Impact of the National Drug Policy on Pharmaceuticals in two Provinces in South Africa

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Funded

By

Department for International Development (DFID)

ACKNOWLEDGEMENTS

DFID, for its financial support for this study
Departments of Health in Limpopo and Western Cape provinces for their cooperation.
Dr Henry Fomundam and Dr Andy Gray for reviewing the study.

The field workers, for data collection, are acknowledged: in Limpopo Province: Mariam Mangena, Ms Catherine Tshishonga, Jane Mudau, Violet Mulaudzi, Catherine Dipela, Christopher Nemukombame, Ms Jane Lehaiwa, Caroline Musi and Lillian Managa; and in the Western Cape: Patricia Bosman, Patricia Ngcelwane Thembela Tyusna, Sarah Hermanus, and Ragma Rhode

We also need to thank Mr E. Reynolds from the Western Cape Department of Health for his support, Dieudonne Anderson Loudou and Deus Mubangizi for input in the design of the study, and the data capturers “Maphume”.
All respondents, for their willingness and enthusiasm to contribute to the study.

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LIST OF ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
ARVs	Anti-retroviral Drugs
DDs	Dispensing Doctors
DfiD	Department for International Development (United Kingdom)
DoH	Department of Health
DPLG	Department of Provincial and Local Government
DSM	Drug Supply Management
DTC	Drugs and Therapeutics Committee
ED	Essential Drugs
EDL	Essential Drugs List
EDP	Essential Drugs Programme
ENT	Ear, Nose, Throat
FGD	Focus Group Discussions
GIS	Geographical Information System
GP	General Practitioner
HPCSA	Health Professional Council of South Africa
HCW	Healthcare Worker
HR	Human Resource
INRUD	International Network for Rational Use of Drugs
MASs	Medical Aid Schemes
NDDs	Non-dispensing Doctors
NDP	National Drug Policy
ORS	Oral Rehydration Solution
PHC	Primary Health Care
STGs	Standard Treatment Guidelines
STIs	Sexually Transmitted Infections
TRIPS	Trade-related Intellectual Property Rights
WHO	World Health Organisation
WTO	World Trade Organisation

EXECUTIVE SUMMARY

Background: Provincial baseline surveys on NDP were carried out between 1996 and 1998 in eight of South Africa's nine provinces. These surveys were conducted to establish baselines for future monitoring of progress of the implementation of aspects of the NDP. Follow up surveys were carried out in all nine provinces and six metros of South Africa in 2003 with the aim of determining the impact of the EDP at PHC level in South Africa.

Aim: The current study sought to evaluate the impact of the NDP on pharmaceuticals in South Africa. The rationale for this study was to provide information on the areas of the public and private healthcare system that may need to be improved in order to ensure rational drug use, therapeutic and physical access to pharmaceuticals.

Research questions

Therapeutic Access

(a) Do health workers and health care consumers/patients have access to information on the essential drugs list (EDL) and its importance with respect to safe and rational use of medicines?
(b) Is patient access to (essential) medicines consistent at all levels of the health care system?
(c) Are health care providers prescribing medicines on the EDL?
(d) Do health workers have access to (standard) treatment guidelines?

Rational use of drugs

(a) and the Is rational prescribing, dispensing and use of drugs by medical, paramedical pharmaceutical personnel and to support the informed and appropriate use by community achieved?
(b) How effectively are essential drugs (ED) used in health facilities?
(c) What measures are taken to increase patient compliance with treatment advices at household level?
(d) What is the health care consumer/patient satisfaction level with regards to care/services provided by health facilities?

Physical Access

What pharmaceutical services are rendered in public health care facilities?
Are these services adequate and/or what is the supply against demands ratio?

Methodology

The study was conducted in 2 provinces, 2 districts per province (1 urban & 1 rural). The two selected provinces include Limpopo and Western Cape. Three sub-studies were conducted in order to answer the above-mentioned research questions. The studies included: health facility survey, household survey and physical access survey. The health facilities included in the study were 36 private doctor practices (surgeries), 15 public hospitals, 2 private hospitals, 27 retail pharmacies, and 4 public PHC clinics. The health facility survey included exit interviews, structured interviews, observations, patient files review, and drug stock checks. Some of the instruments used to collect data were drawn from previous studies (Laing, Hogerzeil and Ross-Degman, 2001; Arhinful et al., 1994).

Key Results: Summary, Conclusions and Recommendations

Key results are summarised according to physical access survey (in four provinces), health facility survey (in two provinces) and household survey (in a not representative sample in two provinces). Considering that this study did not cover all provinces and the household survey was not from a representative sample, we should interpret the findings of this study only to the geographic regions studied and can therefore not generalize the findings to the whole country.

Health Facility Survey

Communication

Most facilities had reliable telephones and fax machines except for 16.5% of public hospitals in Limpopo which stated that their fax machine was not reliable.

Conclusion: Telephone and fax communication is accessible in facilities.

Recommendations: Ensure that communication and press equipment in public hospitals is maintained at best functional states at all times.

Human Resources

All hospital facilities had at least 1 pharmacist in the Western Cape and Limpopo provinces. All facilities had at least one qualified medical practitioner.

Conclusion: Human resources in terms of WHO standards (minimum 1 pharmacist per hospital) seemed adequate.

Recommendations: None

NDP Awareness

All retail pharmacies and public hospitals were aware of NDP but interestingly only 86% of GPs were aware. Public hospitals interviewed all owned a copy of the policy but just over 30% of retail pharmacies, and GPs owned a copy.

Conclusion: NDP awareness is satisfactory in public health facilities.

Recommendations: NDP awareness needs to be improved in the private sector.

Treatment guidelines

All public hospitals had the national standard treatment guidelines, while 77% of GPs and 43% of retail pharmacies had them.

Conclusion: Public but not private health facilities had the national standard treatment guidelines.

Recommendations: Ensure that copies of standard treatment guidelines and essential drugs list are distributed to all health facilities and encourage private health facilities to acquire these reference materials.

Drug Use Indicators

- ***Drugs on National EDL***

Drug stock checks found that 88% of drugs on the shelves of public hospitals, 89% in public clinics, 96% in private hospitals, and only 65% from surgeries were found to be from the National EDL. At the patient exit interview, 93% of all prescribed medicines in public hospitals, 75% in private hospitals, 69% in surgeries, and 62% in retail pharmacies were found to be from the National EDL.

Conclusion: Most facilities use medicines that are on National EDL.

Recommendation: Investigate reasons for nonuse of EDL medication in public facilities and encourage use in the private sector.

- ***Generic prescribing***

In 2005 41.9% of medicines were prescribed by generic name in the surveyed public hospitals which is a bit higher than in previous surveys of 37%. Among GPs only 11% prescribed by generic name.

Conclusion: Generic prescribing was below 50% in public facilities.

Recommendation: Prescribing by generic name should be mandatory in the public sector and encouraged in the private sector.

- ***Antibiotic Use***

From patient exit interviews 55% of patients in public hospitals, 69% in surgeries and 35% in private hospitals were prescribed at least one antibiotic; GPs in Limpopo (72%) prescribed much more than at least one antibiotic than GPs in the Western Cape (50%).

Conclusion: High antibiotic prescribing was found. More than 50% of the private GP and public facilities of all patients received one or more antibiotics per encounter. The WHO considers usage figures exceeding 30% as unacceptably high.

Recommendation: Over utilization of antibiotics leads to antimicrobial resistance. Polypharmacy and indication for antibiotic use need to be investigated and necessary intervention measures designed.

- ***Injection Use***

The proportion of patients receiving injections was 8.6% in public health facilities and 22.4% among GPs.

Conclusion: Injection use was low in public hospitals and high in surgeries.

Recommendation: Investigate the reasons for the high proportion of injection prescribing among GPs and develop interventions.

- ***Labelling of medicines***

About three quarter (73%) of patient medicine labels complied with legal requirements in pharmacies, 57% in public hospitals, 37% in surgeries, and 12% in private hospitals.

Conclusion: Labelling is a problem especially in surgeries and private hospitals.

Recommendation: Investigate why labelling in some facilities did not comply with the minimum legal requirements and remedial action should be taken.

- ***Medicines prescribed and received***

The average number of medicines per prescription was highest at public hospitals (3.3 items), followed by private GPs (3.1 items) and private hospitals 2.6 items. The average number of items per prescription was high, especially among GPs in Limpopo Province.

Conclusion: The number of medicines prescribed per encounter is high. According to the International Network for Rational Use of Drugs (INRUD) the average number of medicines prescribed should be less than 1.6.

Recommendation: Investigate the reasons for the high average number of items prescribed per encounter and develop interventions. Develop a strategic approach to improve prescribing through appropriate regulation and long-term collaborations with professional associations.

- ***Satisfaction with care and service***

About 86 % patients were satisfied with the care and service received from the public hospital.

Conclusion: Majority of patients are satisfied with care and service from facilities.

Recommendation: Continue to maintain the level of patient satisfaction but also investigate and ameliorate reasons for 14% dissatisfaction.

- ***Medicine adherence***

From patients who were followed-up, 30% were adherent to their drug regimen, while 70% were non-adherent. Observation of the health care worker – patient interaction found that three quarters of the health workers offer information and advice on the condition, explain how the medicine is used and reassure the patient, while drug interaction is less often explained. However, “drug interaction explained”

seem to be associated with medication adherence while other HCW – patient interaction variables were not significantly associated with adherence.

Conclusion: Adherence to medication was generally low despite observed patient counselling.

Recommendation: Investigate the factors that hamper treatment adherence. Health care providers should give patient counselling at all times in order to improve medicine adherence.

Household Survey

- ***Keeping of medicines***

Households kept antibiotics (11.3%), analgesics (26.6%), and vitamins (6.0%).

Conclusion: Antibiotics kept at home for future use is high. High availability of antibiotics and analgesics at home may be reflective of polypharmacy or non-adherence.

Recommendation: Train pharmacists and drug sellers to be active members of the health care team and to offer useful advice to consumers about health and drugs. A patient survey on types and reasons of medication availability at home without chronic disease or active use needs to be conducted.

- ***Drugs prescribed***

From the household survey, it was found that public health facilities prescribed more (M=2.8) medicines than private doctors (M=2.7), self-remedy from pharmacy (M=2.3), self-remedy from shop (M=1.5) and traditional healers (M=2.0).

Conclusion: Communities use local resources for their ailments.

Recommendation: The health care fraternity needs to be cognizant of this and develop proper regulations/inspections but also collaborative measures.

- ***Sources of treatment***

From the community members in the household survey, 29% of the medicines used were not prescribed by a health care professional (self-medication or prescribed by a traditional healer).

Conclusion: A high percentage of patients self-medicate, which could be attributed to the difficulty of physically, financially and culturally accessing health care services in South Africa, especially in rural areas.

Recommendation: Educational intervention to help patients decide on the appropriateness of self-medication would be useful. The health care fraternity needs to be cognizant of this and develop proper regulations/inspections but also

collaborative measures. Traditional healers may need to be educated about when to refer a patient for more specialised care.

- ***Rational drug use***

Rational drug uses (instructions on medication uses, contraindications, prevention) were mostly provided by public clinics or hospitals and to a much lesser extend by GPs, pharmacists and the least by the traditional healer. Patients from rural areas seemed to have received much less rational drug use information than patients from urban areas.

Conclusion: Although information on drug use was mostly given by the different treatment sources, this was much lesser the case on contra-indications or side-effects as well as prevention or care, especially in rural areas.

Recommendation: Patient counselling on instructions on how to use medication, contra-indications or side-effects, prevention or care should be emphasised, especially in rural health facilities.

Physical access to pharmacies

Nationally there are 3.76 pharmacies per 10,000 population, with the lowest in Limpopo (1.07) and highest in Western Cape (5.09).

Conclusion: There are adequate pharmacies in urban areas in South Africa but not in rural areas. WHO recommends one pharmacist per 10,000 population.

Recommendation: Increase public access to health facilities with pharmaceutical services (e.g. pharmacies and hospitals, especially in rural areas through 1) implementation of public mobile pharmacy stations with mobile clinics, improving roads infrastructure for cheaper and safe public transport and 3) introduction of full-time pharmacy personnel at local clinics.

2. LITERATURE REVIEW

2.1. Therapeutic access

The primary vehicle for delivering the agenda set out by the NDP was the Drug Policy, with the development of a national EDL for the public sector. First, a Primary Health Care EDL and Standard Treatment Guidelines were developed and launched in April 1996. This was a difficult process as distribution and implementation of this first edition coincided with the launch of free PHC services. It was the first time in any country that guidelines for common diseases were initially developed, and then an EDL extracted from these guidelines (Gray & Suleman, 1999).

A second committee was formed in 1996 to review the list. In addition, a committee was set up to develop an EDL for the Hospital level. The second edition of the PHC EDL has a different format from the first edition, in response to criticism of the first edition. Nine flowcharts have been included to assist in the diagnoses of conditions and non-drug treatment also features prominently. The Hospital level guidelines were divided into Paediatric guidelines and Adult guidelines. This has been a very difficult process, and while consensus could not be reached on all issues, the second edition of the PHC guidelines, and the Paediatric and Adult Guidelines for Hospital level were launched nationally by the Minister of Health on 3 December 1998. The combined EDL for PHC and Hospitals contains 473 active ingredients or 693 different formulations when duplications in each list are removed. While still larger than the 10th WHO model list of essential drugs (306 active ingredients), this is a far cry from the 2 600 items that were on the public sector tender order list. Active ingredients are different chemical entities, whereas the formulations are the different dosage forms, which include the active ingredients (Gray & Suleman, 1999).

The 2003 EDL state that the private sector is encouraged to use these guidelines and drug list wherever appropriate. Further, the PHC EDL reflects only the minimum requirements for Primary Health Care level facilities. In keeping with the objectives of the NDP, provincial and local pharmacy and therapeutics committees may provide additional drugs from the Hospital level EDL based on the services offered and the competency of the staff at each facility (Department of Health, 2003b).

Table 1: Essential drug lists (EDL)

1st EDL (1996)	2nd EDL (1998)	3rd EDL (2003)
-PHC -160 drugs -Based on accompanying standard treatment guidelines -Prescriber levels not designated	-PHC + Hospital (Adult/Paediatric) -473 drugs -Based on accompanying standard treatment guidelines -Prescriber levels not designated	-PHC -Based on accompanying standard treatment guidelines -Prescriber levels not designated

In 2003 a national study on the impact of the essential drugs programme (EDP) at primary health care level in South Africa assessed access of health workers and consumers/patients to information on the essential drug list (EDL) and its importance with respect to safe and rational use of medicines. Reportedly, there was adequate access by health workers to the EDL and over 80% of prescribed drugs were from the EDL. However, because healthcare delivery in the public sector might be different to that in the private sector, further research can be done in the private sector looking at this key area by measuring process indicators and some outcome indicators that might need to be modified to effectively measure rational prescribing and patient satisfaction. An exit survey method (Flores et al., 2003) with pharmacy and General Practitioners (GP) surgery users can be used, alternatively.

2.2. Rational drug use

Rational drug use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own requirements, for an adequate period of time, and at the lowest cost to them and their community (Le Grand, Hogerzeil, & Haaijer-Ruskamp, 1999).

Main drug use problems

Overuse of drugs and injections as a consequence of over-prescribing as well as over-consumption. It concerns particularly the use and prescription of antibiotics, antidiarrhoeals, painkillers, injections and cough and cold preparations. Multi-drug use or polypharmacy: the number of drugs per prescription is often more than needed, with an average of 2.4 up to ten drugs, while generally one or two drugs would have sufficed. Polypharmacy occurs when prescribed medications duplicate or interact with each other. Therefore, polypharmacy cannot be necessarily measured on the basis of quantity of items appearing on a prescription. Dosing can also be a determinant of polypharmacy regardless of the number of drugs prescribed.

Incorrect drug use involves the wrong drug for a specific condition (e.g. antibiotics or antidiarrhoeals for childhood diarrhoea), drugs of doubtful efficacy (e.g. antimotility agents for diarrhoea), drugs of uncertain safety status (e.g. dypyrone) or use of drugs in the wrong dosage (often with antibiotics, oral rehydration solution (ORS) and antimalarials).

Causes of drug use problems may be attributed to three levels:

1) Community level (non-adherence, self-medication)
2) Health care level (training or continuing education on drugs, sociocultural factors, benefit interests, misleading advertisements) and
3) National level (national drug policy implementation, such as monitoring of national drug regulation, a good distribution system, regular supervision, and adequate storage facilities).

2.3 Physical access

Since 1994, more than 700 clinics have been built or upgraded, 2 298 clinics upgraded and given new equipment, and 125 new mobile clinics introduced. There are now more than 3 500 clinics in the public sector. This is supported by recent surveys, which reflected that most people in South Africa now have access to health facilities within 10 km radius. Adequacy of pharmaceutical services can be assessed looking at the type of health services (e.g. screening, HIV tests and prophylaxis, psychiatric, occupational therapy, etc.) available at a particular health facility in certain regions. Number of PHC facilities against a particular population size and referrals to secondary and tertiary health facilities should give indication of public access to emergency and quality medical attention. Improved access to health facilities also means access to technical health equipment of quality standard and availability of a highly skilled health team to use the equipment are essential.

3. PREVIOUS STUDIES

An impact of the EDP at Primary Health Care level in South Africa, as a follow up to provincial baseline studies in 1996-98, was carried out in 2003. The sample of the 2003 survey included 191 PHC clinics, 29 Community health centres and 19 district hospitals in all provinces of South Africa.

The results of the baseline survey studies and the 2003 impact survey are listed against WHO national drug policy process (PR) and outcome (OT) indicators (Brudon, Rainhorn & Reich, 1999), as follows (see Table 2):

Table 2: NDP Outcome Indicators in previous surveys

EDL national surveys in public health facilities	**Baseline surveys (1996-98)**	**Survey 2003**
Availability of essential drugs		
OT1: Number of drugs from a basket of drugs available in a sample of (remote) (public) health facilities, out of total number of drugs in the same basket	82%	82%
PR33: Number of prescribers having direct access to a (national) drug formulary (EDL/STG books), out of total number of prescribers surveyed	59%	97%
Percentage of drugs from national essential drugs list found on the shelves of facilities		86
Percentage of drugs found on the shelves found to be from the applicable provincial formulary		95
Percentage of drugs prescribed from essential drug list or formulary	65	90
Percentage of drugs prescribed by generic name	36	37
Percentage of patients having transport problems in reaching the health facility		21
Quality of drugs		
OT6: Number of drugs beyond the expiry date, out of the total number of drugs surveyed		9.4%
Rational use of drugs		
OT7: Average number of drugs per prescription	2.5	2.2

OT8: Number of prescriptions with at least one injection, out of the total number of prescriptions surveyed	11	5
Percentage of encounters with an antibiotic prescribed	36	47
Percentage of patient's knowledge of correct dosage (i.e. how many tablets and when to take them)		88
Percentage of drugs adequately labelled (labels complied with legal requirements: quantity, dosage and dosage interval, patient name, facility name, facility or patient reference number)		20
Percentage of patients satisfied with care (associated with drug supply) they received		86

The 2003 survey (Department of Health, 2003) found that inventory compliance with the National Essential Drugs List was found to be good at 86% which showed no notable change since the baseline surveys. Inventory compliance with the applicable provincial formulary was found to be 96%. The non-EDL drugs should be identified and evaluated as to whether there is a need to consider them for inclusion on the National EDL. Pharmacy and Therapeutic Committees from facilities, districts and provinces play a vital role in reviewing their formularies and feeding appropriate information into the ongoing national EDL review process. Stock control systems were poorly managed with only 50% of physical counts matching with the stock record, no improvement since the baseline surveys.

Expired drugs were found on the shelves of 9.4% of facilities. The SOPs for checking and destruction of expired medicines should be enforced. Vaccine fridge temperature was recorded twice daily in 75% of facilities, which is a considerable improvement from 25% found in the baseline surveys.

Priority should be given to investigate the reasons for increase/high antibiotic prescribing, especially in provinces with over 50% (in Gauteng, Western Cape and Limpopo Provinces). Tuberculosis (TB) and other opportunistic infections related to HIV and AIDS might have an influence on antibiotic prescribing. In addition, why labelling in 80% of facilities did not comply with the minimum legal requirements should investigated. (Department of Health, 2003)

The following (core and complementary) process indicators (=PR) and outcome indicators (=OT) will be collected in the public and private health sector in this study (see Table 3).

Table 3: Drug use indicators

	Assessed in survey 2005
Availability of essential drugs	
PR33: Number of prescribers having direct access to a (national) drug formulary (EDL/STG books), out of total number of prescribers surveyed	X
Percentage of drugs from national essential drugs list found on the shelves of facilities	X
Percentage of drugs found on the shelves found to be from the applicable provincial formulary	X
Percentage of drugs prescribed by generic name	X
Percentage of patients spending more than one hour to access a health facility	X
Affordability of essential drugs	
Average drug cost per encounter	X
OT6: Number of drugs beyond the expiry date, out of the total number of drugs surveyed	X
Rational use of drugs	
OT7: Average number of drugs per prescription	X
OT8: Number of prescriptions with at least one injection, out of the total number of prescriptions surveyed	X
Percentage of encounters with an antibiotic prescribed	X
Percentage of drugs adequately labelled (labels complied with legal requirements: quantity, dosage and dosage interval, patient name, facility name, facility or patient reference number)	X
Percentage of patients satisfied with care (associated with drug supply) they received	X
Average consultation time	X
Percentage of drugs actually dispensed	X
Prescription in accordance with treatment guidelines	X

4. METHODOLOGY

The project entailed 3 studies, namely a (1) health facility survey, (2) community survey, and
(3) physical access survey. Sections (2) and (3) are reported under (4.2) household survey and (4.3) physical access to pharmaceutical services, respectively.

4.1 Health facility survey

Study design

Cross-sectional design was employed in the study involving various health facilities and respondents. Types of facilities and respondents have been described in detail in succeeding sections.

The study was conducted in 2 provinces, 2 districts per province (1 urban & 1 rural). The 2 selected provinces were Limpopo (LP) and Western Cape (WC): The selection

of the 2 provinces was purposeful (one more urban and one more rural)in order to allow comparison in terms of the findings.

Limpopo Province: The two districts randomly chosen in Limpopo were Capricorn district (urban) which has 10 public hospitals, 1 private hospital, 21 retail/community pharmacies, and 187 private doctors and Vhembe district (rural) which has 8 public hospitals, no private hospital, 15 retail pharmacies and 78 private doctors.

Western Cape: The two districts randomly chosen in the Western Cape were City of Cape Town (urban) which has 29 public hospitals, 17 private hospitals, 268 retail/community pharmacies and 595 private doctors and Karoo district (rural) which has 4 public hospitals (including one mental hospital), 0 private hospitals, 2 retail pharmacies & 5 private doctors.

Sampling

The study sample was selected as follows:

Public hospitals: An updated list of public hospitals in each of the 2 provinces was obtained from the provincial DoH offices and was used to update the 1998 list of public hospitals in the HSRC's database. Using GIS to connect the postal codes of the hospitals, the hospitals were then listed under their respective local municipalities in each district. All public hospital facilities in each district were first listed in alphabetical order to create a sampling frame. A systematic random sample comprising 5 public hospitals in each district was selected. In each selected public hospital, the following categories of respondents/documents were to be surveyed:

- 50 in-patient and 50 out-patient files selected through systematic random sampling
- 50 exit interviews conducted with randomly selected patients who will consent to participate in the study. In hospitals where the patient population is less than the targeted sample size, all patients who consent to participate in the study will be regarded as the sample.
- 1 structured interview conducted with the pharmacy official, human resources official, finance official and facility manager designated by the facility.
- 1 drug stock check observation visit in a hospital pharmacy

Private hospitals: An updated list of private hospitals in each of the 2 provinces was obtained from the provincial DoH offices and was used to update the 1998 list of private hospitals in the HSRC's database. Using GIS to connect the postal codes of the hospitals, the hospitals were listed under their respective local municipalities in each district. All private hospital facilities in each district were listed in alphabetical order to create a sampling frame. A systematic random sample comprising 5 private hospitals in each district were selected. If the number of private hospitals in the targeted district was lower than the targeted number (i.e. 5 private hospitals), then all available private hospitals were surveyed. In each selected private hospital, the following categories of respondents/documents were surveyed:

- 50 out-patient files selected through systematic random sampling and a retrospective analysis of medical records done.

- 50 exit interviews conducted with randomly selected patients who will consent to participate in the study. In hospitals where the patient population is less than the targeted sample size, all patients who consent to participate in the study will be regarded as the sample.
- 1 structured interview conducted with the pharmacy official, human resources official, finance official and facility manager designated by the facility.
- 1 drug stock check observation visit in a hospital pharmacy

Private GP Surgeries: Lists of private surgeries in South Africa were obtained from MedPages, Health Professions Council of South Africa (HPCSA) and the National Department of Health's website. These lists were collated to form the sampling frame of which 10 GPs were targeted per district. If a district had less then 10 GPs, then all GPs were included in the sample. Due to the high expected refusal rate from GPs, systematic random sampling was used to select 100 GP surgeries in each district. The availability of private surgeries depended on whether the GPs consent to participate in the study or not. In each selected private surgery, the following categories of respondents/documents were surveyed:

- 50 in-patient files were selected by random sampling and a retrospective analysis of medical records done.
- 15 exit interviews were conducted with randomly selected patients who consented to participate in the study. In surgeries where the patient population was less than the targeted sample size, all patients who consented to participate in the study were regarded as the sample.
- 1 structured interview with the facility manager or person designated by the facility.
- 1 in-depth interview conducted with any available drug prescriber (only in the case of dispensing doctors)
- 1 drug stock check observation visit in a drug storeroom/dispensary (only in the case of dispensing doctors)

Private drug outlets (retail/community Pharmacies): A list of private pharmacies registered with the South African Pharmacy Council was obtained. Using GIS to connect the different postal codes to local municipalities in each of the 2 provinces, a sampling frame was produced. Systematic random sampling was used to select 10 private pharmacies in each district. The availability of private pharmacies depends on whether the pharmacists consent to participate in the study or not. In each private drug outlet, the following categories of respondents/documents were surveyed:

- 15 medical/prescription scripts were randomly selected and analysed
- 15 exit interviews were conducted with randomly selected patients who consent to participate in the study.
- 1 structured interview with the pharmacy manager or pharmacist-in-charge
- 1 drug stock check observation visit

Public Clinics: Availability sampling was used to select 1 clinic in each district. A total of 4 clinics (2 in each Province) were sampled from each district in the Provinces. All clinics were sampled using availability sampling from a list of clinics in the district. Inclusion criteria were that the clinic must be a primary health care (PHC) clinic that serviced middle to lower income community. In each clinic, the following activities were carried out:

- 15 out-patient files were selected and a retrospective analysis of medical records done.
- 15 patients were selected for observation through availability sampling. In facilities where the patient population is less than the targeted sample size, all patients who consented to participate in the study were regarded as the sample. Between 2 to 4 fieldworkers conducted the observations at the clinic. Patients were sampled based on the next available patient who consented to participate after the fieldworker completed the previous observation. This was then followed by follow-up interviews and home visits with the observed patients to assess satisfaction and adherence.
- 1 structured interview with the facility manager or person designated by the facility.
- 1 drug stock check observation visit in a drug storeroom/dispensary

All activities were carried out by trained registered nurses.

Sample realized

In Limpopo, 9 public hospitals were selected using proportionate random sampling procedures. All the 9 sampled public hospitals agreed to participate in the study. Availability sampling methods were used to include independent retail pharmacies in the study. There were only 6 independent retail pharmacies available in the proximities of Thohoyandou in the Vhembe district of Limpopo. All 6 pharmacies were approached and only 3 agreed to participate in the study. In the Capricorn district, however, 20 Pharmacies were approached and only 7 agreed to participate in the study. Reasons for refusals to participate in the study varied from fear of being investigated, patient confidentiality, lack of free time, Pharmacy manager not being available at the time of survey, and unwillingness to participate.

With regards to Private GPs, a proportionate sample of 15 and 10 GPs was selected for Capricorn and Vhembe districts, respectively. It was, however, found that the list was not that useful as most of the GPs appearing on it were attached to public/private hospitals. As the aim was to target those GPs who owned private surgeries, another sample of 100 GPs was drawn and used to contact the GPs. 15 GPs were contacted in the Vhembe District and only 7 agreed to participate in the study. In the Capricorn district 12 GPs were approached and only 5 agreed to participate in the study. Similar reasons were refusals as in retail pharmacies were documented for private GPs.

2 clinics were identified around a community (1 in each district) and all clinics agreed to participate in the study.

However, looking at the different activities conducted during the health facility survey, some facilities couldn't agree to participate in some parts of the study.

Refusal reasons vary from unavailability of management personnel to complete other or all sections of the tool even after follow up attempts by the fieldworkers to have the tool completed.

Patient exit interviews

An overall total of 1127 patients were interviewed in the study (296 patients interviewed in private surgeries, 733 from public hospitals, 38 from private hospitals, 299 from pharmacies, and 60 from public clinics). The low response rate in private GPs was attributable to fewer patients booked for consultation at the day of the survey or simply a low client turn out. It was then necessary to conduct the patient exit interviews over 2 days in some private surgeries until at least 9 patients were interviewed. The only refusal reason for unwillingness of most patients to participate in study was lack of time as they thought the interview was going to take long. This might also have incorporated fear of divulging medical information to strangers. The same reasons were documented for refusals or low response rate in independent retail pharmacies.

Drug stock checks were conducted in all participating clinics, independent retail pharmacies, public hospitals and in dispensing private GPs. 1 activity per facility were conducted.

HCW patient interaction observation session
60 observations were conducted, 15 in each clinic. All approached patients agreed to participate in the study.

Sample characteristics

The health facilities included in the study were 36 surgeries, 15 public hospitals, 2 private hospitals, 27 retail pharmacies, and 4 public PHC clinics. In addition, the number of participants for each type of assessment (facility interview, drug stock checks, in-out patient file checks, patient exit interviews and patient observation and follow-up are described by health facility type (see Table 4)

Table 4: Sample characteristics of health facilities by assessment type

	Facility type	**Facility interview**	**Drug stock checks**	**In-out patient files checks**	**Patients exit interviews**	**Patient observation and follow-up**
	n	n	n	n	n	n
GPs#	36	18	419	723	296	
Public hospitals	15	9	906	1549	733	
Private Hospitals	2	2	19	75	38	
Pharmacies	27	17	475	291	299#	
Public PHC clinics	4	4	69	129		60

#all also dispensing

Patient characteristics from facility exit interviews

Generally fewer male than female patients were found in the health facilities, especially public clinics. African Black patients were more found in public hospitals than other groups. Patients in clinics were younger than patients in other health facilities (see Table 5).

Table 5: Sample characteristics of patient exit interviews by facility type

	Facility type	**Patients exit interviews**			
	n	n	% male	% African Black	Age= M (SD)
GPs	36	296	39.2	59.8	36.7 (18.7)
Public hospitals	15	733	34.5	70.8	38.5 (22.11)
Private Hospitals	2	38	55.3	47.4	47.4 (21.8)
Pharmacies	27	299#	46.5	53.7	41.7 (20.2)
Public clinics	4	60	27.1	51.0	24.3 (17.8)

#only those who came with a prescription

Measures

Various instruments were used to collect data in the health facility survey: The instruments were drawn from previous studies i.e. Laing, Hogerzeil and Ross-Degman (2001) and Arhinful et al. (1994).

A structured interview questionnaire was adopted from the study completed by the National Department of Health's Directorate Access to Affordable Medicines on the Impact of the EDP at PHC level in SA (Department of Health, 2003).

Structured Interview Schedule

This tool was used in all surveyed categories of health facilities, i.e. public and private hospitals, private surgeries and private pharmacies. The tool contained 5 content areas: facility biographical data with 8 items, facility human resources with 6 items, and budget management with 12 items, essential drug policy & drug use information with 32 items and prescribing and dispensing information with 14 items. The targeted respondents were identified as the facility manager or the medical superintendent, the HR manager, finance personnel, the head of the pharmaceutical section and the chief medical officer, respectively. The questionnaire was targeted at various departments or section heads within the health facility at management level.

Patient exit interviews (Pharmacy and non-pharmacy)

The tool had two content areas covering the patient's demographic data and the patient's medical history, reasons for visitation to the facility and their satisfaction levels with care in the facility. The tool was a 14 item tool with item 12 measuring satisfaction levels on a scale from 1=very satisfied to 5=very dissatisfied. Other items of satisfaction measurement assessed patient care by a healthcare professional, i.e. 'do you feel you had the chance to fully explain your illness to the person who treated you?', and 'Will you visit this health facility again in case of an illness like the

one that brought you here today?'. The tool further provided for assessment of certain aspects used to measure rational prescribing such as number of medicines prescribed for collection in the facility's pharmacy and number of medicines from the facility. This was followed by a table designed to collect information on 'name of drug prescribed, the form of drug, strength of drug, whether or not the drug is an antibiotic, whether or not the drug was on the EDL, and whether or not the medication pack was correctly labelled.

In- and Out-Patient files Form

A data collection form adopted from the WHO guidelines (WHO, 2003) on how to collect drug information was used to collect medical information from patient files after permission was given by the health facility management. The tool was then named 'In- patient and Out-patient files' and had two main content areas including patient demographic data and medical history. Information on how patient's income, education, and race could not be collected using this tool and were not deemed critical in analysis of data. The medical history area had 11 items which included amongst others, the patient age, whether or not it was an out or an in-patient, the diagnosis, the medication given, whether the medication given was an antibiotic and whether or not it was on the EDL. The tool was then useful in providing measurements of other WHO indicators such as number of items per prescription, number of antibiotics per prescription, and number of EDL drugs prescribed per total number of drugs per prescription.

Drug Stock Checks

Using the information on the 'In-patient and Out-patient files' a mini-database of drugs that were prescribed in the surveyed health facilities was developed using a 'Drug stock check form'. This allowed the fieldworkers to check for availability of these drugs on the shelves in the facilities' dispensaries/pharmacies.

Health Care Worker- Patient Observation Guide

A structured observation guide was used to record interaction items between a healthcare worker and consulting patients in clinics. The observation form had two main content areas namely, patient demographic data and the consultation observation session. The consultation observation session was a 'silent' session where a fieldworker (professional nurse) recorded interactions between the patient and the health care worker using 8 broad items which covered the salutations session, the diagnosis session, the examination session, the treatment communication session, the prescription and dispending sessions and the exit interview. The tool would then report on the friendliness, adequacy and professionalism of the consultation session or the interaction between the patient and the healthcare worker as observed by the fieldworker. The exit interview area of the tool assessed patient satisfaction levels with regards to care in the facility. Patient satisfaction levels were assessed by item item1 of the exit interview area on a scale of 1=very satisfied to 5=very dissatisfied.

Further, the observation tool contained a part on patient follow-ups which was completed during unannounced visits by the fieldworker 2 to 3 days after the observation sessions. The patient demographic information was used to follow the patients to their households to check for compliance. Compliance was only limited to the use of solid countable medication such as tablets, capsules and suppositories

and was assessed by counting the number of items (tablets, capsules, suppositories, etc.) remaining at the time of the visit. With regards to semi-solids and liquids patients only had to recall how the medications were taken. Because the visitations were unannounced and due to some patients having given wrong demographic information it was not possible to follow all observed patients.

Pilot study and ethical approval

With regards to the pilot study, fieldworkers were recruited and trained to conduct the pilot study. All pilot study fieldworkers were registered nurses, except for one who was an unemployed college graduate. Fieldworker training for the pilot study was done in May 2005 in Cape Town. The training took a period of two days where 3 researchers trained a group of 12 field workers. The fieldworkers were trained on the purpose of the study, ethics of the study, study sample, how to administer questionnaires and consents, and the instruments themselves. After training of each instrument fieldworkers role played the instruments. Once training was completed, the pilot study began. Six fieldworkers were selected for the pilot study. Permission to conduct the pilot study was secured from the Western Cape Department of Health and the management of the facilities where the pilot study was conducted. Ethics approval for the pilot study was secured from HSRC REC # 3/09/03/05.The pilot study was conducted in June 2005 with the aim of testing the feasibility of the proposed instruments and methodologies for carrying out the main study. The pilot study was conducted in the two selected districts of the Western Cape, namely the Karoo district which is predominantly rural and the Cape Metropolitan district which is predominantly urban. The pilot study period lasted for two weeks. For the health facility survey pilot study, 1 public hospital was surveyed in each district. In each public hospital, 1 structured interview schedule questionnaire was completed, 15 patient exit interviews were conducted, 15 in-patient and 15 out-patient files were analysed and a drug stock check done. Further, 3 private surgeries were surveyed (1 in the Cape Town Metropolitan district and 2 in the Karoo district). In each private surgery, 1 structured interview schedule was completed, 15 patient exit interviews were conducted, 15 out-patient files were analysed and a drug stock check done in dispensing surgeries. The health facility survey pilot study also included surveying 2 private pharmacies in each district. In each private pharmacy, 1 structured interview schedule questionnaire was completed, 15 patient exit interviews were conducted, 15 scripts were analysed and a drug stock check done. For the community survey pilot study, 15 households were interviewed in each district. Data from the pilot study were analysed. The analysed data and field experience reports led to the change of the instruments being refined. Refinement included removing certain questions as poor results were obtained during analysis, inclusion of questions that were missed out, increasing and/or decreasing multiple choice categories, closing open-ended questions, improving the general appearance and layout of the questionnaires. Following the pilot study, aall questionnaires were also standardized as follows:

Serial numbers: each type of questionnaire was given a unique serial number in order to make it easier for fieldworkers to identify in which province and district the questionnaire is supposed to be administered, what number of questionnaire it is, and the data collection method that should be applied. Serial numbers were also introduced in order to enable the HSRC to track the number of questionnaires sent

out to the field and also reconcile the numbers with those received from the field. Therefore, material wastage or loss which is common in large field based studies was eliminated.

Footers: To compliment the serial numbers, footers that describe questionnaire type were attached.

Demographic data of respondents' page was created. This page was meant to collect demographic data such as: a) Project number (the HSRC conducts numerous projects which are field based. In order to ensure that each questionnaire is easily identifiable and packed and stored with the correct batches of questionnaires, the project number plays a key role. b) name of province (in this case Limpopo and the Western Cape), c) district name, date of data collection, etc.

Questionnaires were formatted using blocks to enhance a professional look and user-friendliness. Codes were also introduced to enable easy capturing, analysis and interpretation of data. Scales were also used to collect quantitative data.

All questions were retained. Through a consultative process, some questions were reformulated with almost no impact to the meaning of the question but the quality was enhanced e.g. Original question: "were you given a prescription that you could use to buy a drug outside of the facility and how many drugs were prescribed?"
New questions: “were you given a prescription so that you could buy a drug outside of this facility? (Yes/No)" "If yes, how many drugs were prescribed?

Following the pilot study, the study sites were reduced from four provinces (Western Cape, Northern Cape, Gauteng and Limpopo) to two provinces (Limpopo and Western cape), due to the complex nature of the study, limited timeframes and limited resources. Sample sizes were also changed as follows: Public and private hospitals changed from 15 to 5 respectively, private surgeries and private pharmacies changed from 30 to 10 respectively and 20 clinics per district changed to one clinic per district.

The final protocol, consent forms and questionnaires were presented again at the HSRC REC for approval of the main study. Ethics was approved with # REC 3/09/03/05. Approval was also obtained from the Western Cape Department of Health with reference # 24/1/26 and the Limpopo Department of Health and Welfare.

Procedure

Patient exit interviews: They were conducted in all the health facilities using a structured questionnaire. Patients who had already completed their consultation sessions were approached during time at dispensary points before receiving their medications. The study and the purpose of the interviews were explained to the patients during this time after which those patients who agreed to participate were asked to sign a consent form. A sample of 50 patients in all public and private hospitals, and 15 in both private surgeries and pharmacies was selected using convenient sampling procedure. In cases were a minor (<18 yrs) was accompanied

for health care the parent or the guardian who brought them was interviewed instead. The interviews lasted between 10 to 20 minutes each.

In and Out patient files: This activity was completed with the help of the medical records department in the case of hospitals after approval by the facility managers. Access to patient files was necessary to assess prescribing patterns and availability of frequently prescribed drugs. In order to do this, an electronic database was used to select 50 out-patient and 50 in-patient consultations entered in the preceding 2 months. In the case of private surgeries, 15 patient files were analysed. In private pharmacies where there were no patient files, 15 medical scripts selected similarly from the records were analysed instead Starting with the last recorded entry, every 10^{th} record was selected and the file numbers used to retrieve patient files from the cabinets in the medical records departments. Medical information on recent consultations was extracted from the files and transcribed onto a data collection form adopted from the WHO guidelines. The data collection form was so designed to collect information on patient age, diagnosis, hospitalization period and treatment given and. This information together with the drug classification was used to assess rational prescribing. In order to answer questions on whether the prescribed drug items appeared on the EDL the EDL /STG booklets were used. The SAMF (Vol. 6) was used in identifying drugs that appeared on the EDL but were not prescribed generically.

Drug stock check observations: All the names of the drugs recorded during analysis of patient files and scripts were then copied onto a data collection form adopted from the WHO guidelines. This provided a min-database of drugs that were prescribed in the facility in the preceding 2 months and could be taken as drugs that are frequently prescribed in the facility. The drugs were then checked for availability in the facility dispensaries or on shelves in the case of private pharmacies. This was done to asses the percentage of all frequently prescribed drugs including essential drugs available on stock at the time of visit.

Heal care worker-patient observations: Procedures

The activity was carried out in public clinics only and involved observation of day consultations by patients using a semi-structured observation guide designed in a highly structured manner following the INRUD recommendations (Arhinful et al., 1994). On introduction, the field team would visit the chosen facility for a meeting with the sister in charge. At this time, the study would be explained, consent would be sought, the field team would be introduced to the clinic staff and an appointment would be made for the actual study. On the day of the study, upon entering the facility, the fieldworkers would make contact with the person in charge of the facility to announce their presence for identification processes and to answer any remaining questions that the person may have.

At the start of an observation, a fieldworker would explain the study to the next patient that would be going for an examination. Part of the explanation includes that the fieldworker would like to visit the patient at home for a follow up visit. At this point, the fieldworker will answer any questions that the patient may have and request for written consent from the patient. Patients who agreed to participate in the study were then asked to sign a consent form after which time the fieldworker would then go with the patient throughout the consultation session and observe their

interactions with a health care worker until the patient exits the clinic. If the patient refuses to participate, the HCW then moves to the next patient and starts the process.

Since this study formed part of a survey in which patient compliance was to be assessed, it could be easily explained to the HCWs that observers had to be present at the consultation. During the consultation, both the history taking and all clinical examinations performed by the HCWs were observed. The observations were documented on observation forms. The observers used one base form to document patient demographics and initial complaints as well as the drugs prescribed. A set of ten sub forms represented the ten most frequent symptoms. The sub forms contained a set of questions for history taking as well as a set of physical examinations according to the national guidelines for treatment and diagnosis. The observers documented whether and how the questions and examinations were performed (Krause et al., 1999).

During observations, the fieldworker would shadow the patient from the waiting room, to the examination room, and finally to the clinic dispensary. At each point, the fieldworker would record on the questionnaire their observations on the interactions. Only on exit, the patients were then asked exit interview questions to assess their satisfaction levels with regard to care in the clinic. Once completed, the fieldworker would record the physical address of the patient. Two days after the clinic observation, the fieldworkers would visit the patient at their homes unannounced. The home visit was to assess patient compliance with regard to treatment advices given at the clinic. If the fieldworker could not find the patient during the first visit, two more visits would be made at different times in order to locate the patient. In assessing whether or not the patient was compliant, the fieldworker would ask the patient to produce all the medication that they received at the clinic. The fieldworker would then ask the patient if they still remembered how to take their medications. To ensure that all medications were taken correctly, the fieldworkers counted the number of tablets remaining against the records taken during observation. With liquid and semi-solid medications such creams, lotions, etc. patients were only asked if they remembered and to state how the medication is taken as a means to check for compliance.

Data Analysis

Descriptive statistics were calculated using SPSS package (version 13.0). Regression analyses were used to identify health care – patient variables in relation to medication adherence. Qualitative data were analysed through thematic content analysis in an attempt to answer the key questions of each study. Medicines were classified using international WHO and national criteria by one pharmacist researcher (G.M.).

4.1 HEALTH FACILITY SURVEY

Facility interview

In terms of actual realised sample, Table 6 below shows the number structured interviews completed. It is important to note that although facilities did agree to the study as a whole and allowed us to complete many other aspects of the study; many

refused to complete the structured interview questionnaire, mainly due to the sensitive nature of their budget information.

Table 6: Realised Structured Interview sample

	Western Cape	Limpopo
Private GP surgery	8	10
Private Hospital	2	0
Public Hospital	3	6
Public Clinic	2	2
Independent retail Pharmacy	11	6

Table 7 below shows the percentages of communication mechanisms that are available at the different facilities studied. Apart from recording if the facility had communication mechanisms or not, the study also obtained information regarding the reliability of the mechanism. This information was deemed important, as facilities require reliable communication mechanisms in order to place medication orders. As can be seen below, 100% of facilities mentioned having a functioning telephone with all stating it is reliable. With regards to fax mechanisms, again all facilities stated that they have one but with regards to reliability, 1 (16.5%) public hospital in Limpopo stated that the fax mechanism was not reliable.

With regards to email, 77% of GPs, 86% of retail pharmacies and 100% of public hospitals reported that they had the mechanism. Interestingly, it was found that 28.6% of GPs and 20% of public hospitals in Limpopo reported the service as not reliable. Two way radios were in almost half of the public hospitals and with regards to mail, although all facilities mentioned 100% functionality, 16.7% of public hospitals in Limpopo stated the service was not reliable.

Table 7: Indicators of communication function at facility

	HSRC Study				MEDUNSA/MEDICOS	
	Private GP	Retail Pharmacy	Public Hospital		Public Hospital	
			WC	LP	WC	LP
	n=17	n=16	n=3	n=6	.	n=10
% facilities with functioning telephone	100	100	100	100	.	100
% facilities with functioning fax	100	100	100	100	.	90
% facilities with functioning email	77	86	100	100	.	.
% facilities with functioning two way radio	0	8	50	40	.	.
% facilities with functioning mail system	100	100	100	100	.	.

Human resources

Table 8 below shows the percentage of human resources at public hospitals in Western Cape and Limpopo Provinces as compared to the MEDUNSA/MEDICOS Study (Department of Health, 2003). All facilities had at least 1 pharmacist and at least one qualified medical practitioner.

Table 8: Indicators of human resources at public hospitals in Western Cape and Limpopo Provinces as compared to the MEDUNSA/MEDICOS Study

	Public Hospitals		**MEDUNSA/MEDICOS STUDY**	
	WC	LP	WC	LP
	n=3	n=6		N=10
% facility with at least one qualified pharmacist	100	100		60
% facility with at least one qualified Medical practitioner	100	100		

NDP awareness

All retail pharmacies and public hospitals interviewed were aware of NDP but interestingly only 86% of GP were aware. Public hospitals interviewed all owned a copy of the policy but just over 30% of pharmacies and GPs owned a copy. With regards to visits from either the pharmacy council, DoH and Health Inspectorate, GPs received the least amount of visits with only 9% visited by the pharmacy council and 17% visited by the health inspectorate. Table 4 also shows that no public hospitals interviewed in the Western Cape stated that they were visited by the DoH and Health Inspectorate.

Table 9: Indicators of NDP knowledge and visits by health authorities

	Private GP	**Retail Pharmacy**	**Public Hospital**	
			WC	**LP**
	n=18	n=16	n=3	n=6
% of individuals interviewed aware of NDP	86	100	100	100
% of individuals interviewed owning a copy of NDP	33	36	100	100
% of individuals interviewed able to cite 3 aspects of the NDP				
% facilities visited by: Pharmacy Council	9	100	100	75
% facilities visited by: DoH	0	67	0	75
% facilities visited by: Health Inspectorate	17	33	0	50

As can be seen from Table 10 below, all Western Cape public hospitals stated that the facility had a formulary list where drugs are stated by their generic names yet 50% of individual interviewed stated that the drugs on the formulary list appeared on the EDL. In Limpopo, 50% of facilities reported they had a formulary list with 100%.

Table 10: Indicators of Formulary list

	Public Hospital	
	WC	**LP**
	n=3	n=6
% of individuals interviewed stating facility has formulary list	100	50
% of individuals interviewed stating drugs of formulary list are by generic names	100	100
% of individuals interviewed stating drugs of formulary list also on EDL	50	50

Treatment guidelines

All public hospitals had the national standard treatment guidelines, while 77% of GPs and 43% of retail pharmacies had them.

Conclusion

Facilities such as public hospitals, GP and retail pharmacies all had telephones, fax machines and mail services as communication mechanisms which were reported to be reliable with most having email. Communication can therefore be seen as accessible.

With regards to human resources, all Western Cape public hospitals reported having at least one qualified pharmacist, pharmacist intern, pharmacist assistant, medical practitioner, and medical intern. Limpopo province on the other hand did have fewer pharmacist and medical interns.

The NDP is available but mainly in the public sphere and this also hold true for the treatment guidelines.

Drug use indicators

Drug stock checks found that 88% of drugs found on the shelves of public hospitals, 89% in public clinics, and only 65% from surgeries were found to be from the National EDL. At the patient exit interview 93% of all prescribed medicines in public hospitals, 75% in private hospitals, 69% in surgeries and 62% in pharmacies were found to be on the national EDL. From patient exit interviews 55% of patients in public hospitals, 69% in surgeries and 35% in private hospitals were prescribed at least one antibiotic; GPs in Limpopo (72%) prescribed much more at least one antibiotic than GPs in the Western Cape (50%). The proportion of patients receiving injections ranged from 3.1% in the PHC clinic and pharmacy, 8.6% in the public hospital, 22.4% in the surgery to 40.5% in the private hospital. Three quarter (73%) of labels complied with legal requirements in pharmacies, 53% in public hospitals, 37% in surgeries, and 12% in private hospitals. Patients were further asked to rate on a scale from very satisfied to very dissatisfied on the care and service received at the health facility. Highest satisfaction (very satisfied and satisfied) was found for

GPs (99.3%), followed by pharmacy (96.7%), private hospital (92.1%) and public hospital (85.6%) (see Table 12).

Table 11: Drug use indicators

	Western Cape		**Limpopo**		**Total**	
	n	%	n	%	n	%
Surgery						
Prescribed on EDL (patient exit)	176	67.7	410	68.9	587	68.9
Inventory on EDL (drug stock check)	67	54.0	286	64.7	286	64.7
Generically prescribed (pt files)	153	13.5	147	21.9	300	16.6
Antibiotics	56	49.6	145	86.8	202	71.9
Correctly labelled (pt exit)	139	100	117	20.8	258	36.7
Injection given (pt exit)	17	14.0	49	32.5	66	22.4
Satisfied (pt exit)	125	100	159	98.8	285	99.3
Public Hospital						
On EDL (patient exit)	827	91.9	1353	90.3	2191	92.5
On EDL (drug stock check)	637	79.3	867	87.9	867	87.9
Generically prescribed	859	48.7	1367	41.7	2226	44.2
Antibiotics	156	53.2	246	56.7	402	54.9
Correctly labelled	878	89.9	316	22.9	1200	52.7
Injection given	18	6.4	40	9.7	60	8.6
Satisfied#	259	92.8	348	81.1	610	85.6
Private hospital						
On EDL	32	55.2	54	96.4	86	75.4
On EDL (drug stock check)	-	-	24	96.0	24	96.0
Generically prescribed	32	18.0	0	0	32	18.0
Antibiotics	5	23.8	8	50.0	13	35.1
Correctly labelled	8	100	0	0	8	12.1
Injection given	13	61.9	2	12.5	15	40.5
Satisfied	21	100	14	82.4	35	92.1
Clinic						
On EDL (drug stock check)	135	79.7	42	89.4	70	88.6
Generically prescribed (pt files)	79	27.1	32	40.5	111	30.0
Satisfied	27	100	28	90.3	55	94.8
Pharmacy						
On EDL	172	71.1	98	52.4	277	62.4
On EDL (drug stock check)	187	55.2	239	100		
Antibiotics	24	9.5	19	9.7	43	9.3
Correctly labelled	245	100.0	14	9.4	112	74.2
Injection given	0	0	10	9.0	10	3.1
Medicines received from prescriptions					485	98.8
Satisfied	153	98.1	112	94.9	266	96.7

Medicines prescribed and received

The average number of medicines per prescription was highest at public hospitals (3.3 items), followed by private GPs (3.1 items) and private hospitals 2.6 items. The average number of items per prescription is high, especially among GPs in Limpopo Province (see Table 13).

Table 12: Medicines use

	Western Cape		**Limpopo**		**Total**	
	M	SD	M	SD	M	SD
Surgery#						
No medicines prescribed	1.9	2.5	3.7	1.6	3.1	2.1
No medicines received	1.8	1.8	3.5	1.8	3.1	1.9
Public Hospital						
No medicines prescribed	3.0	2.0	3.4	1.8	3.3	1.9
No medicines received	3.1	2.8	3.5	1.8	3.3	1.9
Private hospital						
No medicines prescribed	1.9	2.2	3.4	2.0	2.6	2.2
No medicines received	2.8	2.0	3.4	2.0	3.2	2.0
Pharmacy						
No medicines prescribed	1.7	1.1	1.6	1.0	1.6	1.0
No medicines received	1.6	1.0	1.6	1.0	1.6	1.0

#all GPs also dispense

Treatment adherence assessment

The sample consisted of 60 patients (27.1% male and 72.9% female). Most were Black African (51.0%) and 45.1% were Coloured and 3.9% other. Forty percent were 40 years and older, 21.7% were under 5 years, and the rest (38.3%) between 5 to 39 years. Most patients were seen by a PHC nurse (84.2%) and 15.8% by a doctor.
From the 60 patients first assessed, 40 could be successfully followed up. From these 40 only 12 (30%) were adherent to their drug regimen, while 28 (70%) were non-adherent.

Results following the observations of the interactions of the patients with the health care workers revealed that three quarters of the HCWs offer information and advice on the condition, explain how the medicine is used and reassure the patient, while drug interaction is less often explained. Only drug interaction explained seem to be associated with medication adherence while other health worker – patient interaction variables were not significantly associated with adherence (see Table 14).

Table 13: Health care worker – patient interaction variables and regression analysis with adherence

	n	%	B
Health care worker offers information or advice on condition	30	78.9	ns
HCW reassures patient	27	75.0	ns
Drug interaction identified and explained	8	29.6	3.22**
Explains how medicine is used	21	77.8	ns
Health worker ends encounter abruptly	6	17.1	ns
Very satisfied with this facility	14	35.9	ns
Length of consultation time (in minutes)	M=9.2; SD=6.3		ns

4.2 HOUSEHOLD SURVEY ON UTILIZATION OF MEDICINES

Introduction

Rational use of drugs is multifaceted. Its medical, social and economic aspects are well reflected in the WHO definition: "Rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, at the lowest cost to them and their community." (WHO, 1988). Viewing access to medicines both in terms of their affordability and their availability in health and pharmaceutical services, the explanations for difficulties in access to essential drugs in poor countries relate not only to the population precarious socioeconomic conditions, but also to lack of organization of health services, inadequate supply system management, and irrational prescription. As to medicine utilization, although intrinsically related to access, it also depends on individual need, and can occur simultaneously with or subsequent to access (De Carvalho et al., 2003). The National Dug Policy for South Africa (Dept of Health, 1996) says: "*the goal of the National Drug Policy is to ensure an adequate and reliable supply of safe, cost-effective drugs of acceptable quality to all citizens of South Africa and the rational use of prescribers, dispensers and consumers."*

Self-medication amongst patients and Pharmacist-initiated therapy (PIT) are common in developing countries. Self-medication often results in inappropriate drug use. Some examples of drug misuse in self-medication are: the use of antibiotics and antidiarrhoeals for children with non-severe diarrhoea or the use of strong analgesics for mild fever. Self-medication is also influenced by many socio-cultural factors, such as people's own perceptions and preferences for certain pharmaceuticals. A study in the Philippines, for example, found that antidiarrhoeals are preferred for the treatment of diarrhoea because they are believed to harden the stool (LeGrand, 1999). Complementary and alternative medications, especially herbs, are also commonly used (Shankar et al., 2002). Kasilo et al. (1991) evaluated the epidemiology of household medications in 498 households in urban Gweru and Harare. Self-medication was common in 95pc of the households. The average number of drugs per household was four. The commonest items encountered were analgesics, cough, cold and sore throat preparations, dermatologicals, gastrointestinals and antimalarials. The majority of the respondents usually chose an

appropriate drug for a particular symptom. The sources of the medications found in the households were chemist/pharmacy, shop/supermarket, hospital/clinic, friends and relatives. Manzambi (2000) studied the choice of determinants of the population for health centres through a survey of the behaviour of families in a representative sample of 1,000 households in the health districts of Kinshasa in 1997. For the most recent episode of illness, the respondents turned to seven types of care: the health centre (37%), private dispensaries (26.5%), self-medication through a pharmacy (23.9%), traditional practitioner (21%), traditional self-medication (16.9%), private outpatients' clinic (16.7%) and a reference hospital (10.4%). Amare et al. (1997) conducted a community based cross-sectional study in Addis Ababa to describe community's perception on drugs, identify people's various sources of modern drugs and determine factors associated with drug use. The study results show that out of the 903 persons who reported an illness in the four weeks recall period, 231 (26%) did not take any action for their illness. The reasons being mainly the perception that the illness was minor and economic inaccessibility. Regarding sources of modern drugs, the majority 398 (63%) of those who used modern drugs obtained their medications from government health institutions. Drug sharing was practiced by 156 (17%) of the respondents. In addition, 39 (6%) prematurely discontinued their treatment course and the majority did so either due to inability to comprehend the instructions or having some social entertainment. It was also found that 178 (20%) of the studied households were found hoarding drugs and the most common ones were oral antibiotics and antipyretic analgesics. Cocks and Dold (2000) found that self-medication in South Africa is an important initial response to illness and many illnesses are successfully managed at this stage. *Amayeza* stores (or 'African chemists') are an important source of medicines for self-diagnosed illnesses, frequently offering the following categories of medicines: (1) traditional herbal medicines and animal artefacts, (2) commercialized patent brands of refined herbal and animal remedies, (3) patented over-the-counter medicines (OTCs), (4), patented brands which resemble neither traditional herbal nor biomedical medicines, (5) biomedical OTCs manufactured by large pharmaceutical companies, (6) Dutch, Afrikaans and Eastern folk remedies manufactured by local companies.

The aims of this study were to examine the prevalence of drug use, and how morbidity, use of health services, self-evaluated health, demographic pattern and lifestyle characteristics influence drug use in a general population.

The objectives of this study were:

- To obtain information on drug use patterns in the preceding month period
- To gain insight into various channels through which people in communities obtain drugs (health facility, private pharmacies, drug sellers, home remedy, traditional healer and neighbourhood shops).
- Access to drug sources (distance, costs)
- Self-medication with prescription drugs
- Rational drug use
- To assess knowledge on management of acute childhood diarrhoea

Method

Sample and procedure

Two communities were selected in each of the two provinces selected already described in section 4.1 (study design), 1 being in the rural district and 1 in the urban district. Therefore in total, four communities were studied. Selection of the community was determined by the sampled primary health care (PHC) clinic for the overall study. This means that four PHC clinics were sampled for the overall study utilizing random sampling procedures. Once sampled, the community that was serviced by the PHC clinic automatically fell into our sample.

In each community a random sample of 100 households having pre-school children or children of a pre-school age was selected. In this study, special attention was paid to drug use by pre-school children, a group that is particularly vulnerable in terms of health. Therefore, only households with pre-school children were selected. It is important to note at this stage that the sample drawn from the communities will be representative for the household in the community with pre-school children, not for the whole population.

The procedure for household sampling was to go to the centres of the communities and spin a bottle on the ground. Whatever direction the bottle pointed would be the walking direction. The researcher then interviewed every household in that direction that had a pre-school aged child. She or he interviewed the caretaker of the pre-school children. If the caretaker did not want to participate, the researcher continued to the next household in that direction. If the caretaker was not at home during the visit, two subsequent return visits were be made. The second day the researcher went again to the centre of the community, and spun a bottle once more. She or he then proceeded to interview every household with a pre-school child found in that direction until a targeted number was met.

The household owners/guardians of the pre-school child were asked first to sign a consent form after agreeing to participate in the study. Participants who agreed to participate in the study were interviewed by using a structured questionnaire which interview was administered by a Fieldworker. Prior to answering questions they were advised of: (a) their status as volunteers, (b) their right to refuse to answer any question, (c) the legal liabilities of their participation, (d) confidentiality, and (e) the limitations of anonymity due to the nature of the study.

Measure

Based on a literature review (e.g. Bhatnagar, Mitshra & Mishra, 2003) questions were developed. Major parts were adopted from a measure developed by WHO (1992).

The household questionnaire measured the following indicators:

- Percentage of illness episodes treated on health worker's prescription/in self-medication
- Percentage of treatments obtained from the health centre/pharmacy

- Percentage of treatments obtained from various health facilities
- Number of medications kept in a households
- Number of expired medications out of total number of medications kept in a household
- Percentage of children under-five treated with oral rehydration therapy/antidiarrhoeal products
- Various sources of drugs available in the community
- Amounts (in rand) spent on medications per household
- Amount (in rand) spent per household to get access to various health facilities

The questionnaire consisted of 16 questions which took between 20 to 30 minutes to answer. Questions included:

- The questionnaire included the following16 questions:
- Have any of the household members been ill in the past month?
- If yes, what were they suffering from?
- What treatment did you give the patient?
- Total number of medication taken from each of the sources mentioned above
- Total cost of medication obtained
- Did the dispenser give you any instructions on how to use any of the medication they gave you?
- Did the dispenser give you any explanations on contra indications or side effects of any of the medication they gave you?
- Did you receive any information about prevention or care provided by the dispenser?
- Complete record of all illnesses occurring in a one month recall period including age of patient, illness, treatment, source of advice, source of treatment and effect of treatment.
- What would you do (if your 3 year old child had diarrhoea. The child has had four watery stools since yesterday and it does not want to eat?
- What type of medicines do you keep in the house? (List below if medicines are mentioned). (List all the medicines and write down the name, unit price, expiry date, the illness they are kept for and ask where each was obtained/purchased).
- Can I see the medicines you keep in the house including the ones you mentioned above?
- What are the various places where you can buy drugs in and around your community?
- How far do you travel to get to the various health facilities?
- Do you feel medicines are expensive now than last year?

Response options to these questions varied from the simple YES/NO response, through multiple responses of three to five possible answers, as well as open ended questionnaires where respondents were asked to fill in information about illness and drugs used.

Data analysis

Descriptive statistics were calculated using SPSS package (version 13.0). Chi-square tests were used to compare the rural and urban groups. Qualitative data

were analysed through thematic content analysis in an attempt to answer the key questions of each study. The lay names of illnesses and medicines provided by the participant were classified by a Pharmacist (researcher) using WHO International Classification Diseases (ICD 10) and the Essential Medicines WHO model list criteria (WHO, 2005).

Results

Sample characteristics

Response rate

A total of 406 households (a parent or guardian with at least one child below 6 years) were approached and out of the 406 valid targets only 1 household (in Limpopo) refused to participate in the study. As a result the response rate was 99.7%.

From the 405 participants, 11.4% were male and 88.6% were female, the majority was 18 to 39 years old. In all 205 participants were from two rural communities (one in Vhembe District in Limpopo Province and one Beautfort West District in the Western Cape) and 201 from two urban communities (one in Capricorn District in Limpopo Province and one in Cape Town in Western Cape province) (see Table 15).

Table 14: Sample characteristics

		Western Cape	**Limpopo**	**Total**
		n	n	n (%)
	n			405 (100)
Sex	Male Female	24 172	22 175	46 (11.4) 357 (88.6)
Race	Black African Coloured White	1 191 2	188 0 0	192 (49.0) 199 (50.8) 1 (0.3)
Age group	18-39 years 40 years above	104 89	116 79	225 (56.7) 172 (43.3)
Geolocality	Rural Urban	103 95	99 99	204 (50.5) 201 (49.5)

Illness episode experienced in past month

In assessing illness patterns, 285 (71.3%) of respondents had at least one of their household members who had been ill in a one-month recall period. Most of these patients only suffered from body pains and other signs or symptoms (34.9%). These included cases such as headaches, fever, general body pains, dizziness, etc. Only about 2% of the patients suffered from HIV/AIDS or related illnesses. The lowest percentage (0.4%) was recorded for patients who had conditions related central nervous system and mental health. It is also fitting to report that 32.4 % of the cases was reported for Respiratory and related conditions. These included conditions such as asthma, bronchitis, influenza, TURI (upper respiratory infections), etc. Other conditions were categorised as respiratory, trauma and emergency, cardiovascular, ENT (Ear, Nose and Throat), Gastro-intestinal related, eye, STIs (sexually transmitted diseases), gynaecological and obstetrics, skin, and other unrelated

conditions such cancer, lymphomas, psoriasis, etc. The percentage of cases reported for these conditions ranged from 1.1 to 32.4 % (see Table 16).

Table 15: Illnesses reported by respondents (n=284)

	Total		**Male (N=32)**	**Female (N=251)**
Illness	n	%	%	%
Body pains and other signs and symptoms	99	34.9	28.1	35.9
Respiratory and related conditions	92	32.4	50.0	29.9
Eye condition	25	8.8	9.4	8.8
Gastro-intestinal conditions	12	4.2	0	4.8
Cardiovascular conditions	19	6.7	3.1	4.0
Ear, nose and throat conditions	12	4.2	3.1	7.2
Trauma and emergency conditions	7	2.5	0	2.8
HIV-AIDS and related illness	5	1.8	0	2.0
Skin conditions	3	1.1	0	1.2
Sexually transmitted infections	3	1.1	3.1	0.8
Central nervous system and mental conditions	3	1.1	3.1	0.8
Other	7	2.6	0	2.8

Sources of treatment

For the illness episodes treated in the past months (for all household members) 71.4% used prescribed medication (from public and private health facilities) and 28.6% used non-prescribed medication including 10.7% home remedies and 2.2% traditional medicine. A home remedy is a treatment or cure for a disease or other ailment that employs certain foods or other common household items. Home remedies may or may not have actual medicinal properties that serve to treat or cure the disease or ailment in question; many are merely used as a result of tradition or habit or because they are quite effective in inducing the placebo effect. A significant number, however, have been demonstrated to effectively treat things such as sprains, minor lacerations, headaches, fevers, and even the common cold (http://en.wikipedia.org/wiki/Home_remedy). Rural dwellers (61.9%) relied more than urban dwellers (38.1%) on public health facilities, while urban dwellers used more private doctors (82%) and medicines from a pharmacy (80%) as compared to rural dwellers (20 and 18% respectively). The commonest allopathic medicines prescribed by the public sector were analgesics/anti-inflammatory medication (29.5%), ENT, cough mixtures and flu medication (19.4%) and antibiotics (18.4%). Concerning antibiotics from those who used medicines kept in the house 65% used antibiotics, from over the counter from shops 11%, from over the counter from pharmacy 7% and from home remedy 11% had used antibiotics (see Table 17).

Table 16: Source of treatment in the past month by type of medication

	Home remedy	Over the counter from pharmacy	Over the counter from shop	Medication stored in house	Private doctor	Healer	Clinic or hospital
Group of medicines (WHO, 2005)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Analgesics, antipyretics, non-steroidal anti-inflammatory medicines (NSAIMs), medicines used to treat gout and disease modifying agents in rheumatoid disorders (DMARDs)	22 (30.6)	8 (12.9)	5 (18.5)	1 (5.9)	13 (19.4)	0	122 (29.5)
Medicines acting on the respiratory tract	10 (13.9)	37 (59.7)	4 (14.8)	5 (29.4)	21 (31.4)	0	94 (22.7)
Cardiovascular medicines & diuretics	5 (6.9)	4 (6.5)	10 (37.0)	0	2 (3.0)	0	32 (7.7)
Antibiotics	9 (12.5)	4 (6.5)	3 (11.1)	11 (64.7)	10 (14.9)	0	75 (18.2)
Steroidal medication	1 (1.4)	1 (1.6)	0	0	11 (16.4)	0	4 (1.0)
Hormones, other endocrine medicines and contraceptives	3 (4.2)	0	0	0	0	0	3 (0.7)
Vitamins and minerals & Solutions correcting water, electrolyte and acid- base disturbances	2 (2.8)	0	0	0	2 (3.0)	0	34 (8.2)
Antiallergics and medicines used in anaphylaxis	1 (1.4)	1 (1.6)	0	0	3 (4.5)	0	10 (2.4)
Herbal medicines	13 (18.1)	3 (4.8)	3 (11.1)	0	0	18 (100)	0
Anticonvulsants/antiepileptics /psychotherapeutic medicines	0	0	0	0	1 (1.5)	0	8 (1.9)
No medication or no treatment given	0	0	0	0	0	0	1 (0.2)
Gastrointestinal medicines, Ophthalmological preparations & Dermatological medicines (topical), antineoplastic	6 (8.3)	2 (3.2)	2 (7.4)	0	2 (3.0)	0	26 (6.2)
Total (673)	72	62	27	17	67	15	413
Total (%)	10.7	9.2	4.0	2.5	10.0	2.2	61.4
Rural dwellers (%)	45.1	18.8	9.5	7.1	17.6	33.3	61.9

Table 18 shows that 2.8 drugs were prescribed on average from the public health facility. This was a little less in private health facilities (2.7), home remedy (2.4), and self-remedy from the pharmacy (2.3).

Table 17: Prescribing pattern (total number of medication) by type of care provider

Type of care provider	n	Mean	Std. Deviation
Home remedy	26	2.4	1.5
Self remedy from pharmacy	35	2.3	3.4
Self remedy from shop	13	1.5	.7
Medication stored in the house	5	2.2	1.1
Medication from private doctor	33	2.7	1.2
Medication from traditional healer	6	2.0	.6
Clinic or hospital	185	2.8	1.5

Rational drug use

Components of rational drug use (instructions on how to use medication, contra-indications or side-effects, prevention or care) were recalled by participants mostly from public clinics or hospitals, and to a lesser extend by GPs, pharmacists, and the least by the traditional healer. Although information on drug use was mostly given by the different treatment sources information on contra-indications or side-effects as well as prevention or care were hardly provided or recalled. Rural dwellers seem to receive or recall much less patients counselling on drug use, contra-indications or side effects and prevention or care than urban dwellers (see Table 19).

Table 18: Rational drug use in affirmative responses and by geolocality

Type of care provider	Instructions on how to use medication given n (%)	Explanations of contra-indications or side-effects were given n (%)	Information about prevention or care was given n (%)
Self-remedy from pharmacy	30 (52.6) Urban=34.3% Rural=0%	10 (17.5) Urban=23.1% Rural=5.6%	13 (23.6) Urban=34.2% Rural=0%
Medication from private doctor	33 (64.7) Urban=43.3% Rural=5.0%	10 (19.6) Urban=32.3% Rural=0%	14 (28.0) Urban=43.3% Rural=5.0%
Medication from traditional healer	14 (38.9) Urban=23.5% Rural=52.6%	3 (7.7) Urban=10.5% Rural=5.0%	5 (13.8) Urban=11.8% Rural=15.8%
Clinic or hospital	143 (98.6) Urban=66.0% Rural=24.3%	35 (23.0) Urban=32.6% Rural=18.9%	57 (37.0) Urban=66.0% Rural=24.3%

Cost of medications

The most common source of self-paid medicines was the pharmacy, followed by the private doctor, home remedy, medicines from shops and the traditional healer. The costs of medicines obtained from GPs was highest (M=109 Rand), followed by medicines from the traditional healer (M=60 Rand), and pharmacy (M=34 Rand) (see Table 20).

Table 19: Costs of medicines obtained from various sources in Rand

	n	Minimum	Maximum	Mean	Std. Deviation
Home remedy	11	.0	100.0	10.0	29.9
Self remedy from pharmacy	30	2.5	98.5	33.8	26.5
Self remedy from shop	11	2.0	37.4	17.1	10.6
Medication stored in the house	1	.0	.0	.0	.
Medication from private doctor	15	.0	323.4	109.1	110.0
Medication from traditional healer	7	.0	160.0	60.0	51.3

Child hood diarrhoea management

On the question “What would you do if your 3 year old had diarrhoea, had 4 watery stools since yesterday and does not want to eat?” most respondents (63%) indicated that they would give their 3 year-old child with diarrhoea a home prepared oral solution (ORS) and taking child to a health professional (22%) (see Table 21).

Table 20: Childhood diarrhoea management

	Frequency	Valid Percent
Give home-prepared oral solution	251	63.2
Take the child to hospital or health facility	87	21.9
I don’t know	20	5.0
Other	39	9.8
Total	397	100.0

Medicines kept in house

Further, it seems almost all households (87.7%) stocked drugs for anticipated illness in the future. Most medicines kept at home were (1) Analgesics, antipyretics, non-steroidal anti-inflammatory medicines (NSAIMs), medicines used to treat gout and disease modifying agents in rheumatoid disorders (DMARDs) (27%), (2) Medicines acting on the respiratory tract (15%), (3) cardiovascular and diuretics medication

(11.6%), and antibiotics (11%). Five percent kept herbal medicine at home for future use (see Table 22).

Table 21: Type of medicines kept in house (multiple responses possible)

	Responses	
Groups of medicines (WHO, 2005)	n	%
Analgesics, antipyretics, non-steroidal anti-inflammatory medicines (NSAIMs), medicines used to treat gout and disease modifying agents in rheumatoid disorders (DMARDs)	338	26.8%
Medicines acting on the respiratory tract	196	15.6%
Cardiovascular medicines & diuretics	146	11.6%
Antibiotics	142	11.3%
Steroidal medication	13	1.0%
Anti-Asthma medication	69	5.5%
Hormones, other endocrine medicines and contraceptives	33	2.6%
Vitamins and minerals, Solutions correcting water, electrolyte and acid- base disturbances	75	6.0%
Antiallergics and medicines used in anaphylaxis	20	1.6%
Traditional medicines	63	5.0%
Anticonvulsants/antiepileptics/psychotherapeutic medicines	39	3.1%
Ophthalmological preparations	6	.5%
Gastrointestinal medicines	102	8.1%
& Dermatological medicines (topical), antineoplastic		
Anti-retroviral or HIV medication	2	.2%
Total	1260	100.0%

There were no significant differences between rural (n=178) and urban (n=172) dwellers in terms of keeping medicines at home.

Expiry of drugs kept at home

From a cumulative total of 1260 drugs kept at home 2.5% had expired.

Participants were further asked for which illness or symptom they kept medicines at home. Medicines kept for anticipated future use were in descending order of frequency for the following (1) body pains and other signs and symptoms (46%), (2) respiratory and related conditions (15%), cardio-vascular conditions (14%), and gastro-intestinal conditions (8%) (see Table 23).

Table 22: For which illness or symptom kept medicines at home (multiple response possible)

	Responses	
	n	%
Body pains and other signs and symptoms	469	45.6
Respiratory and related conditions	154	15.0
Cardiovascular conditions	146	14.2
Gastro-intestinal conditions	79	7.7
Ear, nose and throat conditions	35	3.4
Central nervous system and mental conditions	28	2.7
Trauma and emergency conditions	21	2.0
HIV-AIDS and related illness	15	1.5
Sexually transmitted infections and related conditions	13	1.3
Eye condition	9	.9
Skin conditions	6	.6
Other	53	5.2
Total	1028	100.0%

Medicines kept at home (n=1141) were purchased or obtained from: 1) public clinic or health centre (39.6%), 2) public hospital (25.9%), 3) community pharmacy (17.3%), 4) private surgery (11.6%), 5) supermarket or drug store (4.6%), 6) traditional healer (0.2%) and other (1.0%). Both rural (630 medicines) and urban (633 medicines) dwellers were keeping the same number of medicines at home. Most (62.1%) indicated that they had obtained these medicines free of charge, while 25.1% paid in the range of 1 to 25 Rand and 12.8% paid above 25 rand of the medicines obtained.

On the question, where they could obtain medicines in their community, most said community pharmacy or chemist (52.5%), traditional healer (36.9%), and other (10.6%).

Access to medicines in the community

Most participants indicated that they would have access to a health facility where they could obtain medicines within 10km of their residence, which could be reached within 30 minutes, and would cost less then 5 Rand for transport. However, among the rural communities in the study medicines (health and pharmacy facilities) were significantly less accessible than in the urban communities (see Table 24).

Table 23: Physical and financial access to health facility and pharmacy (*P<.001)**

	Total n (%)	**Urban n (%)**	**Rural n (%)**	**?²**
Time to nearest clinic <30 Min 30-60 >60 Min	 219 (68.0) 102 (31.9) 1 (0.3)	 151 (94.5) 8 (50.0) 1 (0.6)	 68 (42.0) 94 (58.0) 0	Df=2 104.96***
Time to nearest pharmacy <30 Min 30-60 >60 Min	180 (65.9) 87 (31.9) 6 (2.2)	150 (94.3) 8 (5.0) 1 (0.6)	 30 (26.3) 79 (69.3) 5 (4.4)	Df=2 136.91***
Distance to clinic <5km 5-10 >10 km	221 (67.0) 109 (33.0) 0	152 (93.8) 10 (6.2)	69 (41.1) 99 (58.9)	Df=1 103.72***
Distance to pharmacy <5km 5-10 >10 km	168 (61.3) 83 (30.3) 23 (8.4)	142 (89.9) 15 (9.5) 1 (0.6)	26 (22.4) 68 (58.6) 22 (19.0)	Df=2 128.22***
Costs to clinic (in Rand): <5 5-25 >25	170 (63.2) 99 (36.8) 0	84 (95.5) 4 (4.5) 0	 89 (47.5) 95 (52.5) 0	Df=1 58.51***
Costs to pharmacy (in Rand) <5 5-25 >25	94 (42.3) 125 (56.3) 3 (1.4)	74 (78.7) 20 (21.3) 0	 20 (15.6) 105 (82.0) 3 (2.3)	Df=2 88.69***

Discussion

This household survey found that 29% of the medicines used were not prescribed by a health care professional (self-medication or prescribed by a traditional healer). Self-medication can be defined as obtaining and consuming drugs without the advice of a physician either for diagnosis, prescription or surveillance of treatment (Montastruc et al., 1997). This finding is similar to what Shankar et al. (2003) found in survey of drug use patterns in western Nepal where 28.4% used complementary medicine (including 18.9% home remedies), and Durgawale (1998) among Indian slum dwellers (35%). In a large representative survey in the use of medication by the Spanish general population older than 0 years a little over 20% of the medicines used were not prescribed by a doctor (self-medication) (Del Rio, Prada & Alvarez, 1997). The use of traditional healers was with 2% lower than found in another study in South Africa where 34% had consulted a traditional healer for their last illness episode in an urban community sample in the Limpopo Province (Peltzer, 2000).

In this study the commonest allopathic medicines prescribed by the public sector were analgesics/anti-inflammatory medication (29.5%), ENT, cough mixtures and flu medication (19.4%) and antibiotics (18.4%). Shankar et al. (2002) found in a community survey in western Nepal that the commonest allopathic medicines prescribed were antibiotics and paracetamol.

This study showed that urban respondents were more frequent users of self-medication, which is conform to a study in western Nepal (Shankar et al., 2002) where rural patients used more public health services. However, in this study both rural and urban dwellers were keeping the same number of medicines at home. This is different from a community study in Zimbabwe where rural dwellers were keeping significantly more medicines at home than urban dwellers (Stein et al., 1989).

This study found that 2.8 drugs were prescribed on average from the public health facility, 2.7 from private health facilities, 2.4 from home remedy, and 2.3 self-remedy from the pharmacy, which is lower than found in a household survey in rural India where Bhatnagar et al. (2003) found that 3.07 drugs were prescribed on average. This was less in public facilities (2.67) compared to unqualified (defined as local unqualified private practitioners, medicine shops and traditional/spiritual healers) (2.91) and private practitioners (3.6).

Rational drug use (instructions on how to use medication, contra-indications or side-effects, prevention or care) were recalled by participants mostly from public clinics or hospitals, and to a lesser extend by GPs, pharmacists, and the least by the traditional healer. Although information on drug use was mostly given by the different treatment sources information on contra-indications or side-effects as well as prevention or care were hardly provided or recalled. Therefore, it is recommended that patient counselling on instructions on how to use medication, contra-indications or side-effects, prevention or care is emphasized, especially in rural health facilities.

Due to the difficulty of physically and financially accessing health care services in South Africa, clinic treatment, especially in rural areas, and self-medication are often the simplest option for the patient. Since traditional practitioners are easily accessible, people also turn to them for their health care needs. However, traditional practitioners may need to be educated about when to refer a patient for more specialized care. Educational intervention to help patients decide on the appropriateness of self-medication may be helpful (Shankar et al., 2002).

This study further found that for the treatment of childhood diarrhoea most respondents (63%) indicated ORS and taking the child to a health professional (22%). This finding is similar to what CASE (2003) found from a national representative household survey in South Africa where 55% would give ORS and 36% would go to a health professional for childhood diarrhoea management.

Important would be to note the number of households keeping antibiotics (11.3 %), analgesics (26.8%), steroids (1.0%), and vitamins (6.0%). Okumura, Wakai and Umenai (2002) found among rural communities in Vietnam that 55.1% were keeping antibiotics, 60.9% analgesics, 13.8% ORS, 7.2% steroids and 32.6% vitamins.

Study limitations

Due to the skewed sex distribution of our sample, and the effect of recall bias and other confounding variables, the results may not be truly representative of the population in the two provinces. Further studies on the prevalence, the factors influencing and the appropriateness of self and non doctor prescribing are required.

4.3 PHYSICAL ACCESS TO PHARMACEUTICAL SERVICES

Introduction

Interest in the inequalities in health and health status has always been an interest for geographers of health, both in high and low-income countries of the world. Access to health services in low-income countries is of special interest, as authors such as Noor et al. (2004) argue that very little attention is still being paid to the spatial determinants thereof. Among the other factors which influences access to health care (economic, cultural and political), 'geographic access is the most significant factor in the utilization of health services' (Noor et al., 2004: 2045)

Geographic or physical access to health services is derived from the place of residence of the (potential) user and the location of a health facility. It excludes the access barriers experienced by special populations such as the mobility and visually impaired when visiting these facilities (Rosero-Bixby, 2004). Measuring physical access has traditionally been measured through determining the Euclidean (or crow-fly) distance to the nearest facility (Lin, 2004; Noor et al., 2004; Rosero-Bixby, 2004) or travelling costs (Kumar, 2004).

An example of the use of the Euclidean distance in the determination of the accessibility of pharmacies was used by Lin (2004). The Euclidean distance was determined between the centre point of a census block and the location of community or retail pharmacy through the use of ArcView GIS 3.2 software. The closest pharmacy to that census block was determined and the Euclidean distances were compared in rural and urban areas.

The premise for Lin's research was that the spatial distribution of pharmacies does not necessarily take into account the risk factors associated with diseases in vulnerable populations such as the elderly (Lin, 2004). Through the application of a GIS, Lin (2004) was able to determine that although the accessibility of pharmacies was 'generally good' in the study area, some rural areas do not have an acceptable level of accessibility to pharmacies.

The data on health services used in the above cases studies cited from literature were highly detailed in terms of location and other characteristics. This enabled those researchers to measure physical accessibility at a very local level, which is ideal in terms of health care planning and assessing the health impact on the client population of such services. In the absence of such detailed data, other research methods can be adopted to obtain a semblance of what accessibility is in the sample provinces.

In 1998, Gray (1998) indicated that the ratio of pharmacists to population in South Africa was 1: 3897. The norm proposed for industrialised by the World Health Organisation (WHO) was 1: 2300, which translates to 4.34 pharmacists per 10 000 persons. Assuming that one pharmaceutical service is staffed by one pharmacist, the main question in this study is, "What number of pharmaceutical services is available to the population within a relatively small area in the sample provinces?" This comparison between supply (pharmaceutical services) and demand (population), will serve as proxy for physical access which is usually determined

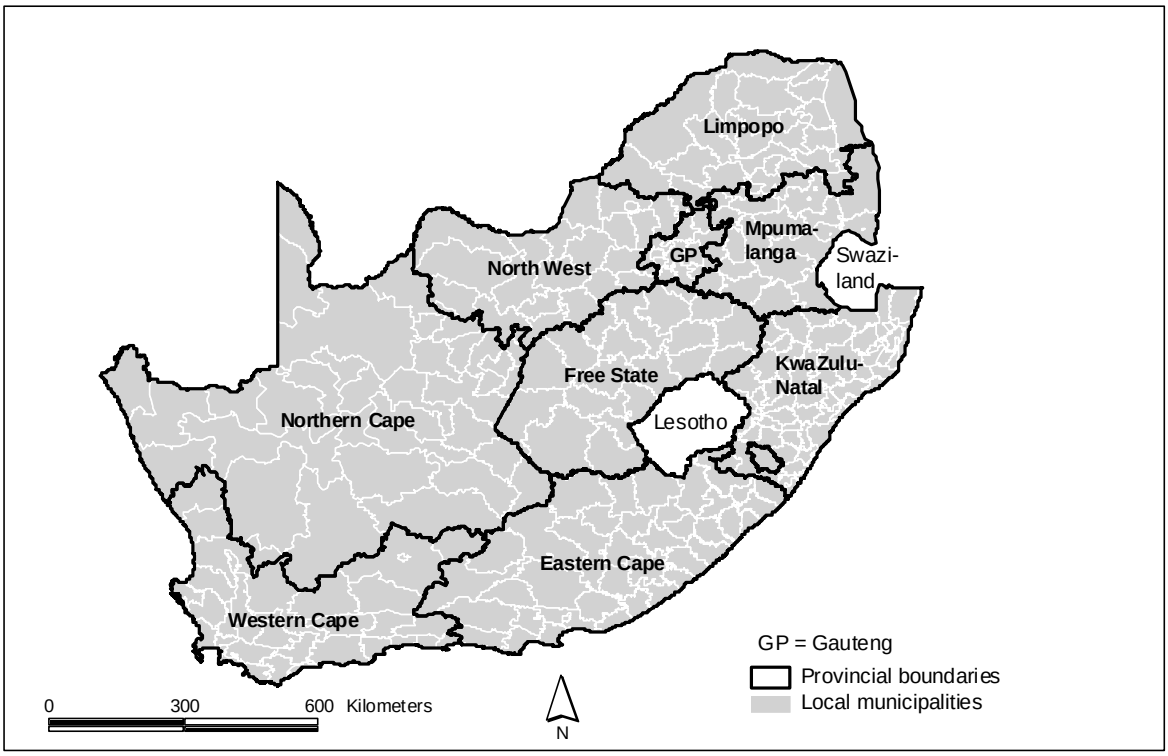
through the consideration of distance and travel costs. This proxy is a relatively crude measure of the population's physical access to pharmaceutical services in their respective municipalities.

Data and Methods

The pharmaceutical services included in the study are those rendered by public and private hospitals, general practitioners, retail pharmacies and pharmacies attached to private institutions. Pharmaceutical services offered by prisons, hospices, military bases and hospitals, care centres and other facilities serving specified segments of the population, were excluded.

The sample provinces selected for the study were Gauteng, Limpopo, Western Cape and Northern Cape (Figure 1). The data sources on pharmaceutical services in these provinces were as diverse as the categories which they represent. An electronic register of general practitioners (GPs) were obtained from the publishers of Medpages. These were not limited to GPs who were registered with the Department of Health as dispensing GPs. The South African Pharmacy Council provided an electronic list (June 2005) of all retail and private institution pharmacies. Contact details for public hospitals were obtained from the provincial health departments in the sample provinces and that for private hospitals from the website of the Hospital Association of South Africa (HASA) (www.hasa.co.za).

Figure 1: Provinces of South Africa



Information on the physical location of the above pharmaceutical services did not include exact latitude and longitude coordinates, as can be reasonably expected. An alternative method had to be used to assign each service to a local municipality, as this was the geographical or administrative unit of interest for the purposes of the study. To utilise the data sources for the purposes of a geographical information system (GIS) application, it was important to establish the physical location, as this is required assign such service to a local municipality.

The postal code, which forms part of the physical address for each service, was used for this purpose. This was possible since the Human Sciences Research Council (HSRC) has the latitude and longitude coordinates for the centroids of all postal code areas in South Africa. Using this spatial information, it was possible to determine within which local municipality a service was located through the process of geo-coding. It is important to note that the relative operational capacities of the identified pharmaceutical services were not taken into account and that it is premised that all pharmaceutical services render the same extent and quality of service.

The population recorded during Census 2001 by Statistics South Africa was used as the demand or potential demand indicator for pharmaceutical services. This data was available at the sub-place (suburb or village) level and could be aggregated to the municipal level. Nine local municipalities in the sample provinces were cross-boundary municipalities at the time of Census 2001. This meant that the physical extent of such local municipality was located astride of two adjacent provinces.

Recent legislation proposed that cross-boundary municipalities are to be re-demarcated and fully or partly assigned to either province, but for the purposes of

this study all cross-boundary municipalities which were partly located in a sample province, were considered.

Province	*General Practitioners*	*Private Hospitals*	*Public Hospitals*	*Retail Pharmacies*	*Private Institutions Pharmacies*	*Total Number of Facilities*	*Percentage of Total Facilities*
Gauteng	3311	168	31	638	40	4188	57.2%
Western Cape	*1814*	*26*	*70*	*381*	*14*	*2305*	*31.5%*
Limpopo	444	2	40	73	7	566	7.7%
Northern Cape	*187*	*2*	*30*	*46*	*0*	*265*	*3.6%*
TOTAL	**5756**	**198**	**171**	**1138**	**61**	**7324**	**100.0%**

ArcView GIS software (Version 3.2) was used to establish an integrated GIS-database of the pharmaceutical services and the population at the municipality level. The frequency of all pharmaceutical services and the 2001 population per local municipality was created in a tabular format and joined to the spatial boundaries of the municipalities. This allowed for the further analysis and representation of the data.

Results

A total of 7324 pharmaceutical services were identified and their distribution in the four sample provinces is listed in Table 25 below.

Table 24: Distribution of Pharmaceutical Services

Most of the services (57.2%) are located in Gauteng, whilst the Northern Cape has the least

(3.6%) of the total number of pharmaceutical services included in the study. The high number of pharmaceutical services in Gauteng and the Western Cape, points to the extensive urban areas which constitutes these provinces and the predominantly rural nature of the two other sample provinces.

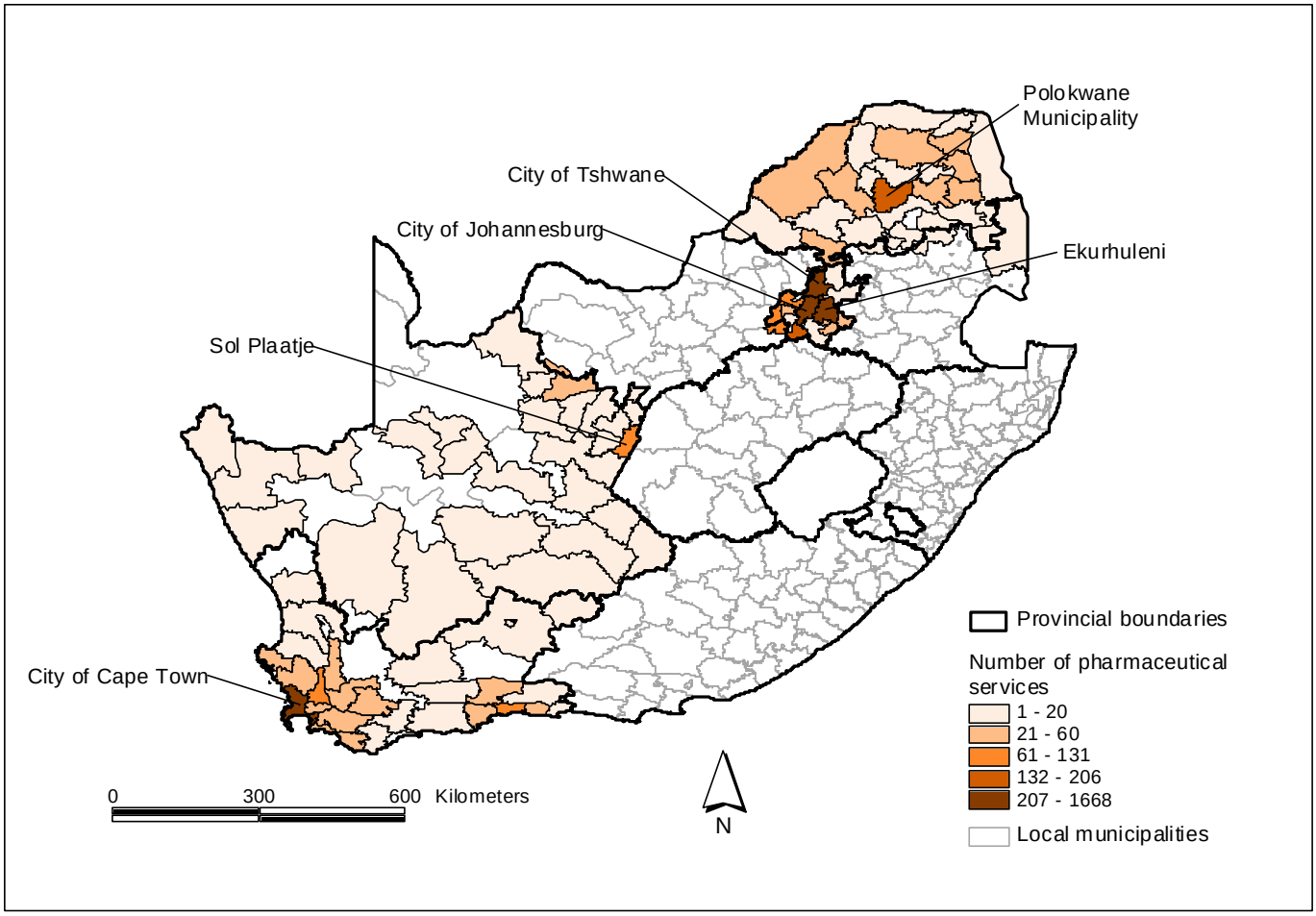
Table 25: Distribution of Municipalities in the sample provinces

Province	*Number of Municipalities*	*Percentage of SA surface area (%)*
Northern Cape	31	29.7
Western Cape	30	10.6
Limpopo	26	10.2
Gauteng	13	1.4
TOTAL	**100**	

The four sample provinces are subdivided into 100 local municipalities (Table 2) with the majority of municipalities located in the Northern Cape. The relatively lower number of local municipalities in Gauteng indicates the larger physical extent of the other three provinces. For example, the Northern Cape comprises 29.7% and Gauteng 1.4% of South Africa's total land area, respectively (Statistics South Africa, 2003).

Through the use of the geo-located postcodes for South Africa, it was determined that 90 of the 100 local municipalities in the four provinces, had at least one pharmaceutical service. Figure 2 confirms the urban bias in the distribution of pharmaceutical services as the majority of services are located in the metropolitan municipalities of Gauteng and the Western Cape.

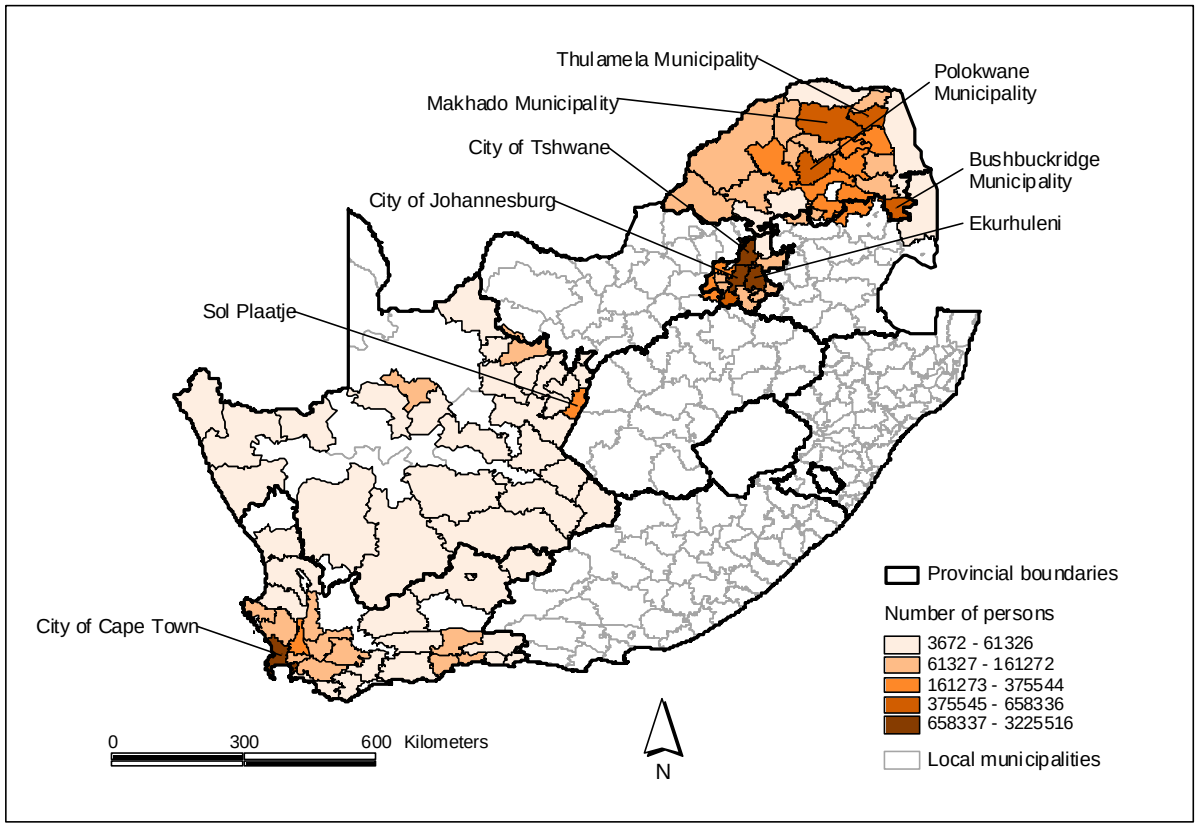
Figure 2: Distribution of pharmaceutical services by municipality



The City of Johannesburg has the highest number of pharmaceutical services (1668), followed by the City of Cape Town with 1661. The City of Tshwane and the Ekurhuleni Metropolitan municipality has 1112 and 869 pharmaceutical services each. The highest number of pharmaceutical services in Limpopo province is located in the Polokwane municipality (206) and in the Sol Plaatje municipality (98) of the Northern Cape.

The distribution of the 2001 population in the sample provinces largely corresponds with the distribution of facilities (Figure 3). Notable exceptions to this, is that relatively large numbers of people reside outside of the major metropolitan areas, in municipalities such as Thulamela (584422), Bushbuckridge (499580) and Makhado (496882).

Figure 3: Population distribution by local municipality



A measure of the access which the population may have to the pharmaceutical services of interest, is to determine the number of such services to a standardised measure of the population for 2001. The number of pharmaceutical services available to the population at the provincial level is summarised in Table 3, with a more localised provincial analysis is possible through the application of a GIS.

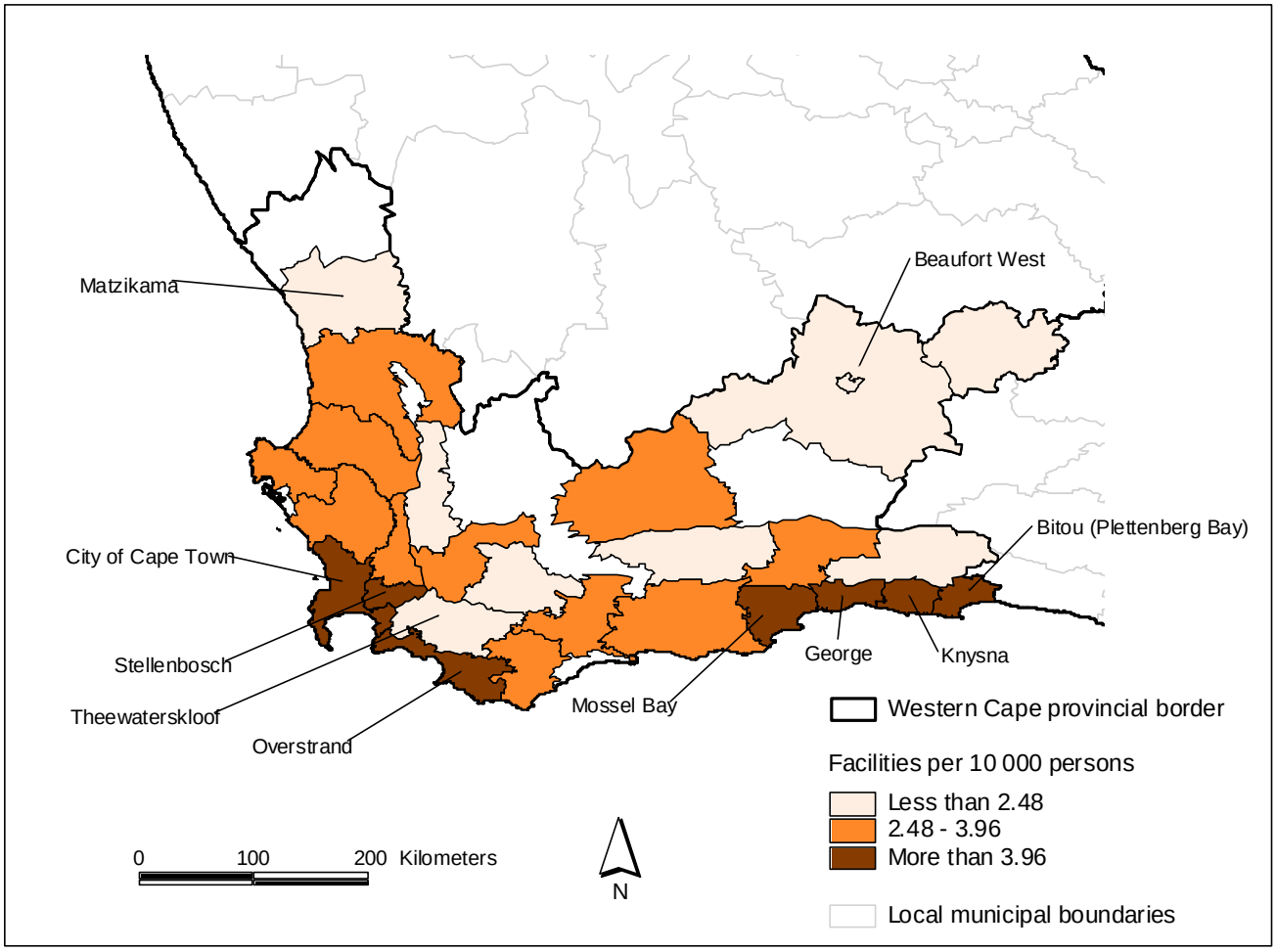
Table 26: Provincial distribution of pharmaceutical services and population

Province	***Population in 2001***	***Pharmaceutical Services***	***Pharmaceutical Services per 10 000 persons***
Western Cape	4524335	2305	5.09
Gauteng	8837178	4188	4.74
Northern Cape	822727	265	3.22
Limpopo	5273642	566	1.07
TOTAL	**19457882**	**7324**	**3.76**

The overall value for the number of pharmaceutical services per 10 000 persons in the sample provinces is 3.76, with the Western Cape (5.09) and Gauteng (4.74) exceeding this figure. Provincial analysis reveals that in terms of potential access to health services, there are stark differences between municipalities in terms of the supply of pharmaceutical services.

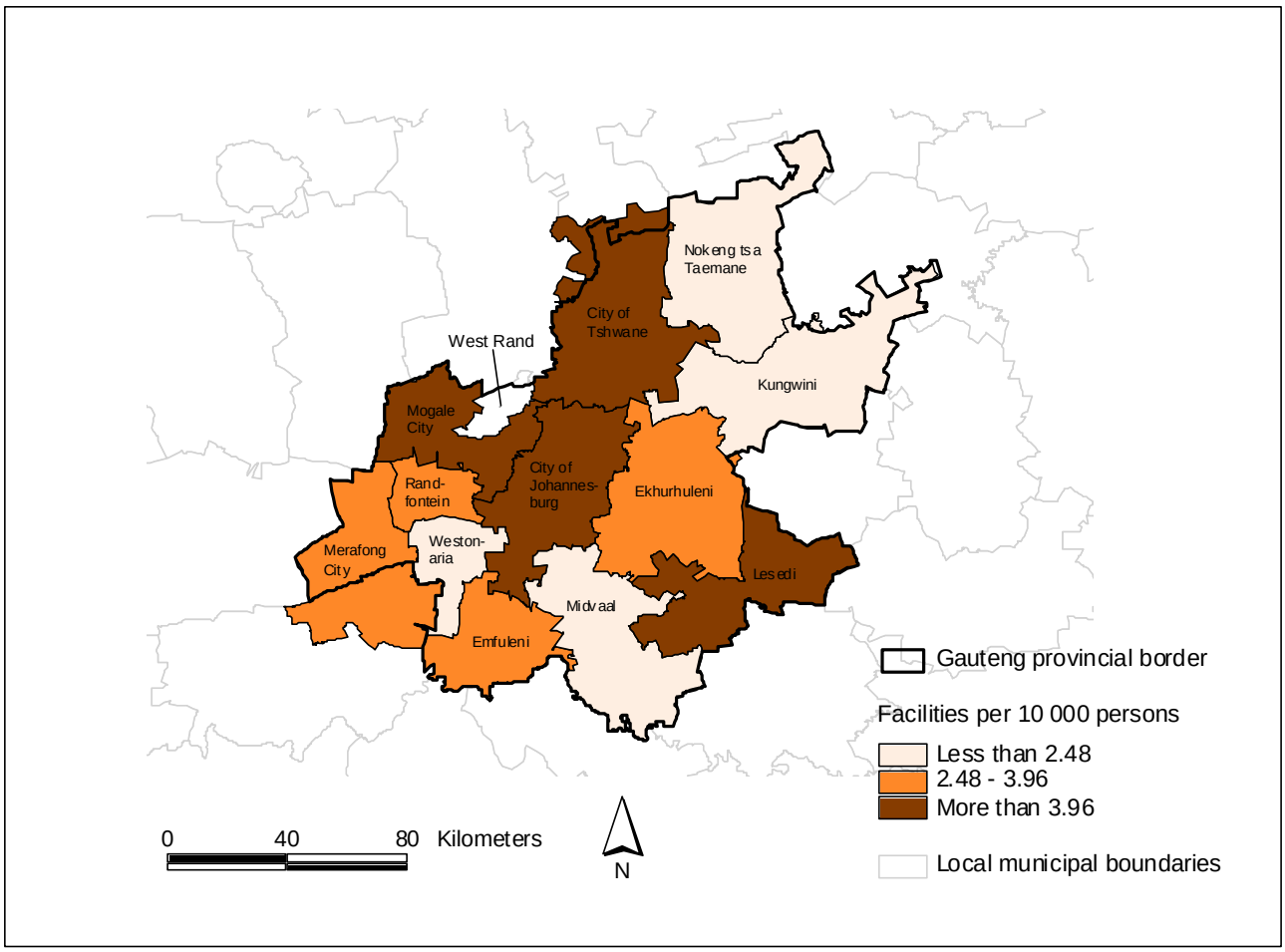
In the Western Cape (Figure 4), six of the 30 municipalities had a value of more than the overall provincial value of 5.09 facilities per 10 000 persons. These municipalities are concentrated along the Atlantic seaboard and the southern Cape, with the exception of Mossel Bay which is at 4.76. The lower values are for municipalities in the Karoo and the west coast such as Beaufort West (2.16) and Matzikama (1.2), respectively.

Figure 4: Pharmaceutical services per 10 000 persons in the Western Cape



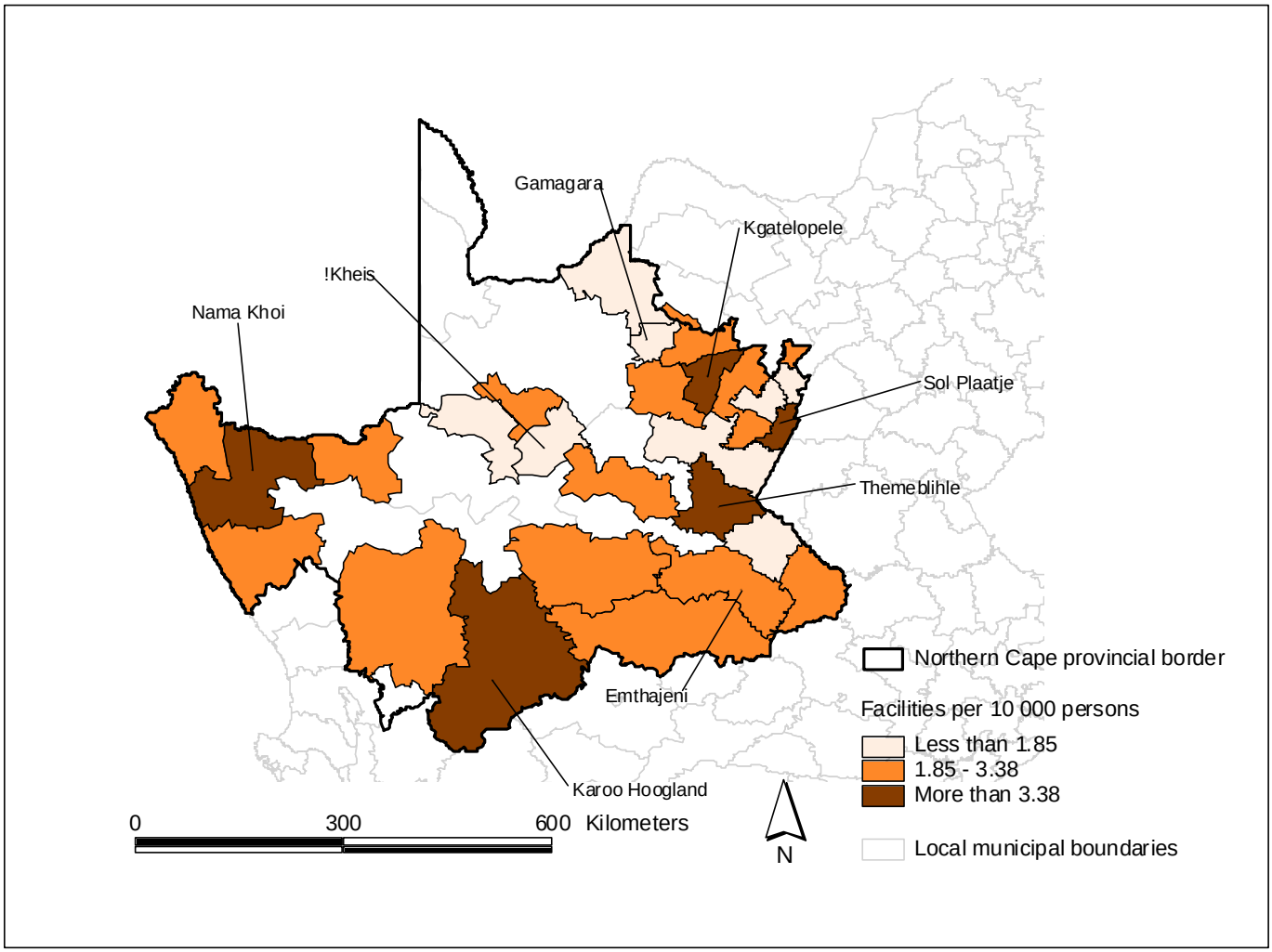
In Gauteng (Figure 5), the municipalities of Tshwane (5.6) and Johannesburg (5.17) has the highest number of services per 10 000 persons, higher than the overall value for Gauteng (4.74). Ekurhuleni (3.5) is the only metropolitan municipality with a value lower than that of the province. The lowest values are found in Westonaria and Midvaal and the north-eastern municipalities of Kungwini and Nokeng tsa Taemane.

Figure 5: Pharmaceutical services per 10 000 persons in Gauteng



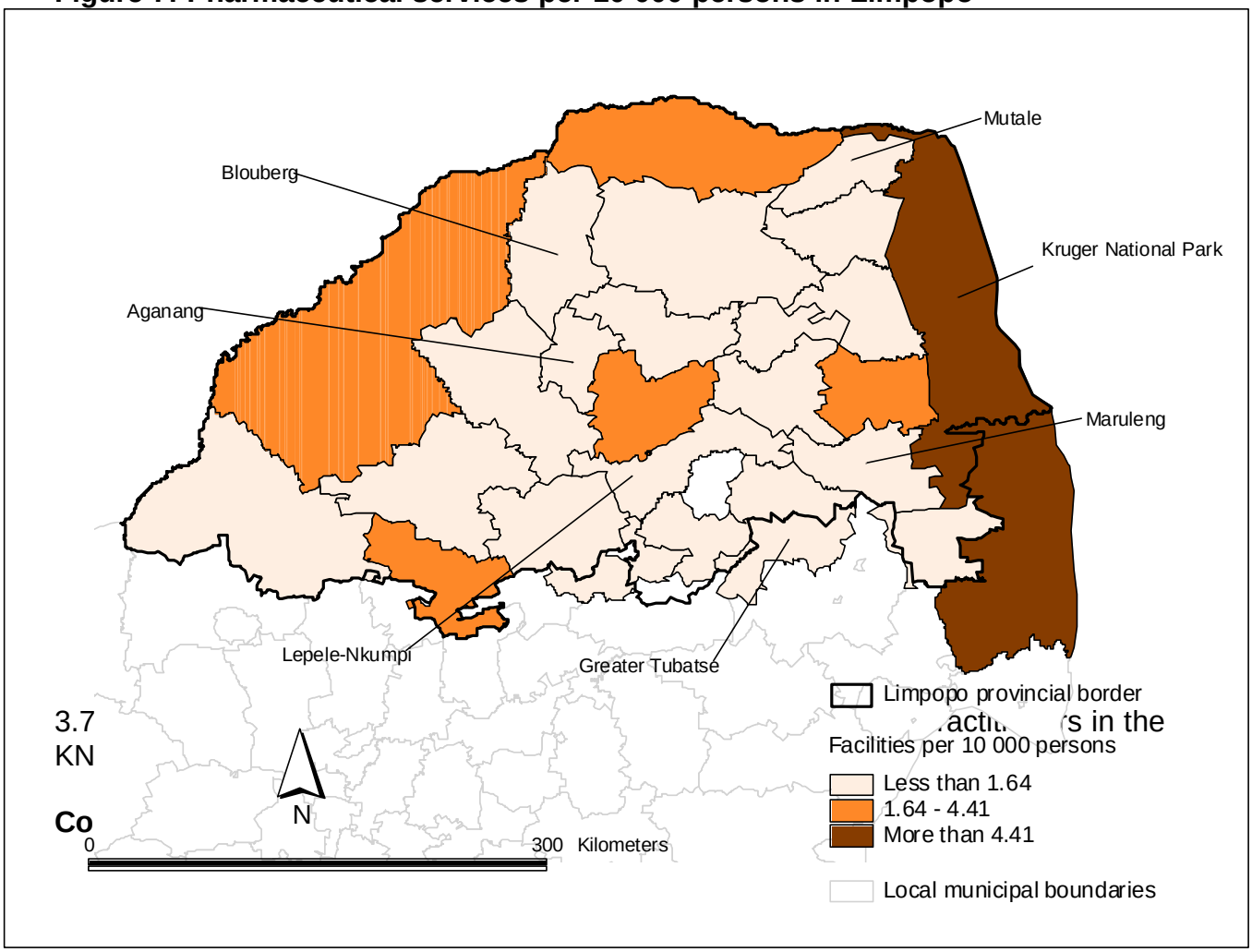
The data revealed that there were 3.22 pharmaceutical services for every 10 000 persons in the Northern Cape Province. Along with Limpopo, it has an overall figure less than the four sample provinces combined. In six of the 31 Northern Cape municipalities, that value was more than its overall value of 3.22. These municipalities are; Sol Plaatje (4.86), Karoo Hoogland (4.75), Kgatelopele (3.88), Nama Khoi (3.58), Thembelihle (3.58) and Emthajeni (3.38). The !Kheis and Gamagara municipalities are the worst off in terms of municipalities where data were recorded in the Northern Cape, as they both have less than one (0.62) facilities per 10 000 population.

Figure 6: Pharmaceutical services per 10 000 persons in the Northern Cape



Limpopo is the province with the least number (1.07) of pharmaceutical services per 10 000 persons in the study, but in 25 of its 26 municipalities, at least one such service was recorded. The distribution of values is quite varied, as 15 of the 25 municipalities have a value less than 1. The municipalities with the lowest five values are indicated in Figure 7 below. The most notable exception with respect to Limpopo and the rest of the sample provinces is the Kruger National Park. It has a value of 21 pharmaceutical services to 10 000 persons, quite higher than the overall figure of

Figure 7: Pharmaceutical services per 10 000 persons in Limpopo



The nature and extent of the data available for this study resulted in relatively crude measures of physical accessibility to pharmaceutical services in the sample provinces. More advanced mechanisms to determine physical accessibility are cited in the literature, but those would require more data on the exact location, the actual utilisation and the quality of the pharmaceutical services rendered.

The data available for this study also had its shortcomings. In several cases during the provincial analyses, some municipalities were excluded as the data suggested that none of the pharmaceutical services in any of the categories where located there. Even though the data sets used for this study were deemed to be exhaustive at the time of collection, this does not mean that the data sets were error free, as certain records may have been excluded. Anecdotal evidence would suggest, that it would be impossible that a there is a single municipality in South Africa where no registered general practitioner resides and works.

For the municipalities where data was recorded, it remains difficult to assess whether the values for the number of pharmaceutical services per 10 000 persons at that level, represents an acceptable figure in terms of a proxy for access to pharmaceutical services. This is because there is no clear indication as to what constitutes a standardised or normative value.

Future studies should take the data requirements for more localised foci of physical accessibility into serious consideration. For example, should one be able to locate pharmaceutical services at a street level or through the use of a global positioning system (GPS), it will allow for analysis using the population of smaller areal units such as sub places. These smaller areas can then serve as an indication of the (potential) demand for such services within service areas which can be established within mandated buffer areas, for example in radii of 5 km zones. If such locational data can be analysed in conjunction with utilisation data, it would paint an even clearer picture as physical access can then be compared to revealed access (utilisation).

To contextualise utilisation, the nature and extent of services can also be included in the analysis. Such contextualisation would be important, as the planners of pharmaceutical services in South Africa need to urgently deal with the requirements of clients living with, and caring for, people with HIV/AIDS. The needs of those with diseases associated with the epidemiological transition such as hypertension, obesity, eating disorders and depression, amongst others, are also important considerations.

Pharmaceutical services offered by traditional healers needs also be taken into account, as they continue to play an important role in the health seeking behaviour of many South Africans. In general, pharmaceutical services have expanded since the entry of retail grocery and other stores to the market. The extent of both these services needs to be incorporated into databases dealing with comparisons between supply and demand for pharmaceutical services in South Africa. In all of these, GIS will continue to play a pivotal role in the analysis of physical and other forms of access to these services.

5. DISCUSSION AND RECOMMENDATIONS

Table 28 below summarizes the outcomes of the various drug use indicators across the various surveys conducted between 96 to 2005 in South Africa. The 2005 survey was only conducted in two provinces (Western Cape and Limpopo), and therefore a comparision is limited since previous surveys included all or almost all provinces.

Table 27: Drug use indicator comparisons

EDL national surveys in health facilities	Baseline surveys (1996-98)	Survey 2003	Survey 2005 public	Survey 2005 private
Availability of essential drugs				
PR33: Number of prescribers having direct access to a (national) drug formulary (EDL/STG books), out of total number of prescribers surveyed	59%	97%	100% (hospitals)	75% (GPs)
Percentage of drugs from national essential drugs list found on the shelves of facilities		86	96%	95%
Percentage of drugs prescribed from essential drug list or formulary	65	90	93% (hosp)	69% (GPs)
Percentage of drugs prescribed by generic name	36	37	41.9 (hosp)	10.7 (GPs)
Medicines received in pharmacy				98.8% (pharmacy)
Pharmacies per 10,000 population				3.76
Affordability of essential drugs				
Average drug cost per encounter (community survey)				109 R (GP)
Quality of drugs				
OT6: Number of drugs beyond the expiry date, out of the total number of drugs surveyed		9.4%		2.4% (at home)
Rational use of drugs				
OT7: Average number of drugs per prescription	2.5	2.2	3.3 (hosp)	3.1 (GPs)
OT8: Number of prescriptions with at least one injection, out of the total number of prescriptions surveyed	11	5	8.6 (hosp)	22.4 (GPs)
Percentage of encounters with an antibiotic prescribed	36	47 (hosp)	54.9 (hosp)	71.9 (GPs)
Percentage of drugs adequately labelled (labels complied with legal requirements: quantity, dosage and dosage interval, patient name, facility name, facility or patient reference number)		20	57.2	36.7
Percentage of patients satisfied with care (associated with drug supply) they received		81	85.6 (hosp)	99.3 (GPs)
Average consultation time			9min (clinics)	
Percentage of drugs actually dispensed				98.8% (pharmacy)
Percentage of medication adherence				30% (clinics)

According to the International Network for Rational Use of Drugs (INRUD) the following standards apply:

- Average number of drugs prescribed <1.6
- % cases antibiotics: <20%
- % cases injections: <15%
- % drugs on essential drug list: 100%

- average consultation time: >10 min
- average dispensing time: >5 min
- % of units having treatment guidelines: 100%

Physical access to pharmacies
This study found that nationally there are 3.76 pharmacies per 10,000 population, with the lowest in Limpopo (1.07) and highest in the Western Cape (5.09). WHO recommends one pharmacist per 10,000 population.

Availability of references and guidelines
All public hospitals had the national standard treatment guidelines, while 77% of GPs and 43% of retail pharmacies had them. The National Essential Drugs List (EDL) was found in 100% of public hospitals in 2005 compared with 97% in 2003 and 59% in 1997. It was, however, only in 75% of surgeries available.

Inventory compliance with national Essential Drugs List (EDL)
In 2005 96% of drugs found on the shelves of public hospitals were found to be from the National EDL, compared to 86% in 2003, which is a notable change. Among GPs 65% of drugs found on shelves were found to be from the National EDL.

Medicines received
In 2005 98.8% of prescribed medicines were received and 1.2% were not received in independent pharmacies. Massele et al. (2002) studied prescribing pattern in Tanzania and found that the percentage of patients leaving the dispensaries with no prescribed drugs was between 1.3% and 0.7%.

Number of drugs prescribed per prescription
The average number of medicines per prescription was in previous survey in public health facilities below 3 (2.5 in 1997 and 2.2 in 2003), and has gone up to 3.3 in public hospitals in 2005; in surgeries it was 3.1. The average number of medicines per prescription is high, therefore suggesting that their may be poly pharmacy. Hogerzeil (1993) found in the study of drug use in twelve developing countries, including outlying values of high average numbers of drugs per encounter in Indonesia and Nigeria (3.3 and 3.8). Hafeez et al. (2004) found among public sector facilities in Pakistan that the average number of drugs per prescription turned out to be 2.7. Keohavong et al. (2002) found that in Lao PDR (2002) 3 items of drugs were prescribed per average encounter in the public sector.
Compared to this study where GPs prescribed 3.1 medicines per encounter, Trap et al. (2002) found lower rates among GPs in Zimbabwe, whereby dispensing doctors prescribed significantly more drugs per patient than non-dispensing doctors (2.3 versus 1.7).

Prescribing according to the national Essential Drugs List
In 2005 93% of all prescribed items in public hospitals were found to be in accordance with the National EDL, which compares with 90% in 2003. It was much lower among GPs (69%). Massele et al. (2002) found in Tanzania that over 70% of prescriptions conformed to the Tanzania essential drug list in the public sector. Keohavong et al. (2002) found in Lao PDR that 84% of prescribed medicines in the public sector were on the national essential drug (ED) list. Rothberg and Walters (1996) found in a large health maintenance organisation in South Africa that only

22.4% of current GP prescriptions included EDL items; a further 19.6% included 'other forms of EDL' items. Simply obtaining those EDL products that are currently prescribed at state tender prices would reduce costs by almost 20%, while extending the use of EDL products might save in excess of 70% on private sector GP prescriptions. Compared to 1996 there is has a significant increase from 22% to 69% in prescribing according to the EDL in by in the private health sector South Africa.

Items prescribed generically

In 2005 41.9% of medicines were prescribed by generic name in public hospitals which is a bit higher than in previous surveys of 37% in South Africa but low compared to public health care services in Lao PDR (Keohavong et al., 2002) where 78% were prescribed by generic name and Tanzania (Massele et al., 2002) with 79.1% generic prescriptions. Among GPs only 11% prescribed by generic name.

Antibiotic prescribing

Antibiotic use of 36% in 1997 and 47% in 2003 has been described as a problem. There has been a further increase of on average of 55% of patients exiting a public hospital in 2005 had received at least one antibiotic, and even higher among patients exiting from a private surgery (72%). Tuberculosis (TB) and other opportunistic infections related to HIV and AIDS might have an influence on high antibiotic prescribing. Compared to the 2003 survey, also this 2005 survey found high antibiotic prescribing in the Western Cape and Limpopo Provinces.

Similar high percentages of prescriptions in public health facilities of one or more antibiotics in Uganda and Sudan (56% and 63%) were reported by Hogerzeil (1993), in Lao PDR 47% (Keohavong et al. 2002), 60-65% in PHC centres in Ethiopia (Desta et al., 1997), and more than half of the prescriptions contained antibiotics in Pakistan (Hafeez et al., 2004).

Injection prescribing

Injection use is not a general problem in South Africa. In 2003 5% of patients were prescribed an injection, a decrease from 11% in 1997. In public health facilities in 2005 it was 8.6% of patients who received an injection, while it was high among GPs (22.4%).

Hogerzeil (1993) found the use of injectable drugs in Uganda, Sudan, and Nigeria (36-48%), 18% in Lao PDR (Keohavong et al., 2002), over 37% in PHC centres in Ethiopia (Desta et al., 1997) and Hafeez et al. (2004) that 15% of patients were prescribed with injectables in Pakistan.

While this study found 22.4% injection prescribing among GPs, similar rates were found by Trap et al. (2002) among doctors in Zimbabwe whereby dispensing doctors injected more patients (28.4%) than non-dispensing doctors(9.5%).

Labelling of medicines

In 2003 only 20% of labels complied with legal requirements, which has increased to 57% in public hospitals in 2005, it was 37% among GPs. Keohavong et al. (2002) found in Lao PDR that 67% of medicines prescribed in the public sector were adequately labelled.

Patient satisfaction
In 2005 86% of patients were satisfied with the care they had received from a public hospital on the day of the survey, which is an increase from 81% in 2003. Satisfaction was much higher from surgeries (99%). Studying public health facilities in Pakistan Hafeez et al. (2004) found that only half of the patients expressed satisfaction with their visit to health facility.

Treatment adherence
In a sample of PHC clinic patients who were followed up, only 30% were adherent to their medication regimen.

Patient consultation time
This study found an average consultation time of 9 minutes among PHC clinic patients.
Desta et al. (1997) an average consultation time of 5.8 minutes among primary health centres in Ethiopia.

Private health facilities
Trap et al. (2002) concluded that findings from comparing dispensing and non-dispensing doctors in Zimbabwe suggest that the quality of health care was related to drug use, patient safety and treatment cost--is lower with dispensing doctors than with non-dispensing doctors.

Limitations
One major limitation was the sample size, only including two provinces and too few private GPs and private hospitals.
Other indicators of rational drug use such as the percentage of patients who knew how to take the drugs they received and patients understanding on how to take medicines were not investigated. Another major limitation is that affordability and financial access to medicines was not studied.

Recommendations
- Recommendations: Ensure that communication and press equipment in public hospitals is maintained at best functional states at all times.
- NDP awareness needs to be improved in the private sector.
- Ensure that copies of standard treatment guidelines and essential drugs list are distributed to all health facilities and encourage private health facilities to acquire these reference materials.
- Investigate reasons for nonuse of EDL medication in public facilities and encourage use in the private sector.
- Over utilization of antibiotics leads to antimicrobial resistance. Polypharmacy and indication for antibiotic use need to be investigated and necessary intervention measures designed.
- Investigate the reasons for the high proportion of injection prescribing among GPs and develop interventions.
- Polypharmacy and indication for antibiotic use need to be investigated and necessary intervention measures designed.
- Investigate why labelling in some facilities did not comply with the minimum legal requirements and remedial action should be taken.

- Investigate the reasons for the high average number of items prescribed per encounter and develop interventions. Develop a strategic approach to improve prescribing through appropriate regulation and long-term collaborations with professional associations.
- Continue to maintain the level of patient satisfaction but also investigate and ameliorate reasons for 14% dissatisfaction.
- Investigate the factors that hamper treatment adherence. Health care providers should give patient counselling at all times in order to improve medicine adherence.
- The health care fraternity needs to be cognizant of this and develop proper regulations/inspections but also collaborative measures.
- Educational intervention to help patients decide on the appropriateness of self-medication would be useful. The health care fraternity needs to be cognizant of this and develop proper regulations/inspections but also collaborative measures. Traditional healers may need to be educated about when to refer a patient for more specialised care
- Patient counselling on instructions on how to use medication, contra-indications or side-effects, prevention or care should be emphasised, especially in rural health facilities
- .
- Increase public access to health facilities with pharmaceutical services (e.g. pharmacies and hospitals, especially in rural areas through 1) implementation of public mobile pharmacy stations with mobile clinics, .improving roads infrastructure for cheaper and safe public transport and 3) introduction of full-time pharmacy personnel at local clinics.

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