

**AN ANALYSIS OF THE USAGE OF ANTIBIOTICS IN
THE PRIVATE HEALTH CARE SECTOR:
A MANAGED HEALTH CARE APPROACH**

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**"Ons oog is nie op die sigbare dinge
gerig nie, maar op die onsigbare dinge;
want die sigbare dinge is tydelik,
maar die onsigbare ewig."**

2 Kor. 4:18

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Abstract

Title: An analysis of the usage of antibiotics in the private health care sector: A managed health care approach.

Key words: Antibiotics, beta-lactam antibiotics, managed health care, drug utilisation review, pharmacoconomics, prescribed minimum benefits, reference medicine price list, prevalence, medicine treatment cost.

The most frequent intervention performed by physicians is the writing of a prescription. Modern medicine has been remarkably effective in managing diseases. Medicines play a fundamental role in the effectiveness, efficiency and responsiveness of health care systems. However, health care expenditure is a great cause for concern and many nations around the world struggle to contain rising health care costs.

Pharmaceutical benefit management programmes such as pharmacoconomics, drug utilisation review (DUR) and disease management have emerged as control tools to ensure cost effective selection and use of medicine. These managed care instruments are often used to determine whether new strategies or interventions, such as the implementation of a managed medicine reference price list, are appropriate and have “value”.

The general objective of this study was to investigate the influences of the implementation of a managed medicine reference price list on the usage and cost of antibiotic medicine in the private health care sector of South Africa.

The research design used in this study was retrospective, non-experimental and quantitative. The data used for the analysis were obtained over a two-year study period (1 May 2001 to 31 April 2003) from the central medicine claims database of Medscheme®. Data was analysed according to prevalence, cost and original (innovator) or generic medicine items. For the purpose of this study antibiotics referred to beta-lactams (penicillins, cephalosporins and “others”), erythromycin and other macrolides, tetracyclines, sulphonamides and combinations, quinolones, chloramphenicol and aminoglycosides.

The results of the empirical investigation showed the total number of medicine items claimed during the study period amounted to 49098736 medicine items having a total expenditure of R7150344897.00. There was a decrease in the prevalence of original (innovator) products during the two-year period. The prevalence of generic products increased from 25.87% to 32.47%.

A total of 4092495 antibiotic medicine items were claimed with a total cost of R526309279.43 representing 7.36% (n = R7150344897.00) of all pharmaceutical products purchased during the two-year period. Original antibiotics had a prevalence of 42.32%, while generic antibiotics constituted 57.68% of all antibiotic products claimed (n = 4092495). However, original (innovator) products contributed 62.32% and generic products 37.68% to the total cost of all antibiotics claimed.

It was concluded that the beta-lactam antibiotics represented 56.99% of all antibiotics claimed (n = 4092495) and contributed 52.51% to the total antibiotic expenditure (n = R526309279.43) for the two-year period. The average cost of beta-lactam items ranged between R112.88 ± 69.95 and R122.18 ± 81.42.

The Medscheme® Price List (MPL) was implemented in May 2001. The aim of this reference pricing system was to allocate a ceiling price to a group of drugs, which are similar in terms of composition, clinical efficacy, safety and quality, with the ultimate goal to reduce medicine expenditure. During the year of implementation of the MPL 62.24% of beta-lactam antibiotics claimed (n = 1303464) were MPL listed. These products contributed 43.25% to the total cost of all beta-lactam antibiotics (n = R157142778.38). Medical aid companies reimbursed R61649211.86 for penicillins claimed and MPL listed. If all penicillin products were claimed at the ceiling price set by the MPL, a cost saving of 2.79% could have been achieved.

Cost analysis indicated that it is possible to reduce health care costs by implementing strategies with the aim to reduce medicine cost. Further research, however, is necessary and in this regard recommendations for further research were formulated.

Opsomming

Titel: 'n Analise van die gebruik van antibiotika in die privaat gesondheidsorg sektor: 'n bestuurde gesondheidsorg benadering.

Sleutelwoorde: Antibiotika, beta-laktam antibiotika, bestuurde gesondheidsorg, medisyneverbruik hersiening, farmako-ekonomie, voorgeskrewe minimum voordele, verwysings medisyne prys lys, voorkoms, medisyne behandelingskoste.

Die mees algemeenste intervensie wat uitgevoer word deur dokters is die skryf van 'n voorskrif. Moderne medisyne is merkwaardig effektief in die beheer van siektes. Medikasie beklee 'n fundamentele plek in die mate waartoe enige gesondheidsorgsisteem effektief, toereikend en met positiewe response funksioneer. Gesondheidsorg uitgawes bly egter 'n saak van erns en talle volke regoor die wêreld strewende om die verhogende gesondheidsorg kostes te beheer.

Programme om farmasuetiese voordele te kontroleer het ontwikkel, soos farmako-ekonomie, medisyneverbruik hersiening en siektebestuur, en dien as instrumente om koste-effektiewe seleksie en verbruik van medisynes te bevorder. Navorsing word van tyd tot tyd in verband met sodanige beheersisteme gedoen sodat vasgestel kan word of nuwe tegnologie of tussentrede toepaslik en "waardevol" sal wees.

Die algemene doel van hierdie studie was om die invloed van 'n bestuurde medisyne verwysings prys lys op die gebruik en voorkoms van antibiotika in die privaat gesondheidsorg sektor van Suid Afrika te bepaal.

Die navorsings metode wat gebruik is in hierdie studie was retrospektief, nie-eksperimenteel en kwantitatief. Die inligting vir die studiedoeleindes is van die sentrale databasis van Medscheme® verkry en die navorsing is oor 'n tydperk van twee jaar uitgevoer (1 Mei 2001 tot 31 April 2003). Data is ontleed volgens voorkoms, koste en oorspronklik (innoverende) en generiese medisyne items. Vir die doeleindes van die studie verwys antibiotika na beta-laktam antibiotika (penisilliene, kefalosporiene en "ander"), eritromisien en ander makroliede, tetrasiklien, sulfoonamiede en kombinasies, kinolone, kloramfenikol en aminoglikosiede.

Resultate van die empiriese studie het getoon dat 'n totaal van 49098736 medisyne items met 'n total koste van R7150344897.00 geëis is gedurende die twee-jaar studie periode. Daar was 'n verlaging in die voorkoms van oorspronklike (innoverende) produkte gedurende die twee-jaar periode. Die voorkoms van generiese produkte het verhoog vanaf 25.87% tot 32.47%

'n Totaal van 4092495 antibiotika medisyne items is geëis met 'n totale koste van R526309279.43 en het 7.36% (n = R7150344897.00) van alle farmaseutiese produkte wat geëis is gedurende die twee-jaar tydperk verteenwoordig. Oorspronklike antibiotika het 'n voorkoms van 42.32% gehad, terwyl generiese antibiotika 57.67% van alle antibiotika produkte wat geëis is (n = 4092495) uit gemaak het. Tog, oorspronklike (innoverende) antibiotika het 62.32% en generiese produkte 37.68% begedra tot die totale koste van alle antibiotika wat geëis is.

Daar is tot gevolgtrekking gekom dat beta-laktam antibiotika 56.99% van alle antibiotika (n = 4092495) verteenwoordig het en het 52.51% bygedra tot die totale antibiotika koste (n = R526309279.43) vir die twee-jaar periode. Die gemiddelde koste vir beta-laktam items het gewissel tussen $R112.88 \pm 69.95$ en $R122.18 \pm 81.42$.

Die Medscheme® Prys Lys (MPL) is in Mei 2001 geïmplementeer. Die doel met hierdie verwysings prys sisteem was om aan 'n bepaalde groep middels, wat gelyk is in samestelling, kliniese effektiwiteit, veiligheid en kwaliteit, 'n plafon prys toe te ken met die hoofdoel om medisyne uitgawes te verlaag. Gedurende die jaar wat die MPL geïmplementeer is, het 62.24% van die beta-laktam antibiotika items wat geëis is op hierdie lys voorkgekome. Hierdie produkte het 43.25% bygedra tot die totale koste van alle beta-laktam antibiotika (n = R157142778.38). Mediese fonds maatskappye het R61649211.86 vir alle penisilliene wat geëis is en wat op die MPL gelys was uit betaal. Indien alle penisillien produkte geëis is volgens die plafon prys soos bepaal deur die MPL, kon dit 'n koste besparing van 2.79% teweeg gebring het.

Koste analise het getoon dat dit moontlik is om gesondheidsorg kostes te verlaag met behulp van strategieë wat ten doel het om medisyne kostes te verlaag. Verdere navorsing is egter nodig en aanbevelings vir verdere navorsing in hierdie verband word gemaak.

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Chapter 1

Introduction

1.1 INTRODUCTION

The focus of this dissertation is on the effects of a managed reference price list on the cost and usage of antibiotics in the private health care sector in South Africa by using a medicine claims database.

1.2 PROBLEM STATEMENT

The most frequent intervention performed by doctors is the writing of a prescription (Ronchon, 1997: 1096). This is to be expected, since modern medicine has been remarkably effective in managing diseases.

The previous Minister of Health, Dr Nkosazana Dlamini Zuma (Department of Health, 1996), stated:

“Drugs have bestowed enormous health benefits on people all over the world. They have transformed the treatment and prevention of many diseases thus effecting the saving of many lives and greatly improving the quality of life.”

However, health care expenditure is a great cause for concern. According to Sardinha (1997: 1), nations around the world struggle to contain rising health care costs. In most cases drug costs are the primary target of reform.

Health care spending in the United States of America rose to \$1.3 trillion dollars and an average of \$4,637 per person during 2000. As a percentage of the Gross Domestic Product, it grew from 13.1% to 13.2% from 1999 to 2000. Spending on health services in the United States of America increased in the public and private health care sectors at almost identical rates, 6.9% and 7.0% respectively (Levit *et al.*, as quoted by Stanton, 2002:2).

In the United States of America the average annual health insurance premium in the private sector rose to \$2,655 for single coverage and \$6,772 for family coverage in the year 2000. This presents an increase of 33.3% for single coverage and 36.7% for family coverage, since 1996 (Stanton, 2002:1). According to the Council for Medical Schemes (2003a: 46) the South African private sector the total expenditure has an average annual growth rate of 15.5%.

In Western Europe medical costs increased by an average of 4.1% each year between 1970 and 1990. The rate of economic growth during the same period increased by 2.7% annually (Belien, 1996:95).

South Africa is devoting increasing amounts to health care. During 1998 to 1999 South Africa spent R70.2 billion on health care. This represented 8.8% of the gross domestic product (GDP) (Doherty *et al.*, 2002: 2). According to Goudge *et al.* (2001: 71), health expenditure has grown annually by 16% between 1996 and 1998.

The high inflation rate on medical costs is due to volume and price. Unnecessary medication usage escalates volume and, not utilizing cost-effective medicine, increases prices (Anon., 2002). According to Stanton (2002: 3), growth rates are driven by factors such as increased use of health care services, general price inflation, inflation in the prices of medical services and an aging population.

Health care in South Africa is divided into the public sector and the private sector. The share of the gross domestic product controlled by public and private financing intermediaries were respectively 3.6% and 5.2% during 1998 to 1999 (Doherty *et al.*, 2002: 6). In this context, problems are still experienced by large sections of the South African population in accessing health care services and enjoying quality care.

There are four main sources of finance for health care in South Africa: government, households, employers and donors or non-governmental organizations. Government is the largest source of health care finance, contributing 44.2% of the total sources and household funding the second largest source of health care finance, contributing 39.0% of the total sources (Doherty *et al.*, 2002: 3).

The National Drug Policy (Department of Health, 1996: 3), states that the private sector in South Africa consumed 48.5% of the total health expenditure during 1992 to 1993 and was responsible for 80% of the total expenditure on drugs in 1990.

According to Rehana *et al.* (1991: 1), antibiotics are the most frequently prescribed drugs on the market and as a group account for 15% to 30% of the total health budget worldwide. Mediscor (2002: 9-10) revealed that in 2002 beta-lactam antibiotics were among the top twenty-five therapeutic classes, contributing 3.8% to the total expenditure on medicines.

In a study done in the public sector, by Paruk *et al.* (1999:1), in the Kwazulu Natal province in South Africa, a large percentage (54%) of prescriptions contained antibiotics. A great percentage of prescribed antibiotics in this study were listed on the National Essential Drug List (96.79%) and were prescribed by their generic name (71%).

It is clear that strategies to reduce the cost of drugs must be implemented. A wide range of strategies have been introduced and evaluated in countries around the globe. Fairfield *et al.* (1997: 1823) stated that managed health care implements a variety of methods to finance and organize the delivery of comprehensive health care in which an attempt is made to control cost by controlling the provision of services. Emphasis should, however, be placed on the fact that while constraining cost, managed care should also maintain and improve the quality of medical care.

1.3 RESEARCH QUESTIONS

The following research questions can be formulated based on the forgoing discussion:

- ❑ What does health care in South Africa, as well as internationally, entail?
- ❑ Which factors contribute to the high health care costs in the private health care sector of South Africa, as well as internationally?
- ❑ What influences does the new legislations have on medicine cost in the private health care sector?
- ❑ Does generic substitution have an effect on medicine cost?
- ❑ What does pharmacoconomics, drug utilisation review and managed health care entail?
- ❑ What are the implications of a managed medicine reference price list in the private sector?
- ❑ What is the basic pharmacology of antibiotics?
- ❑ What are the differences in the utilisation patterns and costs of drugs in general before and after implementation of the Medscheme® Price List?
- ❑ What are the differences in the utilisation patterns and costs of antibiotic drugs before and after implementation of the Medscheme® Price List?
- ❑ What are the difference in prevalence and costs of original products vs. generic products that has been claimed before and after implementation of the Medscheme® Price List for drugs in general and antibiotic drugs specifically?
- ❑ What are the differences in the utilisation patterns and cost of beta-lactam antibiotics before and after the implementation of the Medscheme® Price List?
- ❑ What are the cost savings that could have been incurred if beta-lactam antibiotics were sold at MPL prices?

1.4 RESEARCH OBJECTIVES

This research embraces general and specific objectives.

1.4.1 General objectives

The general research objective of this study is to investigate the influence of the implementation of a managed medicine reference price list on the usage and cost of medicine in general in the private health care sector in South Africa with special reference to antibiotics.

1.4.2 Specific objectives

The specific research objectives include activities as listed below:

- Conceptualise from the literature what health care in South Africa entail, as well as internationally.
- Determine from the literature which factors contribute tot the high health care costs in the private health care sector of South Africa, as well as internationally.
- Investigate from the literature the influences of the new legislation on medicine cost in the private health care sector.
- Review the influences of generic substitution on the prevalence and cost of medicine.
- Conceptualise from literature the concepts of pharmacoeconomics, drug utilisation review and managed health care.
- Determine the implications of a managed medicine reference price list in the private sector.
- Review the basic pharmacology of antibiotics.
- Investigate the differences in the utilisation patterns and costs of drugs in general before and after implementation of the Medscheme® Price List.
- Investigate the differences in the utilisation patterns and costs of antibiotic drugs before and after implementation of the Medscheme® Price List.
- Determine and compare the difference in prevalence and costs of original products vs. generic products that has been claimed before and after implementation of the Medscheme® Price List for drugs in general and antibiotic drugs specifically.
- Investigate the differences in the utilisation patterns and cost of beta-lactam antibiotics before and after the implementation of the Medscheme® Price List.
- Determine the cost savings that could have been incurred if beta-lactam antibiotics were sold at MPL prices.

1.5 RESEARCH METHOD

The research method consists of two phases in conjunction with the specific research objectives, namely a literature review and an empirical investigation.

1.5.1 Phase one: Literature review

The aim of the literature review is to identify methods that are implemented internationally and nationally to contain the cost of medicine. A brief discussion on managed health care will be included. The usage of antibiotics in the private health care sector and different mechanisms that are implemented to reduce cost will be considered. A discussion of the pharmacology of antimicrobials and antimicrobial resistance will also form part of the literature review.

1.5.2 Phase two: Empirical investigation

The empirical investigation constitutes several steps, namely: the selection of the research design, the composition of the research population, the selection and application of the criteria and measuring instruments for data analysis, data application and data analysis, reliability and validity, the report and discussion of the results of the empirical investigation, and the conclusion and recommendations based on the results of the empirical investigation as well as the limitations of the investigation.

1.5.2.1 *Selection of research design:*

In order to achieve the aim of the study, namely to review, analyze and interpret patterns of drug utilization as well as to analyze the costs associated with the usage of antibiotics, a qualitative, retrospective (refer to paragraph 2.10.2.1), drug utilisation research design (refer to paragraph 2.10.1.1) was selected.

1.5.2.2 *Composition of the research population:*

The research population consisted of patients whose date were obtained from the central medicine claims database of Medscheme®, during the period May 2001 to April 2003. The total study population comprised of all the patients that had used one or more antibiotics during the specific period of the study.

1.5.2.3 *Selection and application of measuring instruments/criteria for data analysis:*

The prevalence of antibiotic usage, the costs associated with its usage, as well as the innovator and generic forms of antibiotics were selected and utilised as measuring instruments/criteria for data analysis in order to achieve the objectives of the empirical investigation.

1.5.2.4 Data application and data analysis:

The application of the data was achieved by viewing the criteria retrospectively, there after the data were analysed by means of SAS® 8.2 (SAS. Institute Inc., 1999 – 2002).

1.5.2.5 Reliability and validity of the research instruments:

The data utilized in this study were obtained from a medicine claims database, thus no direct manipulation of the data was possible. It was assumed that all the data obtained from the central database were valid and correct.

1.5.2.6 Report and discussion of the results of the empirical investigation:

The report and discussion of the results of the empirical investigation are illustrated graphically or in tables, in order to ensure clarity and to achieve the set aims of the empirical investigation. A detailed overview of the reports and discussion will follow in chapter five.

1.5.2.7 Conclusions, recommendations and limitations of the study:

The conclusions of the study, based on the results of the literature review and the empirical investigation, as well as the recommendations derived from this study on the usage patterns of antibiotics will be discussed in chapter six. Attention will be brought to the limitations encountered during the study throughout chapters four and five with a further detailed discussion of these limitations in chapter six.

1.6 DIVISION OF CHAPTERS

The division of chapters will be as follows:

Chapter 1: Introduction

Chapter 2: Health Care and Health Care Concepts

Chapter 3: Antibiotic Usage

Chapter 4: Empirical Investigation

Chapter 5: Results and Discussion

Chapter 6: Conclusions, Recommendations and Limitations

1.7 CHAPTER SUMMARY

In this chapter the problem statement, research questions and objectives, research method and division of chapters were discussed.

In the following chapter health care in South Africa as well as health care concepts, such as drug utilisation review (DUR) and pharmacoeconomics, will be discussed.

Chapter 2

Health care and health care concepts

2.1 INTRODUCTION

In the following chapter health care in South Africa as well as health care concepts will be discussed. A discussion on pharmacoeconomics and drug utilisation review studies will also form part of this chapter.

2.2 HEALTH CARE IN SOUTH AFRICA

The South African health care system has been under an ongoing revolution for the past few years. The aim of these changes was to improve inequities in the accessibility and availability of health care services and to fund a higher level of health care. The South African health care system consists of a large public sector and a smaller private sector. The public health care sector is under great pressure to deliver health care services to about 80% of the population (Anon., 2004a: 1). The private health sector serves about 20% of the population, yet it has over 60% of all the doctors and more than half of all the nurses. Furthermore, more than 60% of all health expenditure is consumed by the private health care sector (Schneider, 2000: 1).

2.2.1 The public health care system in South Africa

Poverty and unemployment in South Africa make it difficult for most people to pay for health services. Widespread poverty and the growing gap between the rich and poor continue to hamper social development. While absolute poverty had declined, with the percentage of people living below the national poverty line falling from 51.1% in 1995 to 48.5% in 2002, close to 22 million South Africans were still considered poor (Integrated Regional Information Networks, 2004: 1). The actual number of people dependent on the public health care sector has grown by 6.5 million since 1995 (Ntuli & Day, 2004: 3).

Further, aids, tuberculosis and cholera are some of the diseases that place an enormous strain on the South African public health care system (Anon., 2004b: 1).

During the last ten years the government of South Africa developed a national health plan for the country (Ntuli & Day, 2004: 5) with the aim to decentralise the health care system into district health systems and to assure that a standard primary health care package is available to all (Connolly, 2002: 1). Primary health care for every citizen and free health care for pregnant women and for children under six formed the basis for reaching this goal together with the

creation of a single comprehensive, equitable and integrated national health system (Ntuli & Day, 2004: 1-2).

The structure for the implementation of a national health care system is based on primary health care and operated by district health systems. The National Department of Health oversees the system of nine provincial health departments. The individual provinces have their own ministers and leaders (Connolly, 2002: 1). There are 42 health regions and 162 health districts in South Africa (Anon., 2004: 1).

According to Connolly (2002: 1), a decentralised health care system allows the provincial governments the ability to customise the health care systems to their unique cultural groups, while the national Department of Health assures that all health districts conform to the national health policy. The primary goal of the South African health care system is to ensure that all citizens have access to proper health care.

A unified health system capable of providing quality health care to all would be achieved through the implementation of a broad range of policies and strategies including (Forman *et al.*, 2004: 14):

- Decentralising the management of health services with an emphasis on the creation of a district health system.
- Increasing access to services by making primary health care available to all.
- Ensuring the availability of safe, good quality essential drugs in health facilities.
- Rationalising health financing through budget reprioritisation.

According to Ntuli and Day (2004: 2) one of the major challenges in implementing the primary health care approach has been to strengthen the multi-sectoral vision. The lack of basic infrastructure has been a major stumbling block in reaching this goal.

2.2.2 Public health care expenditure in South Africa

During 1996 and 1999 the public health care sector expenditure increased by R1.7 billion, reaching a total expenditure of R70.2 billion during 1998/1999 (Doherty *et al.*, 2002: 2). The per capita expenditure for 1998/1999 was R29 lower than in 1997/1998, but R10 higher than in 1996/1997. In 1998/1999 public health care financing expenditure amounted to 4.1% of the gross domestic product (GDP) and 15.1% of the overall budget. These percentages were lower than 1996/1997 of 4.3% of the gross domestic product (GDP) and 15.8% of the overall budget (Thomas *et al.*, 2000: 6).

Though there was a drop in financial resources in 1998/1999 the public health sector's financial resources increased during 1992 and 1999 with 9% per annum (National Health Accounts, 2000: 28).

Expenditure in the public health sector according to Thomas *et al.* (2000: 5), is displayed in Table 2.1

Table 2.1: Public health sector expenditure, 1996/1997-1998/1999 (R million, 1999/2000 prices) (Thomas *et al.*, 2000: 5).

	<i>Narrow</i> [*]	<i>Broad</i> [#]	<i>Comprehensive</i> [‡]
1996/1997	23 438	25 689	30 941
	76%	84%	100%
1997/1998	27 754	27 436	32 963
	75%	83%	100%
1998/1999	24 650	27 041	32 695
	75%	83%	100%

* Narrow – Expenditure through the national and provincial Department of Health

Broad – Narrow together with expenditure by local authorities and provincial departments of works

‡ Comprehensive – Broad together with expenditure by other national departments and funds of other provincial departments.

According to Ntuli and Day (2004: 3) the per capita spending annually at primary care level ranges from R389 to R42. However, the basic primary health care package recommended by the Department of Health (excluding HIV-related services) is estimated to cost around R220.

2.2.2.1 Financial resources

According to Thomas *et al.* (2000: 6), one of the main reasons for the decrease in public health expenditure is the sources of funds. Sources of comprehensive public health sector financing in South Africa are general taxation, local authority revenue, user fees from households, provincial government and donors. General taxation is the largest funding source in the public health sector accounting for 94% of the total. In sub-Saharan African countries donors play a crucial part in funding health care. In South Africa donors accounted for less than 1% of public health care funding.

Table 2.2: Sources of comprehensive public health sector financing, 1996-1999 (R million, real 1999/2000 prices) (National Health Accounts, 2000: 27)

	General Taxation	Local Authority Revenue	User fees from households	Provincial Government	Donors	Total
1996/1997	29 244	845	499	334	18	30 941
1997/1998	30 972	963	418	578	33	32 963
1998/1999	30 908	996	340	384	68	32 695

In 1996/1997 R29244 million of the total public health care sector financing was contributed through general taxation, while donors contributed only R18 million. There was an increase in the total contribution from donors to R68 million during 1998/1999 (National Health Accounts, 2000: 27).

2.2.3 The private health care system in South Africa

There has been an overall lack of growth in medical scheme coverage since 1996. This is due to slow employment growth and escalation of medical scheme contributions in South Africa (Harrison, 2004: 297). Private health care in South Africa is provided by a large for-profit sector and a small workplace-based health care system. There are also a few private charitable health care institutions that are partly or mainly funded by the State. The Workers' Compensation Fund and the Road Accident Fund fall under the control of the Department of Labour and Transport respectively. The private health care sector in South Africa is mainly situated in urban areas. Not all financing of private health care emanates from medical scheme contributions. In the poorer communities a significant proportion of out-of-pocket spending goes to private health care. In the lowest income categories, less than one fifth of private health care consultations are covered by insurance (Söderlund *et al.*, 1998: 2).

2.2.3.1 Medical schemes

During the past few years the Medical Schemes Council and government have implemented a few control measures to control private sector medical schemes (Ntuli & Day, 2004: 4).

Medical schemes are non-profit organisations that are controlled by a board representing their members. Registered medical schemes and Bargaining Council schemes are the two main categories of medical schemes in South Africa. Registered medical schemes are those that fall fully under the regulatory control of the Medical Scheme Act (131 of 1998), while Bargaining Council schemes are those schemes that are not able to comply fully with the Medical Scheme Act (131 of 1998) and are granted exemptions from certain of its provisions. Over the past few

years many exempted schemes have acquired registered scheme status (Doherty & McLeod, 2002: 2-3).

2.2.3.2 Medical scheme coverage

Private health care in South Africa is inaccessible to most of the population. During 1995 only 18% of the population in South Africa had access to medical aid coverage (Södurlund *et al.*, 1998: 1). According to Ntuli and Day (2004; 3) the medical scheme population decreased to 15.2% in 2002.

Members of medical schemes were predominantly from high-income groups and consisted mainly of the white population (Södurlund *et al.*, 1998: 1). Due to rapid upward job mobility in the black population there has been an increase in membership. The proportion of the black population with medical aid coverage increased from 24% in 1991 to 36% in 1995. Medical scheme membership in older age groups, however, decreased in all population groups. This places a great burden on the public health sector, because the elderly generally have high care requirements (Bradshaw, 1998: 3).

The Council for Medical Schemes (2003a: 46) stated that more than half of the schemes have less than 6000 members and were considered small. In open schemes, 58.4% were large, while 68% of restricted schemes were small.

Table 2.3: Distribution of medical schemes by size (Council for Medical Schemes, 2003a: 46).

Size of medical scheme	Type of scheme			
	Open	Restricted	Bargaining council	Total
Small (<6000 members)	13 (27.0%)	64 (68.0%)	9 (63.0%)	86 (55.1%)
Medium (>6000 members but <30000 beneficiaries)	7 (14.6%)	16 (17.0%)	2 (14.3%)	25 (16.0%)
Large (30000 or more beneficiaries)	28 (58.4%)	14 (15.0%)	3 (21.4%)	45 (28.9%)
Total	48 (100.0%)	94 (100.0%)	14 (100.0%)	156 (100.0%)

The percentage of the population that are beneficiaries of a medical scheme has increased since 1996, though the medical scheme population is decreasing as a percentage of the total population (Goudge *et al.*, 2001: 74). In 1998 there was a 0.2% decrease in the total beneficiaries. According to the Council for Medical Schemes (2003a: 43) in 2002 the number of beneficiaries declined with 0.89% compared with 2001. Though there was an increase of 0.97% in principal members in 2002, the number of dependants decreased with 1.8%, resulting in a drop in total beneficiaries. In 2002 the total number of beneficiaries of medical schemes were 6962914, with a dependant ratio of 1.53 (Harrison, 2004: 294).

In 2001 two thirds of medical schemes were restricted schemes, while the remaining were open schemes. Restricted schemes accept members belonging to the employer or industry that set them up. Open schemes are open to the general public. In the 1990s beneficiaries were roughly evenly distributed between the two types of schemes. In 2001 71% of registered beneficiaries were located in open schemes. (Doherty & McLeod, 2002: 3). For 2001 there has been an increase in the membership of open schemes (growth rate of 6%) and a decrease of 7% in membership of other schemes (restricted, non-reporting and exempted) (Goudge *et al.*, 2001: 75). According to the Council for Medical Schemes (2003a: 43) in 2002 the number of principal members in open schemes increased by 1.2%, while the number of dependants decreased by 2%. The same trend was noted for restricted schemes. The number of principal members increased by 0.5%, while the number of dependants decreased by 1.4%.

Table 2.4: Distribution of beneficiaries in medical schemes (Council for Medical Schemes, 2003a: 44).

<i>Type of medical scheme</i>	<i>2002</i>	<i>2001</i>	<i>% Change</i>
Registered schemes	6 713 870	6 764 409	-0.75
Open	4 730 936	4 798 076	-0.78
Restricted	1 982 934	1 996 333	-0.67
Bargaining Council	249 044	260 853	-4.53
Total	6 962 914	7 025 262*	-0.89

*Total membership for 2001 restated due to late or non-submission of statutory returns.

2.2.3.3 Medical Scheme legislation

The medical scheme industry was de-regulated in 1989 and 1993 through legislation passed by the previous government. Amendments to the medical scheme legislation aimed to deal with cost escalation. During 1982 and 1992 medical scheme contributions have risen steadily from 7.1% of the average salary to 15.2% (Doherty & McLeod, 2002: 1). The Medical Schemes Act (131 of 1998) further sought to promote non-discriminatory access to medical scheme coverage (Harrison, 2004: 292), which was passed in November 1998 (Pearmain, 2000: 1).

According to the Council for Medical Schemes (2003a: 1) a new set of regulations governing managed health care activities in South Africa took effect on 1 January 2003, by way of amendment to the general regulations made in terms of the Medical Schemes Act (131 of 1998). These changes also impact on further amendments to the regulations relating to the content and delivery of the prescribed minimum benefits (PMBs). The objectives of the prescribed minimum benefits are to avoid incidents where patients lose their medical scheme coverage in the event of serious illness (Harrison, 2004: 292).

Benefits offered by medical schemes for the elderly and sick were greatly diminished in consequence of the 1993 de-regulation. Medical schemes only attracted the young and healthy and as a result of this discouraged membership by high-risk individuals and groups through contribution loadings on the basis of risk profile. The "new Act" determines that contributions are made on the basis of income level and/or number of dependants. This has the potential for cross-subsidisation (Pearmain, 2000: 184).

To ensure non-discriminatory access to medical scheme coverage the "new Act" requires that medical schemes have to maintain minimum reserve levels as a percentage of gross annual contributions, increasing incrementally to 25% (Harrison, 2004: 292).

According to Pearmain (2000: 1) the amendments to the Medical Schemes legislation of 1998 aim to improve private health care in the following ways:

- Compulsory minimum benefit packages for all members on chronic medication.
- Prohibiting discrimination on the basis of age, medical history and health status.
- Requiring that contributions be determined only on the basis of income and/or number of dependants.
- Enabling schemes and hospitals to have an agreement for the provision of minimum benefits to its members with payment for hospitals.
- Forbidding schemes from excluding applicants except on certain prescribed conditions.
- Regulating administrators and other contractors to medical schemes.

2.2.4 Private health care expenditure in South Africa

More than 50% of the total health care spending in South Africa is consumed by the private health care sector, though less than 18% of the total population have access to private health care (Södurlund *et al.*, 1998: 1). Private health care in South Africa had an expenditure growth rate of 16% between 1996 and 1998. This was two times higher than the Consumer Price Index (CPI) with an annual growth rate of 7% (Goudge *et al.*, 2001: 71).

The National Drug Policy (Department of Health, 1996: 3) stated that the private sector in South Africa consumed 48.5% of the total health expenditure during 1992 to 1993 and was responsible for 80% of the total expenditure on drugs in 1990.

According to the Council for Medical Schemes (2003a: 46-47) the total expenditure on health care in the private medical scheme sector increased in 2002, representing an average annual growth of 15.5%. The ratio of expenditure per capita by medical schemes to public sector provincial health spending has risen from 4.5 in 1997/1998 to 7.1 in 2002/2003 (Harrison, 2004: 4). Medical scheme contributions have increased by 7.1% in 2002 (Blecher & Thomas, 2004: 285).

The Council for Medical Schemes (2003a: 46-47) also stated that the bulk of the expenditure in 2002 went to hospitals, which accounted for 32.4% of the overall expenditure. Medicines accounted for 23.5%, medical specialists 20.2% and general practitioners 8.5%.

Health expenditure flows from the original sources through financial intermediaries to the providers. The largest intermediary is medical schemes with 73% of the funds and the second largest is out-of-pocket expenditure from households with 22.5%. It is considered to be an underestimate. Out-of-pocket expenditure by medical scheme members is higher (16.1%) than by non-medical scheme members (6.4%). Out-of-pocket spending by medical scheme members is increasing due to shrinking benefit packages and increased co-payments (Goudge *et al.*, 2001: 71).

2.3 HEALTH CARE EXPENDITURE

The Organisation for Economic Co-operation and Development (OECD) consists of thirty member countries and has relationships with more than seventy other countries, and as a group share a commitment to democratic government and the market economy. According to the OECD (2004: 1) the increase in health spending has driven the share of health expenditure as a percentage of the GDP up from an average 7.8% in 1997 to 8.5% in 2002. This is in sharp contrast to the period 1992 to 1997, when the share of GDP spent on health remained almost unchanged.

According to the Agency for Healthcare Research and Quality (2002: 1), the United States of America spends a large share of its gross domestic product (GDP) on health care and it continues to be the fastest growing component of the Federal budget. During 1999 to 2000 health care spending has grown to 13.2% of the gross domestic product (GDP) (Stanton, 2002: 2), while in 2002 it reached 14.6% (Organisation for Economic Co-operation and Development, 2004: 1). The total amount that was spent on health care for 2000 in OECD countries was an estimated \$1.3 trillion dollars (Stanton, 2002: 2). The overall health care spending per capita of \$4900 in 2001 was more than twice the OECD average of \$2100 (Organisation for Economic Co-operation and Development, 2003:1).

In Western Europe health care spending is the fastest growing segment of government spending. During 1970 to 1996 government spending has risen from 36.5% to 51% of the gross domestic product (GDP). It has been determined that medical costs have risen by 4.1% annually for the period 1970 to 1990 in ten Western Europe countries (Belien, 1996: 95).

The Japanese people can receive equal quality of medical care for the same kind of benefits. The insured person must pay 20% of the medical expenses on his/her visit for each illness. In 1997 the percentage of the national health expenditure to the Gross Domestic Product was 7.2%. Population increase, costly revision of reimbursement for professional services, aging of population, technological innovation and others are the main factors contributing to the increase in health expenditure in Japan (Akaho *et al.*, 2001: 201-203).

A high proportion of the gross domestic product (7.9%) was absorbed by the South African health care sector between 1990 and 1997. This was much higher than the average for middle-income countries, of 4.4%, and not far from the norm of high-income countries, 9%. South Africa displayed high expenditure per capita with poor access to basic primary health care (National Health Accounts, 2000: 3).

In South Africa in 2002 medical scheme contributions per beneficiary were R 6214 per annum, while in the public sector the total amount per capita was R5364. The ratio of public sector health expenditure to medical scheme contributions per beneficiary for the same period was 1:7.1 (Harrison, 2004: 297).

2.3.1 Increasing pharmaceutical expenditure

“Serious illness is a major reason why poor populations remain trapped in poverty. Either they cannot afford health care or else its cost is so high that they are pushed into debt and dependency. The knock-on effects are many and long lasting. Parents cannot afford to send their children to school, working days are lost and economic productivity declines. In countries hit hardest by diseases such as malaria and HIV/AIDS, development has ceased altogether.” (World Health Organization Medicines Strategy: 2000-2003: 1).

Rapid advances in medical technologies, ageing population and rising public expectations were largely responsible for the health spending growth, which was particularly notable in the area of pharmaceuticals. Between 1992 and 2002, spending on pharmaceuticals grew, on average, 1.3 times faster per year than total health expenditure, rising to account for between 9% and 37% of total health spending in OECD countries in 2002 (Organisation of Economic Co-operation and Development, 2004: 1).

Health care costs present major challenges to public expenditure policies. Pharmaceutical expenditure is rising more rapidly than the general inflation rate in most advanced countries. According to Stanton (2002:1) health care organisations are implementing strategies to reduce the current levels of growth in health care expenditure without reducing access to needed health care services or creating unnecessary burdens for providers. Health care expenditure is a great cause for concern. According to Sardinha (1997: 1) nations around the world struggle to contain rising health care costs. In most cases drug costs are the primary target of reform.

The increase in public and private spending on pharmaceuticals has been one of the main drivers of rising health expenditure in many OECD countries. Pharmaceutical spending rose by more than 70%, in real terms, and now account for more than 10% of total health spending in nearly all OECD countries. In countries like France and Italy pharmaceuticals account for more than 20% of total health spending (Organisation for Economic Co-operation and Development, 2003:2).

According to the Department of Health of the United Kingdom (2003: 13-15), the Gross expenditure on drugs for the period of 1998 to 1999 was £4 356 million. The percentage real term growth for the period 1990 to 1999 was 69.5%. The cost of drugs per prescription in 1998/1999 was £8.30, an increase of 0.6% from 1997/1998 to 1998/1999.

In South Africa the private sector accounted for nearly 80% of the total expenditure on pharmaceuticals, though the public sector consumed more than 50% of the total pharmaceutical consumption. About 32% of medical scheme expenditure is accounted for by medicines (Folb *et al.*, 1995: 1).

2.3.2 Average cost per prescription

According to the Council for Medical Schemes (2003a: 5) the average expenditure per item per annum during 2002 in South Africa was R153.6, with an average of 13 items per beneficiary.

Campbell (2004: 1) states that the average cost per prescription is influenced by a number of factors. Three of these factors are average cost per brand prescription, average cost per generic prescription and utilisation rate of brand-name products versus generic products.

The average cost per prescription in a few countries, states and cities are presented as follows:

- Arkansas, United States of America: an increase of \$24.57 from 1990 up until 2000 to \$41.87 per prescription (Anon., 2000: 1).
- United Kingdom: For a branded product the average cost per prescription is €26.36 and for generic products the average cost per prescription is €5.25 (Winaver, 2003: 1). According to the England Department of Health (2004: 2) the average cost per prescription increased with 9.7% between 2002 and 2003.
- According to the Generic Pharmaceutical Association (2002: 1), in the United States of America the average cost of a brand name prescription was \$72.70 while the average cost of a generic prescription was \$16.85 during 2001.
- Kentucky, United States of America: Since 1992 the average cost per prescription for the elderly increased with 48%. In 2000 the average cost per prescription for the elderly was \$42.30. The projected average cost per prescription for 2010 will be \$72.94 (Kentucky State Senate, 2001: 1).
- India: Study done on prescribing practices in an urban area revealed that the average cost per prescription was Rs.150.6, which is expensive for the average person staying in India (Mhetre *et al.*, 2003: 316-317).

The age of the patient might also have an influence on the average cost per prescription. During the 1990s, the price of most prescription drugs commonly used by seniors increased much more than the increase in the overall cost of living as measured by the Consumer Price Index (CPI) in the United States of America. The average cost per prescription also increased faster than the overall price index and the indices for other basic necessities (Fiscal Policy Institute for USAction, 2000: 1).

2.3.3 Reasons behind increasing pharmaceutical expenditure

The Organisation for Economic Co-operation and Development (2003: 1) states that countries are spending record amounts on health care, largely due to rising cost of pharmaceuticals and the diffusion of modern medical technologies.

According to Ioannides-Demos *et al.* (2002: 578) the main factors that increase pharmaceutical expenditure are:

- Price inflation.
- Substitution of usually older (less expensive) treatments by generally newer (more expensive) treatments.
- Increasing number of available drug interventions and an increasing number of drugs shown to be cost effective when compared with other interventions.
- An increase in elderly patients requiring multiple drug therapy.

Mediscor (2002: introduction) states that in South Africa the significant underlying causes for the increase in costs are:

- The growing demand for prescription medicines to treat the increasing prevalence of chronic diseases within an ageing medical scheme.
- Consumer awareness and expectations that all medicines should be accessible and covered by medical schemes.
- The entry into the market of new members previously not exposed to the concept of managed care.
- Increased abuse and misuse of medicine benefits by scheme members.
- Inability of some medical schemes to control the appropriate use of medicines by members.
- Increased therapies to treat opportunistic diseases caused by HIV/AIDS.

Akaho *et al.* (2001: 209) states that medical expenditure has been inflated by various factors. One major factor is overmedication that not only injures health by drug interactions and side effects, but also wastes medical care resources and insurance funds. Rational prescribing by health workers is urgently needed for future development of medical care.

2.4 RATIONAL USE OF DRUGS

From the beginning of time man was interested in human health and illnesses. Yet as recently as fifty years ago penicillin, the first antibiotic, and choloquine, the first modern antimalarial, were discovered. Oral contraceptives have generally been available for only thirty years (Quick, *et al.*, 1997:5). The most frequent intervention performed by doctors is the writing of a prescription (Ronchon, 1997: 1096). This is to be expected, since modern medicine has been remarkably effective in managing diseases.

Although most industrialized countries have regular access to pharmaceutical care, people in many parts of the world cannot benefit from simple, safe, effective pharmaceuticals. During the 1970s it was estimated that 60% to 80% of people in developing countries lacked regular access to most essential drugs (Quick *et al.*, 1997: 5). Each year millions of people die because of acute respiratory infections, diarrheal diseases, malaria, pregnancy-related anemia and other common conditions that can be prevented with essential drugs (Quick, *et al.*, 1997: 5).

Though, once access to drugs is assured, proper use remains a challenge, since waste by both prescribers and users is common. Both prescribers and users are prone to overuse of drugs. The notion that if one drug is good, two will be better dies hard. The quantities of drugs prescribed for a given illness are often far more than what are reasonably needed (Quick, *et al.*, 1997: 21).

This control of health care expenditure takes place against the background of serious problems with the use, misuse and overuse of medication in our existing health care system (Walters & Smart, 1994:820). Many issues manifest themselves as various medicine-related problems and result in serious and often preventable morbidity and mortality. The Director-General of the World Health Organisation mentioned that up to 75% of antibiotics are prescribed inappropriately, even in academic hospitals in developing countries. Worldwide an average of only 50% of patients take their medication correctly (Brundtland, 1999). Statistics from the United States Food and Drug Administration indicated in 1987 that 12 000 deaths and 15 000 hospital admissions were associated with adverse reactions to prescription medicines. It was further found that 10% of hospital admissions were due to non-compliance at a cost of \$25 billion. The cost to the USA economy in 1992, due to failure in taking prescription medication correctly, was an astronomical \$100 billion and approximately 55% of prescription medicines were used incorrectly (Van Niekerk, 1994). The cost associated with inappropriate use of medicines by ambulatory patients has not been fully identified in South Africa. In 1999, Moodley *et al.* (1999) reported that 155 of 281 geriatric patients, attending

outpatient's clinics at Addington Hospital, experienced one or more adverse drug reactions with their medication. In a series of 5674 prescriptions for outpatient psychiatric patients in the North West Province, Saley *et al.* (1999) identified 1123 (19.79%) prescriptions with possible drug-drug interactions and of these, 13.09% with possible severe, suspected outcomes.

An important aspect in the South African health care system is the high incidence of usage of traditional practitioners. According to the Department of Health (1998b) 75% of the population in South Africa consult traditional healers before consulting Western health care services.

According to Quick *et al.* (1997: 21), half of the world's drugs are wasted because of irrational use. Proper use need to be promoted for an effective health policy and well-managed economy. The emphasis is on the need for the public to understand and use drugs better, particularly in view of all that is known about nonadherence to treatment. Irrational use often resulted from lack of proper information and training.

In 1996 the production volume of all drug products in Japan was 1.75 times more and for prescription drugs it was 1.73 times more than that of 1980. In 1997 antibiotics, metabolic drugs, central nervous system drugs and cardiovascular drugs represented 52.3% of the total production volume. Over the counter drugs, used to treat mild disorders, have shown a decrease in the number of sales. Less money is spent on self-medication than before. The sales volume of over the counter drugs is lower than that of the United States of America and major European countries. In Japan it accounts for 15% of the total drug market (Akaho *et al.*, 2001: 207-208).

In a study to investigate the rational use of antibiotics in in-patients in district hospitals in Mashonaland, it has been reported that 16.5% of prescriptions were irrationally prescribed. Further, 85.86% of these were irrationally indicated and the remainder irrational due to incorrect dosing (Chikerema & Kasilo, 1994: 1). The Director-General of the World Health Organisation, Dr Brundtland (1999), mentioned that up to 75% of antibiotics are prescribed inappropriately, even in academic hospitals in developing countries.

2.5 BRAND NAME PRODUCTS VS. GENERIC PRODUCTS

A generic medicine is an equivalent of an originator pharmaceutical product. It contains the same active ingredient as the originator product. Therefore they are interchangeable (European Generic medicine Association, 2004a: 1). Pharmaceutical manufacturers are entitled to produce generic medicines after the patent on an original product has expired. In the United States, patented products are given a 20-year market monopoly (Moore & Harvey, 2002: 1).

2.5.1 Quality assurance of generic products

A generic product is of the same quality, efficacy and safety as the original product and undergoes strict analysis before it is registered and given market approval by the authorities (European generic medicine Association, 2004b: 1). In South Africa the Medicines Control Council (MCC) is a statutory body that was established in terms of the Medicines and Related Substances Control Act (101/1965) to oversee the regulation of medicines in South Africa. Its main purpose is to safeguard and protect the public through ensuring that all medicines that are sold and used in South Africa are safe, therapeutically effective and consistently meet acceptable standards of quality (Health Systems Trust, 2003: 1).

The European generic medicine association (2004a: 1) encourages pharmaceutical manufacturers to produce pharmaceutical ingredients and medicinal products of a high standard. Once a generic product has been approved for human use, the manufacturer and health authorities monitor it closely.

Generic products undergo strict bioequivalence studies before registration takes place. Bioequivalence means that the product to be compared produces essentially the same biological availability of the active substance in the body when given in the same quantity (European Generic medicine Association, 2004: 1).

2.5.2 Overview of the use of generic products

According to Quick (2002: 1-2) one-third of the world's population lack regular access to essential drugs. There is, however, a less expensive alternative for combating this problem: the usage of generic medicine. Though 60% of countries worldwide have generic substitution laws, true generics are less than one-third of consumption in all but a handful of countries.

Quick (2002: 2) further states that to be able to expand generic substitution the following are required:

- Supportive regulations.
- Reliable quality assurance.
- Professional and public acceptance.
- Financial incentives.

2.5.2.1 Generic substitution in Europe

Generic medicines are increasingly prescribed by physicians as effective alternatives to higher-priced original products in many countries in Europe (European Generic medicines Association, 2004a: 1). Though European governments promote the use of generic medicine, many states are far from maximising their potential for savings from generic medicines. In many European countries generics make up as much as 70% of all medicines prescribed in terms of volume, while in value terms generics represent only 30% of pharmaceutical expenditure (European Generic medicines Association, 2004d: 1).

At the end of 2005 the new European Union legislation for pharmaceuticals will come into effect. This will have a major impact on generic medicine since it will (European Generic medicines Association, 2004d: 1):

- Encourage generic registration before patent expiry.
- Allow marketing of generics where branded pharmaceuticals have been withdrawn for commercial reasons.
- Provide a more efficient system for the registration of generic medicines.
- Ensure greater harmony between generic medicines and original products.
- Provide clear scientific and legal definitions of generic and biosimilar medicines.

2.5.2.2 Generic substitution in the United States of America

During the 1970s in the United States of America pharmacists were prevented from legally dispensing a generic medicine for a prescribed brand-name multisource product. In 1984 these laws were repealed and pharmacists were allowed to dispense generic products (Mott & Kreling: 1997: 4). The passage of the 1984 amendments was a compromise to achieve balance between the innovator or pioneer drug industry and the generic drug industry. The act encouraged and awarded innovative new drug development while at the same time made more drug products eligible for generic competition (Holovac, 2004: 125).

In a study done by Mott and Kreling (1997:3) to examine whether generic substitution is determined by the therapeutic drug prescribed and patient insurance type the following results were found. Of a total of 6120 new prescriptions audited from 10 Midwestern community

pharmacies (United States of America), 1686 were eligible for generic substitution. Further, 927 prescriptions were filled with generic substitutes resulting in a substitution rate of 55%. Considerable variability occurred in substitution rates across therapeutic categories and between acute and chronic therapeutic groupings (67.4% and 38.2% respectively) (Mott & Kreling, 1997: 3). Anti-incontinence, analgesics and antibiotics were the top three therapeutic categories where generic substitution took place. In the antibiotic therapeutic category there were 285 prescriptions that could be substituted, while only 217 were actually substituted. This shows a substitution rate of 76.1% for the antibiotic therapeutic category (Mott & Kreling, 1997: 10).

2.5.2.3 *Generic substitution in South Africa*

The chief executive of Medscheme stated that generic medicine comprised over 50% of all prescription in the United States of America, Canada and Europe. In South Africa, though, less than 25% of prescriptions contain generic medicines (Anon., 2002: 1). According to the National Association of Pharmaceutical Manufacturers in South Africa, the increased use of generics can make a major contribution to reducing health care costs in South Africa. Although the use of generics in South Africa has increased in volume terms, there has only been an increase of 1% in the use of generics from a value perspective from 1999 to 2003 (Anon., 2003b: 1).

During 2002 and 2003 amendments were made to the Medicines and Related Substance Act (101/1965). One of the most important elements of the Medicines Act for both pharmacists and the public that came into operation on the 2 May 2003 is that the pharmacist is required to inform the patient of the benefits of the substitution for a branded medicine of an interchangeable multi-source medicine (IMM). Once the patient has been notified of the benefits of generic substitution (Du Toit, 2003), the generic product/IMM must be dispensed unless specifically forbidden by the patient. The prescriber may also indicate, with his own handwriting next to the specific item on the prescription that no substitution is to be done (Gray, 2003: 5).

According to Gray (2003: 5) these interchangeable multi-source medicines must comply with the following requirements:

- Contain the same active substances, in the same strength.
- Be presented in the same dosage forms, intended for administration by the same route.
- Meet the standards of therapeutic equivalence.

If an interchangeable multi-source medicine is dispensed, the brand name of the product dispensed or in a case where there is no brand name, the name of the manufacturer of the product dispensed, must be recorded by the pharmacist (Du Toit, 2003: 4). A pharmacist or person dispensing the prescription must take reasonable steps to inform the prescriber of the substitution that has taken place (Du Toit, 2003: 4; Gray, 2003: 5).

A pharmacist or other person dispensing the prescription may not dispense an interchangeable multi-source medicine in the following situations (Du Toit, 2003: 4):

- When the prescriber indicated in his own hand on the prescription, next to the item prescribed, that no substitution may take place.
- If the retail price of the generic product is higher than the price of the branded product.
- If a medicine has been declared non-substitutable by the Medicines Control Council.

2.5.3 Economics of generic products

According to the European Generic medicines Association (2004c: 1) increasing access to generic medicines generates four main public health benefits:

- Reduces prices.
- Stimulates competition between drug products.
- Creates budget headroom for innovation.
- Encourages the development of new pharmaceutical companies.

Generics are being used more and more due to rising costs of medicines. Generic drugs sell at approximately 40% of the cost of their brand name counterparts during the first six months on the market and decline to approximately 80% of the cost of the brand name products by the end of the year. In the United States of America generic drug sales grew at an 11.3% rate, while brand name products only grew at a rate of 8% during 200 and 2001 (Generic Pharmaceutical Association, 2002: 1).

In the United States of America the average cost of a brand name prescription was \$72.70 in 2001 while the average cost of a generic prescription was \$16.85. This shows a four-fold difference in price (Generic Pharmaceutical Association, 2002: 1). In the United Kingdom it was found that generics supply 50% of the products at 20% of the total cost (European Generic medicines Association, 2004c: 3). It is believed that generic substitution could save South Africa in the region of around R24-billion per year (Anon., 2003: 1).

In the study previously mentioned by Mott and Kreling (1997: 9) it was found that the cost savings per unit of prescribed drug per generic substitution was \$ 0.51. The antibiotic therapeutic category had the largest cost savings per unit of prescribed drug per generic

substitution. A summary of the top ten cost savings per unit of the prescribed drug per generic substitution across therapeutic categories is shown in the table below.

Table 2.5: Cost savings per unit of prescribed drug per generic substitution across therapeutic categories (Mott and Kreling, 1997: 11).

<i>Therapeutic category</i>	<i>Cost per unit of brand name drug prescribed</i> \$	<i>Cost per unit of generic drug prescribed</i> \$	<i>Cost savings per unit per generic substitution</i> \$
Antibiotics*	1.24	0.23	1.01
Muscle relaxants*	1.05	0.38	0.67
Antidepressants	0.74	0.23	0.51
Anti-incontinence	0.56	0.11	0.45
Oral contraceptives	0.78	0.33	0.45
Sedative/hypnotic	0.66	0.21	0.45
Gastrointestinal*	0.70	0.26	0.44
Anti-inflammatory*	0.94	0.51	0.43
Allergy	0.59	0.18	0.41
Analgesic*	0.48	0.15	0.33

*Acute therapeutic categories

2.6 MANAGED HEALTH CARE

Managed care involves the delivery of a predetermined level of health care benefits to a defined population on a prepaid basis (Stergachis *et al.*, 1996: 244)

Managed health care can be referred to as a constantly changing array of health plans that incorporate mechanisms designed to review and control the cost, quality and use of health services by means of formulary lists, pre-admission screening, case management, capitation and other management instruments to control health resources (Stergachis *et al.*, 1996: 244 and UCT, 1997:27).

The Council for Medical Schemes (2003b: 3) states that managed health care is indeed necessary for effective private health care funding in South Africa. The definition of managed health care, as defined by the Council for Medical Schemes, is as follows:

“Managed health care means clinical and financial risk assessment and management of health care, with a view to facilitating appropriateness and cost-effectiveness of relevant health services within the constraints of what is affordable, through the use of rules-based and clinical management-based programmes.”

The integration of managed health care and related concepts are illustrated in the following figure (Figure 2.1).

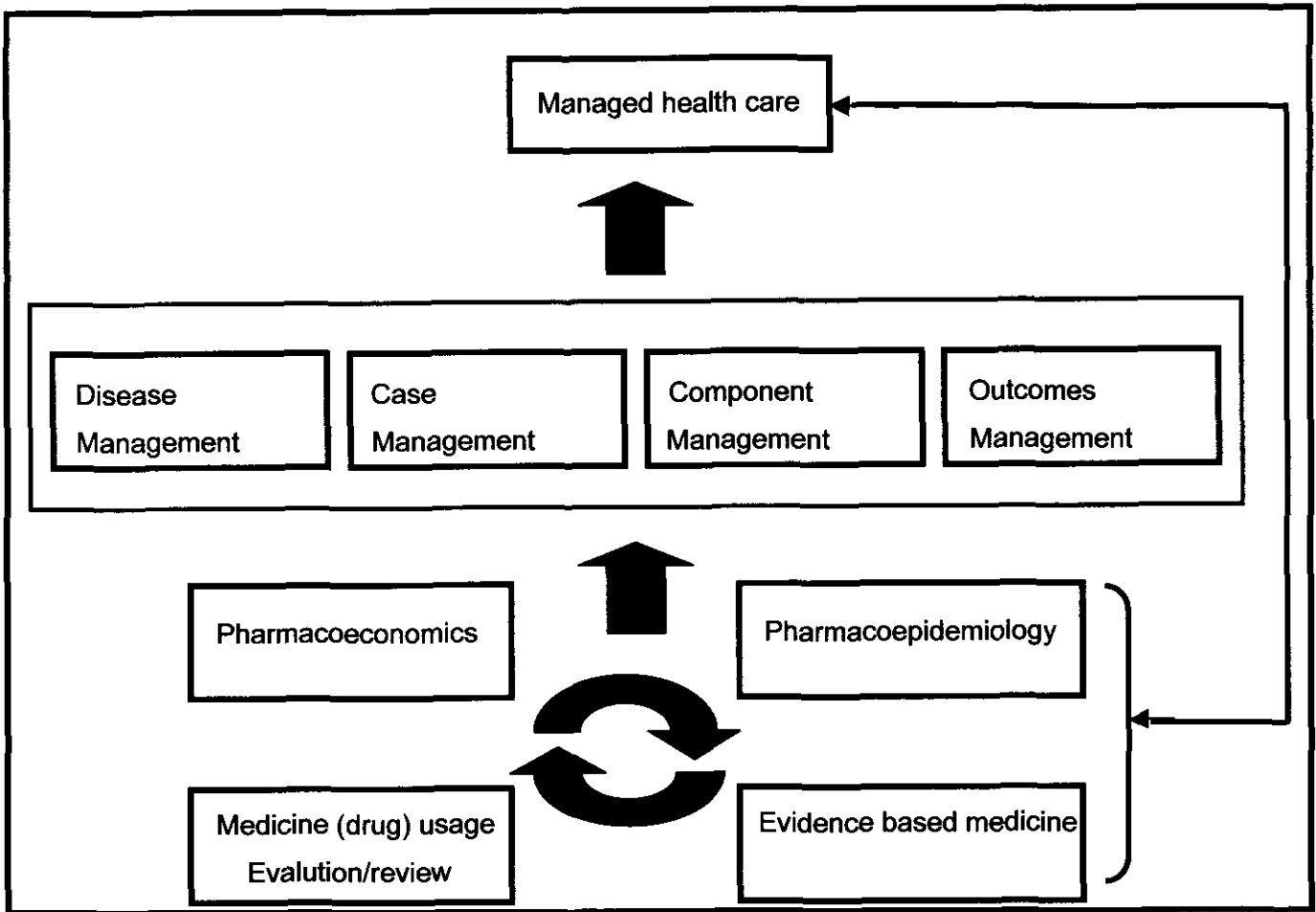


Figure 2.1: Managed health care concepts (Serfontein & Hein, 1999).

Some of the possible forms that managed care interventions might take are listed in Table 2.6 below.

Table 2.6: Possible forms of managed care interventions (South African Health Review, 1998: 1).

Managed care intervention	Description
Pre-authorisation	The requirement that patients and/or their doctors seek permission from the funder prior to certain interventions.
Case-management	Application of protocols, generally by nurses, to direct the care of hospitalised patients.
Provider networks and capitation arrangements	Establishment of contracts between a funder and groups of providers stipulating reimbursement levels, care requirements, minimum access levels, etc. In some cases, this has involved providers assuming risk for utilisation variations through capitation
Provider profiling and peer review	The use of a variety of comparative review techniques to identify providers with particularly wasteful, dangerous or potentially fraudulent practices. Outcomes of the profiling exercise might include constructive feedback, in-service education, financial or other penalties, or exclusion from networks.
Pharmaceutical benefit management	This may involve discount price agreements with pharmacies, establishment of limited formularies, ongoing supply of chronic medications, arrangements for generic substitution, etc.
Provider-insurer integration	Merging of health care financing and provision organisations into Health care Maintenance Organisations.

For medical schemes to ensure that interventions are clinically appropriate and cost-effective they need to combine financial management with clinical management. The patient will benefit most if the best health outcome is achieved through evidence-based and affordable interventions. The Council for Medical Schemes (2003b: 3) recognizes the potential significant advantage of managed health care to the extent that it can

- achieve cost reduction;
- align the financial incentives of providers and financiers to reduce perverse incentives for unnecessary care;
- entrench mechanisms to maintain or improve quality of health care;
- encourage the development of standardized treatment approaches;
- support members in gaining access to the most appropriate treatment interventions; and
- promote an integrated and holistic approach to managing the health care needs of patients.

Since the mid-1990s a number of models of managed health care have emerged in South Africa, some of which are reflected in the figure below.

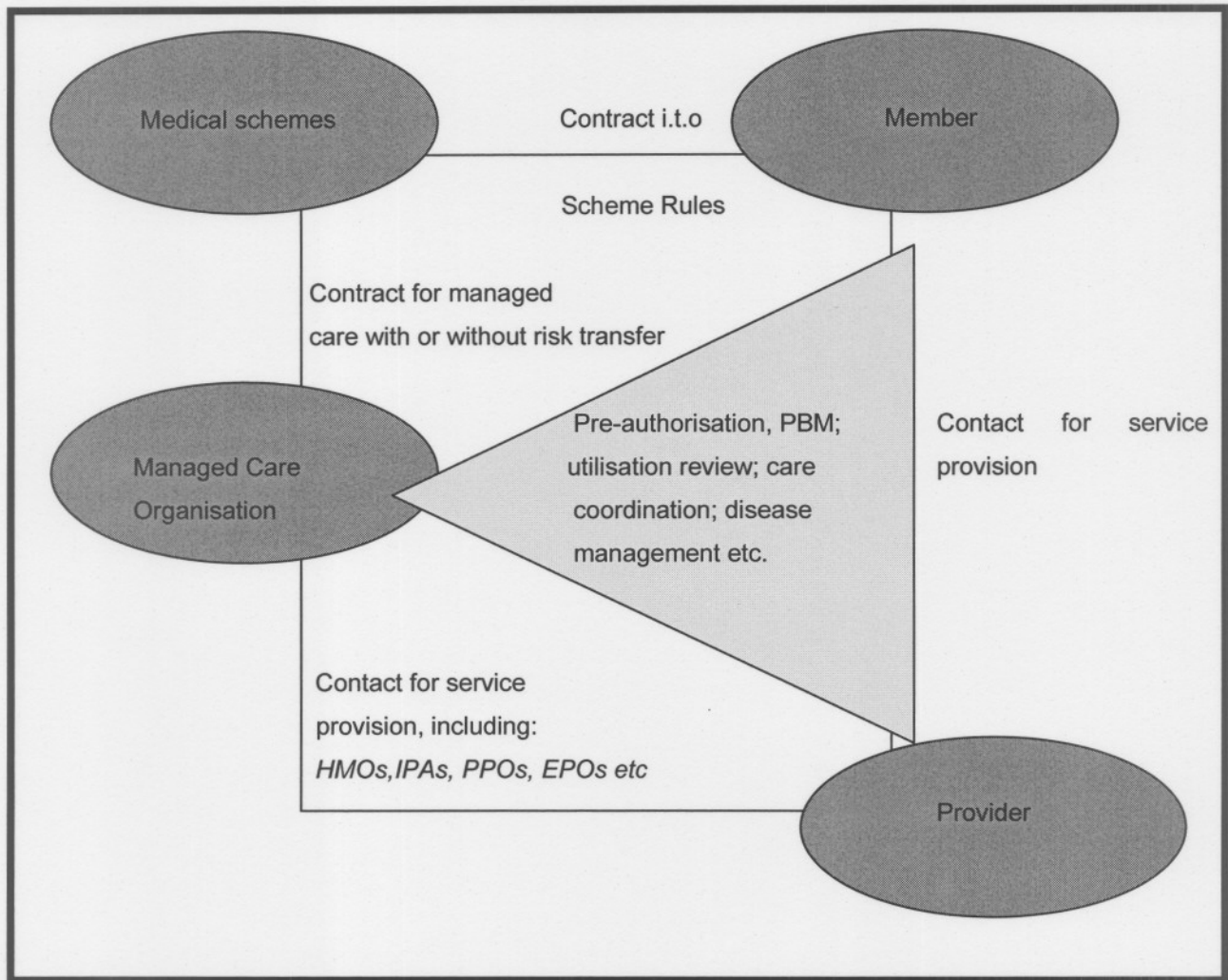


Figure 2.2: Models of managed health care (Council for Medical Schemes, 2003b: 4).

2.6.1 Prescribed Minimum Benefits

Prescribed medical benefits were introduced in the Medical Schemes Act (131 of 1998) in an effort to prevent private sector patients who had run out of medical cover from being dumped on the state without compensation from medical schemes. In the regulations under the medical Schemes Act (131 of 1998) there is a list of 300 minimum benefits that schemes must provide. From January 2004, schemes will be required to offer members coverage for twenty-five listed chronic diseases in addition to existing compulsory minimum benefits (Schickerling, 2003:1).

Prescribed Minimum Benefits are minimum benefits which by law must be provided to all medical scheme members and include the provision of diagnosis, treatment and care cost for an emergency medical condition and a range of conditions as specified in Annexure A of the Regulations to the Medical Scheme Act (131 of 1998), subject to limitations specified in Annexure A. Included in this list of conditions is the list of twenty-five chronic conditions.

According to the Medical Schemes Act (131 of 1998) the diagnosis, treatment and care costs of a prescribed minimum benefit condition will only be paid in full by the medical scheme if those services are obtained from a designated service provider in respect of that condition. If a service provider other than the designated service provider is used a co-payment may be imposed on a member. Members may obtain a service from a provider other than a designated service provider only if the specific service was not available from the designated service provider; if immediate medical or surgical treatment for a prescribed minimum benefit condition is required or when no designated service provider within reasonable proximity is available.

Some of the factors that were taken into account when identifying the twenty-five chronic diseases that would be covered, were the nature of the disease and how that disease would affect the quality of life of the individual; the most prevalent conditions; the affordability of the treatment and the financial impact to medical schemes (Anon., 2003c: 1). Annexure D of the Medical Schemes Act (131 of 1998) contains the treatment guidelines for chronic minimum benefits conditions. These treatment guidelines will be revised every two years.

The twenty-five chronic conditions that have been added to the Prescribed Minimum Benefits list and which, from 2004, medical schemes are required to cover are as follows (Anon., 2003c: 3; Council for Medical Schemes, 2003c: 1):

- Addison's disease
- Asthma
- Bipolar mood disorder
- Bronchiectasis
- Cardiac failure
- Cardiomyopathy
- Chronic obstructive pulmonary disorder
- Chronic renal disease
- Coronary artery disease
- Crohn's disease
- Diabetes insipidus
- Diabetes mellitus types 1 and 2
- Dysrhythmias
- Epilepsy
- Glaucoma
- Haemophilia
- Hyperlipidaemia
- Hypertension
- Hypothyroidism

- Multiple sclerosis
- Parkinson's disease
- Rheumatoid arthritis
- Schizophrenia
- Systemic lupus erythematosus
- Ulcerative colitis

The implementation of the Prescribed Minimum Benefits package had the following in mind (Pearmain, 2000: 2):

- Avoid incidents where individuals lose their medical scheme cover in the event of serious illness and the consequent risk of unfounded utilisation of public hospitals.
- Encourage improved efficiency in the allocation of private and public health care resources.

2.7 PHARMACEUTICAL REFERENCE-BASED PRICING

In an attempt to contain rising pharmaceutical expenditure, benefit managers have implemented a reference-based pricing system. Many governments have adopted reference-based pricing either as a replacement or in addition to product specific price controls (Dickson & Redwood, 1998: 471).

A reimbursement level or reference price for a group of drugs that are regarded as generally interchangeable is determined. Payers in the public or private sector set this reimbursement levels. The reference price becomes the maximum price paid for by medical schemes. When drugs above the reference price are prescribed the consumer pays the difference. Medical schemes fully reimburse drugs priced at or below the reference price (Ioannides-Demos *et al.*, 2002: 580).

Pharmaceutical companies are free to determine their own price for a certain medicine product. From this it is clear that reference-based pricing is not strictly a price control mechanism. It, however, raises the likelihood of products above the reference price losing their market share (Dickson & Redwood, 1998: 472). Reference-based pricing places a strict constraint on pharmaceutical companies' pricing policies. Because of the grouping of similar drug treatments, price competition amongst pharmaceutical suppliers is encouraged. New and innovative drugs, drugs still under patent and drugs used in hospital or inpatient care, may be excluded from reference-based pricing schemes (Ioannides-Demos *et al.*, 2002: 580).

Reference-based pricing is restricted to those specific segments of the drug market where several drugs exist without substantial evidence that any particular agent is superior. Drugs are grouped in one of three ways under reference-based pricing schemes (Ioannides-Demos *et al.*, 2002: 580):

- Groups of different brands of the same drug. It involves the grouping of drugs that have the identical bioactive ingredient and are therefore therapeutically interchangeable (generic groups).
- Related drug groups. Drugs are grouped with related but different drugs regardless of the indication.
- Drugs grouped by therapeutic indication. All the drugs used to treat a particular condition are grouped together.

According to Dickson and Redwood (1998: 472), reference-based pricing has one or more of the following objectives in common:

- To modify physicians' prescribing habits by influencing them to prescribe cheaper drugs.
- To advise patients to accept cheaper drugs or higher co-payment.
- Indirectly decrease price by putting pressure on the pharmaceutical industry to keep market share.
- To restrain expenditure on the payer's drug budget.

2.8 ESSENTIAL DRUGS

The saving of lives and improvement of health depends largely on essential drugs. However, this depends on their availability, affordability, quality and proper usage. Still, in poor households, medicine purchases consume 60% to 90% of health expenses. In developing countries medicines are the second highest public health expenditure (Quick, 2002: 1).

According to Quick (2002: 1), the estimated number of people in the private and public sectors to have regular access to essential drugs during 1977 totalled 2.1 billion in South Africa. This doubled to nearly 4 billion in 1997. All the same, one-third of the world's population lack regular access to essential drugs.

2.8.1 The concept of essential drugs

The essential drug concept was introduced by the World Health Organization in 1975 with the following objectives (Anon., 2003: 1):

- The focus needs to be on drugs that satisfy health needs
- Drugs should be selected based on evidence to meet health needs
- Access to health care needs to be promoted
- Public health care costs need to be reduced
- The total number of drugs in public health care systems needs to be reduced

The essential drug concept is a globally accepted approach for the providing of the best modern, evidence-based and cost-effective health care. Health systems of various types have recognized its therapeutic and economic benefits. The essential drug concept focuses on therapeutic decisions, professional training, public information and financial resources on those drugs that represent the best balance of quality, safety, efficacy and cost for a given health setting (World Health Organization, 2003: 1). Each country, though, should evaluate and adopt a list of essential drugs according to its own health policy (World Health Organization, 1998: 1). The rationale for the selection of essential drugs is that it leads to an improved supply of drugs, more rational prescribing habits and lower costs (Quick *et al.*, 1997: 122).

2.8.1.1 Definition of an essential drugs list

According to the Department of Health (1998a: iv) essential drugs are defined as follows:

“Essential drugs are those that satisfy the needs of the majority of the population. They should therefore be available at all times, in adequate amounts, and in the appropriate dosage forms.”

When taking the above definition into account it is clear that the availability of medicines at health care facilities can draw patients to those facilities. At these facilities patients will have access to other preventive and curative services in addition to medicines (Anon., 2003: 1-2).

2.8.1.2 Advantages of an essential drugs list

There are a few advantages of an essential drugs list according to Quick *et al.* (1997: 124). It will ensure the supply of the following:

- Easier procurement, storage and distribution.
- Lower stock volume.
- Better quality assurance.
- Easier dispensing.

An essential drugs list also influences prescribing habits in the following ways:

- Training more focused and therefore easier.
- More experience with fewer drugs.
- No irrational treatment alternatives available.
- Focussed drug information.
- Better recognition of adverse drug reactions.

The effect on medicine costs is also of great value:

- Lower prices.
- More competition.

Essential drugs improve patient use in the following ways:

- Focused education efforts.
- Reduced confusion and increased adherence to treatment.
- Improved drug availability.

2.8.2 Guidelines for establishing a national programme for essential drugs.

The main objective of the National Health Department is to try and achieve optimal availability and use of drugs for patients and consumers. For this reason a well-designed drug policy needs to be developed and implemented.

According to Quick *et al.* (1997: 56), a National Drug Policy can be defined as follows:

“A National Drug Policy is a guide for action. It is a document specifying the goals set by the government for the pharmaceutical sector, their relative importance, and the main strategies for attaining them. It provides a framework to coordinate activities of the pharmaceutical sector: the public and private sectors, NGOs, donors and other interested parties.”

The most common objectives of the National Drug Policy of South Africa are (Quick *et al.*, 1997: 57)

- to make essential drugs available and affordable;
- to ensure the safety, efficacy and quality of drugs;
- to improve prescribing and dispensing habits and to promote the correct use of medicines by health workers and the public; and
- to improve overall health economy.

Before the implementation of an essential drugs programme the following need to be in place (WHO, 1998: 2-4):

- A national drug regulatory authority should be established. The authority should interact with organizations responsible for drug procurement in the public and private sectors.
- A national drug and therapeutic committee consisting of individuals in the fields of medicine, clinical pharmacology, pharmacy and clinical microbiology need to be appointed. This committee's main function will be to give technical advice to the national programme.
- It is advised that the nonproprietary (generic) names for drugs be used. Prescribers should be provided with cross-index of nonproprietary and proprietary names.
- A prescriber's formulary containing concise, accurate and comprehensive drug information should be prepared to accompany the list of essential drugs.
- The assurance of quality of each product on the essential drugs list needs to be done. Each product needs to undergo a product registration process to assure the quality, stability and bioavailability.
- It is essential to establish the requirements for prescribing an individual drug or groups of drugs in a therapeutic category. In some cases personnel with advanced training are necessary to prescribe initial therapy, while others with less training could be responsible for maintenance of therapy.
- Supply, storage and distribution are factors that will determine the success of the essential drugs programme.
- Drug utilisation studies will contribute to efficient management of stocks. Procurement policies should be implemented to eliminate waste and to ensure continuity of supplies.
- Clinical as well as pharmaceutical research is required to settle the choice of a particular drug product under local conditions.

2.8.3 Criteria for the selection of essential drugs.

The selection of essential drugs must always be evidence-based. Drugs to be included on the essential drugs list should be done after clinical studies regarding efficacy and safety have been done. The dosage form of the drugs should guarantee adequate quality, stability and bioavailability (WHO, 1998: 4-5).

In cost comparisons between drugs, the cost of the total treatment and not only the unit cost of the drug must be considered. The cost/benefit ratio is a major factor that will determine the choice of drug included on the list (WHO, 1998: 4-5).

According to Department of Health of South Africa (1998a: iii), the following criteria are crucial for the selection of essential drugs:

- ❑ Drugs included on the list must meet the needs of the majority of the population.
- ❑ Scientific data regarding effectiveness must be available.
- ❑ Drugs included should have a substantial safety and risk/benefit ratio.
- ❑ Acceptable quality must be guaranteed.
- ❑ The main focus is to include products that contain single pharmacologically active ingredients.
- ❑ More than one pharmacologically active ingredient is accepted when patient compliance becomes important or the two ingredients act synergistically.
- ❑ Non-propriety (generic) names are accepted.
- ❑ The inclusion of a new product on the list must be evaluated according to scientific data and appropriate references on its advantages and benefits over an existing product.
- ❑ Drugs that are clinically equally effective must be compared on the following factors such as
 - cost advantages;
 - scientific data;
 - pharmacokinetic properties;
 - patient compliance; and
 - local manufacturers.

According to the WHO (1998: 4), the choice of essential drugs depends on many factors, such as the pattern of prevalent diseases; the treatment facilities; the training and experience of the available staff; the financial resources; and genetic, demographic and environmental factors.

2.8.4 Quality assurance.

Priority should be given to ensuring that the available drugs have been made according to good manufacturing practices. The purpose is to ensure that each drug reaching a patient is safe, effective and of a standard quality. A drug is a dynamic product whose colour, consistency, weight and even chemical identity can change between manufacturing and consumption (Quick *et al.*, 1997: 272).

According to Quick *et al.* (1997: 272) a comprehensive quality assurance programme must ensure that

- ❑ drugs are selected on the basis of safety and efficacy, in a dosage form with the longest possible shelf life;
- ❑ suppliers with acceptable quality standards are selected;
- ❑ drugs received from commercial suppliers and donors meet specified quality standards at the time of delivery;

- packaging meets contract requirements and can withstand handling and storage conditions;
- repackaging activities and dispensing practices maintain quality;
- storage and transportation conditions are adequate;
- product quality concerns reported by prescribers, dispensers and consumers are addressed and resolved; and
- drug recall procedures are implemented to remove defective products.

2.9 PHARMACOECONOMICS

As previously mentioned, nations around the world struggle to contain rising health care costs and aggressive steps are taken to control the growth rates of health care (Sardinha, 1997: 1). According to Goudge *et al.* (2001: 71), private health care expenditure in South Africa has grown annually by 16%. This is twice as much as the CPI with a growth rate of 7% annually.

The emphasis on cost containment in the health care system has created needs to explicitly quantify and justify the costs and benefits associated with specific medical programmes and procedures to make rational therapeutic decisions. This need has increased the application of economic evaluation techniques comparing health care services, including drug therapies and clinical pharmacy services (Lee & Sanchez, 1991: 2623).

Pharmacoeconomics is a measure of drug impact on the cost of improving health care and goes beyond comparison of drug acquisition cost, to evaluate a drug's impact on total institutional expenditure for patient care. Such pharmacoeconomic analysis allows for the evaluation of all costs associated with drug therapy (Lipsy, 1992: 267).

Pharmacoeconomics can be defined as an evolving discipline that is dedicated to the study of how different approaches to patient care and treatment influence the resources consumed in health care (Truter, 1997: 19). With pharmacoeconomics it is possible to determine the value of an existing service or the potential worth of a new one. It involves identifying, measuring and comparing the costs, risks and benefits of programmes, services or therapies and determining which alternative produces the best health outcome for the resources invested (Jolicoeur *et al.*, 1992: 1741).

2.9.1 Pharmacoeconomic evaluations

There are three fundamental dimensions of pharmacoeconomic studies, namely (Malek, 1996a: 760)

- the perspective of the study;
- the types of cost and outcomes used; and
- the type of analysis performed.

2.9.1.1 Perspective of pharmacoeconomic evaluation

The point of view determines the scope of the analysis. Economic evaluation on any health care programme consists of a comparison between the costs and outcomes of all legitimate alternatives available. The categories of costs and outcomes are not absolute values and are not context free. It is therefore very important to make the point of view of the study clear from the beginning (Malek, 1996b: 3).

There are various perspectives from which the study can be conducted. It includes the patient, the provider, the hospital or health organisation, third party payers, government and society (McCloskey, 2001: 147). Manufacturers, insurers, providers, guideline development committees, governmental agencies and policy makers may all benefit from pharmacoeconomic evaluations.

Patients are generally concerned about the way the treatments will affect their quality of life, while the providers, hospitals or health organisations are primarily concerned about the benefits to their organisations (Bootman *et al.*, 1989: 695). There is a difference of perspective through the cost to patients, providers or third party payers for the medical service. The cost to the provider is the true cost of the service, while the cost to the payer is the cost allowed by that payer. The cost to the patients is the amount they pay for the service, which is not covered by the medical aid or third party payer, together with the other costs incurred due to the illness (Eisenberg, 1989: 2881).

2.9.1.2 Costs

Health care cost inputs or economic outcomes can be grouped into several categories (Sanchez, 1997: 3):

- Direct medical costs are the costs associated directly with the delivery of medical care and purchasing of drugs out of the pocket. It refers to the costs incurred for medical products and services used to prevent, detect and/or treat a disease (Malek, 1996a: 760).
- Direct non-medical costs are the costs incurred as a result of the illness but do not involve purchasing of medical services. It includes costs like transportation to hospital, social services, etc. (Sacristán *et al.*, 1993: 1128).

- ❑ Incremental costs refer the difference between the cost of a treatment programme and the cost of the comparison treatment programme (Anon, 1995: 2).
- ❑ Indirect medical costs are the costs of medical treatment gained through an earlier intervention (Anon, 1995: 2).
- ❑ Indirect non-medical costs are costs that result from changes in production capacity. Indirect costs are associated with the loss of earnings and the shortfall of finance and production resulting from illness, as well as loss of earnings due to morbidity and mortality (Sacristán *et al.*, 1993: 1128).
- ❑ Intangible costs are the costs associated with the patient's pain and suffering due to the illness, which are difficult to express in a monetary value (Sacristán *et al.*, 1993: 1129). It can, however, be taken into account through cost-utility analysis.
- ❑ Opportunity costs represent the economic benefit forgone when using one therapy instead of the next best alternative therapy (Sanchez, 1997: 3).

2.9.1.3 Outcomes

The outcome of a pharmacoeconomic study can either be clinical or humanistic. Clinical outcomes are the medical events or changes in a medical parameter that occur as a result of disease or treatment (Jones & Sanchez, 1997: 3). Where the most common type of pharmacoeconomic method for evaluating humanistic outcomes is the quality of life measurement (Sanchez, 1997: 4).

Quality-of-life (QoL) is a multidimensional concept, referring to a person's total well-being, including his or her psychological, social and physical health status (Coons, 1997: 16).

Health-related-quality-of-life (HRQoL) is used to refer to those elements of well-being that are attributable to health, as a patient's well-being may be influenced by a number of non-health-related factors (MacKeigan & Pathak, 1992: 2238).

2.9.2 Type of pharmacoeconomic evaluations

There are several pharmacoeconomic evaluation methods namely cost utility, cost minimisation, cost benefit and cost-effectiveness. The methodologies and their units of measurement are depicted in the following table.

Table 2.7: Pharmacoeconomic methodologies (Bootman *et al.*, 1996:9).

<i>Methodology</i>	<i>Cost measurement unit</i>	<i>Outcome unit</i>
Cost benefit	Monetary (rand value)	Monetary (rand value)
Cost-effectiveness	Monetary (rand value)	Natural units (life-years gained, mmol/L blood glucose, mm Hg blood pressure)
Cost-minimisation	Monetary (rand value)	Assumed to be equivalent in comparative groups
Cost-utility	Monetary (rand value)	Quality-adjusted life-years or other utilities

2.9.2.1 Cost-minimisation analysis (CMA)

When two or more interventions are examined and demonstrated or assumed to be equivalent in terms of a given outcome or consequence, costs associated with each intervention may be examined and compared (Bootman *et al.*, 1996: 10). It is important to have equal clinical efficacy before the analysis is carried out (Malek, 1996b: 5). According to Eisenberg (1989: 2880) the goal of this analysis is to determine the least expensive way of achieving the outcome.

Because of strict requirements of therapeutic equality, cost-minimisation analysis is not commonly used to assess drug therapies, programmes or services (Jolicoeur *et al.*, 1992: 1742). An example of this type of analysis may be the evaluation of two generically equivalent drugs, which have equal outcomes, but may have different acquisition and administration costs (Lamprecht, 2002: 115).

2.9.2.2 Cost-effectiveness analysis (CEA)

Cost-effectiveness is designed to identify a preferred choice among possible alternatives (Bootman *et al.*, 1996: 11). With cost-effectiveness analysis the consequences of each intervention, whether pharmacological or non-pharmacological, are measured in the most appropriate natural or physical unit ("years-of-life gained") and the costs are measured in monetary terms (Lamprecht, 2002: 115).

Cost-effectiveness is defined as a series of analytical and mathematical procedures that aid in the selection of a course of action from various alternative approaches (Bootman *et al.*, 1996: 11). Mullins *et al.* (1997: 426) state that a cost-effectiveness analysis should include positive outcomes, measured by efficacy and patient well-being, and negative outcomes, such as adverse events and other factors that negatively influence patient quality of life.

According to Jolicoeur *et al.* (1992: 1741) cost effective alternatives are not by definition the least expensive therapies. A treatment can be considered to be cost-effective if it is

- less expensive and at least as effective as other alternatives;
- more expensive than alternatives with additional benefit worth the additional cost; and
- less expensive and less effective in instances where extra benefit is not worth the extra cost.

2.9.2.3 Cost benefit analysis (CBA)

In a cost benefit analysis all costs and benefits of alternatives are measured in monetary terms (Jolicoeur *et al.*, 1992: 1741). According to Bootman *et al.* (1996: 10) cost benefit analysis is a type of analysis that measures costs and benefits in fiscal units and computes a net monetary gain/loss or a cost benefit ratio that can be used to improve decision-making processes in the allocation of funds to health care programmes.

With cost benefit analysis it is difficult to determine a monetary value on clinical outcomes. Single programmes or multiple programmes can be evaluated through cost benefit analysis, though effectiveness analysis is more commonly used (Jolicoeur *et al.*, 1992: 1742).

2.9.2.4 Cost-utility analysis (CUA)

Cost-utility analysis measures health-related quality of life by means of a utility approach, the outcome often being expressed in quality of health. This method evaluates outcomes not only for the associated monetary costs, but also for the added cost of patient discomfort or change in function or level of satisfaction (Jolicoeur *et al.*, 1992: 1741). This type of analysis has an added dimension of a particular point of view, which in most instances, is the patient (Bootman *et al.*, 1996: 11).

The relative values that members of society attach to various states of health can be determined through utility measurements. Often, utility values are on a scale of 1.0 (normal health) to 0 (dead). No standard criteria have been established for measuring utilities (Jolicoeur *et al.*, 1992: 1743).

2.9.2.5 Cost-of-illness (COI)

Cost-of-illness evaluation identifies and estimates the overall cost of a particular disease in a defined population. It involves the following three components: Medical resources used to treat the illness, non-medical resources associated with it and loss of productivity due to illness or disability (Bootman *et al.*, 1996: 12).

Cost-of-illness is not used to compare competing treatment alternatives, but to provide an estimation of the financial burden of the disease.

2.9.3 The purpose and importance of pharmacoeconomics

Pharmacoeconomic studies are done to improve public health through rational decision making entailing the selection of one alternative among several others. The alternative that produces the best outcome for the resource invested is preferred as therapy (Bootman *et al.*, 1996: 7).

Corresponding to recent awareness by the public of rising health care cost there has been an increased interest in evaluating drugs' economic as well as clinical benefits. According to Stanton (2002:1) health care organisations are implementing strategies to reduce the current levels of growth in health care expenditure. Nations around the world struggle to contain rising health care costs. In response to this the expenditure on drugs have become the primary target of reform (Sardinha, 1997: 1). Thus, pharmacoeconomic evaluations will play an important role in future.

Sanchez (1997: 6) indicates that pharmacoeconomics is important due to the following reasons:

- ❑ It can assess the value of the products and services that are provided.
- ❑ It can assist in decision making between more than one treatment alternative.
- ❑ It provides data necessary to make better medication use decisions.
- ❑ It can assist in balancing cost with quality and patient outcome.

2.10 DRUG UTILISATION REVIEW

Patterns of drug use along with population changes and disease prevalence are of increasing importance to health professionals and administrators. In every health care organisation today there exists a huge need for information on outcomes of treatments, real drug intake and prescribing patterns for different indications (Serradell *et al.*, 1987: 996). Further, the increase in drug consumption and irrational drug use have also led to the initiation of drug utilisation review studies (Inesta, 1992: 353).

Drug utilisation can be defined as the study of the prescribing, dispensing, administering and ingesting of drugs. The steps and processes in drug usage and the problems that may arise in each of these steps are taken into account with this definition of drug utilisation (Serradell *et al.*, 1987: 994).

The World Health Organization (WHO) defines drug utilisation as the marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences (Serradell *et al.*, 1987: 994). According to Sacristán and Soto (1994: 300) this broad definition takes into account the process of drug utilisation, that is the

movement of drugs along the drug chain in the society, and how drug utilisation relates to the effects of drug use.

It is important to know that there is a clear difference between drug utilisation review (DUR) and drug utilisation evaluation (DUE). Drug utilisation review (DUR) provides qualitative data on drug usage, focussing on the quantitative aspects and patterns of drug use, while drug utilisation evaluation (DUE) focusses on outcomes as well as providing quantitative data (McGlynn, 1995: 26).

There should also be differentiated between a drug utilisation study and a drug utilisation programme. In a drug utilisation study one looks at the patterns of drug use retrospectively and only identifies areas of inappropriate drug use without initiating efforts to correct it, whereas a drug utilisation programme is more prospective and tries to correct problematic areas before they arouse (Sacristán & Soto, 1994: 30; Kreling & Mott, 1993: 417).

2.10.1 Classification of drug utilisation review

When a drug utilisation review study is done it is necessary to obtain quantitative data regarding the extent and variability in usage and costs of drug therapy, from which medical and social consequences can be extrapolated. Drug utilisation may either be quantitative or qualitative or a combination of both.

2.10.1.1 Quantitative drug utilisation review

Quantitative drug utilisation studies are concerned with trends and amounts of drugs used (Inesta, 1992: 353). Kreling and Mott (1993: 413) described quantitative drug utilisation as episodic or continuing activities performed by pharmacists and pharmacy departments for medical schemes.

The main focus of quantitative data is the cost of drug therapy and the resulting social and economic consequences thereof (Serradell *et al.*, 1987: 994). Quantitative utilisation studies are concerned with the development of strategies to reduce medical expenditure.

According to Sacristán and Soto (1994: 300) quantitative drug utilisation studies are used to

- ☐ determine the quantities of drugs consumed in a specific period of time and in a specific geographical area;
- ☐ investigate the development of drug utilisation over time;
- ☐ compare drug consumption in different geographical areas;
- ☐ identify areas of misuse of drugs;
- ☐ estimate the utilisation of drugs according to certain variables; and

- ❑ estimate the prevalence of particular illnesses based on the consumption of drugs utilised in their treatment.

2.10.1.2 Qualitative drug utilisation studies

Qualitative drug utilisation studies can be defined as the process that analyses the appropriateness of drug use. The analyses can only be done correctly if the diagnoses are known to the analyst (Inesta, 1992: 353). A judgement on the appropriateness of the drug treatment can thus be made. Qualitative drug utilisation studies require pre-determined quality criteria for drug use, such as the duration of treatment, the most suitable dosage for each indication, the choice of efficient drugs, utilisation of fixed combinations of drugs, etc. (Sacristán & Soto, 1994: 300).

According to Kreling and Mott (1993: 416), qualitative drug utilisation studies can be used to

- ❑ determine the appropriateness of the daily dosage;
- ❑ analyse the period of time of therapy;
- ❑ determine the indication of the specific drug therapy;
- ❑ identify possible drug interactions;
- ❑ determine the most suitable dosage for each indication; and
- ❑ assess the fixed combination of drugs.

2.10.1.3 Combination of quantitative and qualitative drug utilisation studies

Both quantitative and qualitative drug utilisation review studies may be combined into a single study to produce information about patterns and amounts of drug use as well as the quality of drug use (Kreling & Mott, 1993: 417).

2.10.2 Types of drug utilisation review studies

Drug utilisation studies may either be prospective, concurrent or retrospective depending on the role player under review.

2.10.2.1 Retrospective drug utilisation review studies

According to Blackburn (1993: 15) retrospective drug utilisation review studies are done after the prescription, dispensing and use of drugs have occurred. Thus, the evaluation of therapy and intervention is performed after the patient has completed therapy.

Retrospective drug utilisation studies have little impact on immediate patient care. It serves to identify trends in prescribing habits that may lead to interventions aimed at enhancing prescribing behaviour. These studies are usually relatively inexpensive (Truter, 1995: 338). A

medical aid claims database can be used to apply statistical methods to identify areas of patient care that are not beneficial or too costly to the funder (Sacristán and Soto, 1994: 301).

2.10.2.2 Concurrent drug utilisation review studies

Concurrent reviews are conducted simultaneously with the dispensing process. Before the prescription is filled the pharmacist evaluates the appropriateness and correctness of the drugs prescribed (Blackburn, 1993: 15). An intervention in the therapy can take place before a problem arises and the desired effect has not been reached. Supportive information can be provided to the prescriber at the time of prescribing.

According to Truter (1995: 338) concurrent review studies are more expensive and time consuming. This type of review study is very limited and it is only used for certain institutionalised patients and patients on chronic medication (Blackburn, 1993: 15). It, however, has the potential for much greater pay-offs in preventing problems.

2.10.2.3 Prospective drug utilisation review studies

Prospective drug utilisation studies refer to programmes where the evaluation of therapy and intervention, if necessary, occurs before the patient receives the first dose of a drug (Blackburn, 1993: 15). This implies providing guideline information to the prescriber and is prospective to the filling of the prescription, so it has to occur before the prescription process occurs (Edgren, 1996: 124).

For prospective utilisation to be effective it is essential for a physician or prescriber to have access to an integrated computer system (Sacristán and Soto, 1994: 301) containing all the information regarding the patient's drug and medical history (Truter, 1994; 18). This permits the practitioner to evaluate the patient's pre-existing therapy on a retrospective basis, thus preventing drug therapy problems before they occur.

2.10.3 Defining the unit of measurement

The three units for quantification of drug use are cost data, prescription volume and defined daily dose.

2.10.3.1 Cost data

In early drug utilisation studies the gross drug sales data were most commonly used as indicator. A few problems appeared when using data based on drug cost because of differential pricing that occurs according to distribution channels employed, quantity purchased, import duties and currency exchange rate differences between certain countries and regulatory policies that affect pricing (Serradell *et al.*, 1987: 995).

2.10.3.2 Prescription volume

Some drug utilisation studies rely on the number of prescriptions written or dispensed for a particular drug product as a measure of drug use. However, because the quantity of the prescription items varies from prescription to prescription and the supply per prescription can be for any period of time, no adequate assessment of the amounts of drugs included in the prescription or dispensed can be provided. Generic substitution may also influence the results (Serradel *et al.*, 1987: 995).

2.10.3.3 Defined daily dose

See 3.6.2.

2.10.4 Criteria used in drug utilisation studies

The type of drug or the disease states analysed, plays an important role in developing the right criteria for the drug utilisation study performed. Knapp (1991: 600) states that criteria are predetermined elements against which the quality and economy of drug use are judged, representing the ideal to which actual drug use is compared. Professionals, relying on professional expertise and literature, develop criteria. Thus, criteria may be developed in a variety of ways. It is essential that criteria be grounded in the scientific and clinical literature.

Criteria must be scientifically valid, appropriate to the aim of the analysis, acceptable to both the review and subjects of the review and likely to yield acceptable numbers of cases for intervention (Knapp, 1991: 600).

Criteria should be developed for each study performed to assure that the aim of the analysis be reached. Specific criteria must reflect characteristics of specific drug therapy as known to pharmacists and physicians (Knapp, 1991: 601).

2.10.4.1 Classification of criteria

Criteria may be developed in a variety of ways and the classification of criteria should also be determined. Criteria can be classified as absolute, relative or pragmatic (Knapp *et al.*, 1974: 649). Criteria can also be classified as subjective (implicit) or objective (explicit). A third way of classifying criteria involves an approach that focuses on three factors: structure, process and outcome (Knapp *et al.*, 1974: 649).

- Absolute criteria are established prior to data collection and function as thresholds or limits.
- Relative or statistical criteria may be established in relation to the distribution of measurements.

- ❑ Pragmatic criteria are those established because it is thought that they are practically or clinically relevant.
- ❑ Subjective criteria are unstructured and are not specifically defined in measurable terms.
- ❑ Objective criteria are so explicitly or specifically defined that any judge using them can evaluate a given data set identically.
- ❑ Structural criteria include the demographic and ecological characteristics of the unit of observation.
- ❑ Process criteria refer to the “what”, the “when”, the “where” and the “how” of care.
- ❑ Outcome criteria are designed to measure whether the end results of patient care were met.

2.10.5 The purpose and importance of drug utilisation studies

The purpose of drug utilisation is to assure appropriate, safe and effective drug use. According to Truter (1995: 338) drug utilisation studies, depending on the setting and underlying priorities, may be used for a variety of purposes, e.g. improvement of quality of care, containment of costs of medical care, identification of fraud and abuse, etc.

There is a great need for drug utilisation studies to be done. Consumption of drugs is usually irrational (Quick *et al.*, 1997: 21) and there is an increase in the cost of medicine (Blackburn, 1993: 14). In the process of trying to reduce both the cost of medical treatment and drugs a balance between cost and drug containment should be kept, in order to assure that optimum treatment is rendered or supplied to the patient (Blackburn, 1993: 14).

Drug utilisation studies are used in clinical research to measure the effect of the drug and to calculate its benefit to the patient (Serradell *et al.*, 1987: 1000) and to estimate the incidence and potential severity of drug reactions (Sacristán & Soto, 1994: 305). Further, it is also used to evaluate the overall quality of drug consumption in a specific geographical area. This is of great importance to the manufacturer (Sacristán & Soto, 1994: 305). Drug utilisation studies are also important for determining quality (Enright & Flagstad, 1991: 1908) and economic implications before licensing of pharmaceutical product (Drummond, 1994: 42).

2.11 CHAPTER SUMMARY

This chapter focussed on health care in South Africa and in particular health care in the public and private sectors. The definition, aim and importance of pharmacoeconomics, as well as pharmacoeconomics evaluations were also discussed. Drug utilisation was discussed according to definition, the goal or purpose of drug utilisation, the significance, classification and types of drug utilisation studies and the criteria and classification of criteria used in drug utilisation studies.

Hereby the first few research questions and research objectives, namely to conceptualise health care in South Africa and internationally and the concepts and approaches of health care, from the literature have been reached.

The following chapter will focus on the utilisation and costs associated with antibiotics and give an overview of the basic pharmacology of antibiotics.

Chapter 3

Antibiotic usage

3.1 INTRODUCTION

This chapter will attempt to conceptualise antibiotic usage. A discussion on the pharmacoeconomics of antibiotics and the influence of prescription habits on antibiotic usage will also be included.

3.2 AN OVERVIEW OF ANTIBIOTICS

More than fifty years ago after the introduction of penicillin into therapeutic use, antibiotics are still among the most widely used drugs, not only in the treatment of human ailments but also in veterinary practice, in agriculture and in animal husbandry (Lancini, 1995: preface). According to Rehana *et al.* (1998: 1) antibiotics fall in the group of most frequently prescribed drugs on the market and as this group accounts for 15% to 30% of the total health budget worldwide.

3.2.1 The prevalence of infectious diseases

In the year 1664 the great plague claimed the lives of 15 to 21% of the population of London (Williams, 1996: 2). Major epidemics have occurred periodically and have caused substantial reductions in populations worldwide. Both the world wars, famines, economic failure and political upheaval have been associated with epidemics of infectious diseases. It is clear that infectious diseases play a huge role in the percentage of deaths that occur each year (Williams, 1996: 2-3).

Radyowijati and Haak (2003: 1) stated that diseases of bacterial origin are a major cause of morbidity and mortality in low-income countries. With improved personal hygiene, immunization and environmental sanitation most of these diseases can be prevented. Antibiotics, though, are still the main therapy of choice. This has led to high levels of consumption and spending for antibiotics.

According to McPhee and Schroeder (1999: 3) the decline in the incidence and fatality rates of infectious diseases are due to improved public health measures that include improved sanitation, better nutrition and great prosperity. McPhee and Schroeder (1999:3) also emphasized that immunization is a great factor contributing to preventing infectious diseases. After the implementation of an immunization programme in the United States of America during the 1900's, there has been a 90% reduction in measles, mumps, rubella, poliomyelitis,

diphtheria, pertussis and tetanus. *Haemophilus influenza* type b infections have been reduced by more than 95% after the introduction of the first conjugate vaccines. However, the total deaths per year are staggering due to the fact that only a small percentage of people are vaccinated.

3.2.2 Definition of antibiotics

The Concise Oxford English Dictionary (2002: 203) defines an antibiotic as a medicine that inhibits the growth of or destroys micro-organisms.

Lancini *et al.* (1995: 1) defined antibiotics as low-molecular-weight microbial metabolites that at low concentrations inhibit the growth of other micro-organisms. The formal definition of an antibiotic restricts the use of the term to chemicals that are produced by micro-organisms and that have the capacity to inhibit the growth of, or to kill, bacteria and other micro-organisms (Pratt *et al.*, 1986: 3).

In the above-mentioned definitions the term “inhibit” means either temporary or permanent inhibition of the ability of the micro-organism to reproduce and consequently, inhibition of growth of the bacterial population rather than of an individual cell. With permanent inhibition, antibiotic activity is termed bactericidal. If inhibition is lost when an antibiotic is removed from its medium, antibiotic activity is termed bacteriostatic (Lancini *et al.*, 1995: 2).

The addition of “at low concentration” to the definition is essential and normal cell components can cause damage at excessive concentrations (Lancini *et al.*, 1995: 2). The ideal antibiotic would have no lethal effect on the patient but only to the micro-organism. Penicillin G in the nonallergic patient comes as close to this goal of selective toxicity as any of the antimicrobial drugs (Pratt *et al.*, 1986: 3).

3.3 PRESCRIBING HABITS FOR ANTIBIOTICS

The most frequent intervention performed by doctors is the writing of a prescription (Ronchon, 1997: 1096). According to Hasan *et al.* (1997: 1) drug therapy is the major component of patient management in health care settings. This is to be expected, since modern medicine has been remarkably effective in managing diseases.

3.3.1 Physicians' prescribing habits

Chatfield (2000: 1) revealed that office-based physicians are prescribing more antibiotics than previously. The Centre for Disease Control in the United States of America (Chatfield 2000: 1) revealed that there has been an increase of 48% in antibiotic prescribing for children from 1980 to 1992. It is estimated that 20% to 50% of the 235 million doses of antibiotics taken annually are unnecessary.

Though there is an awareness of the emergence of antibiotic resistance, physicians are prescribing more broad-spectrum antibiotics than before. This encourages antibiotic resistance. Aldridge (2003: 1) reported that in the United States there has been an increase of 24% in adults and 16% in children that are prescribed a broad-spectrum antibiotic.

It is estimated that one fourth to one third of patients admitted to hospitals receive an antimicrobial drug (Hess *et al.*, 1990:585). In Sharjah antibiotics constituted 45% of prescriptions (Hasan *et al.*, 1997: 1), where in North Goa the antibiotics prescription rate was 14.06% (Hede *et al.*, 1987: 146). In a survey of drug use practices at a general hospital in Nigeria it was found that the average number of antibiotics prescribed per encounter for outpatients was 1.1% and for in-patients 2.4%. The percentage encounter with antibiotics was 50.3% for outpatients and 96.7% for in-patients (Chukwuani *et al.*, 2002: 189-190). A study done in the Kwazulu Natal province, South Africa, revealed that 54% of prescriptions contained antibiotics (Paruk *et al.*, 1999: 1).

Chikerema and Kasilo (1994:1) found that in ten district hospitals in Mashonaland that benzylpenicillin was prescribed 43.8% of the time. Co-trimoxazole followed with 28%. Amoxicillin used by children and adults increased from 50 to 175 per thousand population during 1980 to 1992 in Arizona, United States of America (Chatfield, 2000: 1).

3.3.2 Reasons behind prescribing habits

According to Holloway (2000: 9) there are a few reasons why antimicrobials are prescribed too often and unnecessarily:

- Lack of knowledge or information, leading to uncertainty about the diagnosis and the most appropriate drug(s).
- Fear of poor patient therapy outcome.
- Patient demand for antibiotic treatment.
- Prescribers and pharmacists earning a living through selling medicines.

Although it is widely accepted that control of antibiotic prescribing is essential for the prevention of antibiotic resistance, antibiotic misuse is still common. Sacho and Schoub (1998: 1) state that up to 70% of antibiotic treatment courses are unnecessary or inappropriate. They further state that antibiotic therapy is often unnecessarily prolonged and prophylaxis is often inappropriate or given at the wrong time.

3.3.3 Cost of antibiotics

Many prescribers and retail pharmacists earn their living by selling medicines and not by charging a consultation fee. It has been shown in many countries where there are not strict regulations on dispensing, that prescribers who earn money from dispensing medicines consistently prescribe more drugs than those who do not make money from dispensing. Selling medicine at high costs may earn dispensing prescribers more profit. Due to the high costs of medicine some patients may buy incomplete courses, which may have a negative therapeutic effect when looking at antibiotic therapy (Holloway, 2000: 9).

Studies done all over the world have shown that antimicrobial drugs form the group of drugs that is most frequently prescribed. Hess *et al.* (1990: 585-587) found that antimicrobial drugs represent 20% to 40% of a hospital's drug budget. A study done by Hess *et al.* (1990: 585-587) at Rhode Island Hospital revealed that antimicrobial drugs accounted for between 32% and 34% of the total drug expenditure during the late 1980s.

Bavestrello and Cabello (2000: 13-14) reported about a study done by the Pan American Infectious Disease Society and the Pan-American Health Organization in Chile. The study revealed increases in sales of antibiotics between 1988 and 1997. Noteworthy are the increases in sales of amoxicillin (+309%) and oral fluoroquinolones (+473%). The government reacted upon the study and put control measures in place to contain antibiotic prescribing. Antibiotics are now only available on prescription or from a pharmacy. Expenditure dropped by US\$6483883 between 1998 and 1999 (Bavestrello & Cabello, 2000: 13-14).

In the North West Province of South Africa it was found that antibacterials for systemic use presented with the highest cost percentage during April 2000 to March 2001, representing 20.68% of all medicine cost (Saley, 2004: 102).

3.4 ANTIMICROBIAL RESISTANCE

Antimicrobial resistance is of great concern to many people all over the world. The introduction of antibiotics in the 1940s led many to believe that infectious diseases would be conquered once and for all. Resistance, however, started as soon as the first antimicrobial drugs were given to patients (Mazel & Davies, 1998:1).

According to Levy (1995: 1), antimicrobial resistance is not a local or national problem, but an international problem affecting hospitals and communities worldwide. Countries all over the world face a major risk that diseases considered vanquished in industrialised countries will once again become killers stalking society, bringing an ever present threat of sudden death and disability. Antimicrobial resistance threatens industrialised countries, as well as developing countries (World Health Organization, 2000: 1).

Major drug manufacturers invested large amounts of money in seeking cures for heart disease and other chronic conditions. Intensive antibacterial research was put on the background. Since the 1980s significant breakthroughs have been largely confined to the development of antiviral agents targeting the ever-widening HIV epidemic (World Health Organization, 2000: 1).

A few years after penicillin entered market scientists began noticing the emergence of a penicillin-resistant strain of *Staphylococcus aureus*. Resistant strains of gonorrhoea, dysentery-causing shigella and salmonella rapidly followed. Multidrug-resistant tuberculosis is another major concern not only confined to any one country or those co-infected with HIV, but also to developed countries such as Eastern Europe (World Health Organization, 2000: 1).

Levy (1995: 1) stated that between 1979 and 1987 nearly 0.02% of pneumococcus strains were penicillin-resistant. Almost eight years later in 1995, it was determined that 6.6% of pneumococcus strains were resistant to penicillin. Resistance towards antibiotics is growing rapidly each year resulting in an increased mortality rate. Antimicrobial resistance is a serious public health concern with economic, social and political implications.

Bacterial resistance may result naturally, that is without previous exposure to the antibacterial drug, while acquired resistance is caused by prior exposure to the antibacterial drug (Kee & Hayes, 2003: 393-394). Pathogens develop resistance to antimicrobials through a process known as natural selection. When a microbial population is exposed to an antibiotic, more susceptible organisms will submit, leaving behind only those resistant to the antimicrobial attack (World Health Organization, 2000: 1). These organisms can then either pass on their genetic instruction to their offspring by replication, or to another bacterial species through conjugation whereby plasmids carrying the genes are transferred from one organism to another (Kee and Hayes, 2003: 394).

3.4.1 The biochemical basis of resistance

Biochemical resistance mechanisms can be classified into three categories (Sanders & Sanders, 1995: 15):

- Prevention of intracellular drug accumulation.
- Modification of the target site of the drug.
- Production of a drug-inactivating enzyme.

**Table 3.1: Possible mechanisms of resistance to antimicrobial agents
(Sanders & Sanders, 1995: 15).**

ANTIMICROBIAL AGENT	GRAM-POSITIVES			GRAM-NEGATIVES		
	IMP	TAR	DIE	IMP	TAR	DIE
β -Lactam antibiotics	--	+	++	+	±	+++
Aminoglycosides	+	±	+++	+	±	+++
Fluoroquinolones	+	+++	--	+	+++	--
Rifampin	--	+++	--	--	+++	--
Tetracyclines	+++	±	--	+++	±	--

IMP = Prevention of accumulation of drug

TAR = Modification of the target site of the drug

DIE = Production of drug-inactivating enzymes

3.4.2 The genetic basis of resistance

Genetic resistance mechanisms can be classified into two categories (Mann & Crabbe, 1996: 50):

- ❑ Production of new genes through mutation.
- ❑ Adoption of genetic material from other species.

Bacteria have the ability to modify the shape of the active site of the enzyme antibiotics work on. This change is achieved in one or more nucleotide bases of the DNA sequence coding for the enzyme. The changes in the binding characteristics or shape of the active site are due to the resultant change in the amino acid sequence of the enzyme (Mann & Crabbe, 1996: 50).

Plasmids and chromosomes are capable of individual existence and replication within the cell. The gene products of plasmids are most commonly the enzymes that inactivate or destroy antibiotics. Plasmids are transferred between two bacterial cells either by conjugation or transduction. A plasmid that contains genes that specify different enzymes required for the destruction of antibiotics can be transferred to other cells. During infection with susceptible species it is possible to incorporate resistance genes, from resistant species, that code for enzymes that will destroy a range of antibiotics (Mann & Crabbe, 1996: 50).

3.4.3 Factors contributing to resistance

Unknowingly a wide range of factors contributes to bacterial resistance. The factors responsible for increasing antimicrobial resistance and the potential strategies for attacking the problem are complex and include a broad range of disciplines. In a study done by Watson *et al.* (2000: 1), 97% of physicians agree that overuse of antibiotics is a major factor contributing to the development of antibiotic resistance. Holloway (2000: 9) further states that it also wastes financial resources.

There is a wide variation in the prescribing habits of antibiotics/drugs. In primary health care 30% to 60% of patients receive antibiotics. Misuse is a common mistake and may take the form of incorrect dosage or inappropriate prescription (Holloway, 2000: 9). According to Smith (1998: 1) the problem of antimicrobial resistance developed because of patients' insistence upon antibiotic therapy to recover from illness. Furthermore, patients fail to take a full-prescribed prescription and some physicians prescribe antibiotics to patronize patients. Holloway (2000: 9) states that prescribers citing patient demand as a cause of irrational prescribing have been reported in many countries. Even patient demand for specific drugs has been widely observed by researchers.

Inappropriate use of antimicrobials creates ideal conditions for the emergence of drug-resistant microbes. Usage of antibiotics for common cold and other conditions for which they are not indicated contributes to antimicrobial resistance. Insufficient diagnostic testing may contribute to overuse of antibiotics (National Institute of Allergy and Infectious Diseases, 2000: 1). Uncertainty of the diagnosis leads to over-prescription. In many developing countries, the diagnostic process is often inadequate, resulting in an inability to arrive at a diagnosis with any certainty (Holloway, 2000: 9). Close contact between patients in hospitals provides a fertile environment for the development of drug resistance as well as excessive use of antibiotics (National Institute of Allergy and Infectious Diseases, 2000: 1).

Another factor contributing to antimicrobial resistance is the fact that microbes multiply very rapidly. This enables a single mutant to become dominant. Microbes also spread readily from person to person. One patient infected with a resistant strain may be an important source of spread of a resistant infection (Williams, 2000: 7-8).

Knox *et al.* (2003: 85) stated that improved clinical outcome, patient safety, cost savings and reduction in the burden of antimicrobial resistance are outcomes associated with optimising antimicrobial use. Although strategies have been implemented in hospital settings, the misuse of antimicrobials remains a huge problem.

3.4.4 Treating resistance effectively

Antimicrobial resistance is a natural biological occurrence and therefore it cannot be halted, though it is possible to contain it. According to Williams (2000: 8), coordinator of the Anti-infective Drug Resistance and Containment at the World Health Organization, the main priority should be to first prevent infections and secondly to aim for containment of the problem. The focus should be on minimising any unnecessary, inappropriate or irrational use of antimicrobial drugs.

A large group of people in the health sector play a role in developing and implementing a resistance containment action plan (Williams, 2000: 8):

- ❑ Patients and the general public.
- ❑ All groups of prescribers and dispensers.
- ❑ Hospital managers and health care professionals.
- ❑ Users of antimicrobials in agriculture.
- ❑ National governments.
- ❑ Pharmaceutical, diagnostic and “surveillance” industries.
- ❑ International agencies and professional societies.

Williams (2000: 8) further states that problems with antimicrobial usage occur in both developed and developing countries. These include:

- ❑ Drugs are not equitably available.
- ❑ Used by too many people.
- ❑ To treat the wrong disease.
- ❑ Drugs are administered in the wrong dosage.
- ❑ For the wrong period of time.
- ❑ Not in the correct formulation or strength.

It is clear that everyone in the health care sector plays an important role in the fight against antimicrobial resistance.

3.5 SOME PRINCIPLES OF ANTIMICROBIAL THERAPY

Accurate use of antibiotics can result in favourable therapeutic results. However, uncontrolled use may result in the emergence of resistant organisms. Antibiotics are not only associated with the emergence of resistance from microorganisms, but also with serious adverse reactions. Therefore sound diagnoses, based on evidence that a treatable infection is present, are needed before a drug therapy can be selected.

3.5.1 Decision making regarding antibiotic therapy

Ideal drug usage involves the correct drug, administered by the best route, in the right amount, at optimum intervals, for the appropriate period, after the physician had made an accurate diagnosis (Williams, 2000: 8). According to Jacobs *et al.* (2001: 1494) the following steps are required in each patient considered for antibiotic therapy:

❑ **Etiologic diagnosis:**

The organism causing the infection can usually be predicted based on the organ associated with the disease.

❑ **“Best guess”:**

The physician should select an antimicrobial drug based on past experience with empirical therapy.

❑ **Laboratory control:**

Laboratory examinations should be done before initiating therapy.

□ **Clinical response:**

Based on the clinical response of the patient, the physician should evaluate the laboratory reports and consider the changing of the drug regimen.

□ **Drug susceptibility tests:**

Some micro-organisms are relatively uniformly susceptible to certain drugs. If such organisms are isolated, they need not be tested for drug susceptibility.

□ **Promptness of response:**

Response towards the chosen drug therapy depends on a range of factors, including the host, the site of infection, the pathogen, and the duration of illness. Symptoms may arise and do not indicate improper choice of antibiotics but may be due to the natural history of the disease.

□ **Duration of antimicrobial therapy:**

The duration of therapy depends on several factors, namely the type of micro-organism, the site of infection, and the immunocompetence of the patient. It is clear that each patient should be seen as an individual.

□ **Adverse reaction and toxicity:**

All antimicrobials can cause adverse effects such as hypersensitivity reactions, direct adverse effect or toxicity, superinfections and drug interactions. The severity of the disease and the adverse effects associated with the antibiotics should be measured against the overall outcome of the therapy.

□ **Route of administration:**

The route of administration will depend on the severity of the disease. Parenteral therapy is preferred for acutely ill patients with serious infections when high levels of antibiotics are required for successful therapy.

□ **Cost of antibiotics:**

Antibiotics are used extensively. For this reason the cost of these agents can be substantial to institutions and individuals. Cost should not be the only determinant in choosing antibiotics. Several drugs with equal efficacy and toxicity are available on the market and one should choose the least expensive drug therapy.

3.5.2 Minimum inhibitory concentration

The drug concentration at the site or the exposure time for the drug plays an important role in bacteria eradication. Antibacterial drugs are used to achieve the minimum effective concentration necessary to inhibit the growth of a microorganism (Kee & Hayes, 2003: 392). According to Greene and Harris (1998: 549) the minimum inhibitory concentration (MIC) is the minimum concentration of an antimicrobial that is capable of inhibiting the growth of a particular organism *in vitro*.

Duration of time for use of the antibacterial varies according to the type of pathogen, site of infection and immunocompetence of the patient. With some severe infections, a continuous infusion regimen is more effective than an intermittent dosing because of constant drug concentration and time exposure (Kee & Hayes, 2003: 393).

The minimum bactericidal concentration is more relevant when it is essential that the organisms be killed to prevent relapse (Greene & Harris, 1998: 549).

3.6 DRUG CLASSIFICATION

Various classification schemes have been proposed. Currently, those natural or semi synthetic drugs that have a common basic chemical structure are grouped into one class and named after the member first discovered or after a principal chemical property. This classification is very useful in practice, as the components of one class usually share many biological characteristics. Drugs can also be classified on the basis of their pharmacological action and therapeutic use. A complete classification of all medicines according to the MIMS® (Snyman, 2003: 247-263) follows in Appendix I.

3.6.1 The Anatomical Therapeutic Chemical (ATC) classification system

The World Health Organization (WHO) introduced the Anatomical Therapeutic Chemical (ATC) classification system in 1969. A technical unit of measurement called Defined Daily Dose (DDD) to be used in drug utilisation studies have also been introduced. It was agreed in 1996 that an internationally accepted classification system for drug consumption studies was needed and the ATC/DDD system was recommended. Today many organisations involved in drug monitoring use this classification (Persson & Strøm, 2002: 1).

3.6.1.1 Structure of Anatomical Therapeutic Chemical (ATC) classification system

The Anatomical Therapeutic Chemical (ATC) classification system classifies drugs according to the organ or system on which they act as well as their chemical, pharmacological and therapeutic properties. Table 3.6 shows that there are fourteen main groups (1st level), with one pharmacological/therapeutic subgroup (2nd level). The 3rd and 4th levels are chemical/pharmacological/therapeutic subgroups and the 5th level is the chemical substance.

The complete classification of metformin illustrates the structure of the code (WHO, 2002: 1). It was determined according to Table 3.2:

A	Alimentary tract and metabolism (anatomical main group)
A10	Drugs used in diabetes (therapeutic sub group)
A10B	Oral blood glucose lowering drugs (pharmacological sub group)
A10BA	Biguanides (chemical sub group)
A10BA02	Metformin (Chemical substance)

**Table 3.2: Main groups of the Anatomical Therapeutic Chemical classification
(Persson & Strøm, 2002: 2).**

Anatomical Therapeutic Chemical groups – 1 st level	
A	Alimentary tract and metabolism
B	Blood and blood forming organs
C	Cardiovascular system
D	Dermatologicals
G	Genito urinary system and sex hormones
H	Systemic hormonal preparations, excluding sex hormones and insulins
J	Anti-infectives for systemic use
L	Antineoplastic and immunomodulating agents
M	Musculo-skeletal system
N	Nervous system
P	Antiparasitic products, insecticides and repellents
R	Respiratory system
S	Sensory organs
V	Various

3.6.2 Defined Daily Dose (DDD)

According to Persson and Strøm (2002: 2), the World Health Organisation defines the Defined Daily Dose (DDD) as follows: *“The DDD is the assumed average maintenance dose per day for a drug used for its main indication in adults.”*

The Defined Daily Dose (DDD) is a unit of measurement and does not reflect the recommended or prescribed daily dose. Doses for individual patients and patient groups need to be based on individual characteristics and pharmacokinetic considerations. Data presented in DDDs only give a rough estimate of consumption and not an exact picture of actual use (WHO, 2002: 1).

3.6.2.1 Principles for Defined Daily Dose assignment

The assigned Defined Daily Dose (DDD) is based on the following principles (WHO, 2002: 1):

- ❑ The dosage used by adults for the main indication, as reflected by the ATC code, is used. When the dosage needs to be calculated using body weight, an adult is considered to be a person of 70 kg.
- ❑ The maintenance dose is usually preferred when establishing the DDD.
- ❑ The treatment dose is generally used and if prophylaxis is the main indication, this dose is used.
- ❑ A DDD is usually established according to the declared strength of the product.

3.6.3 Other classification systems

The Anatomical Classification (AC-system) developed by the European Pharmaceutical Market Research Association classifies drugs in groups at three or four different levels. The Anatomical Therapeutic Chemical (ATC) system has been derived from the Anatomical Classification (AC-system) (WHO, 2002: 1).

Other classification systems available are the following: Prescribing Analysis And Cost (PACT), National Approved Product Pricing Index (NAPPI) and Monthly Index of Medical Specialities (MIMS®) used in South Africa. The above-mentioned systems classify drugs according to therapeutic and pharmacological action.

3.6.4 Classification of antibiotics

In South Africa antibiotics are classified according to the Monthly Index of Medical Specialities (MIMS®) (Snyman, 2003: 13a) as follows:

- Beta-lactams
 - Penicillins
 - Cephalosporins
 - Others
- Erythromycin and other Macrolides
- Aminoglycosides
- Tetracyclines
- Chloramphenicols
- Sulphonamides and combinations
- Quinolones
- Other antibiotics

A complete classification of the beta-lactam antibiotics according to the MIMS® (Snyman, 2003: 247-263) is given in Appendix J.

3.7 PHARMACOLOGY OF ANTIBIOTICS

This section provides a short overview of some aspects regarding the pharmacology of antibiotics relevant to this study.

3.7.1 Penicillins

Penicillins form the largest group of antimicrobial drugs. According to Lancini *et al.* (1995: 8), penicillin is the first choice for treatment of a number of infections. Penicillin is a natural antibacterial agent obtained from the mold genus *Penicillium* (Kee & Hayes, 2003: 395).

Penicillins all share a common chemical nucleus (6-aminopenicillanic acid) that contains a β -lactam ring essential to their biologic activity (Chambers, 2004: 734). The addition of different side chains to the parent nucleus has broadened the choice of penicillins (Greene & Harris, 1998: 551).

According to Chambers (2004: 734) penicillins are divided into the following categories:

- Broad-spectrum penicillins (Aminopenicillins).
- Penicillinase-resistant penicillins (Antistaphylococcal penicillins).
- Extended-spectrum penicillins (Antipseudomonal penicillins).

Kee and Hayes (2003: 395-397) also state that there is a fourth category:

- Beta-lactamase inhibitors (combination with clavulanic acid).

3.7.1.1 Antimicrobial action

The mechanism of action of β -lactam antibiotics is to inhibit formation of microbial cell walls (Jacobs *et al.*, 2001: 1502) and is therefore bactericidal (Lancini *et al.*, 1995: 9). The bacterial cell wall is a rigid outer layer that is not found in animal cells (Chambers, 2004: 734).

Inhibition of the peptidoglycan biosynthesis by β -lactams has been the most successful antibacterial discovered by humans. The peptidoglycan layer is an effective target for action because it accounts for about 5% of the cell wall in gram-negative bacteria and 30% to 40% of gram-positive bacteria (Mann & Crabbe, 1996: 34-35).

3.7.1.2 Pharmacokinetics and administration

Oral penicillins, except for amoxicillin, should not be given at mealtimes to minimize binding to food proteins and acid inactivation (Chambers, 2004: 738). Blood levels of penicillin can be raised when aspirin or probenecid is taken with it (Kee & Hayes, 2003: 398).

Absorption of orally administered drugs differs greatly for different penicillins, depending in part on their acid stability and protein binding (Chambers, 2004: 736). Penicillin V, ampicillin, amoxicillin, cloxacillin, dicloxacillin and oxacillin are acid-stable compounds and can be given orally to patients. Penicillin G is acid-labile and can be given via intravenous route to patients in hospital (Lesse, 1995: 365).

The acidic nature of penicillin restricts its distribution to a basic environment such as the prostatic fluid. Penicillins cannot cross cell membranes or be distributed into the spinal fluid because of the blood-brain barrier. Though, during meningeal inflammation almost 40% of serum levels can be achieved. Because of the large therapeutic index of penicillin it is possible to increase the concentration in the cerebrospinal fluid to kill bacteria (Lesse, 1995: 365).

3.7.1.3 Clinical uses

The basic penicillins (penicillin G procaine, penicillin G benzathine, penicillin V potassium) are used to treat moderately serious infections (Kee & Hayes, 2003: 396) caused by streptococci,

meningococci, enterococci, *Treponema pallidum* and non- β -lactamase-producing gram-negative anaerobic organisms (Chambers, 2004: 738-739).

Aminopenicillins include amoxicillin, ampicillin and combinations with clavulanic acid. They have greater activity against gram-negative bacteria than penicillin G, due to their enhanced ability to penetrate the gram-negative outer membrane (Chambers, 2004: 741). This group of broad-spectrum penicillins is used to treat respiratory tract infections, urinary tract infections, otitis media and sinusitis. Amoxicillin is the most frequently prescribed penicillin for adults and children (Kee & Hayes, 2003: 397).

The penicillinase-resistant penicillins are used to treat penicillinase-producing *Staphylococcus aureus*. A few of the penicillins, which have been developed in this group, include methicillin, cloxacillin and flucloxacillin (Greene & Harris, 1998: 552). They are primarily used for systemic infections caused by resistant staphylococci (Kee & Hayes, 2003: 396).

Carbenicillin, mezlocillin, piperacillin and ticarcillin fall in the category of extended-spectrum penicillins. This group of drugs is effective against *Pseudomonas aeruginosa*, a gram-negative bacillus (Chambers, 2004: 741). These drugs are also useful against gram-negative organisms such as *Proteus* spp., *Serratia* spp., *Klebsiella pneumoniae*, *Enterobacter* spp. and *Acinetobacter* spp. The antipseudomonal penicillins are not penicillinase resistant (Kee & Hayes, 2003: 397).

There are three beta-lactamase inhibitors: clavulanic acid, sulbactam and tazobactam (Chambers, 2004; 741). When these inhibitors are combined with broad-spectrum antibiotics the resulting antibiotic inhibits the bacterial beta-lactamase thus making the antibiotic effective and extending its antimicrobial effect (Kee & Hayes, 2003: 397).

3.7.1.4 Adverse effects of penicillin

Major adverse reactions associated with penicillin are hypersensitivity and superinfection. In severe cases it may result in anaphylaxis and death. Allergic effects occur in 5% to 10% of patients receiving penicillin compounds (Kee & Hayes, 2003: 399). Allergic reactions include urticaria, fever, joint swelling, pruritus and angioneurotic edema. Oral lesions, interstitial nephritis, eosinophilia, haemolytic anemia and other hematologic disturbances, and vasculitis may also occur (Chambers, 2004: 741).

Other adverse effects to penicillin are generally less severe than anaphylaxis. The older types of penicillins cause electrolyte disturbances. This is due to the fact that they are administered as sodium or potassium salts. Leukopenia is associated with high doses of nafcillin. Thrombocytopenia and a Coombs'-positive haemolytic anemia occasionally occur (Lesse, 1995:

365-369). With high dosages of intravenous penicillin seizures may occur in patients with renal failure (Chambers, 2004: 741).

3.7.1.5 Other beta-lactam antibiotics

The carbapenems and monobactams have further widened the choice of beta-lactams. Imipenem is a very broad-spectrum carbapenem (Greene & Harris, 1998: 557). Meropenem is also included in the carbapenems. Carbapenems are active against gram-negative organisms, including *Pseudomonas*, and a range of gram-positive bacteria. They are used in the treatment of septicemia, urinary tract infections, lower respiratory infections and skin infections (Kee & Hayes, 2003: 401).

Aztreonam is the only monobactam currently available. It is used for the treatment of gram-negative infections of the lower respiratory tract, urinary tract, skin and vagina (Kee & Hayes, 2003: 401). It has no activity against gram-positive bacteria or anaerobes (Chambers, 2004: 747).

Loracarbef is a synthetic beta-lactam antibiotic from the carbacephem class. It is effective in the treatment of respiratory, urinary tract and skin infections (Kee & Hayes, 2003: 401).

3.7.2 Cephalosporins

Cephalosporins are classified as β -lactam antibiotics because of their ability to bind to penicillin-binding proteins, therefore inhibiting bacterial cell wall synthesis (Kee & Hayes, 2003: 400). Cephalosporins are divided into four generations on account of the spectrum of antimicrobial activity they exert.

3.7.2.1 Antimicrobial action

The mechanism of action of cephalosporins is identical to that of the penicillins, though the spectrum of microbial sensitivity is broad and extends to gram-negative bacteria (Williams, 1996: 33). They are bactericidal by inhibition of cell wall synthesis (Greene & Harris, 1998: 554).

According to Beam (1995: 374), first-generation cephalosporins are short acting and include cefadroxil, cefazolin, cephalexin, cephalothin and cephadrine. They possess excellent activity against gram-positive cocci, *Escherichia coli*, *Proteus*, *Salmonella*, *Shigella* (Kee & Hayes, 2003: 401), limited activity against *Enterobacteriaceae* and no activity against *Pseudomonaceae* (Beam, 1995: 374).

Second-generation cephalosporin, such as cefaclor, cefamandole, cefoxitin sodium, cefprozil and cefuroxime (Kee & Hayes, 2003: 403-404), have a longer half-life, less effective against gram-positive bacteria than against gram-negative bacteria. They exert no activity against *Pseudomonas* (Beam, 1995: 374).

Third-generation cephalosporins' half-life is greater than that of second-generation cephalosporins. They have greater activity against gram-negative bacteria (Greene & Harris, 1998: 554) and some are effective against *Pseudomonas* infections (Beam, 1995: 374). Third-generation cephalosporins include cefixime, cefotaxime, cefpodoxime, ceftazidime, ceftriaxone and ceftibuten (Kee & Hayes, 2003: 404).

Cefepime is a fourth-generation cephalosporin. It is resistant to most beta-lactamase bacteria and has a broader gram-positive coverage than the third generations. It is effective against pneumonia, *Escherichia coli*, *Klebsiella*, *Protues*, streptococci and certain staphylococci (Kee & Hayes, 2003: 404).

3.7.2.2 Pharmacokinetics and administration

Cephalosporins may be administered either by the oral or parenteral route. The chemical formulation for each route of delivery differs. Some drugs that are delivered orally do not have a comparable parenteral formulation and *vice versa* (Beam, 1995: 375-376).

Extravascular sites are penetrated by cephalosporins. There is no penetration of intracellularly sites and therefore they cannot be used to treat intracellular pathogens. Cefuroxime (a second-generation cephalosporin) (Beam, 1995: 375-376) and third-generation cephalosporins (e.g. cefotaxime, ceftizoxime, ceftriaxone) can be used for infections of the central nervous system and bacterial meningitis (Kee & Hayes, 2003: 404).

3.7.2.3 Clinical uses

Cephalosporins may be used for the prophylaxis or treatment of a wide variety of infectious diseases.

First-generation cephalosporins are used to treat infections caused by streptococcal and staphylococcal bacteria (Greene & Harris, 1998: 554). Cefadroxil is used in the treatment of urinary tract infections and skin infections. Cephalothin, cephradine, cefazolin and cephalexin are used in respiratory, gastro intestinal, bone and skin infections. Septicemia, endocarditis and meningitis are also treated with these drugs (Kee & Hayes, 2003: 403). A limited number of infections caused by gram-negative strains may be treated with cephalosporins (Beam, 1995: 377).

Second-generation cephalosporins are used to treat infections caused by *Haemophilus influenzae* or *B. fragilis* and meningitis caused by *H. influenzae*, *Streptococcus pneumoniae* and *Neisseria meningitidis* (Beam, 1995: 377). Other uses include the treatment of infections outside the central nervous system, intra-abdominal and pelvic infections. Cefamandole, cefuroxime and cefmetazole are used for preoperative prophylaxis for surgery, while ceftiofur is used to treat severe infections and septicemia (Kee & Hayes, 2003: 403).

Third-generation cephalosporins (e.g. cefixime, cefpodoxime, ceftriaxone) are useful in the treatment of nosocomial infections caused by gram-negative bacteria (Beam, 1995: 377). Third-generation cephalosporins are used in various infections ranging from meningitis, pneumonia, bacteremia, urinary tract infections, intra abdominal infections, otitis media, lower and upper respiratory infections, septicemia to skin infections (Kee & Hayes, 2003: 404; Green & Harris, 1998: 554).

The fourth-generation cephalosporin (cefepime) is clinically used for the same infections as the third-generation cephalosporins, though, it has a broader gram-positive action than the third-generation cephalosporins (Kee & Hayes, 2003: 404).

3.7.2.4 Adverse effects of cephalosporins

Some adverse effects associated with cephalosporin therapy include nausea, vomiting, diarrhoea, anorexia and pseudomembrane colitis. Cephalosporins are not generally associated with hepatotoxicity and nephrotoxicity (Kee & Hayes, 2003: 403). Cephalothin has been reported to cause tubular necrosis (Beam, 1995: 376).

A positive Coombs' reaction may occur with cephalosporin therapy. When used in high doses for a comprehensive period of time, cephalosporins may cause neutropenia (Beam, 1995: 376).

3.7.3 Erythromycin and other macrolides

Macrolides (azithromycin, clarithromycin, erythromycin, etc.), lincosamides (clindamycin and lincomycin) and vancomycin are discussed together. According to Kee and Hayes (2003: 408) they have spectrums of antibiotic effectiveness similar to penicillin, although they differ in structure. Drugs from these groups, especially erythromycin, are used as penicillin substitutes, especially in individuals who are allergic to penicillin.

Erythromycin is an orally effective macrolides antibiotic. It consists of a lactone ring to which one or more deoxy sugars are attached. Erythromycin is obtained in the metabolic products of a strain of *Streptomyces erythreus* (Kapusnik-Uner *et al.*, 1996: 1135).

3.7.3.1. Antimicrobial action

Macrolide and lincosamide antibiotics are bacteriostatic agents that inhibit protein synthesis by binding to 50S ribosomal subunits of micro-organisms (Jacobs *et al.*, 2001: 1512) . Although they are bacteriostatic agents, they are bactericidal for some gram-positive organisms at higher concentrations. Vancomycin is a bactericidal antibiotic used against drug-resistant *Staphylococcus aureus* (Kee & Hayes, 2003: 412).

Erythromycin possesses a broad spectrum of activities against bacteria. The main spectrum of activity includes gram-positive organisms, except *Staphylococcus aureus* (Kee & Hayes, 2003: 409), and gram-negative aerobic and anaerobic bacteria; mycobacteria; mycoplasma species and chlamydia (Reynard, 1995: 384). Clindamycin is more widely prescribed than lincomycin because it is active against most gram-positive organisms, including *Staphylococcus aureus*, and anaerobic organisms. It is not effective against the gram-negative bacteria (Kee & Hayes, 2003: 410).

3.7.3.2 Pharmacokinetics and administration

Erythromycin base is adequately absorbed from the upper part of the small intestine and diffuses into intracellular fluids except the brain and cerebrospinal fluid. It is incompletely absorbed because of inactivation by gastric acids (Kapusnik-Uner *et al.*, 1996: 1137). Therefore various acid-resistant salts are added to erythromycin (Kee & Hayes, 2003: 409). Erythromycin is formulated as enteric-coated tablets or as capsules containing enteric-coated pellets that dissolve in the duodenum.

Clarithromycin is rapidly absorbed from the gastrointestinal tract after oral administration. Peak concentrations are achieved approximately 2 hours after administration. Clarithromycin is subjected to the first-pass effect and its bioavailability is thus reduced to 50% to 55% (Kapusnik-Uner *et al.*, 1996: 1137). Therefore it is administered twice daily (Kee & Hayes, 2003: 410).

After administration of azithromycin it is rapidly absorbed and distributed throughout the body. It has a long half-life and is prescribed once a day (Kee & Hayes, 2003: 410). Lower concentrations are achieved in the cerebrospinal fluid. Concomitant administration with food will decrease azithromycin bioavailability by 43% (Kapusnik-Uner *et al.*, 1996: 1137).

3.7.3.3 Clinical uses

Erythromycin is clinically useful in a variety of infections. It is the drug of choice for infections caused by legionella, mycoplasma, ureaplasma, corynebacterium (diphtheria) and chlamydia. Erythromycin is effectively used in penicillin-allergic patients for streptococcal and pneumococcal infections (Jacobs *et al.*, 2001: 1512-1513). Other infections that may be treated

are nongonococcal urethritis, syphilis in pregnancy, acne vulgaris, prophylaxis for the prevention of rheumatic fever, and anaerobic bronchopulmonary infections (Reynard, 1995: 384) and to prevent recurrence of rheumatic fever (Kee & Hayes, 2003: 409).

Azithromycin is used for the treatment of mild to moderate streptococcal infections, lower respiratory tract infections, gonorrhoea, chancroid, and infections with *Streptococcus pneumoniae*, *Haemophilus influenzae* and *Staphylococcus aureus*. For the treatment of upper and lower respiratory infections, skin and soft tissue infections and *Helicobacter pylori* clarithromycin is preferred (Kee & Hayes, 2003: 408).

Clindamycin in its various salt forms is prescribed for the treatment of serious infections (Kee & Hayes, 2003: 408) such as skin and soft tissue infections, chronic osteomyelitis and septicaemia (MIMS, 2003: 281).

Vancomycin is considered for *Staphylococcus aureus*-resistant infections and cardiac surgical prophylaxis (Kee & Hayes, 2003: 408).

3.7.3.4 Adverse effects of erythromycin

Gastrointestinal distress, epigastric pain, nausea, vomiting and diarrhoea are commonly associated with oral administration of erythromycin (Reynard, 1995: 385). Superinfections, vaginitis, urticaria and stomatitis are common adverse reactions of erythromycin (Kee & Hayes, 2003: 409). Most adverse effects may be limited by taking drugs with food, though absorption of some drugs is inhibited. An alternative is to switch from one preparation to another.

Cholestatic hepatitis is primarily associated with erythromycin estolate, probably as a hypersensitivity reaction (Jacobs *et al.*, 2001: 1513). Jaundice, accompanied by fever, leukocytosis, eosinophilia and elevated activities of transaminases in plasma, are associated with cholestatic hepatitis (Kapusnik-Uner *et al.*, 1996: 1140).

Clindamycin is considered more effective than lincomycin and has fewer toxic effects. Severe adverse reactions include colitis and anaphylactic shock (Kee & Hayes, 2003: 410).

Ototoxicity and nephrotoxicity are associated with the use of vancomycin. This treatment may result in permanent hearing loss or temporary or permanent loss of balance (Kee & Hayes, 2003: 412).

3.7.4 Tetracycline

The tetracyclines are a large group of antibiotics with a broad spectrum of action and effective therapeutic effects. The tetracyclines are products of different strains of *Streptomyces* (Lancini *et al.*, 1995: 9). Continued use of tetracyclines has resulted in bacterial resistance to the drugs. Tetracycline resistance has increased in the treatment of pneumococci and gonococci infections (Kee & Hayes, 2003: 413). Micro-organisms resistant to this group of drugs show extensive cross-resistance to all tetracyclines (Lancini *et al.*, 1995: 9).

3.7.4.1 Antimicrobial action

The tetracyclines act by preventing bacterial protein synthesis. The tetracyclines bind to the 30S bacterial ribosome, preventing access of aminoacyl tRNA to the acceptor site on the mRNA-ribosome complex (Kapusnik-Uner *et al.*, 1996: 1125).

The selective toxicity of tetracyclines to bacterial cells is due to their inability to be transported into mammalian cells (Reynard, 1995: 381). The tetracyclines are classified as bacteriostatic when given at normal blood concentrations. At much higher concentrations they may exhibit bactericidal effects (Pratt *et al.*, 1986: 205).

3.7.4.2 Pharmacokinetics and administration

Most of the tetracyclines are irregularly absorbed from the gastrointestinal tract. Most of the absorption takes place from the stomach and upper small intestine (Kapusnik-Uner *et al.*, 1996: 1126). Tetracycline absorption is impaired by dairy products, aluminum hydroxide gels and chelation with divalent cations (e.g., Ca^{2+} or Fe^{2+}) (Jacobs *et al.*, 2001: 1514).

After absorption of tetracycline it is distributed into tissues and secretions and accumulates in the reticuloendothelial cells of the liver, spleen and bone marrow and in bone, dentine and the enamel of teeth. Tetracycline is known to cross the placenta and reach high concentrations in the fetal circulation. The amount of tetracycline found in breast milk is also relatively high (Kapusnik-Uner *et al.*, 1996: 1126).

3.7.4.3 Clinical uses

Tetracyclines are used in a variety of infections as drug therapy. It is used in infections caused by chlamydiae, mycoplasmas, rickettsiae, ehrlichia and vibrio. Tetracyclines are also effectively used in sexually transmitted diseases, pelvic inflammatory disease, acne, respiratory infections, Lyme disease, malaria, brucellosis, tularaemia and cholera (Jacobs *et al.*, 2001: 1514 and Kapusnik-Uner *et al.*, 1996: 1128-1129).

Tetracycline and oxytetracycline are short-acting tetracyclines used in urinary tract infections. Intermediate tetracyclines include demeclocycline and methacycline used for gram-positive and gram-negative bacteria. The long-acting tetracyclines are doxycycline, used for *Legionella* syndrome and treatment of anthrax, and minocycline is used effectively in acne treatment (Kee & Hayes, 2003: 413).

The use of tetracyclines has declined due to increased bacterial resistance. This resulted as an effect of overuse in the animal feed industry as well as unmerited use in humans (Kapusnik-Uner *et al.*, 1996: 1129).

3.7.4.4 Adverse effects of tetracycline

Gastrointestinal disturbances such as nausea, vomiting and pain are usually dose-dependent. When diarrhoea is associated with tetracycline therapy it should be distinguished from pseudomembranous colitis (Reynard, 1995: 381). Superinfections (candidiasis) in patients are due to the broad-spectrum of activity of tetracycline (Kee & Hayes, 2003: 412). Hypersensitivity reactions to the tetracyclines (doxycycline and demeclocycline) have been described including rash, fever, glossitis, angioedema and anaphylaxis (Reynard, 1995: 381). Cross-sensitivity is a general occurrence (Williams, 1996: 89).

Adverse effects with the use of tetracyclines are usually observed in pregnant patients and patients under the age of eight years. Tetracyclines chelate divalent metals and bind strongly to bone and tooth material. Tetracyclines cause discoloration of teeth and depression of bone growth. Due to these adverse effects tetracyclines are contraindicated in children of tooth-formation age and pregnant women (Williams, 1996: 89).

3.7.5 Chloramphenicol

Chloramphenicol was the first therapeutic agent active against rickettsiae and related micro-organisms. Chloramphenicol is isolated from a strain of *Streptomyces venezuelae*. The widespread use of chloramphenicol has been limited due to the adverse effects associated with its use (Lancini *et al.*, 1995: 173).

3.7.5.1 Antimicrobial action

Chloramphenicol binds to the 50S subunit of ribosomes to inhibit the peptidyl transfer reaction. The inhibition of peptidyl transfer reactions is directly mediated by ribosomal RNA and chloramphenicol bind to this macromolecule (Lancini *et al.*, 1995: 69). The result of this reaction is an inhibition of protein synthesis. Chloramphenicol is a bacteriostatic drug.

3.7.5.2 Pharmacokinetics and administration

Chloramphenicol is distributed in tissues, including the eye and central nervous system. Cerebrospinal fluid levels are 70% to 80% of peak serum levels. Metabolism of chloramphenicol is done in the liver. Less than 10% of the drug is excreted unchanged in the urine (Jacobs *et al.*, 2001: 1515).

3.7.5.3 Clinical uses

Chloramphenicol is bacteriostatic in its activity. It is effective against both gram-negative and gram-positive organisms. Chloramphenicol is used for the treatment of severe infections or when other antibacterials are not effective (Kee & Hayes, 2003: 686). In some circumstances it shows bacteriocidal effects towards *S pneumoniae*, *H influenza* and *N meningitidis* (Jacobs *et al.*, 2001: 1515).

Chloramphenicol is used to treat meningococcal or pneumococcal infections of the central nervous system in patients that experienced anaphylaxis when using β -lactam antibiotics. Chloramphenicol is also used against anaerobic (*B. fragilis*) or mixed infections of the central nervous system. Where vancomycin-resistant enterococcal infections are suspected, chloramphenicol is used as treatment (Jacobs *et al.*, 2001: 1515).

3.7.5.4 Adverse effects of chloramphenicol

Excessive use of chloramphenicol results in serious adverse effects concerning the hematopoietic system. Disturbances in red cell maturation are revealed within 1 to 2 weeks of excessive use. This is associated with anemia, hyperferremia, reticulocytopenia and the appearance of vacuolated nucleated red cells in the bone marrow (Reynard, 1995: 383).

Chloramphenicol used in newborns may produce the fatal "grey baby syndrome". These patients lack the ability to metabolise chloramphenicol in the liver and this leads to accumulation of the drug. The mechanism for detoxification of chloramphenicol in the liver is essential to newborns, as well as to adults (Jacobs *et al.*, 2001: 1515).

The combination of chloramphenicol with some drugs is not allowed because of chloramphenicol's ability to inhibit the metabolism of these drugs, such as the concurrent use with warfarin, hypoglycaemic agents, phenytoin, etc. is prohibited (MIMS, 2003: 272). The resulting effects are a prolonged action and raised blood concentration of the drugs (Jacobs *et al.*, 2001: 1515).

3.7.6 Aminoglycosides

Aminoglycosides are bactericidal inhibitors of protein synthesis. They are primarily useful in the treatment of infections caused by aerobic gram-negative organisms (Chambers & Sande, 1996: 1103), such as *Escherichia coli*, *Proteus* spp. and *Pseudomonas* spp. (Kee & Hayes, 2003: 415).

3.7.6.1 Antimicrobial action

Aminoglycosides inhibit protein synthesis in bacteria by attaching to and inhibiting the function of the 30S subunit of the bacterial ribosome (Jacobs *et al.*, 2001: 1515). Inhibition of protein synthesis is not considered to be fatal to bacteria. Destruction of the cell wall of bacteria is considered to be more fatal. Aminoglycosides are accepted to be bactericidal because of their irreversible binding to receptors that result in cell death (Reynard, 1995: 378-379).

3.7.6.2 Pharmacokinetics and administration

Adequate absorption is achieved after intramuscular or intravenous injection (Jacobs *et al.*, 2001: 1516). Gentamicin and netilmicin have a short half-life and the drug dose can be given three to four times a day (Kee & Hayes, 2003: 415). However, after oral administration, inadequate concentrations are found in cerebrospinal fluid and the normal kidney excretes all rapidly (Chambers & Sande, 1996: 1103).

3.7.6.3 Clinical uses

The aminoglycosides are used primarily to treat infections caused by aerobic gram-negative organisms (Chambers & Sande, 1996: 1103). According to Jacobs *et al.* (2001: 1516), aminoglycosides demonstrate activity against many gram-positive organisms, but should never be used alone to treat infections caused by these organisms. This is due to the fact that there is no clinical experience with the treatment of such infections and because less toxic alternatives are available.

Aminoglycosides are used for the treatment of a few specific conditions. It has been indicated for the treatment of plague, tularemia, endocarditis, tuberculosis and acute brucellosis (Jacobs *et al.*, (2001: 1517). Streptomycin, the first aminoglycoside, is used in combination with antituberculosis drugs in the treatment of tuberculosis. Amikacin, gentamicin, kanamycin and tobramycin are effective against *Pseudomonas aeruginosa* infections. Neomycin decreases bacteria in the bowels and is used as a preoperative bowel antiseptic, while netilmicin and paromomycin are used in treating hepatic coma and parasitic infections (Kee & Hayes, 2003: 417).

3.7.6.4 Adverse effects of aminoglycosides

Of concern is the possibility of ototoxicity and nephrotoxicity. Ototoxicity can be irreversible and cumulative. It presents as hearing loss, noted first with high-frequency tones, or as vestibular damage, manifested by vertigo and ataxia. Nephrotoxicity is usually reversible, but more frequent than ototoxicity. Rising serum creatinine levels or reduced creatinine clearance is an indication of nephrotoxicity. Adverse effects may be potentiated if used concomitant with other drugs that cause adverse effects associated with aminoglycosides (Reynard, 1995: 380).

Patients suffering from renal failure, volume overload or obesity have distorted antibiotic clearance or volume of distribution. Whenever one or more of these conditions occur in patients, once daily dosing is not recommended and aminoglycoside levels are recommended to guide levels (Jacobs *et al*, 2001: 1517).

A curare-like neuromuscular blockade resulting in respiratory paralysis and allergic reactions in the form of fever and rash may occasionally occur with aminoglycoside therapy (Reynard, 1995: 380).

3.7.7 Sulphonamides

Mandell *et al.* (1996: 1057) stated that the sulphonamide drugs were the first effective chemotherapeutic agents to be used systemically for the treatment of bacterial infections in humans. Because of their low cost and relative efficacy in many infections, sulphonamides are used widely (Jacobs *et al.*, 2001: 1521). The combination of sulfamethoxazole and trimethoprim has resulted in an increased use of sulphonamides for the treatment of bacterial infections (Mandell *et al.*, 1996: 1057).

3.7.7.1 Antimicrobial action

Sulfonamides are competitive inhibitors of dihydropteroate synthase, the bacterial enzyme responsible for the incorporation of para-aminobenzoic acid (PABA) into dihydropteroic acid, the precursor of folic acid (Mandell *et al.*, 1996: 1058). Animal cells and some microorganisms use exogenous folate and thus are not affected by sulphonamides (Jacobs *et al.*, 2001: 1521). Sulfonamides are primarily bacteriostatic agents because they inhibit the bacterial synthesis of folic acid, which is essential for bacterial growth (Kee & Hayes, 2003: 423).

3.7.7.2 Pharmacokinetics and administration

Sulfonamides are rapidly absorbed in the gastrointestinal tract. After oral administration 70% to 100% of the dose is absorbed and can be found within 30 minutes in the urine. Peak plasma levels are achieved in 2 to 6 hours after administration (Mandell *et al.*, 1996: 1059). The

combination of trimethoprim-sufamethoxazole is well absorbed and is moderately protein-bound. It has a half-life of 8 to 12 hours (Kee & Hayes, 2003: 425).

3.7.7.3 Clinical uses

There are a number of conditions for which sulphonamides can be used. However, the development and increase in resistance of several bacterial species has reduced the use of sulphonamides (Kee & Hayes, 2003: 423). The development of the combination of trimethoprim and sulfamethoxazole has increased the use of sulphonamides, but to a lesser extent (Mandell *et al.*, 1996: 1062).

Short-acting sulphonamides include sulfadiazine, sulfamethizole and sulfisoxazole. Short-acting sulphonamides are used for the treatment of systemic infections and urinary tract infections. While sulfisoxazole are used also in the treatment and prophylaxis of otitis media (Kee & Hayes, 2003: 425).

Intermediate-acting sulphonamides are used in a variety of infections. Sulfamethoxazole are used in urinary tract infections, otitis media and meningococcal A strain meningitis prophylaxis. For the treatment of ulcerative colitis and Crohn's disease sulfasalazine is preferred (Kee & Hayes, 2003: 425). Trimethoprim-sufamethoxazole is used for urinary tract infections; parasitic infections; bacterial infections, leprosy (Jacobs *et al.*, 2001: 1522) and rheumatic fever, burns, bronchitis, pneumonia, *Pneumocystis carinii* infections and otitis media (Kee & Hayes, 2003: 426).

3.7.7.4 Adverse effects of sulphonamides

Sulphonamides are capable of producing a wide variety of side effects due to hypersensitivity or direct toxicity. Some of the effects that may be encountered are disturbances of the urinary tract; hypersensitivity (skin reactions); acute haemolytic anemia; agranulocytosis, aplastic anaemia (Lesse, 1995: 390), and gastro-intestinal disturbances (Kee & Hayes, 2003: 424). The early sulphonamides were insoluble in acid urine; thus crystalluria and hematuria were common problems (Kee & Hayes, 2003: 424)

The adverse effect of great concern is photosensitivity (Kee & Hayes, 2003: 424). It manifests as a dermatological skin reaction, ranging from a minor rash to life-threatening exfoliative dermatitis, toxic epidermal necrolysis and Stevens-Johnson syndrome. Discontinuation of therapy is advised after the appearance of a rash (Lesse, 1995: 390).

According to Mandell *et al.* (1996: 1064), there is no evidence that the combination of trimethoprim and sulfamethoxazole will induce a folate deficiency in normal persons. When the

cells of a person are deficient in folate the margin between toxicity for bacteria and that for human beings may be relatively narrow. This may lead to the occurrence of megaloblastosis, leucopenia, or thrombocytopenia (Mandell *et al.*, 1996: 1064). Other life-threatening adverse reactions include agranulocytosis, Stevens-Johnson syndrome and renal failure (Kee & Hayes, 2003: 426).

3.7.8 Quinolones

Quinolone antibacterials inhibit enzymes necessary for replication of micro-organisms. The best-known synthetic products are nalidixic acid, piperimidic acid and the group of 4-fluoroquinolones, such as norfloxacin and ciprofloxacin (Lancini *et al.*, 1995: 61).

3.7.8.1 Antimicrobial action

The enzyme DNA gyrase is responsible for combating a mechanical obstacle known as “over winding” during DNA replication or transcription (Mandell *et al.*, 1996: 1065). Quinolones act by inhibition of bacterial DNA synthesis by blocking the enzyme DNA gyrase (Jacobs *et al.*, 2001: 1525). Their antibacterial spectrum includes both gram-positive and gram-negative organisms. They are bactericidal in their action (Kee & Hayes, 2003: 417). Mammalian DNA gyrase is unaffected by clinical concentrations of the quinolones (Lesse, 1995: 387).

3.7.8.2 Pharmacokinetics and administration

Quinolones and fluoroquinolones are widely distributed in body fluids and tissues after administration (Jacobs *et al.*, 2001: 1526, Mandell *et al.*, 1996: 1067). According to Mandell *et al.* (1996: 1067), fluoroquinolones reach peak serum levels within 1 to 3 hours after oral administration of 400mg.

Food does not impair oral absorption, but may delay the time to peak serum concentrations (Mandell *et al.*, 1996: 1067). Optimal oral bioavailability is achieved if quinolones are given about one hour before or two hours after meals. Some heavy metals, calcium and other multivitamins may inhibit the absorption of quinolones (Jacobs *et al.*, 2001: 1526).

3.7.8.3 Clinical uses

Quinolones have a broad spectrum of activity and because some organisms have the tendency to develop resistance, these agents should be reserved for the treatment of very ill patients. When less expensive antibiotics with narrower spectrums are available they should rather be used (Jacobs *et al.*, 2001: 1527).

Quinolones are used for various infections. According to Kee and Hayes (2003: 419) quinolones such as cinoxacin, ciprofloxacin, gatifloxacin, enoxacin and nalidixic acid are used to

treat acute and/or chronic urinary tract infection and meningitis. Levofloxacin, moxifloxacin, and ciprofloxacin are used for the treatment of upper respiratory infections. Some of the other infections it is used for include: prostatitis; sexually transmitted diseases; gastrointestinal and abdominal infections and bone, joint and soft tissue infections (Mandell *et al.*, 1996: 1068).

3.7.8.4 Adverse effects of quinolones

According to Lesse (1995: 388), quinolones have a low overall incidence of adverse effects (2 - 4%) with nausea and vomiting accounting for most of the adverse effects. Some patients may experience photosensitivity. Adverse reactions that may be encountered are oral candidiasis, crystalluria, hematuria and urticaria (Kee & Hayes, 2003: 420). Central nervous system effects that include insomnia, confusion, headaches, dizziness and anxiety are associated with quinolones (Williams, 1996: 70).

Quinolones are not given to children due to possible cartilage damage that has been found in clinical studies done in animals (Lesse, 1995: 388).

3.8 CHAPTER SUMMARY

In this chapter the focus was on the utilisation and costs associated with antibiotics. Trends regarding the usage in countries around the world were compared with South Africa. An overview regarding the pharmacology of antibiotics was also presented.

Hereby the seventh research question and the seventh specific research objective, namely to review the basic pharmacology of antibiotics, has been reached.

In the following chapter the methodology of this study will be reviewed.

Chapter 4

Research methodology

4.1 INTRODUCTION

In this chapter both the general and specific research objectives of the literature and empirical investigation as well as the research methodology will be discussed. The procedures followed in acquiring the relevant information and the subsequent analysis of the data will also be discussed.

4.2 RESEARCH OBJECTIVES

4.2.1 General research objectives

The general research objective of this study was to investigate the influence of the implementation of a managed reference price list on the usage and cost of antibiotics in the private health care sector in South Africa by utilising a medicine claims database of Medscheme®.

4.2.2 Specific research objectives

4.2.2.1 Specific research objectives of the literature review

The specific research objectives of the literature review were focussed on the following:

- ▣ Conceptualise from the literature what health care entails in South Africa, as well as internationally.
- Determine from the literature which factors contribute tot the high health care costs in the private health care sector of South Africa, as well as internationally.
- ▣ Investigate from the literature the influences of the new legislation on medicine costs in the private health care sector.
- ▣ Review the influences of generic substitution on the prevalence and cost of medicine.
- Conceptualise from literature the concepts of pharmacoeconomics, drug utilisation review and managed health care.
- ▣ Determine the implications of a managed medicine reference price list in the private sector.
- Review the basic pharmacology of antibiotics.

4.2.2.2 *Specific research objectives of the empirical investigation*

The specific research objectives of the empirical investigation included the following:

- ❑ Investigate the differences in the utilisation patterns and costs of drugs in general before and after implementation of the Medscheme® Price List.
- ❑ Investigate the differences in the utilisation patterns and costs of antibiotic drugs before and after implementation of the Medscheme® Price List.
- ❑ Determine and compare the difference in prevalence and costs of original products vs. generic products that have been claimed before and after implementation of the Medscheme® Price List for drugs in general and antibiotic drugs specifically.
- ❑ Investigate the differences in the utilisation patterns and costs of beta-lactam antibiotics before and after the implementation of the Medscheme® Price List.
- ❑ Determine the cost savings that could have been incurred if beta-lactam antibiotics had been provided at MPL prices.

4.3 RESEARCH METHODOLOGY

The study consisted of two phases namely phase one the literature review and phase two the empirical investigation (refer to paragraph 1.5).

Phase 1: The literature review

The aim of the literature review was to investigate health care in South Africa as well as health care concepts. A discussion on pharmacoeconomics and drug utilisation review studies also formed part of this investigation. The aim of the literature review was furthermore to identify methods that are implemented internationally and nationally to contain the costs of medicine. There was also an investigation of the usage of antibiotics in the private health care sector and different mechanisms that are implemented to reduce costs. The basic pharmacology of antibiotics was also discussed.

Phase two: The empirical investigation

The empirical investigation consisted of the following components:

- ❑ Selection of the research design.
- ❑ Selection and composition of the study population.
- ❑ Statistical analysis of the data.
- ❑ Reliability and validity of the data.
- ❑ The report and discussion of the results of the empirical investigation.
- ❑ The conclusions and recommendations based on the results of the empirical investigation as well as the limitations of the study.

4.3.1 Research design

The research design used in this study was retrospective (refer to paragraph 2.10.2.1), non-experimental and quantitative (refer to paragraph 2.10.1.1).

With the empirical investigation the researcher looks at the conditions that have already occurred and then collects data to investigate the relationship of these varying conditions to subsequent behaviours. Retrospective drug utilisation review studies are done after the dispensing of the prescription and possible usage of drugs have occurred (Blackburn, 1993: 15). Sacristán and Soto (1994: 301) believed that a medical aid claims database can be used to apply statistical methods to identify areas of patient care that are not beneficial or too costly to the funder. This design involves no direct manipulation of conditions because the presumed cause has already occurred.

4.3.2 Selection and composition of the study population

The research population consisted of patients whose date could be obtained from the central medicine claims database of Medscheme®, during the period May 2001 to April 2003. The total study population thus comprised of all the patients that had used one or more antibiotics during the specific period of the study.

In order to facilitate the analysis of the data of antibiotics the central medicine claims database was used to compile a secondary database. The secondary database consisted out of all the patient prescription-records that contained an antibiotic that had been prescribed during the two-year period. This was achieved by identifying all the antibiotics by using their NAPP1 codes and by extracting all prescription records that contained any drug that fell into any of the three classifications of antibiotics (refer to paragraphs 4.3.2.3).

The data of the secondary database were used to determine the effect of the Medscheme® Price List (MPL) on the usage and cost of beta-lactam antibiotics. A comparison, regarding the costs and prevalence of beta-lactam antibiotics, was made between the year before implementation (May 2001 to April 2002) and after implementation of the MPL (May 2002 to April 2003).

A total of 4004958 prescriptions containing at least one antibiotic medicine item represented the study population. These data were analysed and discussed according to different criteria/measuring instruments selected for the analyses.

4.3.2.1 *The database*

The data were extracted from the central medicine claims database of Medscheme® for a period of two years, stretching from 1 May 2001 to 30 April 2003.

The medicine claims database consisted of prescription records (claims data) for patients of various medical schemes. The database included the following information:

- ❑ The prescription date, prescription number, prescriber practice number and pharmacy number.
- ❑ The National Approved Product Pricing Index (NAPPI) code of the dispensed product.
- ❑ A description of the NAPPI code, thus the trade name.
- ❑ The quantity of the drug supplied to the patient.
- ❑ The amount paid by the medical scheme.
- ❑ Medical scheme information such as name, member number and dependant number.

4.3.2.2 *Selection of criteria/measuring instruments for the data analysis*

The criteria for inclusion of prescriptions into the study population were:

- ❑ A valid patient record indicating the use of one or more drugs, thus all prescriptions claimed between the period 1 May 2002 and 30 April 2003 (general analysis).
- ❑ Non-medicinal products (such as bandages, syringes, etc.) and mixtures were excluded.
- ❑ The use of antibiotic drugs within the period between 1 May 2001 and 30 April 2003 (specific analysis).
- ❑ All the cases had to have a cost component.

Since no further demographic or clinical data were available from the medicine claims database, it was not possible to divide the study population into any other categories e.g. sex, age, illness, etc. This is a limitation in the medicine claims database, which can be seen as a limitation of the study (refer to paragraph 6.3).

4.3.2.3 *Classification systems*

The following classification systems were used to obtain the necessary data from the medicine claims database.

❑ The NAPPI code

Every agent of the medicine claims database has a NAPPI code, which is the National Approved Product Pricing Index. The NAPPI code consists out of a series of numbers. This code is unique to every agent and distinguishes between different dosages and dosage forms of the same agent. The NAPPI codes of the antibiotics were used to obtain the data from the

central medicine claims database and to run the necessary queries in SAS® 8.2 (SAS. Institute Inc., 1999 – 2002).

■ **MIMS® classification**

This classification system classifies medicine according to its pharmacological action. The MIMS® (Snyman, 2003: 11a) classification was used as criterion to classify antibiotics according to their pharmacological action. This classification system was also used to run queries in SAS® 8.2 (SAS Institute Inc., 1999 – 2002). Refer to Appendix I for a complete list of this classification.

□ **Active ingredient classification**

The MIMS® classification constitutes seven sub-pharmacological groups; therefore the antibiotics were also classified according to their active ingredients. Refer to Appendix J for a complete list of the classification of the active ingredients of the antibiotics.

4.3.3 Statistical analysis of the data

4.3.3.1 Variables analysed

In order to achieve the objectives set for this study, the following were used as measuring instruments or criteria for data analysis:

- Prevalence.
- Medicine cost.
- Prevalence and cost of original and generic drugs.

4.3.3.1.1 Prevalence

The Centre for Disease Control in the United States of America (Chatfield 2000: 1) revealed that there has been an increase of 48% in antibiotic prescribing for children from 1980 to 1992 (refer to paragraph 3.3). According to Mediscor (2003: 14) one of the antibiotic pharmacological groups, beta-lactam antibiotics, was one of the five therapeutic classes with the highest prevalence of use during 2002. It is for this reason that the prevalence of antibiotics was used as a measuring instrument during the analysis of the data.

4.3.3.1.2 Medicine cost

Hess *et al.* (1990: 585-587) found that antimicrobial drugs represent 20% to 40% of a hospital's drug budget. Pharmaceutical spending rose by more than 70%, in real terms, and now account for more than 10% of total health spending in nearly all OECD countries (Organisation for Economic Co-operation and Development, 2003:2). The beta-lactam antibiotics represented one of the top twenty-five therapeutic classes in 2002 and contributed 3.8% of the total cost that was spent on medicine in South Africa (Mediscor, 2003: 8-10).

In this study the total cost of antibiotics, the average cost per antibiotic item, the average cost per prescription containing antibiotics as well the cost index of antibiotics were analysed.

For the purpose of this study when the term “cost” is used it refers to medicine treatment cost (refer to paragraph 2.9.1.2).

4.3.3.1.3 Prevalence and cost of original and generic drugs

In many European countries generics make up as much as 70% of all medicines prescribed in terms of volume, while in value terms generics represent only 30% of pharmaceutical expenditure (European Generic Medicines Association, 2004d: 1). In the United States of America generic drug sales grew at an 11.3% rate, while brand name products only grew at a rate of 8% during 2000 and 2001 (Generic Pharmaceutical Association, 2002: 1).

Due to frequent occurrence of original products being prescribed, as well as the significant cost difference between original drugs and generic drugs, the generic and original drugs were used as measuring instruments in the data analysis.

4.3.3.2 Computer and software used

The analysis of the data was conducted by making use of the following:

- Microsoft® Excel 2000 was used for the statistical analysis of the data, while Microsoft® Word 2000 was used for the basic analysis and word processing.
- Statistical analysis was done making use of the SAS® 8.2 (SAS Institute Inc., 1999 – 2002) computer package for Windows.

4.3.3.3 Statistical methods

The measuring instruments were applied retrospectively to the database by making use of the following statistical methods:

■ Range

The simplest measure of variation is the range of the distribution. The range indicates the variation between the smallest and the largest entries (Brase and Brase, 1999: 102).

$$r = X_{\max} - X_{\min}$$

Where

r = range.

X_{\max} = the largest entry.

X_{\min} = the smallest entry.

□ Average value (mean)

The average value is usually represented by the arithmetic mean. This is simply the sum of the values divided by the number of values (Mendenhall *et al.*, 1993: 38).

$$\bar{x} = \frac{\sum x}{n}$$

Where:

x = the values of the variables.

\sum = the sum of the values of the variables.

n = the number of observations.

□ Standard deviation

The standard deviation is a statistic that measures the amount of variability. It is based on the measurement of deviation or difference of values from the mean value. The standard deviation indicates how much the values in a distribution differ from the average value (Reid, 1987: 77).

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$

Where

s = standard deviation.

x = the values of the variables.

\bar{x} = the average of the sample.

n = the number of observations.

□ Cost index

The cost index can be defined as follows (Serfontein, 1989: 180):

$$Cost - index = \frac{Cost(\%)}{Prevalence(\%)}$$

In context of the study the cost index can be interpreted as follows:

- If cost index < 1 then the medicine therapy utilised is relatively inexpensive in comparison with other therapies.
- If cost index = 1 then there is equilibrium between the costs and prevalence of the medicine therapy.
- If cost index > 1 then the therapy utilised is expensive.

In chapter 5 the discussions will concentrate on cost-index values greater than one (1).

□ Effect size

Effect size (d) is defined by Cohen (1988: 9) as *“the degree to which the phenomenon is present in the population”*.

The effect size can be calculated by the following formula (Steyn, 1998: 3):

$$d = \frac{\bar{X}_a - \bar{X}_b}{S_{\max}}$$

Where:

\bar{X}_a = the average medicine treatment cost of a (for e.g. antibiotic drug a)

\bar{X}_b = the average medicine treatment cost of b (for e.g. antibiotic b)

S_{\max} = the maximum standard deviation between a and b

According to Steyn (1998: 3) the *d* value can be interpreted as follows:

$|d| = 0.2$: small effect, with no practical significant difference.

$|d| = 0.5$: medium effect, which is observable and may be significant.

$|d| = 0.8$: large effect, which is significant and of practical importance.

The *d*-values greater than or equal to 0.8 will be assumed to have practical significant value and will be discussed in chapter 5.

The effect size will be used to determine whether there is any practically significant difference between the average medicine treatment costs for different types of antibiotics (e.g. original and generic products) in this study.

4.3.4 Reliability and validity of the data

The data for analysis were directly obtained from a medicine claims database, Medscheme®. Direct manipulation of the data by the researcher was therefore impossible.

Data for the analysis were obtained, from the central medicine claims database, for a two-year period (1 May 2001 to April 2003), thus limiting the external validity, implying that results can only be generalised to the specific database used, as well as to the specific study population.

The research was conducted assuming that all data were correct and accurate. This is a limitation of the study (refer to chapter 6).

4.4 REPORTS AND DISCUSSION OF RESULTS

An extensive report, followed by an in-depth discussion of the results acquired through the empirical investigation will be reviewed in chapter five.

4.5 CONCLUSIONS, RECOMMENDATIONS AND LIMITATIONS

The conclusions and recommendations based on the results of the literature review and the empirical investigation will be discussed in chapter six. The limitations encountered during the study will be mentioned throughout chapters four and five, with a detailed discussion of the limitations in chapter six.

4.6 CHAPTER SUMMARY

The empirical research was discussed in this chapter. The discussion included the objectives of the empirical investigation, the data source, the structure of the database and the methodology of the empirical investigation.

The results of the empirical investigation will be reported and discussed in chapter five.

Chapter 5

Results and Discussion

5.1. INTRODUCTION

In this chapter the results of the empirical investigation conducted for the period May 2001 to April 2003 will be discussed.

5.2 DISCUSSION OF THE RESULTS

5.2.1 Comments of interest with the interpretation of the results

- The Medscheme® Price List (MPL) was implemented on 1 May 2002. The period before the implementation of the MPL (May 2001 to April 2002) was compared with the period after the implementation of the MPL (May 2002 to April 2003) to perceive the difference in prescribing and utilisation patterns as well as drug expenditure differences.
- For the purpose of the study, the following periods will be denoted in the discussion as follows: May 2001 to April 2002 = first year and May 2002 to April 2003 = second year. Each year is further divided into three four-month periods:

Year 1	}	P1: May 2001 to August 2001
		P2: September 2001 to December 2001
		P3: January 2002 to April 2002
Year 2	}	P4: May 2002 to August 2002
		P5: September 2002 to December 2002
		P6: January 2003 to April 2003

- All further analysis concerning the utilisation and cost of antibiotics will be based on the antibiotics listed in Appendix E. Note that the antibiotics listed are all agents that were available on the South African market, which appeared on the central medicine claims database, that was used for analysis, during the period of investigation
- Pharmaceutical product refers to a drug/medicine item that is intended to modify or explore physiological systems or pathological states for the benefit of the patient. Surgical equipment, non-medicinal items and mixtures (with unidentifiable active ingredients) were excluded from all analyses of the relevant data.
- Dosage form refers to the form of the completed pharmaceutical product, e.g. tablet, capsule, injection, suspension.

- Prevalence refers to the number of times a particular product had appeared on the central medicine claims database during the specified period.
- The results of the general medicine utilisation patterns and cost have been represented separately from those of antibiotics (refer to Figure 1 and 2).
- In figures and tables the percentages have been rounded off to the nearest second decimal and may not add up to 100%.
- Only $d \geq 0.8$ (practically significant difference) was used as this value indicated that the effect is large and of practical importance (refer to paragraph 4.4.3.3).
- For the calculation of the cost-prevalence index, only values higher than 1.00 were used as a value higher than this indicated a relatively expensive treatment cost (refer to paragraph 4.4.3.3).
- For the purpose of this study “original” and “innovator” products are synonyms, whilst trade names may refer to either “original” or “generic” products. Also refer to paragraph 5.4.2.

5.2.2 Presentation of results

The discussion of the empirical investigation will focus on drug utilisation as well as some cost aspects of medicine in general with special focus on antibiotics. The analyses will be presented as summarised in the following diagram.

TOTAL MEDICINE CLAIMS DATABASE

GENERAL ANALYSIS

Prevalence of medicine items

- Total number of medicine items claimed.
- Average number of medicine items per prescription claimed.
- Total number of original and generic medicine items claimed.

Medicine cost

- Total cost of medicine items.
- Average medicine cost.
- Average cost per prescription.
- Cost-prevalence index (CPI).
- Total cost of original and generic medicine items.
- Calculation of d-values.

SPECIFIC ANALYSIS

1. ANTIBIOTICS

Prevalence of antibiotic items

- Total number of antibiotic medicine items claimed.
- Average number of antibiotic medicine items per prescription claimed.
- Total number of original and generic antibiotic medicine items claimed.

Antibiotic cost

- Total cost of antibiotic medicine items.
- Average antibiotic medicine cost.
- Average cost per antibiotic prescription.
- Cost-prevalence index (CPI).
- Total cost of original and generic antibiotic medicine items.
- Calculation of d-values.

2. BETA-LACTAM ANTIBIOTICS

Prevalence of beta-lactam antibiotics

- Total number of antibiotic medicine items claimed.
- Average number of antibiotic medicine items per prescription claimed.
- Total number of original and generic antibiotic medicine items claimed.

Cost of beta-lactam antibiotics

- Total cost of antibiotic medicine items.
- Average antibiotic medicine cost.
- Average cost per antibiotic prescription.
- Cost-prevalence index (CPI).
- Total cost of original and generic antibiotic medicine items.
- Calculation of d-values.

Medscheme® Price List (MPL)

- Effect on prevalence and medicine costs (Possible cost savings).

5.3 GENERAL ANALYSIS

The results of the general medicine utilisation patterns, derived from the medicine claims database, are tabulated in Table 5.1.

Table 5.1: General analysis of the medicine claims database. May 2001 to April 2003.

<i>Description</i>	<i>Database</i>
May 2001 to April 2002 (Year 1)	
Number of prescriptions	11060996
Number of medicine items prescribed	21820911
Total cost (R)	3097064602.00
May 2002 to April 2003 (Year 2)	
Number of prescriptions	14347442
Number of medicine items prescribed	27277825
Total cost (R)	4053280295.00

5.3.1 Prevalence and cost of medicine

□ *Medicine items*

During the two-year period a total number of 49098736 medicine items and 25408438 prescriptions were claimed. According to Table 5.1 there was an increase in the total number of items issued over the two-year period. During the first year (May 2001 to April 2002) a total number of 21820911 medicine items were claimed, while during the second year (May 2002 to April 2003) a total number of 27277825 medicine items were claimed. This increase in total number of medicine items claimed could possibly be attributed to an increase in medical scheme beneficiaries.

Accordingly there were more prescriptions issued during the second year ($n = 14347442$) than the first year ($n = 11060996$). The average number of medicine items per prescription ranged between 2.04 ± 1.25 for P1 to 1.87 ± 1.13 for P6. (refer to Table 5.2). No practical significant differences were found between the average numbers of medicine items per prescription for the different four-month periods ($d \leq 8$)¹.

¹ Refer to paragraph 4.4.3.3 for calculation of effect size (d-value).

In April 2002 a total of 2447323 medicine items were claimed, making it the month with the highest number of medicine items claimed during the two-year period (refer to Appendix A, Table 1A). Though the highest total number of medicine items claimed per four-month period was found to be during P4 (May 2002 to August 2002) (refer to Table 5.2).

Although the lowest number of prescriptions ($n = 595871$) was claimed during June 2001 the average number of medicine items claimed per prescription for this particular month was the highest (2.07 ± 1.26) during the two-year period (refer to Appendix A, Table 1A).

▣ **Medicine cost**

According to Harrison (2004: 294) in 2002/2003 the proportion that medical schemes paid for medicines accounted for 24.28% of all benefits paid to providers. This is to a certain extent a large proportion that is consumed by medicines.

The total cost of all medicine items claimed for the two-year period amounted to R7150344897.00. The total cost for the first and second years were 43.31% and 56.69% respectively. In both the first and second years the highest total cost for all medicine items was found to be during P3 and P6 (January to April 2002 and 2003) (refer to Table 5.2).

According to the Mediscor (2003: 5) the average cost per medicine items during 2002 in South Africa was R153.60. The results of this study were found to be almost the same. The average cost per medicine item during the two-year period varied between $R131.82 \pm 160.41$ (P1) and $R152.55 \pm 224.02$ (P5), while the average cost per prescription varied between $R269.56 \pm 306.44$ (P1) and $R288.73 \pm 314.51$ (P3) (refer to Table 5.2). The d-value analysis reveals that there were no practical significant differences found between the average costs per medicine item for the different four-month periods ($d \leq 0.8$). The same results were found between the average medicine costs per prescriptions between the different four-month periods ($d \leq 0.8$).

As previously mentioned the total cost for both the first and second years was found to be the highest during January to April (refer to Table 5.2). This could be attributed to the fact that most patients' medical schemes funds are not exhausted during the first few months of the year. As the year passes patients' medical schemes funds get exhausted, and may have an influence on their medicine expenditure.

Table 5.2: Medicine items and cost. May 2001 to April 2003.

Month	Medicine items		Prescription			Total cost (R)
	n*	Average cost (R)	n#	Average number of medicine items	Average cost per (R)	
May – Aug. 2001 (P1)	6036149	131.82 ± 160.41	2951703	2.04 ± 1.25	269.56 ± 306.44	795670612.00
Sep. – Dec. 2001 (P2)	6427511	141.80 ± 164.14	3295200	1.95 ± 1.21	276.59 ± 309.75	911431143.00
Jan. –April 2002 (P3)	9357251	148.54 ± 167.09	4814093	1.94 ± 1.20	288.73 ± 314.51	1389962847.00
May – Aug. 2002 (P4)	9776243	143.53 ± 166.40	5020895	1.95 ± 1.18	279.47 ± 306.09	1403168759.00
Sep. –Dec. 2002 (P5)	8113959	152.55 ± 224.02	4310511	1.88 ± 1.14	287.16 ± 406.40	1237803191.00
Jan. –April 2003 (P6)	9387623	150.44 ± 180.52	5016036	1.87 ± 1.13	281.56 ± 325.12	1412308345.00

* Total number of medicine items claimed during the specific period.

Total number of prescriptions claimed during the specific period.

5.3.2 Prevalence and cost of original and generic medicine

□ Medicine items

Mediscor (2003: 6) revealed that the majority of products used during 2002 were original products (72.30%). For every generic equivalent dispensed in 2002, 2.6 original products were dispensed.

It can be derived from Table 5.3 that 70.94% of the 49098736² items claimed during the two-year period were original products and 29.06% were generic products. Though there was an increase in the volume of original products claimed, expressed in percentage value there was a decreasing trend in the utilisation of original products. The percentage of generic products utilised during the two-year period increased with more than 6%.

During the first year a total of 16030994 original products were claimed. For the first year there was a decrease of 1.47% in the prevalence of original products from P1 to P3. In the second year a total of 18799816 original products were issued and there was a decrease of 2.52% in the prevalence of original products from P4 to P6 (refer to Table 5.3).

² Due to some products not listed as either original products or generic products on the database, calculation of the total number of medicine items over the two-year period in Table 5.2 will not correlate with the sum of the total number of original products and generic products in Table 5.3.

Though the prevalence of generic products is still smaller than that of original products, there was an overall increase in the prevalence of generic products from P1 to P6. The prevalence of generic products increased from 25.87% (P1) to 32.47% (P6) (refer to Figure 5.1).

The prevalence of original and generic products for the two-year period is represented by the following numerical values in Figure 5.1:

1. P1 (May 2001 to August 2001).
2. P2 (September 2001 to December 2001).
3. P3 (January 2002 to April 2002).
4. P4 (May 2002 to August 2002).
5. P5 (September 2002 to December 2002).
6. P6 (January 2003 to April 2003.)

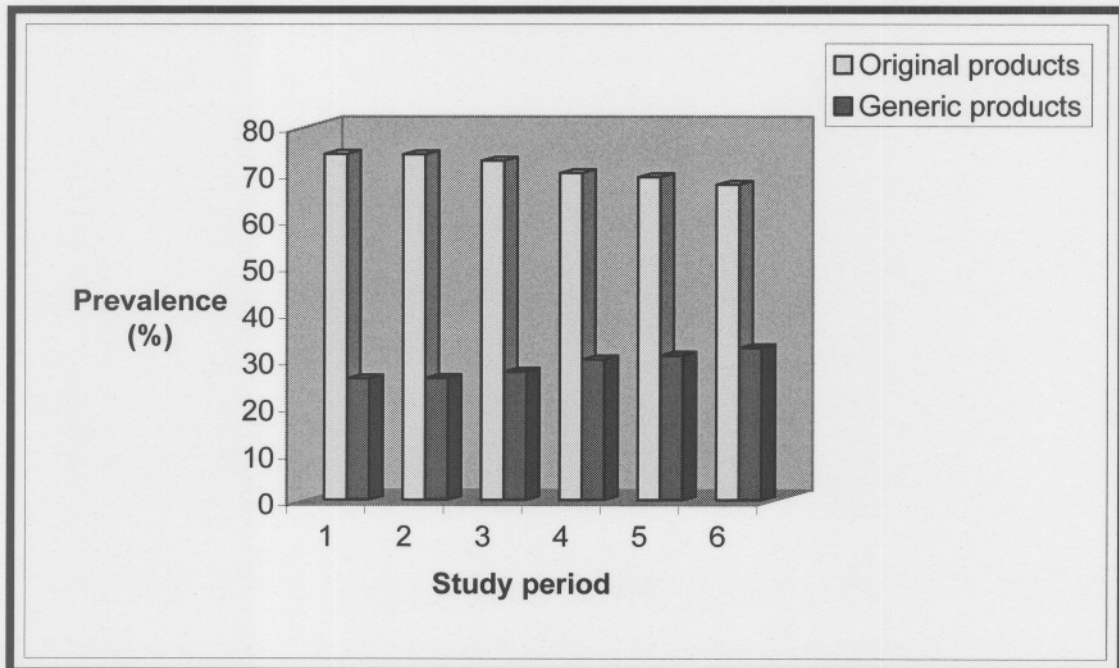


Figure 5.1: Prevalence of original and generic products. May 2001 to April 2003.

□ **Medicine cost**

One of the major reasons behind the overall increase in medicine expenditure is the new branded medicines entering the market. This increased utilisation of new more expensive medicines can be curbed by the introduction of generally less expensive generic medicines (Mediscor, 2003: 6). According to the Generic Pharmaceutical Association (2002: 1) the generic drug market in the United States grew at a rate of 11.3% during 2000 and 2001.

According to Table 5.3 the total cost for original products claimed during the two-year period was R6096817531.00 and for generic products the total cost was R1053499969.00. Thus, original products consumed 85.27% of the total cost, while generic products constituted 14.73% of the total cost of medicine items ($n = R7150344897.00$)³ claimed during the two-year period.

Original products constituted 86.74% of the total cost of all medicine items claimed ($n = R3097064602.00$) during the first year. This percentage decreased in the second year to 84.14% ($n = R4053280295.00$) (refer to Table 5.3). Calculation of the cost indices revealed that original products are relatively expensive. The cost indices of the original products for the first and second years were 1.18 and 1.22 respectively.⁴

The average cost for original products ranged between $R154.87 \pm 176.89$ (P1) and $R176.40 \pm 183.45$ (P3) for the first year and between $R173.87 \pm 185.55$ (P4) and $R186.10 \pm 258.06$ (P5) for the second year (refer to Table 5.3). Calculation of the d-value revealed that there was no practical significant difference between the average costs of original products for the different four-month periods ($d \leq 0.8$).

However, according to Mediscor (2003: 6) the average cost per original product was found to be R190.00. In comparison the results revealed that there were no practical significant differences between the average costs per original product ($d < 0.8$).

The expenditure on generic products increased over the two-year period. During the first year generic products constituted 13.26% of the total cost of all medicine items ($n = R3097064602.00$), while in the second year the generic products constituted 15.86% of the total medicine cost ($n = R642760360$). The cost-prevalence indices revealed that generic products are relatively inexpensive (cost index < 1). The cost-prevalence indices of generic products for the first and second years were 0.50 and 0.51 respectively.⁵

The average cost for generic products gradually increased over the two-year period. During the first year the average cost ranged between $R65.78 \pm 62.64$ (P1) and $R74.53 \pm 71.69$ (P3), while in the second year it ranged between $R72.55 \pm 68.78$ (P4) and $R77.74 \pm 74.58$ (P6) (refer to Table 5.3). In the Medicines Review done by Mediscor (2003: 6) the average cost of generic products was R76.00.

³ Due to some products not listed as either original products or generic products on the database, calculation of the total cost over the two-year period in Table 5.2 will not correlate with the sum of the total cost of original products and generic products in Table 5.3.

⁴ The cost-prevalence index for original products was calculated by dividing the cost % by the prevalence % for each year (e.g. $CPI = 86.74\% / 73.47\% = 1.18$).

⁵ The cost-prevalence index for generic products was calculated by dividing the cost % by the prevalence % for each year (e.g. $CPI = 13.26\% / 26.53\% = 0.50$).

With reference to the d-value, there were no practical significant differences between the average cost of original products and generic products for the different four-month periods ($d \leq 0.8$).

Table 5.3: Prevalence and cost of original and generic medicine. May 2001 to April 2003.

Month	Original products				Generic products			
	<i>n</i>	%*	Average cost (R)	Total cost (R)	<i>n</i>	%#	Average cost (R)	Total cost (R)
May – Aug. 2001 (P1)	4474402	74.13	154.87 ± 176.89	692946182.00	1561747	25.87	65.78 ± 62.64	102724429.00
Sep. – Dec. 2001 (P2)	4757927	74.02	166.90 ± 180.05	794110336.00	1669584	25.98	70.27 ± 66.55	117320807.00
Jan. – April 2002 (P3)	6798665	72.66	176.40 ± 183.45	1199268474.00	2558586	27.34	74.53 ± 71.69	190694373.00
May – Aug. 2002 (P4)	6848238	70.05	173.87 ± 185.55	1190729185.00	2928005	29.95	72.55 ± 68.78	212439574.00
Sep. – Dec. 2002 (P5)	5612312	69.17	186.10 ± 258.06	1044451856.00	2501647	30.83	77.29 ± 72.02	193351335.00
Jan. – April 2003 (P6)	6339266	67.53	185.40 ± 204.48	1175311498.00	3048357	32.47	77.74 ± 74.58	236969451.00

* The prevalence percentage of original products is the total number of original products divided by the total number of medicine items claimed during the specific period multiplied by hundred.

The prevalence percentage of generic products is the total number of generic products divided by the total number of medicine items claimed during the specific period multiplied by hundred.

5.3.3 Prevalence and cost of the top ten main pharmacological groups

□ *Medicine items*

Respiratory drugs rated as the main pharmacological group most frequently claimed during the two-year period. In the first year respiratory drugs represented 13.40% of all medicine items claimed ($n = 21820911$). The prevalence of respiratory drugs increased in the second year to 13.94% ($n = 27277825$) (refer to Figure 5.2, Table 5.4). Respiratory drugs were the most frequently prescribed during P1 and P4, 16.71% ($n = 6036149$) and 16.49% ($n = 9776243$)

respectively (refer to Table 5.5). It could be attributed to the fact that respiratory drugs are seasonal drugs and more often prescribed during winter months.

Cardiovascular drugs represented 13.45% of all medicine items (n = 49098736) claimed during the two-year period (refer to Table 5.4). This percentage correlates with what was determined by Mediscor. According to them 14.4% of the total of items claimed in 2002 consisted of cardiovascular drugs (Mediscor, 2003; 9).

The prevalence percentage for cardiovascular drugs was 13.34% (n= 21820911) for the first year and 13.54% (n = 27277825) for the second year (refer to Table 5.4). Most cardiovascular drugs are used on a chronic basis and are not restricted to seasonal changes, thus the prevalence percentages did not vary much during the months under review. However, most cardiovascular drugs were issued during P2, 14.55% (n = 6427511), and P5, 14.39% (n =8113959) (refer to Table 5.5). The Registrar of Medical Schemes stated that hypertension is by far the most common chronic condition. In 2002 there were 72 cases of hypertension for every thousand beneficiaries (Council for Medical Schemes, 2003a: 48).

Antimicrobials represented the third highest prevalence, 11.13% (n = 49098736), during the two-year period. A total of 2356434 (10.80%) antimicrobials were claimed during the first year, while in the second year it increased to 3107642 (11.39%) (refer to Table 5.4 and Figure 5.2).

In the first year most antimicrobials were claimed during P1 (11.82%) and in the second year most antimicrobials were claimed during P4 (11.67%). This could be attributed to the fact that antimicrobials are seasonal drugs and are more often prescribed during the winter months together with respiratory drugs, thus from May to August (refer to Table 5.5). This could be substantiated by the fact that the five therapeutic classes with the highest prevalence during 2002 were (Mediscor, 2003: 14):

- Agents used for the relief of coughs and colds.
- Combination analgesics.
- Beta-lactam antibiotics.
- Non-steroidal anti-inflammatory drugs (NSAID's).
- Topical nasal preparations.

During the two-year period there was an increase in the prevalence of analgesics and drugs used for ear, nose and throat conditions. The prevalence of analgesics during the first year was 8.38% (n = 21820911), and increased to 8.77% (n = 27277825) during the second year. The prevalence of combination analgesics was 6.4% of all medicine items during 2002 (Mediscor, 2003: 9).

Ear, nose and throat drugs increased from 4.87% (n = 21820911) during the first year to 4.99% (n = 27277825) during the second year. The prevalence of the other pharmacological drug groups decreased from the first year to the second year (refer to Table 5.4).

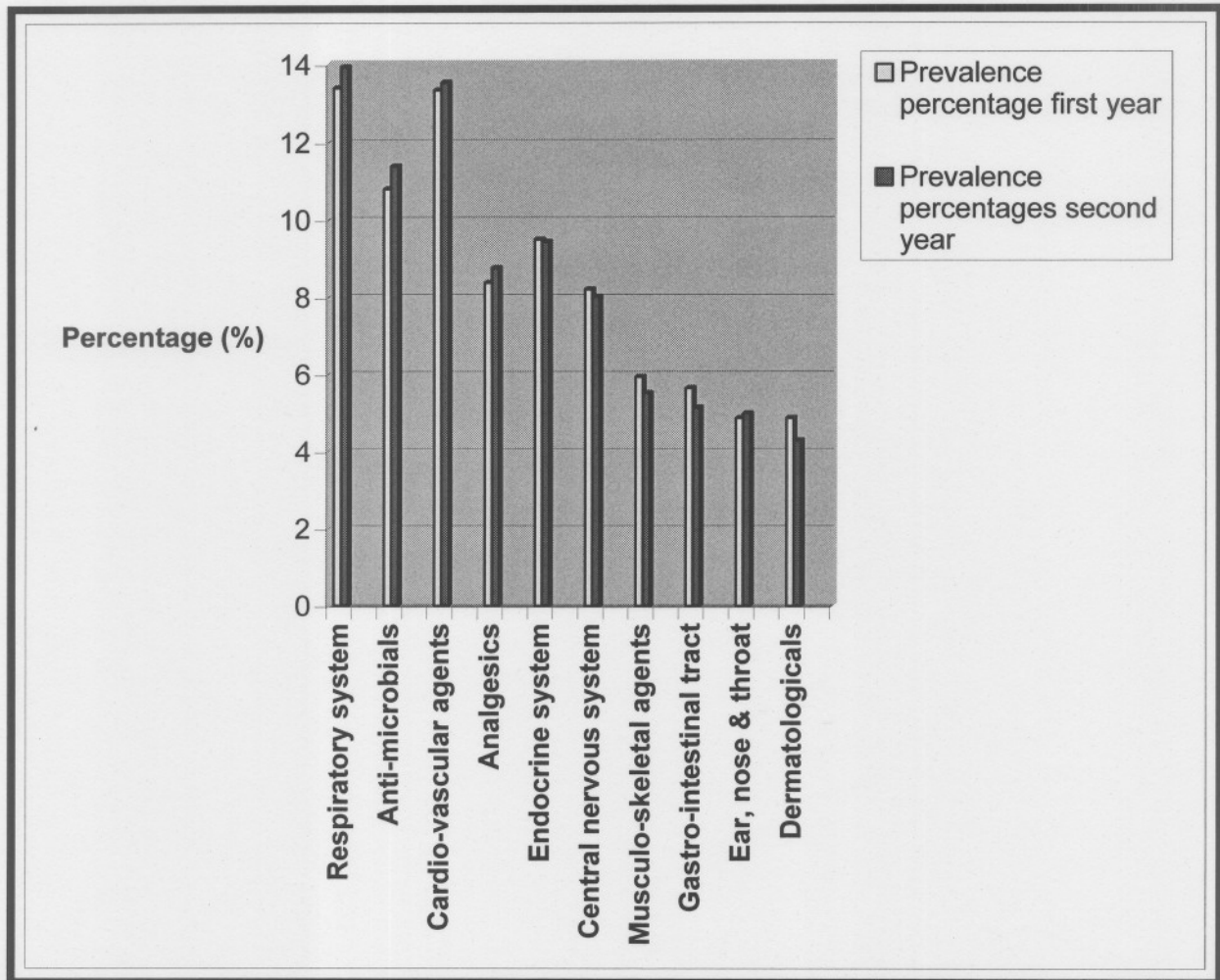


Figure 5.2: Prevalence of the top ten main pharmacological groups. May 2001 to April 2003

□ **Medicine cost**

Respiratory drugs contributed 9.20% of the total cost of all medicine items claimed (n = R3097064602.00) during the first year. In the second year this contribution increased to 9.70% (n = R4053280295.00) (refer to Figure 5.3). The cost-prevalence index calculation revealed that respiratory drugs were relatively inexpensive (cost index < 1) for both years (refer to Table 5.4). During the first period of each year (P1 and P4) the average cost of respiratory drugs was the lowest and increased with time, while the prevalence was the highest during P1 and P4 and decreased during the year that followed (refer to Table 5.5).

Cardiovascular drugs had the highest cost percentage for both years. During the first year a total of R644233349.00 (20.80%) was spent on cardiovascular drugs. In the second year there was a small decrease to 20.71% ($n = R4053280295.00$) in the total amount that was spent on cardiovascular drugs (refer to Figure 5.3). Cardiovascular drugs are relatively expensive when calculating the cost: prevalence ratio (cost index > 1). The average cost of cardiovascular drugs did not vary much over the two-year period. During the first year the average cost ranged between $R216.31 \pm 115.36$ (P1) and $R226.45 \pm 116.83$ (P3), while during the second year it ranged between $R226.14 \pm 115.59$ (P4) and $R229.15 \pm 117.64$ (P6) (refer to Table 5.5).

Antimicrobials contributed 13.56% of the total drug expenditure ($n = R3097064602.00$) during the first year. During the second year this percentage increased to 14.93% ($n = R4053280295.00$) (refer to Figure 5.3). According to Table 5.4 antimicrobials are relatively expensive when calculating the cost-prevalence indices. The cost-prevalence indices for the first and second years were 1.26 and 1.31 respectively. The average cost of antimicrobials ranged between $R168.4 \pm 235.03$ (P1) and $R184.22 \pm 266.05$ (P2) for the first year and for the second year it ranged between $R181.10 \pm 221.83$ (P4) and $R206.83 \pm 486.34$ (P5) (refer to Table 5.5).

The total cost contribution of analgesics and endocrine system drugs increased from the first year to the second year. During the first year analgesics contributed 3.80% to the total cost spending ($n = R3097064602.00$), while in the second year their contribution increased to 3.84% ($n = R4053280295.00$). The total cost of the endocrine system drugs stayed almost the same during the first (10.06%, $n = R3097064602.00$) and second years (10.09%, $n = R4053280295.00$). The cost contribution of the other pharmacological groups decreased from the first year to the second year (refer to Table 5.4).

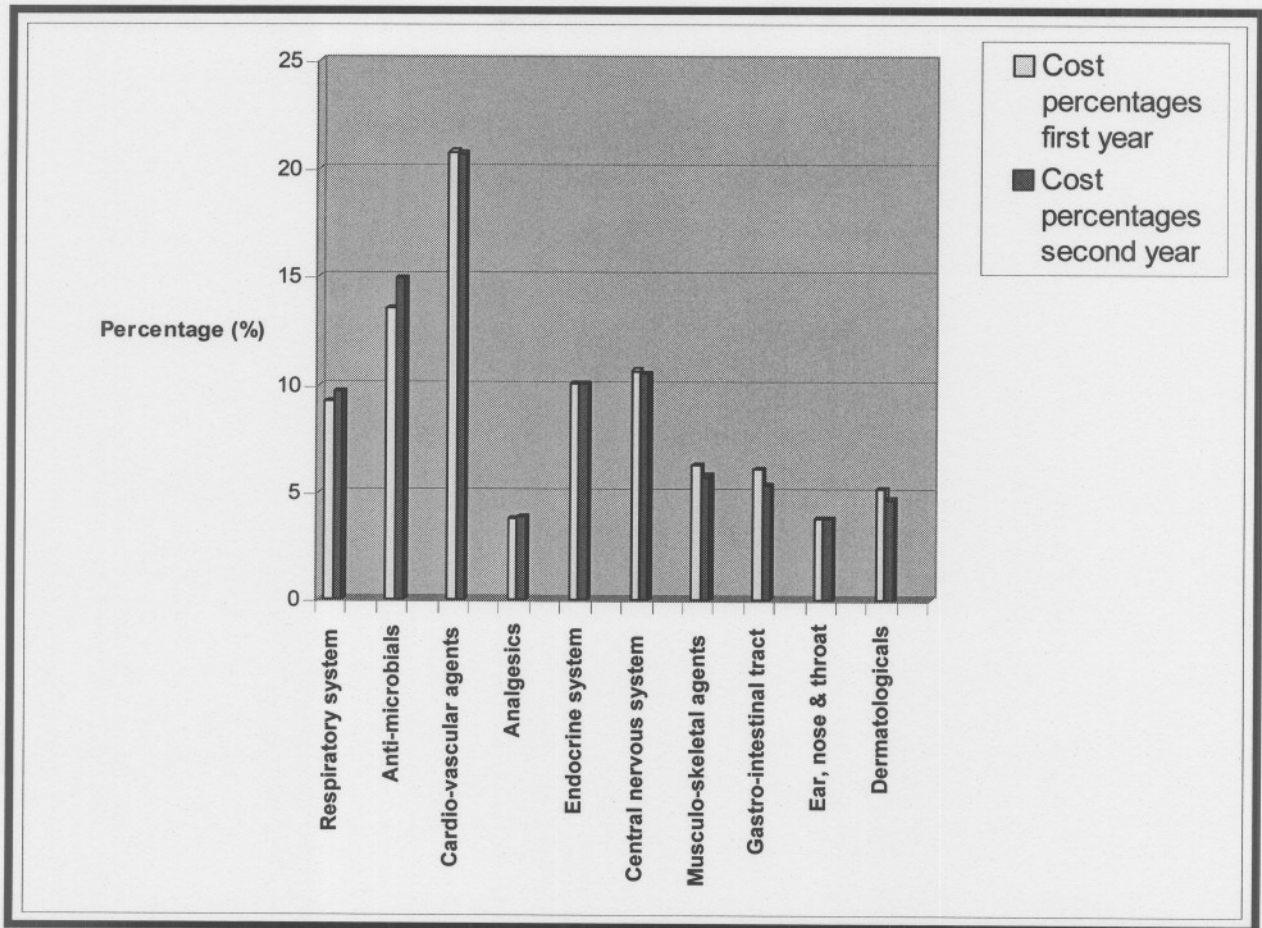


Figure 5.3: Cost percentages of the top ten main pharmacological groups. May 2001 to April 2003

Table 5.4 gives an indication of the cost-prevalence indices of the top ten main pharmacological groups for the first and second years. It was found that seven out of the ten pharmacological groups had a cost-prevalence index higher than one, which gives an indication that these pharmacological groups are relatively expensive. In both years the cost-prevalence indices of antimicrobials were higher than one and the central nervous system drugs were the highest, 1.30 and 1.32 respectively (refer to Table 5.4).

Table 5.4: Cost index of the top ten pharmacological groups.

Main pharmacological group	Total cost (R)	Cost %*	Prevalence	Prevalence % [#]	Cost index [♣]
May 2001 to April 2002					
Respiratory system	284931809.96	9.20	2924859	13.40	0.69
Antimicrobials	419943580.00	13.56	2356434	10.80	1.26
Cardio-vascular agents	644233349.00	20.80	2910041	13.34	1.56
Analgesics	117737360.66	3.80	1827632	8.38	0.45
Endocrine system	311707718.54	10.06	2073379	9.50	1.06
Central nervous system	330015227.72	10.66	1791414	8.21	1.30
Musculo-skeletal agents	194754436.75	6.29	1296304	5.94	1.06
Gastro-intestinal tract	188223350.25	6.08	1231941	5.65	1.08
Ear, nose & throat	117222633.92	3.78	1063736	4.87	0.78
Dermatologicals	159510266.90	5.15	1062319	4.87	1.06
May 2002 to April 2003					
Respiratory system	393265306.00	9.70	3803523	13.94	0.70
Antimicrobials	605339482.00	14.93	3107642	11.39	1.31
Cardio-vascular agents	839421013.00	20.71	3693474	13.54	1.53
Analgesics	155826487.77	3.84	2391001	8.77	0.44
Endocrine system	408907903.00	10.09	2575906	9.44	1.07
Central nervous system	427561749.00	10.55	2186950	8.02	1.32
Musculo-skeletal agents	233935339.76	5.77	1507085	5.52	1.04
Gastro-intestinal tract	217241117.12	5.36	1401294	5.14	1.04
Ear, nose & throat	151895874.92	3.75	1362227	4.99	0.75
Dermatologicals	188698695.55	4.66	1167414	4.28	1.09

* The cost percentage of the specific main pharmacological group is the total cost of the specific main pharmacological group divided by the total cost of all medicine items claimed for the year period multiplied by hundred.

The prevalence percentage of the specific main pharmacological group is the prevalence of the specific main pharmacological group divided by the total number of medicine items claimed for the year period multiplied by hundred.

♣ The cost-prevalence index of the specific main pharmacological groups is the cost percentage divided by the prevalence percentage for the specific main pharmacological group for that particular year.

Table 5.5: Prevalence and cost of the top ten pharmacological groups. May 2001 to April 2003.

Main pharmacological group	May 2001 – Aug. 2001 (P1)				Sep. 2001 – Dec. 2001 (P2)				Jan. 2002 – April 2002 (P3)			
	n	%*	Average cost (R)	Total cost (R)	n	%*	Average cost (R)	Total cost (R)	n	%*	Average cost (R)	Total cost (R)
Respiratory system	1008679	16.71	82.77 ± 117.45	83483450.10	810908	12.62	102.18 ± 118.62	82860660.86	1105272	11.81	107.29 ± 124.16	118587699.00
Antimicrobials	713307	11.82	168.40 ± 235.03	120118583.00	629139	9.79	184.22 ± 266.05	115901857.00	1013988	10.84	181.39 ± 223.44	183923140.00
Cardio-vascular agents	716130	11.86	216.31 ± 115.36	154904474.00	935261	14.55	218.44 ± 113.73	204301758.00	1258650	13.45	226.45 ± 116.83	285027117.00
Analgesics	524549	8.69	59.72 ± 61.56	31328209.34	497404	7.74	60.31 ± 66.57	29996373.98	805679	8.61	70.02 ± 81.23	56412777.34
Endocrine system	527341	8.74	142.25 ± 168.77	75014613.58	648199	10.08	145.29 ± 176.19	94177389.96	897839	9.60	158.73 ± 197.09	142515715.00
Central nervous system	468476	7.76	174.07 ± 180.17	81547907.95	502756	7.82	185.02 ± 188.95	93017903.77	820182	8.77	187.53 ± 201.93	155449416.00
Musculo-skeletal agents	352971	5.85	137.80 ± 121.48	48639359.60	388020	6.04	148.21 ± 129.45	57510119.65	555313	5.93	159.56 ± 138.91	88604957.50
Gastro-intestinal tract	319159	5.29	148.29 ± 156.15	47329129.52	364257	5.67	144.37 ± 150.41	52586563.81	548525	5.86	160.99 ± 170.11	88307656.92
Ear, nose & throat	309557	5.13	101.53 ± 78.70	31430457.99	307640	4.79	111.29 ± 81.72	34238055.07	446539	4.77	115.45 ± 84.61	51554120.86
Dermatologicals	266216	4.41	154.07 ± 233.83	41014839.03	313128	4.87	148.15 ± 224.15	46391110.99	482975	5.16	149.29 ± 212.72	72104316.88

* The prevalence percentage for the main pharmacological group is the prevalence of the main pharmacological group divided by the total number of medicine items claimed for the specific period multiplied by hundred.

Table 5.5 continues

Main pharmacological group	May – Aug. 2002 (P4)				Sep. – Dec. 2002 (P5)				Jan. – April 2003 (P6)			
	<i>n</i>	%*	Average cost (R)	Total cost (R)	<i>n</i>	%*	Average cost (R)	Total cost (R)	<i>n</i>	%*	Average cost (R)	Total cost (R)
Respiratory system	1612420	16.49	93.69 ± 112.53	151071613.00	1004092	12.37	112.65 ± 131.84	113108340.00	1187011	12.64	108.75 ± 132.60	129085353.00
Antimicrobials	1140958	11.67	181.10 ± 221.83	206624524.00	880239	10.85	206.83 ± 486.34	182059712.00	1086445	11.57	199.42 ± 288.80	216655246.00
Cardio-vascular agents	1276088	13.05	226.14 ± 115.59	288571782.00	1167991	14.39	226.50 ± 113.87	264549670.00	1249395	13.31	229.15 ± 117.64	286299561.00
Analgesics	847115	8.67	62.12 ± 75.33	52621833.92	671269	8.27	65.37 ± 77.32	43882182.07	872617	9.30	67.98 ± 82.58	59322471.78
Endocrine system	907555	9.28	156.71 ± 194.53	142219734.00	812201	10.01	156.99 ± 219.41	127505854.00	856150	9.12	162.57 ± 214.27	139182315.00
Central nervous system	758235	7.76	192.44 ± 204.13	145911342.00	637873	7.86	197.45 ± 203.19	125947858.00	790842	8.42	196.88 ± 207.74	155702549.00
Musculo-skeletal agents	521308	5.33	156.27 ± 137.42	81463262.99	451753	5.57	154.80 ± 133.24	69931321.34	534024	5.69	154.56 ± 138.17	82540755.43
Gastro-intestinal tract	448836	4.59	158.75 ± 172.71	71254713.35	418388	5.16	152.95 ± 177.35	63993614.43	534070	5.69	153.52 ± 166.53	81992789.34
Ear, nose & throat	494832	5.06	105.07 ± 79.02	51990432.31	397346	4.90	115.98 ± 84.02	46082887.698	470049	5.01	114.50 ± 84.74	53822554.91
Dermatologicals	397097	4.06	168.33 ± 257.95	66843961.13	395987	4.88	164.62 ± 242.56	65188943.87	374330	3.99	151.38 ± 197.28	56665790.55

* The prevalence percentage for the main pharmacological group is the prevalence of the main pharmacological group divided by the total number of medicine items claimed for the specific period multiplied by hundred.

5.4 SPECIFIC ANALYSIS

The specific analyses were done on the following antimicrobial groups with special emphasis on the beta-lactam group:

- ❑ Beta-lactams (penicillins, cephalosporins, other).
- ❑ Erythromycin and other macrolides.
- ❑ Aminoglycosides.
- ❑ Tetracyclines.
- ❑ Chloramphenicols.
- ❑ Sulphonamides and combinations.
- ❑ Quinolones.

For clarification during the discussions of this study these antimicrobial groups will be termed as antibiotics.

5.4.1 Prevalence and cost of antibiotics

All over the world there is an awareness of the emergence of antibiotic resistance. However, physicians are prescribing more broad-spectrum antibiotics than before. According to Aldridge (2003: 1) there has been an increase in the percentage of adults and children receiving broad-spectrum antibiotics in the United States. In a study done in Sharjah antibiotics constituted 45% of prescriptions (Hasan *et al.*, 1997: 1), while in North Goa it accounted for 14.06% of prescriptions (Hede *et al.*, 1987: 146).

According to Table 5.5 it can be determined that antimicrobials constituted 11.13% of all medicine items claimed ($n = 49098736$) during the two years. The total cost for antimicrobials constituted 14.34% of the total cost ($n = R7150344897.00$) of all medicine items claimed during the two-year study period.

During the first year 2356434 (10.80%) antimicrobial drugs were claimed with a total cost of R419943580.00, which represented 13.56% of the total cost of all medicine items ($n = R3097064602.00$). While during the second year a total of 3107642 (11.39%) antimicrobial drugs were claimed. The total cost for antimicrobial drugs during the second year amounted to R605339482.00 (refer to Table 5.4)

The cost-prevalence index of antimicrobial products claimed during both years was higher than one, giving an indication that antimicrobial therapy is relatively expensive (refer to Table 5.4).

For further discussions of this study there will only be concentrated on the usage and cost of antibiotics, which consisted of the groups mentioned above.

Antibiotics (as previously classified under 5.4) represented 74.90% of all antimicrobial items (n = 5464076) claimed and 8.34% of all medication (n = 49098736) claimed during the two-year period. It was found that antibiotics represented 51.33% of the total cost of antimicrobials (n = R1025283062.00). Thus, antibiotics have a relatively large influence on the total cost of antimicrobials. Antibiotics consumed 7.36% of the total cost of all medication (n = R7150344897.00) on the database.

Table 5.6 summarises the analysis conducted on antibiotics for the study period.

Table 5.6: Analysis of antibiotics on the medicine claims database. May 2001 to April 2003.

<i>Description</i>	<i>Database</i>
May 2001 to April 2002 (Year 1)	
Number of prescriptions	1772674
Number of items prescribed	1812001
Total cost (R)	232312831.04
May 2002 to April 2003 (Year 2)	
Number of prescriptions	2232284
Number of items prescribed	2280494
Total cost (R)	293996448.38

□ **Medicine items**

Of the total number of prescriptions (n = 11060996) issued during the first year 16.03% of the prescriptions contained antibiotics (refer to Table 5.6). During the second year there was a decrease in the percentage of prescriptions that contained antibiotics. Though there were more antibiotic prescriptions issued during the second year, as a percentage of the total number of prescriptions (n = 14347442) claimed, there was a decrease of 0.47% in the number of prescriptions containing antibiotics in comparison with the first year (refer to Table 5.6). This aspect was not further investigated as it was outside the scope of this study.

There was no practical significant variation in the average number of antibiotics per prescription found between the first year and the second year ($d \leq 0.8$). The average number of antibiotic prescriptions for both the first and second years ranged between 1.02 ± 0.14 (P1) and 1.02 ± 0.16 (P6) (refer to Table 5.7).

The total number of antibiotic items prescribed during the first year was 1812001, while in the second year 2280494 items were prescribed. When comparing the first year with the second year, there was a decrease in the number of antibiotic-containing prescriptions issued, however, there was an increase in the number of antibiotic items issued when comparing the first year (8.30%) with the second year (8.36%) (refer to Table 5.7).

Figure 5.3 reveals that antibiotics had the highest prevalence during P1 (9.58%) and P4 (9.08%). Both P1 and P4 are winter periods in South Africa and thus more antibiotics are issued during these months.

□ **Medicine cost**

Rehana *et al.* (1998: 1) stated that antibiotics classify under the most frequently prescribed group of drugs on the market and as a group account for 15% to 30% of the total health budget worldwide. The results here indicated a much lower cost percentage.

The total cost of antibiotics during the first year amounted to R232312831.04, constituting 7.50% of the total cost ($n = R3097064602.00$) of all medicine items on the database; along with the average cost per antibiotic item ranging between $R124.10 \pm 88.06$ (P2) and $R132.04 \pm 98.86$ (P3). In the second year the total cost of antibiotics claimed was R293996448.38 (7.25%), while the average cost per antibiotic item ranged between $R126.13 \pm 102.44$ (P5) and $R130.33 \pm 94.61$ (P4) (refer to Table 5.7). The d-value indicated that there was no practical significant difference between the average costs of antibiotics for the different four-month periods ($d \leq 0.8$).

The average cost per antibiotic prescription ranged between $R126.71 \pm 90.96$ (P2) and $R135.31 \pm 101.95$ (P3) during the first year. The average cost per antibiotic prescription varied between $R128.85 \pm 106.36$ (P5) and $R132.89 \pm 97.09$ (P5) for the second year (refer to Table 5.7). Calculation of the d-value revealed that there was no practical significant difference between the different four-month periods relating to the average cost per antibiotic prescription ($d \leq 0.8$).

Table 5.7: Prevalence and cost of antibiotics. May 2001 to April 2003.

Month	Antibiotic items			Prescription				Total cost (R)
	n	%*	Average cost (R)	n	%#	Average number of antibiotics	Average cost (R)	
May - Aug. 2001 (P1)	578122	9.58	126.52 ± 90.62	566903	19.21	1.02 ± 0.14	129.02 ± 95.43	73142174.13
Sep. - Dec. 2001 (P2)	472499	7.35	124.10 ± 88.06	462760	14.04	1.02 ± 0.15	126.71 ± 90.96	58637492.53
Jan. - April 2002 (P3)	761380	8.14	132.04 ± 98.86	743011	15.43	1.02 ± 0.16	135.31 ± 101.95	100533165.00
May - Aug. 2002 (P4)	888124	9.08	130.33 ± 94.61	871028	17.35	1.02 ± 0.14	132.89 ± 97.09	115747058.00
Sep. - Dec. 2002 (P5)	624742	7.70	126.13 ± 102.44	611542	14.19	1.02 ± 0.15	128.85 ± 106.36	78798517.52
Jan. - Apr. 2003 (P6)	767628	8.18	129.56 ± 98.01	749714	14.96	1.02 ± 0.16	132.65 ± 100.94	99450872.86

* The prevalence percentage of antibiotic items is the prevalence of antibiotic items divided by the total number of medicine items claimed for the specific period multiplied by hundred.

The prevalence percentage of antibiotic prescriptions is the prevalence of antibiotic prescriptions divided by the total number of prescriptions claimed for the specific period multiplied by hundred.

5.4.2 Prevalence and cost of original and generic antibiotics

An analysis of the prevalence, cost and cost-prevalence index values of antibiotics based on the original (innovator) and generic classification of antibiotics will also be discussed in this study. It is important to note that all antibiotic agents that were available on the database at the time of the study are classified as an original or generic product (refer to Appendix G) and will be included in the analysis. The classification of antibiotics, as original products or generic products, is based on the following criteria:

- The dosage indications for both the original and its generic counterparts must be identical, thus instances where generic agents with a slightly different amount of active ingredients but with identical dosage indications as the corresponding original drug may exist.
- Both the original and generic agents must contain the same active ingredient, however different derivatives of the active ingredients are present in certain generic agents but are still classified under the original product.

□ *Medicine items*

During the two-year period 42.32% (n = 4092495) original antibiotic products and 57.68% (n = 4092495) generic antibiotic products were claimed (refer to Table 5.8).

According to Table 5.8 there was a decrease in the percentage of original antibiotic products claimed. During the first year 45.11% (n = 1812001) original antibiotics were claimed, but decreased with 5% in the second year to 40.11% (n = 2280494). The highest percentage of original antibiotics that were claimed was 48.44% (n = 578122) (P1).

Consequently the percentage generic antibiotics claimed increased over the two-year period. During the first year 54.89% (n = 1812001) generic antibiotics were claimed and increased during the second year to 57.68% (n = 2280494) (refer to Table 5.8).

One of the goals of the MPL was to promote generic substitution and from Table 5.8 it could be seen that there was an increase in generic prescribing concerning antibiotics. According to Mediscor (2003: 6) generic substitution and the promotion of the prescribing of generic equivalents are seen as mechanisms to reduce medicine expenditure.

□ *Medicine cost*

Original products contributed 62.32% of the R526309279.42 that was spent on antibiotics during the two-year period, while only 37.68% of the total cost was contributed by generic products. Calculation of the cost to prevalence ratio (1.5) of original products revealed that the medicine therapy is rather expensive when comparing it with the cost prevalence ratio (0.70) of generic products.

The average cost of original products ranged between R175.90 ± 95.10 (P1) and R207.42 ± 101.61 (P6) (refer to Table 5.8). Calculation of the d-value revealed that there was no practical significant difference between the average costs of the original products for each of the six periods ($d \leq 0.8$).

The average cost that was spent on generic antibiotic products ranged between R80.13 ± 54.69 (P1) and R88.82 ± 63.06 (P3) (refer to Table 5.8). Compared to the average cost of original antibiotic products the average cost of generic antibiotic products was much cheaper. Further analysis revealed that there was a practical significant difference found between the average costs of original antibiotic products and generic antibiotic products ($d > 0.8$).

Table 5.8: Prevalence and cost of original and generic antibiotics. May 2001 to April 2003.

Month	Original products				Generic products			
	n	%*	Average cost (R)	Total cost (R)	n	%#	Average cost (R)	Total cost (R)
May - Aug. 2001 (P1)	280015	48.44	175.90 ± 95.10	49253885.41	298107	51.56	80.13 ± 54.69	23888288.72
Sep. - Dec. 2001 (P2)	209325	44.30	176.50 ± 91.42	36944939.84	263174	49.98	82.43 ± 57.92	21692552.69
Jan. - April 2002 (P3)	327993	43.08	189.16 ± 108.17	62041757.70	433387	56.92	88.82 ± 63.06	38491407.18
May - Aug. 2002 (P4)	386097	43.47	190.71 ± 96.80	73633423.60	502027	56.53	83.89 ± 60.56	42113634.17
Sep. - Dec. 2002 (P5)	241152	38.60	192.88 ± 119.58	46513365.16	383590	61.40	84.17 ± 59.48	32285152.09
Jan. - April 2003 (P6)	287373	37.44	207.42 ± 101.61	59606616.78	480255	62.56	82.96 ± 58.11	39844256.08

* The prevalence percentage of original products is the prevalence of original products divided by the total number of antibiotic items claimed for the specific period multiplied by hundred.

The prevalence percentage of generic products is the prevalence of generic products divided by the total number of antibiotic items claimed for the specific period multiplied by hundred.

5.4.3 Prevalence and cost of different antibiotic pharmacological groups

□ *Medicine items*

Beta-lactams accounted for 56.99% of all the antibiotic items (n = 4092495) claimed during the two-year period. The prevalence of beta-lactams increased from the first year (56.78%) to the second year (57.16%) (refer to Table 5.9). As previously mentioned, most antibiotics were claimed during P1 and P4. The same were found to be true of beta-lactam antibiotics. The prevalence percentages of beta-lactams during P1 and P4 were 59.09% and 59.75% respectively (refer to Table 5.10)

Over the two-year period a total of 507908 (12.41%, n = 4092495) macrolides were claimed. The prevalence for the first year was 12.94% (n = 1812001), while it decreased in the second year to 11.99% (n = 2280494). As with the beta-lactams, most macrolides were issued during P1 (n = 84555) and P4 (n = 13.17) (refer to Table 5.10).

The antibiotic pharmacological group that had the third highest prevalence was the quinolones. The quinolones accounted for 12.40% of all antibiotics (n = 4092495) prescribed during the two years. The prevalence of the quinolones increased from the first year to the second year, being

12.17% (n = 1812001) and 12.59% (n = 2280494) respectively. Though the most antibiotics were prescribed during P1 and P4, the prevalence of the quinolones was the highest during P3 (n = 106264) and P6 (n = 108730) (refer to Table 5.10).

The prevalence of the aminoglycosides was overall the lowest. During the first year it accounted for 0.02% of all antibiotics (n = 1812001), with the highest prevalence during P3 (n = 173). The prevalence decreased during the second year to 0.01% (n = 321). The highest prevalence during the second year was found to be during P6 (n = 116) (refer to Table 5.10).

The prevalence of tetracyclines for the first and second years was 9.09% (n = 1812001) and 8.06% (n = 2280494) respectively. There was an increase in the prevalence of chloramphenicol and sulphonamides during the two-year period. A total of 1667 chloramphenicol products and 122543 sulphonamides was prescribed during the first year, while it increased to 2661 and 180865 in the second year respectively.

□ **Medicine cost**

A total cost of R276356577.56 (52.51%) was spent on beta-lactams during the two-year period. The beta-lactam group accounted for 51.32% of the total costs of all antibiotics (n = R232312831.66) claimed on the database during the first year of the study. During the second year of the study this percentage increased to 53.54% (n = R293996448.38), though the prevalence only increased with 0.38%. The cost index-value specifies that the prevalence: cost ratio was relatively low (CPI < 1) during the first year, while in the second year there was a drop in the cost index-value (CPI < 1) (refer to Table 5.9 and Figure 5.4).

The average cost of beta-lactam products ranged between R112.88 ± 69.95 (P2) and R200.25 ± 260.65 (P3) during the first year. In the second year there was a decrease in the average cost of beta-lactam products, ranging between R118.01 ± 75.67 (P5) and R122.19 ± 81.42 (P6) (refer to Table 5.10). Calculation of the d-value revealed that there was no practical significant difference (d < 0.8) between the average cost of beta-lactam products for the first and second years.

Table 5.9 revealed that the macrolides contributed 16.08% to the total cost of all antibiotics (n = R526309280.04). Though the prevalence of the macrolides was higher than that of the quinolones, the costs of the quinolones were relatively higher than that of the macrolides. There was an increase in the cost that was spent on the macrolides from the first year to the second year. During the first year the total cost of macrolides amounted to 15.90% of the total cost of all antibiotics (n = R232312831.66), while in the second year the cost amounted to 16.22% of the total cost of all antibiotics (n = R232312831.66) on the database.

The average cost of the macrolides was more expensive than that of the beta-lactams, though after calculation of the d-value it indicated that there was no practical significant difference between the average cost of beta-lactams and macrolides ($d < 0.8$). The average cost that was spent on macrolides during the first year was between R154.27 \pm 98.95 (P2) and R159.49 \pm 116.96 (P3). In the second year there was an increase in the average cost of macrolides, ranging between R156.44 \pm 110.80 (P4) and R191.70 \pm 124.65 (P6) (refer to Table 5.10). In the first year the cost-prevalence index was 1.23 and in the second year it was 1.35. The cost index-value gives an indication that the cost of macrolides is relatively expensive (cost index $>$ 1) when taking the prevalence into account (refer to Figure 5.4).

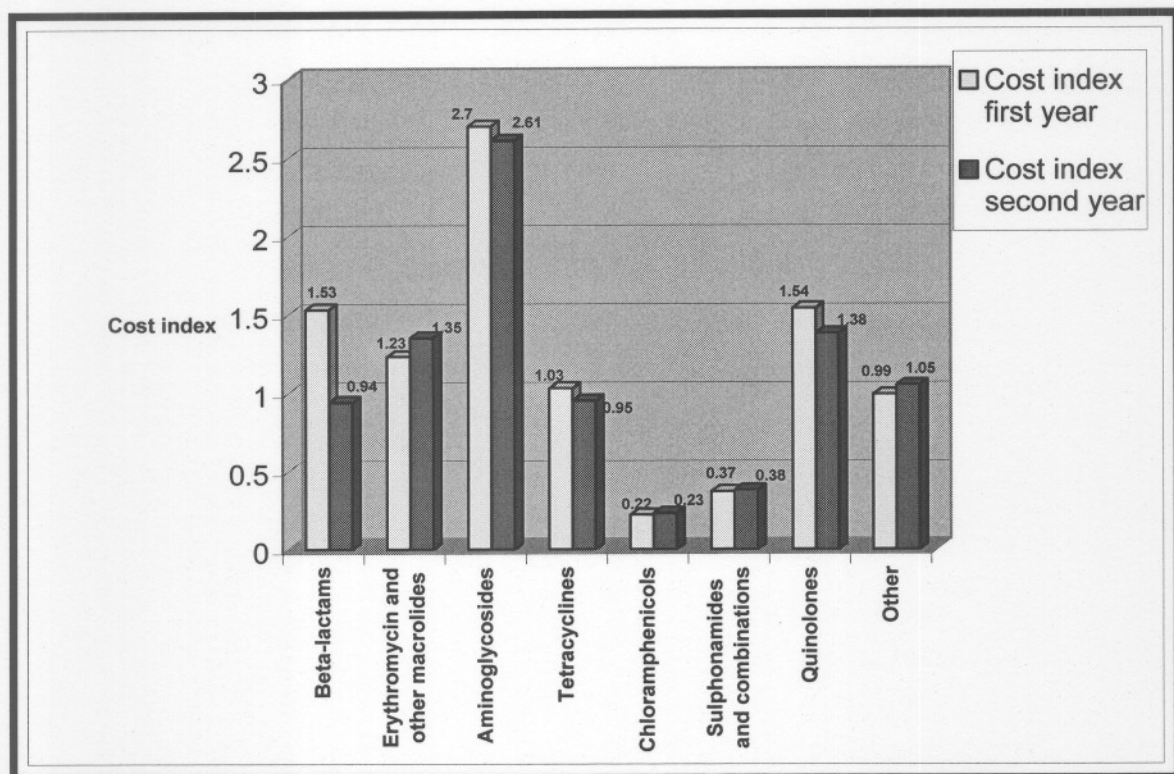


Figure 5.4: Cost-prevalence index values of the antibiotic pharmacological groups. May 2001 to April 2003.

The quinolones are relatively expensive when comparing the cost-prevalence indices with other antibiotic pharmacological groups. The cost-prevalence index for quinolones during the first year was 1.54, while in the second year it decreased to 1.38 (refer to Table 5.9). Quinolones contributed 17.97% of the total cost of all antibiotics ($n = R526309280.04$). The cost of quinolones on the database decreased from 18.76% during the first year ($n = R232312831.66$) to 17.34% during the second year ($n = R293996448.38$).

The average cost of quinolones was higher during the first year than during the second year. The average cost ranged between R194.34 \pm 120.58 (P2) and R205.37 \pm 126.38 (P1) for the first year and between R161.08 \pm 113.50 (P6) and R195.68 \pm 116.06 (P4) for the second year (refer to Table 5.10). No practical significant differences were found between the average costs of the first and second years concerning quinolones ($d \leq 0.8$).

Aminoglycosides had a relatively high cost-prevalence index during the first (2.70) and second (2.61) years. The cost-prevalence index revealed that the prevalence: cost ratio was more than one, which gives an indication that aminoglycosides are relatively expensive (refer to Figure 5.4).

The cost index-values of the antibiotic pharmacological groups are shown in Table 5.9.

Table 5.9: Cost and prevalence of the different antibiotic pharmacological groups.

Pharmacological group	Total cost (R)	Cost %*	Prevalence	Prevalence % [#]	Cost index [♣]
May 2001 to April 2002					
Beta-lactams	119213799.18	51.32	1028817	56.78	0.90
Erythromycin and other macrolides	36948095.27	15.90	234386	12.94	1.23
Aminoglycosides	130492.03	0.06	377	0.02	2.70
Tetracyclines	21700213.82	9.34	164655	9.09	1.03
Chloramphenicols	46522.80	0.02	1667	0.09	0.22
Sulphonamides and combinations	5741596.57	2.47	122543	6.76	0.37
Quinolones	43589837.29	18.76	220482	12.17	1.54
Other	4942274.58	2.13	39074	2.16	0.99
May 2002 to April 2003					
Beta-lactams	157142778.38	53.45	1303464	57.16	0.94
Erythromycin and other macrolides	47688263.30	16.22	273522	11.99	1.35
Aminoglycosides	107817.61	0.04	321	0.01	2.61
Tetracyclines	22499542.18	7.65	183775	8.06	0.95
Chloramphenicols	78455.11	0.03	2661	0.12	0.23
Sulphonamides and combinations	8888907.16	3.02	180865	7.93	0.38
Quinolones	50986840.62	17.34	287094	12.59	1.38
Other	6603843.79	2.25	48792	2.14	1.05

* The cost percentage of the pharmacological group is the total cost of the pharmacological group divided by the total cost of all antibiotic items claimed for the year period multiplied by hundred.

The prevalence percentage of the pharmacological group is the prevalence of pharmacological group divided by the total number of antibiotic items claimed for the year period multiplied by hundred.

♣ The cost-prevalence index of pharmacological group is the cost percentage divided by the prevalence percentage of pharmacological group for that particular year.

Table 5.10: Prevalence and cost of antibiotic pharmacological groups. May 2001 to April 2003.

Pharmacological group	May - Aug. 2001 (P1)				Sep. - Dec. 2001 (P2)				Jan. - April 2002 (P3)			
	n	%*	Average cost (R)	Total cost (R)	n	%*	Average cost (R)	Total cost (R)	n	%*	Average cost (R)	Total cost (R)
Beta-lactams	341598	59.09	113.03 ± 70.67	38610263.61	270615	57.27	112.88 ± 69.95	30547004.00	416604	54.72	120.15 ± 78.20	50556531.57
Erythromycin and other macrolides	84555	14.63	157.83 ± 84.52	13345488.31	56362	11.92	154.27 ± 98.95	8695193.99	93469	12.28	159.49 ± 116.96	14907412.97
Aminoglycosides	127	0.01	407.10 ± 428.21	51701.15	77	0.02	358.33 ± 562.45	27591.33	173	0.02	295.95 ± 324.24	51199.55
Tetracyclines	47624	8.24	126.46 ± 83.79	6022388.84	44389	9.39	133.80 ± 83.11	5939257.09	72642	9.54	134.06 ± 88.92	9738567.89
Chloramphenicols	503	0.09	27.27 ± 21.50	13715.16	429	0.09	28.55 ± 23.17	12246.50	735	0.10	27.97 ± 16.34	20561.14
Sulphonamides and combinations	33599	5.81	45.61 ± 59.95	1532406.95	36184	7.66	46.89 ± 37.18	1696501.86	52760	6.93	47.62 ± 37.68	2512687.76
Quinolones	59982	10.38	205.37 ± 126.38	12318791.77	54236	11.48	194.34 ± 120.58	10540019.74	106264	13.96	195.09 ± 129.45	20731025.78
Other	10134	1.75	123.09 ± 156.58	1247418.34	10207	2.16	115.57 ± 60.15	1179678.02	18733	2.46	134.26 ± 109.55	2515178.22

* The prevalence percentage of the pharmacological group is the prevalence of the pharmacological group divided by the total number of antibiotic items claimed for the specific period multiplied by hundred.

Table 5.10 continues.

Pharmacological group	May - Aug. 2002 (P4)				Sep. - Dec. 2002 (P5)				Jan. - April 2003 (P6)			
	<i>n</i>	%*	Average cost (R)	Total cost (R)	<i>n</i>	%*	Average cost (R)	Total cost (R)	<i>n</i>	%*	Average cost (R)	Total cost (R)
Beta-lactams	530632	59.75	120.94 ± 76.05	64173841.29	349440	55.93	118.01 ± 75.67	41236456.35	423392	55.16	122.19 ± 81.42	51732480.74
Erythromycin and other macrolides	116984	13.17	165.44 ± 110.80	19353714.88	70808	11.33	168.07 ± 114.39	11900428.93	85730	11.17	191.70 ± 124.65	16434119.49
Aminoglycosides	123	0.01	328.16 ± 404.01	40363.34	82	0.01	269.18 ± 264.57	22072.39	116	0.02	391.22 ± 464.25	45381.88
Tetracyclines	65515	7.38	119.95 ± 92.23	7858666.36	53794	8.61	125.42 ± 93.15	6746966.96	64466	8.40	122.45 ± 96.94	7893908.86
Chloramphenicols	832	0.09	29.45 ± 32.05	24499.46	922	0.15	28.78 ± 18.98	26536.77	907	0.11	30.23 ± 23.57	27418.88
Sulphonamides and combinations	57923	6.52	44.81 ± 34.01	2595804.66	56744	9.08	51.14 ± 33.73	2901950.59	66198	8.62	51.23 ± 34.58	3391151.91
Quinolones	99632	11.22	195.68 ± 116.06	19496417.82	78732	12.60	177.51 ± 111.08	13976025.38	108730	14.16	161.08 ± 113.50	17514397.42
Other	16483	1.86	133.70 ± 155.15	2203749.96	14220	2.28	139.81 ± 317.29	1988080.15	18089	2.36	133.34 ± 114.02	2412013.68

* The prevalence percentage of the pharmacological group is the prevalence of the pharmacological group divided by the total number of antibiotic items claimed for the specific period multiplied by hundred.

5.5 ANALYSIS OF BETA-LACTAM ANTIBIOTICS

In 2002 beta-lactam antibiotics ranked as the number seven therapeutic class based on the percentage contribution (3.80%) to the total medicine expenditure and was one of the top five therapeutic classes with the highest prevalence of use (Mediscor, 2003: 9-14).

With reference to Table 5.10 it can be determined that beta-lactams accounted for more than 50% of all antibiotics issued on this database over the two-year period. Also, the beta-lactams consumed more than 50% of the total cost of all antibiotics during the same period.

5.5.1 Prevalence and cost of beta-lactam antibiotics

The beta-lactam pharmacological group, consisting out of penicillins and cephalosporins, will be discussed further on in detail regarding costs, prevalence and the influence of the MPL (Medscheme® Price List) on the prevalence and cost of the pharmacological group as such. Refer to Appendix J for a complete classification of the beta-lactam group.

□ *Medicine items*

A total of 2317586 beta-lactam antibiotic prescriptions, containing between 1.01 ± 0.07 and 1.07 ± 0.08 antibiotics per prescription, were issued during the two-year period. A total of 2332281 beta-lactam products were claimed. Beta-lactam antibiotics contributed 56.99% to the total number of antibiotic items ($n = 4092495$) claimed during the two-year period (refer to Table 5.11).

According to Table 5.11 1028817 (59.09%) beta-lactam items were issued during the first year. The prevalence of beta-lactam antibiotics was the highest during P1 and decreased as time progressed, reaching a total of 416604 (54.72%) (refer to Figure 5.5). Also, the number of prescriptions claimed decreased from P1 (59.89%) to P3 (55.74%) (refer to Table 5.11).

At the start of the second year the prevalence of beta-lactam items increased to 59.75% of the total number of antibiotics ($n = 578122$) issued. However, as with the previous year the prevalence of beta-lactam items decreased to 55.16% of the total number of antibiotics ($n = 767628$) issued (refer to Figure 5.5 and Table 5.11). A total of 527273 prescriptions containing beta-lactam items were claimed during P4 and decreased to 420547 during P6 (refer to Table 5.11).

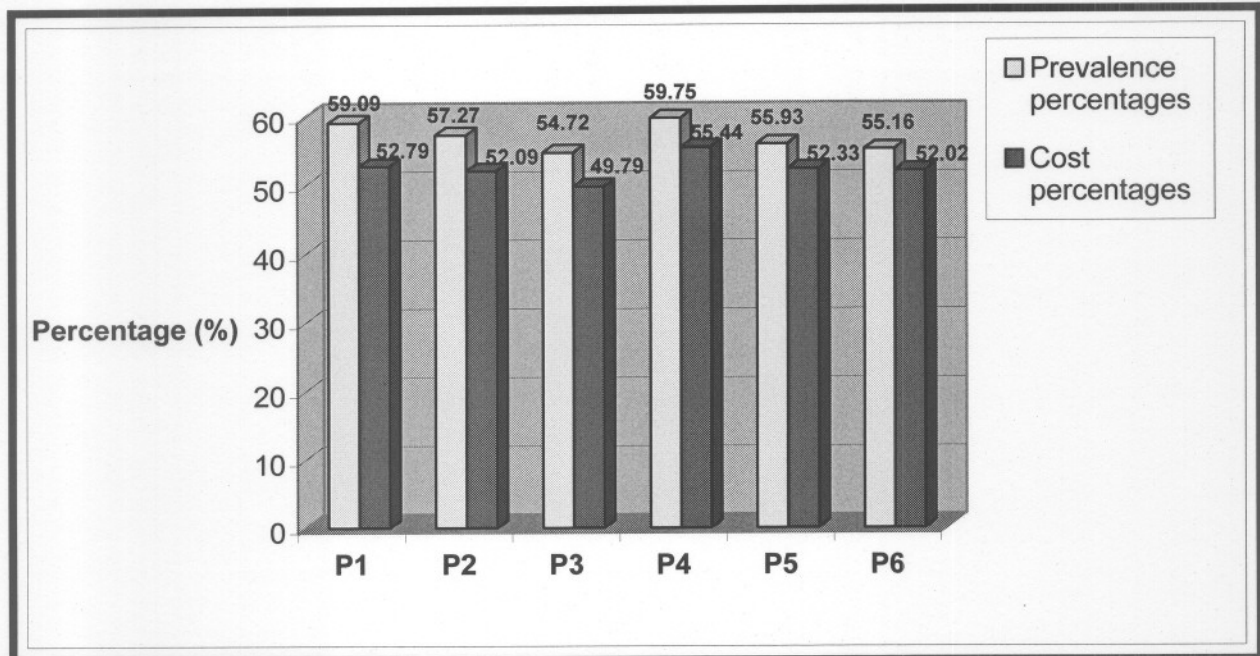


Figure 5.5: Prevalence and cost percentages of beta-lactam antibiotics. May 2001 to April 2003.

□ *Medicine cost*

During the two-year period the total amount that was spent on beta-lactam antibiotics was R276356577.56. The total cost of beta-lactam antibiotics constituted 3.86% of the total cost of all medicine items ($n = R7150344897.00$), which correlates with the results of Mediscor of 3.80% (Mediscor 2003: 9), and 52.51% of all antibiotics ($n = R526609279.92$) (refer to Table 5.11).

It was determined that for the two year period, the first year contributed 43.14% of the total expenditure on beta-lactam antibiotics ($n = R276356577.56$) and the second year contributed 56.86% of the total expenditure on beta-lactam antibiotics (refer to Table 5.11).

The total cost of beta-lactam antibiotics in the first year was R119213799.18 and contributed 51.32% of the total cost of all antibiotics ($n = R232312831.54$) claimed. The average cost per beta-lactam item ranged between $R113.03 \pm 70.67$ (P1) and $R120.15 \pm 78.21$ (P3) (refer to Table 5.11). Calculation of the d-value indicated that there was no practical significant difference found between the average costs of beta-lactam antibiotics for the different periods ($d < 0.8$).

Beta-lactam antibiotics accounted for 53.45% of the total cost of all antibiotics ($n = R293996448.38$) during the second year. There was, however, an increase in the cost contribution of the beta-lactam antibiotics to the total expenditure on antibiotics. The average cost ranged between $R118.01 \pm 75.67$ (P5) and $R122.18 \pm 81.42$ (P6) (refer to Table 5.11).

According to the Mediscor® survey the average cost of a beta-lactam product is R115.58, while the average expenditure per beneficiary is R75.85 and per utilising beneficiary R210.25 (Mediscor, 2003: 9).

In this study conducted the average cost per prescription ranged between $R113.72 \pm 70.96$ (P1) and $R123.01 \pm 81.82$ (P6), with no practical significant difference ($d < 0.8$) (refer to Table 5.11).

According to Figure 5.5 there were no big differences between the prevalence percentage and cost percentage of beta-lactam antibiotics during the two-year period. Figure 5.6, though, indicated that there was an increase in the cost-prevalence index over the two-year period. The cost-prevalence indices increased from 0.89 (P1) to 0.94 (P6). In both years, during the last two periods (P2 and P3, P5 and P6) the cost-prevalence index remained the same, 0.91 and 0.94 respectively. According to the cost-prevalence index the beta-lactam therapy was relatively inexpensive (<1.5).

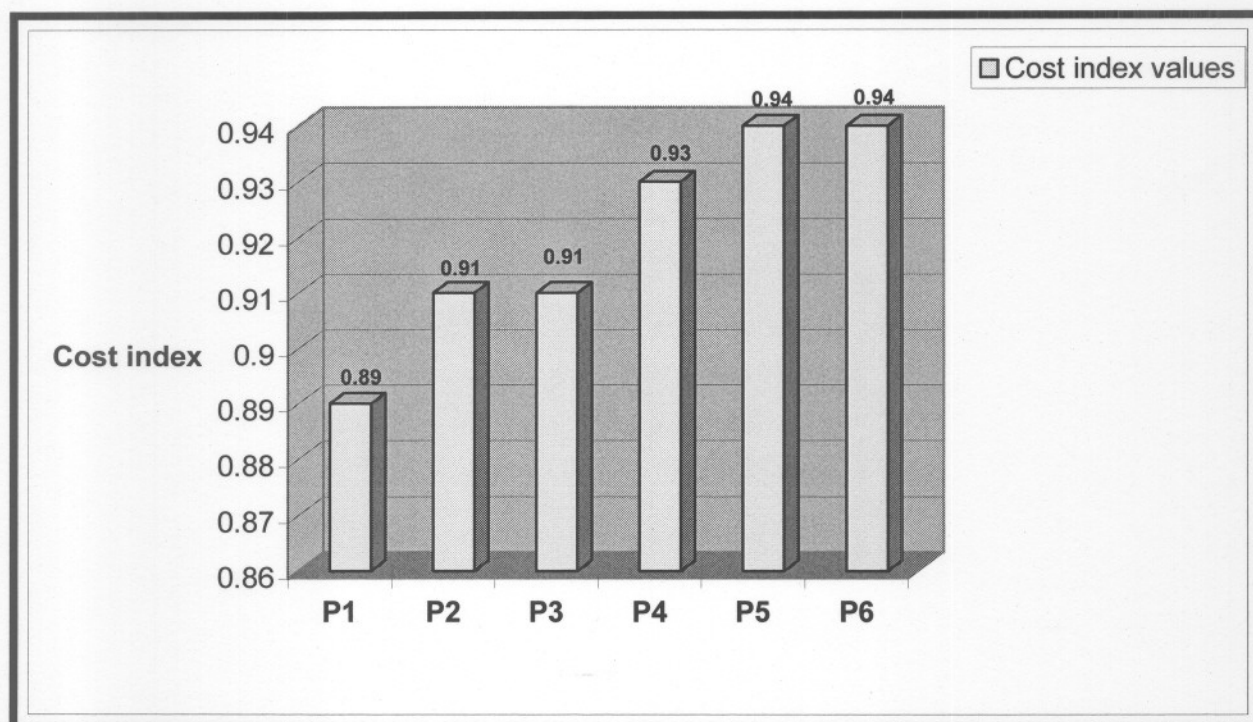


Figure 5.6: Cost index-values of beta-lactam antibiotics. May 2001 to April 2003.

Table 5.11: Prevalence and cost of beta-lactam antibiotics. May 2001 to April 2003.

Month	Beta-lactam items			Prescription				Total cost (R)
	N	%*	Average cost (R)	n	%#	Average number of antibiotics	Average cost (R)	
May - Aug. 2001 (P1)	341598	59.09	113.03 ± 70.67	339510	59.89	1.01 ± 0.08	113.72 ± 70.96	38610263.61
Sep. - Dec. 2001 (P2)	270615	57.27	112.88 ± 69.95	269150	58.16	1.01 ± 0.07	113.49 ± 70.18	30547004.00
Jan. - Apr. 2002 (P3)	416604	54.72	120.15 ± 78.21	414140	55.74	1.01 ± 0.08	120.87 ± 78.52	50056531.57
May - Aug. 2002 (P4)	530632	59.75	120.94 ± 76.05	527273	60.53	1.01 ± 0.08	121.71 ± 76.21	64173841.29
Sep. - Dec. 2002 (P5)	349440	55.93	118.01 ± 75.67	346966	56.74	1.07 ± 0.08	118.85 ± 75.96	41236456.35
Jan. - Apr. 2003 (P6)	423392	55.16	122.18 ± 81.42	420547	56.09	1.01 ± 0.08	123.01 ± 81.82	51732480.74

* The prevalence percentage of beta-lactam items is the prevalence of the beta-lactam items divided by the total number of antibiotic items claimed for the specific period multiplied by hundred.

The prevalence percentage of beta-lactam prescriptions is the prevalence of beta-lactam prescriptions divided by the total number of antibiotic prescriptions claimed for the specific period multiplied by hundred.

5.5.2 Prevalence of top ten individual beta-lactam products

An in depth discussion on the prevalence and costs of the individual beta-lactam products, as well as the influence of the Medscheme® Price List (MPL) will follow in paragraph 5.6.

During the two-year period none of the antibiotics was listed as one of the top ten selling products according to the general analysis medicine items on the central medicine claims database (refer to Table 3B and 4B, Appendix B).

5.5.2.1 Penicillins

Figure 5.7 indicates that Augmaxil® 375mg tablets represented the largest proportion of the beta-lactam pharmacological group utilised during the first year, amounting to 8.68% (n =

1028817). During the first (P1), second (P2) and third (P3) period of the first year it had the highest prevalence of all beta-lactam products (refer to Table 5.12).

However, during the second year the prevalence of Augmaxil® 375mg tablets decreased drastically to 5.18% (n = 1303464). In the second year its prevalence was the fourth highest of all beta-lactam products (refer to Figure 5.7). Generic prescribing increased as a result of the implementation of the MPL. Though Augmaxil® is a generic product, there was an increase in the usage of other generic products (e.g. Ranclav® and Rolab-Amoclav®). In effect there were almost no differences in the prevalence of the amoxicillin/clavulanic acid combination between the first year and the second year. The prevalence of Augmaxil®, however, was very high during the first year, contributing the highest percentage to the prevalence of the amoxicillin/clavulanic acid combination and during the second year it was contributed by other generic products.

The increase in the usage of Ranclav® 375mg tablets and Clavumox® 375mg tablets could be attributed to a lower average cost per medicine item. Tables 4G, 5G and 6G (Appendix G) indicated that the average cost of Ranclav® 375mg tablets and Clavumox® 375mg tablets were the lowest of all amoxicillin/clavulanic acid antibiotics during P5 and P6. This could be the reason behind the increase in the prevalence of both these products during the second year (refer to Table 5.12). This also gives a reason behind the redistribution of the prevalence of generic products of the amoxicillin/clavulanic acid combination antibiotics.

5.5.2.2 Cephalosporins

According to Mediscor (2003; 19), Zinnat® 250mg tablets ranked as the twenty-fourth highest product contributing 0.4% of the total expenditure and 0.3% of the total number of items claimed during 2002.

The prevalence of Zinnat® 250mg tablets increased from the first year (7.03%, n = 1028817) to the second year (8.03%, n = 1303464) (refer to Figure 5.7). During the first year it was the second highest selling beta-lactam product on the database, while in the second year it was the highest. In both years the prevalence was the highest during the May to August period (P1 and P4), reaching a prevalence of 7.51% (n = 341598) and 9.17% (n = 530632) respectively (refer to Table 5.12).

The high prevalence of Zinnat® 250mg tablets could be attributed to the fact that no generic products were available on the market at the time of the investigation. Further reasons for the high prevalence could be due to the once daily dosage and the existence of antimicrobial resistance with regard to other antibiotics.

There was also an increase in the prevalence of Orelox® Junior suspension over the two-year period. During the first year it was the third highest selling beta-lactam product, with a prevalence of 6.15% (n = 1028817). During the second year though, it ranked as the second highest selling beta-lactam product, with a prevalence of 6.58% (n = 1303464) (refer to Table 5.12). As with Zinnat®, no direct generic substitution was possible with Orelox®.

From Table 5.12 and Figure 5.7 it was revealed that the prevalence of cephalosporins increased during the second year, while there was a decrease in the prevalence of penicillins. The top three selling products of all antibiotics during the second year were cephalosporins antibiotics.

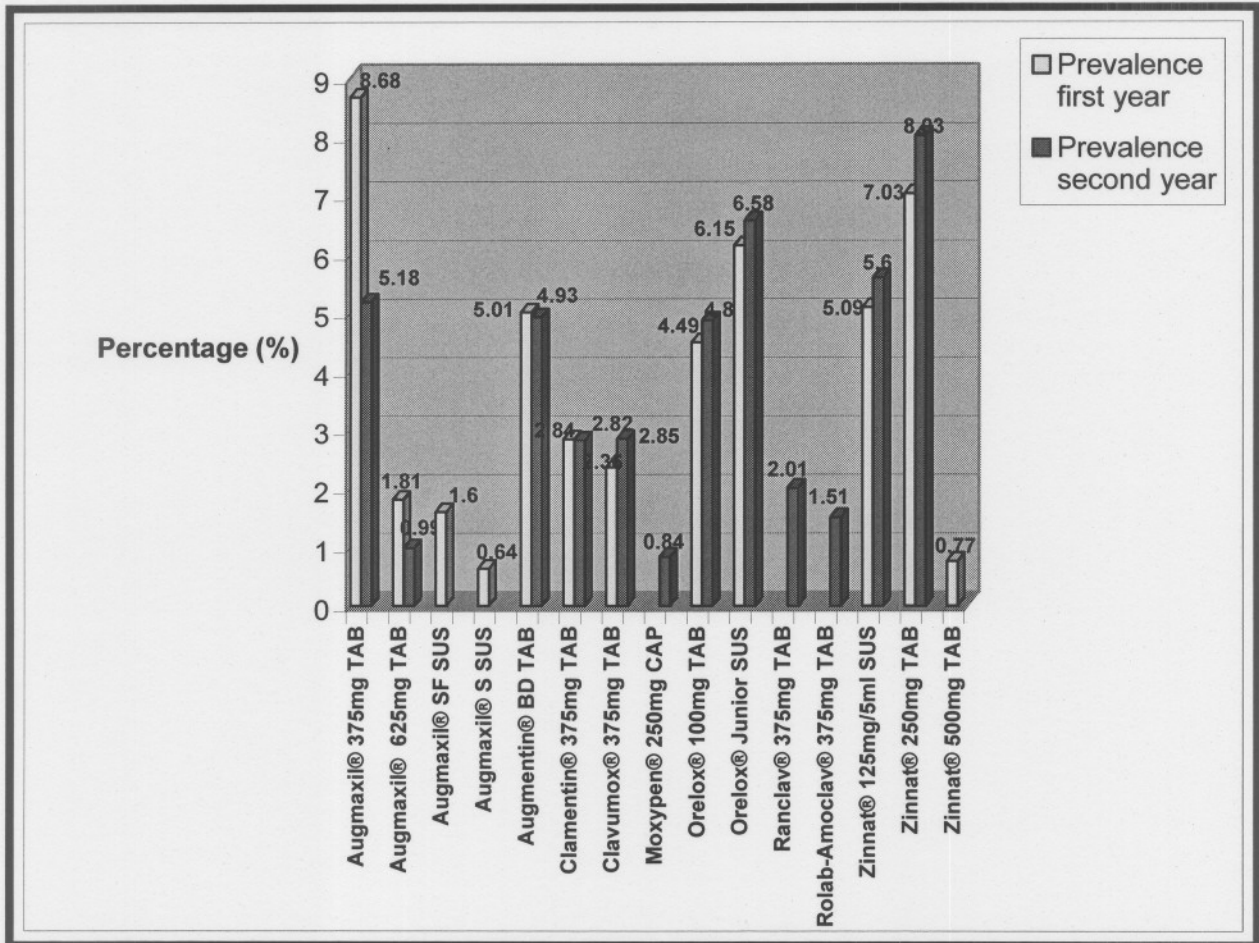


Figure 5.7: Prevalence of top ten beta-lactam products. May 2001 to April 2003.

Table 5.12: Prevalence of the top ten beta-lactam products for each period. May 2001 to April 2003.

Individual antibiotic products	May - Aug. 2001		Sep.- Dec. 2001		Jan. April 2002		May - Aug. 2002		Sep. - Dec. 2002		Jan. - April 2003	
	n	%*	n	%*	n	%*	n	%*	n	%*	n	%*
Augmaxil® 375mg TAB	30082	8.81	23676	8.75	35561	8.54	39660	7.47	16252	4.65	11637	2.75
Augmaxil® 625mg TAB	7848	2.30			10766	2.58	12850	2.42				
Augmaxil® S SUS			6620	2.45								
Augmaxil® SF SUS			7315	2.70	9186	2.20						
Augmentin® BD TAB	16170	4.73	13798	5.10	21610	5.19	24011	4.52	17564	5.03	22654	5.35
Clamentin® 375mg TAB	10233	3.00	7005	2.59	11995	2.88	14051	2.65	10828	3.10	11943	2.82
Clavumox® 375mg TAB	8496	2.49	6445	2.38	9334	2.24	12404	2.34	9646	2.76	15101	3.57
Moxypen® 250mg CAP							10987	2.07				
Orelox® 100mg TAB	16433	4.81	11359	4.20	18393	4.41	30186	5.69	15142	4.33	18169	4.29
Orelox® Junior SUS	20730	6.07	17042	6.30	25490	6.12	35970	6.78	22826	6.53	26910	6.36
Ranclav® 375mg TAB									10727	3.07	15435	3.65
Rolab-Amoclav® 375mg TAB									8711	2.49	10907	2.58
Zinnat® 125mg/5ml SUS	16908	4.95	14974	5.53	20517	4.92	30661	5.78	19389	5.55	22882	5.40
Zinnat® 250mg TAB	25643	7.51	17297	6.39	29437	7.07	48639	9.17	25771	7.37	30303	7.16
Zinnat® 500mg TAB	7919	2.32										

* The prevalence percentage of individual antibiotic products is the prevalence of the individual antibiotic product divided by the total number of antibiotics claimed for the specific period multiplied by hundred.

5.6 THE MEDSCHEME® PRICE LIST (MPL)

The Medscheme® Price List (MPL) is a reference pricing system whereby a ceiling price has been allocated to a group of drugs, which are similar in terms of composition, clinical efficacy, safety and quality. Medscheme® only reimburses up to the ceiling price for the specific group of drugs, irrespective of which drug has been prescribed. At least one medicine in each group will be reimbursed fully, and no co-payment from the patient should be required other than that which is determined by scheme rules. If the drug in question is more expensive (including VAT) than the MPL Reference Price for that generic group of drugs, then the patient will be required to pay the difference directly to the provider of the medicine (Medprax, 2001: 1).

The reference price has been set for a specific pack size (quantity) and it will apply pro rata to any other number of units supplied. The reference price for all pack sizes other than the MPL reference pack will be a direct conversion from the MPL reference pack and reference price to the dispensed pack size (i.e. if the reference price for a 30 pack is R100.00, then the reference price for a 100 pack will be $R100/30 \times 100 = R333.34$).

In the following section some possible aspects of the effect(s) of the Medscheme® Price List (MPL) on the prevalence and cost of the beta-lactam antibiotics will be discussed. As mentioned before the beta-lactam antibiotics represented 56.99% of all antibiotics claimed ($n = 4092495$) and contributed 52.51% to the total antibiotic expenditure ($n = R526309280.04$) for the two-year period (refer to paragraph 5.5.4).

The beta-lactam antibiotics are divided into three sub-groups (penicillins, cephalosporins and other beta-lactams) with their individual original and generic products. The discussion will be done according to the active ingredient classification referred to in Appendix J. Only the products listed on the MPL will be discussed.

The MPL was implemented in May 2001. The lists for each month for the period May 2001 to April 2003, with the relevant information, were received from Medscheme® and could be referred to in Appendix H.

During year two (P4 to P6), the year of implementation of the MPL, 62.24% of all beta-lactam antibiotics ($n = 1303464$) claimed were MPL listed⁶. These products constituted 43.25% of the total cost of all beta-lactam antibiotics ($n = R157142778.38$)⁷.

⁶ This percentage was calculated by dividing the number of beta-lactam antibiotic items claimed (listed on the MPL in Appendix H) by the total number of beta-lactam antibiotics claimed during year two, multiplied by hundred.

It should be noted that in the discussion that follows only year two (P4 tot P6) would be relevant, as it is the year the MPL was implemented. Notification will be given if the period discussed is not year two (P4 to P6).

5.6.1 Penicillins

Of the three sub-pharmacological groups of the beta-lactam antibiotics, penicillins had the highest prevalence of medicine items listed on the MPL. A total of 776413 penicillin medicine items were claimed that were MPL listed (95.70%). These products had a cost of R63340370.62 and contributed 93.20% to the total cost of all beta-lactam antibiotics (n = R67961959.50) listed on the MPL (refer to Table 5.13).

According to Table 5.13 the MPL reimbursed R61619211.86 for the penicillins that were listed on the MPL. This resulted in a saving of 2.79% for medical schemes. The difference of R1721158.76 was either paid as a levy by the patient or given as a discount to the patient.

Eight of the thirteen sub-pharmacological groups of penicillin were MPL listed (refer to Table 5.13). Products containing one of the following as active ingredient(s) were not listed on the MPL: benzathine penicillin, benzylpenicillin, benzylpenicillin/procaine combinations, piperacillin and procaine penicillin (refer to Appendix G). Most of these products are given parenterally to patients and were not listed on the MPL.

5.6.1.1 Amoxicillin

With reference to Table 5.13 it was determined that of all the amoxicillin items claimed only 314358 were listed on the MPL. The total cost that was claimed for the amoxicillin items were R12290046.70, while the MPL only reimbursed R11715893.27. From these results it could be concluded that R574152.83 was either paid by the patient or given as a discount by the dispenser. Thus it is possible to say that the MPL brought a saving of 4.67%.

Products such as Amoxil® 250mg vials, Amoxil® paediatric drops, Ranmoxy® dispersible 250mg tablets and Ranmoxy® dispersible tablets were not included in the calculations for these products were not listed on the MPL (refer Appendix G and Appendix H). There was no differentiation between different dosage forms of the same active ingredient and strength (Vice, 2004: telephonically).

⁷ This percentage was calculated by dividing the cost of beta-lactam antibiotic items claimed (listed on the MPL in Appendix H) by the total cost of beta-lactam antibiotics claimed during year two, multiplied by hundred.

The total number of products that was claimed, but not listed on the MPL, was 7132. Most of these products were original products with no generic substitution possible. The prescribing of these products was possibly due to patient compliance, patients unable to swallow, patients being unconscious, etc. The amounts that were claimed for these products for each of the three periods were as follows, R134352.63 (P4), R167588.58 (P5) and R267787.98 (P6) (refer to Appendix G).

These products that were not listed on the MPL were however reimbursed by the medical aids, but the amount that was reimbursed was calculated according to ceiling price that was paid for the specific strength of drug. For example, if the physician prescribed the Ranmoxy® dispersible 250mg tablets, the medical aid paid the dispenser the amount according to the MPL that was agreed on for any amoxicillin 250mg tablets. The patient paid the difference between the Ranmoxy® dispersible 250mg tablets and the calculated cost according to the MPL for amoxicillin 250mg tablets.

5.6.1.1.1 Cost and prevalence of original and generic products

Table 1K (Appendix K) revealed that 2.01% of all amoxicillin products claimed were original products, while 97.98% were generic products. A total of R438602.42 was claimed for original amoxicillin products. Original amoxicillin products had a cost-prevalence index of 1.78. This indicated that it was a relatively expensive medicine therapy. Of the total amount that was claimed for original amoxicillin products, medical aid companies only paid R231504.82.

Generic amoxicillin products claimed had a cost-prevalence index of 0.98, indicating that it was a less expensive medicine therapy when comparing it with the original amoxicillin products. The total cost of these products claimed was R11851444.28 (refer to Appendix K).

5.6.1.1.2 Cost and prevalence of individual products

During the three periods (P4 to P6) more than sixty different amoxicillin items were claimed. Their average cost ranged between R7.18 ± 13.28 (C-Mox® 250mg capsules) and R361.81 (Amoxil® 250mg vial). The amoxicillin product with the highest average cost that was listed on the MPL was Amoxil® 500mg capsules with an average cost of R91.82 ± 48.69 (refer to Table 1g, Appendix G).

Amoxil® 500mg tablets had the highest prevalence of all original amoxicillin products (n = 1000) claimed and a total cost expenditure of R91819.63 during P4. During P5 Amoxil® 500mg tablets had a decrease in the total number of items claimed (n = 631). Consequently the total cost decreased to R53220.43. In the last period (P6) the total number of Amoxil® 500mg tablets claimed was 563, with a total cost of R31947.38 (refer to Appendix G). The average

package size varied between 16.61 ± 5.97 (P5) and 17.01 ± 6.30 (P4). There were no practical significant differences between the package sizes ($d < 0.8$).

5.6.1.2 Amoxicillin/clavulanic acid combination

Amoxicillin/clavulanic acid combination products had the highest prevalence ($n = 398189$) of all beta-lactam products that were listed on the MPL. It had an expenditure of R44659065.23 and contributed 65.71% to the total cost of beta-lactam antibiotics ($n = R\ 67961959.50$). However, after calculation of the cost saving it was determined that if the MPL had been applied completely it could have resulted in a saving of only 1.02%. More than R450000.00 in difference was paid by the patient (refer to Table 5.13).

Augmentin® 0.6g vials, Augmentin® 1.2g vials, Augmentin® 1000mg BD tablets, Augmentin® Comb pack, Clamentin® 0.6g vials and Clamentin® 1.2g vials were not listed on the MPL. The total number of these products that was claimed was 66985 and the total cost was R14705970.71 (refer to Appendix G). These products were, however, reimbursed, but only up to the MPL ceiling price.

5.6.1.2.1 Cost and prevalence of original and generic products

During the year of implementation of the MPL 2.69% original amoxicillin/clavulanic acid combination products were claimed ($n = 398189$). The cost-prevalence index (1.13) revealed that these products were a relatively expensive medicine therapy. A total cost of R1359529.00 was claimed, while medical aid companies paid providers only R1194353.30 (refer to Appendix K).

The total cost that was spent on the 387458 (97.31%) generic amoxicillin/clavulanic acid combination products was R43299536.23. The cost-prevalence index was 1, indicating that there was equilibrium between the cost percentage and the prevalence percentage for generic amoxicillin/clavulanic acid combination products. The prevalence of generic amoxicillin/clavulanic acid combination products increased from 96.90% (P4) to 98.08% (P6).

5.6.1.2.2 Cost and prevalence of individual products

A wide variety of amoxicillin/clavulanic acid combination products exist on the market. During the study period thirty-eight different amoxicillin/clavulanic acid combination products were claimed.

Augmaxil® 375mg tablets had the highest prevalence of all the amoxicillin/clavulanic acid combination products. In each of the three periods 39660 (P4), 16252 (P5) and 11637 (P6) were claimed. In the last period (P6) Clamentin® 375mg tablets ($n = 11943$), Clavumox®

375mg tablets (n = 15101) and Ranclav® 375mg tablets (n = 15435) had a higher prevalence than Augmaxil® 375mg tablets (n = 11637) (refer to Appendix G). As mentioned in paragraph 5.4.5.1, though Augmaxil® 375mg is a generic product, there has been a tendency to prescribe more of the other generic products.

5.6.1.3 Amoxicillin/flucloxacillin combination

The second highest beta-lactam antibiotic products that were claimed were the amoxicillin/flucloxacillin combination products. A total of 34587 amoxicillin/flucloxacillin combination products with a total expenditure of R3058576.88 were claimed during the year.

5.6.1.4 Ampicillin

A total of 4639 ampicillin products were claimed during the year the MPL was implemented. The total expenditure for all the ampicillin products was R1450881.41. The medical aid paid dispensers more than the amount that was claimed, R164725.44 (refer to Table 5.13).

5.6.1.5 Ampicillin/cloxacillin combination

The ampicillin/cloxacillin combination products had a higher prevalence than products containing only ampicillin. The 9405 ampicillin/cloxacillin combination products had a total cost of R892396.89. If the MPL had been applied the amount of R978835.30 would have been paid to dispensers. However, R86438.30 less was claimed than the MPL was willing to reimburse (refer to Table 5.13).

5.6.1.6 Cloxacillin

During the year 5640 cloxacillin products were claimed. These products contributed R531342.84 to the total expenditure on beta-lactam antibiotics listed on the MPL. The MPL was willing to reimburse more for cloxacillin products than the amount that was claimed. However, the difference of R68206.85 was not saved by the medical aid. The MPL paid the ceiling price to the provider even if the amount claimed by the provider was lower than the MPL price (refer to Table 5.13).

5.6.1.7 Flucloxacillin

According to Table 5.13 the MPL reimbursement price for flucloxacillin was much higher than actual amount that was claimed. Dispensers only claimed R186966.24 for 1409 flucloxacillin products. This brought a difference of R469314.61 that was paid to dispensers even though the price they wanted was much lower (refer to Table 5.13). Medical aid companies could have saved much more if the ceiling price had been lower.

5.6.1.8 Penicillin VK

During the year after implementation of the MPL a total 8186 Penicillin VK products were claimed. The total cost that was claimed for Penicillin VK was R271094.43. The amount that was paid to providers, however, was R40764.86 more than the claimed amount (refer to Table 5.13).

5.6.2 Cephalosporins

The cephalosporin products that were claimed and listed on the MPL were 4.29% (n = 811270). This percentage is low compared to penicillin antibiotics. This is attributed to the fact that most of the cephalosporin products claimed were original products and thus no generic substitutions were possible. The MPL were only applied if generic substitution where possible. Subsequently the cost contribution was also very low, 6.80%.

It was revealed after calculation of the calculated cost that the MPL would reimburse R4786451.79 for all cephalosporin products listed on the MPL. However, providers claimed only R4621588.89 for cephalosporin products.

A large number of products containing cephalosporin were not listed on the MPL. Most of these products were original (innovator) products and no generic substitutes were on the market. Only three (cefactor, cefadroxil and cephalexin) of the fifteen sub-pharmacological groups of cephalosporin were listed on the MPL.

5.6.2.1 Cefaclor

Cefaclor products had the highest prevalence of all cephalosporins. It had a prevalence of 1.55% of all beta-lactam antibiotics (n = 1303464). The ceiling price for cefaclor products, according to the MPL, was much higher than the price that was actually claimed by dispensers. The total expenditure for cefaclor products was R3091078.74, while the amount that was paid by medical aids was R3236818.61 (refer to Table 5.13).

All of the cefaclor products were listed on the MPL except for Adco-Cefaclor® BD tablets and Rolab-Cefaclor® 500mg CD tablets. These cefaclor products not listed on the MPL had a prevalence of 4882 and a total cost expenditure of R718247.90 (refer to Appendix G).

5.6.2.1.1 Cost and prevalence of original and generic products

Original cefaclor products contributed 5.17% to the total number of cefaclor products (n = 20238) claimed. Providers claimed R170129.81 for all original cefaclor products provided to patients. More than 18% could have been saved to patients if providers claimed cefaclor products at the ceiling price set by the MPL (refer to Appendix K). Calculation of the cost-

prevalence index of original cefaclor products revealed that it is not a very expensive medicine treatment (CPI ≤ 1).

The prevalence of generic cefaclor products during year two was 94.81% (n = 20238). Providers for the dispensing of generic cefaclor products claimed less than the amount paid by medical aid companies. Further analysis revealed that this is an inexpensive medicine therapy (CPI ≤ 1).

5.6.2.1.2 Cost and prevalence of individual products

More than 40 different cefaclor products that were registered on the market were claimed during year two. Nine of these products were original products and the rest generic products.

Adco-Cefaclor® BD 187mg suspension had the highest prevalence during each of the three periods, 2423 (P4 to P6). This product had an average package size of between 50.95 ± 7.16 and 51.13 ± 7.72 and the average cost ranged between $R98.74 \pm 15.29$ (P6) and $R101.46 \pm 14.35$ (P5) (refer to Appendix G).

5.6.2.2 Cefadroxil

Cefadroxil products had a prevalence of 2548 products claimed, with a resulting cost of R367618.67. More than 43% was paid unnecessary by medical aids to dispensers and providers.

5.6.2.3 Cephalexin

Dispensers claimed a total of 12111 cephalixin products. The ceiling price that the MPL calculated to pay for cephalixin products was much lower than the actual amount claimed. Dispensers claimed R1162891.48, while only R1020588.38 was paid to the dispensers. More than R140000.00 was paid out of the pocket by patients or were given as discounts by providers (refer to Table 5.13).

5.6.3 “Other” beta-lactam antibiotics

None of the “other” beta-lactam antibiotic products were listed on the MPL. Products containing meropenem, loracarbef or imipenem/cilastatin were not listed on the MPL. No generic substitutes were listed on the market for these products. Also some of these products were for parenteral use and therefore not listed.

The "other" beta-lactam products had a prevalence of 25008 medicine items and a total cost expenditure of R5557259.72. Lorabid® (loracarbef) had the highest prevalence of 24958 (99.80%) of all "other" beta-lactam products. During both year one and year two the prevalence remained the same for Lorabid®. No different prescribing pattern was noted.

Table 5.13: Beta-lactam antibiotic expenditure. May 2002 to April 2003. #

<i>Therapeutic class</i>	<i>Total cost (R)</i>	<i>Calculated cost (R)</i>	<i>Cost effect (R)</i>	<i>Saving %*</i>
Amoxicillin (n=314358)	12290046.70	11715893.27	-574152.83	-4.67
Amoxicillin/clavulanic acid (n=398189)	44659065.23	44202402.14	-456663.09	-1.02
Amoxicillin/flucloxacillin (n=34587)	3058576.88	2989665.88	-51960.63	-1.70
Ampicillin (n=4639)	1450881.41	164725.44	19637.03	1.35
Ampicillin/cloxacillin (n=9405)	892396.89	978835.30	86438.30	9.69
Cefaclor (n=20238)	3091078.74	3236818.61	145739.13	4.71
Cefadroxil (n=2548)	367618.67	529044.80	161426.13	43.91
Cephalexin (n=12111)	1162891.48	1020588.38	142303.10	12.24
Cloxacillin (n=5640)	531342.84	599549.69	68206.85	12.84
Flucloxacillin (n=1409)	186966.24	656280.85	469314.61	251.02
Penicillin VK (n=8186)	271094.43	311859.29	40764.86	15.04

This table is a summary of Table 1K given in Appendix K.

* Saving percentage is the total generic cost divided by the total cost (sum of original and generic) multiplied by hundred.

5.7 SUMMARY OF RESULTS

In the following section a concise summary of the results of this study will be given.

The general analysis of the central medicine claims database revealed that a total of 25408438 prescriptions containing one or more medicine items were prescribed during the two-year study period. The total number of medicine items claimed was 49098736, with a total cost expenditure of R7150344897.00

After the implementation of the Medscheme® Price List (MPL) there was an increase in the prevalence of generic medicine items. From the first to the second year the number of generic medicine items claimed increased from 26.53% to 31.08%. The cost-prevalence ratio of generic medicine items indicated that it is a relatively inexpensive medicine therapy compared to original medicine items.

The specific analysis revealed that during the two-year period a total of 4004958 prescriptions containing one or more antibiotic medicine items was claimed. The total number of antibiotic items, 4092495, had a total cost of R526309279.43.

Further analysis revealed that from the first to the second year the prevalence of generic antibiotic items increased from 54.89% to 59.89%, while there was a decrease in the prevalence of original antibiotic items. However, when taking the cost of original antibiotic items into account it was revealed that the total cost for original antibiotic items was much higher than for generic antibiotic items. The cost-prevalence index for original and generic antibiotics were, 1.5 and 0.7 respectively for the two-year period.

The implementation of the MPL resulted in a variety of effects regarding the prevalence and cost of beta-lactam antibiotics. As previously mentioned there was an increase in the prevalence of generic medicine items after the implementation of the MPL. Further, it was also revealed that there was an increase in the prescribing of different generic medicine items. For example during the first year Augmaxil® 375mg tablets was the main generic amoxicillin/clavulanic combination product prescribed, but during year two there was an increase in the prescribing of other generic products such as Ranclav® 375mg tablets, Clavumox®, etc.

Another effect that was noted is the fact that there was an increase in the prescribing of products that may be therapeutically substituted, but not on a generic (same active ingredient) bases. For example during the second year Zinnat® had the highest prevalence of all beta-lactam products. It is, however, possible to substitute Zinnat® therapeutically with a cheaper medicine. The same was found with products such as Orelox® and Lorabid®.

Results of the general and specific analyses are reviewed in Table 5.14.

Table 5.14: Summary of data. May 2001 to April 2003.

	Description	May 2001 to April 2002	May 2002 to April 2003	Total
General analysis	Number of prescriptions	11060996	14347442	25408438
	Number of medicine items	21820911	27277825	49098736
	Medicine cost	R3097064602.00	R4053280295.00	R7150344897.00
	Number of original items	16030994	18799816	34830810
	Number of generic items	5789917	8478009	14267926
	Cost of original items	R2686324992.00	R3410492539.00	R6096817531.00
	Cost of generic items	R410739609.00	R642760360.00	R1053499969.00
Specific analysis	Number of antibiotic prescriptions	1772674	2232284	4004958
	Number of antibiotic items	1812001	2280494	4092495
	Cost of antibiotics	R232312831.04	R293996448.38	R526309279.43
	Number of original antibiotic items	817333	914622	1731955
	Number of generic antibiotic items	994668	1365872	2360540
	Cost of original antibiotic items	R148240582.95	R179753405.54	R327993988.49
	Cost of generic antibiotic items	R84072248.59	R114243042.34	R198315290.93
	Number of beta-lactam prescriptions	1022800	1294786	2317586
	Number of beta-lactam items	1028817	1303464	2332281
	Cost of beta-lactam items	R119213799.18	R157142778.38	R276356577.56
Medscheme® Price List data	Number of beta-lactam items		811310	
	Cost of beta-lactam items		R66656166.51	
	Number of original beta-lactam items		23051	
	Number of generic beta-lactam items		788252	
	Cost of original beta-lactam items		R2649435.05	
	Cost of generic beta-lactam items		R64006731.46	
	Number of penicillin items		776413	
	Cost of penicillin items		R62034577.62	
	Number of original penicillin items		21242	
	Number of generic penicillin items		755171	
	Cost of original penicillin items		R2275876.56	
	Cost of generic penicillin items		R59758701.06	
	Number of cephalosporin items		34897	
	Cost of cephalosporin items		R4621588.89	
	Number of original cephalosporin items		1809	
	Number of generic cephalosporin items		33088	
	Cost of original cephalosporin items		R373558.49	
Cost of generic cephalosporin items		R4248030.40		

5.8 CHAPTER SUMMARY

In this chapter the results of the empirical study were discussed. The prevalence and cost of medicine, specifically antibiotics, were established according to the central medicine claims database. The effect of a reference medicine price list on the prevalence and cost of beta-lactam antibiotics was also analysed.

Hereby the research questions eight to fourteen have been answered and their research objectives reached.

Chapter 6

Conclusions, Recommendations and Limitations

6.1 INTRODUCTION

In this chapter the conclusions, recommendations and limitations based on the results will be discussed.

6.2 CONCLUSIONS

The conclusions will be divided into those deduced from the literature review (research objectives one to seven) and those deduced from the empirical investigation (research objectives eight to twelve).

6.2.1 Conclusions deduced from the literature review (chapters 2 and 3)

- The **first** research objective was to *conceptualise from the literature what health care entails in South Africa, as well as internationally*. A concise overview regarding the private and public health care sectors in South Africa was discussed in paragraph 2.2. Access to health care, health care expenditure and financing of health care also formed part of the discussion. In paragraph 2.3 various aspects regarding health care in other countries were discussed.

- The **second** research objective was to *determine from the literature which factors contribute to the high health care costs in the private health care sector of South Africa, as well as internationally*. A concise overview regarding this objective was reviewed in paragraphs 2.3.1, 2.3.3 and 2.4.

- The **third** research objective was to *investigate from the literature the possible influences of the new legislation on medicine cost in the private health care sector*. Amendments to legislation regarding the costs of medicine were reviewed in paragraphs 2.2.3.3, 2.5.2.3 and 2.6.1.

- The **fourth** research objective was to *review from the literature the influences of generic substitution on the prevalence and cost of medicine*. An overview regarding the prevalence and costs of original and generic products and possible effects of generic substitution on the costs of medicine is given in paragraph 2.5.

- The *fifth* research objective was to *conceptualise from literature the concepts of pharmacoeconomics, drug utilisation review and managed health care*. The concept of managed health care is explained in paragraph 2.6. An in depth discussion on pharmacoeconomics and drug utilisation review are given in paragraphs 2.9 and 2.10 respectively.

- The *sixth* research objective was to *determine the implications of a managed medicine reference price list on the cost and prevalence of medicine in the private sector*. One of the methods of reducing medicine expenditure is the implementation of a managed medicine reference price list. This medicine cost reducing strategy is discussed in paragraph 2.7. Another strategy, essential drug lists, is discussed in paragraph 2.8.

- The *seventh* research objective was to *review the basic pharmacology of antibiotics*. In chapter three an overview of antibiotics is given. The antimicrobial action, pharmacokinetics and administration, clinical uses and adverse effects of antibiotics, discussed in this study, are reviewed in paragraphs 3.7.1 to 3.7.8.

6.2.2 Conclusions deduced from the empirical investigation (chapter 5)

- The *eighth* research objective was to *investigate the differences in the utilisation patterns and costs of drugs in general before and after implementation of the Medscheme® Price List*.

It was concluded that during year one (May 2001 to April 2002) fewer medicine items were claimed than during year two (May 2002 to April 2003), being 21820911 and 27277825 respectively. This increase of 25.01% in the total number of medicine items claimed could possibly be attributed to an increase in the number of medical scheme beneficiaries. The first year contributed 43.31% to the total cost expenditure of medicine items (n = R7150344897.00) during the two-year study period, while 56.69% was contributed by year two. The total medicine cost was the highest during January to April of each year (P3 and P6) and could possibly be attributed to the fact that most patients' medical scheme funds were not yet at the beginning of the year exhausted (refer to paragraph 5.3.1).

There were no practically significant differences between the average numbers of medicine items claimed per prescription between the different four-month periods ($d \leq 0.8$). There were also no differences of practical significance between the average costs of medicine items claimed ($d \leq 0.8$).

- The *ninth* research objective was to *investigate the differences in the utilisation patterns and costs of antibiotic drugs before and after implementation of the Medscheme® Price List.*

Antibiotics (as classified in paragraph 5.4) represented 74.90% of all antimicrobial items (n = 5464076) claimed during the two-year period and a cost contribution of 51.33% of the total costs of antimicrobial items (n = R1025283062.00).

Analysis of the data revealed that prescriptions containing one or more antibiotics decreased from year one (16.03%) to year two (15.56%) with 0.47%. Further analysis revealed that antibiotics constituted 8.30% (n = 21820911) and 8.36% (n = 27277825) of the total number of medicine items claimed during year one and year two respectively. However, there was a decrease in cost contribution of antibiotics from year one (7.50%) to year two (7.25%) (refer to paragraph 5.4.1). Analysis also revealed that there were no difference of practical significance between the different four-month periods regarding the average number of antibiotic medicine items per prescription and the average cost per antibiotic prescription ($d \leq 0.8$).

Beta-lactam antibiotics were the antibiotics most frequently utilised and accounted for 56.78% (n = 1028817) and 57.16% (n = 1303464) of the total number of antibiotics prescribed during year one and year two respectively. Beta-lactam antibiotics accounted for 51.32% of the total cost of all antibiotics (n = R232312831.66) claimed during year one, while during year two it increased to 53.54% of the total cost of all antibiotics (n = R293996448.38) claimed (refer to paragraph 5.4.3).

Macrolide antibiotics had the second highest prevalence of all antibiotic drugs, being 12.94% (n = 1812001) and 11.99% (n = 2280494) for year one and year two respectively. During the first year the total cost of macrolides amounted to 15.90% of the total cost of all antibiotics (n = R232312831.66), while in the second year the cost amounted to 16.22% of the total cost of all antibiotics (n = R232312831.66) on the database (refer to paragraph 5.4.3).

Calculation of the cost-prevalence index of beta-lactam and macrolide antibiotics indicated that beta-lactam antibiotics are relatively inexpensive (CPI < 1) compared to macrolide antibiotics (CPI > 1). It was also revealed after calculation of the d-value that there were no differences of practical significance between the different four-month periods regarding average costs of macrolide and beta-lactam antibiotics ($d \leq 0.8$).

- The *tenth* research objective was to *determine and compare the difference in prevalence and cost of original products vs. generic products that have been claimed before and after implementation of the Medscheme® Price List for drugs in general and antibiotic drugs specifically.*

Analysis of the data revealed that the total number of original products claimed during year one was 73.47% (n = 21820911) compared to 68.92% (n = 27277825) claimed during year two. Generic prescribing on the other hand increased from 26.53% (n = 21820911) to 31.08% (n = 27277825) during year one and year two respectively. It can be concluded that this increase in the prescribing of more generic products may be due to the implementation of the MPL. This increase in the prescribing of more generic products led to an increase in the total cost contribution of generic products from year one to year two. Generic drugs accounted for 13.26% of the total cost of all medicine items (n = R3097064602.00) claimed during year one and 15.86% of the total cost of all medicine items (n = R4053280295.00) claimed during year two. Original products accounted for 86.74% and decreased to 84.14% of the total cost of all medicine items during year one (n = R3097064602.00) and year two (n = R4053280295.00) respectively (refer to paragraph 5.3.2).

For antibiotics, it was found that there was an increase in the utilisation of generic antibiotic products from year one to year two. Generic products accounted for 54.89% of all antibiotic products (n = 1812001) claimed during year one and 57.68% of all antibiotic products (n = 2280494) during year two. There was a decrease of 5% in the utilisation of original products from year one (45.11%, n = 1812001) to year two (40.11%, n = 2280494). However, more money was spent on original products compared to generic products. During the two year period 62.32% of the total cost of all antibiotics (n = R526309279.42) was spent on original antibiotic products and only 37.68% was spent on generic products (refer to paragraph 5.4.2).

Calculation of the cost to prevalence ratio (1.5) of original products revealed that the medicine therapy is rather expensive when comparing it with the cost prevalence ratio (0.70) of generic products. Further analysis revealed that there was a practical significant difference between the average costs of original antibiotic products and generic antibiotic products ($d > 0.8$).

- The *eleventh* research objective was to *investigate the differences in the utilisation patterns and cost of beta-lactam antibiotics before and after the implementation of the Medscheme® Price List.*

It was found that prescriptions containing one or more beta-lactam antibiotics constituted 57.70% of all prescriptions containing one or more antibiotic drug(s) (n = 1772674) during year one. There was, however, an increase in the number of prescriptions containing one or more beta-lactam antibiotic drug(s) during year two (58.01%, n = 2232284). The total number of beta-lactam items claimed also increased from year one to year two, being 56.78% (n = 1812001) and 57.16% (n = 2280494) respectively. As previously noted, the prevalence of beta-lactam antibiotic items was the highest during the first period of each year. The beta-lactam antibiotic items contributed 51.32% to the total cost of all antibiotic items (n = R232312831.54) claimed during year one and 53.45% of the total cost of all antibiotic items (n = R293996448.38) claimed during year two (refer to paragraph 5.5.1).

In this study conducted the average cost per beta-lactam prescription ranged between R113.72 ± 70.96 (P1) and R123.01 ± 81.82 (P6), with no practical significant difference (d < 0.8). According to the cost-prevalence index the beta-lactam therapy was relatively inexpensive (CPI <1).

Further analysis revealed that Zinnat® 250mg was the beta-lactam product claimed most on the central medicine claims database followed by Augmaxil® 375mg for the two-year period. During year one Augmaxil® 375mg had the highest prevalence (8.68%) of all beta-lactam items (n = 1028817), but decreased to the fourth place (5.18%, n = 1303464) during year two. Zinnat® 250mg had a prevalence of 7.03% (n = 1028817) during year one and increased to 8.03% (n = 1303464) during year two (refer to paragraph 5.5.2).

- The *twelfth* research objective was to *determine the cost savings that could have been incurred if beta-lactam antibiotics had been provided at MPL prices.*

A total of R67961959.51 was claimed during year two for beta-lactam products, while medical scheme companies only reimbursed R66405663.65. If beta-lactam products had been claimed at MPL prices 2.34% of the providing costs could have been saved. This implies that patients possibly paid R1556295.86 as co-payments to providers of medicine.

It was determined that R11515.78 could have been saved for original beta-lactam items if they had been provided at MPL prices. Providers of medicine claimed R2649435.05 for

original beta-lactam products, while medical scheme companies utilising the Medscheme® Price List only reimbursed R2637919.27 for original beta-lactam products. Accordingly, providers of medicine claimed R64006731.46 for generic products, but medical scheme companies only reimbursed R63767744.37. Thus, R238987.09 could have been saved if generic beta-lactam products had been claimed at MPL prices.

Analysis also revealed that there was an increase in the prescribing of different generic medicine items. For example, during the first year Augmaxil® 375mg tablets turned out to be the main generic amoxicillin/clavulanic combination product prescribed, but during year two there was an increase in the prescribing of other generic products such as Ranclav® 375mg tablets, Clavumox®, etc. This could possibly be attributed to the fact that medical aid companies only reimbursed products with a selling price closest to the MPL ceiling price.

Another effect that was noted is the fact that there was an increase in the prescribing of products that may be therapeutically substituted, but not on a generic (same active ingredient) basis. For example during the second year Zinnat® had the highest prevalence of all beta-lactam products. It is, however, possible to substitute Zinnat® therapeutically with a cheaper medicine. The same was found with products such as Orelox® and Lorabid®.

6.3 RECOMMENDATIONS

The following recommendations can be made for further research on aspects that were not investigated in this study due to the limited scope, nature and extent of this study experienced during the study period:

- ❑ Studies should be done on the influence of therapeutic substitution on the prevalence and medicine cost of antibiotics.
- ❑ Further studies should be conducted to determine the influence of the reference medicine price list on the prevalence and cost of other pharmacological groups.
- ❑ Studies should be done to determine the appropriate and necessary usage of antibiotics in the private sector.
- ❑ In the private sector studies regarding possible cost savings if unnecessary antibiotic prescribing is eliminated could be done.
- ❑ Research should be done on the effect of the new legislation of government, regarding the pricing of medicine (single exit price), on the prevalence and cost of medicine.
- ❑ Studies should be done to compare the effect of the implementation of the one exit pricing system with that of a medicine reference price list regarding the prevalence and cost of antibiotics.

6.4 LIMITATIONS AND SHORTCOMINGS OF THE RESEARCH

The following shortcomings should be taken into account when evaluating the results and conclusions of this study:

- The data available on the database as well as the associated costs were considered to be correct.
- After the refinements and the analysis of the data, all data documented were considered to be correct.
- The cost-prevalence index is limited to cost and prevalence and does not provide information on the patient's clinical outcomes.
- No clinical data were available on the database with the following consequences:
 - No diagnoses of diseases were available for antibiotic therapies issued.
 - No specific antibiotic therapy regimens were compared due to existence of a large variety of prescribing patterns.
 - Patient compliance could not be measured.
 - No clinical outcomes could be measured.

6.5 CHAPTER SUMMARY

In this final chapter the recommendations and limitations of the study conducted were discussed.

Hereby the research questions have been answered and the research objectives reached.

Glossary

Beneficiaries	These include all principal members registered with a medical scheme, as well as their dependants.
Co-payment	A relatively small fixed fee required by a health insurer to be paid by the patient at the time of each office visit, outpatient service, or filling of a prescription
Drug policy	Defined, in the context of pharmacoeconomics, as a strategy, clinical practice guideline, or coverage decision created for the purpose of guiding the selection of pharmacological therapy, with the intent of delivering the highest-quality, lowest-cost drug therapy to the largest possible population.
Formulary	A list of selected pharmaceuticals judged to be the most clinically and economically useful for a group of patients, from which physicians are expected to select – may be open, no denial of reimbursement for non-formulary products by the payer; closed, only formulary products will be reimbursed by the payer.
Gross Domestic Product	Is the measure of the value of total goods and services produced nationally over a given period of time.
Health:	The state of physical, mental and social well-being, not merely the absence of disease or disability.
Health maintenance organisations (HMOs)	Health care organisations that provide a comprehensive set of medical care services to a voluntarily enrolled group of patients. The enrollee pays a fixed amount per month regardless of the amount of services used. This places the HMO at financial risk if total costs are greater than aggregate premiums, but it yields a financial gain if costs are lower than the premium revenue. This system provides incentives to patients and health care providers to minimize utilisation and therefore costs.

Health outcomes	The result of therapeutic interventions measured in terms of clinical or humanistic endpoints.
Items	One of the medications on the prescription.
MIMS	Refers to monthly index of medical specialities.
Mixtures	Refer to a mixture of two or more items (no NAPPI codes of the individual items were available for mixtures on the database).
Outcomes	The results and value of healthcare intervention.
Patient	Someone receiving medication on prescription.
Pharmacoeconomics	The description and analysis of the costs of drug therapy to health care systems and society.
Pharmacy Benefit Management firms (PBMs)	Prescription claim processors.
Preferred provider organizations (PPOs)	A managed care arrangement that creates a contractual arrangement between a restricted group of caregivers to deliver health services to health plan members.
Prescribed	Can refer to items sold by the pharmacy or claimed for by the pharmacy benefit management company, since data is that of a pharmacy benefit management company and contains only prescription data claimed from the medical aid.
Prescription	Prescription issued by a medical practitioner.
Principal member	The person under whose name all contributions are made to the medical scheme.

Private sector	The economic subdivision of the health care industry represented by non-government, non-federal purchasers (e.g., private insurance, out-of-pocket payers).
Provider	Hospital, physician or other health personnel that make available services or products required to diagnose, treat, or prevent disease or injury.
Public sector	The economic subdivision of the health care industry represented by government or federal purchasers.

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Table 1A: Medicine items and prescriptions claimed. May 2001 to April 2002.

<i>Month</i>	<i>Total number of medicine items claimed</i>	<i>Total number of prescriptions claimed</i>	<i>Average number of items per prescription</i>
May	1524296	740708	2.06 ± 1.26
June	1230754	595871	2.07 ± 1.26
July	1266101	616329	2.05 ± 1.25
August	2014988	998795	2.02 ± 1.23
September	1722109	872305	1.97 ± 1.22
October	1708168	885892	1.93 ± 1.20
November	1400453	724293	1.93 ± 1.20
December	1596781	812710	1.96 ± 1.21
January	2311879	1187338	1.95 ± 1.21
February	2237776	1148370	1.95 ± 1.20
March	2360273	1217185	1.94 ± 1.20
April	2447323	1261200	1.94 ± 1.20

Table 2A: Medicine items and prescriptions claimed. May 2002 to April 2003.

<i>Month</i>	<i>Total number of medicine items claimed</i>	<i>Total number of prescriptions claimed</i>	<i>Average number of items per prescription</i>
May	1229381	650519	1.89 ± 1.15
June	2385440	1211046	1.97 ± 1.20
July	2440048	1257723	1.94 ± 1.18
August	2427244	1260648	1.93 ± 1.16
September	2098813	1107865	1.89 ± 1.15
October	2149888	1146070	1.88 ± 1.13
November	1983465	1058583	1.87 ± 1.13
December	1881793	997993	1.89 ± 1.14
January	2434555	1304379	1.87 ± 1.14
February	2228799	1188840	1.87 ± 1.13
March	2414253	1289640	1.87 ± 1.13
April	2310016	1233177	1.87 ± 1.12

Table 1B: Prevalence of the top 10 main pharmacological groups (e.g. antimicrobial agents). May 2001 to April 2002.

Main pharmacological groups	May		June		July		August		September		October	
	n	%*	n	%*	n	%*	n	%*	n	%*	n	%*
Respiratory system	253798	16.65	210133	17.07	217882	17.21	326866	16.22	232607	13.51	217537	12.74
Antimicrobials	178315	11.70	147574	11.90	152742	12.06	234847	11.66	180280	10.47	159188	9.32
Cardiovascular agents	173131	11.36	142074	11.54	152571	12.05	248183	12.32	242216	14.07	247490	14.49
Analgesics	132195	8.67	108361	8.80	111071	8.77	172922	8.58	134788	7.83	134683	7.88
Endocrine system	130277	8.55	106172	8.63	110253	8.71	180639	8.96	170951	9.93	169444	9.92
Central nervous system	119983	7.87	94188	7.65	95407	7.54	158898	7.89	140628	8.17	135278	7.92
Musculoskeletal agents	91005	5.97	71470	5.81	72861	5.75	117635	5.84	104595	6.07	105381	6.17
Gastro-intestinal tract	84197	5.52	65350	5.31	63294	5.00	106318	5.28	93667	5.44	97508	5.71
Ear, nose and throat	79558	5.22	63583	5.17	63543	5.02	102873	5.11	83827	4.87		
Dermatologicals											82502	4.83
Other	281837	18.49	221847	18.03	226475	17.89	365807	17.38	338548	19.66	359157	25.87
Total	1524296	100	1230754	100	1266101	100	2014988	100	1722107	100	1708168	100

* The prevalence percentage of the main pharmacological group is the prevalence of the pharmacological group divided by the total number of medicine items claimed for the specific month multiplied by hundred.

Table 1B continues:

Main pharmacological groups	November		December		January		February		March		April	
	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*
Respiratory system	180738	12.91	180026	11.27	227452	9.84	268683	12.01	289468	12.26	319669	13.06
Antimicrobials	132832	9.48	156839	9.82	247258	10.70	244509	10.93	256263	10.86	265958	10.87
Cardiovascular agents	203606	14.54	241949	15.15	312457	13.52	296816	13.26	320327	13.57	329050	13.45
Analgesics	110057	7.86	117876	7.38	197227	8.53	193897	8.66	204401	8.66	210154	8.59
Endocrine system	139693	9.97	168111	10.53	222110	9.61	212429	9.49	229301	9.72	233999	9.56
Central nervous system	107239	7.66	119611	7.49	208782	9.03	196622	8.79	205417	8.70	209361	8.55
Musculoskeletal agents	83160	5.94	94884	5.94	144100	6.23	132552	5.92	136921	5.80	141740	5.79
Gastro-intestinal tract	79526	5.68	93556	5.86	149931	6.49	131033	5.86	132675	5.62	134886	5.51
Ear, nose and throat											119316	4.88
Dermatologicals	69843	4.99	84674	5.30	133642	5.78	114549	5.12	117426	4.98		
Other	293759	20.98	339255	21.25	468920	20.28	446686	19.96	468074	19.83	483190	19.74
Total	1400453	100	1596781	100	2311879	100	2237776	100	2360273	100	2447323	100

* The prevalence percentage of the main pharmacological group is the prevalence of the pharmacological group divided by the total number of medicine items claimed for the specific month multiplied by hundred.

Table 2B: Prevalence of the top ten main pharmacological groups (e.g. antimicrobial agents). May 2002 to April 2003.

Main pharmacological groups	May		June		July		August		September		October	
	n	%*	n	%*	n	%*	n	%*	n	%*	n	%*
Respiratory system	222341	18.09	424407	17.79	393022	16.11	326866	16.22	291147	13.87	268684	12.50
Antimicrobials	136304	11.09	281930	11.82	286442	11.74	234847	11.66	231987	11.05	238091	11.07
Cardiovascular agents	144737	11.77	305292	12.80	321321	13.17	248183	12.32	294197	14.02	301052	14.00
Analgesics	111279	9.05	209282	8.77	211111	8.65	172922	8.58	173985	8.29	179264	8.34
Endocrine system	104944	8.54	217800	9.13	227518	9.32	180639	8.96	206819	9.85	211599	9.84
Central nervous system	96229	7.83	180171	7.55	187531	7.69	158898	7.89	165689	7.89	173576	8.07
Musculo-skeletal agents	64547	5.25	122532	5.14	131209	5.38	117635	5.84	115464	5.50	121286	5.64
Gastro-intestinal tract	61679	5.02	106318	4.46	111329	4.56	106318	5.28	97578	4.65	108474	5.05
Ear, nose and throat	65774	5.35	121094	5.08	123754	5.07	102873	5.11	105509	5.03	106348	4.95
Dermatologicals												
Other	221547	18.02	416641	17.46	446811	18.31	365817	18.15	416438	19.84	441514	20.54
Total	1229381	100	2385440	100	2440048	100	2014998	100	2098813	100	2149888	100

* The prevalence percentage of the main pharmacological group is the prevalence of the pharmacological group divided by the total number of medicine items claimed for the specific month multiplied by hundred.

Table 2B continues:

Main pharmacological groups	November		December		January		February		March		April	
	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*
Respiratory system	239086	12.05	205175	10.90	263771	10.83	267724	12.01	323672	13.41	331844	14.37
Antimicrobials	215700	10.87	194461	10.33	277743	11.41	259302	11.63	280359	11.61	269041	11.65
Cardiovascular agents	286713	14.46	286029	15.20	338349	13.90	291859	13.09	314038	13.01	305149	13.21
Analgesics	164384	8.29	153636	8.16	225859	9.28	209854	9.42	224709	9.31	212195	9.19
Endocrine system	199179	10.04	194604	10.34	229328	9.42	202498	9.09	217087	8.99	207237	8.97
Central nervous system	156784	7.90	141824	7.54	215991	8.87	190619	8.55	199150	8.25	185082	8.01
Musculo-skeletal agents	110177	5.55	104826	5.57	1441012	5.92	126998	5.70	135866	5.63	127148	5.50
Gastro-intestinal tract	103899	5.24	108437	5.76	149223	6.13	128081	5.75	133058	5.51	123708	5.36
Ear, nose and throat					117622	4.83	110322	4.95	123459	5.11	118646	
Dermatologicals	97905	4.94	100473	5.34								
Other	409638	20.65	392328	20.85	472657	19.41	441542	19.81	462855	19.17	429966	18.61
Total	1983465	100	1881793	100	2434555	100	2228799	100	2414253	100	2310016	100

* The prevalence percentage of the main pharmacological group is the prevalence of the pharmacological group divided by the total number of medicine items claimed for the specific month multiplied by hundred.

Table 3B: Prevalence of individual medicines with special emphasis on the top 10 drugs claimed. May 2001 to April 2002.

Individual medicines	May		June		July		August		September		October	
	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*
Alcophyllex® SYR	10373	0.68	8681	0.71	9320	0.74	13091	0.65				
Coversyl® TAB									8794	0.51	8875	0.52
Dapamax® 2.5mg TAB	7531	0.49	6531	0.53	7004	0.55	10296	0.51	10148	0.59	10366	0.61
Disprin CV® 100mg TAB												
Ecotrin® 81mg TAB									9647	0.56	9996	0.59
Eltroxin® 0.1mg TAB	13015	0.85	10367	0.84	11323	0.89	18942	0.94	18379	1.07	18543	1.09
Flixonase Aques® SPR	9327	0.61	7398	0.60	7388	0.58	11794	0.59	11049	0.64	10706	0.63
Lipitor® 10mg TAB	15718	1.03	12951	1.05	14112	1.11	24407	1.21	24896	1.45	26127	1.53
Myprodol® CAP	23856	1.57	18936	1.54	20574	1.62	30739	1.53	23821	1.38	21440	1.26
Premarin® 0.625mg TAB	10427	0.68	8388	0.68	8796	0.69	14680	0.73	14258	0.83	14282	0.84
Solphyllex® SYR	8188	0.54	6992	0.57	7579	0.60	10852	0.54				
Stilpane® TAB	10206	0.67	7916	0.64	8633	0.68	14147	0.70	10550	0.61	9758	0.57
Vioxx® 25mg TAB												
Zyrtec® 10mg TAB												
Other	1415655	92.87	1142594	92.84	1171372	92.52	1866040	92.61	1590565	92.36	1578075	92.38
Total	1524296	100	1230754	100	1266101	100	2014988	100	1722107	100	1708168	100

* The prevalence percentage of the individual medicine is the prevalence of the individual medicine divided by the total number of medicine items claimed for the specific month multiplied by hundred.

Table 3B continues:

Individual medicines	November		December		January		February		March		April	
	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*
Alcophyllex® SYR												
Coversyl® TAB	7377	0.53										
Dapamax® 2.5mg TAB	8470	0.60	10469	0.66	13001	0.56	12260	0.55	13392	0.57	13728	0.56
Disprin CV® 100mg TAB												
Ecotrin® 81mg TAB	8140	0.58	9492	0.59	12908	0.56	12528	0.56	13561	0.57	14213	0.58
Eltroxin® 0.1mg TAB	15578	1.11	18779	1.18	23826	1.03	22570	1.01	24925	1.06	25328	1.03
Flixonase Aques® SPR	8789	0.63	11593	0.73	14587	0.63	13312	0.59	13786	0.58	14345	0.59
Lipitor® 10mg TAB	21809	1.55	25927	1.62	33006	1.43	31752	1.42	34559	1.46	35975	1.47
Myprodol® CAP	16246	1.16	19592	1.23	33768	1.46	31843	1.42	33706	1.43	34806	1.42
Premarin® 0.625mg TAB	11992	0.86	14566	0.91	18469	0.80	17473	0.78	18744	0.79	19243	0.79
Solphyllex® SYR												
Stilpane® TAB	7757	0.55	9295	0.58	18149	0.79	16217	0.72	17496	0.74	18781	0.77
Voixx® 25mg TAB					12407	0.54	11807	0.53	12366	0.52	13170	0.54
Zyrtec® 10mg TAB			8971	0.56								
Other	1294439	92.43	1468097	91.94	2131758	92.21	2068014	92.41	2177738	92.27	2257734	92.25
Total	1400453	100	1596781	100	2311879	100	2237776	100	2360273	100	2447323	100

* The prevalence percentage of the individual medicine is the prevalence of the individual medicine divided by the total number of medicine items claimed for the specific month multiplied by hundred.

Table 4B: Prevalence of individual medicines with special emphasis on the top 10 drugs claimed. May 2002 to April 2003.

Individual medicines	May		June		July		August		September		October	
	n	%*	n	%*	n	%*	n	%*	n	%*	n	%*
Alcophyllex® SYR	12032	0.98	23180	0.97	21626	0.89	20610	0.85	14435	0.69		
Coversyl® TAB												
Dapamax® 2.5mg TAB					13942	0.57	13916	0.57			13233	0.62
Disprin CV® 100mg TAB												
Ecotrin® 81mg TAB			13107	0.55	13941	0.57	14090	0.58	12812	0.61	13076	0.61
Eltroxin® 0.1mg TAB	11345	0.92	23521	0.99	24665	1.01	24959	1.03	22905	1.09	23380	1.09
Flixonase® Aques SPR												
Lipitor® 10mg TAB	15988	1.30	33749	1.41	35550	1.46	36145	1.50	33098	1.58	33801	1.57
Mybulen® TAB	12806	1.04	28032	1.18	32459	1.33	30904	1.27	24105	1.15	19940	0.93
Mypaid® CAP	7028	0.57										
Myprodol® CAP	10365	0.84	16009	0.67	16811	0.69	15587	0.64	13692	0.65	19546	0.91
Premarin® 0.625mg TAB	8479	0.69	17190	0.72	18050	0.74	17949	0.74	16383	0.78	16916	0.79
Solphyllex® SYR	6819	0.55	13639	0.57								
Stilpane® TAB	9404	0.76	18086	0.76	19922	0.82	19736	0.81	16725	0.80	17612	0.82
Voixx® 25mg TAB												
Zyrtec® 10mg TAB									13131	0.63	14702	0.68
Other	1135115	92.33	2198927	92.18	2243082	91.93	2233078	92.00	1931527	92.03	1977682	91.99
Total	1229381	100	2385440	100	2440048	100	2427244	100	2098813	100	2149888	100

* The prevalence percentage of the individual medicine is the prevalence of the individual medicine divided by the total number of medicine items claimed for the specific month multiplied by hundred.

Table 4B continues:

Individual medicines	November		December		January		February		March		April	
	n	%*	n	%*	n	%*	n	%*	n	%*	n	%*
Alcophyllex® SYR							13856	0.62	17348	0.72	18563	0.80
Coversyl® TAB												
Dapamax® 2.5mg TAB	12957	0.65	12691	0.67							13005	0.56
Disprin CV® 100mg TAB												
Ecotrin® 81mg TAB	12705	0.64	12577	0.67	15922	0.65	13826	0.62	14952	0.62	14587	0.63
Eltroxin® 0.1mg TAB	22429	1.13	22348	1.19	25375	1.04	21987	0.99	23989	0.99	23336	1.01
Flixonase® Aques SPR					14511	0.60						
Lipitor® 10mg TAB	32131	1.62	32277	1.72	35951	1.48	30288	1.36	32403	1.34	30574	1.32
Mybulen® TAB	15643	0.79	13691	0.73	20431	0.84	18320	0.82	18908	0.78	17296	0.75
Mypaid® CAP												
Myprodol® CAP	19902	1.00	20394	1.08	31960	1.31	29623	1.33	32741	1.36	31296	1.35
Premarin® 0.625mg TAB	16035	0.81	16132	0.86	17271	0.71	14938	0.67	16004	0.66	15685	0.68
Solphyllex® SYR												
Stilpane® TAB	14354	0.72	12498	0.66	21884	0.90	19597	0.88	19678	0.82	18597	0.81
Voixx® 25mg TAB												
Zyrtec® 10mg TAB	13729	0.69	13067	0.69	16061	0.66	13934	0.63	13650	0.57		
Other	1823580	91.94	1726118	91.73	2235189	91.81	2052430	92.07	2224580	92.14	2127077	92.08
Total	1983465	100	1881793	100	2434555	100	2228799	100	2414253	100	2310016	100

* The prevalence percentage of the individual medicine is the prevalence of the individual medicine divided by the total number of medicine items claimed for the specific month multiplied by hundred.

Table 5B: Prevalence of the type (original vs. generic) of medicine items claimed. May 2001 to April 2002

Month	Original products		Generic products	
	<i>n</i>	%*	<i>n</i>	%#
May	1137441	74.62	386855	25.38
June	913491	74.22	317263	25.78
July	935998	73.93	330103	26.07
August	1487472	73.82	527526	26.18
September	1277418	74.18	444691	25.82
October	1264403	74.02	443765	25.98
November	1033791	73.82	366662	26.18
December	1182315	74.04	414466	25.96
January	1684564	72.87	627315	27.13
February	1630700	72.87	607076	27.13
March	1712506	72.56	647767	27.44
April	1770895	72.36	676428	27.64

* The prevalence percentage of original products is the prevalence of original products divided by the total number of medicine items claimed for the specific month multiplied by hundred.

The prevalence percentage of generic products is the prevalence of generic products divided by the total number of medicine items claimed for the specific month multiplied by hundred.

Table 6B: Prevalence of the type (original vs. generic) of medicine items claimed. May 2002 to April 2003.

Month	Original products		Generic products	
	<i>n</i>	%*	<i>n</i>	%*
May	870266	70.79	359115	29.21
June	1679268	70.40	706172	29.60
July	1707375	69.97	732673	30.03
August	1682257	69.31	744987	30.69
September	1450748	69.12	648065	30.88
October	1481572	68.91	668316	31.09
November	1373390	69.24	610075	30.76
December	1306602	69.43	575191	30.57
January	1646785	67.64	787770	32.36
February	1501304	67.36	727495	32.64
March	1632647	67.63	781547	32.37
April	1558530	67.47	751486	32.53

* The prevalence percentage of original products is the prevalence of original products divided by the total number of medicine items claimed for the specific month multiplied by hundred.

The prevalence percentage of generic products is the prevalence of generic products divided by the total number of medicine items claimed for the specific month multiplied by hundred.

Table 7B: Prevalence of the top ten main pharmacological groups according to type (original vs. generic) of medicine. May 2001 to April 2002.

<i>Main pharmacological group</i>			<i>May</i>	<i>June</i>	<i>July</i>	<i>August</i>	<i>September</i>	<i>October</i>
Respiratory system	<i>Original product</i>	<i>n</i>	201607	166129	172046	256581	184127	172394
		<i>%*</i>	17.72	18.19	18.38	17.25	14.41	13.63
	<i>Generic product</i>	<i>n</i>	52191	44004	45836	70285	48480	45143
		<i>%*</i>	13.49	13.87	13.89	13.32	10.90	10.17
Antimicrobials	<i>Original product</i>	<i>n</i>	93068	77115	79510	121792	91920	80231
		<i>%*</i>	8.18	8.44	8.49	8.19	7.20	6.35
	<i>Generic product</i>	<i>n</i>	85247	70459	73061	113055	88360	78957
		<i>%*</i>	22.04	22.21	22.13	21.43	19.87	17.79
Cardiovascular agents	<i>Original product</i>	<i>n</i>	139383	113519	121734	196784	191779	195616
		<i>%*</i>	12.25	12.43	13.01	13.23	15.01	15.47
	<i>Generic product</i>	<i>n</i>	33748	28555	31008	51399	50437	51874
		<i>%*</i>	8.72	9.00	9.39	9.74	11.34	11.69
Analgesics	<i>Original product</i>	<i>n</i>	82410	66623	67839	104311	81821	80263
		<i>%*</i>	7.25	7.29	7.25	7.01	6.41	6.35
	<i>Generic product</i>	<i>n</i>	49785	41738	43232	68611	52967	54420
		<i>%*</i>	12.87	13.16	13.10	13.01	11.91	12.26
Endocrine system	<i>Original product</i>	<i>n</i>	112764	91493	94855	156212	148519	147786
		<i>%*</i>	9.91	10.02	10.13	10.50	11.63	11.69
	<i>Generic product</i>	<i>n</i>	17513	14679	15398	24427	22432	21658
		<i>%*</i>	4.53	4.63	4.66	4.63	5.04	4.88
Central nervous system	<i>Original product</i>	<i>n</i>	77924	61284	61745	101773	90778	87172

	<i>product</i>	%*	6.85	6.71	6.60	6.84	7.11	6.89
	<i>Generic product</i>	<i>n</i>	42059	32904	31008	57125	49850	48106
		%#	10.87	10.37	9.39	10.83	11.21	10.84
Musculo-skeletal agents	<i>Original product</i>	<i>n</i>	62581	48716	49230	81452	71762	71973
		%*	5.50	5.33	5.26	5.48	5.62	5.69
	<i>Generic product</i>	<i>n</i>	28424	22754	23631	36183	32833	33408
		%#	7.35	7.17	7.16	6.86	7.38	7.53
Gastro-intestinal tract	<i>Original product</i>	<i>n</i>	66825	51844	50275	83849	73343	75096
		%*	5.88	5.68	5.37	5.64	5.74	5.94
	<i>Generic product</i>	<i>n</i>	17372	13506	13019	22469	32833	22412
		%#	4.49	4.26	3.94	4.26	7.38	5.05
Ear, nose and throat	<i>Original product</i>	<i>n</i>	73530	58685	58573	94107	75577	72940
		%*	6.46	6.42	6.26	6.33	5.92	5.77
	<i>Generic product</i>	<i>n</i>	6028	4898	4970	8766	8250	9121
		%#	1.56	1.54	1.51	1.66	1.86	2.06
Dermatologicals	<i>Original product</i>	<i>n</i>						68046
		%*						5.38
	<i>Generic product</i>	<i>n</i>						14456
		%#						3.26

* The prevalence percentage of original products is the prevalence of original products divided by the total number of medicine items claimed for the specific month multiplied by hundred.

The prevalence percentage of generic products is the prevalence of generic products divided by the total number of medicine items claimed for the specific month multiplied by hundred.

Table 7B continues:

Main pharmacological group			November	December	January	February	March	April
Respiratory system	Original product	<i>n</i>	143355	144220	18212	211612	226373	248916
		%*	13.87	12.20	10.81	12.98	13.22	14.06
	Generic product	<i>n</i>	37383	35806	45331	57071	63095	70753
		% [#]	10.20	8.64	7.23	9.40	9.74	10.46
Antimicrobials	Original product	<i>n</i>	66866	77791	122708	122243	125131	128856
		%*	6.47	6.58	7.28	7.50	7.31	7.28
	Generic product	<i>n</i>	65966	79048	124550	122266	131132	137102
		% [#]	17.99	19.07	19.85	20.14	20.24	20.27
Cardiovascular agents	Original product	<i>n</i>	160327	190509	244368	231956	250476	256917
		%*	15.51	16.11	14.51	14.22	14.63	14.51
	Generic product	<i>n</i>	43279	51440	68089	64860	69851	72133
		% [#]	11.80	12.41	10.85	10.68	10.78	10.66
Analgesics	Original product	<i>n</i>	65007	71502	120031	117611	123250	125206
		%*	6.29	6.05	7.13	7.21	7.20	7.07
	Generic product	<i>n</i>	45050	46374	77196	76286	81151	84948
		% [#]	12.29	11.19	12.31	12.57	12.53	12.56
Endocrine system	Original product	<i>n</i>	121546	146392	191865	183942	197989	201505
		%*	11.76	12.38	11.39	11.28	11.56	11.38
	Generic product	<i>n</i>	18147	21719	30245	28487	31312	32494
		% [#]	4.95	5.24	4.82	4.69	4.83	4.80
Central nervous system	Original product	<i>n</i>	69099	76651	130101	123165	128285	130145
		%*	6.68	6.48	7.72	7.55	7.49	7.35
	Generic product	<i>n</i>	38140	42960	78681	73457	77132	79216

	<i>product</i>	<i>%[#]</i>	10.40	10.37	12.54	12.10	11.91	11.71
Musculo-skeletal agents	<i>Original product</i>	<i>n</i>	56587	64409	98035	89817	92399	94727
		<i>%[*]</i>	5.47	5.45	5.82	5.51	5.40	5.35
	<i>Generic product</i>	<i>n</i>	26573	30475	46065	42735	44522	47013
		<i>%[#]</i>	7.25	7.35	7.34	7.04	6.87	6.95
Gastro-intestinal tract	<i>Original product</i>	<i>n</i>	60875	70989	112358	99156	99575	101285
		<i>%[*]</i>	5.89	6.00	6.67	6.08	5.81	5.72
	<i>Generic product</i>	<i>n</i>	18651	22567	37573	31877	33100	33601
		<i>%[#]</i>	5.09	5.44	5.99	5.25	5.11	4.97
Ear, nose and throat	<i>Original product</i>	<i>n</i>						105330
		<i>%[*]</i>						5.95
	<i>Generic product</i>	<i>n</i>						13986
		<i>%[#]</i>						2.07
Dermatologicals	<i>Original product</i>	<i>n</i>	57496	70989	111575	96156	98059	
		<i>%[*]</i>	5.56	6.00	6.62	5.90	5.73	
	<i>Generic product</i>	<i>n</i>	12347	13685	22067	18393	19367	
		<i>%[#]</i>	3.37	3.30	3.52	3.03	2.99	

* The prevalence percentage of original products is the prevalence of original products divided by the total number of medicine items claimed for the specific month multiplied by hundred.

The prevalence percentage of generic products is the prevalence of generic products divided by the total number of medicine items claimed for the specific month multiplied by hundred.

Table 8B: Prevalence of the top ten main pharmacological groups according to type (original vs. generic) of medicine. May 2002 to April 2003.

Main pharmacological group			May	June	July	August	September	October
Respiratory system	Original product	<i>n</i>	173808	333398	308634	300654	228463	211355
		%*	19.97	19.85	18.08	17.87	15.75	14.27
	Generic product	<i>n</i>	48533	91009	84388	84837	62684	57329
		%#	13.51	12.89	11.52	11.39	9.67	8.58
Antimicrobials	Original product	<i>n</i>	66867	139633	142378	138447	111243	114533
		%*	7.68	8.32	8.34	8.23	7.67	7.73
	Generic product	<i>n</i>	69437	142297	144064	143371	120744	123558
		%#	19.34	20.15	19.66	19.24	18.63	18.49
Cardiovascular agents	Original product	<i>n</i>	111261	234753	245885	248609	224835	229715
		%*	12.78	13.98	14.40	14.78	15.50	15.50
	Generic product	<i>n</i>	33476	70539	75436	76548	69362	71337
		%#	9.32	9.99	10.30	10.28	10.70	10.67
Analgesics	Original product	<i>n</i>	56480	99898	100444	99462	83252	90238
		%*	6.49	5.95	5.88	5.91	5.74	6.09
	Generic product	<i>n</i>	54799	109384	110667	110745	90733	89026
		%#	15.26	15.49	15.10	14.87	14.00	13.31
Endocrine system	Original product	<i>n</i>	89005	183368	190292	192053	173010	176097
		%*	10.23	10.92	11.15	11.42	11.93	11.89
	Generic product	<i>n</i>	15939	34432	37226	37890	33809	35502
		%#	4.44	4.88	5.08	5.09	5.22	5.31
Central nervous system	Original product	<i>n</i>	57386	108182	111800	112005	98298	102918
	%*	6.59	6.44	6.55	6.66	6.78	6.95	

	Generic product	<i>n</i>	38843	71989	75731	7697	67391	70658
		%#	10.82	10.19	10.34	10.33	10.40	10.57
Musculo-skeletal agents	Original product	<i>n</i>	41442	77164	82169	77343	66389	68360
		%*	4.76	4.60	4.81	4.60	4.58	4.61
	Generic product	<i>n</i>	23105	45368	49040	53392	49075	52926
		%#	6.43	6.42	6.69	7.17	7.57	7.92
Gastro-intestinal tract	Original product	<i>n</i>	44656	77327	81877	80997	71238	77520
		%*	5.13	4.60	4.80	4.81	4.91	5.23
	Generic product	<i>n</i>	17023	28991	29452	29976	26340	30954
		%#	4.74	4.11	4.02	4.02	4.06	4.63
Ear, nose and throat	Original product	<i>n</i>	58276	106584	107627	105710	89640	89010
		%*	6.70	6.35	6.30	6.28	6.18	6.01
	Generic product	<i>n</i>	7498	14510	16127	16444	15869	17338
		%#	2.09	2.05	2.20	2.21	2.45	2.59
Dermatologicals	Original product	<i>n</i>						
		%*						
	Generic product	<i>n</i>						
		%#						

* The prevalence percentage of original products is the prevalence of original products divided by the total number of medicine items claimed for the specific month multiplied by hundred.

The prevalence percentage of generic products is the prevalence of generic products divided by the total number of medicine items claimed for the specific month multiplied by hundred.

Table 8B continues:

Main pharmacological group			November	December	January	February	March	April
Respiratory system	Original product	<i>n</i>	188635	163998	209385	209787	252914	257973
		%*	13.73	16.48	12.71	13.97	15.49	16.55
	Generic product	<i>n</i>	50451	41177	54386	57937	70758	73871
		%#	8.27	7.16	6.90	7.96	9.05	9.83
Antimicrobials	Original product	<i>n</i>	105147	95641	129404	121729	132743	128183
		%*	7.66	7.32	7.86	8.11	8.13	8.22
	Generic product	<i>n</i>	110553	98820	148339	137573	147616	140858
		%#	18.12	17.18	18.83	18.91	18.89	18.74
Cardiovascular agents	Original product	<i>n</i>	218861	215353	251879	215991	231267	222977
		%*	15.94	16.48	15.30	14.39	14.17	14.31
	Generic product	<i>n</i>	67852	70676	86470	75868	82771	82172
		%#	11.12	12.29	10.98	10.43	10.59	10.93
Analgesics	Original product	<i>n</i>	87278	84207	120953	111833	119687	113375
		%*	6.35	6.44	7.34	7.45	7.33	7.27
	Generic product	<i>n</i>	77106	69429	104906	98021	105022	98820
		%#	12.64	12.07	13.32	13.47	13.44	13.15
Endocrine system	Original product	<i>n</i>	166204	163366	188990	165427	177766	169823
		%*	12.10	12.50	11.48	11.02	10.89	10.90
	Generic product	<i>n</i>	32975	31238	40338	37071	39321	37414
		%#	5.41	5.43	5.12	5.10	5.03	4.98
Central nervous system	Original product	<i>n</i>	93407	84628	124808	107465	112169	102800
		%*	6.80	6.48	7.58	7.16	6.87	6.60
	Generic product	<i>n</i>	63377	57196	91183	83154	86981	82282

	<i>product</i>	% [#]	10.39	9.94	11.57	11.43	11.13	10.95
Musculo-skeletal agents	<i>Original product</i>	<i>n</i>	61189	57906	79831	69821	75631	70576
		% [*]	4.46	4.43	4.85	4.65	4.63	4.53
	<i>Generic product</i>	<i>n</i>	48988	46920	64181	57177	60235	56572
		% [#]	8.03	8.16	8.15	7.86	7.71	7.53
Gastro-intestinal tract	<i>Original product</i>	<i>n</i>	74353	76873	104193	88869	91924	86404
		% [*]	5.41	5.88	6.33	5.92	5.63	5.54
	<i>Generic product</i>	<i>n</i>	29546	31564	45030	39212	41134	37304
		% [#]	4.84	5.49	5.72	5.39	5.26	4.96
Ear, nose and throat	<i>Original product</i>	<i>n</i>			99377	93503	105388	101400
		% [*]			6.03	6.23	6.46	6.51
	<i>Generic product</i>	<i>n</i>			18245	16819	18071	17246
		% [#]			2.32	2.31	2.31	2.29
Dermatologicals	<i>Original product</i>	<i>n</i>	78863	80701				
		% [*]	5.74	6.18				
	<i>Generic product</i>	<i>n</i>	19042	19772				
		% [#]	3.12	3.44				

* The prevalence percentage of original products is the prevalence of original products divided by the total number of medicine items claimed for the specific month multiplied by hundred.

The prevalence percentage of generic products is the prevalence of generic products divided by the total number of medicine items claimed for the specific month multiplied by hundred.

Table 1C: Average cost of all medicine items claimed. May 2001 to April 2002.

<i>Month</i>	<i>Total number of medicine items claimed</i>	<i>Average cost per medicine item (R)</i>	<i>Minimum cost (R)</i>	<i>Maximum cost (R)</i>	<i>Total cost (R)</i>
May	1524296	130.80 ± 164.23	0.01	38793.12	199379399.00
June	1230754	131.49 ± 166.89	0.01	19248.28	161836026.00
July	1266101	132.20 ± 159.13	0.01	12019.01	167376142.00
August	2014998	132.55 ± 154.13	0.01	19248.28	267079044.00
September	1722109	139.82 ± 161.05	0.01	19248.28	240778497.00
October	1708168	140.10 ± 163.14	0.01	10787.14	239312390.00
November	1400453	141.08 ± 165.24	0.01	10123.68	197569799.00
December	1596781	146.40 ± 167.42	0.01	17736.21	233770458.00
January	2311879	148.12 ± 167.29	0.01	21837.88	342444664.00
February	2237776	147.78 ± 166.74	0.01	19474.36	330702915.00
March	2360273	149.33 ± 167.51	0.01	21837.88	352449547.00
April	2447323	148.88 ± 166.82	0.20	21837.88	364365722.00

Table 2C: Average cost of all medicines items claimed. May 2002 to April 2003.

<i>Month</i>	<i>Total number of medicine items claimed</i>	<i>Average cost per medicine item (R)</i>	<i>Minimum cost (R)</i>	<i>Maximum cost (R)</i>	<i>Total cost (R)</i>
May	1229381	135.63 ± 160.94	0.01	21837.88	166740336.00
June	2385440	141.69 ± 163.88	0.01	11777.79	337998335.00
July	2440048	145.29 ± 169.12	0.01	20403.92	354516468.00
August	2427244	144.26 ± 168.02	0.01	33084.05	350165125.00
September	2098813	148.88 ± 199.49	0.01	83769.48	312465164.00
October	2149888	150.66 ± 235.62	0.01	73304.28	323904056.00
November	1983465	153.62 ± 212.90	0.01	73304.28	304691145.00
December	1881793	157.69 ± 246.49	0.01	73304.28	296742825.11
January	2434555	154.93 ± 203.33	0.01	73304.28	377173643.00
February	2228799	151.09 ± 172.40	0.01	33084.10	336741645.00
March	2414253	148.29 ± 170.10	0.02	33048.10	358014042.00
April	2310016	147.35 ± 172.94	0.01	29321.37	340379016.00

Table 3C: Average medicine cost per prescription. May 2001 to April 2002.

<i>Month</i>	<i>Total number of prescriptions</i>	<i>Average cost per prescription (R)</i>	<i>Minimum cost (R)</i>	<i>Maximum cost (R)</i>	<i>Total cost (R)</i>
May	740708	269.17 ± 313.57	0.01	38942.21	199379399.00
June	595871	271.60 ± 318.87	0.01	24531.06	161836026.00
July	616329	271.57 ± 306.53	0.01	20660.22	167376142.00
August	998795	267.40 ± 293.15	0.01	24531.06	267079044.00
September	872305	276.03 ± 305.28	0.01	24531.06	240778497.00
October	885892	270.14 ± 307.83	0.01	11479.41	239312390.00
November	724293	272.78 ± 312.27	0.01	10123.68	197569799.00
December	812710	287.64 ± 314.04	0.01	24040.38	233770458.00
January	1187338	288.41 ± 314.10	0.01	24067.38	342444664.00
February	1148370	287.98 ± 314.63	0.06	23761.15	330702915.00
March	1217185	289.56 ± 315.38	0.09	24552.01	352449547.00
April	1261200	288.90 ± 313.93	0.03	24552.01	364365722.00

Table 4C: Average medicine cost per prescription. May 2002 to April 2003.

<i>Month</i>	<i>Total number of prescriptions</i>	<i>Average cost per prescription (R)</i>	<i>Minimum cost (R)</i>	<i>Maximum cost (R)</i>	<i>Total cost (R)</i>
May	650519	256.32 ± 295.20	0.01	24573.80	166740336.00
June	1211046	279.10 ± 306.00	0.02	14547.35	337998335.00
July	1257723	281.87 ± 307.57	0.05	20403.92	354516468.00
August	1260648	277.77 ± 303.40	0.01	33084.05	350165125.00
September	1107865	282.04 ± 346.96	0.05	96152.96	312465164.00
October	1146070	282.62 ± 432.17	0.04	129490.32	323904056.00
November	1058583	287.83 ± 386.98	0.03	129490.32	304691145.00
December	997993	297.34 ± 454.13	0.06	129490.32	296742825.00
January	1304379	289.16 ± 373.42	0.02	129490.32	377173643.00
February	1188840	283.25 ± 310.03	0.03	33084.10	336741645.00
March	1289640	277.61 ± 303.73	0.02	33084.10	358014042.00
April	1233177	276.02 ± 305.31	0.05	29321.37	340379016.00

Table 5C continues:

Main pharmacological group	August			September			October		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
Respiratory system	326866	84.58 ± 100.02	27647302.13	232607	96.79 ± 112.92	22514258.09	217537	99.54 ± 116.75	21654049.30
Anti-microbials	234847	163.73 ± 219.99	38451622.99	180280	173.00 ± 246.36	31187833.90	159188	183.02 ± 268.30	29134445.90
Cardio-vascular agents	248183	216.96 ± 115.77	53845759.62	242216	217.96 ± 115.36	52792633.27	247490	218.24 ± 113.84	54013147.72
Analgesics	172922	59.55 ± 61.28	10296920.09	134788	60.45 ± 62.71	8147650.23	134683	59.84 ± 69.89	8058840.95
Endocrine system	180639	141.69 ± 166.78	25595464.49	170951	144.34 ± 171.80	24675164.81	97508	140.92 ± 147.65	13741097.50
Central nervous system	158898	175.00 ± 181.68	27806485.55	140628	181.51 ± 187.30	25525416.52	135278	183.54 ± 185.62	24828270.19
Musculo-skeletal agents	117635	139.77 ± 123.51	16442215.79	104595	144.58 ± 126.64	15122284.50	105381	147.68 ± 130.58	15563132.66
Gastro-intestinal tract	106318	148.32 ± 151.70	15769475.90	93667	150.35 ± 153.13	14082471.66	97508	140.92 ± 147.65	13741097.50
Ear, nose & throat	102873	101.90 ± 77.93	10483261.58	83827	108.53 ± 81.45	9097367.57			
Dermatologicals							82502	146.23 ± 223.16	12064355.39

Table 5C continues:

Main pharmacological group	November			December			January		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
Respiratory system	180738	101.19 ± 118.67	18288320.70	180026	113.34 ± 126.99	20404032.77	227452	116.28 ± 131.10	26448629.22
Anti-microbials	132832	189.80 ± 276.78	25211156.45	156839	193.62 ± 275.61	30368420.25	247258	180.24 ± 224.14	44565171.94
Cardio-vascular agents	203606	217.85 ± 113.55	44355363.87	241949	219.64 ± 112.10	53140613.19	312457	223.53 ± 115.12	6984474.12
Analgesics	110057	58.74 ± 64.83	6464544.46	117876	62.14 ± 68.50	7325338.34	197227	68.82 ± 77.11	13572529.19
Endocrine system	139693	145.91 ± 178.49	20381977.35	168111	144.64 ± 172.64	24315382.71	222110	155.03 ± 190.48	34434214.15
Central nervous system	107239	187.03 ± 191.04	20056773.71	119611	189.01 ± 192.61	22607443.35	208782	184.67 ± 198.69	38556625.09
Musculo-skeletal agents	83160	148.73 ± 130.95	12368313.19	94884	152.36 ± 129.81	14456389.30	144100	154.38 ± 136.12	22245792.80
Gastro-intestinal tract	79526	140.74 ± 148.66	11192540.60	93556	145.05 ± 151.81	13570454.05	149931	156.25 ± 171.58	23427222.94
Ear, nose & throat									
Dermatologicals	69843	144.11 ± 121.96	10065401.38	84674	144.04 ± 210.04	12196829.18	133642	143.66 ± 203.56	19199657.27

Table 5C continues:

Main pharmacological group	February			March			April		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
Respiratory system	268683	104.95 ± 122.11	21897592.98	289468	105.80 ± 122.32	30625147.09	319669	104.22 ± 122.12	33316329.62
Anti-microbials	244509	180.42 ± 220.49	44115153.71	256263	182.09 ± 223.69	46663758.19	265958	182.66 ± 225.23	48579056.38
Cardio-vascular agents	296816	225.90 ± 115.88	67051191.40	320327	227.38 ± 118.15	72837216.36	329050	228.82 ± 117.95	75293961.88
Analgesics	193897	68.94 ± 80.46	13367254.90	204401	71.50 ± 84.34	14615493.87	210154	70.70 ± 82.59	14857499.38
Endocrine system	212429	160.69 ± 204.90	34135809.43	229301	159.86 ± 193.05	36655758.26	233999	159.36 ± 199.86	37289933.11
Central nervous system	196622	188.83 ± 201.39	37128142.57	205417	192.08 ± 204.06	39457416.49	209361	192.53 ± 203.44	40307231.75
Musculo-skeletal agents	132552	157.26 ± 138.62	20845264.78	136921	163.70 ± 142.23	22414138.50	141740	162.97 ± 138.97	23099761.42
Gastro-intestinal tract	131033	163.67 ± 162.40	21446409.93	132675	162.64 ± 173.12	21578275.61	134886	162.03 ± 172.69	21855748.44
Ear, nose & throat							119316	114.89 ± 82.23	13707695.32
Dermatologicals	114549	147.76 ± 208.21	16925365.95	117426	151.35 ± 217.42	17771899.68			

Table 6C continues:

Main pharmacological group	November			December			January		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
Respiratory system	239086	114.64 ± 132.78	27409251.07	205175	125.81 ± 142.55	25813797.70	263771	119.98 ± 143.25	31646816.29
Anti-microbials	215700	209.62 ± 432.78	45215644.20	194461	223.46 ± 579.54	43454883.05	277743	203.12 ± 391.81	56416137.36
Cardio-vascular agents	286713	226.83 ± 113.30	65035690.59	286029	227.40 ± 114.48	65044231.46	338349	230.61 ± 117.96	78025894.42
Analgesics	164384	66.12 ± 82.71	10868732.12	153636	67.89 ± 74.22	10430325.55	225859	71.82 ± 85.57	16221488.08
Endocrine system	199179	156.45 ± 223.61	31161229.65	194604	157.36 ± 224.59	30623103.92	229328	163.02 ± 213.16	37385136.62
Central nervous system	156784	198.51 ± 202.47	31122812.29	141824	203.74 ± 206.98	28895416.51	215991	199.39 ± 210.84	43067439.62
Musculo-skeletal agents	110177	155.91 ± 133.17	17178219.28	104826	160.87 ± 136.43	16863107.22	1441012	156.78 ± 138.34	22578010.02
Gastro-intestinal tract	103899	153.16 ± 184.95	15912892.18	108437	150.06 ± 186.29	16271524.20	149223	154.38 ± 169.67	23036888.75
Ear, nose & throat							117622	119.36 ± 83.90	14039749.49
Dermatologicals	97905	166.74 ± 259.00	16324661.44	100473	162.40 ± 220.35	16316859.93			

Table 7C: Average cost of medicine items according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original Products			Generic Products		
	<i>n</i>	Average cost (R)	Total Cost (R)	<i>n</i>	Average cost (R)	Total Cost (R)
May	1137441	153.16 ± 181.26	174211269.00	386855	65.06 ± 62.29	25168130.38
June	913491	154.34 ± 184.71	140992512.00	317263	65.70 ± 63.02	20843513.83
July	935998	155.62 ± 175.42	145663196.00	330103	65.78 ± 62.43	21712945.57
August	1487472	156.02 ± 169.34	232079205.00	527526	66.35 ± 62.80	34999839.70
September	1277418	164.46 ± 176.40	210085736.00	444691	69.02 ± 65.53	30692761.34
October	1264403	164.90 ± 179.11	208494741.00	443765	69.45 ± 65.59	30817648.25
November	1033791	166.28 ± 181.58	171899517.00	366662	70.01 ± 67.01	25670281.98
December	1182315	172.23 ± 183.46	203630342.00	414466	72.72 ± 68.17	30140115.51
January	1684564	176.02 ± 183.62	296510901.00	627315	73.22 ± 70.02	45933762.55
February	1630700	175.15 ± 183.00	285622567.00	607076	74.26 ± 71.44	45080347.45
March	1712506	177.26 ± 183.89	303563760.00	647767	75.47 ± 72.95	48885787.04
April	1770895	177.07 ± 183.28	313571245.00	676428	75.09 ± 72.21	50794476.19

Table 8C: Average cost of medicine items according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original Products			Generic Products		
	<i>n</i>	Average cost (R)	Total Cost (R)	<i>n</i>	Average cost (R)	Total Cost (R)
May	1779338	172.52 ± 182.81	306962819.00	744173	71.93 ± 68.83	53526011.18
June	1679268	171.20 ± 182.32	287496279.00	706172	71.52 ± 68.43	50502055.84
July	1707375	176.14 ± 188.80	300739196.00	732673	73.40 ± 69.25	53777271.98
August	1682257	175.68 ± 188.24	295530890.00	744987	73.34 ± 68.60	54634234.71
September	1450748	181.86 ± 227.74	263826547.00	648065	75.05 ± 69.91	48638617.48
October	1481572	184.53 ± 273.16	273401803.00	668316	75.57 ± 70.69	50502253.04
November	1373390	187.11 ± 243.80	256978009.00	610075	78.21 ± 73.09	47713135.28
December	1306602	191.52 ± 285.16	250245496.00	575191	80.84 ± 74.52	46497329.12
January	1646785	190.83 ± 232.92	314259541.00	787770	79.86 ± 77.64	62914101.75
February	1501304	186.65 ± 193.74	280221510.00	727495	77.69 ± 74.79	56520134.29
March	1632647	182.46 ± 191.17	297895360.00	781547	76.89 ± 73.70	60091286.53
April	1558530	181.54 ± 195.56	282935087.00	751486	76.44 ± 71.91	57443928.64

Table 1D: Antibiotic items and prescriptions claimed. May 2001 to April 2002.

Month	Total number of antibiotics claimed		Total number of prescriptions containing antibiotics		Average number of antibiotics per prescription
	<i>n</i>	%*	<i>n</i>	%#	
May	144359	9.47	141394	19.09	1.02 ± 0.15
June	118424	9.62	116092	19.48	1.02 ± 0.14
July	123291	9.74	120888	19.61	1.02 ± 0.14
August	192048	9.53	188529	18.88	1.02 ± 0.14
September	140468	8.16	137600	15.77	1.02 ± 0.15
October	118952	6.96	116482	13.15	1.02 ± 0.15
November	98693	7.04	96613	13.34	1.02 ± 0.15
December	114386	7.16	112065	13.79	1.02 ± 0.14
January	182271	7.88	177247	14.93	1.02 ± 0.17
February	185223	8.28	180812	15.75	1.02 ± 0.16
March	193398	8.19	189073	15.53	1.02 ± 0.15
April	200488	8.19	195879	15.53	1.02 ± 0.16

* The prevalence percentage of antibiotic items is the prevalence of antibiotic items divided by the total number of items claimed for the specific month multiplied by hundred.

The prevalence percentage of antibiotic prescriptions is the prevalence of antibiotic prescriptions divided by the total number of prescriptions claimed for the specific month multiplied by hundred.

Table 2D: Antibiotic items and prescriptions claimed. May 2002 to April 2003.

Month	Total number of antibiotics claimed		Total number of prescriptions containing antibiotics		Average number of antibiotics per prescription
	<i>n</i>	%	<i>n</i>	%	
May	226496	18.42	222036	34.13	1.02 ± 0.15
June	224103	9.39	220101	18.17	1.02 ± 0.14
July	219692	9.00	215351	17.12	1.02 ± 0.14
August	217833	8.97	213540	16.94	1.02 ± 0.14
September	170685	8.13	167173	15.09	1.02 ± 0.15
October	171104	7.96	167435	14.61	1.02 ± 0.15
November	151300	7.63	148152	14.00	1.02 ± 0.15
December	131653	7.00	128782	12.90	1.02 ± 0.15
January	192686	7.91	187679	14.39	1.03 ± 0.16
February	183686	8.24	179173	15.07	1.03 ± 0.16
March	200589	8.31	196225	15.22	1.02 ± 0.15
April	190667	8.25	186637	15.13	1.02 ± 0.15

* The prevalence percentage of antibiotic items is the prevalence of antibiotic items divided by the total number of items claimed for the specific month multiplied by hundred.

The prevalence percentage of antibiotic prescriptions is the prevalence of antibiotic prescriptions divided by the total number of prescriptions claimed for the specific month multiplied by hundred.

Table 1E: Prevalence of the pharmacological groups of antibiotics (e.g. Beta-lactam agents). May 2001 to April 2002.

Pharmacological groups	May		June		July		August		September		October	
	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*
Beta-lactams	83260	57.67	69775	58.92	73429	59.56	115134	59.95	82345	58.62	67469	56.72
Erythromycin and other Macrolides	21657	15.00	17468	14.75	17841	14.47	27589	14.37	17690	15.59	13958	11.73
Aminoglycosides	41	0.03	26	0.02	32	0.03	28	0.01	21	0.01	27	0.02
Tetracyclines	12440	8.62	9957	8.41	9978	8.09	15249	7.94	12608	8.98	11318	9.51
Chloramphenicols	126	0.09	111	0.09	111	0.09	155	0.08	111	0.08	104	0.09
Sulphonamides	8733	6.05	7397	6.25	7115	5.77	10354	5.39	9342	6.65	9436	7.93
Quinolones	15463	10.71	11634	9.82	12806	10.39	20079	10.46	15375	10.95	14036	11.80
Other	2639	1.83	2056	1.74	1979	1.61	3460	1.80	2976	2.12	2604	2.19
Total	114359	100	118424	100	123291	100	192048	100	140468	100	118952	100

* The prevalence percentage of the pharmacological group is the prevalence of the pharmacological group divided by the total number of antibiotic items claimed for the specific month multiplied by hundred.

Table 1E continues:

Pharmacological groups	November		December		January		February		March		April	
	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*
Beta-lactams	56241	56.99	64560	56.44	95508	52.40	102745	55.47	107309	55.49	111042	55.39
Erythromycin and other Macrolides	11551	11.70	13163	11.51	21012	11.53	22381	12.08	24904	12.88	25172	12.56
Aminoglycosides	16	0.02	13	0.01	70	0.04	20	0.01	30	0.02	53	0.03
Tetracyclines	9526	9.65	10937	9.56	19027	10.44	17416	9.40	17410	9.00	18789	9.37
Chloramphenicols	86	0.09	128	0.11	219	0.12	150	0.08	158	0.08	208	0.10
Sulphonamides	7947	8.05	9459	8.27	13524	7.42	12331	6.66	12924	6.68	13981	6.97
Quinolones	11102	11.25	13723	12.00	28043	15.39	25608	13.83	26028	13.46	26585	13.26
Other	2224	2.25	2403	2.10	4868	2.67	4572	2.47	4635	2.40	4658	2.32
Total	98693	100	114386	100	182271	100	185223	100	193398	100	200488	100

*The prevalence percentage of the pharmacological group is the prevalence of the pharmacological group divided by the total number of antibiotic items claimed for the specific month multiplied by hundred.

Table 2E: Prevalence of the pharmacological groups of antibiotics (e.g. Beta-lactam agents). May 2002 to May 2003.

Pharmacological groups	May		June		July		August		September		October	
	n	%*	n	%*	n	%*	n	%*	n	%*	n	%*
Beta-lactams	133348	58.87	137764	61.47	129051	58.74	130469	59.89	98197	57.53	96142	56.19
Erythromycin and other Macrolides	29647	13.09	30240	13.49	29127	13.26	27970	12.84	20004	11.72	19840	11.60
Aminoglycosides	31	0.01	36	0.02	24	0.01	32	0.01	28	0.02	22	0.01
Tetracyclines	17657	7.80	15384	6.86	16522	7.52	15952	7.32	13975	8.19	14636	8.55
Chloramphenicols	223	0.10	161	0.07	183	0.08	265	0.12	296	0.17	263	0.15
Sulphonamides	14740	6.51	13748	6.13	14720	6.70	14715	6.76	13684	8.02	15210	8.89
Quinolones	26382	11.65	23024	10.27	25876	11.78	24350	11.18	20740	12.15	21149	12.36
Other	4468	1.97	3746	1.67	4189	1.91	4080	1.87	3761	2.20	3842	2.25
Total	226496	100	224103	100	219692	100	217833	100	170685	100	171104	100

* The prevalence percentage of the pharmacological group is the prevalence of the pharmacological group divided by the total number of antibiotic items claimed for the specific month multiplied by hundred.

Table 2E continues:

Pharmacological groups	November		December		January		February		March		April	
	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*
Beta-lactams	83754	55.36	71347	54.19	100923	52.38	101091	55.03	113664	56.67	107714	55.49
Erythromycin and other Macrolides	16831	11.12	14133	10.74	20568	10.67	19774	10.77	23390	11.66	21998	11.54
Aminoglycosides	21	0.01	11	0.01	27	0.01	31	0.02	37	0.02	21	0.01
Tetracyclines	13344	8.82	11839	8.99	18042	9.36	15233	8.29	16045	8.00	15146	7.94
Chloramphenicols	172	0.11	191	0.15	247	0.13	240	0.13	232	0.12	188	0.10
Sulphonamides	14335	9.47	13515	10.27	16919	8.78	15627	8.51	16800	8.38	16852	8.84
Quinolones	19344	12.79	17499	13.29	31133	16.16	27121	14.76	25937	12.93	24539	12.87
Other	3499	2.31	3118	2.37	4827	2.51	4569	2.49	4484	2.24	4209	2.21
Total	151300	100	131653	100	192686	100	183686	100	200589	100	190667	100

* The prevalence percentage of the pharmacological group is the prevalence of the pharmacological group divided by the total number of antibiotic items claimed for the specific month multiplied by hundred.

Table 3E: Prevalence of individual antibiotics of the Penicillin pharmacological group claimed. May 2001 to April 2002.

Individual antibiotics	May		June		July		August		September		October	
	n	%*	n	%*	n	%*	n	%*	n	%*	n	%*
Amoxicillin	20430	38.54	16947	38.14	18280	38.80	27491	37.84	19649	36.97	16119	36.48
Amoxicillin/Clavulanic	27718	52.29	23876	53.73	25051	53.17	38872	53.51	28630	53.86	23500	53.18
Amoxicillin/Flucloxacillin	2094	3.95	1523	3.43	1667	3.54	2779	3.83	2279	4.29	2000	4.53
Ampicillin	636	1.20	448	1.01	392	0.83	777	1.07	496	0.93	475	1.07
Ampicillin/Cloxacillin	766	1.44	550	0.12	670	1.42	993	1.37	730	1.37	664	1.50
Benzathine Penicillin	1	0.002							1	0.00		
Benzympenicillin	2	0.004	1	0.002								
Benzympenicillin/Procaine penicillin	17	0.03	24	0.05	11	0.02	58	0.21	18	0.03	23	0.05
Cloxacillin	427	0.81	353	1.20	370	0.79	601	0.83	458	0.86	490	1.11
Flucloxacillin	233	0.44	199	0.45	161	0.34	156	0.22	200	0.38	203	0.46
Penicillin VK	684	1.29	511	1.15	517	1.10	813	1.12	693	1.30	704	1.59
Procaine Penicillin	3	0.006	3	0.01			1	0.00			9	0.02
Total	53011	100	44435	100	47119	100	72641	100	53154	100	44187	100

* The prevalence percentage of the individual antibiotic is the prevalence of the individual antibiotic divided by the total number of penicillin items claimed for the specific month multiplied by hundred.

Table 3E continues:

<i>Individual antibiotics</i>	<i>November</i>		<i>December</i>		<i>January</i>		<i>February</i>		<i>March</i>		<i>April</i>	
	<i>n</i>	<i>%*</i>	<i>n</i>	<i>%*</i>	<i>n</i>	<i>%*</i>	<i>n</i>	<i>%*</i>	<i>n</i>	<i>%*</i>	<i>n</i>	<i>%*</i>
Amoxicillin	13758	37.52	15092	34.82	21466	33.22	23745	35.51	24619	35.34	26355	36.42
Amoxicillin/Clavulanic	19205	52.38	23208	53.55	35060	54.25	36085	53.96	37483	53.81	38843	53.67
Amoxicillin/Flucloxacillin	1541	4.20	2353	5.43	3867	5.98	3292	4.92	3513	5.04	3274	4.52
Ampicillin	335	0.91	402	0.93	591	0.71	550	0.82	600	0.86	662	0.91
Ampicillin/Cloxacillin	641	1.75	778	1.80	1412	2.18	1183	1.77	1330	1.91	1321	1.83
Benzathine Penicillin					8	0.01			10	0.01		
Benzylpenicillin	9	0.02	6	0.01	3	0.01						
Benzylpenicillin/Procaine penicillin	18	0.05	22	0.05	37	0.06	17	0.03	6	0.01	41	0.06
Cloxacillin	370	1.01	603	1.39	949	1.47	799	1.19	840	1.21	725	1.00
Flucloxacillin	186	0.51	256	0.59	421	0.65	415	0.62	505	0.72	470	0.65
Penicillin VK	595	1.62	619	1.43	803	1.24	775	1.16	748	1.07	678	0.94
Procaine Penicillin	9	0.02	1	0.002	6	0.01	7	0.01	6	0.01		
Total	36667	100	43340	100	64623	100	66868	100	69660	100	72369	100

* The prevalence percentage of the individual antibiotic is the prevalence of the individual antibiotic divided by the total number of penicillin items claimed for the specific month multiplied by hundred.

Table 4E: Prevalence of individual antibiotics of the Penicillin pharmacological group claimed. May 2002 to May 2003.

Individual antibiotics	May		June		July		August		September		October	
	n	%*	n	%*	n	%*	n	%*	n	%*	n	%*
Amoxicillin	32620	38.35	33195	38.92	30831	37.29	32246	38.39	25047	38.05	24098	37.10
Amoxicillin/Clavulanic	45745	53.78	46026	53.96	45288	54.78	45513	54.19	35517	53.96	35198	54.19
Amoxicillin/Flucloxacillin	3158	0.37	2779	3.26	3039	3.68	2950	3.51	2487	3.78	2715	4.18
Ampicillin	556	0.65	583	0.68	598	0.72	536	0.64	437	0.66	391	0.60
Ampicillin/Cloxacillin	1147	1.35	1111	1.30	1130	1.37	912	1.08	869	1.32	855	1.32
Benzathine Penicillin	1	0.00			1	0.00	3	0.00	1	0.00	7	0.01
Benzympenicillin			7	0.01	1	0.00	5	0.01	1	0.00	2	0.00
Benzympenicillin/Procaine penicillin	18	0.02	33	0.04	33	0.04	22	0.03	7	0.01	10	0.02
Cloxacillin	696	0.82	580	0.68	653	0.79	662	0.79	552	0.84	683	1.05
Flucloxacillin	369	0.43	327	0.38	345	0.42	395	0.47	262	0.40	271	.042
Penicillin VK	752	0.88	654	0.77	744	0.90	744	0.89	642	0.98	721	1.11
Piperacillin			1	0.00							3	0.00
Procaine Penicillin	6	0.01	4	0.00	6	0.01	4	0.00	3	0.00		
Total	85068	100	85300	100	82669	100	83992	100	65825	100	64954	100

* The prevalence percentage of the individual antibiotic is the prevalence of the individual antibiotic divided by the total number of penicillin items claimed for the specific month multiplied by hundred.

Table 4E continues:

Individual antibiotics	November		December		January		February		March		April	
	n	%*	n	%*	n	%*	n	%*	n	%*	n	%*
Amoxicillin	21427	37.96	17344	35.22	24792	35.08	24657	35.83	27465	36.00	26582	36.94
Amoxicillin/Clavulanic	29819	52.83	26887	54.60	38295	54.19	37145	53.97	41950	54.99	39213	54.49
Amoxicillin/Flucloxacillin	2528	4.48	2414	4.90	3576	5.06	3369	4.90	3229	4.23	2878	4.00
Ampicillin	345	0.61	355	0.72	489	0.69	486	0.71	537	0.70	416	0.58
Ampicillin/Cloxacillin	867	1.54	779	1.58	1349	1.91	1141	1.66	1169	1.53	1022	1.42
Benzathine Penicillin	1	0.00	6	0.01	5	0.01	3	0.00	2	0.00	6	0.01
Benzympenicillin					6	0.01						
Benzympenicillin/Procaine penicillin	13	0.02	43	0.09	30	0.04	31	0.05	13	0.02	13	0.02
Cloxacillin	598	1.06	563	1.14	983	1.39	914	1.33	778	1.02	764	1.06
Flucloxacillin	286	0.51	286	0.58	448	0.63	399	0.58	415	0.54	343	0.48
Penicillin VK	554	0.98	551	1.12	694	0.98	679	0.99	732	0.96	719	1.00
Piperacillin												
Procaine Penicillin	3	0.01			5	0.01			3	0.00	3	0.00
Total	56441	100	49245	100	70672	100	68824	100	76293	100	71959	100

* The prevalence percentage of the individual antibiotic is the prevalence of the individual antibiotic divided by the total number of penicillin items claimed for the specific month multiplied by hundred.

Table 5E: Prevalence of individual antibiotics of the Cephalosporin pharmacological group claimed. May 2001 to April 2002.

Individual antibiotics	May		June		July		August		September		October	
	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*
Cefaclor	2248	8.03	1659	7.04	1838	7.49	2654	6.71	1803	6.58	1455	6.69
Cefadroxil	609	2.17	424	1.80	432	1.76	634	1.60	441	1.61	396	1.82
Cefazolin	2	0.007					9	0.02	3	0.01		
Cefepime											3	0.01
Cefixime	541	1.93	431	1.83	544	2.22	778	1.97	490	1.79	373	1.72
Cefotaxime					3	0.01					3	0.01
Cefpodoxime	8962	32.00	7844	33.31	7843	39.98	12514	31.66	8755	31.97	7026	32.32
Cefprozil	1649	5.89	1447	6.14	1382	5.63	2667	6.75	1834	0.49	1247	5.74
Ceftibuten	605	2.16	498	2.11	487	1.99	797	2.02	545	1.99	452	2.08
Ceftrazidime			3	0.00								
Ceftriaxone	49	0.17	43	0.18	74	0.30	59	0.15	101	0.37	69	0.32
Cefuroxime	12059	43.06	10212	43.36	10893	44.41	17619	44.57	11993	43.79	9681	44.54
Cephalexin	1069	3.82	835	3.55	889	3.62	1646	4.16	1290	4.71	918	4.22
Cephalothin			3	0.00								
Cephradine	215	0.77	152	0.65	142	0.58	158	0.40	132	0.48		
Total	28008	100	23551	100	24527	100	39532	100	27387	100	21737	100

* The prevalence percentage of the individual antibiotic is the prevalence of the individual antibiotic divided by the total number of cephalosporin items claimed for the specific month multiplied by hundred.

Table 5E continues:

Individual antibiotics	November		December		January		February		March		April	
	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*
Cefaclor	1268	6.88	1566	7.87	2159	7.43	2518	7.49	2384	6.75	2511	6.94
Cefadroxil	299	1.62	438	2.20	628	2.16	675	2.01	759	2.15	739	2.04
Cefazolin			2	0.01	3	0.01			5	0.01		
Cefepime							3	0.01				
Cefixime	287	1.56	321	1.61	586	2.02	554	1.65	529	1.50	598	1.65
Cefotaxime	3	0.02	3	0.02			2	0.01	4	0.01	3	0.01
Cefpodoxime	6268	34.00	6352	31.94	8703	29.93	11332	33.73	11903	33.69	11945	33.02
Cefprozil	1056	5.73	694	3.49	1658	5.70	2246	6.68	2107	5.96	2278	6.30
Ceftibuten	349	1.89	407	2.05	684	2.35	631	1.88	618	1.75	328	0.91
Ceftrazidime							6	0.02	4	0.01		
Ceftriaxone	68	0.37	67	0.30	96	0.33	132	0.39	143	0.40	127	0.35
Cefuroxime	7936	43.05	8773	44.11	12998	44.70	13964	41.56	15522	43.93	16082	44.46
Cephalexin	795	4.31	858	4.31	1296	4.46	1262	3.76	1150	3.25	1322	3.65
Cephalothin												
Cephradine	106	0.57	137	0.69	261	0.90	276	0.82	204	0.58	242	0.67
Total	18435	100	19888	100	29076	100	33601	100	35332	100	36175	100

* The prevalence percentage of the individual antibiotic is the prevalence of the individual antibiotic divided by the total number of cephalosporin items claimed for the specific month multiplied by hundred.

Table 6E: Prevalence of individual antibiotics of the Cephalosporin pharmacological group claimed. May 2002 to April 2003.

Individual antibiotics	May		June		July		August		September		October	
	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*
Cefaclor	2979	6.58	2889	5.88	2444	5.60	2412	5.51	1928	6.30	1790	6.06
Cefadroxil	594	1.31	478	0.97	481	1.10	543	1.24	345	1.13	303	1.03
Cefazolin	6	0.01	1	0.00					2	0.01		
Cefepime												
Cefixime	682	1.51	742	1.51	568	1.30	513	1.17	462	1.51	453	1.53
Cefotaxime	2	0.00	5	0.01								
Cefoxitin Sodium												
Cefpodoxime	15732	34.75	18444	37.53	15939	36.49	16041	36.66	11298	36.90	10569	35.79
Cefprozil	2935	6.48	3009	6.12	2761	6.32	2876	6.57	1958	6.39	2266	7.67
Cefradine	9	0.02	4	0.01			1	0.00	2	0.01		
Ceftibuten	310	0.68	214	0.44	265	0.61	268	0.61	194	0.63	219	0.74
Ceftrazidime												
Ceftriaxone	123	0.27	108	0.22	125	0.29	135	0.31	94	0.31	96	0.33
Cefuroxime	20498	45.28	21850	44.47	19815	45.36	19813	45.28	13398	43.76	12944	43.83
Cephalexin	1208	2.67	1247	2.54	1101	2.52	953	2.18	870	2.84	791	2.68
Cephalothin												
Cephradine	192	0.42	148	0.30	182	0.42	96	0.22	68	0.22	100	0.34
Total	45270	100	49139	100	43681	100	43755	100	30619	100	29531	100

* The prevalence percentage of the individual antibiotic is the prevalence of the individual antibiotic divided by the total number of cephalosporin items claimed for the specific month multiplied by hundred.

Table 6E continues:

Individual antibiotics	November		December		January		February		March		April	
	n	%*	n	%*	n	%*	n	%*	n	%*	n	%*
Cefaclor	1546	6.02	1463	7.01	1988	6.92	1855	6.07	1866	5.28	1856	5.46
Cefadroxil	263	1.02	260	1.25	392	1.36	347	1.13	366	1.03	406	1.19
Cefazolin	3	0.01			9	0.03					13	0.04
Cefepime											1	0.00
Cefixime	376	1.46	356	1.70	471	1.64	396	1.30	410	1.16	392	1.15
Cefotaxime			1	0.00			4	0.01			3	0.01
Cefoxitin Sodium											3	0.01
Cefpodoxime	9029	35.14	7072	33.86	9642	33.57	10758	35.19	12659	35.79	12020	35.34
Cefprozil	2084	8.11	1339	6.41	1779	6.19	2060	6.74	2727	7.71	2459	7.23
Cefradine					36	0.13	11	0.04	4	0.01	5	0.01
Ceftibuten	301	1.17	334	1.60	291	1.01	269	0.88	297	0.84	323	0.95
Ceftazidime												
Ceftioxone	87	0.34	103	0.49	168	0.58	107	0.35	122	0.34	136	0.40
Cefuroxime	11213	43.65	9087	43.51	12570	43.76	13573	44.40	15746	44.52	15292	44.95
Cephalexin	702	2.73	740	3.54	1222	4.25	1045	3.42	1061	3.00	1003	2.95
Cephalothin												
Cephadrine	87	0.34	128	0.61	154	0.54	148	0.48	113	0.32	105	0.31
Total	25691	100	20883	100	28722	100	30573	100	35371	100	34017	100

* The prevalence percentage of the individual antibiotic is the prevalence of the individual antibiotic divided by the total number of cephalosporin items claimed for the specific month multiplied by hundred.

Table 7E: Prevalence of individual antibiotics of the other Beta-lactam pharmacological group claimed. May 2001 to April 2002.

Individual antibiotics	May		June		July		August		September		October	
	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*
Loracarbef	2254	100	1789	100	1783	100	2961	100	1804	100	1545	100
Meropenem/Trihydrate												
Imipenem/Cilastatin												
Total	2254	100	1789	100	1783	100	2961	100	1804	100	1545	100

* The prevalence percentage of the individual antibiotic is the prevalence of the individual antibiotic divided by the total number of other beta-lactam items claimed for the specific month multiplied by hundred.

Table 7E continues:

Individual antibiotics	November		December		January		February		March		April	
	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*
Loracarbef	1139	100	1330	99.85	1808	99.94	2276	100	2317	100	2492	99.76
Meropenem/Trihydrate											6	0.24
Imipenem/Cilastatin			2	0.15	1	0.06						
Total	1139	100	1332	100	1809	100	2276	100	2317	100	2498	100

* The prevalence percentage of the individual antibiotic is the prevalence of the individual antibiotic divided by the total number of other beta-lactam items claimed for the specific month multiplied by hundred.

Table 8E: Prevalence of individual antibiotics of the other Beta-lactam pharmacological group claimed. May 2002 to April 2003.

Individual antibiotics	May		June		July		August		September		October	
	n	%*	n	%*	n	%*	n	%*	n	%*	n	%*
Loracarbef	3010	100	3325	100	2701	100	2722	100	1753	100	1657	100
Meropenem/Trihydrate												
Imipenem/Cilastatin												
Total	3010	100	3325	100	2701	100	2722	100	1753	100	1657	100

* The prevalence percentage of the individual antibiotic is the prevalence of the individual antibiotic divided by the total number of other beta-lactam items claimed for the specific month multiplied by hundred.

Table 8E continues:

Individual antibiotics	November		December		January		February		March		April	
	n	%*	n	%*	n	%*	n	%*	n	%*	n	%*
Loracarbef	1622	100	1216	100	1526	99.80	1690	99.76	1999	99.95	1737	99.94
Meropenem/Trihydrate					3	0.20			1	0.05	1	0.06
Imipenem/Cilastatin							4	0.24				
Total	1622	100	1216	100	1529	100	1694	100	2000	100	1738	100

* The prevalence percentage of the individual antibiotic is the prevalence of the individual antibiotic divided by the total number of other beta-lactam items claimed for the specific month multiplied by hundred.

Table 9E: Prevalence of the top 10 individual antibiotic products claimed. May 2001 to April 2002.

Individual antibiotic products	May		June		July		August		September		October	
	n	%*	n	%*	n	%*	n	%*	n	%*	n	%*
Augmaxil® 375mg TAB	7370	5.11	6322	5.34	6585	5.34	9805	5.11	6738	4.80	5950	5.00
Augmentin® 1000BD TAB	3495	2.42	3143	2.65	3728	3.02	5804	3.02	4391	3.13	3465	2.91
Ciprobay® 250mg TAB	3605	2.50	2524	2.13	2729	2.21	4311	2.24	3647	2.60	3412	2.87
Ciprobay® 500mg TAB												
Orelox® 100mg TAB	3669	2.54	3256	2.75	3716	3.01	5792	3.02	3553	2.53		
Orelox® Junior SUS	5293	3.67	4588	3.87	4127	3.35	6722	3.50	5202	3.70	4121	3.46
Purbac® 480mg TAB	3137	2.17					3907	2.03			3326	2.80
Purbac® DS TAB			2879	2.43	2780	2.25			3709	2.64	3865	3.25
Zinnat® 125mg/5ml SUS	4267	2.96	3672	3.10	3257	2.64	5712	2.97	4479	3.19	3745	3.15
Zinnat® 250mg TAB	6017	4.17	4977	4.20	5682	4.61	8967	4.67	5587	3.98	4304	3.62
Zithromax® 500mg TAB	4527	3.14	3784	3.20	4316	3.50	6925	3.61	4072	2.90	3217	2.70
Other	102979	71.34	83279	70.32	86371	70.05	134103	69.83	99090	70.54	83547	70.45
Total	144359	100	118424	100	123291	100	192048	100	140468	100	118952	100

* The prevalence percentage of the individual antibiotic products is the prevalence of the individual antibiotic products divided by the total number of antibiotics items claimed for the specific month multiplied by hundred.

Table 9E continues:

<i>Individual antibiotic products</i>	<i>November</i>		<i>December</i>		<i>January</i>		<i>February</i>		<i>March</i>		<i>April</i>	
	<i>n</i>	<i>%*</i>	<i>n</i>	<i>%*</i>	<i>n</i>	<i>%*</i>	<i>n</i>	<i>%*</i>	<i>n</i>	<i>%*</i>	<i>n</i>	<i>%*</i>
Augmaxil® 375mg TAB	4953	5.02	6035	5.28	9147	5.02	8732	4.71	8548	4.42	9134	4.56
Augmentin® 1000BD TAB	2732	2.77	3210	2.81	5540	3.04	5203	2.81	5365	2.77	5502	2.74
Ciprobay® 250mg TAB	2915	2.95	3200	2.80	5751	3.16						
Ciprobay® 500mg TAB					5014	2.75						
Orelox® 100mg TAB							4778	2.58	4642	2.40	4790	2.39
Orelox® Junior SUS	3991	4.04	3728	3.26	4520	2.48	6554	3.54	7261	3.75	7155	3.57
Purbac® 480mg TAB	2573	2.61	3135	2.74	5084	2.79	4356	2.35	4534	2.34	4982	2.48
Purbac® DS TAB	3370	3.41	3961	3.46	5300	2.91	5006	2.70	5237	2.71	5699	2.84
Zinnat® 125mg/5ml SUS	3328	3.37	3422	2.99			4777	2.58	5839	3.02	5937	2.96
Zinnat® 250mg TAB	3483	3.53	3923	3.43	6516	3.57	6570	3.55	7327	3.79	9024	4.50
Zithromax® 500mg TAB	2617	2.65	2826	2.47	4931	2.71	5428	2.93	5494	2.84	5562	2.77
Other	68731	69.64	80946	70.77	130468	71.58	133819	72.25	139151	71.95	142703	71.18
Total	98693	100	114386	100	182271	100	185223	100	193398	100	200488	100

* The prevalence percentage of the individual antibiotic products is the prevalence of the individual antibiotic products divided by the total number of antibiotics items claimed for the specific month multiplied by hundred.

Table 10E: Prevalence of the top 10 individual antibiotic products claimed. May 2002 to May 2003.

Individual antibiotic products	May		June		July		August		September		October	
	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*	<i>n</i>	%*
Augmaxil® 375mg TAB	10580	4.67	10059	4.49	10297	4.69	8724	4.00	6086	3.57	4856	2.84
Augmentin® 1000BD TAB	5971	2.64	5458	2.44	6416	2.92	6166	2.83	4830	2.83	5082	2.97
Clavumox® 375mg TAB												
Orelox® 100mg TAB	6762	2.99	8016	3.58	7922	3.61	7486	3.44	4643	2.72	4210	2.46
Orelox® Junior SUS	8970	3.96	10428	4.65	8017	3.65	8555	3.93	6655	3.90	6359	3.72
Purbac® 480mg TAB	4890	2.16	4356	1.94	4806	2.19	4787	2.20	4254	2.49	4815	2.81
Purbac® DS TAB	6118	2.70	5935	2.65	6661	3.03	6695	3.07	6550	3.84	7204	4.21
Ranclav® 375mg TAB												
Utin® 400mg TAB												
Zinnat® 125mg/5ml SUS	7717	3.41	8947	3.99	6567	2.99	7430	3.41	5239	3.07	5282	3.09
Zinnat® 250mg TAB	11885	5.25	12197	5.44	12694	5.78	11863	5.45	7774	4.55	7302	4.27
Zithromax® 500mg TAB	6838	3.02	6517	2.91	6890	3.14	6341	2.91	4389	2.57	4279	2.50
Other	156765	69.21	152190	67.71	149422	68.01	149786	68.76	120265	70.46	121715	71.14
Total	226496	100	224103	100	219692	100	217833	100	170685	100	171104	100

* The prevalence percentage of the individual antibiotic products is the prevalence of the individual antibiotic products divided by the total number of antibiotics items claimed for the specific month multiplied by hundred.

Table 10E continues:

<i>Individual antibiotic products</i>	<i>November</i>		<i>December</i>		<i>January</i>		<i>February</i>		<i>March</i>		<i>April</i>	
	<i>n</i>	<i>%*</i>	<i>n</i>	<i>%*</i>	<i>n</i>	<i>%*</i>	<i>n</i>	<i>%*</i>	<i>n</i>	<i>%*</i>	<i>n</i>	<i>%*</i>
Augmaxil® 375mg TAB	2999	1.98										
Augmentin® 1000BD TAB	4007	2.65	3645	2.77	5840	3.03	5168	2.81	5862	2.92	5784	3.03
Clavumox® 375mg TAB									4047	2.02	4015	2.11
Orelox® 100mg TAB	3484	2.30	2805	2.13	4326	2.25	4281	2.33	4941	2.46	4621	2.42
Orelox® Junior SUS	5545	3.66	4267	3.24	5316	2.76	6477	3.53	7718	3.85	7399	3.88
Purbac® 480mg TAB	4275	2.83	3912	2.97	5342	2.77	4750	2.59	4975	2.48	5022	2.63
Purbac® DS TAB	7045	4.66	6752	5.13	7928	4.11	7478	4.07	8319	4.15	8461	4.44
Ranclav® 375mg TAB			2832	2.15			3732	2.03				
Utin® 400mg TAB					4204	2.18						
Zinnat® 125mg/5ml SUS	4792	3.17	4076	3.10	4375	2.27	5293	2.88	6995	3.49	6219	3.26
Zinnat® 250mg TAB	6083	4.02	4612	3.50	7665	3.98	7410	4.03	7603	3.79	7625	4.00
Zithromax® 500mg TAB	3628	2.40	2704	2.05	4561	2.37	4294	2.34	4652	2.32	4472	2.35
Other	109442	72.33	96048	72.96	143129	74.28	134803	73.39	145477	72.52		
Total	151300	100	131653	100	192686	100	183686	100	200589	100	190667	100

* The prevalence percentage of the individual antibiotic products is the prevalence of the individual antibiotic products divided by the total number of antibiotics items claimed for the specific month multiplied by hundred.

Table 11E: Prevalence of the type (original vs. generic) of antibiotic items claimed. May 2001 to April 2002

Month	Original products		Generic products	
	<i>n</i>	%*	<i>n</i>	%#
May	69968	48.47	74391	51.53
June	56707	47.88	61717	52.12
July	59664	48.39	63627	51.61
August	93676	48.78	98372	51.22
September	65159	46.39	75309	53.61
October	53001	44.56	65951	55.44
November	43083	43.65	44510	56.35
December	48082	42.03	66304	57.97
January	79767	43.76	102504	56.24
February	81989	44.27	103234	55.73
March	82088	42.45	111310	57.55
April	84149	41.97	116339	58.03

* The prevalence percentage of original antibiotic products is the prevalence of original antibiotic products divided by the total number of antibiotic items claimed for the specific month multiplied by hundred.

The prevalence percentage of generic antibiotic products is the prevalence of generic antibiotic products divided by the total number of antibiotic items claimed for the specific month multiplied by hundred.

Table 12E: Prevalence of the type (original vs. generic) of antibiotic items claimed. May 2002 to May 2003

Month	Original products		Generic products	
	<i>n</i>	%*	<i>n</i>	%*
May	97948	43.24	128548	56.76
June	99438	44.37	124665	55.63
July	95785	43.60	123907	56.40
August	92926	42.66	124907	57.34
September	67123	39.33	103562	60.67
October	66387	38.80	104717	61.20
November	58048	38.37	93252	61.63
December	49594	37.67	82059	62.33
January	71245	36.97	121441	63.03
February	68945	37.53	114741	62.47
March	75949	37.86	124640	62.14
April	71234	37.36	119433	62.64

* The prevalence percentage of original antibiotic products is the prevalence of original antibiotic products divided by the total number of antibiotic items claimed for the specific month multiplied by hundred.

The prevalence percentage of generic antibiotic products is the prevalence of generic antibiotic products divided by the total number of antibiotic items claimed for the specific month multiplied by hundred.

Table 2F: Average cost of antibiotics claimed. May 2001 to April 2002.

<i>Month</i>	<i>Total number antibiotics claimed</i>	<i>Average cost of antibiotics (R)</i>	<i>Minimum cost (R)</i>	<i>Maximum cost (R)</i>	<i>Total cost (R)</i>
May	144359	124.99 ± 104.48	0.11	4006.26	18042841.63
June	118424	125.43 ± 91.16	0.05	11009.46	14854005.52
July	123291	127.35 ± 96.02	0.05	12019.01	15700616.71
August	192048	127.81 ± 87.99	0.01	5096.24	24544710.27
September	140468	124.93 ± 89.88	0.01	5205.53	17548854.53
October	118952	123.34 ± 85.44	0.13	1590.14	14671591.54
November	98693	122.90 ± 86.54	0.11	3368.36	12129679.16
December	114386	124.90 ± 89.77	0.01	3764.70	14287367.11
January	182271	133.08 ± 100.07	0.13	2917.51	24257287.38
February	185223	133.27 ± 99.20	0.01	3448.25	24685543.46
March	193398	131.25 ± 99.54	0.11	11619.21	25384003.23
April	200488	130.71 ± 96.72	0.07	2805.92	26206330.81

Table 2F: Average cost of antibiotics claimed. May 2002 to April 2003.

<i>Month</i>	<i>Total number antibiotics claimed</i>	<i>Average cost of antibiotics (R)</i>	<i>Minimum cost (R)</i>	<i>Maximum cost (R)</i>	<i>Total cost (R)</i>
May	226496	128.59 ± 95.66	0.08	6617.72	29125923.31
June	224103	129.76 ± 95.78	0.11	5251.18	29079578.33
July	219692	133.17 ± 94.25	0.09	1959.43	29255558.69
August	217833	129.85 ± 92.58	0.05	2906.66	28285997.44
September	170685	127.14 ± 94.36	0.07	3270.44	21700694.27
October	171104	124.87 ± 104.48	0.07	28011.15	21366002.32
November	151300	124.99 ± 93.52	0.11	7239.68	18910742.44
December	131653	127.77 ± 93.71	0.07	3186.79	16821078.49
January	192686	131.99 ± 100.58	0.12	6324.69	25432609.59
February	183686	130.08 ± 99.01	0.10	3717.19	23894412.27
March	200589	128.38 ± 95.92	0.04	3186.75	25752556.35
April	190667	127.82 ± 96.52	0.15	3763.68	24371294.65

Table 3F: Average antibiotic cost per prescription. May 2001 to April 2002.

<i>Month</i>	<i>Total number of antibiotic prescriptions</i>	<i>Average cost per prescription (R)</i>	<i>Minimum cost (R)</i>	<i>Maximum cost (R)</i>	<i>Total cost (R)</i>
May	141394	127.61 ± 92.21	0.11	4363.22	18042841.63
June	116092	127.95 ± 93.95	0.05	11009.46	14854005.52
July	120888	129.88 ± 107.08	0.05	20660.22	15700616.71
August	188529	130.19 ± 90.63	0.01	5096.24	24544710.27
September	117341	217.53 ± 254.19	0.01	5398.33	25525416.52
October	116482	125.96 ± 87.94	0.13	1653.36	14671591.54
November	96613	125.55 ± 89.35	0.11	3368.36	12129679.16
December	112065	127.49 ± 92.44	0.01	3764.70	14287367.11
January	177247	136.86 ± 103.60	0.13	2917.51	24257287.38
February	180812	136.53 ± 102.24	0.01	3448.25	24685543.46
March	189073	134.26 ± 102.55	0.11	11619.21	25384003.23
April					

Table 4F: Average antibiotic cost per prescription. May 2002 to April 2003.

<i>Month</i>	<i>Total number of antibiotic prescriptions</i>	<i>Average cost per prescription (R)</i>	<i>Minimum cost (R)</i>	<i>Maximum cost (R)</i>	<i>Total cost (R)</i>
May	222036	131.18 ± 98.20	0.09	6617.72	29125923.31
June	220101	132.12 ± 98.32	0.11	5251.18	29079578.33
July	215351	135.85 ± 96.62	0.09	2240.56	29255558.69
August	213540	132.46 ± 95.03	0.05	2906.66	28285997.44
September	167173	129.81 ± 96.88	0.07	3270.44	21700694.27
October	167435	127.61 ± 128.97	0.07	29719.28	21366002.32
November	148152	127.64 ± 96.19	0.11	7239.68	18910742.44
December	128782	130.62 ± 96.19	0.07	3325.93	16821078.49
January	187679	135.51 ± 103.92	0.12	3947.82	25432609.59
February	179173	133.36 ± 101.95	0.10	3717.19	23894412.27
March	196225	131.24 ± 98.40	0.04	3186.75	25752556.35
April	186637	130.58 ± 99.48	0.15	3763.68	24371294.65

Table 5F: Average cost of antibiotics according to the pharmacological groups. May 2001 to April 2002.

Pharmacological group	May			June			July		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
Beta-lactams	83260	111.05 ± 67.02	9246043.17	69775	112.63 ± 66.89	7858863.74	73429	113.54 ± 81.15	8337017.49
Erythromycin and other macrolides	21657	155.81 ± 85.10	3374302.18	17468	157.22 ± 85.72	2746365.12	17841	159.84 ± 83.01	2840006.80
Aminoglycosides	41	535.95 ± 411.15	21974.05	26	204.43 ± 193.68	5315.08	32	531.35 ± 599.70	17003.29
Tetracyclines	12440	125.20 ± 82.80	1557529.46	9957	126.48 ± 86.55	1259333.73	9978	127.06 ± 82.85	1267783.28
Chloramphenicols	126	26.14 ± 16.93	3924.02	111	32.22 ± 25.18	3575.89	111	27.49 ± 21.30	3051.83
Sulphonamides and combinations	8733	43.67 ± 37.04	381403.99	7397	46.40 ± 37.18	343240.31	7115	48.35 ± 109.11	343979.28
Quinolones	15463	202.57 ± 135.54	3132384.33	11634	204.09 ± 124.02	2386032.57	12806	206.68 ± 119.86	2646800.98
Other	2639	123.50 ± 97.26	325910.43	2056	122.22 ± 250.19	251279.08	1979	123.79 ± 96.43	244973.76

Table 5F continues:

Pharmacological group	August			September			October		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
Beta-lactams	115134	114.37 ± 68.22	13168339.21	82345	113.08 ± 70.90	9311278.38	67469	111.96 ± 67.10	7553799.69
Erythromycin and other macrolides	27589	158.93 ± 84.23	4384814.21	17690	157.48 ± 107.90	2785887.15	13958	153.36 ± 90.24	2140611.53
Aminoglycosides	28	264.60 ± 231.25	7408.73	21	303.43 ± 328.68	6371.99	27	248.74 ± 279.16	6715.93
Tetracyclines	15249	127.07 ± 83.38	1937742.37	12608	130.42 ± 83.44	1644294.73	11318	132.69 ± 82.81	1501830.91
Chloramphenicols	155	24.47 ± 21.70	3793.42	111	28.76 ± 24.60	3192.28	104	27.84 ± 22.81	2895.85
Sulphonamides and combinations	10354	44.79 ± 36.42	463783.37	9342	46.09 ± 40.12	430546.57	9436	47.65 ± 38.19	449597.64
Quinolones	20079	206.86 ± 124.43	4153573.89	15375	196.27 ± 120.39	3017621.51	14036	193.75 ± 120.47	2719487.50
Other	3460	122.91 ± 148.68	425255.07	2976	117.49 ± 77.96	349662.11	2604	113.92 ± 48.76	296652.49

Table 5F continues:

Pharmacological group	November			December			January		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
Beta-lactams	56241	112.59 ± 69.08	6331959.42	64560	113.85 ± 72.37	7349966.51	95508	120.02 ± 75.16	11462876
Erythromycin and other macrolides	11551	151.69 ± 93.10	1752135.48	13163	153.20 ± 100.09	2016559.83	21012	155.12 ± 108.86	3259443.45
Aminoglycosides	16	489.09 ± 857.91	7825.45	13	513.69 ± 808.35	6677.96	70	326.31 ± 401.73	22841.77
Tetracyclines	9526	134.48 ± 81.55	1281029.59	10937	138.26 ± 84.21	1512101.86	19027	134.03 ± 83.74	2550128.38
Chloramphenicols	86	36.15 ± 29.95	3108.92	128	23.82 ± 14.17	3049.45	219	21.54 ± 12.89	4717.47
Sulphonamides and combinations	7947	47.34 ± 36.07	376201.63	9459	46.53 ± 33.90	440156.02	13524	45.66 ± 37.50	617524.26
Quinolones	11102	190.83 ± 121.46	2118579.75	13723	195.61 ± 120.14	2684330.98	28043	202.49 ± 137.14	5676430.40
Other	2224	116.38 ± 50.89	258838.92	2403	114.24 ± 53.52	274524.50	4868	136.26 ± 124.78	663324.76

Table 5F continues:

Pharmacological group	February			March			April		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
Beta-lactams	102745	121.21 ± 75.54	12454082.34	107309	119.32 ± 83.28	12804385.12	111042	120.09 ± 78.12	13335187.22
Erythromycin and other macrolides	22381	152.55 ± 117.03	3414298.83	24904	163.97 ± 118.84	4083631.56	25172	164.87 ± 121.03	4150039.13
Aminoglycosides	20	261.91 ± 299.45	5238.13	30	371.95 ± 341.33	11158.50	53	225.68 ± 160.63	11961.15
Tetracyclines	17416	137.93 ± 88.47	2402212.61	17410	134.59 ± 92.63	2343155.10	18789	130.03 ± 90.73	2443071.80
Chloramphenicols	150	23.86 ± 14.61	3578.36	158	32.31 ± 24.99	5104.56	208	34.43 ± 28.68	7160.75
Sulphonamides and combinations	12331	47.39 ± 35.03	584326.87	12924	49.12 ± 40.58	634790.87	13981	48.35 ± 37.25	676045.76
Quinolones	25608	203.37 ± 134.29	5207955.18	26028	187.57 ± 122.21	4882195.11	26585	186.74 ± 122.10	4964445.09
Other	4572	134.26 ± 125.78	613851.14	4635	133.67 ± 95.38	619582.41	4658	132.77 ± 86.12	618419.91

Table 6F: Average cost of antibiotics according to the main pharmacological groups. May 2002 to April 2003.

Pharmacological group	May			June			July		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
Beta-lactams	133348	119.05 ± 74.51	15874494.10	137764	121.11 ± 76.54	16685037.53	129051	122.98 ± 76.98	15870663.54
Erythromycin and other macrolides	29647	163.99 ± 113.54	4861775.49	30240	161.02 ± 110.06	4869279.53	29127	171.15 ± 110.88	4985201.19
Aminoglycosides	31	432.34 ± 637.57	13402.66	36	241.13 ± 124.77	8680.55	24	403.43 ± 474.68	9682.23
Tetracyclines	17657	120.40 ± 90.91	2125880.57	15384	120.45 ± 92.14	1852964.61	16522	119.89 ± 91.44	1980763.91
Chloramphenicols	223	31.40 ± 26.61	7002.66	161	29.89 ± 25.75	4812.43	183	24.21 ± 16.35	4431.07
Sulphonamides and combinations	14740	41.43 ± 35.09	610607.24	13748	43.89 ± 32.94	603392.91	14720	47.18 ± 34.06	694427.97
Quinolones	26382	190.74 ± 114.14	5032228.79	23024	197.56 ± 118.87	4548679.18	25876	199.67 ± 117.04	5166565.37
Other	4468	134.41 ± 189.58	600531.80	3746	135.27 ± 207.13	506731.59	4189	129.82 ± 81.84	543823.41

Table 6F continues:

Pharmacological group	August			September			October		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
Beta-lactams	130469	120.67 ± 76.11	15743646.12	98197	117.28 ± 74.77	11516881.12	96142	117.42 ± 75.29	11288601.07
Erythromycin and other macrolides	27970	165.80 ± 108.32	4637458.67	20004	162.42 ± 109.85	3248995.28	19840	162.89 ± 111.78	3231693.73
Aminoglycosides	32	268.68 ± 191.19	8597.90	28	308.32 ± 284.78	8633.07	22	215.58 ± 238.16	4742.68
Tetracyclines	15952	119.05 ± 94.53	1899057.27	13975	122.24 ± 93.19	1708254.07	14636	123.28 ± 92.13	1804268.24
Chloramphenicols	265	31.14 ± 45.01	8253.30	296	28.84 ± 21.86	8538.07	263	29.58 ± 15.60	7780.95
Sulphonamides and combinations	14715	46.71 ± 33.54	587376.54	13684	49.12 ± 32.82	672211.75	15210	49.99 ± 33.75	760352.76
Quinolones	24350	195.03 ± 114.19	4748944.48	20740	192.32 ± 116.86	3988809.84	21149	175.22 ± 111.23	3705738.77
Other	4080	135.46 ± 107.81	552663.16	3761	145.80 ± 160.33	548371.07	3842	146.49 ± 554.46	562824.12

Table 6F continues:

Pharmacological group	November			December			January		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
Beta-lactams	83754	118.46 ± 76.72	9921102.23	71347	119.27 ± 76.17	8509871.93	100923	122.16 ± 80.67	12329231.39
Erythromycin and other macrolides	16831	165.26 ± 117.54	2781454.15	14133	186.68 ± 118.55	2638285.77	20568	200.10 ± 133.66	4115688.20
Aminoglycosides	21	276.45 ± 298.17	5805.38	11	262.84 ± 200.79	2891.26	27	303.70 ± 279.66	8199.81
Tetracyclines	13344	126.22 ± 93.29	1684226.40	11839	130.94 ± 93.95	1550218.25	18042	121.35 ± 98.59	2189472.16
Chloramphenicols	172	25.74 ± 14.66	4426.54	191	30.32 ± 21.56	5791.21	247	29.94 ± 23.41	7396.30
Sulphonamides and combinations	14335	52.95 ± 35.20	759107.43	13515	52.55 ± 32.87	710278.65	16919	51.06 ± 35.95	863824.17
Quinolones	19344	170.39 ± 106.43	3296109.26	17499	170.60 ± 107.18	2985367.51	31133	169.58 ± 113.78	5279392.98
Other	3499	131.04 ± 165.14	458511.05	3118	134.18 ± 136.37	418373.91	4827	132.46 ± 108.83	639404.58

Table 6F continues:

Pharmacological group	February			March			April		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
Beta-lactams	101091	122.12 ± 83.96	12344067.44	113664	122.12 ± 79.76	13880850.62	107714	122.35 ± 81.44	13178331.29
Erythromycin and other macrolides	19774	191.39 ± 123.51	3784472.35	23390	188.12 ± 119.45	4400124.93	21998	187.92 ± 121.96	4133834.01
Aminoglycosides	31	554.37 ± 700.16	17185.44	37	366.59 ± 390.54	13563.65	21	306.33 ± 259.74	6432.98
Tetracyclines	15233	121.30 ± 95.83	1847742.61	16045	123.86 ± 98.34	1987377.59	15146	123.42 ± 94.56	1869316.50
Chloramphenicols	240	32.73 ± 28.05	7854.64	232	30.17 ± 24.42	6998.71	188	27.50 ± 18.16	5169.23
Sulphonamides and combinations	15627	51.82 ± 36.98	809776.65	16800	51.82 ± 33.16	870530.53	16852	50.26 ± 32.15	847020.56
Quinolones	27121	165.23 ± 113.80	4481226.72	25937	154.49 ± 114.87	4007009.94	24539	152.69 ± 110.32	3746767.78
Other	4569	131.78 ± 93.83	602086.42	4484	130.71 ± 114.30	586100.38	4209	138.85 ± 137.05	584422.30

Table 7F: Average cost of Amoxicillin according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	1597	66.98 ± 38.71	106964.00	18833	37.92 ± 16.27	714108.58
June	1269	67.84 ± 38.44	86091.51	15678	38.05 ± 16.89	596528.15
July	1362	66.67 ± 35.66	90808.02	16918	38.62 ± 15.96	653388.19
August	2011	67.81 ± 45.45	136367.89	25480	38.16 ± 15.99	972280.65
September	1386	64.30 ± 35.57	89124.68	18263	37.77 ± 17.02	689767.20
October	1072	59.17 ± 31.15	63431.16	15047	37.85 ± 16.69	569468.37
November	855	61.87 ± 32.77	52898.21	12903	37.70 ± 15.87	486464.32
December	928	61.57 ± 33.73	57138.61	14164	37.79 ± 16.55	535273.68
January	1456	65.31 ± 37.37	95096.06	20010	39.03 ± 18.61	780983.68
February	1569	65.37 ± 39.29	102571.67	22176	39.33 ± 24.62	872088.80
March	1522	64.18 ± 43.95	97676.44	23097	38.90 ± 25.29	898559.58
April	1448	62.61 ± 35.30	90660.78	24907	38.95 ± 17.24	970231.28

Table 8F: Average cost of Amoxicillin according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	1275	61.24 ± 34.57	78083.77	31345	38.39 ± 16.09	1203273.75
June	1242	60.75 ± 35.92	75448.59	31953	38.46 ± 17.39	1228926.52
July	923	59.61 ± 35.40	55018.40	29908	39.59 ± 22.02	1183994.46
August	702	59.65 ± 40.59	41877.19	31544	39.10 ± 16.53	1233456.19
September	507	54.64 ± 35.45	27704.81	24540	39.19 ± 16.99	961669.44
October	497	59.53 ± 42.29	29588.35	23601	38.83 ± 22.32	916462.24
November	696	68.47 ± 42.58	47653.96	20731	39.69 ± 22.89	822789.29
December	999	100.41 ± 53.30	100311.61	16345	39.28 ± 18.68	642103.13
January	995	90.71 ± 57.87	90253.93	23797	38.97 ± 18.22	927441.74
February	947	95.22 ± 59.76	90172.59	23710	38.82 ± 18.09	920325.77
March	704	66.44 ± 50.45	46775.99	26761	38.85 ± 18.59	1039722.94
April	554	44.91 ± 24.18	24881.97	26028	37.75 ± 23.76	982683.13

Table 9F: Average cost of Amoxicillin/Clavulanic according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	6431	175.78 ± 59.29	1130436.05	21287	109.14 ± 35.16	2323208.55
June	5520	179.22 ± 60.59	989272.67	18356	109.56 ± 37.80	2011129.83
July	5950	181.23 ± 56.08	1078291.11	19101	110.30 ± 35.12	2106918.23
August	8653	185.56 ± 60.63	1605615.38	30219	111.59 ± 35.36	3372124.78
September	6566	185.61 ± 57.07	1218695.79	22064	111.19 ± 56.66	2453368.48
October	5017	183.31 ± 52.34	919657.25	18483	111.77 ± 38.22	2065871.19
November	3756	194.89 ± 67.22	732001.33	15449	113.55 ± 40.62	1754310.85
December	4425	194.35 ± 67.90	859976.78	18783	114.12 ± 39.73	2143583.66
January	7403	201.79 ± 64.53	1493865.88	27657	117.57 ± 41.53	3251661.99
February	7111	199.08 ± 67.86	1415644.52	28974	117.25 ± 41.59	3397219.72
March	7180	198.25 ± 63.51	1423468.72	30303	111.67 ± 41.82	3383957.19
April	7017	202.19 ± 65.86	1418737.95	31826	112.92 ± 36.73	3593834.16

Table 10F: Average cost of Amoxicillin/Clavulanic according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	7354	202.33 ± 64.55	1487948.57	38391	112.60 ± 39.08	4322772.83
June	6798	206.20 ± 70.91	1401766.42	39228	112.33 ± 38.10	4406581.84
July	7557	207.34 ± 64.32	15660931.10	37731	114.82 ± 41.24	4332354.59
August	7271	207.60 ± 74.34	1509482.72	38242	113.67 ± 38.36	4335333.43
September	5807	206.41 ± 72.59	1198597.45	29710	112.66 ± 38.81	3347172.98
October	6154	203.15 ± 71.46	1250196.82	29044	112.87 ± 38.09	3278170.87
November	4998	200.08 ± 70.12	999999.33	24821	112.25 ± 38.29	2786112.81
December	4502	203.92 ± 74.65	918038.44	22385	111.46 ± 36.60	2494933.86
January	6659	212.20 ± 64.38	1413043.59	31636	112.85 ± 37.17	3570209.60
February	6057	211.67 ± 69.09	1282091.48	31088	110.01 ± 37.68	3419841.35
March	6745	212.70 ± 68.59	1434671.04	35205	109.55 ± 37.06	3856716.70
April	6527	213.86 ± 68.52	1395844.46	32686	110.73 ± 37.12	3619201.40

Table 11F: Average cost of Amoxicillin/ Flucloxacillin according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	187	145.86 ± 43.63	27275.51	1907	99.29 ± 32.06	189350.58
June	106	131.33 ± 48.81	13921.31	1417	96.26 ± 23.63	136404.66
July	116	137.78 ± 52.50	15982.14	1551	96.13 ± 24.26	149096.20
August	162	134.46 ± 53.37	21781.85	2617	92.90 ± 24.32	243128.17
September	148	146.78 ± 55.66	21723.01	2131	92.95 ± 23.83	198150.96
October	100	135.58 ± 44.54	13557.70	1900	93.03 ± 24.67	176755.33
November	50	136.66 ± 40.06	6832.94	1491	93.71 ± 31.79	139719.46
December	93	119.28 ± 41.47	11093.28	2260	92.06 ± 22.24	208051.51
January	160	133.63 ± 52.65	21381.00	3707	94.35 ± 32.04	349749.89
February	133	120.74 ± 44.36	16058.66	3159	94.11 ± 28.73	297278.27
March	143	120.54 ± 48.40	17237.88	3370	88.53 ± 24.05	298337.62
April	136	123.38 ± 48.06	16779.03	3138	88.72 ± 26.06	278405.84

Table 12F: Average cost of Amoxicillin/Flucloxacillin according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	109	110.96 ± 39.92	12095.00	3049	88.63 ± 24.38	270229.37
June	104	143.47 ± 59.08	14920.63	2675	88.80 ± 25.44	237547.59
July	99	115.29 ± 39.42	11413.70	2940	87.40 ± 23.29	256958.10
August	96	120.79 ± 58.67	11595.80	2854	86.86 ± 22.92	247894.47
September	65	117.98 ± 43.21	7668.46	2422	88.71 ± 32.98	214844.61
October	60	107.34 ± 42.12	6440.66	2655	89.22 ± 27.22	236873.85
November	64	102.69 ± 37.99	6571.87	2464	86.48 ± 20.48	213085.83
December	76	103.69 ± 43.72	7880.49	2338	87.50 ± 21.72	204570.94
January	75	94.82 ± 23.85	7111.47	3501	87.09 ± 22.28	304906.50
February	60	92.75 ± 27.14	5565.25	3309	89.00 ± 44.39	294485.08
March	77	99.77 ± 33.97	7682.43	3152	87.06 ± 25.32	274416.54
April	108	88.20 ± 21.56	9526.11	2770	87.21 ± 24.73	241564.64

Table 13F: Average cost of Ampicillin according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	3	36.00 ± 17.06	107.99	633	29.35 ± 10.62	18576.48
June	1	16.30	16.30	447	28.58 ± 13.33	12773.51
July				392	31.14 ± 13.25	12208.07
August	1	23.82	23.82	776	31.06 ± 13.84	24100.00
September				496	32.92 ± 15.29	16326.78
October				475	34.27 ± 37.08	16278.30
November				335	30.04 ± 14.46	10063.73
December				402	32.49 ± 15.70	13061.23
January	5	51.35 ± 39.17	256.69	586	30.80 ± 12.86	18050.11
February	2	94.25	188.50	548	31.37 ± 13.85	17190.19
March	2	80.11	160.22	598	34.75 ± 16.70	20789.11
April				662	36.69 ± 41.60	24289.13

Table 14F: Average cost of Ampicillin according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May				556	30.25 ± 14.39	16820.68
June				583	30.35 ± 14.87	17694.56
July				598	34.81 ± 18.47	20815.60
August				536	32.91 ± 16.29	17640.06
September				437	33.90 ± 17.94	14812.84
October				391	31.38 ± 13.62	12271.10
November				345	29.61 ± 14.76	10317.66
December				355	32.93 ± 15.36	11690.83
January				489	34.12 ± 20.23	16686.78
February				486	31.32 ± 18.64	15220.62
March				537	34.14 ± 17.36	18331.13
April				416	31.75 ± 16.23	13207.00

Table 15F: Average cost of Ampicillin/Cloxacillin according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	263	117.54 ± 51.67	30912.91	503	91.57 ± 44.16	46061.51
June	133	110.61 ± 30.89	14711.76	417	89.17 ± 32.94	37185.35
July	216	103.78 ± 33.28	22416.30	454	87.17 ± 31.90	39575.61
August	235	105.05 ± 43.11	24686.31	758	86.31 ± 27.34	65421.36
September	195	105.65 ± 47.71	20602.17	535	91.73 ± 42.96	49077.76
October	136	107.17 ± 46.17	14575.49	528	85.07 ± 33.07	44917.50
November	137	95.18 ± 54.85	13039.26	504	85.54 ± 38.87	43109.76
December	171	93.88 ± 71.36	16053.40	607	83.35 ± 28.59	50592.39
January	314	99.31 ± 52.80	31181.88	1098	84.40 ± 31.26	92675.89
February	248	106.25 ± 37.72	26349.41	935	84.14 ± 33.65	78667.20
March	241	103.59 ± 49.48	24965.01	1089	82.60 ± 30.22	89950.78
April	241	111.08 ± 52.30	26770.00	1080	86.78 ± 33.89	93721.72

Table 16F: Average cost of Ampicillin/Cloxacillin according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	207	110.43 ± 45.40	22858.51	940	85.35 ± 33.86	80228.67
June	162	105.76 ± 41.15	17132.96	949	87.79 ± 30.22	83313.72
July	163	116.34 ± 56.66	18963.41	967	94.97 ± 30.94	91835.63
August	145	104.26 ± 42.53	15117.78	767	91.78 ± 29.87	70398.15
September	102	121.63 ± 40.57	12406.43	767	95.30 ± 40.06	73094.32
October	125	105.30 ± 44.03	13162.80	730	95.60 ± 42.64	69788.78
November	81	115.55 ± 61.21	9359.64	786	95.71 ± 35.57	75229.65
December	90	113.84 ± 63.28	10245.21	709	93.71 ± 31.83	66439.23
January	124	84.77 ± 19.72	10511.66	1225	91.44 ± 34.41	112012.50
February	125	106.92 ± 100.13	13364.74	1016	86.85 ± 27.77	88236.73
March	116	87.14 ± 32.80	10108.31	1053	86.79 ± 24.89	91386.07
April	121	79.12 ± 19.87	9573.74	901	82.35 ± 31.01	74196.41

Table 17F: Average cost of Benzathine Penicillin according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	1	11.51	11.51			
June						
July						
August						
September	1	14.18	14.18			
October						
November						
December						
January	8	14.18	113.44			
February						
March	10	26.12 ± 16.65	261.18			
April						

Table 18F: Average cost of Benzathine Penicillin according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	1	15.60	15.60			
June						
July	1	14.98	14.98			
August	3	16.93	50.79			
September	1	19.19	19.19			
October	7	19.19	134.33			
November	1	19.19	19.19			
December	6	19.19	115.14			
January	5	19.19	95.95			
February	3	19.19	57.57			
March	2	136.24	272.48			
April	6	18.44	110.64			

Table 19F: Average cost of Benzylpenicillin according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	1	38.11	38.11	1	44.12	44.12
June	1	38.11	38.11			
July						
August						
September						
October						
November	9	14.94 ± 5.56	134.46			
December	6	24.74	148.44			
January	3	190.04	570.12			
February						
March						
April						

Table 20F: Average cost of Benzylpenicillin according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May						
June	7	25.45 ± 14.78	178.18			
July				1	23.51	23.51
August	3	13.60	40.80	2	66.29	132.58
September	1	27.66	27.66			
October	2	25.61 ± 3.58	51.22			
November						
December						
January	4	45.28 ± 34.27	181.10	2	25.60 ± 2.96	51.20
February						
March						
April						

Table 21F: Average cost of Benzylpenicillin/Procaine according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	17	18.12 ± 6.14	308.01			
June	24	22.38 ± 13.01	537.18			
July	11	15.93 ± 4.24	175.19			
August	58	13.47 ± 1.41	781.42			
September	18	13.89 ± 1.03	249.99			
October	23	21.52 ± 16.63	494.85			
November	18	13.36 ± 1.55	240.42			
December	22	19.56 ± 13.40	430.27			
January	37	26.95 ± 18.50	997.31			
February	17	33.70 ± 32.05	572.89			
March	6	21.12 ± 8.36	126.65			
April	41	13.73 ± 2.27	562.78			

Table 24F: Average cost of Cloxacillin according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	54	94.99 ± 43.79	5129.25	642	108.02 ± 76.90	69346.42
June	60	95.90 ± 42.84	5753.95	520	105.86 ± 85.61	55046.76
July	40	89.91 ± 34.29	3596.45	613	103.01 ± 83.42	63142.13
August	42	117.55 ± 42.35	4937.27	620	114.11 ± 79.83	70749.14
September	34	110.18 ± 63.67	3746.03	518	116.36 ± 85.22	60272.97
October	38	121.51 ± 69.54	4617.25	645	115.98 ± 121.18	74807.30
November	29	116.09 ± 60.81	3366.57	569	125.27 ± 148.06	71279.90
December	28	82.23 ± 23.79	2302.38	535	110.13 ± 85.63	58921.30
January	20	118.62 ± 53.35	2372.46	963	122.88 ± 105.13	118330.66
February	30	82.10 ± 32.84	2462.99	884	114.77 ± 69.15	101461.07
March	15	127.10 ± 32.93	1906.48	763	118.62 ± 70.88	90508.20
April	18	121.69 ± 59.35	2190.40	746	134.15 ± 96.61	100078.20

Table 25F: Average cost of Flucloxacillin according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	104	105.88 ± 50.64	11011.37	129	129.40 ± 100.68	16692.80
June	85	130.44 ± 109.26	11087.22	114	124.58 ± 71.05	14202.21
July	76	100.85 ± 60.83	7664.41	85	118.03 ± 62.66	10032.69
August	113	113.59 ± 43.37	12835.43	143	145.89 ± 147.75	20861.73
September	81	108.09 ± 46.03	8755.35	119	139.84 ± 113.74	16640.99
October	82	103.14 ± 33.75	8457.09	121	141.45 ± 129.26	17114.85
November	98	101.33 ± 33.85	9930.44	88	129.31 ± 71.17	11378.87
December	125	95.66 ± 22.65	11957.33	131	133.64 ± 107.88	17506.67
January	182	107.46 ± 43.81	19556.82	239	115.91 ± 57.47	27701.39
February	182	99.49 ± 30.13	18107.16	233	134.70 ± 81.34	31386.20
March	309	114.73 ± 57.57	35451.62	196	133.78 ± 76.09	26221.51
April	221	111.49 ± 46.31	24640.35	249	133.46 ± 59.72	33232.54

Table 26F: Average cost of Flucloxacillin according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	166	120.97 ± 63.60	20080.30	203	139.01 ± 78.46	28218.10
June	122	103.47 ± 34.31	12623.21	205	141.18 ± 67.64	28942.37
July	147	114.81 ± 53.93	16876.66	198	132.72 ± 77.91	26279.48
August	175	113.07 ± 74.49	19787.53	220	155.35 ± 138.65	34177.72
September	126	116.94 ± 81.63	14735.01	136	147.66 ± 77.38	20081.82
October	170	129.13 ± 99.93	21952.67	101	132.78 ± 56.84	13410.90
November	203	125.85 ± 72.57	25547.23	83	128.98 ± 78.60	10705.18
December	210	120.22 ± 66.36	25246.62	76	143.14 ± 57.50	10878.67
January	330	125.95 ± 60.99	41563.98	118	173.98 ± 88.12	20529.31
February	225	116.11 ± 69.31	26124.94	174	173.65 ± 92.74	30215.52
March	234	148.53 ± 92.37	34755.09	181	168.66 ± 76.34	30526.74
April	190	125.84 ± 61.60	23910.34	153	161.57 ± 73.10	24720.61

Table 27F: Average cost of Penicillin VK according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May				684	32.89 ± 21.55	22499.96
June				511	32.76 ± 19.85	16740.18
July				517	35.40 ± 21.63	18301.77
August	1	20.50	20.50	812	34.18 ± 21.58	27750.97
September				693	35.08 ± 29.58	24307.01
October				704	35.32 ± 21.64	24866.59
November				595	38.71 ± 24.38	23031.58
December				619	36.01 ± 21.30	22290.40
January				803	35.34 ± 21.70	28374.16
February				775	35.25 ± 23.05	27319.00
March				748	35.49 ± 20.76	26548.57
April				678	34.43 ± 21.71	23343.75

Table 28F: Average cost of Penicillin VK according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May				752	34.45 ± 22.07	25909.07
June				654	36.93 ± 24.19	24152.49
July				744	32.95 ± 22.18	24511.50
August				744	31.08 ± 19.69	23121.98
September	3	83.73	251.19	639	31.68 ± 21.26	20240.88
October				721	32.98 ± 20.97	23775.91
November				554	35.04 ± 21.65	19411.77
December				551	34.99 ± 30.92	19280.52
January	5	26.32 ± 7.06	131.62	689	32.26 ± 20.89	22226.17
February				679	31.25 ± 20.69	21217.43
March	7	19.76 ± 1.66	138.33	725	33.08 ± 20.12	23984.27
April	6	49.16 ± 45.16	294.93	713	32.27 ± 21.19	23011.25

Table 29F: Average cost of Piperacillin according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May						
June						
July						
August						
September						
October						
November						
December						
January						
February						
March						
April						

Table 30F: Average cost of Piperacillin according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May						
June	1	583.42	583.42			
July						
August						
September						
October	3	160.30	480.90			
November						
December						
January						
February						
March						
April						

Table 31F: Average cost of Procaine Penicillin according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	3	12.16	36.48			
June	3	16.13	48.39			
July						
August	1	10.69	10.69			
September						
October	9	12.50 ± 2.72	112.53			
November	9	10.69	96.21			
December	1	17.60	17.60			
January	6	11.77 ± 0.53	70.59			
February	7	19.72 ± 4.51	138.04			
March	6	42.35 ± 33.25	254.07			
April						

Table 32F: Average cost of Procaine Penicillin according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	3	12.92	38.76	3	17.74	53.22
June	4	12.92	51.68			
July	6	12.92 ± 0.01	77.49			
August	4	12.92	51.68			
September	3	12.92	38.76			
October						
November				3	23.04	69.12
December						
January	5	12.92	64.60			
February						
March	3	24.13	72.39			
April	3	14.19	42.57			

Table 33F: Average cost of Cefaclor according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	232	168.27 ± 76.99	39039.50	2016	125.59 ± 41.71	253197.66
June	156	160.98 ± 74.63	25112.71	1503	125.76 ± 35.02	189011.30
July	158	166.38 ± 75.27	26287.71	1680	127.62 ± 47.66	214398.49
August	240	173.05 ± 85.37	41533.04	2414	126.90 ± 37.01	306332.16
September	162	160.84 ± 68.23	26056.24	1641	127.64 ± 45.49	209452.53
October	172	161.31 ± 70.54	27746.08	1283	127.16 ± 34.85	163152.30
November	102	154.12 ± 82.54	15720.23	1166	127.23 ± 47.85	148358.50
December	149	154.18 ± 78.02	22972.58	1417	134.56 ± 47.48	190667.26
January	180	159.04 ± 77.33	28626.50	1979	132.24 ± 49.94	261707.93
February	218	185.10 ± 135.28	40352.42	2300	129.10 ± 42.67	296928.83
March	203	168.29 ± 120.33	34162.75	2181	135.43 ± 42.69	295377.68
April	240	167.09 ± 102.26	40101.08	2271	133.57 ± 45.62	303339.40

Table 34F: Average cost of Cefaclor according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	158	191.04 ± 140.50	30184.71	2821	134.45 ± 43.62	379269.52
June	96	175.64 ± 92.71	16861.26	2793	136.07 ± 41.52	380033.07
July	83	154.32 ± 59.35	12808.29	2361	137.93 ± 39.52	325652.57
August	115	162.40 ± 73.63	18686.40	2401	134.60 ± 39.27	323173.04
September	65	157.40 ± 78.36	10230.89	1863	137.67 ± 46.19	256485.62
October	102	160.64 ± 68.14	16384.92	1688	135.85 ± 40.92	229317.47
November	80	161.45 ± 87.97	12915.77	1466	139.66 ± 44.67	204737.21
December	79	159.28 ± 63.82	12582.75	1384	136.75 ± 46.68	189256.32
January	88	148.19 ± 66.76	13041.15	1900	144.77 ± 53.01	275054.84
February	73	152.42 ± 82.77	11126.89	1782	139.79 ± 56.73	249097.64
March	67	146.49 ± 61.53	9814.81	1799	133.15 ± 44.14	239528.16
April	41	134.20 ± 21.73	5502.00	1815	138.89 ± 48.10	252084.50

Table 35F: Average cost of Cefadroxil according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	82	114.54 ± 32.83	9391.90	524	97.93 ± 28.26	51315.23
June	29	93.96 ± 39.03	2724.97	395	100.71 ± 36.07	39779.83
July	13	98.02 ± 13.64	1274.20	419	98.58 ± 29.85	41306.81
August	33	108.44 ± 38.77	3578.67	601	105.80 ± 42.48	63587.01
September	26	87.42 ± 10.73	2272.91	415	101.62 ± 36.18	42171.45
October	31	91.76 ± 37.49	2844.47	365	101.91 ± 37.10	37195.39
November	8	114.26 ± 61.04	914.06	291	103.32 ± 34.27	30065.56
December	9	79.52 ± 2.65	715.68	429	112.10 ± 51.40	48090.83
January	11	90.67 ± 13.01	997.33	617	98.54 ± 33.21	60800.75
February	15	99.60 ± 34.26	1493.96	660	105.15 ± 39.43	69401.96
March	31	97.27 ± 42.87	3015.31	728	117.24 ± 39.75	85348.88
April	25	98.80 ± 15.66	2470.12	714	116.27 ± 34.44	83017.13

Table 36F: Average cost Cefadroxil according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	32	100.64 ± 11.36	3220.55	562	120.11 ± 42.91	67500.08
June	4	107.08 ± 0.02	428.33	474	114.12 ± 40.54	54091.32
July	9	119.08 ± 54.38	1071.75	472	116.87 ± 37.89	55163.82
August	9	126.61 ± 29.28	1139.46	534	109.66 ± 26.89	58556.70
September				345	117.84 ± 43.59	40655.61
October	4	107.09 ± 0.01	428.37	299	129.21 ± 66.96	38634.68
November	6	107.10 ± 0.01	642.57	257	125.53 ± 53.68	32260.28
December	4	100.46 ± 12.90	402.56	256	130.39 ± 61.78	33380.06
January	3	213.16	639.48	389	121.28 ± 45.43	47176.35
February	6	94.18 ± 14.13	565.08	341	130.54 ± 59.55	44514.28
March	6	81.29	487.74	360	120.91 ± 46.97	43526.70
April	3	81.29	243.87	403	131.28 ± 65.66	52904.56

Table 37F: Average cost of Cefazolin according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	2	540.11 ± 338.44				
June						
July						
August	3	194.33	582.99	3	70.19	210.57
September	3	164.99	494.97			
October						
November						
December	2	584.99	1169.98			
January	3	1371.19	4113.57			
February						
March	5	155.86 ± 52.68	779.30			
April						

Table 38F: Average cost Cefazolin according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	4	342.41 ± 118.27	1369.63	2	129.28	258.56
June	1	390.18	390.18			
July						
August						
September				2	70.19	140.38
October						
November				3	37.04	111.12
December						
January	9	97.33 ± 0.25	875.94			
February						
March						
April	3	1454.74	4364.22	10	66.71 ± 41.36	667.12

Table 39F: Average cost of Cefepime according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May						
June						
July						
August						
September						
October						
November						
December						
January	3	615.52	1846.56			
February						
March						
April						

Table 40F: Average cost Cefepime according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May						
June						
July						
August						
September						
October						
November						
December						
January						
February						
March						
April	1	1658.43	1658.43			

Table 41F: Average cost of Cefixime according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	541	152.01 ± 41.84	82239.26			
June	431	160.72 ± 52.68	69269.12			
July	544	163.17 ± 55.75	88765.79			
August	778	156.03 ± 46.87	121394.22			
September	490	155.73 ± 51.16	76306.67			
October	373	161.63 ± 54.24	60289.81			
November	287	170.38 ± 80.74	48898.14			
December	321	151.20 ± 60.48	48534.66			
January	586	135.21 ± 75.76	79232.90			
February	554	143.38 ± 59.54	79431.09			
March	529	148.74 ± 67.89	78685.37			
April	598	147.59 ± 72.93	88257.92			

Table 42F: Average cost Cefixime according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	682	159.53 ± 75.98	108797.41			
June	742	155.29 ± 76.53	115227.12			
July	568	148.60 ± 86.52	84404.80			
August	513	144.75 ± 67.58	74258.33			
September	462	152.44 ± 52.13	70426.20			
October	453	156.90 ± 78.47	71075.95			
November	376	155.03 ± 79.98	58291.65			
December	356	154.10 ± 97.01	54859.64			
January	471	186.63 ± 88.29	87903.18			
February	396	183.07 ± 60.71	72493.80			
March	410	202.61 ± 81.28	83070.75			
April	392	199.83 ± 67.39	78332.74			

Table 43F: Average cost of Cefotaxime according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May						
June						
July	3	1474.11	4422.33			
August						
September						
October	3	329.04	987.12			
November	3	163.79	491.37			
December	3	237.58	982.74			
January						
February	2	378.20	756.40			
March				4	519 ± 149.79	2077.52
April	3	188.36	565.08			

Table 44F: Average cost Cefotaxime according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May				2	683.78	1367.56
June	1	201.54	201.54	4	2580.83 ± 1672.74	10323.33
July						
August						
September						
October						
November						
December				1	71.74	71.74
January						
February	4	364.11 ± 284.86	1456.44			
March						
April	3	187.76	563.28			

Table 45F: Average cost of Cefoxitin Sodium according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May						
June						
July						
August						
September						
October						
November						
December						
January						
February						
March						
April						

Table 46F: Average cost Cefoxitin Sodium according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May						
June						
July						
August						
September						
October						
November						
December						
January						
February						
March						
April	3	170.34	511.02			

Table 47F: Average cost of Cefpodoxime according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	8962	150.79 ± 43.72	1351352.55			
June	7844	153.07 ± 46.43	1200668.15			
July	7843	153.42 ± 42.18	1203252.41			
August	12514	153.93 ± 42.05	1926312.13			
September	8755	152.99 ± 46.70	1339389.82			
October	7026	151.16 ± 43.13	1062057.77			
November	6268	149.90 ± 44.60	939571.66			
December	6352	152.44 ± 44.60	968285.31			
January	8703	163.26 ± 46.97	1420882.85			
February	11332	163.85 ± 47.89	1856744.30			
March	11903	163.43 ± 53.31	1945348.59			
April	11945	164.25 ± 51.39	1961981.75			

Table 48F: Average cost Cefpodoxime according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	15732	164.94 ± 47.43	2594819.13			
June	18444	170.09 ± 48.21	3137055.34			
July	15939	173.37 ± 49.66	2763367.08			
August	16041	172.96 ± 48.88	2774455.85			
September	11298	168.45 ± 48.96	1903125.81			
October	10569	168.73 ± 49.88	178335.82			
November	9029	182.83 ± 55.79	1650777.89			
December	7072	185.02 ± 54.16	1308494.84			
January	9642	187.46 ± 55.66	1807515.04			
February	10758	184.23 ± 56.45	1981901.21			
March	12659	184.10 ± 54.08	2330497.27			
April	12020	183.58 ± 55.13	2206584.99			

Table 49F: Average cost of Cefprozil according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	1649	143.59 ± 49.05	236777.51			
June	1447	147.33 ± 48.36	213187.68			
July	1382	148.61 ± 53.65	205373.64			
August	2667	149.92 ± 51.56	399844.49			
September	1834	147.61 ± 53.96	270711.53			
October	1247	148.01 ± 52.42	184571.19			
November	1056	147.45 ± 55.36	155708.82			
December	964	149.18 ± 55.89	143808.83			
January	1658	167.64 ± 56.76	277945.22			
February	2246	167.60 ± 58.59	376432.20			
March	2107	167.21 ± 62.23	352305.91			
April	2278	166.87 ± 59.12	380133.50			

Table 50F: Average cost Cefprozil according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	2935	170.22 ± 57.20	499599.31			
June	3009	172.08 ± 73.46	517798.40			
July	2761	173.93 ± 62.52	480220.16			
August	2876	169.98 ± 59.39	488870.10			
September	1958	165.53 ± 61.15	324106.32			
October	2266	164.94 ± 60.52	373760.89			
November	2084	163.75 ± 56.00	341251.57			
December	1339	166.95 ± 59.95	223540.77			
January	1779	190.11 ± 76.40	338198.86			
February	2060	185.33 ± 74.79	381773.84			
March	2727	177.07 ± 65.77	482860.00			
April	2459	180.40 ± 68.41	443613.66			

Table 51F: Average cost of Cefradine according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May						
June						
July						
August						
September						
October						
November						
December						
January						
February						
March						
April						

Table 52F: Average cost Cefradine according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May				9	242.00 ± 130.53	2178.03
June				4	226.93 ± 44.91	907.73
July						
August				1	204.48	204.48
September				2	610.98	1221.96
October						
November						
December						
January				36	195.00 ± 26.17	7020.11
February				11	179.70 ± 42.44	1976.73
March				4	178.23 ± 17.50	712.92
April				5	204.48	1022.40

Table 53F: Average cost of Ceftibuten according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	591	193.02 ± 73.12	114076.09	14	229.44 ± 45.03	3212.26
June	489	209.73 ± 79.29	102557.62	9	209.20 ± 71.53	1882.83
July	478	206.05 ± 75.25	98293.57	9	153.69 ± 59.79	1383.18
August	797	215.78 ± 76.63	171978.66			
September	543	212.25 ± 76.87	115253.14	2	244.31 ± 15.70	488.61
October	449	217.58 ± 78.34	97694.04	3	256.89	770.67
November	346	231.85 ± 100.23	80222.92	3	233.19	699.57
December	406	206.04 ± 78.25	83652.66	1	256.89	256.89
January	677	220.47 ± 90.58	149255.36	7	305.04 ± 200.36	2135.25
February	622	207.40 ± 76.07	129005.71	9	113.83	1024.47
March	606	222.14 ± 90.28	134614.66	12	113.83	1365.96
April	318	224.83 ± 103.48	71497.18	10	213.97 ± 69.10	2139.72

Table 54F: Average cost Cefitibuten according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	296	271.02 ± 109.51	80223.20	14	226.23 ± 60.92	3167.28
June	214	260.25 ± 86.30	55693.94			
July	265	298.47 ± 80.14	79093.92			
August	268	265.96 ± 102.69	71276.41			
September	194	290.72 ± 120.66	56398.92			
October	219	309.57 ± 98.26	67795.81			
November	301	310.56 ± 118.84	93478.93			
December	334	298.05 ± 104.47	99549.88			
January	291	315.72 ± 99.75	91875.68			
February	269	292.24 ± 97.88	78613.78			
March	297	315.26 ± 119.47	93632.06			
April	323	314.40 ± 104.49	101551.39			

Table 55F: Average cost of Ceftrazidime according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May						
June	3	177.53	532.59			
July						
August						
September						
October						
November						
December						
January						
February	6	1268.47 ± 462.27	7610.82			
March	4	3063.25 ± 5703.98	12252.96			
April						

Table 56F: Average cost Ceftrazidime according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May						
June						
July						
August						
September						
October						
November						
December						
January						
February						
March						
April						

Table 57F: Average cost of Ceftriaxone according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	49	330.10 ± 578.31	16174.98			
June	40	227.37 ± 188.22	9094.95	3	411.63	1234.89
July	62	495.30 ± 1512.77	30708.56	12	169.63 ± 32.83	2035.50
August	59	289.86 ± 514.43	17101.69			
September	98	273.10 ± 175.24	26763.61	3	201.06	603.18
October	68	217.54 ± 182.64	14792.91	1	400.65	400.65
November	64	217.74 ± 132.38	13935.04	4	471.50 ± 141.71	1886.01
December	64	271.04 ± 269.38	17346.58	3	138.19	414.57
January	93	384.97 ± 394.99	35801.91	3	201.06	603.18
February	129	239.76 ± 182.94	30929.34	3	616.23	1848.69
March	138	248.35 ± 199.37	34272.19	5	572.99 ± 421.34	2864.93
April	124	325.64 ± 283.08	40379.49	3	411.30	1233.90

Table 58F: Average cost Ceftriaxone according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	117	265.29 ± 232.94	31038.45	6	580.61 ± 487.97	3483.63
June	104	249.39 ± 174.78	25937.05	4	170.59 ± 60.95	682.35
July	117	236.00 ± 197.28	27611.98	8	334.87 ± 135.15	2678.98
August	126	294.78 ± 163.85	37142.09	9	255.86 ± 309.78	2302.74
September	91	274.29 ± 232.04	24960.40	3	401.54	1204.62
October	96	291.45 ± 197.03	27979.64			
November	83	212.62 ± 104.97	17647.81	4	126.66 ± 52.18	506.63
December	102	272.85 ± 225.64	27830.97	1	147.96	147.96
January	157	286.75 ± 207.67	45019.53	11	136.60 ± 15.76	1502.55
February	97	325.48 ± 258.87	31571.95	10	619.01 ± 406.74	6190.09
March	112	238.61 ± 162.49	26723.78	10	491.90 ± 410.28	4918.97
April	89	313.69 ± 287.26	27918.77	47	190.09 ± 41.99	8934.07

Table 59F: Average cost of Cefuroxime according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	12059	156.18 ± 63.87	1883328.90			
June	10212	157.36 ± 64.18	1606962.21			
July	10893	161.97 ± 65.93	1764303.59			
August	17619	160.83 ± 64.82	2833727.95			
September	11993	157.75 ± 64.32	1891884.59			
October	9681	157.13 ± 67.11	1521145.78			
November	7936	162.16 ± 63.75	1286928.68			
December	8773	167.44 ± 66.06	1468989.37			
January	12998	174.26 ± 68.65	2265065.86			
February	13964	172.52 ± 65.55	2409135.31			
March	15522	170.05 ± 66.46	2639477.97			
April	16082	174.91 ± 75.55	2812936.82			

Table 60F: Average cost Cefuroxime according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	20498	174.96 ± 72.13	3586301.28			
June	21850	176.04 ± 71.19	3846393.95			
July	19815	181.11 ± 74.42	3588603.00			
August	19813	178.15 ± 75.73	3529626.97			
September	13398	176.34 ± 75.09	2362608.76			
October	12944	174.52 ± 73.28	2258925.57			
November	11213	174.07 ± 72.82	1951835.83			
December	9087	177.67 ± 72.28	1614474.52			
January	12570	194.73 ± 83.29	2447802.40			
February	13573	194.89 ± 82.28	2645285.11			
March	15746	192.42 ± 80.69	3029889.89			
April	15292	192.49 ± 78.38	2943515.20			

Table 61F: Average cost of Cephalexin according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	43	320.52 ± 134.19	13782.42	1016	81.01 ± 33.32	82304.29
June	43	340.98 ± 120.44	14662.26	792	80.85 ± 34.17	64032.61
July	53	311.65 ± 143.50	16517	836	81.80 ± 35.34	68391.76
August	169	272.50 ± 161.42	46052.61	1477	84.50 ± 35.02	124810.20
September	115	317.05 ± 166.60	36460.93	1175	87.07 ± 32.54	102311.59
October	134	300.53 ± 142.77	40270.55	784	89.36 ± 31.98	70060.40
November	71	333.89 ± 129.93	23706.26	724	82.90 ± 29.40	60018.60
December	85	379.32 ± 109.52	32242.56	773	86.59 ± 31.92	66936.11
January	257	375.51 ± 145.71	96506.02	1039	89.07 ± 36.83	92546.42
February	260	435.76 ± 173.48	113298.33	1002	92.69 ± 35.64	92872.61
March	242	492.98 ± 150.59	119301.02	908	87.51 ± 34.39	79455.49
April	317	508.95 ± 159.65	161335.64	1005	92.67 ± 40.24	93131.69

Table 62F: Average cost Cephalexin according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	92	317.21 ± 235.49	29183.37	1116	88.64 ± 35.02	98926.38
June	54	396.97 ± 217.73	21436.26	1193	92.44 ± 46.18	110284.26
July	55	346.37 ± 220.29	19050.37	1046	88.87 ± 38.12	92955.75
August	45	371.30 ± 227.08	16708.58	908	88.95 ± 34.40	80765.10
September	34	345.11 ± 191.86	11733.75	836	90.51 ± 64.98	75668.99
October	46	298.37 ± 216.61	13725.17	745	86.68 ± 33.42	64579.87
November	61	273.47 ± 246.13	16681.95	641	92.27 ± 41.52	59145.36
December	56	270.06 ± 211.82	15123.52	684	91.77 ± 42.78	62774.00
January	75	159.54 ± 171.54	11965.42	1147	90.43 ± 36.80	103718.48
February	66	97.83 ± 65.12	6457.10	979	90.30 ± 35.08	88405.21
March	52	259.18 ± 281.62	13477.13	1009	89.15 ± 42.28	89956.60
April	43	137.76 ± 152.52	5923.56	960	88.16 ± 33.34	84628.85

Table 63F: Average cost of Cephalothin according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May						
June				3	221.86	665.58
July						
August						
September						
October						
November						
December						
January						
February						
March						
April						

Table 64F: Average cost Cephalothin according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May						
June						
July						
August						
September						
October						
November						
December						
January						
February						
March						
April						

Table 65F: Average cost of Cephradine according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	90	164.02 ± 88.58	14761.70	125	187.59 ± 114.61	23448.18
June	73	153.84 ± 62.15	11230.52	79	163.48 ± 57.31	12914.87
July	73	196.35 ± 264.46	14333.64	69	143.65 ± 54.93	9911.64
August	72	155.86 ± 94.82	11222.09	86	151.73 ± 58.01	13048.79
September	73	172.99 ± 82.65	12628.33	59	150.83 ± 66.38	8899.12
October	80	191.56 ± 124.56	15324.40	34	126.98 ± 44.43	4317.47
November	84	185.44 ± 106.37	15576.96	22	128.23 ± 64.66	2821.00
December	121	194.78 ± 81.58	23568.69	16	127.87 ± 32.78	2045.99
January	218	215.83 ± 97.93	47051.12	47	130.08 ± 37.51	6113.54
February	230	211.29 ± 89.51	48595.98	46	138.57 ± 42.76	6374.34
March	176	238.59 ± 115.93	41990.97	28	160.60 ± 57.63	4496.72
April	222	207.44 ± 109.56	46052.50	20	161.45 ± 56.15	3229.09

Table 66F: Average cost Cephadrine according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	170	196.69 ± 114.79	33437.11	22	167.56 ± 51.62	3686.36
June	136	226.10 ± 102.35	30750.11	12	204.47 ± 0.00	2453.67
July	171	258.23 ± 164.03	44157.75	11	207.65 ± 7.08	2284.15
August	96	289.72 ± 131.78	27812.71			
September	65	258.58 ± 114.37	16807.82	3	316.62	949.86
October	97	256.94 ± 117.63	24923.48	3	204.47	612.41
November	87	262.44 ± 110.68	22832.07			
December	128	253.63 ± 148.28	32465.13			
January	154	324.24 ± 160.58	49932.46			
February	148	285.11 ± 115.22	42196.36			
March	113	266.15 ± 112.72	30075.19			
April	102	302.96 ± 137.70	30901.96	3	169.46	508.38

Table 67F: Average cost of Imipenem/Cilastatin according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May						
June						
July						
August						
September						
October						
November						
December	2	3011.76 ± 1064.82	6023.52			
January	1	376.47	376.47			
February						
March						
April						

Table 68F: Average cost Imipenem/Cilastatin according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May						
June						
July						
August						
September						
October						
November						
December						
January						
February	4	3717.19	14868.76			
March						
April	2492	222.73 ± 64.29	555031.19			

Table 69F: Average cost of Loracarbef according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	2254	1702.41 ± 54.65	388611.51			
June	1789	176.22 ± 57.13	315262.47			
July	1783	169.53 ± 53.08	302275.75			
August	2961	169.22 ± 57.80	501071.12			
September	1804	163.57 ± 55.29	295075.91			
October	2545	170.35 ± 61.52	263189.71			
November	1139	163.89 ± 54.64	186668.07			
December	1330	163.45 ± 95.24	217388.29			
January	1808	178.02 ± 76.06	321857.67			
February	2276	220.41 ± 61.14	501661.07			
March	2317	218.85 ± 57.22	507077.55			
April	2492	222.73 ± 64.29	555031.19			

Table 70F: Average cost Loracarbef according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May	3010	223.61 ± 67.70	673059.44			
June	3325	224.51 ± 65.55	746483.35			
July	2701	228.82 ± 67.71	618032.29			
August	2722	221.33 ± 62.97	602448.33			
September	1753	218.27	382622.40			
October	1657	220.13 ± 70.89	364754.80			
November	1622	219.65 ± 66.27	356275.80			
December	1216	214.67 ± 57.01	261044.69			
January	1526	221.95 ± 61.62	338692.91			
February	1690	221.26 ± 64.62	373926.46			
March	1999	219.60 ± 61.23	438975.34			
April	1737	219.14 ± 69.62	380653.97			

Table 71F: Average cost of Meropenem trihydrate according to type (original vs. generic) of medicine. May 2001 to April 2002.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May						
June						
July						
August						
September						
October						
November						
December						
January						
February						
March						
April	6	934.69	5608.14			

Table 72F: Average cost of Meropenem trihydrate according to type (original vs. generic) of medicine. May 2002 to April 2003.

Month	Original product			Generic product		
	<i>n</i>	Average cost (R)	Total cost (R)	<i>n</i>	Average cost (R)	Total cost (R)
May						
June						
July						
August						
September						
October						
November						
December						
January	3	936.17	2808.51			
February						
March	1	493.30	493.30			
April	1	494.78	494.78			

Table 73F: Average cost of antibiotics according to type of medicine claimed. May 2001 to April 2002.

Month	Original Products			Generic Products		
	<i>n</i>	Average cost (R)	Total Cost (R)	<i>n</i>	Average cost (R)	Total Cost (R)
May	69968	173.67 ± 92.50	12151366.32	74391	79.20 ± 54.27	5891475.31
June	56707	174.77 ± 96.65	9910470.55	61717	80.10 ± 65.44	4943534.97
July	59664	177.46 ± 104.73	10587704.94	63627	80.36 ± 54.93	5112911.77
August	93676	177.25 ± 89.41	16604343.60	98372	80.72 ± 54.36	7940366.67
September	65159	175.57 ± 93.41	11440126.26	75309	81.12 ± 59.49	6108728.46
October	53001	175.13 ± 87.14	9282182.92	65951	81.72 ± 56.35	5389407.62
November	43083	175.50 ± 89.96	7560877.26	55610	82.16 ± 56.72	4568801.90
December	48082	180.15 ± 95.79	8661753.40	66304	84.85 ± 58.58	5625613.71
January	79767	190.65 ± 109.37	15207455.58	102504	88.29 ± 62.56	9049831.80
February	81989	188.16 ± 108.21	15427421.92	103234	89.68 ± 63.75	9258121.54
March	82088	188.25 ± 110.01	15453167.96	111310	89.22 ± 64.25	9930835.27
April	84149	189.59 ± 105.12	15953712.24	116339	88.13 ± 61.71	10252618.57

Table 74F: Average cost of antibiotics according to type of medicine claimed. May 2002 to May 2003.

Month	Original Products			Generic Products		
	<i>n</i>	Average cost (R)	Total Cost (R)	<i>n</i>	Average cost (R)	Total Cost (R)
May	97948	187.49 ± 101.18	18364811.06	128548	83.71 ± 60.54	10761112.25
June	99438	188.10 ± 99.13	18703890.46	124665	83.23 ± 61.44	10375687.87
July	95785	195.23 ± 93.48	18699895.77	123907	85.19 ± 60.94	10555662.92
August	92926	192.25 ± 92.61	17864826.31	124907	83.43 ± 59.29	10421171.13
September	67123	193.32 ± 98.73	12975895.50	103562	84.25 ± 60.66	8724798.77
October	66387	190.43 ± 161.20	12641856.45	104717	83.31 ± 58.97	8724145.87
November	58048	190.63 ± 100.21	11065895.88	93252	84.13 ± 59.88	7844846.56
December	49594	198.20 ± 98.79	9829717.33	82059	85.20 ± 58.14	6991361.16
January	71245	210.2 ± 106.04	14982350.02	121441	86.05 ± 61.21	10450259.57
February	68945	207.04 ± 103.96	14274481.41	114741	83.84 ± 59.18	9619930.86
March	75949	205.80 ± 97.55	15630492.63	124640	81.21 ± 55.96	10122063.72
April	71234	206.63 ± 98.95	14719292.72	119433	80.82 ± 55.84	9652001.93

Comments of interest with the interpretation of the following tables:

- Average package size: Due to the existence of more than one package size per product, the average package size was calculated.
- Total units: Refer to the total number of units that was claimed for the specific product (e.g. capsules, tablets, vials, etc.).
- Average cost: The average cost for that specific product claimed.
- Total cost: The actual total cost for that specific product claimed by the service provider.
- Cost per unit: The amount the MPL was reimbursing per unit for that specific product (capsules, tablets, vials, etc.).
- Total calculated cost: The total units claimed for that specific product multiplied by the cost per unit reimbursed by the MPL for that specific product.
- Effect: It is the total calculated cost subtracting the actual total cost. This value gives an indication whether there was a saving or a loss regarding the specific product claimed. When there was a negative value it means that the patient had to make a co-payment.
- Saving %: Gives an indication of what percentage was saved through the MPL.

Table 1G: Amoxicillin. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
Original products								
Amoxil 250mg CAP (n=938)	16.51 ± 4.17	15490	44.35 ± 21.25	41595.79	1.73	26797.70	-14798.09	-55.22
Amoxil 250mg VIAL (n=3)*	15.00	45	331.51	994.53				
Amoxil 500mg CAP (n=1000)	17.01 ± 6.30	17013	91.82 ± 48.69	91819.63	3.07	52229.91	-39589.72	-75.80
Amoxil Pead DRP (n=1073)*	20.41 ± 5.52	21900	56.29 ± 14.95	60395.07				
Amoxil S 125mg SUS (n=739)	105.41 ± 24.37	77900	38.87 ± 14.93	28728.51	0.23	17917.00	-10811.51	-60.34
Amoxil SF 250mg SUS (n=334)	107.23 ± 30.42	35815	72.39 ± 32.56	24177.41	0.38	13609.70	-10567.71	-77.65
Ranmoxy DISP 250mg TAB (n=19)*	19.74 ± 11.24	375	55.37 ± 30.43	1052.06				
Ranmoxy DISP TAB (n=36)*	29.30 ± 8.53	1055	46.25 ± 12.89	1664.95				
Generic products								
A-Lennon Amoxy CAP 250mg (n=232)	18.03 ± 6.84	4184	32.61 ± 18.00	7565.23	1.73	7238.32	-326.91	-4.52
A-Lennon Amoxy 125mg SUS (n=156)	103.85 ± 19.29	16200	26.01 ± 5.62	4066.44	0.23	3726.00	-340.44	-9.14
A-Lennon Amoxy 250mg SUS (n=102)	91.33 ± 25.07	9316	36.68 ± 8.86	3740.98	0.38	3540.08	-200.90	-5.68
Acucil S 125mg SUS (n=9)	100.00	900	24.46 ± 0.03	220.16	0.23	207.00	-13.16	-6.36
Acucil SF 250mg SUS (n=22)	100.00	2200	39.32 ± 0.31	864.95	0.38	836.00	-28.95	-3.46
Adco-Amoxycil 125mg SUS (n=2000)	102.50 ± 17.43	205000	24.77 ± 4.30	49535.99	0.23	47150.00	-2385.99	-5.06
Adco-Amoxycil 500mg CAP (n=2774)	16.32 ± 4.06	45259	51.12 ± 12.92	141817.95	3.07	138945.13	-2872.82	-2.07

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
Adco-Amoxycil 250mg CAP (n=4078)	18.80 ± 7.26	76660	33.20 ± 12.83	135409.64	1.73	132621.80	-2787.84	-2.10
Adco-Amoxycil 250mg SUS (n=1366)	104.22 ± 27.14	142368	40.03 ± 10.31	54684.50	0.38	54099.84	-584.66	-1.08
Amocillin 125mg SUS (n=54)	100.00	5400	25.49 ± 5.18	1376.44	0.23	1242.00	-134.44	-10.82
Amocillin 250mg CAP (n=243)	19.81 ± 9.32	4815	32.90 ± 20.39	7994.07	1.73	8329.95	335.88	4.03
Amocillin 250mg SUS (n=6)	100.00	600	39.48	236.88	0.38	228.00	-8.88	-3.89
Amocillin 500mg CAP (n=167)	15.84 ± 4.22	2645	50.43 ± 13.91	8422.25	3.07	8120.15	-302.10	-3.72
Amoxycillin-Hexal (n=1183)*	16.39 ± 5.33	19391	59.38 ± 17.84	70246.02				
Betamox 250mg CAP (n=5450)	18.46 ± 10.22	100583	31.16 ± 12.48	169807.43	1.73	174008.59	4201.16	2.41
Betamox 500mg CAP (n=6128)	17.49 ± 17.12	107160	51.42 ± 38.20	315104.75	3.07	328981.20	13876.45	4.22
Betamox S 125mg SUS (n=1445)	101.90 ± 14.23	147250	24.84 ± 3.48	35894.12	0.23	33867.50	-2026.62	-5.98
Betamox SF 250mg SUS (n=1482)	102.41 ± 22.52	151765	39.66 ± 8.64	58775.96	0.38	57670.70	-1105.26	-1.92
C-Mox 250mg CAP (n=8)	14.63 ± 0.52	117	27.48 ± 0.23	219.86	1.73	202.41	-17.45	-8.62
C-Mox 500mg CAP (n=18)	15.00	270	47.64 ± 0.22	857.52	3.07	828.90	-28.62	-3.45
Ipcamox 250mg CAP (n=55)	28.85 ± 17.14	1587	47.20 ± 26.85	2595.86	1.73	2745.51	149.65	5.45
Maxcil A 250mg CAP (n=7063)	17.76 ± 8.39	125419	31.10 ± 13.92	219684.81	1.73	216974.87	-2709.94	-1.25
Maxcil AF 500mg CAP (n=6426)	16.76 ± 6.01	107715	52.20 ± 19.198	335414.28	3.07	330685.05	-4729.23	-1.43
Maxcil P 125mg SUS (n=3002)	101.91 ± 17.23	305943	23.74 ± 3.88	71275.11	0.23	70366.89	-908.22	-1.29
Maxcil PF 250mg SUS (n=2809)	102.69 ± 16.87	288457	38.45 ± 6.47	107995.72	0.38	109613.66	1617.94	1.48
Moxan 250mg CAP (n=3740)	16.99 ± 5.19	63539	30.70 ± 9.24	114827.37	1.73	109922.47	-4904.90	-4.46

Appendix G

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
Moxan 500mg CAP (n=10029)	16.69 ± 5.38	167392	52.14 ± 14.85	522949.52	3.07	513893.44	-9056.08	-1.76
Moxan S 125mg SUS (n=1662)	101.94 ± 15.37	169425	24.84 ± 3.65	41278.24	0.23	38967.75	-2310.49	-5.93
Moxan SF 250mg SUS (n=2489)	105.33 ± 23.70	262163	40.82 ± 9.22	101609.87	0.38	99621.94	-1987.93	-2.00
Moxyphen 125mg SUS (n=4435)	102.01 ± 15.71	452403	24.88 ± 3.85	110333.43	0.23	104052.69	-6280.74	-6.04
Moxyphen 250mg CAP (n=10987)	17.87 ± 7.08	196389	32.25 ± 12.36	354320.85	1.73	339752.97	-14567.88	-4.29
Moxyphen 250mg SUS (n=4423)	103.28 ± 21.64	456820	40.06 ± 8.43	177205.39	0.38	173591.60	-3613.79	-2.08
Moxyphen 500mg CAP (n=8655)	16.53 ± 4.48	143102	52.59 ± 14.71	455131.96	3.07	439323.14	-15808.82	-3.60
Penmox 250mg CAP (n=66)	21.41 ± 15.50	1413	39.38 ± 26.97	2599.46	1.73	2444.49	-154.97	-6.34
Penmox 500mg CAP (n=94)	19.74 ± 5.83	1856	69.87 ± 28.25	6567.86	3.07	5697.92	-869.94	-15.27
Penmox P 125mg SUS (n=33)	100.00	3300	25.36 ± 3.59	836.83	0.23	759.00	-77.83	-10.25
Penmox PF 250mg SUS (n=20)	100.00	2000	39.29 ± 0.31	785.86	0.38	760.00	-25.86	-3.40
Promoxil 250mg CAP (n=1317)	21.09 ± 8.82	27780	13.24 ± 13.24	42892.44	1.73	48059.40	5166.96	10.75
Promoxil S 125mg SUS (n=80)	100.00	8000	24.22 ± 0.28	1937.92	0.23	1840.00	-97.92	-5.32
Promoxil SF 250mg SUS (n=80)	108.75 ± 28.43	8700	41.85 ± 10.96	3347.85	0.38	3306.00	-41.85	-1.27
Ranmoxy 250mg CAP (n=3086)	18.87 ± 8.47	58230	30.64 ± 13.58	94547.78	1.73	100737.90	6190.12	6.14
Ranmoxy 500mg CAP (n=2818)	16.20 ± 4.33	45654	51.31 ± 13.67	144601.98	3.07	140157.78	-4444.20	-3.17
Rolab-Amoxil 250mg CAP (n=1026)	21.17 ± 11.37	21720	34.53 ± 16.23	35429.19	1.73	37575.60	2146.41	5.71
Saltermox 250mg CAP (n=10)	22.50 ± 6.77	225	40.96 ± 11.25	409.95	1.73	389.25	-20.70	-5.32
Saltermox 500mg CAP (n=6)	17.50 ± 6.12	105	57.25 ± 23.22	343.44	3.07	322.35	-21.09	-6.54
Saltermox S 125mg SUS (n=13)	100.00	1300	25.32 ± 1.67	329.14	0.23	299.00	-30.14	-10.08

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
Saltermox SF 250mg SUS (n=9)	100.00	900	38.61 ± 1.65	347.49	0.38	342.00	-5.49	-1.61
Spectramox 250mg CAP (n=124)	20.12 ± 12.02	2495	36.62 ± 22.90	4541.16	1.73	4316.35	-224.81	-5.21
Spectramox S 125mg SUS (n=104)	105.29 ± 24.05	10950	27.62 ± 5.73	2872.28	0.23	2518.50	-353.78	-14.05
Spectramox SF 250mg SUS (n=88)	100.00	8800	40.44 ± 5.69	3558.76	0.38	3344.00	-214.76	-6.42
Xeracil 250mg CAP (n=5)	15.00	75	20.48	102.40	1.73	129.75	27.35	21.08
Zoxil 250mg CAP (n=8181)	17.08 ± 5.42	139753	30.73 ± 9.78	251365.39	1.73	241772.69	-9592.70	-3.97
Zoxil 500mg CAP (n=5574)	16.28 ± 5.32	90741	51.37 ± 16.79	286322.55	3.07	278574.87	-7747.68	-2.78
Zoxil S 125mg SUS (n=5690)	101.70 ± 13.82	578653	24.78 ± 3.37	141018.74	0.23	133090.19	-7928.55	-5.96
Zoxil SF 250mg SUS (n=3628)	101.69 ± 16.15	368918	39.53 ± 6.67	143429.26	0.38	140188.84	-3240.42	-2.31

* Not listed on Medscheme® Price List.

Table 2G: Amoxicillin. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
Original products								
Amoxil 250mg CAP (n=515)	16.69 ± 5.36	8597	42.55 ± 20.19	21914.98	1.73	14872.81	-7042.17	-47.35
Amoxil 500mg CAP (n=631)	16.61 ± 5.97	10484	84.34 ± 48.69	53220.43	3.07	32185.88	-21034.55	-65.35
Amoxil Pead DRP (n=301)*	20.20 ± 1.99	6080	56.49 ± 5.59	17003.28				
Amoxil S 125mg SUS (n=487)	106.57 ± 27.18	51900	36.93 ± 15.70	17982.63	0.23	11937.00	-6045.63	-50.65
Amoxil SF 250mg SUS (n=109)	100.92 ± 9.58	11000	53.22 ± 28.65	5800.47	0.38	4180.00	-1620.47	-38.77
Ranmoxy 250mg DISP (n=650)*	49.96 ± 12.30	32471	137.16 ± 33.27	89155.85				
Ranmoxy DISP TAB (n=6)*	20.67 ± 10.98	124	30.18 ± 13.57	181.09				
Generic products								
A-Lennon Amoxy CAP 250mg (n=555)	30.38 ± 19.18	16860	55.76 ± 38.45	30949	1.73	29167.80	-1781.20	-6.11
A-Lennon Amoxy 125mg (n=194)	102.32 ± 18.56	19850	25.94 ± 5.34	5031.54	0.23	4565.50	-466.04	-10.21
A-Lennon Amoxy 250mg (n=134)	91.54 ± 37.19	12266	38.14 ± 16.10	5110.97	0.38	4661.08	-449.89	-9.65
A-Lennon Amoxy 500mg (n=89)	17.01 ± 4.49	1514	59.17 ± 26.14	5266.00	3.07	4647.98	-618.02	-13.30
Acucil SF 250mg SUS (n=6)	100.00	600	39.48	236.88	0.38	228.00	-8.88	-3.89
Adco-Amoxycil 125mg SUS (n=1297)	101.93 ± 15.35	132200	24.82 ± 3.74	32188.54	0.23	30406.00	-1782.54	-5.86
Adco-Amoxycil 250mg CAP (n=2312)	19.10 ± 8.45	44120	32.11 ± 15.72	74227.64	1.73	76327.60	2099.96	2.75
Adco-Amoxycil 250mg SUS (n=1062)	104.71 ± 26.89	111205	40.79 ± 10.43	43317.43	0.38	42257.90	-1059.53	-2.51
Adco-Amoxycil 500mg CAP (n=1890)	16.54 ± 4.85	31264	50.95 ± 15.78	96297.51	3.07	95980.48	-317.03	-0.33

Appendix G

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
Moxypen 125mg SUS (n=3610)	101.13 ± 12.80	365091	24.81 ± 3.22	89552.61	0.23	83970.93	-5581.68	-6.65
Moxypen 250mg CAP (n=7505)	17.89 ± 9.43	134239	31.24 ± 13.84	234474.16	1.73	232233.47	-2240.69	-0.96
Moxypen 250mg SUS (n=3349)	103.61 ± 23.03	346991	40.55 ± 9.36	135795.73	0.38	131856.58	-3939.15	-2.99
Moxypen 500mg CAP (n=6160)	16.55 ± 5.18	101918	52.31 ± 16.76	322230.44	3.07	312888.26	-9342.18	-2.99
Penmox 250mg CAP (n=7)	18.57 ± 5.56	130	49.00 ± 7.51	343.00	1.73	224.90	-118.10	-52.51
Penmox 500mg CAP (n=26)	15.58 ± 5.09	405	52.96 ± 17.82	1377.02	3.07	1243.35	-133.67	-10.75
Penmox P 125mg SUS (n=6)	100.00	600	29.41 ± 7.64	176.46	0.23	138.00	-38.46	-27.87
Penmox PF 250mg SUS (n=6)	100.00	600	39.48	236.88	0.38	228.00	-8.88	-3.89
Promoxil 250mg CAP (n=845)	21.84 ± 12.58	18459	33.52 ± 18.82	28324.56	1.73	31934.07	3609.51	11.30
Promoxil S 125mg SUS (n=31)	103.23 ± 17.96	3200	25.02 ± 4.09	775.52	0.23	736.00	-39.52	-5.37
Promoxil SF 250mg SUS (n=50)	100.00	5000	38.54	1926.97	0.38	1900.00	-26.97	-1.42
Ranmoxy 250mg CAP (n=2564)	19.05 ± 7.91	48851	30.81 ± 12.55	78999.78	1.73	84512.23	5512.45	6.52
Ranmoxy 500mg CAP (n=2829)	16.51 ± 4.79	46711	52.22 ± 15.05	147744.24	3.07	143402.77	-4341.47	-3.03
Rolab-Amoxil 250mg CAP (n=805)	22.82 ± 14.16	18369	34.89 ± 21.35	28088.92	1.73	31778.37	3689.45	11.61
Saltermox 250mg CAP (n=7)	20.86 ± 15.50	146	38.18 ± 28.05	267.23	1.73	252.58	-14.65	-5.80
Saltermox S 125mg SUS (n=7)	100.00	700	24.48	171.36	0.23	161.00	-10.36	-6.43
Saltermox SF 250mg SUS (n=3)	100.00	300	39.92	119.76	0.38	114.00	-5.76	-5.05
Spectramox 250mg CAP (n=59)	18.14 ± 7.06	1070	33.03 ± 13.09	1948.60	1.73	1851.10	-97.50	-5.27
Spectramox S 125mg SUS (n=96)	96.35 ± 33.44	9250	24.71 ± 6.67	2372.36	0.23	2127.50	-244.86	-11.51
Spectramox SF 250mg SUS (n=46)	108.70 ± 28.49	5000	40.23 ± 15.22	1850.43	0.38	1900.00	49.57	2.61

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
Zoxil 250mg CAP (n=5211)	17.23 ± 6.27	89769	30.79 ± 10.91	160468.72	1.73	155300.37	-5168.35	-3.33
Zoxil 500mg CAP (n=4426)	16.45 ± 5.18	72788	52.18 ± 16.16	230969.55	3.07	223459.16	-7510.39	-3.36
Zoxil S 125mg SUS (n=4273)	101.53 ± 12.72	433845	24.75 ± 3.14	105742.07	0.23	99784.35	-5957.72	-5.97
Zoxil SF 250mg SUS (n=2373)	102.57 ± 15.83	243400	39.94 ± 7.12	94785.17	0.38	92492.00	-2293.17	-2.48

* Not listed on Medscheme® Price List.

Table 3G: Amoxicillin. January 2003 to April 2003

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
Original products								
Amoxil 250mg CAP (n=541)	16.68 ± 4.13	9026	30.55 ± 13.77	16527.64	1.58	14261.08	-2266.56	-15.89
Amoxil 250mg VIAL (n=2)*	15.00	30	361.81	723.62				
Amoxil 500mg CAP (n=563)	16.95 ± 7.49	9542	56.74 ± 39.54	31947.38	3.07	29293.94	-2653.44	-9.06
Amoxil Pead DRP (n=548)*	20.26 ± 2.25	11100	61.11 ± 6.99	33489.61		0.00	-33489.61	#DIV/0!
Amoxil S 125mg SUS (n=347)	106.51 ± 27.12	36960	27.08 ± 8.41	9395.20	0.23	8500.80	-894.40	-10.52
Amoxil SF 250mg SUS (n=143)	105.24 ± 23.52	15050	44.31 ± 20.04	6336.50	0.38	5719.00	-617.50	-10.80
Amoxzil 500mg VIAL (n=3)*	5.00	15	234.42 ± 0.01	703.27				
Ranmoxy 250mg DISP (n=1033)*	53.73 ± 11.12	55500	147.37 ± 30.07	152232.06				
Ranmoxy DISP TAB (n=20)*	29.55 ± 9.88	591	36.46 ± 20.35	729.20				
Generic products								
A-Lennon Amoxy 250mg CAP (n=552)	20.84 ± 12.09	11503	34.76 ± 20.04	19188.96	1.58	18174.74	-1014.22	-5.58
A-Lennon Amoxy 125mg SUS (n=174)	100.00	17400	23.32 ± 4.90	4058.36	0.23	4002.00	-56.36	-1.41
A-Lennon Amoxy 250mg SUS (n=158)	99.87 ± 32.04	15779	39.47 ± 12.32	6236.25	0.38	5996.02	-240.23	-4.01
A-Lennon Amoxy 500mg (n=268)	23.59 ± 51.10	6321	74.45 ± 156.93	19953.60	3.07	19405.47	-548.13	-2.82
Acucil S 125mg SUS (n=3)	100.00	300	24.48	73.44	0.23	69.00	-4.44	-6.43

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
Acucil SF 250mg SUS (n=11)	100.00	1100	39.48	434.28	0.38	418.00	-16.28	-3.89
Adco-Amoxycil 125mg SUS (n=1341)	102.46 ± 18.16	137400	25.07 ± 4.52	33619.44	0.23	31602.00	-2017.44	-6.38
Adco-Amoxycil 250mg CAP (n=2664)	18.38 ± 7.60	48955	30.27 ± 12.81	80628.60	1.58	77348.90	-3279.70	-4.24
Adco-Amoxycil 250mg SUS (n=1070)	103.98 ± 21.57	111260	40.98 ± 8.63	43847.83	0.38	42278.80	-1569.03	-3.71
Adco-Amoxycil 500mg CAP (n=2068)	16.79 ± 5.30	34728	51.21 ± 17.81	105909.77	3.07	106614.96	705.19	0.66
Amocillin 125mg SUS (n=296)	101.18 ± 13.91	29950	24.84 ± 3.40	7352.39	0.23	6888.50	-463.89	-6.73
Amocillin 250mg CAP (n=202)	16.53 ± 2.78	3340	27.92 ± 5.24	5640.03	1.58	5277.20	-362.83	-6.88
Amocillin 250mg SUS (n=16)	100.00	1600	39.00 ± 0.97	624.00	0.38	608.00	-16.00	-2.63
Amocillin 500mg CAP (n=348)	17.51 ± 5.64	6095	54.15 ± 18.31	18841.07	3.07	18711.65	-129.42	-0.69
Amoxycillin-Hexal (n=1275)*	17.55 ± 8.05	22374	62.67 ± 27.44	79910.22				
Betamox 250mg CAP (n=6164)	18.46 ± 7.86	6164	30.66 ± 12.53	189005.06	1.58	9739.12	-179265.94	-1840.68
Betamox 500mg CAP (n=6161)	17.58 ± 5.61	108281	53.63 ± 17.54	330411.71	3.07	332422.67	2010.96	0.60
Betamox S 125mg SUS (n=1872)	101.10 ± 13.40	189255	24.71 ± 3.22	46263.21	0.23	43528.65	-2734.56	-6.28
Betamox SF 250mg SUS (n=1613)	100.70 ± 16.92	162435	39.39 ± 6.46	63538.43	0.38	61725.30	-1813.13	-2.94
C-Mox 250mg CAP (n=9)	15.00	135	25.24 ± 1.08	227.19	1.58	213.30	-13.89	-6.51
Ipcamox 250mg CAP (n=147)	19.24 ± 8.22	2828	29.01 ± 14.34	4264.61	1.58	4468.24	203.63	4.56
Maxcil A 250mg CAP (n=3025)	17.72 ± 8.00	53606	29.02 ± 11.99	87798.61	1.58	84697.48	-3101.13	-3.66
Maxcil AF 500mg CAP (n=2055)	16.86 ± 6.09	34652	51.34 ± 19.46	105503.98	3.07	106381.64	877.66	0.83
Maxcil P 125mg SUS (n=1469)	100.82 ± 9.00	148100	24.62 ± 2.34	36168.76	0.23	34063.00	-2105.76	-6.18
Maxcil PF 250mg SUS (n=1362)	109.00 ± 54.98	148463	42.69 ± 21.15	58142.07	0.38	56415.94	-1726.13	-3.06

Appendix G

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
Moxan 250mg CAP (n=2483)	17.00 ± 5.18	42217	28.01 ± 8.94	69551.36	1.58	66702.86	-2848.50	-4.27
Moxan 500mg CAP (n=7584)	16.77 ± 5.44	127166	51.70 ± 15.04	392062.20	3.07	390399.62	-1662.58	-0.43
Moxan S 125mg SUS (n=1476)	101.69 ± 12.91	150100	24.44 ± 3.64	36069.40	0.23	34523.00	-1546.40	-4.48
Moxan SF 250mg SUS (n=1569)	106.05 ± 27.05	166400	41.12 ± 11.09	64499.27	0.38	63232.00	-1267.27	-2.00
Moxyphen 125mg SUS (n=4340)	101.95 ± 15.12	442460	24.51 ± 4.10	106390.08	0.23	101765.80	-4624.28	-4.54
Moxyphen 250mg CAP (n=9213)	18.13 ± 8.74	167064	29.50 ± 13.42	271742.61	1.58	263961.12	-7781.49	-2.95
Moxyphen 250mg SUS (n=3796)	103.95 ± 23.75	394605	39.91 ± 10.10	151483.07	0.38	149949.90	-1533.17	-1.02
Moxyphen 500mg CAP (n=7351)	17.04 ± 6.38	125238	51.95 ± 20.65	381902.22	3.07	384480.66	2578.44	0.67
Penmox 250mg CAP (n=8)	31.88 ± 23.29	255	62.37 ± 37.02	498.96	1.58	402.90	-96.06	-23.84
Penmox 500mg CAP (n=19)	20.21 ± 6.42	384	50.66 ± 28.43	962.58	3.07	1178.88	216.30	18.35
Penmox P 125mg SUS (n=3)	100.00	300	24.65	73.95	0.23	69.00	-4.95	-7.17
Promoxil 250mg CAP (n=918)	20.54 ± 9.49	18858	31.69 ± 14.25	29092.43	1.58	29795.64	703.21	2.36
Promoxil S 125mg SUS (n=20)	100.00	2000	24.28	485.53	0.23	460.00	-25.53	-5.55
Promoxil SF 250mg SUS (n=21)	100.00	2100	38.54	809.32	0.38	798.00	-11.32	-1.42
Ranmoxy 250mg CAP (n=2539)	18.42	46763	29.93 ± 14.28	75993.42	1.58	73885.54	-2107.88	-2.85
Ranmoxy 500mg CAP (n=4447)	16.89 ± 6.38	75089	53.39 ± 20.03	237443.85	3.07	230523.23	-6920.62	-3.00
Rolab-Amoxil 250mg CAP (n=1107)	20.49 ± 9.23	22687	30.39 ± 13.77	33639.69	1.58	35845.46	2205.77	6.15
Saltermox 250mg CAP (n=3)	15.00	45	25.50	76.50	1.58	71.10	-5.40	-7.59
Saltermox 500mg CAP (n=14)	7.79 ± 5.54	249	57.00 ± 18.90	798.03	3.07	764.43	-33.60	-4.40
Saltermox S 125mg SUS (n=6)	100.00	600	24.48	146.88	0.23	138.00	-8.88	-6.43

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
Saltermox SF 250mg SUS (n=9)	100.00	900	39.77 ± 0.22	357.96	0.38	342.00	-15.96	-4.67
Spectramox 250mg CAP (n=82)	16.59 ± 3.64	1360	25.80 ± 7.33	2115.75	1.58	2148.80	33.05	1.54
Spectramox S 125mg SUS (n=114)	101.75 ± 17.51	11600	24.94 ± 4.37	2843.38	0.23	2668.00	-175.38	-6.57
Spectramox SF 250mg SUS (n=58)	100.00	5800	39.48	2289.84	0.38	2204.00	-85.84	-3.89
Xeracil 250mg CAP (n=5)	20.00	100	26.63	133.15	1.58	158.00	24.85	15.73
Zoxil 250mg CAP (n=6166)	17.09 ± 6.24	105353	27.88 ± 9.85	171933.47	1.58	166457.74	-5475.73	-3.29
Zoxil 500mg CAP (n=4966)	16.34 ± 4.66	81121	51.72 ± 14.86	256821.18	3.07	249041.47	-7779.71	-3.12
Zoxil S 125mg SUS (n=4424)	101.57 ± 15.24	449358	24.35 ± 3.87	107735.81	0.23	103352.34	-4383.47	-4.24
Zoxil SF 250mg SUS (n=3232)	100.95 ± 11.87	326270	38.55 ± 4.77	124579.82	0.38	123982.60	-597.22	-0.48

* Not listed on Medscheme® Price List.

Appendix G

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
Amocillin 125mg SUS (n=83)	106.02 ± 23.94	8800	30.28 ± 11.69	2513.63	0.23	2024.00	-489.63	-24.19
Amocillin 250mg CAP (n=161)	18.73 ± 6.84	3015	32.64 ± 13.52	5254.69	1.73	5215.95	-38.74	-0.74
Amocillin 250mg SUS (n=7)	100.00	700	39.48	276.36	0.38	266.00	-10.36	-3.89
Amocillin 500mg CAP (n=71)	18.28 ± 5.30	1298	57.56 ± 17.82	4086.63	3.07	3984.86	-101.77	-2.55
Amoxicillin-Hexal (n=980)*	17.44 ± 8.57	17090	62.50 ± 29.13	61248.36				
Betamox 250mg CAP (n=4471)	19.46 ± 9.26	87014	32.74 ± 14.73	146381.08	1.73	150534.22	4153.14	2.76
Betamox 500mg CAP (n=4237)	18.53 ± 17.63	78499	54.97 ± 47.15	232893.97	3.07	240991.93	8097.96	3.36
Betamox S 125mg SUS (n=1278)	103.48 ± 20.02	132250	25.24 ± 4.93	32253.38	0.23	30417.50	-1835.88	-6.04
Betamox SF 250mg SUS (n=1007)	102.98 ± 25.76	103703	39.79 ± 10.15	40070.01	0.38	39407.14	-662.87	-1.68
C-Mox 250mg CAP (n=4)	26.25 ± 7.50	105	7.18 ± 13.28	28.72	1.73	181.65	152.93	84.19
C-Mox 500mg CAP (n=3)	21.00	63	68.23	204.69	3.07	193.41	-11.28	-5.83
Ipcamox 250mg CAP (n=16)	21.88 ± 15.04	350	36.14 ± 23.62	578.29	1.73	605.50	27.21	4.49
Maxcil A 250mg CAP (n=3587)	17.79 ± 9.64	63824	31.11 ± 16.14	111581.92	1.73	110415.52	-1166.40	-1.06
Maxcil AF 500mg CAP (n=3132)	16.67 ± 5.28	52202	51.19 ± 17.35	160337.38	3.07	160260.14	-77.24	-0.05
Maxcil P 125mg SUS (n=1987)	101.21 ± 10.93	201100	24.26 ± 2.76	48209.98	0.23	46253.00	-1956.98	-4.23
Maxcil PF 250mg SUS (n=1549)	106.47 ± 31.67	164915	40.78 ± 12.57	63161.51	0.38	62667.70	-493.81	-0.79
Moxan 250mg CAP (n=2065)	16.94 ± 5.58	34984	30.31 ± 10.05	62581.18	1.73	60522.32	-2058.86	-3.40
Moxan 500mg CAP (n=6162)	16.80 ± 5.68	103524	52.73 ± 16.08	324921.82	3.07	317818.68	-7103.14	-2.23
Moxan S 125mg SUS (n=1290)	101.74 ± 13.02	131250	24.92 ± 3.29	32150.71	0.23	30187.50	-1963.21	-6.50
Moxan SF 250mg SUS (n=1294)	104.48 ± 22.14	135200	40.90 ± 8.86	52922.66	0.38	51376.00	-1546.66	-3.01

Table 4G: Amoxicillin/clavulanic acid. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
Original products								
Augmentin 0.6g VIAL (n=17)*	15.41 ± 12.11	262	627.86 ± 488.84	10673.60				
Augmentin 1.2g VIAL (n=35)*	1.00	35	87.31 ± 0.08	3055.71				
Augmentin 1000 BD TAB (n=24011)*	10.59 ± 2.58	254311	221.33 ± 55.28	5314348.65				
Augmentin 375mg TAB (n=2104)	15.98 ± 3.21	33627	139.99 ± 43.83	294548.98	6.87	231017.49	-63531.49	-27.50
Augmentin 625mg TAB (n=680)	15.89 ± 3.60	10808	210.89 ± 66.15	143406.93	11.33	122454.64	-20952.29	-17.11
Augmentin COMB PACK (n=3)*	1.00	3	145.64	436.92				
Augmentin S 156mg SUS (n=1011)	106.03 ± 26.94	107200	51.26 ± 36.45	51821.62	0.59	63248.00	11426.38	18.07
Augmentin SF 312mg SUS (n=996)	104.09 ± 20.57	103675	140.91 ± 38.41	140346.19	1.16	120263.00	-20083.19	-16.70
Generic products								
Adco-Amoclav 375mg CAP (n=3239)	15.64 ± 3.07	50659	109.01 ± 22.22	353088.45	6.87	348027.33	-5061.12	-1.45
Adco-Amoclav Forte SUS (n=157)	103.18 ± 17.62	16200	120.20 ± 20.56	18871.52	1.16	18792.00	-79.52	-0.42
Adco-Amoclav S SUS (n=123)	102.44 ± 15.49	12600	60.90 ± 8.98	7490.21	0.59	7434.00	-56.21	-0.76
Augmaxil 375mg TAB (n=39660)	15.67 ± 3.61	621576	109.13 ± 25.89	4328043.11	6.87	4270227.12	-57815.99	-1.35
Augmaxil 625mg TAB (n=12850)	15.68 ± 3.42	201524	179.54 ± 40.23	2307110.05	11.33	2283266.92	-23843.13	-1.04
Augmaxil S 156mg SUS (n=8518)	102.47 ± 17.45	872835	61.60 ± 10.42	524671.82	0.59	514972.65	-9699.17	-1.88
Augmaxil SF 312mg SUS (n=10926)	102.36 ± 16.33	1118375	119.64 ± 19.27	1307133.75	1.16	1297315.00	-9818.75	-0.76

Appendix G

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
Bio-Amoksiklav 375mg TAB (n=901)	15.48 ± 2.36	13949	98.90 ± 22.84	89109.85	6.87	95829.63	6719.78	7.01
Bio-Amoksiklav 625mg TAB (n=316)	16.52 ± 3.16	5220	178.80 ± 37.48	56501.54	11.33	59142.60	2641.06	4.47
Bio-Amoksiklav S SUS (n=318)	100.94 ± 9.68	32100	60.07 ± 5.84	19103.19	0.59	18939.00	-164.19	-0.87
Bio-Amoksiklav SF SUS (n=451)	104.88 ± 24.46	47300	37.07 ± 64.41	16718.85	1.16	54868.00	38149.15	69.53
Clamentin 375mg TAB (n=14051)	15.63 ± 2.96	219661	109.00 ± 20.85	1531526.31	6.87	1509071.07	-22455.24	-1.49
Clamentin S 125mg SUS (n=3520)	101.61 ± 13.06	357660	61.60 ± 7.97	216828.56	0.59	211019.40	-5809.16	-2.75
Clamentin SF 250mg SUS (n=4138)	102.19 ± 15.45	422875	119.57 ± 19.16	494796.02	1.16	490535.00	-4261.02	-0.87
Clamentin 0.6g IV (n=8)*	1.00	8	41.21	329.68				
Clamentin 1.2g IV (n=3)*	1.00	3	75.38	226.14				
Clavumox 375mg TAB (n=12404)	15.73 ± 3.61	195140	109.76 ± 25.20	1361473.22	6.87	1340611.80	-20861.42	-1.56
Clavumox S 156mg SUS (n=3494)	102.56 ± 16.70	358345	61.31 ± 10.99	214217.91	0.59	211423.55	-2794.36	-1.32
Clavumox SF 312mg SUS (n=4927)	102.11 ± 15.63	503105	119.37 ± 18.41	588120.57	1.16	583601.80	-4518.77	-0.77
Moxyclav 375mg TAB (n=1353)	15.37 ± 1.92	20802	107.21 ± 13.63	145054.70	6.87	142909.74	-2144.96	-1.50
Moxyclav S 125mg SUS (n=151)	103.97 ± 19.60	15700	62.49 ± 12.01	9436.42	0.59	9263.00	-173.42	-1.87
Moxyclav SF 250mg SUS (n=200)	102.00 ± 14.04	20400	119.24 ± 16.32	23847.02	1.16	23664.00	-183.02	-0.77
Ranclav 375mg TAB (n=10421)	15.77 ± 3.15	164330	107.52 ± 21.67	1120479.85	6.87	1128947.10	8467.25	0.75
Ranclav 625mg TAB (n=5116)	15.75 ± 3.16	80597	174.35 ± 34.97	891959.75	11.33	913164.01	21204.26	2.32
Ranclav S 125mg SUS (n=1853)	102.70 ± 18.10	190300	59.61 ± 11.16	110452.09	0.59	112277.00	1824.91	1.63
Ranclav SF 250mg SUS (n=2588)*	102.85 ± 17.93	266187	113.87 ± 19.75	294685.06				
Rolab-Amoclav 375mg TAB	16.14 ± 3.75	122107	111.15 ± 29.12	841096.33	6.87	838875.09	-2221.24	-0.26

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
(n=7567)								
Rolab-Amoclav S SUS (n=1461)	103.29 ± 18.95	150900	61.61 ± 11.41	90006.57	0.59	89031.00	-975.57	-1.10
Rolab-Amoclav SF SUS (n=1579)	102.89 ± 19.18	162460	120.23 ± 22.91	189850.22	1.16	188453.60	-1396.62	-0.74

* Not listed on Medscheme® Price List.

Table 5G: Amoxicillin/clavulanic acid. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
Original products								
Augmentin 0.6g VIAL (n=13)*	20.77 ± 12.22	270	861.45 ± 512.89	11198.84				
Augmentin 1.2g VIAL (n=12)*	1.33 ± 1.15	16	112.18 ± 86.10	1346.11				
Augmentin 1000 BD TAB (n=17564)*	10.57 ± 2.55	185695	221.54 ± 54.85	3891115.76				
Augmentin 375mg TAB (n=1396)	16.15 ± 4.10	22545	138.87 ± 47.69	193856.58	6.87	154884.15	-38972.43	-25.16
Augmentin 625mg TAB (n=484)	16.10 ± 3.48	7793	209.61 ± 67.01	101450.86	11.33	88294.69	-13156.17	-14.90
Augmentin S 156mg SUS (n=813)	104.31 ± 20.31	84800	52.41 ± 32.64	42607.24	0.59	50032.00	7424.76	14.84
Augmentin SF 312mg SUS (n=680)	104.71 ± 21.19	71200	138.25 ± 32.99	94012.20	1.16	82592.00	-11420.20	-13.83
Generic products								
Adco-Amoclav 375mg CAP (n=2910)	15.75 ± 3.81	45838	109.21 ± 27.78	317798.96	6.87	314907.06	-2891.90	-0.92
Adco-Amoclav 625mg CAP (n=1469)	15.48 ± 2.15	22742	177.77 ± 25.48	261150.57	11.33	257666.86	-3483.71	-1.35
Adco-Amoclav Forte SUS (n=593)	101.69 ± 12.89	60300	119.36 ± 15.21	70778.89	1.16	69948.00	-830.89	-1.19
Adco-Amoclav S SUS (n=499)	104.21 ± 22.90	52000	62.61 ± 14.16	31244.45	0.59	30680.00	-564.45	-1.84
Augmaxil 375mg TAB (n=16252)	15.64 ± 3.10	254241	109.04 ± 22.79	1772090.46	6.87	1746635.67	-25454.79	-1.46
Augmaxil 625mg TAB (n=5117)	15.56 ± 2.67	79622	177.56 ± 36.07	908574.15	11.33	902117.26	-6456.89	-0.72
Augmaxil S 156mg SUS (n=4191)	101.48 ± 13.53	425296	62.10 ± 9.38	260263.16	0.59	250924.64	-9338.52	-3.72

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
Augmaxil SF 312mg SUS (n=4964)	101.83 ± 14.99	505508	121.22 ± 21.59	601713.48	1.16	586389.28	-15324.20	-2.61
Bio-Amoksiklav 375mg TAB (n=1066)	15.62 ± 3.07	16646	108.78 ± 21.68	115962.13	6.87	114358.02	-1604.11	-1.40
Bio-Amoksiklav 625mg TAB (n=605)	16.10 ± 3.00	9743	161.71 ± 60.68	97835.56	11.33	110388.19	12552.63	11.37
Bio-Amoksiklav S SUS (n=130)	102.31 ± 15.07	13300	61.51 ± 9.27	7996.05	0.59	7847.00	-149.05	-1.90
Bio-Amoksiklav SF SUS (n=445)	101.91 ± 15.44	45350	39.64 ± 59.80	17638.52	1.16	52606.00	34967.48	66.47
Clamentin 375mg TAB (n=10828)	15.62 ± 2.90	169085	108.89 ± 20.47	1179057.97	6.87	1161613.95	-17444.02	-1.50
Clamentin 1.2g IV (n=2)*	3.00	6	222.02	444.04				
Clamentin S 125mg SUS (n=2664)	101.33 ± 12.85	269930	61.58 ± 7.98	164047.83	0.59	159258.70	-4789.13	-3.01
Clamentin SF 250mg SUS (n=3350)	101.60 ± 13.22	340370	119.14 ± 15.53	399127.35	1.16	394829.20	-4298.15	-1.09
Clavumox 375mg TAB (n=9646)	15.74 ± 3.40	151842	109.05 ± 24.24	1051850.60	6.87	1043154.54	-8696.06	-0.83
Clavumox S 156mg SUS (n=3300)	101.96 ± 15.89	336477	61.63 ± 10.05	203374.93	0.59	198521.43	-4853.50	-2.44
Clavumox SF 312mg SUS (n=3866)	103.46 ± 19.73	399975	121.06 ± 25.53	468000.00	1.16	463971.00	-4029.00	-0.87
Moxyclav 375mg TAB (n=993)	15.50 ± 2.33	15388	107.18 ± 17.07	106430.11	6.87	105715.56	-714.55	-0.68
Moxyclav S 125mg SUS (n=136)	100.74 ± 8.57	13700	58.26 ± 13.56	7923.66	0.59	8083.00	159.34	1.97
Moxyclav SF 250mg SUS (n=165)	104.24 ± 20.22	17200	122.52 ± 24.08	20215.53	1.16	19952.00	-263.53	-1.32
Ranclav 375mg TAB (n=10727)	15.65 ± 3.36	167928	106.63 ± 23.07	1143785.14	6.87	1153665.36	9880.22	0.86
Ranclav 625mg TAB (n=6259)	15.61 ± 2.76	97711	172.98 ± 30.63	1082670.21	11.33	1107065.63	24395.42	2.20
Ranclav S 125mg SUS (n=1992)	103.06 ± 17.23	205300	59.51 ± 10.12	118540.91	0.59	121127.00	2586.09	2.14
Ranclav SF 250mg SUS (n=2635)	102.11 ± 14.66	269050	112.86 ± 16.64	297389.19	1.16	312098.00	14708.81	4.71

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/- (R)	Saving %
Rolab-Amoclav 375mg TAB (n=8711)	16.01 ± 3.84	139456	110.25 ± 29.04	960420.78	6.87	958062.72	-2358.06	-0.25
Rolab-Amoclav S SUS (n=1411)	102.34 ± 15.12	144400	61.10 ± 10.04	86205.27	0.59	85196.00	-1009.27	-1.18
Rolab-Amoclav SF SUS (n=1533)	103.08 ± 17.49	158023	120.75 ± 21.38	185105.07	1.16	183306.68	-1798.39	-0.98

* Not listed on Medscheme® Price List.

Table 6G: Amoxicillin/clavulanic acid. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Augmentin 0.6g VIAL (n=56)*	1.88 ± 1.65	105	90.81 ± 72.73	5085.52				
Augmentin 1.2g VIAL (n=7)*	4.86 ± 4.81	34	380.12 ± 365.80	2660.86				
Augmentin 1000 BD TAB (n=22654)*	10.46 ± 2.38	236981	228.57 ± 52.93	5177915.05				
Augmentin 375mg TAB (n=985)	16.21 ± 5.37)	15971	118.20 ± 43.50	116422.66	6.73	107484.83	-8937.83	-8.32
Augmentin 625mg TAB (n=420)	15.85 ± 3.56	6657	180.61 ± 51.88	75857.76	11.00	73227.00	-2630.76	-3.59
Augmentin COMB PACK (n=2)*	1.00	2	159.89	319.78				
Augmentin S 156mg SUS (n=600)	101.92 ± 13.26	61150	60.67 ± 11.67	36401.00	0.57	34855.50	-1545.50	-4.43
Augmentin SF 312mg SUS (n=568)	105.63 ± 23.08	60000	121.12 ± 28.79	68796.98	1.10	66000.00	-2796.98	-4.24
Generic products								
Adco-Amoclav 375mg CAP (n=3239)	15.66 ± 3.18	50726	107.25 ± 23.55	347387.15	6.73	341385.98	-6001.17	-1.76
Adco-Amoclav 625mg CAP (n=751)	15.25 ± 1.71	11456	169.70 ± 22.23	127447.28	11.00	126016.00	-1431.28	-1.14
Adco-Amoclav FORT SUS (n=966)	101.14 ± 11.99	97700	114.16 ± 13.33	110281.07	1.10	107470.00	-2811.07	-2.62
Adco-Amoclav S SUS (n=696)	103.45 ± 19.02	72001	60.62 ± 12.14	42190.96	0.57	41040.57	-1150.39	-2.80
Augmaxil 375mg TAB (n=11637)	15.66 ± 2.96	182208	107.57 ± 20.87	1251830.92	6.73	1226259.84	25571.08	-2.09
Augmaxil 625mg TAB (n=5140)	15.61 ± 3.06	80230	173.53 ± 35.98	891919.08	11.00	882530.00	-9389.08	-1.06
Augmaxil S 156mg SUS (n=3791)	102.42 ± 16.94	388265	59.66 ± 10.08	226185.94	0.57	221311.05	-4874.89	-2.20
Augmaxil SF 312mg SUS (n=4578)	101.99 ± 14.57	466910	114.32 ± 17.23	523340.96	1.10	513601.00	-9739.96	-1.90

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Bio-Amoksiklav 375mg TAB (n=2296)	15.64 ± 2.61	35914	108.31 ± 18.56	248672.73	6.73	241701.22	-6971.51	-2.88
Bio-Amoksiklav 625mg TAB (n=1597)	16.40 ± 3.35	26190	177.28 ± 40.52	283120.43	11.00	288090.00	4969.57	1.73
Bio-Amoksiklav S SUS (n=349)	103.30 ± 20.67	36050	60.96 ± 12.39	21274.43	0.57	20548.50	-725.93	-3.53
Bio-Amoksiklav SF SUS (n=555)	110.27 ± 30.24	61200	115.61 ± 46.98	64164.58	1.10	67320.00	3155.42	4.69
Clamentin 375mg TAB (n=11943)	15.68 ± 3.20	187281	107.43 ± 22.45	1283043.27	6.73	1260401.13	22642.14	-1.80
Clamentin 0.6g IV (n=3)*	3.00	9	118.19	354.57				
Clamentin 1.2g IV (n=7)*	5.00	35	349.72 ± 256.69	2448.02				
Clamentin S 125mg SUS (n=3357)	102.41 ± 15.35	343800	60.22 ± 9.70	202148.39	0.57	195966.00	-6182.39	-3.15
Clamentin SF 250mg SUS (n=4108)	101.18 ± 12.49	415640	113.48 ± 15.80	466177.62	1.10	457204.00	-8973.62	-1.96
Clavumox 375mg TAB (n=15101)	15.67 ± 3.11	236666	106.78 ± 21.76	1612524.95	6.73	1592762.18	19762.77	-1.24
Clavumox S 156mg SUS (n=4613)	102.59 ± 18.11	473234	58.97 ± 10.46	272011.59	0.57	269743.38	-2268.21	-0.84
Clavumox SF 312mg SUS (n=4141)	102.52 ± 15.97	424550	113.63 ± 17.88	470542.53	1.10	467005.00	-3537.53	-0.76
Moxyclav 375mg TAB (n=5594)	15.75 ± 3.08	88084	106.98 ± 22.09	598470.62	6.73	592805.32	-5665.30	-0.96
Moxyclav S 125mg SUS (n=392)	100.77 ± 8.73	39500	57.73 ± 5.18	22629.81	0.57	22515.00	-114.81	-0.51
Moxyclav SF 250mg SUS (n=633)	102.53 ± 17.83	64900	113.48 ± 19.60	71835.96	1.10	71390.00	-445.96	-0.62
Ranclav 375mg TAB (n=15435)	15.54 ± 2.56	239788	105.98 ± 18.47	1635727.19	6.73	1613773.24	21953.95	-1.36
Ranclav 625mg TAB (n=9783)	15.62 ± 2.83	152850	172.72 ± 32.98	1689761.81	11.00	1681350.00	-8411.81	-0.50

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Ranclav S 125mg SUS (n=3415)	103.56 ± 19.29	353660	58.77 ± 14.95	200708.41	0.57	201586.20	877.79	0.44
Ranclav SF SUS (n=4698)	102.26 ± 15.46	480410	111.74 ± 22.87	524931.68	1.10	528451.00	3519.32	0.67
Rolab-Amoclav 375mg TAB (n=10907)	15.83 ± 3.69	172659	108.36 ± 27.61	1181888.17	6.73	1161995.07	-19893.10	-1.71
Rolab-Amoclav S SUS (n=866)	102.89 ± 16.75	89100	59.77 ± 12.36	51758.16	0.57	50787.00	-971.16	-1.91
Rolab-Amoclav SF SUS (n=720)	102.64 ± 16.04	73900	115.81 ± 18.73	83381.73	1.10	81290.00	-2091.73	-2.57

* Not listed on Medscheme® Price List.

Table 7G: Amoxicillin/flucloxacillin. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Suprapen 500mg CAP (n=293)	16.18 ± 3.95	4740	130.63 ± 55.20	38274.12	5.20	24648.00	-13626.12	-55.28
Suprapen S 250mg SUS (n=115)	107.83 ± 26.15	12400	102.18 ± 32.45	11751.01	0.82	10168.00	-1583.01	-15.57
Generic products								
Flumox 500mg CAP (n=132)*	17.29 ± 7.62	2282	91.25 ± 39.46	12045.49				
Macropen 500mg CAP (n=5818)	16.34 ± 4.39	95043	86.30 ± 21.03	502117.46	5.20	494223.60	-7893.86	-1.60
Macropen S 250mg SUS (n=1667)	102.24 ± 16.75	170430	84.60 ± 15.14	141021.47	0.82	139752.60	-1268.87	-0.91
Megapen 500mg CAP (n=3283)	17.30 ± 5.74	56811	92.03 ± 29.99	302119.59	5.20	295417.20	-6702.39	-2.27
Megapen S 125mg SUS (n=618)	107.77 ± 32.28	66600	89.52 ± 26.73	55325.52	0.82	54612.00	-713.52	-1.31

* Not listed on Medscheme® Price List.

Table 8G: Amoxicillin/flucloxacillin. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Suprapen 500mg CAP (n=191)	15.86 ± 3.18	3030	111.85 ± 43.52	21364.26	5.20	15756.00	-5608.26	-35.59
Suprapen S 250mg SUS (n=74)	107.43 ± 32.77	7950	97.26 ± 36.43	7197.22	0.82	6519.00	-678.22	-10.40
Generic products								
Flumox 500mg CAP (n=129)*	17.47 ± 5.46	2254	94.24 ± 32.38	12156.34		0.00	-12156.34	#DIV/0!
Macropen 500mg CAP (n=5045)	16.60 ± 5.54	83737	88.04 ± 28.63	444168.49	5.20	435432.40	-8736.09	-2.01
Macropen S 250mg SUS (n=1968)	102.39 ± 16.24	201500	85.03 ± 14.65	167339.00	0.82	165230.00	-2109.00	-1.28
Megapen 500mg CAP (n=2179)	16.94 ± 5.50	36914	90.43 ± 29.15	197047.23	5.20	191952.80	-5094.43	-2.65
Megapen S 125mg SUS (n=558)	104.15 ± 20.65	58115	87.21 ± 17.50	48664.17	0.82	47654.30	-1009.87	-2.12

* Not listed on Medscheme® Price List.

Table 9G: Amoxicillin/flucloxacillin. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Suprapen 500mg CAP (n=238)	16.67 ± 3.56	3968	93.74 ± 27.49	22311.29	5.20	20633.60	-1677.69	-8.13
Suprapen S 250mg SUS (n=82)	108.54	8900	92.37 ± 24.84	7573.97	0.82	7298.00	-275.97	-3.78
Generic products								
Flumox 500mg CAP (n=274)*	16.05 ± 4.54	4398	84.20 ± 26.05	23070.68				
Macropen 500mg CAP (n=6126)	16.73 ± 7.02	102465	87.63 ± 36.76	536795.23	5.20	532818.00	-3977.23	-0.75
Macropen S 250mg SUS (n=2371)	103.36 ± 18.93	245075	85.95 ± 15.72	203778.54	0.82	200961.50	-2817.04	-1.40
Megapen 500mg CAP (n=3207)	16.90 ± 5.55	54206	89.34 ± 28.39	286500.71	5.20	281871.20	-4629.51	-1.64
Megapen S 125mg SUS (n=754)	104.67 ± 25.27	78924	86.51 ± 20.85	65227.60	0.82	64717.68	-509.92	-0.79

* Not listed on Medscheme® Price List.

Table 10G: Ampicillin. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Generic products								
Ampimax 250mg CAP (n=3)	15.00	45	16.19	48.57	1.00	45.00	-3.57	-7.93
Ampipen 125mg SUS (n=3)	100.00	300	18.48	55.44	0.17	51.00	-4.44	-8.71
Ampipen 250mg CAP (n=71)	37.54 ± 20.09	2665	39.66 ± 28.14	2815.60	1.00	2665.00	-150.60	-5.65
Ampipen 500mg CAP (n=11)	21.36 ± 5.95	235	38.94 ± 12.79	428.30	1.80	423.00	-5.30	-1.25
Ampi-Rol 250mg CAP (n=184)*	31.84 ± 20.71	5858	31.77 ± 19.97	5845.04				
Ampi-Rol 500mg CAP (n=282)*	22.11 ± 8.14	6234	40.78 ± 14.53	11501.14				
Be-Ampicil 125mg SUS (n=50)	100.00	5000	16.96 ± 0.12	848.01	0.17	850.00	1.99	0.23
Be-Ampicil 250mg CAP (n=247)	25.60 ± 10.03	6323	21.52 ± 8.02	5315.14	1.00	6323.00	1007.86	15.94
Penrite S 250mg SUS (n=2)	100.00	200	40.47	80.94	0.22	44.00	-36.94	-83.95
Petercillin 125mg SUS (n=128)	110.94 ± 31.33	14200	19.88 ± 5.55	2544.13	0.17	2414.00	-130.13	-5.39
Petercillin 250mg CAP (n=384)	26.09 ± 12.55	10020	25.10 ± 12.76	9638.51	1.00	10020.00	381.49	3.81
Petercillin 250mg SUS (n=153)	100.00	15300	22.85 ± 0.16	3495.36	0.22	3366.00	-129.36	-3.84
Petercillin 500mg CAP (n=723)	24.00 ± 8.74	17354	41.00 ± 14.31	29640.58	1.80	31237.20	1596.62	5.11
Ranamp 500mg INJ (n=4)	1.75 ± 0.50	7	30.52 ± 8.72	122.08				
Spectracil 125mg SUS (n=10)	100.00	1000	18.72 ± 0.75	187.18	0.17	170.00	-17.18	-10.11
Spectracil 250mg CAP (n=6)	20.00	120	20.52	123.12	1.00	120.00	-3.12	-2.60
Spectracil 250mg SUS (n=12)	100.00	1200	23.48	281.76	0.22	264.00	-17.76	-6.73

* Not listed on Medscheme Price List.

Table 11G: Ampicillin. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Generic products								
Ampimax 250mg CAP (n=3)	20.00	60	20.98	62.94	1.00	60.00	-2.94	-4.90
Ampipen 250mg SUS (n=3)	200.00	600	69.52	208.56	0.32	192.00	-16.56	-8.63
Ampipen 250mg CAP (n=43)	26.28 ± 9.00	1130	16.42 ± 10.49	705.85	1.00	1130.00	424.15	37.54
Ampipen 500mg CAP (n=7)	28.57 ± 10.69	200	60.74 ± 23.73	425.16	2.10	420.00	-5.16	-1.23
Ampi-Rol 250mg CAP (n=96)*	26.74 ± 11.83	2567	28.28 ± 11.69	2714.87				
Ampi-Rol 500mg CAP (n=167)*	20.90 ± 4.74	3490	40.89 ± 8.60	6829.17				
Be-Ampicil 125mg SUS (n=19)	131.58 ± 74.93	2500	22.54 ± 12.19	428.26	0.17	425.00	-3.26	-0.77
Be-Ampicil 250mg CAP (n=91)	25.64 ± 9.71	2333	23.46 ± 8.16	2135.20	1.00	2333.00	197.80	8.48
Petercillin 125mg SUS (n=109)	111.01 ± 29.15	12100	20.50 ± 5.95	2234.24	0.17	2057.00	-177.24	-8.62
Petercillin 250mg CAP (n=313)	29.03 ± 14.50	9085	28.76 ± 14.39	9002.62	1.00	9085.00	82.38	0.91
Petercillin 250mg SUS (n=86)	97.21 ± 14.76	8360	11.30 ± 11.19	971.94	0.32	2675.20	1703.26	63.67
Petercillin 500mg CAP (n=580)	23.06 ± 8.74	13374	39.44 ± 14.21	22877.26	2.10	28085.40	5208.14	18.54
Ranamp 500mg INJ (n=3)*	2.00	6	34.88	104.64				
Spectracil 250mg CAP (n=6)	53.50 ± 29.03	321	52.88 ± 27.62	317.28	1.00	321.00	3.72	1.16
Spectracil 125mg SUS (n=2)	200.00	400	37.22	74.44	0.17	68.00	-6.44	-9.47

* Not listed on Medscheme® Price List.

Table 12G: Ampicillin. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Generic products								
Ampipen 250mg CAP (n=48)	26.90 ± 10.13	1291	14.93 ± 10.77	716.80	1.01	1303.91	587.11	45.03
Ampipen 500mg CAP (n=3)	20.00	60	36.49	109.47	2.01	120.60	11.13	9.23
Ampipen F 250mg SUS (n=1)	100.00	100	34.12	34.12	0.33	33.00	-1.12	-3.39
Ampicillin 500mg INJ (n=2)*	10.00	20	195.82	391.64				
Ampi-Rol 250mg CAP (n=109)*	30.08 ± 18.37	3279	26.60 ± 19.62	2899.24				
Ampi-Rol 500mg CAP (n=247)*	20.23 ± 2.93	4997	40.54 ± 6.28	10012.63				
Be-Ampicil 125mg SUS (n=34)	100.00	3400	18.24 ± 0.79	620.17	0.17	578.00	-42.17	-7.30
Be-Ampicil 250mg CAP (n=144)	29.35 ± 14.99	4227	27.95 ± 13.74	4024.10	1.01	4269.27	245.17	5.74
Petercillin 125mg SUS (n=84)	113.10 ± 33.94	9500	20.36 ± 6.51	1710.00	0.17	1615.00	-95.00	-5.88
Petercillin 250mg CAP (n=342)	29.92 ± 15.41	10232	3.62 ± 8.25	379.93	1.01	10334.32	9954.39	96.32
Petercillin 250mg SUS (n=105)	98.50 ± 10.82	10343	29.89 ± 14.44	10223.71	0.33	3413.19	-6810.52	-199.54
Petercillin 500mg CAP (n=779)	23.70 ± 10.20	18461	40.37 ± 16.64	31448.30	2.01	37106.61	5658.31	15.25
Spectracil 125mg SUS (n=5)	100.00	500	17.48	87.40	0.17	85.00	-2.40	-2.82
Spectracil 250mg CAP (n=9)	53.33 ± 20.00	480	26.26 ± 38.79	236.34	1.01	484.80	248.46	51.25
Spectracil 250mg SUS (n=16)	100.00	1600	34.48	551.68	0.33	528.00	-23.68	-4.48

* Not listed on Medscheme® Price List.

Table 13G: Ampicillin/cloxacillin. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Ampiclox 500mg CAP (n=464)	21.27 ± 6.54	9867	127.44 ± 45.05	59130.37	4.95	48841.65	-10288.72	-21.07
Ampiclox S 250mg SUS (n=213)	103.52 ± 17.49	22050	70.15 ± 18.57	14942.29	4.95	109147.50	94205.21	86.31
Generic products								
Apen 500mg CAP (n=1450)	21.07 ± 6.90	30557	97.36 ± 28.73	141169.86	4.95	151257.15	10087.29	6.67
Apen S 250mg SUS (n=384)	105.21 ± 22.25	40400	59.91 ± 14.44	23007.29	0.60	24240.00	1232.71	5.09
Cloxam 500mg CAP (n=838)	22.33 ± 8.24	18715	100.18 ± 35.93	83954.07	4.95	92639.25	8685.18	9.38
Megamox 500mg CAP (n=725)*	19.97 ± 5.25	14476	89.36 ± 22.37	64788.14				
Megamox S 250mg SUS (n=226)*	109.82 ± 45.54	24820	56.89 ± 23.34	12856.81				

* Not listed on Medscheme® Price List.

Table 14G: Ampicillin/cloxacillin. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Ampiclox 500mg CAP (n=300)	21.37 ± 7.94	6410	127.98 ± 51.98	38207.57	4.73	30319.30	-7888.27	-26.02
Ampiclox S 250mg SUS (n=95)	103.16 ± 17.58	9800	69.11 ± 16.10	6565.05	0.60	5880.00	-685.05	-11.65
Ampiclox 500mg VIAL (n=3)*	5.00	15	133.82	401.46				
Generic products								
Apen 500mg CAP (n=1140)	21.49 ± 7.31	24503	104.37 ± 34.33	118978.77	4.73	115899.19	-3079.58	-2.66
Apen S 250mg SUS (n=269)	102.08 ± 20.99	27460	62.34 ± 12.98	16769.34	0.60	16476.00	-293.34	-1.78
Cloxam 500mg CAP (n=742)	22.39 ± 9.76	16616	103.32 ± 43.35	76665.69	4.73	78593.68	1927.99	2.45
Megamox 500mg CAP (n=569)*	20.91 ± 7.47	11897	97.57 ± 33.04	55519.81				
Megamox S 250mg SUS (n=272)*	108.05 ± 35.24	29389	61.10 ± 20.33	16618.37				

* Not listed on Medscheme® Price List.

Table 15G: Ampicillin/cloxacillin. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Ampiclox 500mg CAP (n=334)	20.52 ± 7.72	6855	93.59 ± 34.03	31257.73	4.30	29476.50	-1781.23	-6.04
Ampiclox 500mg VIAL (n=7)*	11.86 ± 10.16	83	351.15 ± 296.33	2458.04				
Ampiclox S 250mg SUS (n=145)	110.34 ± 30.56	16000	67.88 ± 18.23	9842.68	0.60	9600.00	-242.68	-2.53
Generic products								
Apen 500mg CAP (n=1545)	21.43 ± 6.34	33116	94.36 ± 27.09	145785.49	4.30	142398.80	-3386.69	-2.38
Apen S 250mg SUS (n=525)	104.00 ± 19.61	54600	62.93 ± 12.02	33038.08	0.60	32760.00	-278.08	-0.85
Cloxam 500mg CAP (n=961)	22.10 ± 7.62	21234	96.86 ± 33.53	93082.64	4.30	91306.20	-1776.44	-1.95
Megamox 500mg CAP (n=851)*	20.41 ± 5.55	17362	90.10 ± 23.08	76674.44				
Megamox S 250mg SUS (n=313)*	106.39 ± 24.50	33300	55.12 ± 27.94	17251.06				

* Not listed on Medscheme® Price List.

Table 16G: Benzathine penicillin. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Ultracillin LA 2.4 (n=1)*	1.00	1	15.60	15.60				
Generic products								
Benzathine Pen 2.4MU (n=4)*	1.00	4	16.44 ± 0.98	65.77				

* Not listed on Medscheme® Price List.

Table 17G: Benzathine penicillin. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Ultracillin LA 2.4 (n=15)*	1.00	15	19.19	287.85				
Generic products								

* Not listed on Medscheme® Price List.

Table 18G: Benzathine penicillin. January 2003. to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Ultacillin LA 2.4 (n=8)*	1.00	8	19.19	153.52				
Generic products								
Benzathine Pen 2.4 MU (n=8)*	3.25 ± 4.17	26	47.89 ± 54.53	383.12				

* Not listed on Medscheme® Price List.

Table 19G: Benzylpenicillin. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Novopen 1.0 OMU CAR (n=10)*	1.60 ± 0.97	16	21.90 ± 13.36	218.98				
Generic products								
Benzylpenicillin 1MU (n=2)*	5.00	10	66.29	132.58				
Benzylpenicillin 5MU (n=1)*	1.00	1	23.51	23.51				

* Not listed on Medscheme® Price List.

Table 20G: Benzylpenicillin. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Novopen 1.0 MU CAR (n=2)*	1.75 ± 0.35	4	25.37 ± 3.24	50.74				
Novopen 5.0 MU CAR (n=1)*	1.00	1	28.14	28.14				
Generic products								

* Not listed on Medscheme® Price List.

Table 21G: Benzylpenicillin. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost. (R)	Effect +/-	Saving %
Original products								
Novopen 1.0 MU CAR (n=1)*	7.00	7	96.68	96.68				
Novopen 5.0 MU CAR (n=3)*	1.00	3	28.14	84.42				
Generic products								
Benzylpenicillin 1MU (n=1)*	2.00	2	27.69	27.69				
Benzylpenicillin 5MU (n=1)*	1.00	1	23.51	23.51				

* Not listed on Medscheme® Price List.

Table 22G: Benzylpenicillin/procaine. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Penilente LA 2.4MU (n=67)*	1.61 ± 0.97	108	25.39 ± 15.30	1700.83				
Penilente LA 1.2 INJ (n=33)*	1.24 ± 0.44	41	13.91 ± 4.87	458.93				
Penilente FORT 1.2MU (n=3)*	1.00	3	11.19	33.57				
Penilente FORT 6.0MU (n=3)*	2.00	6	50.41	151.23				
Generic products								

* Not listed on Medscheme® Price List.

Table 23G: Benzylpenicillin/procaine. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Penilente LA 2.4MU (n=52)*	1.23 ± 0.73	64	19.40 ± 11.62	1008.60				
Penilente LA 1.2 INJ (n=19)*	1.47 ± 1.17	28	16.53 ± 13.24	314.04				
Penilente FORT 1.2MU (n=2)*	4.00 ± 2.83	8	44.80 ± 31.69	89.59				
Generic products								

* Not listed on Medscheme® Price List.

Table 24G: Benzylpenicillin/procaine. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Penilente LA 2.4MU (n=60)*	1.68 ± 0.93	101	28.05 ± 15.47	1682.73				
Penilente LA 1.2 INJ (n=25)*	1.04 ± 0.20	26	12.18 ± 2.20	304.56				
Penilente FORT 1.2MU (n=2)*	1.00	2	12.31	24.62				
Generic products								

* Not listed on Medscheme® Price List.

Table 25G: Cefaclor. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Ceclor 125mg SUS (n=47)	78.19 ± 16.17	3675	150.29 ± 69.43	7063.75	1.37	5034.75	-2029.00	-40.30
Ceclor 250mg CAP (n=51)	17.65 ± 10.88	900	185.48 ± 100.24	9459.34	8.13	7317.00	-2142.34	-29.28
Ceclor 250mg SUS (n=30)	75.00	2250	177.90 ± 32.00	5337.08	2.24	5040.00	-297.08	-5.89
Ceclor 500mg CAP (n=20)	17.50 ± 6.18	350	478.59 ± 199.62	9571.88	12.47	4364.50	-5207.38	-119.31
Ceclor BD 187mg SUS (n=83)	50.00	4150	102.25 ± 11.10	8487.15	1.94	8051.00	-436.15	-5.42
Ceclor BD Forte 375mg SUS (n=36)	52.08 ± 7.01	1875	196.37 ± 35.04	7069.30	3.14	5887.50	-1181.80	-20.07
Ceclor CD 375mg TAB (n=85)	10.44 ± 2.15	887	156.45 ± 36.97	13298.28	13.80	12240.60	-1057.68	-8.64
Ceclor CD 500mg TAB (n=25)	10.20 ± 1.00	255	296.91 ± 127.37	7422.68	12.47	3179.85	-4242.83	-133.43
Cloracef MR 375mg TAB (n=75)	10.21 ± 1.07	766	144.28 ± 24.30	10821.20	13.80	10570.80	-250.40	-2.37
Generic products								
Adco-Cefaclor 125P SUS (n=438)	76.78 ± 14.25	33628	105.83 ± 19.99	46355.14	1.37	46070.36	-284.78	-0.62
Adco-Cefaclor 250mg CAP (n=686)	16.20 ± 4.77	11111	133.78 ± 38.93	91773.52	8.13	90332.43	-1441.09	-1.60
Adco-Cefaclor 250P SUS (n=372)	75.32 ± 5.00	28020	168.57 ± 12.36	62706.51	2.24	62764.80	58.29	0.09
Adco-Cefaclor BD 187mg SUS (n=1110)	51.13 ± 7.72	56750	100.02 ± 16.12	111026.72	1.94	110095.00	-931.72	-0.85
Adco-Cefaclor BD 375mg SUS (n=775)	49.68 ± 8.67	38500	156.75 ± 26.71	121478.04	3.14	120890.00	-588.04	-0.49

Appendix G

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Adco-Cefaclor BD TAB (n=2320)*	10.17 ± 1.60	23603	140.83 ± 22.32	326727.71				
Cec 125mg SUS (n=129)	101.36 ± 16.03	13075	107.08 ± 29.40	13812.99	1.37	17912.75	4099.76	22.89
Cec 250mg SUS (n=121)	100.29 ± 25.59	12135	184.02 ± 45.38	22266.26	2.24	27182.40	4916.14	18.09
Cec 500mg TAB (n=175)	15.63 ± 4.32	2735	191.58 ± 53.54	33526.92	12.47	34105.45	578.53	1.70
Cloracef 250mg CAP (n=32)	13.59 ± 5.42	435	120.64 ± 43.56	3860.59	8.13	3536.55	-324.04	-9.16
Cloracef BD 187mg SUS (n=17)	58.82 ± 19.65	1000	87.53 ± 41.86	1488.00	1.94	1940.00	452.00	23.30
Cloracef BD 375mg SUS (n=24)	50.00	1200	161.29 ± 12.25	3870.84	3.14	3768.00	-102.84	-2.73
Cloracef P 125mg SUS (n=3)	75.00	225	104.48	313.44	1.37	308.25	-5.19	-1.68
Cloracef PF 250mg SUS (n=9)	83.33 ± 12.50	750	190.30 ± 32.22	1712.70	2.24	1680.00	-32.70	-1.95
Lilly-Cefaclor 125P (n=91)	77.47 ± 13.47	7050	107.06 ± 18.97	9742.07	1.37	9658.50	-83.57	-0.87
Lilly-Cefaclor 250P (n=56)	73.79 ± 24.05	4132	166.94 ± 52.57	9348.88	2.24	9255.68	-93.20	-1.01
Lilly-Cefaclor BD 187mg SUS (n=204)	51.23 ± 7.75	10450	99.98 ± 15.67	20395.31	1.94	20273.00	-122.31	-0.60
Lilly-Cefaclor BD 375mg SUS (n=179)	49.43 ± 5.75	8795	155.08 ± 17.17	27759.14	3.14	27616.30	-142.84	-0.52
Lilly-Cefaclor CAP (n=109)	16.96 ± 4.17	1740	126.39 ± 34.69	13776.02	8.13	14146.20	370.18	2.62
Lilly-Cefaclor CD 375mg (n=402)	10.45 ± 1.98	4202	144.32 ± 27.31	58017.43	13.80	57987.60	-29.83	-0.05
Rolab-Cefaclor 250mg CAP (n=268)	15.85 ± 3.88	4249	125.53 ± 31.99	33642.19	8.13	34544.37	902.18	2.61
Rolab-Cefaclor 500mg CAP (n=166)	15.40 ± 3.75	2557	194.42 ± 51.13	32274.06	12.47	31885.79	-388.27	-1.22
Rolab-Cefaclor BD 187mg SUS (n=183)	53.96 ± 13.41	9875	105.98 ± 26.32	19393.87	1.94	19157.50	-236.37	-1.23
Rolab-Cefaclor BD 375mg SUS	45.04 ± 13.24	5090	142.78 ± 39.82	16134.35	3.14	15982.60	-151.75	-0.95

Appendix G

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
(n=113)								
Rolab-Cefaclor CD 375mg TAB (n=223)	10.19 ± 1.35	2272	140.69 ± 19.19	31374.51	13.80	31353.60	-20.91	-0.07
Rolab-Cefaclor CD 500mg TAB (n=20)*	12.50 ± 4.44	250	438.97 ± 155.49	8779.35				
Rolab-Cefaclor PAED 125mg SUS (n=78)	76.92 ± 11.93	6000	106.68 ± 16.75	8321.04	1.37	8220.00	-101.04	-1.23
Rolab-Cefaclor PAED 250mg SUS (n=52)	78.37 ± 14.88	4075	176.17 ± 33.51	9160.65	2.24	9128.00	-32.65	-0.36
Vercef 125mg SUS (n=9)	75.00	675	94.49 ± 0.01	850.38	1.37	924.75	74.37	8.04
Vercef 187mg SUS (n=303)	50.31 ± 6.72	15245	86.18 ± 14.27	26112.29	1.94	29575.30	3463.01	11.71
Vercef 250mg CAP (n=308)	16.47 ± 4.69	5074	123.06 ± 34.40	37901.29	8.13	41251.62	3350.33	8.12
Vercef 250mg SUS (n=9)	51.67 ± 35.00	465	106.98 ± 69.76	962.79	2.25	1046.25	83.46	7.98
Vercef 375mg SUS (n=228)	49.47 ± 4.57	11280	142.05 ± 12.41	32387.43	3.14	35419.20	3031.77	8.56
Vercef 500mg CAP (n=329)	14.70 ± 2.82	4835	167.59 ± 64.05	55138.17	12.47	60292.45	5154.28	8.55
Vercef MR 375mg TAB (n=835)	10.99 ± 2.82	9176	138.61 ± 36.55	115737.60	13.80	126628.80	10891.20	8.60

* Not listed on Medscheme® Price List.

Table 26G: Cefaclor. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Ceclor 125mg SUS (n=52)	76.44 ± 5.89	3975	118.58 ± 24.98	6166.38	1.37	5445.75	-720.63	-13.23
Ceclor 250mg CAP (n=55)	15.76 ± 2.32	867	158.33 ± 66.86	8708.14	8.13	7048.71	-1659.43	-23.54
Ceclor 250mg SUS (n=13)	75.00	975	190.11 ± 29.63	2471.47	2.24	2184.00	-287.47	-13.16
Ceclor 500mg CAP (n=18)	14.44 ± 1.62	260	275.61 ± 77.09	4960.93	12.47	3242.20	-1718.73	-53.01
Ceclor BD 187mg SUS (n=34)	54.41 ± 14.40	1850	107.08 ± 32.87	3640.81	1.94	3589.00	-51.81	-1.44
Ceclor BD Forte 375mg SUS (n=22)	56.82 ± 17.56	1250	188.21 ± 62.74	4140.53	3.14	3925.00	-215.53	-5.49
Ceclor CD 375mg TAB (n=46)	10.65 ± 2.50	490	154.58 ± 34.97	7110.86	13.80	6762.00	-348.86	-5.16
Ceclor CD 500mg TAB (n=10)	11.40 ± 3.27	114	356.32 ± 190.40	3563.19	12.47	1421.58	-2141.61	-150.65
Cloracef MR 375mg TAB (n=76)	10.39 ± 1.96	790	149.37 ± 27.68	11352.02	13.80	10902.00	-450.02	-4.13
Generic products								
Adco-Cefaclor 125P (n=314)	76.43 ± 9.04	24000	106.59 ± 12.36	33470.36	1.37	32880.00	-590.36	-1.80
Adco-Cefaclor 250mg CAP (n=353)	17.31 ± 7.88	6112	135.05 ± 66.75	47671.62	8.13	49690.56	2018.94	4.06
Adco-Cefaclor 250P (n=198)	76.59 ± 11.81	15165	173.78 ± 27.07	34407.87	2.24	33969.60	-438.27	-1.29
Adco-Cefaclor BD 187 SUS (n=660)	50.95 ± 7.16	33625	101.46 ± 14.35	66964.48	1.94	65232.50	-1731.98	-2.66
Adco-Cefaclor BD 375mg TAB	49.07 ± 12.56	21540	154.73 ± 38.70	67927.60	13.80	297252.00	229324.40	77.15

Appendix G

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
(n=439)								
Adco-Cefaclor BD TAB (n=1263)*	10.20 ± 1.45	12884	143.33 ± 20.83	181028.81				
Cec 125mg SUS (n=105)	99.29 ± 4.18	10425	109.98 ± 2.86	11547.59	1.37	14282.25	2734.66	19.15
Cec 250mg SUS (n=113)	98.45 ± 7.68	11125	178.72 ± 24.47	20195.22	2.24	24920.00	4724.78	18.96
Cec 500mg TAB (n=139)	16.11 ± 3.96	2239	197.37 ± 48.64	27433.89	12.47	27920.33	486.44	1.74
Cloracef 250mg CAP (n=5)	15.00	75	123.49 ± 0.01	617.43	8.13	609.75	-7.68	-1.26
Cloracef BD 187mg SUS (n=5)	50.00	250	106.75 ± 11.30	533.73	1.94	485.00	-48.73	-10.05
Cloracef BD 375mg SUS (n=18)	50.00	900	130.55 ± 59.48	2349.84	3.14	2826.00	476.16	16.85
Cloracef PF 250mg SUS (n=3)	75.00	225	169.50	508.50	2.24	504.00	-4.50	-0.89
Lilly-Cefaclor 125P SUS (n=84)	78.57 ± 17.42	6600	109.37 ± 24.20	9187.38	1.37	9042.00	-145.38	-1.61
Lilly-Cefaclor 250P SUS (n=54)	75.93 ± 10.82	4100	170.99 ± 23.95	9233.50	2.24	9184.00	-49.50	-0.54
Lilly-Cefaclor BD 187mg SUS (n=162)	53.70 ± 13.14	8700	105.39 ± 25.85	17073.08	1.94	16878.00	-195.08	-1.16
Lilly-Cefaclor BD 375 SUS (n=111)	49.10 ± 5.49	5450	155.07 ± 16.00	17213.12	3.14	17113.00	-100.12	-0.59
Lilly-Cefaclor CAP (n=90)	16.76 ± 4.95	1508	139.64 ± 40.64	12512.54	8.13	12260.04	-252.50	-2.06
Lilly-Cefaclor CD 375mg TAB (n=218)	10.19 ± 1.76	2222	139.93 ± 25.63	30504.66	13.80	30663.60	158.94	0.52
Rolab-Cefaclor 250mg CAP (n=139)	15.21 ± 1.34	2114	127.16 ± 13.80	17674.73	8.13	17186.82	-487.91	-2.84
Rolab-Cefaclor 500mg CAP (n=33)	16.82 ± 5.42	555	183.04 ± 75.79	6040.24	12.47	6920.85	880.61	12.72
Rolab-Cefaclor BD 187mg SUS (n=134)	50.37 ± 4.32	6750	92.34 ± 30.26	12374.00	1.94	13095.00	721.00	5.51
Rolab-Cefaclor BD 375mg SUS	49.65 ± 3.76	5610	156.48 ± 11.33	17682.17	3.14	17615.40	-66.77	-0.38

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
(n=113)								
Rolab-Cefaclor CD 375mg TAB (n=158)	10.49 ± 2.11	1658	145.44 ± 36.35	22979.48	13.80	22880.40	-99.08	-0.43
Rolab-Cefaclor CD 500 TAB (n=27)*	10.56 ± 1.60	285	385.90 ± 60.47	10419.30				
Rolab-Cefaclor PAED 125 SUS (n=42)	83.93 ± 20.53	3525	119.32 ± 29.02	5011.35	1.37	4829.25	-182.10	-3.77
Rolab-Cefaclor PAED 250 SUS (n=19)	71.84 ± 13.76	1365	165.16 ± 30.17	3138.07	2.24	3057.60	-80.47	-2.63
Vercef 125mg SUS (n=6)	75.00	450	94.48 ± 0.02	566.86	1.37	616.50	49.64	8.05
Vercef 187mg SUS (n=218)	50.92 ± 6.73	11100	87.99 ± 11.65	19180.83	1.94	21534.00	2353.17	10.93
Vercef 250mg CAP (n=316)	17.08 ± 5.47	5397	128.14 ± 40.08	40493.04	8.13	43877.61	3384.57	7.71
Vercef 250mg SUS (n=3)	75.00	225	153.48	460.44	2.24	504.00	43.56	8.64
Vercef 375mg SUS (n=122)	49.67 ± 12.31	6060	142.90 ± 34.63	17434.21	3.14	19028.40	1594.19	8.38
Vercef 500mg CAP (n=180)	15.27 ± 1.86	2748	186.06 ± 41.62	33491.49	12.47	34267.56	776.07	2.26
Vercef MR 375mg TAB (n=557)	11.70 ± 3.58	6517	148.06 ± 45.05	82469.19	13.80	89934.60	7465.41	8.30

* Not listed on Medscheme® Price List.

Table 27G: Cefaclor. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Ceclor 125mg SUS (n=42)	77.98 ± 8.19	3275	111.08 ± 13.05	4665.56	1.37	4486.75	-178.81	-3.99
Ceclor 250mg CAP (n=29)	17.07 ± 11.14	495	152.26 ± 108.21	4415.67	8.13	4024.35	-391.32	-9.72
Ceclor 250mg SUS (n=24)	75.00	1800	148.52 ± 56.69	3564.36	2.24	4032.00	467.64	11.60
Ceclor 500mg CAP (n=16)	18.19 ± 6.40	291	162.70 ± 84.65	2603.16	12.47	3628.77	1025.61	28.26
Ceclor BD 187mg SUS (n=42)	53.57 ± 13.03	2250	110.05 ± 25.25	4621.95	1.94	4365.00	-256.95	-5.89
Ceclor BD Forte 375mg SUS (n=18)	50.00	900	166.74 ± 7.59	3001.32	3.14	2826.00	-175.32	-6.20
Ceclor CD 375mg TAB (n=47)	11.34 ± 3.55	533	161.67 ± 48.45	7598.57	13.80	7355.40	-243.17	-3.31
Ceclor CD 500mg TAB (n=15)	10.00	150	247.24 ± 121.67	3708.58	12.47	1870.50	-1838.08	-98.27
Cloracef MR 375mg TAB (n=36)	10.42 ± 1.40	375	147.38 ± 21.40	5305.68	13.80	5175.00	-130.68	-2.53
Generic products								
Adco-Cefaclor 125P (n=271)	78.87 ± 15.77	21375	110.70 ± 24.08	30000.08	1.37	29283.75	-716.33	-2.45
Adco-Cefaclor 250mg CAP (n=463)	17.25 ± 7.99	7985	132.32 ± 68.80	61262.67	8.13	64918.05	3655.38	5.63
Adco-Cefaclor 250P (n=135)	76.48 ± 9.54	10325	173.84 ± 22.73	23468.22	2.24	23128.00	-340.22	-1.47
Adco-Cefaclor BD 187 SUS (n=653)	51.11 ± 7.18	33375	98.74 ± 15.29	64475.43	1.94	64747.50	272.07	0.42
Adco-Cefaclor BD 375mg TAB (n=394)	47.47 ± 11.74	18705	149.90 ± 35.53	59061.17	13.80	258129.00	199067.83	77.12
Adco-Cefaclor BD TAB (n=1215)*	10.24 ± 1.49	12444	144.15 ± 23.43	175144.66				
Cec 125mg SUS (n=149)	101.85 ± 16.97	15175	113.05 ± 24.71	16844.78	1.37	20789.75	3944.97	18.98

Appendix G

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Cec 250mg SUS (n=115)	96.74 ± 10.22	11125	181.29 ± 33.08	20847.85	2.24	24920.00	4072.15	16.34
Cec 500mg TAB (n=275)	15.65 ± 4.90	4303	192.58 ± 59.69	52958.13	12.47	53658.41	700.28	1.31
Cloracef 250mg CAP (n=6)	15.00	90	123.49	740.94	8.13	731.70	-9.24	-1.26
Cloracef 500mg CAP (n=3)	12.67 ± 4.62	38	203.84 ± 50.94	611.52	12.47	473.86	-137.66	-29.05
Cloracef BD 375mg SUS (n=3)	50.00	150	158.49	475.47	3.14	471.00	-4.47	-0.95
Lilly-Cefaclor P 125mg SUS (n=56)	73.14 ± 9.74	4096	101.53 ± 12.47	5685.84	1.37	5611.52	-74.32	-1.32
Lilly-Cefaclor P 250mg SUS (n=97)	75.00	7275	168.64 ± 0.01	16357.66	2.24	16296.00	-61.66	-0.38
Lilly-Cefaclor BD 187mg SUS (n=202)	51.49 ± 8.51	10400	101.04 ± 16.82	20409.23	1.94	20176.00	-233.23	-1.16
Lilly-Cefaclor BD 375 (n=148)	51.89 ± 16.34	7680	163.70 ± 50.87	24228.21	1.94	14899.20	-9329.01	-62.61
Lilly-Cefaclor CAP (n=117)	16.38 ± 4.33	1916	128.51 ± 36.95	15035.61	8.13	15577.08	541.47	3.48
Lilly-Cefaclor CD 375mg TAB (n=273)	10.38 ± 3.25	2833	143.35 ± 45.40	39134.62	13.80	39095.40	-39.22	-0.10
Rolab-Cefaclor 250mg (n=110)	14.86 ± 0.82	1635	123.42 ± 7.32	13576.55	8.13	13292.55	-284.00	-2.14
Rolab-Cefaclor 500mg (n=76)	15.76 ± 3.77	1198	213.40 ± 65.86	16218.16	12.47	14939.06	-1279.10	-8.56
Rolab-Cefaclor BD 187mg SUS (n=124)	50.81 ± 4.44	6300	90.14 ± 33.79	11177.75	1.94	12222.00	1044.25	8.54
Rolab-Cefaclor BD 375mg SUS (n=101)	49.50 ± 3.50	5000	151.53 ± 28.08	15304.44	3.14	15700.00	395.56	2.52
Rolab-Cefaclor CD 375mg TAB (n=268)	10.21 ± 1.69	2735	135.59 ± 37.62	36338.95	13.80	37743.00	1404.05	3.72
Rolab-Cefaclor CD 500 (n=37)*	11.08 ± 2.92	410	436.43 ± 118.02	16148.07				

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Rolab-Cefaclor PAED 125mg SUS (n=27)	77.78 ± 14.43	2100	109.12 ± 24.32	2946.33	1.37	2877.00	-69.33	-2.41
Rolab-Cefaclor PAED 250mg SUS (n=61)	78.69 ± 16.35	4800	177.96 ± 36.86	10855.47	2.24	10752.00	-103.47	-0.96
Vercef 187mg SUS (n=343)	53.21 ± 13.94	18250	91.92 ± 23.83	31527.92	1.94	35405.00	3877.08	10.95
Vercef 250mg CAP (n=205)	16.89 ± 4.76	3462	126.76 ± 35.31	25985.61	8.13	28146.06	2160.45	7.68
Vercef 375mg SUS (n=199)	47.59 ± 9.55	9470	134.76 ± 30.82	26817.77	3.14	29735.80	2918.03	9.81
Vercef 500mg CAP (n=337)	15.01 ± 1.69	5060	187.14 ± 26.97	63065.50	12.47	63098.20	32.70	0.05
Vercef MR 375mg TAB (n=833)	11.31 ± 3.32	9423	142.93 ± 41.66	119060.53	13.80	130037.40	10976.87	8.44

* Not listed on Medscheme® Price List.

Table 28G: Cefadroxil. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Cefadrox 500mg CAP (n=42)	10.83 ± 2.45	455	116.30 ± 26.60	4884.66	10.60	4823.00	-61.66	-1.28
Cefadrox 250mg SUS (n=12)*	60.00	720	81.29 ± 0.01	975.43				
Cefadrox 500mg SUS (n=10)	60.00	600	122.04 ± 0.01	1220.43	2.02	1212.00	-8.43	-0.70
Generic products								
Cipadur 250mg DISP TAB (n=504)*	15.33 ± 6.52	7726	129.77 ± 58.16	65406.10				
Cipadur 500mg CAP (n=167)	11.17 ± 4.40	1865	115.79 ± 41.19	19337.51	10.60	197690.00	178352.49	90.22
Dacef 250mg SUS (n=87)*	62.41 ± 18.23	5430	86.34 ± 24.56	7512.21				
Dacef 500mg CAP (n=1240)	10.35 ± 2.01	12830	111.17 ± 21.86	137850.97	10.60	135998.00	-1852.97	-1.36
Dacef 500mg SUS (n=34)	56.18 ± 24.12	1910	117.20 ± 48.11	3984.70	2.02	3858.20	-126.50	-3.28

* Not listed on Medscheme® Price List.

Table 29G: Cefadroxil. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Cefadrox 500mg CAP (n=13)	10.00	130	107.09	13921.21	10.60	1378.00	-12543.21	-910.25
Cefadrox 250mg SUS (n=1)*	60.00	60	81.29	81.29				
Generic products								
Cipadur 250mg DISP TAB (n=362)*	18.46 ± 11.34	6683	156.64 ± 86.25	56704.20				
Cipadur 500mg CAP (n=38)	13.68 ± 5.41	520	144.04 ± 59.38	5473.65	10.60	5512.00	38.35	0.70
Dacef 250mg SUS (n=62)*	63.06 ± 14.09	3910	92.94 ± 22.27	5762.58				
Dacef 500mg CAP (n=680)	10.26 ± 1.96	6979	110.56 ± 21.13	75179.13	10.60	73977.40	-1201.73	-1.62
Dacef 500mg SUS (n=15)	58.00 ± 4.14	870	120.74 ± 3.62	1811.07	2.02	1757.40	-53.67	-3.05

* Not listed on Medscheme® Price List.

Table 30G: Cefadroxil. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Cefadrox 500mg CAP (n=6)	15.00	90	160.12 ± 58.10	960.72	10.60	954.00	-6.72	-0.70
Cefadrox 250mg SUS (n=12)	60.00	720	81.29	975.45	2.02	1454.40	478.95	32.93
Cefadrox 500mg SUS (n=3)*	60.00	180	122.04	366.12				
Generic products								
Cipadur 250mg DISP TAB (n=416)*	20.51 ± 11.26	8470	172.25 ± 85.07	71139.09				
Cipadur 500mg CAP (n=26)	11.15 ± 3.26	290	119.60 ± 34.64	3109.52	10.60	3074.00	-35.52	-1.16
Dacef 250mg SUS (n=157)*	61.15 ± 8.24	9600	92.98 ± 12.71	14597.53				
Dacef 500mg CAP (n=858)	10.25 ± 1.56	8792	110.17 ± 16.66	94521.95	10.60	93195.20	-1326.75	-1.42
Dacef 500mg SUS (n=36)	57.22 ± 11.62	2060	121.88 ± 25.08	4387.68	2.02	4161.20	-226.48	-5.44

* Not listed on Medscheme® Price List.

Table 31G: Cefazolin. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Ranzol 1g INJ (n=2)*	1.00	2	129.28	258.56				
Generic products								
Kefzol 500mg VIAL (n=4)*	4.75	19	398.70 ± 5.68	1594.80				
Kefzol 1g INJ (n=1)*	1.00	1	165.01	165.01				

* Not listed on Medscheme® Price List.

Table 32G: Cefazolin. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Ranzol 250mg INJ (n=3)*	1.00	3	37.04	111.12				
Ranzol 500mg INJ (n=2)*	1.00	2	70.19	140.38				
Generic products								

* Not listed on Medscheme® Price List.

Table 33G: Cefazolin. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Ranzol 250mg INJ (n=6)*	1.00	6	40.54	243.24				
Ranzol 500mg INJ (n=4)*	1.5 ± 0.58	6	105.97 ± 41.32	423.88				
Generic products								
Kefzol 500mg VIAL (n=9)*	1.00	9	97.33 ± 0.25	875.94				
Kefzol 1g INJ (n=3)*	9.00	27	1454.74	4364.22				

* Not listed on Medscheme® Price List.

Table 34G: Cefepime. January to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Maxipime 1g INJ (n=1)*	6.00	6	1658.43	1658.43				
Generic products								

* Not listed on Medscheme® Price List.

Table 35G: Cefixime. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Fixime PAED SUS (n=1485)*	53.10 ± 12.20	78850	161.92 ± 37.18	240447.53				
Fixime 200mg TAB (n=1020)*	6.49 ± 3.07	6621	139.45 ± 111.09	142240.13				
Generic products								

* Not listed on Medscheme® Price List.

Table 36G: Cefixime. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Fixime PAED SUS (n=900)*	52.64 ± 12.17	47375	160.66 ± 36.93	144593.95				
Fixime 200mg TAB (n=747)*	6.61 ± 2.90	4934	147.34 ± 106.63	110059.49				
Generic products								

* Not listed on Medscheme® Price List.

Table 37G: Cefixime. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Fixime PAED SUS (n=776)*	50.52 ± 6.33	39200	167.46 ± 21.82	129950.22				
Fixime 200mg TAB (n=893)*	6.55 ± 2.73	5849	214.84 ± 97.10	191850.25				
Generic products								

* Not listed on Medscheme® Price List.

Table 38G: Cefotaxime. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Claforan 1g AMP (=n1)*	1.00	1	201.54	201.54				
Generic products								
Oritaxim 500mg INJ (n=1)*	1.00	1	71.73	71.73				
Totam 1g VIAL (n=5)*	20.40 ± 13.15	102	2323.83	11619.16				

* Not listed on Medscheme® Price List.

Table 39G: Cefotaxime. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Generic products								
Oritaxim 500mg INJ (n=1)*	1.00	1	71.74	71.74				

* Not listed on Medscheme® Price List.

Table 40G: Cefotaxime. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Claforan 500mg AMP (n=1)*	6.00	6	791.40	791.40				
Claforan 1g AMP (n=3)*	1.00	3	221.68	665.04				
Generic products								
Oritaxim 500mg INJ (n=3)*	3.00	9	187.76	563.28				

* Not listed on Medscheme® Price List.

Table 41G: Cefoxitin. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Pharmacare-Cefoxitin (n=3)*	2.00	6	170.34	511.02				
Generic products								

* Not listed on Medscheme® Price List.

Table 42G: Cefpodoxime. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Orelox Junior SUS (n=35970)*	76.52 ± 28.47	2752577	154.60 ± 46.32	5560881.61				
Orelox 100mg TAB (n=30186)*	10.61 ± 2.51	320277	189.12 ± 44.54	5708815.79				
Generic products								

* Not listed on Medscheme® Price List.

Table 43G: Cefpodoxime. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Orelox Junior SUS (n=22826)*	74.66 ± 28.04	1704219	159.16 ± 47.78	3633089.28				
Orelox 100mg TAB (n=15142)*	10.66 ± 2.63	161459	198.96 ± 50.00	3012665.08				
Generic products								

* Not listed on Medscheme® Price List.

Table 44G: Cefpodoxime. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Orelox Junior SUS (n=26910)*	74.51 ± 27.96	2005012	167.55 ± 50.24	4508870.07				
Orelox 100mg TAB (n=18169)*	10.65 ± 2.67	193427	210.12 ± 52.57	3817628.44				
Generic products								

* Not listed on Medscheme® Price List.

Table 45G: Cefprozil. May 2002 to August 2002

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Prozef 125mg SUS (n=3730)*	88.85 ± 24.43	331420	109.80 ± 22.47	409536.47				
Prozef 250mg SUS (n=3078)*	100.94 ± 13.98	310702	190.25 ± 26.27	585579.93				
Prozef 250mg TAB (n=2503)*	10.73 ± 3.86	26848	167.95 ± 60.24	420367.80				
Prozef 500mg TAB (n=2270)*	10.13 ± 1.64	22992	251.54 ± 41.18	571003.77				
Generic products								

* Not listed on Medscheme® Price List.

Table 46G: Cefprozil. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Prozef 125mg SUS (n=2823)*	87.15 ± 25.43	246015	108.81 ± 23.38	307180.08				
Prozef 250mg SUS (n=2098)*	99.57 ± 8.94	208890	188.45 ± 16.45	395374.50				
Prozef 250mg TAB (n=1508)*	10.64 ± 2.40	16044	166.21 ± 38.42	250650.33				
Prozef 500mg TAB (n=1218)*	10.26 ± 1.79	12501	254.07 ± 48.81	309454.64				
Generic products								

* Not listed on Medscheme® Price List.

Table 47G: Cefprozil. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Prozef 125mg SUS (n=3414)*	85.71 ± 23.04	292610	120.15 ± 22.21	410207.08				
Prozef 250mg SUS (n=2359)*	99.75 ± 15.03	235303	210.41 ± 31.33	496368.41				
Prozef 250mg TAB (n=1748)*	10.94 ± 3.02	19117	180.01 ± 63.16	314663.75				
Prozef 500mg TAB (n=1504)*	10.19 ± 1.91	15320	282.72 ± 52.93	425207.12				
Generic products								

* Not listed on Medscheme® Price List.

Table 48G: Cefradine. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Generic products								
Ranfradin 500mg CAP (n=14)*	22.71 ± 10.60	318	235.02 ± 105.24	3290.24				

* Not listed on Medscheme® Price List.

Table 49G: Cefradine. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Generic products								
Ranfradin 500mg CAP (n=2)*	60.00	120	610.98	1221.96				

* Not listed on Medscheme® Price List.

Table 50G: Cefradine. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
<i>Original products</i>								
<i>Generic products</i>								
Ranfradin 500mg CAP (n=56)*	18.48 ± 3.29	1035	191.65 ± 29.05	10732.16				

* Not listed on Medscheme® Price List.

Table 51G: Ceftibuten. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Cedax 90mg SUS (n=567)*	52.70 ± 22.12	29880	202.14 ± 41.62	114613.80				
Cedax 400mg CAP (n=476)*	5.28 ± 1.13	2511	360.66 ± 70.66	171673.67				
Generic products								
Sepexin 400mg CAP (n=11)*	5.00	55	256.89	2825.79				
Sepexin 90mg SUS (n=3)*	30.00	90	113.83	341.49				

* Not listed on Medscheme® Price List.

Table 52G: Ceftibuten. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Cedax 90mg SUS (n=557)*	49.17 ± 23.13	27390	211.03 ± 37.71	117545.82				
Cedax 400mg CAP (n=491)*	5.14 ± 0.87	2524	406.68 ± 65.00	199677.72				
Generic products								

* Not listed on Medscheme® Price List.

Table 53G: Cefitibuten. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Cedax 90mg SUS (n=584)*	47.09 ± 21.63	27500	211.88 ± 36.32	123737.21				
Cedax 400mg CAP (n=596)*	5.04 ± 0.56	3003	405.93 ± 48.95	241935.70				
Generic products								

* Not listed on Medscheme® Price List.

Table 54G: Ceftriaxone. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost ³ (R)	Effect +/-	Saving %
Original products								
Rocephin 1g AMP (n=190)*	1.32 ± 0.83	250	307.02 ± 202.42	58334.03				
Rocephin 250mg AMP (n=92)*	1.63 ± 1.00	150	158.56 ± 97.25	14587.38				
Rocephin 2g VIAL INF (n=4)*	1.00	4	420.61 ± 0.01	1682.45				
Rocephin 500mg AMP (n=178)*	1.83 ± 1.32	325	264.75 ± 205.40	47125.71				
Generic products								
Oframax 250mg INJ (n=7)*	1.00	7	53.60 ± 11.27	375.21				
Pharmacare-Ceftriaxone (n=20)*	2.80 ± 2.33	56	438.62 ± 376.30	8772.49				

* Not listed on Medscheme® Price List.

Table 55G: Ceftriaxone. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Rocephin 1g AMP (n=163)*	1.53 ± 2.02	250	308.15 ± 200.32	50229.12				
Rocephin 250mg AMP (n=88)*	1.66 ± 0.92	146	161.33 ± 89.30	14197.09				
Rocephin 2g VIAL INF (n=9)*	1.67 ± 1.32	15	694.93 ± 560.02	6254.39				
Rocephin 500mg AMP (n=112)*	1.64 ± 0.99	184	247.66 ± 142.02	27738.22				
Generic products								
Oframax 250mg INJ (n=4)*	2.25 ± 0.50	9	112.42 ± 23.70	449.67				
Pharmacare-Ceftriaxone (n=4)*	2.50 ± 1.00	10	352.39 ± 98.31	1409.54				

* Not listed on Medscheme® Price List.

Table 56G: Ceftriaxone. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Rocephin 1g AMP (n=195)*	1.29 ± 0.79	251	314.98 ± 192.34	61421.70				
Rocephin 250mg AMP (n=99)*	1.73 ± 2.26	172	169.11 ± 218.96	16741.94				
Rocephin 2g VIAL INF (n=14)*	2.29 ± 0.61	32	961.72 ± 257.22	13464.12				
Rocephin 500mg AMP (n=147)*	1.77 ± 0.90	260	269.43 ± 146.66	39606.27				
Generic products								
Oframax 250mg INJ (n=18)*	2.17 ± 0.92	39	116.25 ± 45.98	2092.51				
Pharmacare-Ceftriazone (n=13)*	2.77 ± 1.74	36	518.77 ± 398.49	6744.05				
Rociject 1g INJ (n=47)*	1.32 ± 1.00	62	270.41 ± 205.74	12709.12				

* Not listed on Medscheme® Price List.

Table 57G: Cefuroxime. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Zinnat 125mg SUS (n=30661)*	78.70 ± 31.24	2412870	140.94 ± 45.63	4321450.50				
Zinnat 125mg TAB (n=640)*	11.82 ± 5.90	7562	118.25 ± 58.57	75683.18				
Zinnat 250mg TAB (n=48639)*	11.84 ± 4.49	576080	195.96 ± 74.28	9531533.09				
Zinnat 500mg TAB (n=2033)*	10.43 ± 2.55	21210	305.66 ± 81.69	621413.12				
Generic products								
Zinacef 750mg INJ (n=3)*	5.00	15	281.77	845.31				

* Not listed on Medscheme® Price List.

Table 58G: Cefuroxime. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Zinnat 125mg SUS (n=19389)*	77.67 ± 30.96	1505862	140.29 ± 45.46	2720162.78				
Zinnat 125mg TAB (n=394)*	12.55 ± 11.00	4946	126.97 ± 108.52	50025.97				
Zinnat 250mg TAB (n=25771)*	11.82 ± 4.46	304657	196.77 ± 74.08	5071045.48				
Zinnat 500mg TAB (n=1088)*	10.59 ± 2.52	11518	318.58 ± 80.36	346610.45				
Generic products								

* Not listed on Medscheme® Price List.

Table 59G: Cefuroxime. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Zinnat 125mg SUS (n=22882)*	77.13 ± 30.71	1764990	151.08 ± 48.44	3456963.85				
Zinnat 125mg TAB (n=525)*	11.24 ± 5.95	5903	122.57 ± 65.23	64351.55				
Zinnat 250mg TAB (n=30303)*	11.65 ± 4.10	352907	210.09 ± 74.65	6366457.19				
Zinnat 500mg TAB (n=3465)*	10.65 ± 2.48	36898	340.06 ± 83.50	1178305.89				
Generic products								
Zinacef 750mg INJ (n=6)*	1.00	6	69.02 ± 0.83	414.12				

* Not listed on Medscheme® Price List.

Table 60G: Cephalexin. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Keflex 125mg SUS (n=26)	115.38 ± 54.35	3000	158.24 ± 174.12	4114.27	0.63	1890.00	-2224.27	-117.69
Keflex 250mg CAP (n=32)	19.94 ± 5.09	638	175.69 ± 133.83	5622.22	3.15	2009.70	-3612.52	-179.75
Keflex 250mg SUS (n=22)	122.73 ± 42.89	2700	278.45 ± 214.05	6125.79	1.36	3672.00	-2453.79	-66.82
Keflex 500mg TAB (n=166)	17.95 ± 5.48	2979	424.80 ± 212.38	70516.30	5.75	17129.25	-53387.05	-311.67
Generic products								
Betacef 125mg SUS (n=9)	100.00	900	62.47 ± 0.01	562.26	0.63	567.00	4.74	0.84
Betacef 250mg CAP (n=49)	21.71 ± 7.18	1064	62.55 ± 25.90	3064.91	3.15	3351.60	286.69	8.55
Betacef 500mg CAP (n=612)	18.99 ± 3.92	3077	104.30 ± 19.82	16896.06	5.75	17692.75	796.69	4.50
Cerexin 500mg CAP (n=115)*	18.16 ± 6.15	2088	107.06 ± 34.11	12311.98				
Fexin 250 mg TAB (n=32)	17.66 ± 2.54	565	73.31 ± 13.66	2345.85	3.15	1779.75	-566.10	-31.81
Fexin 250mg SUS (n=45)	84.78 ± 21.74	3815	127.79 ± 30.01	5750.61	1.36	5188.40	-562.21	-10.84
Fexin 500mg TAB (n=15)	21.27 ± 3.71	319	142.04 ± 25.75	2130.62	5.75	1834.25	-296.37	-16.16
Lenocef 125mg SUS (n=349)	107.45 ± 26.30	37500	70.26 ± 17.35	24521.85	0.63	23625.00	-896.85	-3.80
Lenocef 250mg CAP (n=1269)	21.41 ± 7.25	27169	69.42 ± 22.46	88090.92	3.15	85582.35	-2508.57	-2.93
Lenocef 250mg SUS (n=259)	100.62 ± 16.95	26060	137.92 ± 22.73	35721.57	1.36	35441.60	-279.97	-0.79
Lenocef 500mg CAP (n=925)	17.31 ± 8.78	16012	104.63 ± 49.05	96784.71	5.75	92069.00	-4715.71	-5.12
Lilly-Cephalexin 125P SUS (n=2)*	100.00	200	144.47	288.94				
Lilly-Cephalexin CAP (n=4)*	20.00	80	90.94 ± 52.76	363.75				
Ranceph 125mg SUS (n=98)	95.66 ± 13.44)	9375	61.98 ± 6.94	6074.40	0.63	5906.25	-168.15	-2.85

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Ranceph 250mg CAP (n=412)	22.75 ± 8.94	9371	72.07 ± 28.54	29692.69	3.15	29518.65	-174.04	-0.59
Ranceph 250mg SUS (n=59)	100.00	5900	120.34	7100.09	1.36	8024.00	923.91	11.51
Ranceph 500mg CAP (n=459)	18.81 ± 6.59	8635	111.61 ± 36.41	51230.28	5.75	49651.25	-1579.03	-3.18

* Not listed on Medscheme® Price List.

Table 61G: Cephalexin. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Keflex 125mg SUS (n=33)	109.09 ± 29.19	3600	111.99 ± 73.68	3695.57	0.63	2268.00	-1427.57	-62.94
Keflex 250mg CAP (n=31)	24.13 ± 6.51	748	217.50 ± 168.46	6742.43	3.15	2356.20	-4386.23	-186.16
Keflex 250mg SUS (n=17)	159.00 ± 50.51	2703	456.05 ± 253.19	7752.82	1.36	3676.08	-4076.74	-110.90
Keflex 500mg TAB (n=116)	15.90 ± 6.09	1844	336.84 ± 220.50	39073.57	5.75	10603.00	-28470.57	-268.51
Generic products								
Betacef 125mg SUS (n=3)	100.00	300	62.47	187.41	0.63	189.00	1.59	0.84
Betacef 250mg CAP (n=1)	30.00	30	93.23	93.23	3.15	94.50	1.27	1.34
Betacef 500mg CAP (n=23)	18.48 ± 3.51	425	101.68 ± 16.58	2338.75	5.75	2443.75	105.00	4.30
Cerexin 500mg CAP (n=67)*	18.94 ± 5.13	1269	112.92 ± 28.72	7565.37				
Fexin 250 mg TAB (n=7)	29.29 ± 13.36	205	107.93 ± 24.55	755.49	3.15	645.75	-109.74	-16.99
Fexin 250mg SUS (n=28)	81.43 ± 27.72	2280	118.77 ± 33.33	3325.55	1.36	3100.80	-224.75	-7.25
Fexin 500mg TAB (n=8)	17.00 ± 5.66	136	136.37 ± 48.74	1090.92	5.75	782.00	-308.92	-39.50
Lenocef 125mg SUS (n=232)	111.64 ± 33.46	25900	73.89 ± 22.30	17143.63	0.63	16317.00	-826.63	-5.07
Lenocef 250mg CAP (n=727)	22.11 ± 8.36	16072	71.50 ± 26.29	51981.08	3.15	50626.80	-1354.28	-2.68
Lenocef 250mg SUS (n=185)	96.65 ± 18.87	17880	132.83 ± 24.97	24574.42	1.36	24316.80	-257.62	-1.06
Lenocef 500mg CAP (n=698)	16.54 ± 7.61	11542	98.94 ± 41.63	69055.20	5.75	66366.50	-2688.70	-4.05
Lilly-Cephalexin CAP (n=6)*	20.00	120	64.48	386.88				
Ranceph 125mg SUS (n=107)	100.00	10700	64.14 ± 0.11	6863.37	0.63	6741.00	-122.37	-1.82
Ranceph 250mg CAP (n=343)	21.93 ± 6.30	7523	65.38 ± 20.96	22425.69	3.15	23697.45	1271.76	5.37

<i>Product name</i>	<i>Average package size</i>	<i>Total units</i>	<i>Average cost (R)</i>	<i>Total cost (R)</i>	<i>Medscheme Price List</i>			
					<i>Cost per unit (R)</i>	<i>Total calculated cost (R)</i>	<i>Effect +/-</i>	<i>Saving %</i>
Ranceph 250mg SUS (n=83)	107.23 ± 26.05	8900	129.04 ± 31.35	10710.21	1.36	12104.00	1393.79	11.52
Ranceph 500mg CAP (n=388)	19.02 ± 6.80	7381	112.55 ± 37.66	43671.02	5.75	42440.75	-1230.27	-2.90

* Not listed on Medscheme® Price List.

Table 62G: Cephalexin. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Keflex 125mg SUS (n=41)	127.20 ± 49.22	5215	83.04 ± 31.87	3404.48	0.63	3285.45	-119.03	-3.62
Keflex 250mg CAP (n=33)	20.94 ± 13.74	691	69.76 ± 42.95	2302.05	3.15	2176.65	-125.40	-5.76
Keflex 250mg SUS (n=19)	100.00	1900	123.17 ± 6.38	2340.18	1.19	2261.00	-79.18	-3.50
Keflex 500mg TAB (n=143)	14.59 ± 7.56	2087	208.23 ± 226.62	29776.50	5.75	12000.25	-17776.25	-148.13
Generic products								
Betacef 125mg SUS (n=3)	100.00	300	62.47	187.41	0.63	189.00	1.59	0.84
Betacef 250mg CAP (n=15)	23.00 ± 9.02	345	56.72 ± 39.44	850.74	3.15	1086.75	236.01	21.72
Betacef 500mg CAP (n=21)	19.71 ± 2.78	414	106.03 ± 9.18	2226.69	5.75	2380.50	153.81	6.46
Cerexin 500mg CAP (n=85)*	17.82 ± 5.26	1515	107.12 ± 28.52	9105.19				
Fexin 250 mg TAB (n=11)	13.00 ± 4.73	143	59.52 ± 20.14	654.70	3.15	450.45	-204.25	-45.34
Fexin 250mg SUS (n=18)	82.22 ± 20.45	1480	109.24 ± 25.38	1966.23	1.19	1761.20	-205.03	-11.64
Fexin 500mg TAB (n=14)	19.57 ± 0.85	274	116.34 ± 0.30	1628.74	5.75	1575.50	-53.24	-3.38
Lenocef 125mg SUS (n=130)	115.77 ± 42.70	15050	75.30 ± 27.65	9788.67	0.63	9481.50	-307.17	-3.24
Lenocef 250mg CAP (n=1126)	21.78 ± 7.81	24520	69.92 ± 24.14	78732.00	3.15	77238.00	-1494.00	-1.93
Lenocef 250mg SUS (n=86)	109.30 ± 29.22	9400	134.88 ± 35.22	11599.44	1.19	11186.00	-413.44	-3.70
Lenocef 500mg CAP (n=1161)	16.19 ± 7.65	18795	97.62 ± 40.65	113340.78	5.75	108071.25	-5269.53	-4.88
Lilly-Cephalexin CAP (n=3)*	100.00	300	120.48	361.44				
Ranceph 125mg SUS (n=224)	105.80 ± 36.83	23700	67.70 ± 23.77	15165.18	0.63	14931.00	-234.18	-1.57
Ranceph 250mg CAP (n=346)	21.93 ± 8.70	7587	69.39 ± 27.16	24010.50	3.15	23899.05	-111.45	-0.47

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Ranceph 250mg SUS (n=265)	101.74 ± 18.30	26960	122.52 ± 21.97	32466.82	1.19	32082.40	-384.42	-1.20
Ranceph 500mg CAP (n=587)	18.61 ± 6.14	10927	110.09 ± 33.57	64624.61	5.75	62830.25	-1794.36	-2.86

* Not listed on Medscheme® Price List.

Table 63G: Cephradine. May 2002 to August 2002.

Product name	Average package size	Total unit	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Cefril 125mg SUS (n=116)*	102.37 ± 16.14	11875	109.45 ± 18.77	12696.06				
Cefril 250mg CAP (n=187)*	21.90 ± 9.14	4095	200.12 ± 85.11	37422.31				
Cefril 500mg CAP (n=267)*	19.44 ± 5.43	5190	308.09 ± 96.65	82260.06				
Cefril A 500mg INJ (n=3)*	15.00	45	1259.75	3779.25				
Generic products								
Bactocef 250mg CAP (n=18)*	28.89 ± 10.23	520	161.30 ± 55.83	2903.40				
Bactocef 500mg CAP (n=27)*	20.00	540	204.47	5520.78				

* Not listed on Medscheme® Price List.

Table 64G: Cephradine. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Cefril 125mg SUS (n=66)*	106.06 ± 24.04	7000	115.75 ± 26.35	7639.45				
Cefril 250mg CAP (n=82)*	23.50 ± 12.82	1927	215.33 ± 111.09	17656.87				
Cefril 250mg SUS (n=13)*	100.00	1300	176.13	2289.65				
Cefril 500mg CAP (n=216)*	19.48 ± 6.47	4207	321.49 ± 108.43	69442.53				
Generic products								
Bactocef 500mg CAP (n=6)*	25.00 ± 5.48	150	260.55 ± 61.43	1563.27				

* Not listed on Medscheme® Price List.

Table 65G: Cephadrine. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Cefril 125mg SUS (n=61)*	116.39 ± 48.92	7100	144.98 ± 60.93	8843.62				
Cefril 250mg CAP (n=140)*	22.52 ± 9.75	3153	235.80 ± 102.08	33012.65				
Cefril 250mg SUS (n=6)*	100.00	600	176.12	1056.72				
Cefril 500mg CAP (n=302)*	19.10 ± 6.46	5768	360.80 ± 120.84	108961.78				
Cefril A 1g INJ (n=8)*	1.00	8	153.90	1231.20				
Generic products								
Bactocef 500mg CAP (n=3)*	15.00	45	169.46	508.38				

* Not listed on Medscheme® Price List.

Table 66G: Cloxacillin. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Orbenin 250mg CAP (n=29)	22.41 ± 7.98	650	76.67 ± 31.74	2223.50	3.05	1982.50	-241.00	-12.16
Orbenin 500m CAP (n=60)	21.57 ± 4.53	1294	117.52 ± 37.24	7051.00	4.90	6340.60	-710.40	-11.20
Orbenin S 125mg SUS (n=107)*	145.79 ± 67.68	15600	94.79 ± 43.60	10142.42				
Generic products								
Clocillin 250mg CAP (n=369)*	33.77 ± 18.65	12462	102.21 ± 53.57	37716.19				
Clocillin 500mg CAP (n=447)*	27.53 ± 17.36	12304	92.94 ± 107.33	41544.16				
Cloxin 250mg AMP (n=7)*	23.43 ± 4.28	164	344.31 ± 68.54	2410.19				
Cloxin 250mg CAP (n=828)	32.76 ± 25.55	27129	98.28 ± 73.73	81377.11	3.05	94951.50	13574.39	14.30
Cloxin 500mg AMP (n=12)*	10.25 ± 7.65	123	304.90 ± 215.21	3658.81				
Cloxin 500mg CAP (n=732)	25.58 ± 14.60	18725	125.11 ± 67.68	91577.99	4.90	91752.50	174.51	0.19

* Not listed on Medscheme® Price List.

Table 67G: Cloxacillin. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Orbenin 250mg CAP (n=16)*	25.31 ± 10.40	405	83.20 ± 47.10	1331.17	3.05	1235.25	-95.92	-7.77
Orbenin 500m CAP (n=57)*	24.37 ± 9.92	1389	132.93 ± 59.16	7577.29	4.95	6875.55	-701.74	-10.21
Orbenin S 125mg SUS (n=56)	141.07 ± 86.92	7900	91.50 ± 55.48	5123.77				
Generic products								
Clocillin 250mg CAP (n=377)*	36.17 ± 25.69	13637	104.46 ± 82.30	39383.22				
Clocillin 500mg CAP (n=229)*	28.90 ± 37.80	6618	121.35 ± 197.81	27789.01				
Cloxin 250mg AMP (n=4)*	37.50 ± 5.00	150	541.69 ± 72.18	2166.76				
Cloxin 250mg CAP (n=773)	30.70 ± 18.65	23731	88.31 ± 60.68	68260.23	3.05	72379.55	4119.32	5.69
Cloxin 500mg AMP (n=16)*	24.94 ± 9.09	399	726.64 ± 260.24	11626.19				
Cloxin 500mg CAP (n=868)	27.03 ± 17.55	23463	133.71 ± 87.85	116056.06	4.98	116845.74	789.68	0.68

* Not listed on Medscheme® Price List.

Table 68G: Cloxacillin. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Orbenin 250mg CAP (n=15)	22.27 ± 3.92	334	76.34 ± 11.00	1145.12	3.03	1012.02	-133.10	-13.15
Orbenin 500m CAP (n=24)	22.17 ± 4.82	532	115.92 ± 45.09	2782.07	5.05	2686.60	-95.47	-3.55
Orbenin S 125mg SUS (n=44)*	175.00 ± 83.87	7700	113.75 ± 53.96	5005.14				
Generic products								
Clocillin 250mg CAP (n=639)*	34.85 ± 22.98	22269	110.77 ± 72.82	70781.87				
Clocillin 500mg CAP (n=441)*	27.54 ± 18.88	12147	135.26 ± 98.46	59648.09				
Cloxacillin Fesenius 500mg INJ (n=4)*	20.00	80	631.76 ± 0.02	2526.92				
Cloxin 250mg AMP (n=3)*	15.00	45	248.08	744.24				
Cloxin 250mg CAP (n=1081)	34.10 ± 28.22	36859	110.27 ± 89.19	119204.05	3.03	172282.77	53078.72	30.81
Cloxin 500mg AMP (n=14)*	21.00 ± 4.19	294	618.55 ± 127.00	8659.65				
Cloxin 500mg CAP (n=1174)	24.97 ± 12.33	29317	126.76 ± 61.79	148813.31	5.05	148050.85	-762.46	-0.51

* Not listed on Medscheme® Price List.

Table 69G: Flucloxacillin. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Floxapen 250mg CAP (n=366)	25.67 ± 12.82	9396	117.16 ± 71.08	42880.24	5.00	46980.00	4099.76	8.73
Floxapen S 125mg SUS (n=244)*	118.85 ± 42.23	29000	108.56 ± 38.86	26487.46				
Generic products								
Flucillin 250mg CAP (n=826)*	29.31 ± 24.23	242089	142.39 ± 96.24	117617.67				

* Not listed on Medscheme® Price List.

Table 70G: Flucloxacillin. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Floxapen 250mg CAP (n=452)	28.37 ± 15.08	12823	133.10 ± 93.10	60159.90	5.15	66038.45	5878.55	8.90
Floxapen S 125mg SUS (n=257)*	115.18 ± 47.22	29600	106.31 ± 43.84	27321.63				
Generic products								
Flucillin 250mg CAP (n=396)*	27.71 ± 15.19	10972	139.08 ± 69.53	55076.57				

* Not listed on Medscheme® Price List.

Table 71G: Flucloxacillin. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Floxapen 250mg CAP (n=591)	28.18 ± 13.60	16654	142.01 ± 85.66	83926.10	5.60	93262.40	99336.30	10.01
Floxapen S 125mg SUS (n=388)*	111.06 ± 37.95	43090	109.35 ± 37.96	42428.25				
Generic products								
Flucillin 250mg CAP (n=626)*	30.96 ± 17.02	19380	169.32 ± 82.68	105992.18				

* Not listed on Medscheme® Price List.

Table 72G: Imipenem/cilastatin. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Tienam 500mg INJ (n=4)*	9.00	36	3717.19	14868.76				
Generic products								

* Not listed on Medscheme® Price List.

Table 73G: Loracarbef. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Lorabid 200mg CAP (n=4995)*	10.50 ± 2.33	52467	254.86 ± 56.48	1273040.67				
Lorabid PAED 100 SUS (n=3571)*	52.05 ± 10.02	185870	156.63 ± 30.20	559318.79				
Lorabid PAED 200 SUS (n=3192)*	52.00 ± 10.43	165980	253.03 ± 51.56	807663.95				
Generic products								

* Not listed on Medscheme® Price List.

Table 74G: Loracarbef. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Lorabid 200mg CAP (n=2125)*	10.44 ± 2.02	22188	253.51 ± 49.05	538707.47				
Lorabid PAED 100 SUS (n=2289)*	52.21 ± 11.02	119513	157.19 ± 33.11	359812.59				
Lorabid PAED 200 SUS (n=1834)*	52.19 ± 11.21	95725	254.19 ± 54.89	466177.63				
Generic products								

* Not listed on Medscheme® Price List.

Table 75G: Loracarbef. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Lorabid 200mg CAP (n=2613)*	10.34 ± 2.00	27025	251.16 ± 48.59	656291.17				
Lorabid PAED 100 SUS (n=2425)*	53.19 ± 12.25	128985	160.05 ± 36.66	388123.67				
Lorabid PAED 200 SUS (n=1914)*	52.36 ± 10.57	100225	254.88 ± 51.67	487833.84				
Generic products								

* Not listed on Medscheme® Price List.

Table 79G: Meropenem. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Meropenem 1000mg INJ (n=3)*	1.00	3	936.17	2808.51				
Meropenem 500mg INJ (n=2)*	1.00	2	494.04 ± 1.05	988.08				
Generic products								

* Not listed on Medscheme® Price List.

Table 80G: Penicillin VK. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Generic products								
Betapen 125mg SUS (n=38)	147.37 ± 68.72	5600	27.71 ± 12.85	1052.89	0.19	1064.00	11.11	1.04
Betapen 250mg TAB (n=499)	57.67 ± 39.01	28775	27.02 ± 18.76	13480.54	0.67	19279.25	5798.71	30.08
Incil VK 125mg SUS (n=10)	100.00	1000	20.49	204.87	0.19	190.00	-14.87	-7.83
Len V.K. 250mg TAB (n=1282)	65.98 ± 41.47	84585	36.88 ± 22.14	47275.79	0.67	56671.95	9396.16	16.58
Len VK 125mg SUS (n=218)	158.49 ± 108.33	34550	27.11 ± 20.71	5910.76	0.19	6564.50	653.74	9.96
Novo VK 250mg TAB (n=847)	51.34 ± 34.58	43484	35.15 ± 23.37	29770.19	0.67	29134.28	-635.91	-2.18

* Not listed on Medscheme® Price List.

Table 81G: Penicillin VK. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
A-Lennon Phenox Pen TAB (n=3)	120.00	360	83.73	251.19	0.67	241.20	-9.99	-4.14
Generic products								
Betapen 125mg SUS (n=42)	123.81 ± 43.11	5200	23.23 ± 8.19	975.82	0.18	936.00	-39.82	-4.25
Betapen 250mg TAB (n=386)	57.74 ± 40.77	22286	27.05 ± 19.40	10440.97	0.67	14931.62	4490.65	30.07
Incil VK 125mg SUS (n=3)	100.00	300	19.48	58.44	0.18	54.00	-4.44	-8.22
Len V.K. 250mg TAB (n=1015)	63.99 ± 50.28	64952	35.47 ± 27.08	36001.59	0.67	43517.84	7516.25	17.27
Len VK 125mg SUS (n=178)	158.26 ± 98.25	28170	29.98 ± 18.14	5335.61	0.18	5070.60	-265.01	-5.23
Novo VK 250mg TAB (n=841)	49.97 ± 32.12	42026	35.55 ± 22.21	29896.65	0.67	28157.42	-1739.23	-6.18

* Not listed on Medscheme® Price List.

Table 82G: Penicillin VK. January 2003 to April 2003.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
A-Lennon Phenox Pen TAB (n=18)	41.56 ± 37.16	748	31.38 ± 28.06	564.88	0.71	531.08	-33.8	-6.36
Generic products								
Betapen 125mg SUS (n=55)	153.82 ± 99.99	8460	29.67 ± 18.77	1631.87	0.18	1522.80	-109.07	-7.16
Betapen 250mg TAB (n=485)	50.01 ± 32.83	24255	25.62 ± 15.82	12424.66	0.71	17221.05	4796.39	27.85
Incil VK 125mg SUS (n=15)	100.00	1500	12.29 ± 10.32	184.39	0.18	270.00	85.61	31.71
Len V.K. 250mg TAB (n=1101)	61.76 ± 39.89	68001	32.50 ± 19.75	35787.00	0.71	48280.71	12493.71	25.88
Len VK 125mg SUS (n=224)	180.54 ± 130.33	40440	33.46 ± 23.42	7496.08	0.18	7279.20	-216.88	-2.98
Novo VK 250mg TAB (n=919)	47.94 ± 31.86	44057	35.76 ± 22.57	32859.94	0.71	31280.47	-1579.47	-5.05
Rolab Pen VK 250mg TAB (n=7)	37.14 ± 21.38	260	7.88 ± 3.42	55.18	0.74	192.40	137.22	71.32

* Not listed on Medscheme® Price List.

Table 83G: Piperacillin. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Pipril 2g VIAL (n=1)*	4.00	4	583.42	583.42				
Generic products								

* Not listed on Medscheme® Price List.

Table 84G: Piperacillin. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Pipril 2g VIAL (n=3)*	1.00	3	160.30	480.90				
Generic products								

* Not listed on Medscheme® Price List.

Table 85G: Procaine Penicillin. May 2002 to August 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Novocillin 10ml INJ (n=17)*	1.00	17	12.92	219.61				
Generic products								
Procillin 20ml INJ (n=3)*	1.00	3	17.74	53.22				

* Not listed on Medscheme® Price List.

Table 86G: Procaine Penicillin. September 2002 to December 2002.

Product name	Average package size	Total units	Average cost (R)	Total cost (R)	Medscheme Price List			
					Cost per unit (R)	Total calculated cost (R)	Effect +/-	Saving %
Original products								
Novocillin 10ml INJ (n=3)*	1.00	3	12.92	38.76				
Generic products								
Procillin 20ml INJ (n=3)*	1.00	3	23.04	69.12				

* Not listed on Medscheme® Price List.

Table 87G: Procaine Penicillin. January 2003 to April 2003.

<i>Product name</i>	<i>Average package size</i>	<i>Total units</i>	<i>Average cost (R)</i>	<i>Total cost (R)</i>	<i>Medscheme Price List</i>			
					<i>Cost per unit (R)</i>	<i>Total calculated cost (R)</i>	<i>Effect +/-</i>	<i>Saving %</i>
<i>Original products</i>								
Novocillin 10ml INJ (n=8)*	1.00	8	13.39 ± 0.66	107.17				
Novocillin 20mkl INJ (n=3)*	1.00	3	24.13	72.39				
<i>Generic products</i>								

* Not listed on Medscheme® Price List.

<i>Product name</i>	<i>MPL Size</i>	<i>MPL Price (Retail incl VAT)</i>					
		<i>May 2002</i>	<i>June 2002</i>	<i>July 2002</i>	<i>Aug. 2002</i>	<i>Average</i>	<i>Cost per unit (R)</i>
XERACIL 250MG CAP	15	26.00	26.00	26.00	26.00	26.00	1.73
ZOXIL 250MG CAP	15	26.00	26.00	26.00	26.00	26.00	1.73
ZOXIL 500MG CAP	15	46.00	46.00	46.00	46.00	46.00	3.07
ZOXIL S 125MG/5ML SUS	100	23.00	23.00	23.00	23.00	23.00	0.23
ZOXIL SF 250MG/5ML SUS	100	38.00	38.00	38.00	38.00	38.00	0.38

Product name	MPL Size	MPL Price (Retail incl VAT)					Average	Cost per unit (R)
		Sept. 2002	Oct. 2002	Nov. 2002	Dec. 2002			
BETAMOX 500MG CAP	15	46.00	46.00	46.00	46.00	46.00	3.07	
BETAMOX S 125/5ML SUS	100	23.00	23.00	23.00	23.00	23.00	0.23	
BETAMOX SF 250/5ML SUS	100	38.00	38.00	38.00	38.00	38.00	0.38	
BETAPEN 125/5ML SUS	100	19.00	18.00	18.00	18.00	18.25	0.18	
BETAPEN 250MG TAB	100	67.00	67.00	67.00	67.00	67.00	0.67	
BIO-AMOKSIKLAV S SUS	100	59.00	59.00	59.00	59.00	59.00	0.59	
BIO-AMOKSIKLAV SF SUS	100	116.00	116.00	116.00	116.00	116.00	1.16	
BIO-AMOKSIKLAV 625MG TAB	15	170.00	170.00	170.00	170.00	170.00	11.33	
BIO-AMOKSIKLAV 375MG TAB	15	103.00	103.00	103.00	103.00	103.00	6.87	
CEC 125 125MG/5ML SUS	75	103.00	103.00	103.00	103.00	103.00	1.37	
CEC 250MG/5ML SUS	75	168.00	168.00	168.00	168.00	168.00	2.24	
CEC 500MG TAB	15	187.00	187.00	187.00	187.00	187.00	12.47	
CECLOR P 125MG/5ML SUS	75	103.00	103.00	103.00	103.00	103.00	1.37	
CECLOR 250MG CAP	15	122.00	122.00	122.00	122.00	122.00	8.13	
CECLOR P 250MG/5ML SUS	75	168.00	168.00	168.00	168.00	168.00	2.24	
CECLOR 500MG CAP	15	187.00	187.00	187.00	187.00	187.00	12.47	
CECLOR BD 187/5ML SUS	50	97.00	97.00	97.00	97.00	97.00	1.94	
CECLOR BD FORTE 375/5ML SUS	50	157.00	157.00	157.00	157.00	157.00	3.14	
CECLOR CD 375MG TAB	10	138.00	138.00	138.00	138.00	138.00	13.80	
CECLOR CD 500MG TAB	15	187.00	187.00	187.00	187.00	187.00	12.47	
CEFADROX 500MG CAP	10	106.00	106.00	106.00	106.00	106.00	10.60	
CEFADROX SUSP 500MG/ML SUS	60	121.00	121.00	121.00	121.00	121.00	2.02	
CIPADUR 500MG CAP	10	106.00	106.00	106.00	106.00	106.00	10.60	
CLAMENTIN 375MG TAB	15	103.00	103.00	103.00	103.00	103.00	6.87	
CLAMENTIN S SUS	100	59.00	59.00	59.00	59.00	59.00	0.59	
CLAMENTIN SF SUS	100	116.00	116.00	116.00	116.00	116.00	1.16	
CLAVUMOX S SUS	100	59.00	59.00	59.00	59.00	59.00	0.59	
CLAVUMOX SF 312MG SUS	100	116.00	116.00	116.00	116.00	116.00	1.16	
CLAVUMOX 375MG TAB	15	103.00	103.00	103.00	103.00	103.00	6.87	

Appendix H

Product name	MPL Size	MPL Price (Retail incl VAT)					
		Sept. 2002	Oct. 2002	Nov. 2002	Dec. 2002	Average	Cost per unit (R)
CLORACEF 250MG CAP	15	122.00	122.00	122.00	122.00	122.00	8.13
CLORACEF 500MG CAP	15	187.00	187.00	187.00	187.00	187.00	12.47
CLORACEF BD 187MG SUS	50	97.00	97.00	97.00	97.00	97.00	1.94
CLORACEF BD 375MG SUS	50	157.00	157.00	157.00	157.00	157.00	3.14
CLORACEF MR TAB	10	138.00	138.00	138.00	138.00	138.00	13.80
CLORACEF P 125MG SUS	75	103.00	103.00	103.00	103.00	103.00	1.37
CLORACEF PF 250MG/5ML SUS	75	168.00	168.00	168.00	168.00	168.00	2.24
CLOXAM 500MG CAP	20	99.00	87.00	96.00	96.00	94.50	4.73
CLOXIN 250MG CAP	20	61.00	61.00	61.00	61.00	61.00	3.05
CLOXIN 500MG CAP	20	98.00	98.00	101.00	101.00	99.50	4.98
CLP ALLIANCE CEPHALEXIN	20	63.00	63.00	63.00	63.00	63.00	3.15
C-MOX 125 S 125/5ML SUS	100	23.00	23.00	23.00	23.00	23.00	0.23
C-MOX 250MG CAP	15	26.00	26.00	26.00	26.00	26.00	1.73
C-MOX S 250/5ML SUS	100	38.00	38.00	38.00	38.00	38.00	0.38
C-MOX 500MG CAP	15	46.00	46.00	46.00	46.00	46.00	3.07
CPL ALLIANCE CEPHALEXIN	20	115.00	115.00	115.00	115.00	115.00	5.75
CPL ALLIANCE CEPHALEXIN DRY SYRUP	100	63.00	63.00	63.00	63.00	63.00	0.63
DACEF 500 MG CAP	10	106.00	106.00	106.00	106.00	106.00	10.60
DACEF 500MG/5ML SUS	60	121.00	121.00	121.00	121.00	121.00	2.02
DYNA-AMOXYCILLIN 125/5ML SUS	100	23.00	23.00	23.00	23.00	23.00	0.23
EXCILLIN 125 MG SUS	100	17.00	17.00	17.00	17.00	17.00	0.17
FEXIN 250MG TAB	20	63.00	63.00	63.00	63.00	63.00	3.15
FEXIN 250MG/5ML SUS	100	136.00	136.00	136.00	136.00	136.00	1.36
FEXIN 500MG TAB	20	115.00	115.00	115.00	115.00	115.00	5.75
FLOXAPEN 250 250MG CAP	20	100.00	100.00	100.00	112.00	103.00	5.15
INCIL VK 100ml 125/5ml SUS	100	19.00	18.00	18.00	18.00	18.25	0.18
IPCAMOX 250MG CAP	15	26.00	26.00	26.00	26.00	26.00	1.73
KEFLEX 125MG/5ML SUS	100	63.00	63.00	63.00	63.00	63.00	0.63
KEFLEX 250MG CAP	20	63.00	63.00	63.00	63.00	63.00	3.15

Appendix H

Product name	MPL Size	MPL Price (Retail incl VAT)						Cost per unit (R)
		Sept. 2002	Oct. 2002	Nov. 2002	Dec. 2002	Average		
KEFLEX 250MG/5ML SUS	100	136.00	136.00	136.00	136.00	136.00	1.36	
KEFLEX 500MG TAB	20	115.00	115.00	115.00	115.00	115.00	5.75	
LEN VK 100 125/5ML SUS	100	19.00	18.00	18.00	18.00	18.25	0.18	
LEN VK 250MG TAB	100	67.00	67.00	67.00	67.00	67.00	0.67	
LENACLOR 125MG P SUS	75	103.00	103.00	103.00	103.00	103.00	1.37	
LENACLOR 250MG P SUS	75	168.00	168.00	168.00	168.00	168.00	2.24	
LENACLOR BD 187MG SUS	50	97.00	97.00	97.00	97.00	97.00	1.94	
LENACLOR BD FORTE SUS	50	157.00	157.00	157.00	157.00	157.00	3.14	
LENACLOR CAP	15	122.00	122.00	122.00	122.00	122.00	8.13	
LENACLOR CAP	15	187.00	187.00	187.00	187.00	187.00	12.47	
LENACLOR CD 500MG TAB	15	187.00	187.00	187.00	187.00	187.00	12.47	
LENACLOR CD TAB	10	138.00	138.00	138.00	138.00	138.00	13.80	
LENOCEF 125MG/5ML SUS	100	63.00	63.00	63.00	63.00	63.00	0.63	
LENOCEF 250MG CAP	20	63.00	63.00	63.00	63.00	63.00	3.15	
LENOCEF 250MG/5ML SUS	100	136.00	136.00	136.00	136.00	136.00	1.36	
LENOCEF 500MG CAP	20	115.00	115.00	115.00	115.00	115.00	5.75	
LILLY-CEFACLOR 125MG/5ML SUS	75	103.00	103.00	103.00	103.00	103.00	1.37	
LILLY-CEFACLOR 250 MG CAP	15	122.00	122.00	122.00	122.00	122.00	8.13	
LILLY-CEFACLOR 250MG/5ML SUS	75	168.00	168.00	168.00	168.00	168.00	2.24	
LILLY-CEFACLOR BD 375MG/5ML SUS	50	157.00	157.00	157.00	157.00	157.00	3.14	
LILLY-CEFACLOR BD 187MG/5ML SUS	50	97.00	97.00	97.00	97.00	97.00	1.94	
LILLY-CEFACLOR CD 375MG TAB	10	138.00	138.00	138.00	138.00	138.00	13.80	
MACROPEN 500MG CAP	15	78.00	78.00	78.00	78.00	78.00	5.20	
MACROPEN S 250MG SUS	100	82.00	82.00	82.00	82.00	82.00	0.82	
MAXCIL A 250MG CAP	15	26.00	26.00	26.00	26.00	26.00	1.73	
MAXCIL AF 500MG CAP	15	46.00	46.00	46.00	46.00	46.00	3.07	
MAXCIL P 125/5ML SUS	100	23.00	23.00	23.00	23.00	23.00	0.23	
MAXCIL PF 250/5ML SUS	100	38.00	38.00	38.00	38.00	38.00	0.38	
MEGAMOX 250MG CAP	20	99.00	87.00	96.00	96.00	94.50	4.73	

Appendix H

Product name	MPL Size	MPL Price (Retail incl VAT)					
		Sept. 2002	Oct. 2002	Nov. 2002	Dec. 2002	Average	Cost per unit (R)
MEGAMOX S 125MG/5ML SUS	100	60.00	60.00	60.00	60.00	60.00	0.60
MEGAPEN 500MG CAP	15	78.00	78.00	78.00	78.00	78.00	5.20
MEGAPEN S 125MG/5ML SUS	100	82.00	82.00	82.00	82.00	82.00	0.82
MOXAN 250MG CAP	15	26.00	26.00	26.00	26.00	26.00	1.73
MOXAN 500MG CAP	15	46.00	46.00	46.00	46.00	46.00	3.07
MOXAN S 125/5ML SUS	100	23.00	23.00	23.00	23.00	23.00	0.23
MOXAN SF 250/5ML SUS	100	38.00	38.00	38.00	38.00	38.00	0.38
MOXYCLAV 375MG TAB	15	103.00	103.00	103.00	103.00	103.00	6.87
MOXYCLAV S SUS	100	59.00	59.00	59.00	59.00	59.00	0.59
MOXYCLAV SF SUS	100	116.00	116.00	116.00	116.00	116.00	1.16
MOXPEN 125/5ML SUS	100	23.00	23.00	23.00	23.00	23.00	0.23
MOXPEN 250/5ML SUS	100	38.00	38.00	38.00	38.00	38.00	0.38
MOXPEN 250MG CAP	15	26.00	26.00	26.00	26.00	26.00	1.73
MOXPEN 500MG CAP	15	46.00	46.00	46.00	46.00	46.00	3.07
NOVO VK 250MG TAB	100	67.00	67.00	67.00	67.00	67.00	0.67
ORBENIN 250MG CAP	20	61.00	61.00	61.00	61.00	61.00	3.05
ORBENIN 500MG CAP	20	98.00	98.00	101.00	101.00	99.50	4.98
PENMOX 250MG CAP	15	26.00	26.00	26.00	26.00	26.00	1.73
PENMOX 500MG CAP	15	46.00	46.00	46.00	46.00	46.00	3.07
PENMOX P 125/5ML SUS	100	23.00	23.00	23.00	23.00	23.00	0.23
PENMOX PF 250/5ML SUS	100	38.00	38.00	38.00	38.00	38.00	0.38
PENRITE S 125/5ML SUS	100	17.00	17.00	17.00	17.00	17.00	0.17
PENRITE S 250/5ML SUS	100	32.00	32.00	32.00	32.00	32.00	0.32
PENRITE 500MG CAP	20	42.00	42.00	42.00	42.00	42.00	2.10
PETERCILLIN 125/5ML SUS	100	17.00	17.00	17.00	17.00	17.00	0.17
PETERCILLIN 250/5ML SUS	100	32.00	32.00	32.00	32.00	32.00	0.32
PETERCILLIN 250MG CAP	20	20.00	20.00	20.00	20.00	20.00	1.00
PETERCILLIN 500MG CAP	20	42.00	42.00	42.00	42.00	42.00	2.10
PROMOXIL 250MG CAP	15	26.00	26.00	26.00	26.00	26.00	1.73

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Product name	MPL Size	MPL Price (Retail incl VAT)					
		Sept. 2002	Oct. 2002	Nov. 2002	Dec. 2002	Average	Cost per unit (R)
PROMOXIL S 125MG/5ML SUS	100	23.00	23.00	23.00	23.00	23.00	0.23
PROMOXIL SF 250MG/5ML SUS	100	38.00	38.00	38.00	38.00	38.00	0.38
RANCEPH 250MG CAP	20	63.00	63.00	63.00	63.00	63.00	3.15
RANCEPH 500MG CAP	20	115.00	115.00	115.00	115.00	115.00	5.75
RANCEPH 125MG/5ML SUS	100	63.00	63.00	63.00	63.00	63.00	0.63
RANCEPH 250MG/5ML SUS	100	136.00	136.00	136.00	136.00	136.00	1.36
RANCLAV 375MG TAB	15	103.00	103.00	103.00	103.00	103.00	6.87
RANCLAV 625MG TAB	15	170.00	170.00	170.00	170.00	170.00	11.33
RANCLAV FORTE SUS	100	116.00	116.00	116.00	116.00	116.00	1.16
RANCLAV SUS	100	59.00	59.00	59.00	59.00	59.00	0.59
RANMOXY 250 250MG CAP	15	26.00	26.00	26.00	26.00	26.00	1.73
RANMOXY 500 500MG CAP	15	46.00	46.00	46.00	46.00	46.00	3.07
ROLAB-AMOCCLAV S SUS	100	59.00	59.00	59.00	59.00	59.00	0.59
ROLAB-AMOCCLAV SF SUS	100	116.00	116.00	116.00	116.00	116.00	1.16
ROLAB-AMOCCLAV TAB	15	103.00	103.00	103.00	103.00	103.00	6.87
ROLAB-AMOXYCILLIN 250MG CAP	15	26.00	26.00	26.00	26.00	26.00	1.73
ROLAB-AMOXYCILLIN/FL 500 MG CAP	15	78.00	78.00	78.00	78.00	78.00	5.20
ROLAB-AMPICILLIN 250MG CAP	20	20.00	20.00	20.00	20.00	20.00	1.00
ROLAB-AMPICILLIN 500MG CAP	20	42.00	42.00	42.00	42.00	42.00	2.10
ROLAB-CEFACTOR 250MG CAP	15	122.00	122.00	122.00	122.00	122.00	8.13
ROLAB-CEFACTOR 500MG CAP	15	187.00	187.00	187.00	187.00	187.00	12.47
ROLAB-CEFACTOR BD 187MG SUS	50	97.00	97.00	97.00	97.00	97.00	1.94
ROLAB-CEFACTOR BD 375MG SUS	50	157.00	157.00	157.00	157.00	157.00	3.14
ROLAB-CEFACTOR CD TAB	10	138.00	138.00	138.00	138.00	138.00	13.80
ROLAB-CEFACTOR PAED 125MG SUS	75	103.00	103.00	103.00	103.00	103.00	1.37
ROLAB-CEFACTOR PAED 250MG SUS	75	168.00	168.00	168.00	168.00	168.00	2.24
ROLAB-CEPHALEXIN 500MG CAP	20	115.00	115.00	115.00	115.00	115.00	5.75
ROLAB-CLOXACILLIN 250MG CAP	20	61.00	61.00	61.00	61.00	61.00	3.05
ROLAB-CLOXACILLIN 500MG CAP	20	98.00	98.00	101.00	101.00	99.50	4.98

Appendix H

Product name	MPL Size	MPL Price (Retail incl VAT)					Average	Cost per unit (R)
		Jan. 2003	Feb. 2003	Mar-2003	Apr-2003			
MACROPEN S 250MG SUS	100	82.00	82.00	82.00	82.00	82.00	0.82	
MAXCIL A 250MG CAP	15	24.00	24.00	24.00	23.00	23.75	1.58	
MAXCIL AF 500MG CAP	15	46.00	46.00	46.00	46.00	46.00	3.07	
MAXCIL P 125/5ML SUS	100	23.00	23.00	23.00	23.00	23.00	0.23	
MAXCIL PF 250/5ML SUS	100	38.00	38.00	38.00	38.00	38.00	0.38	
MEGAMOX 250MG CAP	20	86.00	86.00	86.00	86.00	86.00	4.30	
MEGAMOX S 125MG/5ML SUS	100	60.00	60.00	60.00	60.00	60.00	0.60	
MEGAPEN 500MG CAP	15	78.00	78.00	78.00	78.00	78.00	5.20	
MEGAPEN S 125MG/5ML SUS	100	82.00	82.00	82.00	82.00	82.00	0.82	
MOXAN 250MG CAP	15	24.00	24.00	24.00	23.00	23.75	1.58	
MOXAN 500MG CAP	15	46.00	46.00	46.00	46.00	46.00	3.07	
MOXAN S 125/5ML SUS	100	23.00	23.00	23.00	23.00	23.00	0.23	
MOXAN SF 250/5ML SUS	100	38.00	38.00	38.00	38.00	38.00	0.38	
MOXYCLAV 375MG TAB	15	101.00	101.00	101.00	101.00	101.00	6.73	
MOXYCLAV S SUS	100	57.00	57.00	57.00	57.00	57.00	0.57	
MOXYCLAV SF SUS	100	110.00	110.00	110.00	110.00	110.00	1.10	
MOXPEN 125/5ML SUS	100	23.00	23.00	23.00	23.00	23.00	0.23	
MOXPEN 250/5ML SUS	100	38.00	38.00	38.00	38.00	38.00	0.38	
MOXPEN 250MG CAP	15	24.00	24.00	24.00	23.00	23.75	1.58	
MOXPEN 500MG CAP	15	46.00	46.00	46.00	46.00	46.00	3.07	
NOVO VK 250MG TAB	100	67.00	67.00	74.00	74.00	70.50	0.71	
ORBENIN 250MG CAP	100	303.00	303.00	303.00	303.00	303.00	3.03	
ORBENIN 500MG CAP	20	101.00	101.00	101.00	101.00	101.00	5.05	
PENMOX 250MG CAP	15	24.00	24.00	24.00	23.00	23.75	1.58	
PENMOX 500MG CAP	15	46.00	46.00	46.00	46.00	46.00	3.07	
PENMOX P 125/5ML SUS	100	23.00	23.00	23.00	23.00	23.00	0.23	
PENMOX PF 250/5ML SUS	100	38.00	38.00	38.00	38.00	38.00	0.38	
PENRITE S 125/5ML SUS	100	16.00	16.00	18.00	18.00	17.00	0.17	

The pharmacological classification of drugs according to the MIMS® (Snyman, 2003: 9-11a).

- 1 CENTRAL NERVOUS SYSTEM
- 2 ANAESTHETICS
- 3 ANAGESICS
- 4 MUSCULO-SCELETAL AGENTS
- 5 AUTONOMIC
- 6 AUTACOIDS
- 7 CARDIO-VASCULAR AGENTS
- 8 BLOOD AND HAEMOPOEITIC
- 9 ALCOHOLISM
- 10 RESPIRATORY SYSTEM
- 11 EAR, NOSE AND THROAT
- 12 GASTRO-INTESTINAL TRACT
- 13 ANTHELMINTICS
- 14 DERMATOLOGICALS
- 15 OPHTHALMICS
- 16 URINARY SYSTEM
- 17 GENITAL SYSTEM
- 18 ANTIMICROBIALS
 - 18.1 Beta-lactams
 - 18.1.1 Penicillins
 - 18.1.2 Cephalosporins
 - 18.1.3 Others
 - 18.2 Erythromycin and other macrolides
 - 18.3 Aminoglycosides
 - 18.4 Tetracyclines
 - 18.5 Chloramphenicols
 - 18.6 Sulphonamides and combinations
 - 18.7 Quinolones
 - 18.8 Mycobacteria
 - 18.8.1 Tuberculostatics
 - 18.8.2 Antileprotics
 - 18.9 Other anti-bacterial agents
 - 18.10 Antifungal agents
 - 18.11 Antiprotozoal agents
 - 18.12 Antiviral agents
- 19 ENDOCRINE SYSTEM

- 20 VITAMINS, TONICS, MINERALS AND ELECTROLYTS
- 21 ANIMO-ACIDS
- 22 SPECIAL FOODS
- 23 CYTOSTATICS
- 24 IMMUNOLOGICAL
- 25 CHELATING AGENTS, ION EXCHANGE PREPARATIONS
- 26 BIOLOGICALS
- 27 ENZYMES
- 28 POISEN ANTIDOTES
- 29 OTHERS
- 30 MEDICAL CASES

Table 1J: Classification of beta-lactam antibiotics according to the MIMS® (Snyman, 2003: 247-263).

<i>Therapeutic class</i>	<i>Trade name</i>	<i>Active ingredient/s</i>
Penicillins	A-Lennon Amoxicillin®	Amoxicillin trihydrate
	Adco-Amoclav®	Amoxicillin/clavulanic acid
	Adco-Amoxicillin®	Amoxicillin trihydrate
	Amocillin®	Amoxicillin sodium
	Amoxicillin Hexal®	Amoxicillin trihydrate
	Amoxil®	Amoxicillin trihydrate
	Ampicillin-Fresenius Vials®	Ampicillin sodium
	Ampiclox®	Ampicillin/cloxacillin
	Ampipen®	Ampicillin
	Apen ®	Ampicillin/cloxacillin
	Augmaxil®	Amoxicillin/clavulanic acid
	Augmentin®	Amoxicillin/clavulanic acid
	Be-Ampicil®	Ampicillin trihydrate
	Benzatec®	Buffered benzylpenicillin sodium
	Benzathine Penicillin-Fresenius Vials®	Benzathine penicillin
	Benzyl Penicillin-Fresenius Vials®	Benzyl penicillin sodium
	Betamox®	Amoxicillin trihydrate
	Betapen®	Phenoxymethylpenicillin
	Bio-Amoksiklav®	Amoxicillin/clavulanic acid
	Clamentin®	Amoxicillin/clavulanic acid
	Clavumox®	Amoxicillin/clavulanic acid
	Cloxacillin-Fresenius Vials®	Cloxacillin sodium
	Cloxam®	Ampicillin/cloxacillin
	Cloxin®	Cloxacillin sodium
	Floxapen®	Flucloxacillin sodium
	Intramed Ampicillin & Cloxacillin®	Ampicillin/cloxacillin
	Ipcamox®	Amoxicillin trihydrate
	Len V.K.®	Phenoxymethylpenicillin potassium
	Macropen®	Amoxicillin/flucloxacillin
	Maxcil®	Amoxicillin trihydrate
	Megamox®	Ampicillin/cloxacillin
	Megapen®	Amoxicillin/flucloxacillin
	Moxan®	Amoxicillin
	Moxyclav®	Amoxicillin/clavulanic acid

Therapeutic class	Trade name	Active ingredient/s
	Moxypen®	Amoxicillin trihydrate
	NOVO VK®	Phenoxymethylpenicillin potassium
	Novocillin®	Procaine penicillin
	Novopen®	Na-benzylpenicillin
	Orbenin®	Cloxacillin sodium
	Penbritin®	Ampicillin trihydrate
	Penilente Forte®	Benzathine benzyl penicillin/procaine penicillin/benzyl penicillin
	Penilente LA®	Benzathine penicillin
	Petercillin®	Ampicillin trihydrate
	Procillin®	Procaine penicillin
	Promoxil®	Amoxicillin
	Ranamp®	Ampicillin sodium
	Ranclav®	Amoxicillin/clavulanic acid
	Rancosil®	Ampicillin/cloxacillin
	Ranmoxy®	Amoxicillin trihydrate
	Rolab-Amoclav®	Amoxicillin/clavulanic acid
	Rolab-Amoxycillin®	Amoxicillin trihydrate
	Rolab-Amoxycillin/Flucloxacillin®	Amoxicillin/flucloxacillin
	Rolab Ampicillin®	Ampicillin trihydrate
	Rolab-Cloxacillin®	Cloxacillin sodium
	Rolab-Flucloxacillin ®	Flucloxacillin sodium
	Rolab-Pen-V-K®	Phenoxymethylpenicillin potassium
	Spectracil®	Ampicillin trihydrate
	Spectramox®	Amoxicillin trihydrate
	Suprapen®	Amoxicillin/flucloxacillin
	Tazocin®	Piperacillin/tazobactam
	Ultracillin®	Benzathine penicillin/benzylpenicillin sodium/procainpenicillin
	Zoxil®	Amoxicillin trihydrate
Cephalosporins	Adco-Cefaclor®	Cefaclor
	Cec®	Cefaclor
	CeClor®	Cefaclor
	Cedax®	Ceftibuten
	Cefacidal®	Cefazolin
	Cefazolin Soduim-Fresenius Vials®	Cefazolin sodium
	Cefril®	Cephradine
	Cefrom®	Cefpirome sulphate

<i>Therapeutic class</i>	<i>Trade name</i>	<i>Active ingredient/s</i>
	Cipadur®	Cefadroxil
	Cipofix®	Cefuroxime sodium
	Claforan®	Cefotaxime
	Cloracef®	Cefaclor
	CPL Alliance Cephalexin®	Cephalexin monohydrate
	Dacef®	Cefadroxil monohydrate
	Fixime®	Cefixime
	Fortum®	Ceftazidime pentahydrate
	Kefdole®	Cefamandole nafate
	Keflex®	Cephalexin monohydrate
	Keflin®	Cephalotin sodium
	Kefzim®	Ceftazidime
	Kefzol®	Cefazolin sodium
	Klafotaxim®	Cefotaxime sodium
	Lenocef®	Cephalexin
	Lifurom®	Cefuroxime sodium
	Lilly-Cefaclor®	Cefaclor
	Mandokef®	Cefamandole nafate
	Maxipime®	Cefepime
	Mefoxin®	Cefoxitin sodium
	Oframax®	Ceftriaxone
	Orelox®	Cefpodoxime proxetil
	Pharmacare-Cefotaxime®	Cefotaxime
	Pharmacare-Cefoxitin®	Cefoxitin sodium
	Pharmacare-Ceftriaxone®	Ceftriaxone
	Pharmacare-Cefuroxime®	Cefuroxime sodium
	Prozef®	Cefprozil monohydrate
	Ranceph®	Cephalexin monohydrate
	Ranfradin®	Cefradine
	Ranzol®	Cefazolin sodium
	Reftax®	Cefotaxime sodium
	Rocephin®	Ceftriaxone
	Rolab-Cefaclor®	Cefaclor
	Rolab-Cephalexin®	Cephalexin
	Totam®	Cefotaxime
	Vercef®	Cefaclor
	Zinacef®	Cefuroxime sodium

<i>Therapeutic class</i>	<i>Trade name</i>	<i>Active ingredient/s</i>
	Zinnat®	Cefuroxime
Other	Azactam®	Aztreonam
	Lorabid®	Loracarbef
	Meropenem®	Meropenem trihydrate
	Tienam®	Imipenem/cilastatin soduim

Table 1K: Total cost saving according to original and generic antibiotic products. May 2002 to April 2003.

Product	Period	Total cost (R)	Medscheme® Price List (MPL)		
			Total calculated cost (R)	Effect (+/-)*	Saving % [#]
Original Amoxicillin	P4	186321.34	110554.31	-75767.03	-40.66
	P5	188074.36	63175.69	-124898.67	-66.41
	P6	64206.72	57774.82	-6431.90	-10.02
Total		438602.42	231504.82	-207097.60	-47.22
Generic Amoxicillin	P4	4779405.26	4697981.43	-81423.83	-1.70
	P5	3281775.66	3236054.35	-45721.31	-1.39
	P6	3790263.36	3550352.67	-239910.69	-6.33
Total		11851444.28	11484388.45	-367055.83	-3.10
Original Amoxicillin/clavulanic acid	P4	630123.72	536983.13	-93140.59	-14.78
	P5	431926.88	375802.84	-56124.04	-12.99
	P6	297478.40	281567.33	-15911.07	-5.35
Total		1359529.00	1194353.30	-165175.70	-12.15
Generic Amoxicillin/clavulanic acid	P4	16856987.88	16761661.41	-95326.47	-0.57
	P5	11937190.93	11920088.75	-17102.18	-0.14
	P6	14505357.42	14326298.68	-179058.74	-1.23
Total		43299536.23	43008048.84	-291487.39	-0.67
Original Amoxicillin/flucloxacillin	P4	50025.13	34816.00	-15209.13	-30.40
	P5	28561.48	22275.00	-6286.48	-22.01
	P6	29885.26	27931.60	-1953.66	-6.54
Total		108471.87	85022.60	-23449.27	-21.62
Generic Amoxicillin/flucloxacillin	P4	1000584.04	984005.40	-16578.64	-1.66
	P5	857218.89	840269.50	0.98	0.00
	P6	1092302.08	1080368.38	-11933.70	-1.09
Total		2950105.01	2904643.28	-28511.36	-0.97
Original Ampicillin	P4				
	P5				
	P6				
Total					
Generic Ampicillin	P4	55502.64	58002.14	2499.5	4.50
	P5	39443.75	46851.6	7407.85	18.78
	P6	50142.02	59871.7	9729.68	19.40
Total		145088.41	164725.44	19637.03	13.53

Product	Period	Total cost (R)	Medscheme® Price List (MPL)		
			Total calculated cost (R)	Effect (+/-)*	Saving % [#]
Original Ampicillin/cloxacillin	P4	74072.66	157989.2	83916.49	113.29
	P5	44772.62	36199.3	-8573.32	-19.15
	P6	41100.41	39076.5	-2023.91	-4.92
Total		159945.69	233265.00	73319.26	45.84
Generic Ampicillin/cloxacillin	P4	248131.20	268136.40	20005.18	8.06
	P5	212413.80	210968.90	-1444.93	-0.68
	P6	271906.20	266465.00	-5441.21	-2.00
Total		732451.20	745570.30	13119.04	1.79
Original Cefaclor	P4	78530.66	61686.00	-16844.7	-21.45
	P5	52114.33	44520.24	-7594.09	-14.57
	P6	39484.85	37763.77	-1721.08	-4.36
Total		170129.84	143970.01	-26159.87	-15.38
Generic Cefaclor	P4	1408128.00	1104934.00	-303195.00	-21.53
	P5	688348.50	941060.60	252712.10	36.71
	P6	824472.40	1046854.00	222381.90	26.97
Total		2920948.90	3092848.60	171899.00	5.89
Original Cefadroxil	P4	6105.09	6035	-70.09	-1.15
	P5	13921.21	1378.00	-12543.21	-90.10
	P6	1936.17	2408.40	472.23	24.39
Total		21962.47	9821.40	-12141.07	-55.28
Generic Cefadroxil	P4	161173.2	337546.20	176373	109.43
	P5	82463.85	81246.80	-1217.05	-1.48
	P6	102019.15	100430.40	-1588.75	-1.56
Total		345656.20	519223.40	173567.20	50.21
Original Cephalexin	P4	86378.58	24700.95	-61677.63	-71.40
	P5	57264.39	18903.28	-38361.11	-66.99
	P6	37823.21	19723.35	-18099.86	-47.85
Total		181466.18	63327.58	-118138.60	-65.10
Generic Cephalexin	P4	369966.82	360231.85	-9734.97	-2.63
	P5	254215.97	249866.10	-4349.87	-1.71
	P6	357242.51	347162.85	-10079.66	-2.82
Total		981425.30	957260.80	-24164.50	-2.46
Original Cloxacillin	P4	9274.50	8323.10	-951.40	-10.26
	P5	8908.46	8110.80	-797.66	-8.95
	P6	3927.19	3698.62	-228.57	-5.82

Appendix K

Product	Period	Total cost (R)	Medscheme® Price List (MPL)		
			Total calculated cost (R)	Effect (+/-)*	Saving % [#]
Total		22110.15	20132.52	-1977.63	-8.94
Generic Cloxacillin	P4	172955.10	186704.00	13748.90	7.95
	P5	68260.23	72379.55	4119.32	6.03
	P6	268017.36	320333.62	52316.26	19.52
Total		509232.69	579417.17	70184.48	13.78
Original Flucloxacillin	P4	42880.24	496980.00	454099.76	1059.00
	P5	60159.9	66038.45	5878.55	9.77
	P6	83926.10	93262.40	9336.30	11.12
Total		186966.24	656280.85	469314.61	251.02
Generic Flucloxacillin	P4				
	P5				
	P6				
Total					
Original Penicillin VK	P4				
	P5	251.19	241.20	-9.99	-3.98
	P6				
Total		251.19	241.20	-9.99	-3.98
Generic Penicillin VK	P4	97695.04	112903.98	15208.94	15.57
	P5	82709.08	92667.48	9958.40	12.04
	P6	90439.12	106046.63	15607.51	17.26
Total		270843.24	311618.09	40774.85	15.05

* (-) Product/medicine not paid by medical aid due to "higher" cost than "MPL" cost. Possibly funded by either patient or provider.

Percentage saving calculated by dividing the MPL effect by the total cost claimed multiplied by hundred.