for Childhood Illness*. Submitted to the U.S. Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: Management Sciences for Health.

Keene, D., and T. Moore. 2000. *Drug Management for Childhood Illness (DMCI): Data Collector's Guide.* Submitted to the U.S. Agency for International Development by the Rational Pharmaceutical Management Project. Arlington, VA: Management Sciences for Health.

Keene, D., P. Ickx, and J. McFadyen. 2000. *Drug Management for Childhood Illness (DMCI) Manual.* Submitted to the U.S. Agency for International Development by the Rational Pharmaceutical Management Project. Arlington, VA: Management Sciences for Health.

Management Sciences for Health and the World Health Organization. 1997. *Managing Drug Supply*. 2nd ed. West Hartford, CT: Kumarian Press.

Rational Pharmaceutical Management Project. 1995. *Rapid Pharmaceutical Management Assessment: An Indicator-Based Approach.* Submitted to the U.S. Agency for International Development by the Rational Pharmaceutical Management Project. Arlington, VA: Management Sciences for Health.

World Health Organization (WHO). 1995. *WHO Model Prescribing Information: Drugs Used in Sexually Transmitted Diseases in HIV Infection.* Geneva: WHO.

ANNEX 1. LIST OF PARTICIPANTS

Student Data Collectors

Eric Mubiana	Medicine
F. K. Chitondo	Pharmacy
Barack Kalumba	Pharmacy
Matthews Mwale	Pharmacy
Azion Tonga	Pharmacy
Victor Liyuma	Medicine
John Ngosa	Medicine
Farai Nyoni	Pharmacy
Julius Peter	Medicine
Justine Chongo	Medicine
Logizomai Chipasha	Medicine
Gunet Mwalungali	Medicine

Supervisors from the DTC

Dr. Charles Chilumanda
Joyce Banda
Maxwell Kasonde
Sheilla Mukuni Mutondo
Martin Kalwanji
Evans Muduli
Betty Chipungu

ANNEX 2. LUSAKA URBAN DISTRICT CLINICS

FACILITY	YEAR ASSESSED	
	2002	2004
1. Airport Clinic	NA	NA
2. Bauleni Clinic	X	X
3. Central Prisons Clinic	NA	X
4. Chainama Clinic	NA	X
5. Chainda Clinic	X	X
6. Chawama Clinic	X	X
7. Chelstone Clinic	NA	NA
8. Chilenje Clinic	X	X
9. Chipata Clinic	X	X
10. Civic Centre Clinic	X	X
11. George Clinic	NA	X
12. Kabwata Clinic	X	X
13. Kalingalinga Clinic	NA	X
14. Kamwala Clinic	NA	X
15. Kamwala Prison Clinic	NA	X
16. Kanyama Clinic	X	X
17. Kaunda Square Clinic	NA	NA
18. Lilayi Clinic	NA	NA
19. Makeni Clinic	X	X
20. Mandevu Clinic	NA	X
21. Matero Clinic	NA	NA
22. Matero Reference Centre	X	X
23. Mtendere Clinic	X	
24. State Lodge Clinic	NA	NA
* Chilenje Main Medical Store	X	X

NA = Not assessed.

ANNEX 3. RESULTS OF THE 2004 DRUG SUPPLY AND USE REVIEW FOR STG DEVELOPMENT AND AMR MANAGEMENT

Drug Availability Indicators (Percentages)

FACILITY		INDICATOR		
		1	2	3
1	Matero Reference Centre	85.3	82.4	10.5
2	Chipata Clinic	72	71	18
3	George Clinic	0	0	0
4	Mandevu Clinic	54.5	59.4	10.5
5	Chilenje Clinic	57.1	94.2	1.1
6	Kabwata Clinic	73.3	65.7	7.8
7	Civic Centre Clinic	83.3	54.3	25.1
8	Central Prisons Clinic	70.9	0	45
9	Kanyama Clinic	56.7	90.6	7.6
10	Chawama Clinic	93.3	77	2.9
11	Kalingalinga Clinic	84.2	55.8	5.4
12	Mtendere Clinic	57.5	0	12.6
13	Bauleni Clinic	37.1	28.5	3.8
14	Chainda Clinic	67	44	5.3
15	Chainama Clinic	70.8	80.6	0.43
16	Makeni	83.3	76	20.2
17	Chilenje Medical Stores	17.1	88.5	2.17
	Average	**62.6**	**57**	**10.5**

Drug Availability Indicators

1. Average percentage of stock records that correspond with the physical counts for a set of indicator drugs in the LUDHMT store and health centers

2. Average percentage of a set of unexpired indicator drugs available in the LUDHMT store and health centers

3. Average percentage of time out of stock for a set of indicator drugs in the LUDHMT store and health centers

Drug Use Indicators (Percentages)

FACILITY		INDICATOR														
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**Av.**
1	Matero Reference Centre	2.8	26	66.7	6.6	96	20	73.3	86.7	100	0	33.3	90	43	60	**60**
2	Chipata Clinic	2.8	28	76.7	23.3	77.3	33.3	90	87	80	0	70	43	57.1	17	**50**
3	George Clinic	2.4	19.2	50	6.7	97.3	0	90	ND	66.6	0	50	60	ND	ND	**20**
4	Mandevu Clinic	2.2	20.9	40	10	98.5	100	63.3	80	70	0	41	56.6	56.7	ND	**45.3**
5	Chilenje Clinic	2.6	32.9	66.7	20	94.9	0	70	73.3	90	0	76.6	53.3	16.7	0	**49**
6	Kabwata Clinic	2.7	16	73.3	10	93.8	66.6	90	76.7	93.3	0	60	50	40	60	**52**
7	Civic Centre Clinic	2.1	45.2	50	16.7	79	100	96.7	87	87	0	43.3	93	53.3	87	**59**
8	Central Prisons Clinic	2.2	19.7	63.3	10	100	0	53.3	ND	ND	0	ND	66.7	ND	ND	**25.3**
9	Kanyama Clinic	2.5	47.3	80	3.3	80	25	83.3	83	83	0	60	76.6	93.3	100	**57.2**
10	Chawama Clinic	2.3	5.7	56.7	10	87.1	100	70	93.3	86.7	0	56.7	53.3	56.6	60	**54.2**
11	Kalingalinga Clinic	1.9	39.7	66.7	16.7	98.2	0	53.3	73.3	86.7	0	26.7	53.3	52	56.2	**45.3**
12	Mtendere Clinic	2.4	40.3	76.7	30	100	0	100	84	44	0	44	43.3	40	40	**42**
13	Bauleni Clinic	25	73.3	66.7	6.7	80	0	40	86.6	90	0	33.3	73.3	56.7	0	**41.2**
14	Chainda Clinic	2.8	29.1	60	3.3	84.8	75	33	86.6	96.7	0	20	80	90	30.7	**47.5**
15	Chainama Clinic	2.8	36.9	70	13.3	81	0	100	76.6	90	0	80	73.3	8.3	37.5	**48.3**
16	Makeni Clinic	2.7	26.8	80	7.6	85.4	100	80	90	90	0	64	70	67	0	**55.4**
17	Kamwala Clinic	2.6	30.4	86.7	33.3	89.9	0	93.3	93	73.7	0	57.9	43	75	46.7	**35**
	Average	**2.5**	**31.3**	**67.1**	**13.3**	**85.3**	**36.5**	**75.3**	**73.9**	**78.5**	**0**	**48**	**63.4**	**44.1**	**35**	

ND = No data.

Drug Use Indicators

1. Average number of drugs prescribed per curative outpatient encounter
2. Percentage of drugs prescribed by generic name
3. Percentage of outpatients prescribed injections
4. Percentage of outpatients prescribed antibiotics
5. Percentage of prescribed drugs presented for dispensing that are actually dispensed
6. Percentage of health centers visited that had an official manual of treatment guidelines
7. Percentage of encounters diagnosed as non-pneumonia (cough or cold) in which antibiotics are prescribed
8. Percentage of encounters diagnosed as pneumonia in which appropriate antibiotics are prescribed
9. Percentage of encounters diagnosed as diarrhea in which ORS is prescribed
10. Percentage of encounters diagnosed as diarrhea in which antidiarrheals are prescribed
11. Percentage of encounters diagnosed as non-dysentery or non-cholera diarrhea in which antibiotics are prescribed
12. Percentage of encounters diagnosed as malaria in which an appropriate oral antimalarial is prescribed according to treatment guidelines
13. Percentage of encounters diagnosed as genital discharge in which an appropriate antibiotic is prescribed
14. Percentage of encounters diagnosed as genital ulcer in which an appropriate antibiotic is prescribed

ANNEX 4. TRACER MEDICINES LIST

1. Adrenaline 1,000 ml injection
2. Amoxicillin 125 mg/5 ml suspension
3. Amoxicillin 250 mg capsules/tablets
4. Ampicillin 250 mg injection
5. Benzathine penicillin 2.4 MU injection
6. Benzylpenicillin 2 MU injection
7. Cefalexin 250 MU injection
8. Chloramphenicol 250 mg capsules
9. Chloroquine 150 mg base tablets
10. Ciprofloxacin 250 mg tablets
11. Co-trimoxazole 240 mg/5 ml suspension
12. Co-trimoxazole 480 mg tablets
13. Doxycycline 100 mg tablets/capsules
14. Erythromycin 125 mg/ml suspension
15. Erythromycin 250 mg capsules/tablets
16. Ferrous sulfate 200 mg tablets
17. Gentamicin 40 mg/ml injection
18. Hydrocortisone injection
19. Kanamycin 1 g injection
20. Metronidazole 200 mg/100 ml IV infusion
21. Metronidazole 250 mg tablets
22. Nalidixic acid 100 mg tablets
23. ORS sachet
24. Phenoxymethylpenicillin 250 mg tablets
25. Procaine penicillin 3 MU injection
26. Quinine 300 mg/ml injection
27. Ringer’s lactate 1,000 ml infusion
28. Salbutamol 2 mg tablets
29. Streptomycin 1 g vial
30. Vitamin A 200,000 IU capsules

ANNEX 5. DATA COLLECTION SHEETS

LDAS–1: Inventory Data Form

Date _____
Clinic Name _____
Location _____
Data Collector _____

Product	Counting Unit	Record Count	Recent Issues	Recent Receipts	Adjusted Total	Physical Count	Discrepancy
Adrenaline 1,000 ml injection	1						
Amoxicillin 125 mg/5 ml suspension	1						
Amoxicillin 250 mg capsules/ tablets	1,000						
Ampicillin 250 mg injection	1						
Benzathine penicillin 2.4 MU injection	1						
Benzyl penicillin 2 MU injection	1						
Cefalexin 250 mg injection	1						
Chloramphenicol 250 mg capsules	1,000						
Chloroquine 150 mg base tablets	1,000						
Ciprofloxacin 250 mg tablets	1,000						
Co-trimoxazole 240 mg/5 ml suspension	1						
Co-trimoxazole 480 mg tablets	1,000						
Doxycycline 100 mg tablets/ capsules	100						
Erythromycin 125 mg/ml suspension	1						

Product	Counting Unit	Record Count	Recent Issues	Recent Receipts	Adjusted Total	Physical Count	Discrepancy
Erythromycin 250 mg capsules/ tablets	1,000						
Ferrous sulfate 200 mg tablets	1,000						
Gentamicin 40 mg/ml injection	1						
Hydrocortisone injection	1						
Kanamycin 1 g injection	1						
Metronidazole 200 mg/100 ml IV infusion	1						
Metronidazole 250 mg tablets	1,000						
Nalidixic acid 100 mg tablets	1,000						
ORS sachet	1						
Phenoxymethyl-penicillin 250 mg tablets	1,000						
Procaine penicillin 3 MU injection	1						
Quinine 300 mg/ml injection	1						
Ringer's lactate 1,000 ml infusion	1						
Salbutamol 2 mg tablets	1,000						
Streptomycin 1 g vial	1						
Vitamin A 200,000 IU capsules	1,000						

LDAS–2: Stock-Out Data Form

Date _____
Clinic Name _____
Location _____
Data Collector _____

Product	Counting Unit	Sept 2003	Oct 2003	Nov 2003	Dec 2003	Jan 2004	Feb 2004	Availability	Total Days Out of Stock
Adrenaline 1,000 ml injection	1								
Amoxicillin 125 mg/5 ml suspension	1								
Amoxicillin 250 mg capsules/tablets	1,000								
Ampicillin 250 mg injection	1								
Benzathine 2.4 MU injection	1								
Benzyl penicillin 2 MU injection	1								
Cefalexin 250 mg injection	1								
Chloramphenicol 250 mg capsules	1,000								
Chloroquine 150 mg base tablets	1,000								
Ciprofloxacin 250 mg tablets	1,000								
Co-trimoxazole 240 mg/5 ml suspension	1								
Co-trimoxazole 480 mg tablets	1,000								
Doxycycline 100 mg tablets/capsules	100								
Erythromycin 125 mg/ml suspension	1								
Erythromycin 250 mg capsules/ tablets	1,000								
Ferrous sulfate 200 mg tablets	1,000								

Product	Counting Unit	Sept 2003	Oct 2003	Nov 2003	Dec 2003	Jan 2004	Feb 2004	Availability	Total Days Out of Stock
Gentamicin 40 mg/ml injection	1								
Hydrocortisone injection	1								
Kanamycin 1 g injection	1								
Metronidazole 200 mg/100 ml IV infusion	1								
Metronidazole 250 mg tablets	1,000								
Nalidixic acid 100 mg tablets	1,000								
ORS sachet	1								
Phenoxymethyl-penicillin 250 mg tablets	1,000								
Procaine penicillin 3 MU injection	1								
Quinine 300 mg/ml injection	1								
Ringer's lactate 1,000 ml infusion	1								
Salbutamol 2 mg tablets	1,000								
Streptomycin 1 g vial	1								
Vitamin A 200,000 IU capsules	1,000								

LDUS–1: Drug Use Data Form

Date _____
Clinic Name _____
Location _____
Data Collector _____
Reference Manuals Available _____

Patient Name	Drugs Prescribed	Dosage Form	Generic	Injectable	Antibiotic	Dispensed
Overall Totals						

LDUS–2: Medical Records Review Form (1)

Date _____
Clinic Name _____
Location _____
Data Collector _____
Selected For: _____

Encounter No.	Age in Months	Sex (M/F)	Diagnosis/Symptoms	Date	Prescriber Type	Name and Strength of Drug	Dosage Form	No. of Units

LDUS–3: Medical Records Review Form (2)

Date _____
Clinic Name _____
Location _____
Data Collector _____
Selected For _____

Encounter No.	Sex (M/F)	Diagnosis/Symptoms	Date	Prescriber Type	Name and Strength of Drug	Dosage Form	No. of Units