

**An Investigation into the Relationship between the  
Number of Available Generics within a Therapeutic  
Class and Prices of Medicines in South Africa.**

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## DECLARATION

In fulfillment of the requirements of the coursework degree of Masters in Pharmacy in the Discipline of Pharmaceutical Sciences, University of KwaZulu-Natal, Durban, South Africa, I, Varsha Bangalee declare that:

-

- (i) The research reported in this dissertation, except where referenced, is my original work.
- (ii) This dissertation has not been submitted for any degree or examination to any other university .
- (iii) This dissertation does not contain other persons' text, tables, data, graphs or other information, unless specifically acknowledged as being sourced from other persons.
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  - (a) their words have been re-written but the general information attributed to them has been referenced;
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**Student Signature:**  \_\_\_\_\_

**Date:** 5/02/2014

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## ABBREVIATIONS

| <b>Abbreviation</b> | <b>Description / Meaning</b>           |
|---------------------|--|
| CVD                 | Cardiovascular disease                 |
| DOH                 | Department of Health                   |
| HAI                 | Health Action International            |
| IMSM                | Interchangeable Multi-source Medicines |
| IRP                 | International Reference price          |
| MSH                 | Management Sciences for Health         |
| NDP                 | National Drug Policy                   |
| NHI                 | National Health Insurance              |
| RSA                 | Republic of South Africa               |
| SEP                 | Single Exit Price                      |
| WHO                 | World Health Organization              |

## **ABSTRACT**

### **RATIONALE FOR THE STUDY**

Access to therapeutic drugs form an integral part of any successful healthcare system particularly in the Republic of South Africa where the burden of disease is on average four times that of developed countries and, in most instances, twice that of its developing counterparts. The high costs of therapeutic drugs, however, remain a barrier to accessibility and improved health to the majority of the population. The promotion of generic drug competition is a key policy strategy in the containment of increasing drug costs in South Africa. Generic drugs represent a substantial part of the pharmaceutical industry, and offer several advantages. A principal pharmaco-economic question with regard to the use of generic drugs relates to the association between drug prices and the number of available sellers. This relationship is particularly important in South Africa, where concurrent pricing legislation, is being implemented without monitoring of the consequences on generic drug prices and use.

### **AIMS AND OBJECTIVES**

1. To examine the effect of generic competition on the price differentials between the least expensive and the most expensive drug products with respect to the number of available brands within five classes of cardiovascular drugs
2. To make a comparison between South African drug prices with International Reference Prices

### **METHODOLOGY**

Data on private sector prices of originator and generic drugs belonging to the cardiovascular class of drugs as at 10 June 2013 was sourced from the South African Medicine Price Registry and utilized in this study. The relationship between the mean proportional

price (in percentage) and the number of brands was analyzed using correlation analysis. International reference prices were obtained from the Management Sciences for Health International Drug Price Indicator Guide (2012 edition).

## **RESULTS**

Findings were inconsistent with those found in unregulated markets in that with the exception of diuretics, a weak correlation between price and the number of originator drugs and generics and between generics drugs themselves was observed. A comparison of median prices for each strength of the originator drug, originator generic drug and the highest price generic drug showed that the price of the generic drug manufactured by the originator was still higher than the most expensive generic version manufactured by any other company. The exception was telmisartan, where no other generic drugs were available for this product. Comparison of the price ratio between the originator drug, lowest priced generic and the International Reference Price values revealed that the originator drug prices had a Median Price Ratio of 20.99 (interquartile range 7.31 to 53.46) and the lowest priced generics had a Median Price Ratio of 4.28 (interquartile range 2.10 to 8.47).

## **CONCLUSION**

The number of generic entrants is not necessarily a predictor of lower drug prices in South Africa. This research suggests that Single Exit Pricing as a single pricing policy initiative seems to hinder healthy competition in terms of prices of generic drugs. The results also suggest that the South African procurement system has not achieved the lowest prices for drugs when compared internationally.

## TABLE OF CONTENTS

|   | <b>Page</b> |
|---|-------------|
| Declaration   | i           |
| Acknowledgements  | ii          |
| Abbreviations   | iii         |
| Abstract  | iv          |
| Table of Contents   | vi          |
| <b>Chapter 1:</b> Introduction  | 1           |
| 1.1 Implications for Practice   | 3           |
| <b>Chapter 2:</b> Literature Review   | 4           |
| 2.1 Definition of Concepts  | 5           |
| 2.1.1 Originator brand drug   | 6           |
| 2.1.2 Generic drug  |             |
| 2.2 Pharmaceutical Policy Implementation in South Africa                                    | 7           |
| 2.2.1 Single exit pricing   | 8           |
| 2.2.2 International reference pricing   |             |
| 2.3 The Benefits of Generic Drugs   | 8           |
| 2.4 Other Research into the Impact of Generic Drug Competition                              | 9           |
| 2.5 Research into the Impact of Pricing Policies  | 11          |
| <b>Chapter 3:</b> Paper 1   | 13          |
| <b>Chapter 4</b> Summarized Recommendations and Conclusions                                 | 34          |
| <b>References for Introduction and Literature Review</b>                                    | 35          |
| <b>Appendices</b>   |             |
| Appendix 1 Data Collection  |             |
| Appendix 2 Comparison of Median Price Ratio values and International Reference Price values |             |
| Appendix 3 Consumption Data   |             |
| Appendix 4 Ethical Clearance Certificates / Documents                                       |             |

## **CHAPTER 1**

### **1. INTRODUCTION**

In the Republic of South Africa (RSA), the burden of disease is on average four times that of developed countries and, in most instances, twice that of its developing counterparts (Bradshaw et al., 2006). This dire situation further lends itself to an increased burden on finances, health sector facilities and human resources in South Africa.

Access to therapeutic drugs form an integral part of any successful healthcare system. These drugs are utilized in the prevention and treatment of both communicable and non-communicable diseases, enabling people to live longer and more productive lives. The high costs of therapeutic drugs, however, remain a barrier to accessibility and improved health to the majority of the RSA population (Gray and Matsebula, 2000). The increasing costs of pharmaceutical drugs account for a significant portion of total health expenditure, straining the budgets of patients and public/private insurers. These inflated costs further directly contribute to poor health outcomes by decreasing adherence to vital medication (Shrank et al., 2006). Out-of-pocket expenditure has been estimated to be as much as 65% of total therapeutic drug expenditure in sub-Saharan Africa (Shrank et al., 2006). In light of the costs of therapeutic drugs, the promotion of generic drug consumption could potentially be an important cost-saving mechanism for final consumers, insurance providers, and government.

The restructuring of the RSA public health sector post-1994 led to the development and implementation of the National Drug Policy (NDP). The economic objective of the NDP was to decrease the cost of therapeutic drugs in both the private and public sectors (Department of Health, 1996). In 2001 the RSA Government subsequently amended the Medicine and Related Substances Act 101 of 1965 which allows generic substitution of branded drugs with generics (Government Gazette, 2001). Generic drugs represent a substantial part of the pharmaceutical industry, and offer several irrevocable

advantages. A principal pharmaco-economic question relates to the relationship between drug prices and the number of sellers. This relationship is particularly important in the pharmaceutical industry as the market is sensitive to changes in legislation, which are specifically implemented to promote competition. Most studies on the pharmaceutical industry reveal a mixed impact with respect to generic entry (Wiggins and Maness, 2004), with very limited research being available on the South African market.

In addition to mandatory generic substitution, the amended South African Medicines and Related Substances Act 101 of 1965 introduced several additional regulations to reduce health care expenditure (Department of Health, 1996). The first of these (section 18A) banned “bonusing” (preventing pharmaceutical manufacturers from offering discounts and/or rebates to patients or healthcare providers) and the second (section 22G) which led to the formation of a “Pricing Committee” who were tasked with constructing “transparent pricing mechanisms” (Nicolosi and Gray, 2009). The high levels of discounting and payment of incentives within the pharmaceuticals supply chain had raised serious concerns in the Department of Health (DOH) as these practices were of no benefit to the consumer. Retail pharmacies and dispensing doctors on the other hand were able to capitalize on these incentives while patients continued to pay the official manufacturers “listed” price (Hawkins, 2011). This also countered the effect of generic substitution as evidence revealed that in many cases doctors and pharmacists were not always agreeable to substituting the lower priced generic but would rather dispense the most profitable product (Hawkins, 2011). This led to the prices of pharmaceutical drugs being regulated by the Single Exit Price (SEP) legislation. Single Exit Price refers to a legislation mandating that medicine manufacturers may only sell their products at one price to all their customers, regardless of the nature of the customer’s order size and consumption levels. The implementation of SEP in the private sector resulted in a significant shift from a free market, to a regulated one, ensuring transparent pricing practices for the industry (Advanstar Communications, 2009).

While previous studies revealed the price-lowering effect of generic competition with respect to the number of sellers in the overall market (Cook, 1998, Fatokun, 2011), very little data is available on this concept within a specific drug therapeutic class, let alone in RSA, which has the additional policy of the SEP. While HIV/AIDS remains the leading overall cause of mortality in sub-Saharan Africa, cardiovascular disease (CVD) is the second leading killer and is first amongst individuals over the age of 45 years (Lopez et al., 2006). “In RSA approximately 195 people die per day due to CVD, representing about 20% of the daily deaths due to HIV/AIDS” (Steyn, 2007). There is currently minimal information on the cost of CVD in South Africa, however it was estimated that overall costs in 2010 would have been more than double that 20 years ago (Murray and Lopez, 1996).

The objectives of this study were to examine the relationship between generic drug price competition and the number of available brands within the cardiovascular drug class with respect to the SEP policy. A secondary objective was to make a comparison of South African drug prices to international drug prices, to gauge where exactly the South African cardiovascular market stands relative to its developed counterparts, in an effort to guide future policy efforts. The final objective was to follow the consumption trends of generic drugs when compared to the originator drug and the originator generic drug.

### **1.1 Implications for Practice**

The value of these findings is untold, as currently, there is limited and dated information on economic interventions specific to the unique South African context and addressing its specific needs. The implementation of the proposed National Health Insurance (NHI) is likely to result in a shift in the use of prescription drugs, as public access to healthcare services will also be increased. Limited information is available on the potential impact of NHI on the pharmaceutical space in South Africa. This study is therefore important since lessons learnt can guide further regulatory affairs, demand forecasts and be used as a potential intervention to further reduce costs in the healthcare

system. The potential impact of NHI in South Africa should be researched as a single focus area and will not be covered within this research dissertation.

## **CHAPTER 2**

### **LITERATURE REVIEW**

The focus of the literature review is on relevant background and explanation of terms regarding the impact of the implementation of regulated pricing within the pharmaceutical environment in South Africa.

#### **2.1 Definition of Concepts**

##### **2.1.1 Originator brand drug**

Originator brand drugs are products that have been designed, developed, tested and subsequently patented by a company in order to maximize economic gain which may result from the availability of a new drug (van der Merwe Smit and Bredenkamp, 2013). Patent protection and the sole monopoly of sales for a defined period of time allow the company to recoup costs incurred during research and development (McDonald, 2005).

Innovation in the pharmaceutical industry typically have a high fixed cost of production and has consistently been described as being complex, lengthy, and risky (OECD, 2008). It is estimated, that the cost of development of a novel drug ranges from US\$ 500 million to US\$ 2 billion, depending upon the targeted disease, and requires an average investment time of 73 months (Daems et al., 2011 ). Furthermore, it should be noted that only 20% of potential drugs are ever brought to market (Adams and Brantner, 2006). These are often the reasons cited by pharmaceutical manufactures to justify the high retail prices of their drugs.

Post patent expiry, originator brand drug prices are affected by the entry of generic drugs. To compensate for competition from generic firms and to continue funding innovation, original manufactures must therefore achieve exceptional profits while they still enjoy patent rights. Patents are usually valid for 20 years but, owing to the onerous process required to bring a product onto the market, companies often only have about ten years in the market before the patent expires (Adams and Brantner, 2006).

### **2.1.2 Generic drug**

Section 22F of the Medicines and Related Substance Control Amendment Act 90 of 1997 refers to “generics” as interchangeable multi-source medicines (“IMSM”). IMSM is defined in the Medicines Control Act as “medicines that contain the same active substances which are identical in strength or concentration, dosage form and route of administration and meet the same or comparable standards which comply with the requirements for therapeutic equivalence as prescribed” (OECD, 2008).

In an effort to reduce drug expenditure in South Africa, the Medicines and Related Substances Control Act 101 of 1965 was amended by the Medicines and Related Substances Control amendment Act (Act 90 of 1997) under section 22F. Under this law a pharmacist is obliged to inform a patient of the benefits of the substitution for a branded drug of an interchangeable multi-source medicine. A pharmacist may replace the drug or medicine prescribed by a doctor with a generic alternative drug or medicine unless expressly forbidden to do so by the patient or stipulated by the prescriber as 'no substitution' next to the item prescribed (Government Gazette, 2001).

Following patent expiry of branded drugs, other manufacturing companies may produce the same drug under a different brand name once they have filed for registration and gained approval from the regulatory authorities. Generic drugs bypass the large marketing and Research and Development expenditure, and are offered on the market at much lower prices compared to the originator drugs with as much as a 20% to 90% cost benefit (Brems et al., 2011).

In 2010, the South African Mediscor Medicines Review indicated that 50% of patients that are insured with medical aids used generic drugs when they were available, which was a steady increase from previous years (Badenhorst et al., 2011). The growth of the South African generic pharmaceutical market is set to rapidly accelerate in the presence of the

countries medicine regulations, spiralling drug costs and the expiry of a number of patents especially in the cardiovascular category (Moorad, 2012).

## **2.2 Pharmaceutical Policy Implementation in South Africa**

### **2.2.1 Single exit pricing**

In 2004, the South African government - in striving to attain total transparency in the pricing structure of medicines - introduced a SEP for generic and branded drugs. Single Exit Price refers to legislation mandating that drug manufacturers may only sell their products at one price to all their customers, regardless of the nature of the customer's order size and consumption levels (Nicolosi and Gray, 2009). Price increase limits are granted by the DOH on an annual basis only, while manufacturers are allowed to apply for price reductions whenever they choose (Pretorius, 2011).

The implementation of SEP in the private sector resulted in a significant shift from a free market, to a regulated one (Advanstar Communications, 2009). This policy evades the excessive rebates passing between manufacturers, and the private sector suppliers (such as wholesalers and distributors) as well as puts a stop to discounts and additional levies on drugs, thus setting price competition limits and averting predatory pricing strategies (Pretorius, 2011). The medicine pricing regulations provided only for the addition of a regulated professional fee to the SEP. In this way the consumers are made aware of how much is being paid for the medicine and what is being paid for the dispensing and distribution (OECD, 2008).

The South African Government has introduced several price control mechanisms to regulate the cost of medicines in the country. The combination of SEP and capped annual price increases led to an overall decrease of 22% in medication costs in its first year of introduction (McIntyre and Thiede, 2007) and hence appeared to produce its targeted effect of cost reduction of medications to the patient. However, these policies have also been met with mixed reactions. Several economists have argued that by

interfering in the normal market process of pharmaceuticals, price controls discourage normal price competition and stifle innovation, research and development (Calfee, 2001). While the South African government may have good intentions in creating transparency in the pricing structure of medicines the imposition of a SEP may have many unintended consequences, which could potentially reduce access to medicines and compromise South Africa's healthcare system (Calfee, 2001).

### **2.2.2 International reference pricing**

International Reference Pricing also referred to as External Price Referencing and External Price Benchmarking is defined as "the practice of comparing pharmaceutical prices across countries" (OECD, 2008). In South Africa, the DOH is presently aiming to implement legislation that will promote international benchmarking of drug prices, where the national originator brand drug price will be benchmarked against counterparts in Australia, Canada, New Zealand and Spain (Government Gazette, 2010). Generic drugs will thereafter be pegged at 40% below the price of the originator drug. The rationale for the proposal is to protect the South African health system from "distorted" medicine prices. International Reference pricing as a method to reduce price distortions is seen to be superior to generalized price cuts or price freezes (Government Gazette, 2010). It is anticipated that there will be an immediate 10% cost reduction in originator drug pricing with a possible further 9.9 % reduction at a later stage (Government Gazette, 2010).

### **2.3 The Benefits of Generic Drugs**

In resource-constrained developing countries like South Africa, the sustainability of a generic drug market is imperative to improving access and availability of essential drugs. In addition to offering a cost saving, to both patients and government, generic drugs also ensure that patients continue to receive gold standard treatments at affordable prices post patent expiry (Sheppard and Principal, 2010).

Unlike originator drugs, which are manufactured by a single firm, generic drugs are multi-sourced. This stimulates healthy competition not only between the originator drug companies and generic drug companies but also amongst generic drug companies themselves. Increased competition, not only means lower patient costs, but also drives product improvements, distribution efficiencies and improved access to all medicines (Sheppard and Principal, 2010).

An added benefit of generic drugs is in ensuring supply continuity even after the originator drug may have exited the market (Brems et al., 2011). They further assist by ensuring availability of supply for particular medicines which can be important at times of increased demand, such as unexpected requirements for anti-infectives during an influenza epidemic (Sheppard and Principal, 2010). Generic drug manufacturing also improves economic development and affords increased employment opportunities especially when produced locally (Sheppard and Principal, 2010).

## **2.4 Other Research into the Impact of Generic Drug Competition**

The dynamic nature of the pharmaceutical industry remains a complex one and varies across the globe, being governed by different legislation and supply and demand characteristics. Several international studies have sought to evaluate the impact of generic entry on originator brand products (Frank and Salkever, 1997, Hudson, 2000, Lexchin, 1993, Fatokun et al., 2011).

A study by van der Merwe Smit and Bredenkamp (2013) focused on the effect of generic drug competition on market share, growth and pricing of originator brand drug was conducted on the South African private pharmaceutical market. The results of the estimations which were performed on 39 different molecules revealed that generic drug competition has different effects in different anatomical classes. The relative pricing of

originator drug in the Cardiovascular System had a significant negative impact on the change of its market share.

The study further showed that the relative prices of originator drugs had a significant positive relationship with the number of generics available in the market, while at the same time the absolute prices of originator drugs had a significant negative relationship with the number of generics available in the market. In other words, while the relative prices of originator brand drug increase as more generic drugs enter the market and aim to compete by entering at lower prices, the originator manufacturers also lower the absolute prices of their medicines in an apparent effort to compete more effectively.

Adriaen et al (2007) in researching the determinants of pricing strategies of originator and generic drugs following patent expiry in Belgium revealed that pricing strategies of originator and generic drugs are dependent on the medication class, with the price differential between originator and generic drugs being higher for the cardiovascular class of drugs. The regression analysis revealed that the number of generic drugs in the market reduces the price of generic drugs and raises the price differential between originator and generic drugs.

Generic drug entry stimulates competition among the various brands of the off-patent product available in the market and assists in reducing the overall price of the drug product (Cook, 1998). This phenomenon however is only likely if there are a sufficient number of generic products in the market (King and Kanavos, 2002, Nguyen et al., 2008). Fatokun et al (2011) conducted a study in Malaysia which examined the relationship between the number of multisource medicines and their proportional prices. The study was limited to the use of private retail price data. The results of the study supported the hypothesis of the price-lowering effect of generic competition as shown by the decrease in the mean proportional price as the number of brands of the multisource product increases. These findings were consistent with the finding of several other empirical studies (Caves et al., 1991, Cook, 1998, Frank and Salkever, 1992, Grabowski and Vernon, 1992, Kong and Seldon,

2004, Lexchin, 1993, Saha et al., 2006, Frank and Salkever, 1997). This generic price lowering effect as observed in the Fatokun et al (2011) study was, however, not observable across all drug brands.

The majority of the previous studies investigating the effect of generic entry and the number of firms have focused on small sets of drugs across several therapeutic classes. Wiggins and Maness (2004) focused on one segment of the pharmaceutical industry, namely anti-infective pharmaceutical products. Data for this study consisted of retail-level pharmacy transactions for all anti-infective products over a period from 1984-1990. Results from this study revealed that prices fall rapidly moving from one seller to several, with prices continuing to decrease in the face of numerous sellers.

## **2.5 Research into the Impact of Pricing Policies**

Various global investigations into the implementation of pharmaceutical price controls and pricing regulations for the pharmaceutical industry have been conducted (Calfee, 2001, Anonymous, 2006, McIntyre and Thiede, 2007). However, there is a dearth of information to determine the effectiveness of the medicine pricing policy in South Africa.

A study conducted by Pretorius (2011) sought to investigate whether the cost benefits of SEP has in fact filtered down in a consistent and predictable manner to a patient level in the private healthcare sector in South Africa. A mixed methodology approach was applied to 50 private sector pharmacies comparing the actual prices of predetermined drugs to ascertain if consistent pricing benefits were experienced by patients through the introduction of the SEP system. In addition to this, 22 semi-structured interviews were conducted with pharmacy managers from independent, group, and hospital pharmacies to determine the changes in the business environment following the introduction of the SEP. The study revealed that the implementation of the SEP did not result in consistent pricing benefits to the patient. Changes in the business environment of private retail pharmacies, following the introduction of SEP included: strategic changes, survival tactics and day to

day changes as well as restructuring. In essence the findings revealed that even though pricing regulations may initially produce a positive impact for all stakeholders involved, in the long term however, the true impact of interference in the market may be more harmful to all stakeholders.

These studies all indicate a need to monitor the impact of pharmaceutical policies, especially pricing policies at all times and therefore makes it imperative to investigate the effects of current pricing policies being implemented in South Africa.

## **CHAPTER 3**

### **Paper 1**

Preface

This article has been submitted to the “International Journal of Clinical Pharmacy.”

Title:

An investigation into the relationship between the number of available generics within a therapeutic class and prices of medicines

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## **Running Title**

### **An investigation of the relationship between the number of generic drugs and pricing within a therapeutic class**

#### **Abstract**

*Background:* The promotion of generic drug competition is a key policy strategy in the containment of increasing drug costs in South Africa. One question regarding generic drugs relates to the association between drug prices and the number of available brands within a therapeutic class. This relationship is particularly important in South Africa, where concurrent pricing legislation, is being implemented without monitoring of the consequences on generic drug competition and usage.

*Objectives:* To examine the relationship between generic drug price competition and the number of available brands within cardiovascular class of drugs; to compare South African prices with International Reference Prices and to compare the consumption of generic drugs to originator drugs.

*Setting:* South African Private Health sector

*Method:* Data on private sector drug prices utilized in this study was sourced from the South African Medicine Price Registry. The relationship between the median proportional price and the number of brands was analyzed using correlation analysis. International reference prices were obtained from the Management Sciences for Health International Drug Price Indicator Guide (2012 edition).

*Main outcome measure:* Drug prices and drug consumption

*Results:* Findings were inconsistent with those in other studies in that; with the exception of diuretics, a weak correlation between originator drugs and generics and between generic drugs themselves was observed. The observed

median prices per strength of the originator generic were still higher than the most expensive generic version manufactured by any other company. The exception was telmisartan, for which no other generic drugs were available. Comparison of the price ratio between the originator drug, lowest priced generic and the International Reference Price values revealed that the originator drug prices had a Median Price Ratio of 20.99 (interquartile range 7.31 to 53.46) and the lowest priced generics had a Median Price Ratio of 4.28 (interquartile range 2.10 to 8.47).

*Conclusion:* The number of generic entrants is not necessarily a predictor of lower drug prices in South Africa. Single Exit Pricing as a single pricing policy initiative seems to hinder healthy competition in terms of prices of generic drugs. The results also suggest that the South African procurement system has not achieved the lowest prices for drugs when compared internationally.

### **Keywords**

Medicine pricing, South Africa, Generic drugs, Single Exit Price, Price competition

### **Impact of Research Findings on Pharmacy/Clinical Practice**

- Generic competition may be affected by other policies and requires careful monitoring within countries
- Pricing studies for medicines within therapeutic classes are required to determine what factors affect generic medicine adoption and use

## Introduction

Access to therapeutic drugs form an integral part of any successful healthcare system. The high costs of therapeutic drugs, however, remain a barrier to accessibility and improved health to the majority of the South African population [1]. In light of the escalating costs of therapeutic drugs, the promotion of generic drug consumption could potentially be an important cost-saving mechanism for final consumers, insurance providers, and government.

In 2001 the South African Government amended the Medicine and Related Substances Act 101 of 1965 which allows substitution of branded drugs with generic drugs [2]. Questions arise as to the relationship between drug prices and the number of brands available in the market.

In addition to mandatory generic substitution, the amended South African Medicines and Related Substances Act in terms of section 18A banned “bonusing” (preventing pharmaceutical manufacturers from offering discounts and/or rebates to patients or healthcare providers) and with section 22G led to the formation of a “Pricing Committee” who were tasked with constructing “transparent pricing mechanisms” [3]. Prices of drugs were regulated by the Single Exit Price (SEP) legislation, i.e. drug manufacturers may only sell their products at one price to all their customers, regardless of the nature of the customer’s order size and consumption levels.

Currently, both nationally and internationally, very little data is available with regard to generic price competition and the number of brands within a specific drug therapeutic class. This study focuses on the drugs used to treat cardiovascular disease (CVD). While HIV/AIDS remains the leading overall cause of mortality in sub-Saharan Africa, CVD is the second leading killer and is first amongst individuals over the age of 45 years [4].

## **Aim of the Study**

The aim of this study was to examine the relationship between generic drug competition and the number of available brands within the cardiovascular drug class within the context of SEP legislation, and to compare South African drug prices with international drug prices.

## **Ethical Approval**

Ethics approval for the study was obtained from the Humanities and Social Science Ethics Committee of the University of KwaZulu-Natal.

## **Method**

The quantitative study design was a secondary data analysis based on data collected on the five classes of cardiovascular drugs listed in the abridged South African hypertension guideline 2011 [5]. These classes were ace-inhibitors, beta blockers, calcium channel blockers, diuretics and angiotensin II antagonists. All drugs listed under each class were then sought from the South African Medicines Formulary (10th edition) [6]. Data on private sector prices of originator and generic drugs was sourced from the South African Medicine Price Registry which is an official website that communicates drug prices as approved by the Pharmaceutical Economic Evaluation Unit of the Department of Health [7]. The number of registered brands as at 10 June 2013 for each drug preparation was obtained from the registry. Drugs chosen under each medication were only included if there was a generic drug and originator price available. Combination preparations were excluded as they tend to alter the classification of the drug.

Originator or Brand pharmaceutical products were those initially registered by the innovator research-based pharmaceutical manufacturer on the basis of the documentation of its efficacy, safety and quality, whereas generic drugs were those usually intended to be interchangeable with the originator brand product, of the same strength and dosage form, registered after patent expiry or as

licensed by the patent-holder. Due to the differences in pack sizes between originator and generic drugs, the SEP, inclusive of value added tax per standard unit (i.e. price per tablet or capsule) was computed.

The price differential between originator and generic drugs was calculated as the difference between the price per standard unit of the originator drug and the median price per standard unit of available generic drugs expressed as a percentage of the price per standard unit of the originator drug. The relationship between the median proportional price (in percentage) and the number of brands was analyzed using correlation analysis. It was hypothesized that the price differential would be larger when the number of generic drugs on the market increases.

Reference prices were obtained from the Management Sciences for Health (MSH) International Drug Price Indicator Guide (2012 edition) [8]. These constitute internationally recognized prices, based on current catalogues and price lists obtained from pharmaceutical suppliers, international development organizations, and government agencies. Price comparisons were made only for the originator drugs and the lowest price generics where the median buyer International Reference Price (IRP) values were available. Price summaries were expressed as ratios relative to a standard set of reference prices. The ratio indicates how many times more or less the comparator drug is than the IRP. For international price comparisons the exchange rate used was that of the first day of data collection from Google Finance (1 ZAR = 0.1017 US\$ on 30 July 2013). Price comparisons were made using a methodology developed by the World Health Organization and Health Action International for the WHO/HAI Project on Medicine Prices and Availability [9].

Consumption data on the use of generic and originator drugs were sourced from IMS Health. Data was captured as the single unit measure (per tablet or capsule) per drug strength from January 2010 - June 2013. All data was analyzed using Microsoft Excel version 2010.

## **Results**

The findings relate to prices of the different available strengths of 23 originator medicines and their generic equivalents. Table 1 reflects the private sector prices of originator and generic drugs sourced from the South African Medicine Price Registry on the 10th June 2013.

**Table 1: Private sector prices of originator and generic drugs sourced from The South African Medicine Price Registry (10 June 2013)**

| <b>Drug Strength</b> | <b>Drug Class</b> | <b>Median cost differentials between Originator and Generic versions (%)</b> | <b>Minimum SEP (R)</b> | <b>Maximum SEP (R)</b> | <b>Number of Registered brands</b> |
|----------------------|-------------------|--|------------------------|------------------------|------------------------------------|
| Captopril 12.5mg     | ACE inhibitor     | 73.72  | 0.58                   | 2.20                   | 2                                  |
| Captopril 25mg       | ACE inhibitor     | 86.01  | 0.24                   | 2.82                   | 9                                  |
| Enalapril 10mg       | ACE inhibitor     | 14.63  | 1.02                   | 1.55                   | 8                                  |
| Enalapril 20mg       | ACE inhibitor     | 19.44  | 1.35                   | 2.84                   | 7                                  |
| Enalapril 5mg        | ACE inhibitor     | 17.06  | 0.59                   | 1.12                   | 7                                  |
| Perindopril 10mg     | ACE inhibitor     | 39.30  | 4.19                   | 6.90                   | 2                                  |
| Perindopril 2mg      | ACE inhibitor     | 53.69  | 2.82                   | 6.09                   | 2                                  |
| Perindopril 4mg      | ACE inhibitor     | 42.79  | 1.32                   | 4.56                   | 15                                 |
| Quinapril 10mg       | ACE inhibitor     | 56.14  | 1.34                   | 4.15                   | 3                                  |
| Quinapril 20mg       | ACE inhibitor     | 60.30  | 2.03                   | 5.85                   | 4                                  |
| Quinapril 40mg       | ACE inhibitor     | 41.91  | 3.65                   | 6.28                   | 2                                  |
| Quinapril 5mg        | ACE inhibitor     | 52.83  | 1.86                   | 3.94                   | 2                                  |
| Ramipril 1.25mg      | ACE inhibitor     | 51.07  | 1.96                   | 4.78                   | 5                                  |
| Ramipril 10mg        | ACE inhibitor     | 50.04  | 1.44                   | 10.11                  | 6                                  |
| Ramipril 2.5mg       | ACE inhibitor     | 53.57  | 2.73                   | 6.36                   | 7                                  |
| Ramipril 5mg         | ACE inhibitor     | 52.45  | 4.13                   | 9.39                   | 7                                  |
| Lisinopril 10mg      | ACE inhibitor     | 38.88  | 0.68                   | 2.80                   | 10                                 |
| Lisinopril 20mg      | ACE inhibitor     | 50.52  | 0.68                   | 4.75                   | 13                                 |
| Lisinopril 5mg       | ACE inhibitor     | 37.78  | 0.683                  | 1.96                   | 9                                  |
| Nifedipine 20mg      | CCB               | 90.89  | 0.63                   | 9.20                   | 6                                  |
| Nifedipine 30mg      | CCB               | 44.87  | 4.34                   | 8.38                   | 6                                  |
| Nifedipine 60mg      | CCB               | 41.33  | 6.41                   | 11.60                  | 5                                  |
| Amlodipine 10mg      | CCB               | 49.25  | 2.09                   | 7.09                   | 20                                 |
| Amlodipine 5mg       | CCB               | 56.80  | 1.18                   | 5.05                   | 22                                 |
| Felodipine 5mg       | CCB               | 57.49  | 3.65                   | 8.58                   | 2                                  |
| Propranolol 10mg     | BB                | 92.86  | 0.08                   | 1.59                   | 6                                  |
| Propranolol 40mg     | BB                | 95.18  | 0.14                   | 3.99                   | 7                                  |

| Drug Strength       | Drug Class                   | Median cost differentials between Originator and Generic versions (%) | Minimum SEP (R) | Maximum SEP (R) | Number of Registered brands |
|---------------------|------------------------------|---|-----------------|-----------------|-----------------------------|
| Atenolol 100mg      | BB                           | 88.28   | 0.79            | 10.01           | 8                           |
| Atenolol 25mg       | BB                           | 86.98   | 0.48            | 3.70            | 2                           |
| Atenolol 50mg       | BB                           | 88.66   | 0.52            | 6.16            | 9                           |
| Acebutolol 400mg    | BB                           | 26.50   | 6.86            | 9.33            | 2                           |
| Bisoprolol 10mg     | BB                           | 45.21   | 2.53            | 4.91            | 8                           |
| Bisoprolol 5mg      | BB                           | 48.39   | 1.5             | 3.10            | 8                           |
| Carvedilol1.25mg    | BB                           | 53.02   | 2.07            | 4.66            | 8                           |
| Carvedilol 25mg     | BB                           | 40.41   | 2.61            | 4.661           | 8                           |
| Carvedilol 6.25mg   | BB                           | 54.44   | 1.72            | 4.47            | 8                           |
| Indapamide 1.5mg    | Diuretics                    | 65.13   | 1.06            | 3.03            | 2                           |
| Indapamide 2.5mg    | Diuretics                    | 84.42   | 0.44            | 3.83            | 12                          |
| Furosemide 40mg     | Diuretics (loop)             | 95.76   | 0.12            | 4.29            | 11                          |
| Spironolactone100mg | Diuretics (anti-aldosterone) | 0.00  | 6.91            | 6.91            | 2                           |
| Spironolactone 25mg | Diuretics (anti-aldosterone) | 2.18  | 1.07            | 1.12            | 3                           |
| Losartan 100mg      | Angiotensin-receptor blocker | 8.22  | 2.53            | 3.02            | 11                          |
| Losartan 50mg       | Angiotensin-receptor blocker | 19.09   | 1.35            | 3.02            | 15                          |
| Irbesartan 150mg    | Angiotensin-receptor blocker | 51.84   | 1.49            | 8.16            | 4                           |
| Irbesartan 300mg    | Angiotensin-receptor blocker | 50.81   | 1.49            | 7.99            | 4                           |
| Valsartan160mg      | Angiotensin-receptor blocker | 50.20   | 1.25            | 7.49            | 6                           |
| Valsartan 80mg      | Angiotensin-receptor blocker | 50.20   | 1.25            | 7.49            | 6                           |
| Telmisartan 40mg    | Angiotensin-receptor blocker | 41.89   | 4.84            | 8.33            | 2                           |
| Telmisartan 80mg    | Angiotensin-receptor blocker | 41.89   | 4.84            | 8.33            | 2                           |
| Verapamil 240mg     | CCB (non-dihydropyridine)    | 24.36   | 3.80            | 5.89            | 5                           |
| Verapamil 40mg      | CCB (non-dihydropyridine)    | 51.35   | 0.38            | 0.90            | 4                           |
| Diltiazem 240mg     | CCB (non-dihydropyridine)    | 21.24   | 7.25            | 9.21            | 2                           |

Note: ACE inhibitor- angiotensin converting enzyme inhibitor; BB - beta-blocker; ARB - angiotensin receptor blocker; CCB-calcium channel blocker

As indicated in Table 1, the largest therapeutic class is angiotensin converting enzyme (ACE) inhibitors with 6 drug products, followed by beta-blockers and angiotensin-receptor blockers (ARB) with 5 and 4 drug products respectively. The total number of brands for the different strengths of the 23 drug products is 346, of which ACE inhibitors are 120; beta-blockers are 74; calcium channel blockers (CCBs) are 61; ARBs are 50; diuretics are 30 and CCBs (non-dihydropyridine) are 11. Older generics drugs (e.g. captopril) that have been off-patent several years back have more registered brands than newer off-patent drugs (e.g. telmisartan).

Table 1 reveals considerable variability in the number of drugs under each class as well as in the number of registered brands for each drug preparation. A cursory look at Table 1 also reveals that drug products with higher number of registered brands generally have higher median cost differentials between originator and generic versions compared to drug preparations with lower number of registered brands. Competition theory (effect of the number of generic equivalents) was tested statistically between the price of the originator drug and generic drugs, between generic drugs and finally between the originator drug and generic version of the drug manufactured by the originator firm. The assumption was that increased generic entry would result in price competition and reduction in drug prices suggesting that the calculated price differential would be larger as number of generic drugs on the market increases [10]. Of the 346 branded drugs, the median cost differential was 50.4% (interquartile range 40.1% to 56.98%). Of all generic drugs identified, 75% were more than 40% cheaper than the branded version, which was the proposed government price at which generic drugs will be pegged at in South Africa.

Of the 23 cardiovascular drugs, four originator companies manufactured a generic version of the drug. Table 2 shows cost differentials between originator brand and generic versions manufactured by the originator for each of the available strengths of the drug. The median cost differential between originator brand and generic versions manufactured by the originator was 32.7% (interquartile range 22.96 to 41.89%). A weak correlation between the number

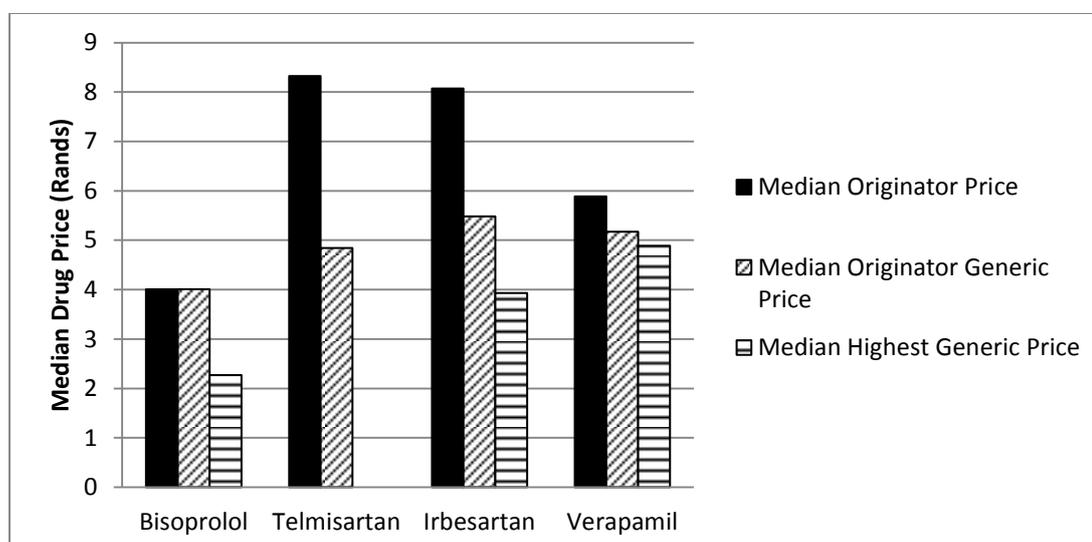
of generics and the size of the cost differential was apparent (correlation coefficient -0.48).

**Table 2: Cost differentials associated with originator brand and originator generics**

| Drug Name          | Number of registered brands identified | Cost differential between originator brand and originator generic drugs (%) |
|--------------------|--|---|
| Bisoprolol 5mg     | 8                                      | 0   |
| Bisoprolol 10mg    | 8                                      | 0   |
| Telmisartan 40mg   | 2                                      | 41.89   |
| Telmisartan 80mg   | 2                                      | 41.89   |
| Irbesartan 150mg   | 4                                      | 32.81   |
| Irbesartan 300mg   | 4                                      | 31.37   |
| Verapamil 240mg SR | 5                                      | 12.19   |

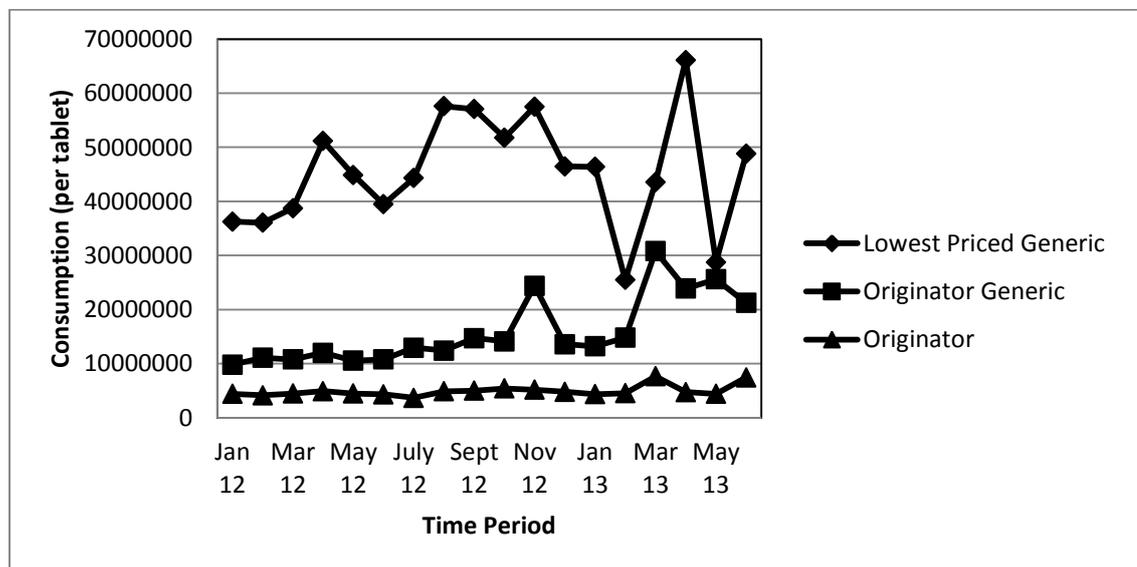
Figure 1 represents the median prices of the different available strengths for the 4 originator generic drugs in comparison to the originator drug, and the corresponding highest priced generic. With the exception of telmisartan for which there were no other generic drugs available (aside from the originator generic), the price of the originator generic was still higher than the most expensive generic version manufactured by any other company. There was no price difference between the originator brand and the originator generic version for bisoprolol.

**Figure 1: Comparison of prices for Bisoprolol, Telmisartan, Irbesartan and Verapamil**



In terms of consumption data for the 4 originator generics, it was revealed that bisoprolol (5mg and 10mg) and telmisartan (40mg and 80mg) produced similar trends as portrayed by verapamil (240mg SR) (Figure 2) where the lowest priced generic had the highest usage, followed by the originator generic and finally the originator. The exception was irbesartan (150mg and 300mg) where usage of the originator generic was higher than that of the originator and found to be higher than even the lowest priced generic (Figure 3).

**Figure 2: Consumption trends from Jan 2012-June2013 for verapamil 240mg SR tablets**



**Figure 3: Consumption trends from Jan 2012-June2013 for Irbesartan 150mg tablets**

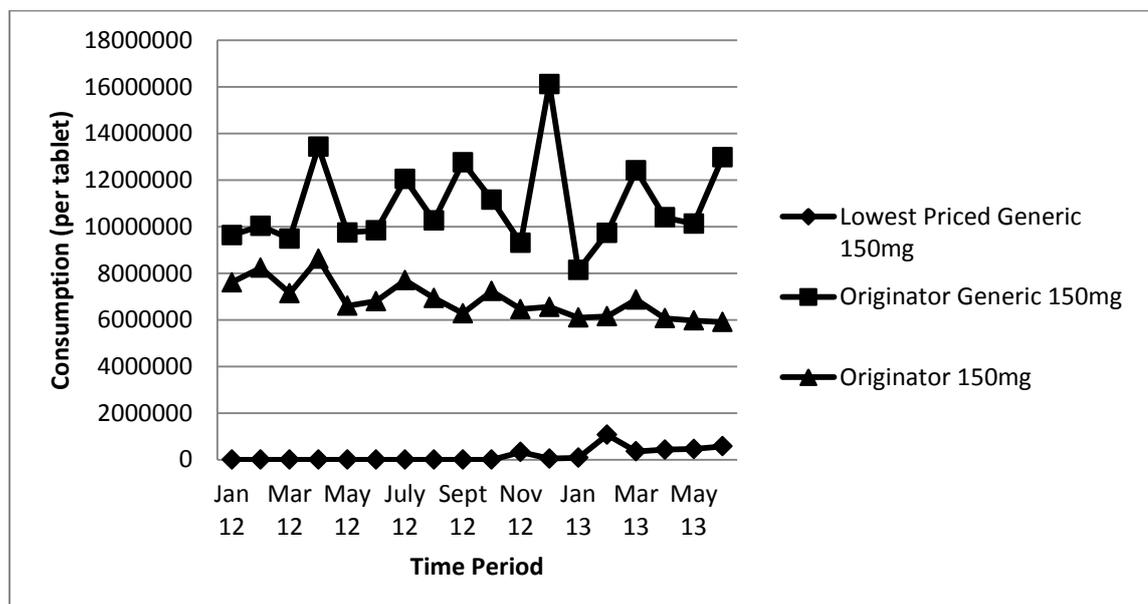


Table 3 presents the correlation coefficient for median cost differentials between originator and generic versions as well as the correlation coefficient for median cost differentials between generic drugs for each drug class. The negative value indicates an inverse relationship between the price differential between the originator drug and median generic drug prices. With the exception of diuretics, the remaining drug classes display a weak correlation between the number of generics and the size of the cost differential.

**Table 3: Correlation coefficients results for each drug class**

| <b>Drug Class</b>                             | <b>Correlation coefficient (Median cost differentials between originator and generic drugs)</b> | <b>Correlation coefficient (between generic drugs)</b> |
|---|---|--|
| ACE inhibitor                                 | -0.19   | 0.08   |
| Calcium channel blocker                       | -0.12   | 0.04   |
| Beta blocker                                  | 0.07  | 0.51   |
| Diuretics                                     | 0.78  | 0.92   |
| Angiotensin-receptor blocker                  | -0.77   | -0.39  |
| Calcium-channel blockers: non-dihydropyridine | 0.28  | 1  |

Reference pricing allows for comparisons to be drawn between South Africa and international countries. Table 4 indicates that South Africa shows large variations between originator and generic prices and secondly that the lowest prices for medications are not always being attained.

**Table4: Comparison of Median Price Ratios (MPR) with International Reference Price (IRP) values**

|                      | IRP Unit Price (US\$)<br>(Buyer Price) | MPR* for Originator<br>Drug Unit Price (US\$) | MPR* for Lowest<br>Price<br>Generic Unit Price<br>(US\$) |
|----------------------|--|---|--|
| Captopril 25mg       | 0.01                                   | 25.41   | 2.16   |
| Enalapril 10mg       | 0.01                                   | 28.71   | 18.78  |
| Enalapril 20mg       | 0.01                                   | 38.03   | 18.02  |
| Perindopril 4mg      | 0.04                                   | 11.98   | 3.48   |
| Nifedipine 20mg Sr   | 0.02                                   | 62.36   | 4.27   |
| Amlodipine 10mg      | 0.01                                   | 55.93   | 16.48  |
| Amlodipine 5mg       | 0.01                                   | 47.59   | 11.11  |
| Propranolol 10mg     | 0.05                                   | 3.28  | 0.16   |
| Propranolol 40mg     | 0.01                                   | 52.64   | 1.79   |
| Atenolol 100mg       | 0.01                                   | 99.83   | 7.88   |
| Atenolol 50mg        | 0.01                                   | 115.97  | 9.79   |
| Carvedilol 12.5mg    | 0.05                                   | 9.64  | 4.29   |
| Carvedilol 25mg      | 0.05                                   | 8.79  | 4.92   |
| Carvedilol 6.25mg    | 0.09                                   | 4.94  | 1.90   |
| Furosemide 40mg      | 0.01                                   | 65.10   | 1.82   |
| Spironolactone 100mg | 0.09                                   | 8.03  | 8.03   |
| Spironolactone 25mg  | 0.03                                   | 3.36  | 3.22   |
| Losartan 50mg        | 0.02                                   | 16.57   | 7.44   |
| Verapamil 240mg SR   | 0.12                                   | 5.14  | 3.32   |
| Verapamil 40mg       | 0.034                                  | 2.69  | 1.13   |

Note: \* (MPR = Drug Unit Price/ IRP Unit Price)

Of the 20 drugs that were compared, none of originator drugs or lowest priced generics resulted in a ratio of 1.00 or less. None of the ratio values for originator brand and lowest-priced generics were close to each other, which indicates that the procurement system is not obtaining very competitive prices for drugs. The originator drug prices had a median MPR of 20.99 (interquartile range 7.31 to 53.46) and the lowest priced generics had a median MPR of 4.28 (interquartile range 2.10 to 8.47)

## Discussion

Generic drug entry stimulates competition among the various brands of the off-patent product available in the market and assists in reducing the overall price of the drug product [11]. This phenomenon however is only likely if there are a sufficient number of generic products in the market [12] [13]. Several international studies have sought to characterize the relationship between the number of brands of a product and its effect on drug pricing. An American study by Wiggins and Maness, explored price variation in anti-infective drugs and yielded results differing from previous studies conducted on several random drugs [14]. They showed that pricing variation may be sensitive to the class of generic drugs. Their analysis further showed that increases in the number of competitors significantly reduced prices. These findings are consistent for unregulated markets without price caps and are consistent with findings of an American study by Brenham and Reiss [15].

Fatokun et al conducted a study in Malaysia examining the relationship between the number of multisource drugs and their proportional prices [10]. The results confirmed the price-lowering effect of generic competition as shown by the decrease in the mean proportional price as the number of brands of the product increases. This generic price lowering effect was, however, not observable across all therapeutic classes.

Adriaen et al in researching the determinants of pricing strategies of originator and generic drugs following patent expiry in Belgium revealed that pricing strategies of originator and generic drugs are dependent on the therapeutic class, with the price differential between originator and generic drugs being higher for cardiovascular classes of drugs [16]. Pricing strategies were further influenced by regulatory aspects, such as successive reductions in reference prices and prescription status of drugs; by market incentives in the form of price competition between generic drugs

and competition between originator and generic drugs and by market power of the manufacturer of the originator drug.

The results from our analysis do not indicate that there is a price-lowering effect for CVD drugs with increased generic competition. When testing the competition hypothesis between originator drugs and generics and between generics drugs themselves, the correlation was found to be weak in both instances, with the exception of diuretics. There is a wide variation between the price of the least expensive brands and the most expensive brands. One explanation for this observation is that the originator companies do not engage in price competition with generic brands [17]. This is supported by the second finding. When the price of the generic drug manufactured by an originator company was compared to the median generic drug price, these drugs were consistently found to be higher, suggesting that originator companies may set the price ceiling for other generic products. In this study the originator generics showed greater consumption than the originator drug, but less than the lowest price generic. In the case of irbesartan the originator generic displayed greater use than even the lowest priced generic. The possible reasoning for this could be that the originator generic was introduced before any other generic into the South African market. Thus the increased use could potentially be linked to product loyalty.

A study conducted in Gauteng Province in South Africa (2004) revealed that the majority of drug prices did not compare well with the international reference price [18]. Similarly our findings revealed high prices for drugs when compared with buyer international prices ranging from 2.69 times greater to a staggering 115.97 times greater for originator drugs. These results indicate that current pricing policies are not optimal in South Africa even though there is greater consumption of generic drugs for the five classes of cardiovascular drugs in this study.

## **Limitations**

Price comparisons to international prices would have benefited if IRP values for all drugs in the study were available. The second limitation involves the reliability of median price ratios, which may be skewed since the international reference prices are based on limited data. Due to the lack of availability of supplier prices, buyer prices were used as a proxy thus MPR results could potentially be skewed by a particularly high or low international reference price.

## **Conclusion**

While the pro-generic legislations may seek to increase accessibility to medicines and improved healthcare, the implementation of SEP may result in long term unintended effects by interfering in the normal market processes. Alternative price regulations may promote active competition among generic drug producers thus avoiding the observed behavior of drug prices clumping together.

The differences between the high South African medicine prices and international prices warrant the implementation of future policy evaluations as well as possible pricing interventions such as benchmarking and reference pricing in an effort to lower drug prices. More work is required to identify the determinants of the price differentials between originator and generic drugs in South Africa, particularly in light of the newly proposed healthcare restructuring.

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**Conflict of interests:** None

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## CHAPTER 4

### SUMMARISED RECOMMENDATIONS AND CONCLUSIONS

Decision makers in South Africa, in an effort to economize on scarce resources, have implemented aggressive generic policies through mandatory drug substitution. However the variability with which generic medicines diffuse in South Africa and the complexity of generic policies pose a series of questions, many of which still remain unaccounted for. For instance, what are the determinants affecting generic drug competition, as well as what are the barriers to healthy competition posed by current health and pharmaceutical regulatory policies in South Africa? Secondly, how are generic prices influenced by the entry of new competitors and are prices of branded products sensitive to competition from generics and is this phenomenon specific to drug classes and treatment algorithms? Finally what is the impact of (pricing and reimbursement) regulation, market structure and product differentiation on generic competition, prices and market share?

The study results reveal that the number of generic entrants is not necessarily a predictor of lower drug prices in South Africa; hence the full benefit of generic drug competition may actually be negated due to an unintended consequence of SEP implementation. The irregularities between the high South African medicine prices and international prices warrant the implementation of future pharmaco-economic evaluations as well as possible interventions such as benchmarking and reference pricing in an effort to lower medicine prices. Further work is therefore required to identify the determinants of the price differentials between originator and generic medicines in South Africa, particularly in light of the newly proposed healthcare restructuring.

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## APPENDICES

## **APPENDIX 1**

**Data Collection: Private sector prices of originator and generic drugs sourced from the RSA Medicine Price Registry (10 June 2013)**

## Captopril

| Applicant Name                    | Proprietary Name    | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator / Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|-----------------------------------|---------------------|----------|------|-----------|---------------------------|--------------------|----------------------|-----------|-------------------|---------------------|
| Bristol Meyers Squibb             | Capoten             | 12.5mg   | TAB  | 90        | 198.27                    | 2.20               | Originator           | 20.16     | 0.22              | Not Avail           |
| Sandoz Sa (Pty) Ltd               | Capto-Hexal 12.5    | 12.5mg   | TAB  | 100       | 57.89                     | 0.58               | Generic              | 5.89      | 0.06              | Not Avail           |
|                                   |                     |          |      |           |                           |                    |                      |           |                   |                     |
| Bristol Meyers Squibb             | Capoten             | 25mg     | TAB  | 60        | 169.42                    | 2.82               | Originator           | 17.23     | 0.29              | 1.01                |
| Pharmacare Limited, Woodmead      | Capace              | 25mg     | TAB  | 60        | 70.00                     | 1.17               | Generic              | 7.12      | 0.12              | 1.01                |
| Pharmacare Limited, Woodmead      | Zapto               | 25mg     | TAB  | 60        | 23.82                     | 0.40               | Generic              | 2.42      | 0.04              | 1.01                |
| Sandoz Sa (Pty) Ltd               | Captohexal 25       | 25mg     | TAB  | 60        | 30.88                     | 0.51               | Generic              | 3.14      | 0.05              | 1.01                |
| Sandoz Sa (Pty) Ltd               | Sandoz Captopril 25 | 25mg     | TAB  | 60        | 23.59                     | 0.39               | Generic              | 2.40      | 0.04              | 1.01                |
| Adcock Ingram Limited             | Adco Captomax 25    | 25mg     | TAB  | 60        | 16.86                     | 0.28               | Generic              | 1.71      | 0.03              | 1.01                |
| Biotech Laboratories (Pty) Ltd    | Bio-Captopril 25    | 25mg     | TAB  | 60        | 16.67                     | 0.28               | Generic              | 1.69      | 0.03              | 1.01                |
| Mylan (Pty) Ltd                   | Mylan Captopril 25  | 25mg     | TAB  | 60        | 14.33                     | 0.24               | Generic              | 1.46      | 0.02              | 1.01                |
| Pharmacare Limited, Woodmead      | Capace              | 25mg     | TAB  | 60        | 70.00                     | 1.17               | Generic              | 7.12      | 0.12              | 1.01                |
|                                   |                     |          |      |           |                           |                    |                      |           |                   |                     |
| Pharmacare Limited, Woodmead      | Zapto               | 50mg     | TAB  | 60        | 46.81                     | 0.78               | Generic              | 4.76      | 0.08              | Not Avail           |
| Sandoz-Hexal (a Novartis company) | CaptoHexal          | 50mg     | TAB  | 60        | 57.89                     | 0.96               | Generic              | 5.89      | 0.10              | Not Avail           |
| Adcock Ingram Limited             | Adco Captomax 50    | 50mg     | TAB  | 60        | 19.45                     | 0.32               | Generic              | 1.98      | 0.03              | Not Avail           |
| Biotech Laboratories (Pty) Ltd    | Bio Captopril 50 mg | 50mg     | TAB  | 60        | 25.47                     | 0.42               | Generic              | 2.59      | 0.04              | Not Avail           |
| Mylan (Pty) Ltd                   | Mylan Captopril 50  | 50mg     | TAB  | 60        | 20.72                     | 0.35               | Generic              | 2.11      | 0.04              | Not Avail           |

## Enalapril

| Applicant Name               | Proprietary Name        | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|------------------------------|-------------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| MSD (Pty) Ltd                | Renitec 10              | 10mg     | TAB  | 28        | 43.47                     | 1.55               | Originator          | 4.42      | 0.16              | 0.01                |
| Sandoz Sa (Pty) Ltd          | Hr-Enalapril Mealate 10 | 10mg     | TAB  | 30        | 39.76                     | 1.33               | Generic             | 4.04      | 0.13              | 0.01                |
| Thebe Medicare (Pty) Ltd     | Envas 10                | 10mg     | TAB  | 30        | 36.03                     | 1.20               | Generic             | 3.66      | 0.12              | 0.01                |
| Cipla Medpro (Pty) Ltd       | Ciplatec 10             | 10mg     | TAB  | 30        | 41.37                     | 1.38               | Generic             | 4.21      | 0.14              | 0.01                |
| Pharma Dynamics (Pty) Ltd    | Enap 10 Mg              | 10mg     | TAB  | 30        | 39.88                     | 1.33               | Generic             | 4.06      | 0.14              | 0.01                |
| Pharmacare Limited, Woodmead | Pharmapress             | 10mg     | TAB  | 30        | 41.68                     | 1.39               | Generic             | 4.24      | 0.14              | 0.01                |
| Ranbaxy (S.A.) (Pty) Ltd     | Alapren 10 Tablets      | 10mg     | TAB  | 28        | 28.45                     | 1.02               | Generic             | 2.89      | 0.10              | 0.01                |
| Ranbaxy (S.A.)(Pty) Ltd      | Enalapril Unicorn 10    | 10mg     | TAB  | 28        | 34.20                     | 1.22               | Generic             | 3.48      | 0.12              | 0.01                |
|                              |                         |          |      |           |                           |                    |                     |           |                   |                     |
| MSD (Pty) Ltd                | Renitec 2 5             | 2.5mg    | TAB  | 14        | 20.15                     | 1.44               | Originator          | 2.05      | 0.15              | Not Avail           |
|                              |                         |          |      |           |                           |                    |                     |           |                   |                     |
| MSD (Pty) Ltd                | Renitec 20              | 20mg     | TAB  | 28        | 79.57                     | 2.84               | Originator          | 8.09      | 0.29              | 0.01                |
| Sandoz Sa (Pty) Ltd          | Hr-Enalapril Maleate 20 | 20mg     | TAB  | 30        | 67.34                     | 2.24               | Generic             | 6.85      | 0.23              | 0.01                |
| Pharma Dynamics (Pty) Ltd    | Enap 20 Mg              | 20mg     | TAB  | 30        | 70.03                     | 2.33               | Generic             | 7.12      | 0.24              | 0.01                |
| Pharmacare Limited, Woodmead | Pharmapress             | 20mg     | TAB  | 30        | 70.66                     | 2.36               | Generic             | 7.19      | 0.24              | 0.01                |
| Ranbaxy (S.A.) (Pty) Ltd     | Alapren 20 Tablets      | 20mg     | TAB  | 28        | 37.71                     | 1.35               | Generic             | 3.84      | 0.14              | 0.01                |
| Ranbaxy (S.A.)(Pty) Ltd      | Enalapril Unicorn 20    | 20mg     | TAB  | 28        | 54.72                     | 1.95               | Generic             | 5.57      | 0.20              | 0.01                |
| Sandoz Sa (Pty) Ltd          | Ciplatec                | 20mg     | TAB  | 30        | 70.13                     | 2.34               | Generic             | 7.13      | 0.24              | 0.01                |
|                              |                         |          |      |           |                           |                    |                     |           |                   |                     |
| MSD (Pty) Ltd                | Renitec 5               | 5mg      | TAB  | 28        | 31.39                     | 1.12               | Originator          | 3.19      | 0.11              | Not Avail           |
| Sandoz Sa (Pty) Ltd          | Hr-Enalapril Mealate 5  | 5mg      | TAB  | 30        | 28.35                     | 0.95               | Generic             | 2.88      | 0.10              | Not Avail           |
| Thebe Medicare (Pty) Ltd     | Envas 5                 | 5mg      | TAB  | 30        | 24.51                     | 0.82               | Generic             | 2.49      | 0.08              | Not Avail           |
| Cipla Medpro (Pty) Ltd       | Ciplatec 5.0            | 5mg      | TAB  | 30        | 28.02                     | 0.93               | Generic             | 2.85      | 0.09              | Not Avail           |
| Pharma Dynamics (Pty) Ltd    | Enap 5 Mg               | 5mg      | TAB  | 30        | 27.88                     | 0.93               | Generic             | 2.84      | 0.10              | Not Avail           |
| Pharmacare Limited, Woodmead | Pharmapress             | 5mg      | TAB  | 30        | 27.91                     | 0.93               | Generic             | 2.84      | 0.09              | Not Avail           |
| Ranbaxy (S.A.) (Pty) Ltd     | Alapren 5 Tablets       | 5mg      | TAB  | 28        | 16.54                     | 0.59               | Generic             | 1.68      | 0.06              | Not Avail           |

**Cilazapril**

| <b>Applicant Name</b>    | <b>Proprietary Name</b> | <b>Strength</b> | <b>Unit</b> | <b>Pack Size</b> | <b>Single Exit Price (Rands)</b> | <b>Unit Price (Rands)</b> | <b>Originator/ Generic</b> | <b>SEP(US\$)</b> | <b>Unit Price (US\$)</b> | <b>IRP(US\$)Unit Price</b> |
|--------------------------|-------------------------|-----------------|-------------|------------------|----------------------------------|---------------------------|----------------------------|------------------|--------------------------|----------------------------|
| Roche Products (Pty) Ltd | Inhibace                | 5mg             | TAB         | 28               | 156.63                           |                           | Originator                 | 15.93            | 0.10                     | Not Avail                  |

## Perindopril

| Applicant Name                                  | Proprietary Name        | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|---|-------------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Servier Laboratories SA (Pty) Ltd               | Coversyl 10 mg          | 10mg     | TAB  | 30        | 206.97                    | 6.90               | Originator          | 21.05     | 0.70              | Not Avail           |
| Biogaran South Africa (Pty) Ltd                 | Prexum 10 mg            | 10mg     | TAB  | 30        | 125.63                    | 4.19               | Generic             | 12.78     | 0.42              | Not Avail           |
|   |                         |          |      |           |                           |                    |                     |           |                   |                     |
| Servier Laboratories SA (Pty) Ltd               | Preterax                | 2mg      | TAB  | 30        | 182.69                    | 6.09               | Originator          | 18.58     | 0.62              | Not Avail           |
| Specpharm (Pty) Ltd                             | Spec-Perindopril Plus 2 | 2mg      | TAB  | 30        | 84.70                     | 2.82               | Generic             | 8.61      | 0.29              | Not Avail           |
|   |                         |          |      |           |                           |                    |                     |           |                   |                     |
| Servier Laboratories SA (Pty) Ltd               | Coversyl 4 mg           | 4mg      | TAB  | 30        | 136.75                    | 4.56               | Originator          | 13.91     | 0.46              | 0.04                |
| Aurobindo Pharma (Pty) Ltd                      | Auro Perindopril 4 mg   | 4mg      | TAB  | 30        | 75.96                     | 2.53               | Generic             | 7.73      | 0.27              | 0.04                |
| Aurobindo Pharma (Pty) Ltd                      | Bindace 4 mg            | 4mg      | TAB  | 30        | 76.18                     | 2.54               | Generic             | 7.75      | 0.26              | 0.04                |
| Biogaran South Africa (Pty) Ltd                 | Prexum                  | 4mg      | TAB  | 30        | 97.64                     | 3.25               | Generic             | 9.93      | 0.33              | 0.04                |
| Biogaran South Africa (Pty) Ltd                 | Vectoryl 4 mg           | 4mg      | TAB  | 30        | 97.26                     | 3.24               | Generic             | 9.89      | 0.33              | 0.04                |
| Biogaran South Africa (Pty) Ltd                 | Perindopril Unicorn 4   | 4mg      | TAB  | 30        | 76.59                     | 2.55               | Generic             | 7.79      | 0.26              | 0.04                |
| Cipla Life Sciences (Pty) Ltd                   | Cipla-Perindopril 4 Mg  | 4mg      | TAB  | 30        | 118.97                    | 3.97               | Generic             | 12.10     | 0.40              | 0.04                |
| Cipla Medpro (Pty)Ltd                           | Ciplasyl 4              | 4mg      | TAB  | 30        | 76.60                     | 2.55               | Generic             | 7.79      | 0.26              | 0.04                |
| Glenmark Pharmaceuticals South Africa (Pty) Ltd | Acti-Prex               | 4mg      | TABS | 30        | 74.74                     | 2.49               | Generic             | 7.60      | 0.25              | 0.04                |
| Pharma Dynamics (Pty) Ltd                       | Pearinda 4              | 4mg      | TAB  | 30        | 76.64                     | 2.55               | Generic             | 7.79      | 0.26              | 0.04                |
| Ranbaxy (S.A.) (Pty) Ltd                        | Ran-Perindopril 4       | 4mg      | TAB  | 30        | 37.49                     | 1.32               | Generic             | 3.81      | 0.13              | 0.04                |
| Specpharm (Pty) Ltd                             | Spec-Perindopril 4      | 4mg      | TAB  | 30        | 80.00                     | 2.66               | Generic             | 8.14      | 0.27              | 0.04                |
| Specpharm (Pty) Ltd                             | Spec-Perindopril Plus 4 | 4mg      | TAB  | 30        | 121.00                    | 4.03               | Generic             | 12.31     | 0.41              | 0.04                |
| Thebe Medicare (Pty) Ltd                        | Acesyl 4 Mg             | 4mg      | TAB  | 30        | 91.93                     | 3.06               | Generic             | 9.35      | 0.31              | 0.04                |
| Zydus Healthcare S.A. (Pty) Ltd                 | Zydus Perindopril 4 mg  | 4mg      | TAB  | 30        | 88.92                     | 2.96               | Generic             | 9.04      | 0.30              | 0.04                |
|   |                         |          |      |           |                           |                    |                     |           |                   |                     |
| Aurobindo Pharma (Pty) Ltd                      | Auro Perindopril 8 mg   | 8mg      | TAB  | 30        | 115.32                    | 3.84               | Generic             | 11.73     | 0.39              | Not Avail           |
| Aurobindo Pharma (Pty) Ltd                      | Bindace 8 mg            | 8mg      | TAB  | 30        | 116.38                    | 3.88               | Generic             | 11.84     | 0.39              | Not Avail           |
| Biogaran South Africa (Pty) Ltd                 | Vectoryl 8Mg            | 8mg      | TAB  | 30        | 110.10                    | 3.67               | Generic             | 11.20     | 0.37              | Not Avail           |
| Biogaran South Africa (Pty) Ltd                 | Perindopril Unicorn 8   | 8mg      | TAB  | 30        | 115.79                    | 3.86               | Generic             | 11.78     | 0.39              | Not Avail           |
| Cipla Life Sciences (Pty) Ltd                   | Cipla-Perindopril 8 Mg  | 8mg      | TAB  | 30        | 118.98                    | 3.97               | Generic             | 12.10     | 0.40              | Not Avail           |
| Cipla Medpro (Pty) Ltd                          | Ciplasyl 8              | 8mg      | TAB  | 30        | 109.50                    | 3.65               | Generic             | 11.14     | 0.37              | Not Avail           |
| Pharma Dynamics (Pty) Ltd                       | Pearinda 8              | 8mg      | TAB  | 30        | 109.50                    | 3.65               | Generic             | 11.14     | 0.37              | Not Avail           |
| Specpharm (Pty) Ltd                             | Spec-Perindopril 8      | 8mg      | TAB  | 30        | 115.00                    | 3.83               | Generic             | 11.70     | 0.39              | Not Avail           |

## Quinapril

| Applicant Name                   | Proprietary Name | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|----------------------------------|------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Pfizer Laboratories (Pty) Ltd    | Accupril 10Mg    | 10mg     | TAB  | 28        | 116.21                    | 4.15               | Originator          | 11.82     | 0.42              | Not Avail           |
| Mylan (Pty) Ltd                  | Quinagen         | 10mg     | TAB  | 30        | 69.12                     | 2.30               | Generic             | 7.03      | 0.23              | Not Avail           |
| Pharmacia South Africa (Pty) Ltd | Accumax 10 mg    | 10mg     | TAB  | 30        | 40.21                     | 1.34               | Generic             | 4.09      | 0.14              | Not Avail           |
|                                  |                  |          |      |           |                           |                    |                     |           |                   |                     |
| Pfizer Laboratories (Pty) Ltd    | Accupril 20Mg    | 20mg     | TAB  | 28        | 163.78                    | 5.85               | Originator          | 16.66     | 0.59              | Not Avail           |
| Mylan (Pty) Ltd                  | Quinagen         | 20mg     | TAB  | 30        | 104.37                    | 3.48               | Generic             | 10.61     | 0.35              | Not Avail           |
| Pharmacare Limited, Woodmead     | Quinaspen        | 20mg     | TAB  | 30        | 69.67                     | 2.32               | Generic             | 7.09      | 0.24              | Not Avail           |
| Pharmacia South Africa (Pty) Ltd | Accumax 20 mg    | 20mg     | TAB  | 30        | 60.98                     | 2.03               | Generic             | 6.20      | 0.21              | Not Avail           |
|                                  |                  |          |      |           |                           |                    |                     |           |                   |                     |
| Pfizer Laboratories (Pty) Ltd    | Accupril 40Mg    | 40mg     | TAB  | 28        | 175.93                    | 6.28               | Originator          | 17.89     | 0.64              | Not Avail           |
| Mylan Pty Ltd                    | Quinagen         | 40mg     | TAB  | 30        | 109.45                    | 3.65               | Generic             | 11.13     | 0.37              | Not Avail           |
|                                  |                  |          |      |           |                           |                    |                     |           |                   |                     |
| Pfizer Laboratories (Pty) Ltd    | Accupril 5Mg     | 5mg      | TAB  | 28        | 110.41                    | 3.94               | Originator          | 11.23     | 0.40              | Not Avail           |
| Mylan (Pty) Ltd                  | Quinagen         | 5mg      | TAB  | 30        | 55.89                     | 1.86               | Generic             | 5.68      | 0.19              | Not Avail           |

## Lisinopril

| Applicant Name                                     | Proprietary Name         | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|--|--------------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Astrazeneca Pharmaceuticals (Pty) Ltd- Sunninghill | Zestril 10               | 10mg     | TAB  | 30        | 83.90                     | 2.80               | Originator          | 8.53      | 0.28              | Not avail           |
| Ranbaxy (SA) (Pty) Ltd                             | Sinopren 10              | 10mg     | TAB  | 30        | 20.50                     | 0.68               | Generic             | 2.09      | 0.07              | Not avail           |
| Ranbaxy(SA)(Pty)Ltd                                | Simayla Lisinopril 10    | 10mg     | TAB  | 30        | 49.54                     | 1.65               | Generic             | 5.04      | 0.167             | Not avail           |
| Sandoz Sa (Pty) Ltd                                | Hexal-Lisinopril 10      | 10mg     | TAB  | 30        | 52.11                     | 1.74               | Generic             | 5.30      | 0.18              | Not avail           |
| Xixia Pharmaceuticals (Pty) Ltd                    | Zeprosil 10Mg            | 10mg     | TAB  | 30        | 41.10                     | 1.37               | Generic             | 4.18      | 0.14              | Not avail           |
| Adcock Ingram Limited                              | Adco-Zetomax 10 mg       | 10mg     | TAB  | 30        | 52.14                     | 1.74               | Generic             | 5.30      | 0.18              | Not avail           |
| Aurobindo Pharma (Pty) Ltd                         | Lisinozide 10 mg         | 10mg     | TAB  | 30        | 53.07                     | 1.77               | Generic             | 5.40      | 0.18              | Not avail           |
| Aurobindo Pharma (Pty) Ltd                         | Lizro 10 mg              | 10mg     | TAB  | 30        | 52.11                     | 1.74               | Generic             | 5.30      | 0.18              | Not avail           |
| Austell Laboratories (Pty) Ltd                     | Austell-Lisinopril 10 mg | 10mg     | TAB  | 30        | 20.50                     | 0.68               | Generic             | 2.09      | 0.07              | Not avail           |
| Cipla Medpro (Pty) Ltd                             | Cipla Lisinopril 10      | 10mg     | TAB  | 30        | 51.28                     | 1.71               | Generic             | 5.22      | 0.17              | Not avail           |
|  |                          |          |      |           |                           |                    |                     |           |                   |                     |
| Astrazeneca Pharmaceuticals (Pty) Ltd- Sunninghill | Zestril 20               | 20mg     | TAB  | 30        | 142.63                    | 4.75               | Originator          | 14.51     | 0.48              | Not avail           |
| Ranbaxy (SA) (Pty) Ltd                             | Sinopren 20 Tab          | 20mg     | TAB  | 30        | 20.50                     | 0.68               | Generic             | 2.09      | 0.07              | Not avail           |
| Ranbaxy(SA)(Pty)Ltd                                | Simayla Lisinopril 20    | 20mg     | TAB  | 30        | 70.65                     | 2.36               | Generic             | 7.19      | 0.24              | Not avail           |
| Sandoz Sa (Pty) Ltd                                | Hexal-Lisinopril 20      | 20mg     | TAB  | 30        | 82.98                     | 2.77               | Generic             | 8.44      | 0.28              | Not avail           |
| Sandoz Sa (Pty) Ltd                                | Zemax                    | 20mg     | TAB  | 30        | 81.12                     | 2.70               | Generic             | 8.25      | 0.28              | Not avail           |
| Xixia Pharmaceuticals (Pty) Ltd                    | Zeprosil 20Mg            | 20mg     | TAB  | 30        | 65.47                     | 2.18               | Generic             | 6.66      | 0.22              | Not avail           |
| Adcock Ingram Limited                              | Adco-Zetomax 20 Mg       | 20mg     | TAB  | 30        | 72.70                     | 2.42               | Generic             | 7.39      | 0.26              | Not avail           |
| Aurobindo Pharma (Pty) Ltd                         | Lisinozide 20 mg         | 20mg     | TAB  | 30        | 86.84                     | 2.89               | Generic             | 8.83      | 0.29              | Not avail           |
| Aurobindo Pharma (Pty) Ltd                         | Lizro 20 mg              | 20mg     | TAB  | 30        | 71.28                     | 2.38               | Generic             | 7.25      | 0.24              | Not avail           |
| Austell Laboratories (Pty) Ltd                     | Austell Lisinopril       | 20mg     | TAB  | 30        | 66.24                     | 2.21               | Generic             | 6.74      | 0.22              | Not avail           |
| Austell Laboratories (Pty) Ltd                     | Austell-Lisinopril 20 mg | 20mg     | TAB  | 30        | 20.50                     | 0.68               | Generic             | 2.09      | 0.07              | Not avail           |
| Be-Tabs Pharmaceuticals (Pty) Ltd                  | Lysin 20                 | 20mg     | TAB  | 30        | 65.65                     | 2.19               | Generic             | 6.68      | 0.22              | Not avail           |
| Camox Pharmaceuticals (Pty) Ltd                    | Apex-Lisinopril 20 mg    | 20mg     | TAB  | 30        | 70.35                     | 2.35               | Generic             | 7.15      | 0.24              | Not avail           |
|  |                          |          |      |           |                           |                    |                     |           |                   |                     |
| Astrazeneca Pharmaceuticals (Pty) Ltd- Sunninghill | Zestril 5                | 5mg      | TAB  | 30        | 58.73                     | 1.96               | Originator          | 5.97      | 0.20              | Not avail           |
| Ranbaxy (SA) (Pty) Ltd                             | Sinopren 5 Tablets       | 5mg      | TAB  | 30        | 20.50                     | 0.68               | Generic             | 2.09      | 0.07              | Not avail           |
| Sandoz Sa (Pty) Ltd                                | Hexal-Lisinopril 5       | 5mg      | TAB  | 30        | 38.59                     | 1.29               | Generic             | 3.93      | 0.13              | Not avail           |
| Xixia Pharmaceuticals (Pty) Ltd                    | Zeprosil 5Mg             | 5mg      | TAB  | 30        | 31.86                     | 1.06               | Generic             | 3.24      | 0.11              | Not avail           |
| Zydus Healthcare SA (Pty) Ltd                      | Simayla Lisinopril       | 5mg      | TAB  | 30        | 33.80                     | 1.13               | Generic             | 3.44      | 0.11              | Not avail           |
| Adcock Ingram Limited                              | Adco-Zetomax 5 Mg        | 5mg      | TAB  | 30        | 38.64                     | 1.29               | Generic             | 3.93      | 0.13              | Not avail           |
| Aurobindo Pharma (Pty) Ltd                         | Lizro 5 mg               | 5mg      | TAB  | 30        | 38.50                     | 1.28               | Generic             | 3.92      | 0.17              | Not avail           |

## Lisinopril

| Applicant Name                    | Proprietary Name   | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|-----------------------------------|--------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Be-Tabs Pharmaceuticals (Pty) Ltd | Lysin 5            | 5mg      | TAB  | 30        | 37.27                     | 1.24               | Generic             | 3.79      | 0.13              | Not avail           |
| Cipla Medpro (Pty) Ltd            | Cipla Lisinopril 5 | 5mg      | TAB  | 30        | 35.82                     | 1.19               | Generic             | 3.64      | 0.12              | Not avail           |

## Nifedipine

| Applicant Name                 | Proprietary Name      | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|--------------------------------|-----------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Biotech Laboratories (Pty) Ltd | Bio-Nifedipine 10     | 10mg     | CAP  | 250       | 61.20                     | 0.24               | Generic             | 6.22      | 0.02              | Not Avail           |
| Pharmacare Limited, Woodmead   | Cardifen              | 10mg     | CAP  | 100       | 105.78                    | 1.06               | Generic             | 10.76     | 0.11              | Not Avail           |
| Pharmacare Limited, Woodmead   | Cardifen              | 10mg     | CAP  | 250       | 227.86                    | 0.91               | Generic             | 23.17     | 0.09              | Not Avail           |
| Sandoz Sa (Pty) Ltd            | Rolab-Nifedipine      | 10mg     | CAP  | 100       | 124.74                    | 1.25               | Generic             | 12.69     | 0.13              | Not Avail           |
| Sandoz Sa (Pty) Ltd            | Nifedalat 10Mg        | 10mg     | CAP  | 100       | 74.48                     | 0.74               | Generic             | 7.57      | 0.08              | Not Avail           |
|                                |                       |          |      |           |                           |                    |                     |           |                   |                     |
| Bayer (Pty) Ltd                | Adalat Retard 20Mg    | 20mg     | TAB  | 60        | 551.89                    | 9.20               | Originator          | 56.13     | 0.93              | 0.02                |
| Bayer (Pty) Ltd                | Adalat Retard 20Mg    | 20mg     | TAB  | 28        | 189.16                    | 6.76               | Originator          | 19.24     | 0.69              | 0.02                |
| Adcock Ingram Limited          | Adco Vascard 20 Sr    | 20mg     | CAP  | 60        | 37.82                     | 0.63               | Generic             | 3.84      | 0.06              | 0.02                |
| Cipla Life Sciences (Pty) Ltd  | Cipalat Retard        | 20mg     | TAB  | 60        | 50.64                     | 0.84               | Generic             | 5.15      | 0.10              | 0.02                |
| Sandoz Sa (Pty) Ltd            | Nifedalat 20 Sr       | 20mg     | SRT  | 60        | 50.25                     | 0.84               | Generic             | 5.11      | 0.09              | 0.02                |
| Adcock Ingram Limited          | Adco Vascard 20 Sr    | 20mg     | CAP  | 60        | 37.82                     | 0.63               | Generic             | 3.85      | 0.06              | 0.02                |
|                                |                       |          |      |           |                           |                    |                     |           |                   |                     |
| Bayer (Pty) Ltd                | Adalat XI Tabs 30Mg   | 30mg     | TAB  | 28        | 234.58                    | 8.38               | Originator          | 23.86     | 0.85              | Not Avail           |
| Adcock Ingram Limited          | Adco-Vascard 30 Sr    | 30mg     | SRC  | 30        | 169.59                    | 5.65               | Originator          | 17.253    | 0.57              | Not Avail           |
| Biotech Laboratories (Pty) Ltd | Bio Nifedipine XL 30  | 30mg     | TAB  | 30        | 138.55                    | 4.62               | Generic             | 14.10     | 0.47              | Not Avail           |
| Pharma Dynamics (Pty) Ltd      | Fedaloc 30Mg Sr       | 30mg     | TAB  | 30        | 146.59                    | 4.89               | Generic             | 14.91     | 0.50              | Not Avail           |
| Specpharm (Pty) Ltd            | Macorel 30 Sr         | 30mg     | TAB  | 30        | 138.52                    | 4.62               | Generic             | 14.09     | 0.47              | Not Avail           |
| Specpharm (Pty) Ltd            | Spec Nifedipine 30 Sr | 30mg     | TAB  | 30        | 130.23                    | 4.34               | Generic             | 13.24     | 0.44              | Not Avail           |
|                                |                       |          |      |           |                           |                    |                     |           |                   |                     |
| Biotech Laboratories (Pty) Ltd | Bio-Nifedipine 5      | 5mg      | CAP  | 100       | 43.48                     | 0.43               | Generic             | 4.42      | 0.04              | Not Avail           |
| Pharmacare Limited, Woodmead   | Cardifen              | 5mg      | CAP  | 100       | 119.00                    | 1.19               | Generic             | 12.10     | 0.12              | Not Avail           |
|                                |                       |          |      |           |                           |                    |                     |           |                   |                     |
| Bayer (Pty) Ltd                | Adalat XI Tabs 60Mg   | 60mg     | TAB  | 28        | 324.83                    | 11.60              | Originator          | 33.04     | 1.18              | Not Avail           |
| Biotech Laboratories (Pty) Ltd | Bio Nifedipine XL 60  | 60mg     | TAB  | 30        | 204.06                    | 6.80               | Generic             | 20.75     | 0.69              | Not Avail           |
| Pharma Dynamics (Pty) Ltd      | Fedaloc 60Mg Sr       | 60mg     | TAB  | 30        | 215.90                    | 7.20               | Generic             | 21.96     | 0.73              | Not Avail           |
| Specpharm (Pty) Ltd            | Macorel 60 Sr         | 60mg     | TAB  | 30        | 204.32                    | 6.81               | Generic             | 20.78     | 0.69              | Not Avail           |
| Specpharm (Pty) Ltd            | Spec Nifedipine 60 Sr | 60mg     | TAB  | 30        | 192.53                    | 6.42               | Generic             | 19.58     | 0.65              | Not Avail           |

## Amlodipine

| Applicant Name                                  | Proprietary Name                       | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|---|--|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Pfizer Laboratories (Pty) Ltd                   | Norvasc Tablets 10Mg                   | 10mg     | TAB  | 30        | 212.82                    | 7.09               | Originator          | 21.64     | 0.72              | 0.01                |
| Be-Tabs Pharmaceuticals (Pty) Ltd               | Calbloc                                | 10mg     | TAB  | 30        | 96.44                     | 3.21               | Generic             | 9.818     | 0.32              | 0.01                |
| Brimpharm Sa (Pty) Ltd                          | Amlosyn 10 Mg                          | 10mg     | TAB  | 30        | 159.65                    | 5.32               | Generic             | 16.23     | 0.544             | 0.01                |
| Cipla Medpro (Pty) Ltd                          | Ciplavasc 10                           | 10mg     | TAB  | 30        | 111.10                    | 3.70               | Generic             | 11.30     | 0.38              | 0.01                |
| Dr Reddy's Laboratories (Pty) Ltd               | Amlate 10                              | 10mg     | TAB  | 30        | 109.97                    | 3.67               | Generic             | 11.18     | 0.37              | 0.01                |
| Dr Reddy's Laboratories (Pty) Ltd               | Stamlo 10                              | 10mg     | TAB  | 30        | 111.93                    | 3.73               | Generic             | 11.38     | 0.38              | 0.01                |
| Gulf Drug Company (Pty) Ltd                     | Gulf Amlodipine 10                     | 10mg     | TAB  | 30        | 62.70                     | 2.09               | Generic             | 6.38      | 0.21              | 0.01                |
| Pharma Dynamics (Pty) Ltd                       | Amloc 10 Mg                            | 10mg     | TAB  | 30        | 108.31                    | 3.61               | Generic             | 11.023    | 0.37              | 0.01                |
| Pharma Dynamics (Pty) Ltd                       | Pharma Dynamics Amlodipine Besylate 10 | 10mg     | TAB  | 30        | 92.40                     | 3.08               | Generic             | 9.39      | 0.31              | 0.01                |
| Pharmacare Limited, Woodmead                    | Almadin Tabs 10Mg 3                    | 10mg     | TAB  | 30        | 95.64                     | 3.19               | Generic             | 9.73      | 0.32              | 0.01                |
| Pharmacia South Africa (Pty) Ltd                | Lomanor 10 mg                          | 10mg     | TAB  | 30        | 97.76                     | 3.26               | Generic             | 9.94      | 0.34              | 0.01                |
| Sandoz Sa (Pty) Ltd                             | Sandoz-Amlodipine 10                   | 10mg     | TAB  | 30        | 109.45                    | 3.65               | Generic             | 11.13     | 0.37              | 0.01                |
| Sanofi-Aventis Sa (Pty) Ltd                     | Amlodipine-Winthrop                    | 10mg     | TAB  | 30        | 109.34                    | 3.64               | Generic             | 11.12     | 0.37              | 0.01                |
| Unichem SA (Pty) Ltd                            | Pendine 10                             | 10mg     | TAB  | 30        | 92.26                     | 3.07               | Generic             | 9.38      | 0.31              | 0.01                |
| Zydus Healthcare S.A (Pty) Ltd                  | Amlodac 10 Tablets                     | 10mg     | TAB  | 30        | 108.06                    | 3.60               | Generic             | 10.99     | 0.37              | 0.01                |
| Accord-Healthcare (Pty) Ltd                     | Amtas 10                               | 10mg     | TAB  | 30        | 111.74                    | 3.72               | Generic             | 11.36     | 0.38              | 0.01                |
| Akacia Healthcare (Pty) Ltd                     | Norcard 10                             | 10mg     | TAB  | 30        | 108.06                    | 3.60               | Generic             | 10.99     | 0.37              | 0.01                |
| Aurobindo Pharma (Pty) Ltd                      | Keysal 10 mg                           | 10mg     | TAB  | 30        | 102.03                    | 3.40               | Generic             | 10.38     | 0.35              | 0.01                |
| Aurobindo Pharma (Pty) Ltd                      | Aprate 10 mg                           | 10mg     | TAB  | 30        | 99.85                     | 3.33               | Generic             | 10.15     | 0.34              | 0.01                |
| Austell Laboratories (Pty) Ltd                  | Austell-Amlodipine                     | 10mg     | TAB  | 30        | 107.74                    | 3.59               | Generic             | 10.96     | 0.37              | 0.01                |
|   |  |          |      |           |                           |                    |                     |           |                   |                     |
| Pfizer Laboratories (Pty) Ltd                   | Norvasc Tablets 5Mg                    | 5mg      | TAB  | 30        | 151.61                    | 5.05               | Originator          | 15.42     | 0.51              | 0.01                |
| Be-Tabs Pharmaceuticals (Pty) Ltd               | Calbloc                                | 5mg      | TAB  | 30        | 60.33                     | 2.01               | Generic             | 6.14      | 0.20              | 0.01                |
| Brimpharm Sa (Pty) Ltd                          | Amlosyn 5,0 Mg                         | 5mg      | TAB  | 30        | 113.72                    | 3.79               | Generic             | 11.57     | 0.39              | 0.01                |
| Cipla Medpro (Pty) Ltd                          | Ciplavasc 5                            | 5mg      | TAB  | 30        | 71.32                     | 2.38               | Generic             | 7.25      | 0.24              | 0.01                |
| Dezzo Trading 392 (Pty) Limited T/A Indo Pharma | Indo Amlodipine-5                      | 5mg      | TAB  | 30        | 55.44                     | 1.85               | Generic             | 5.64      | 0.19              | 0.01                |
| Dr Reddy's Laboratories (Pty) Ltd               | Amlate 5                               | 5mg      | TAB  | 30        | 67.40                     | 2.25               | Generic             | 6.85      | 0.23              | 0.01                |
| Dr Reddy's Laboratories (Pty) Ltd               | Stamlo 5                               | 5mg      | TAB  | 30        | 71.84                     | 2.39               | Generic             | 7.31      | 0.24              | 0.01                |
| Gulf Drug Company (Pty) Ltd                     | Gulf Amlodipine 5                      | 5mg      | TAB  | 30        | 35.34                     | 1.18               | Generic             | 3.59      | 0.12              | 0.01                |

## Amlodipine

| Applicant Name                   | Proprietary Name                      | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|----------------------------------|---------------------------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Pharma Dynamics (Pty) Ltd        | Amloc 5 Mg                            | 5mg      | TAB  | 30        | 77.17                     | 2.57               | Generic             | 7.84      | 0.26              | 0.01                |
| Pharma Dynamics (Pty) Ltd        | Pharma Dynamics Amlodipine Besylate 5 | 5mg      | TAB  | 30        | 61.50                     | 2.05               | Generic             | 6.25      | 0.21              | 0.01                |
| Pharmacare Limited, Woodmead     | Almadin Tabs 5Mg                      | 5mg      | TAB  | 30        | 61.43                     | 2.05               | Generic             | 6.25      | 0.21              | 0.01                |
| Pharmacia South Africa (Pty) Ltd | Lomanor 5 mg                          | 5mg      | TAB  | 30        | 63.80                     | 2.13               | Generic             | 6.49      | 0.22              | 0.01                |
| Pharmascrypt Pharmaceuticals Ltd | Klodip-5                              | 5mg      | TAB  | 30        | 63.78                     | 2.13               | Generic             | 6.49      | 0.22              | 0.01                |
| Sandoz Sa (Pty) Ltd              | Sandoz-Amlodipine 5                   | 5mg      | TAB  | 30        | 70.21                     | 2.34               | Generic             | 7.14      | 0.241             | 0.01                |
| Sanofi-Aventis Sa (Pty) Ltd      | Amlodipine-Winthrop                   | 5mg      | TAB  | 30        | 77.90                     | 2.60               | Generic             | 7.92      | 0.26              | 0.01                |
| Thebe Medicare (Pty) Ltd         | Norcard 5                             | 5mg      | TAB  | 30        | 63.33                     | 2.11               | Generic             | 6.44      | 0.21              | 0.01                |
| Unichem SA (Pty) Ltd             | Pendine 5                             | 5mg      | TAB  | 30        | 58.22                     | 1.94               | Generic             | 5.92      | 0.19              | 0.01                |
| Zydus Healthcare S.A (Pty) Ltd   | Amlodac 5 Tablets                     | 5mg      | TAB  | 30        | 67.00                     | 2.23               | Generic             | 6.81      | 0.23              | 0.01                |
| Accord-Healthcare (Pty) Ltd      | Amtas 5                               | 5mg      | TAB  | 30        | 71.71                     | 2.39               | Generic             | 7.29      | 0.24              | 0.01                |
| Aurobindo Pharma (Pty) Ltd       | Keysal 5 mg                           | 5mg      | TAB  | 30        | 65.49                     | 2.18               | Generic             | 6.66      | 0.22              | 0.01                |
| Aurobindo Pharma (Pty) Ltd       | Aprate 5 mg                           | 5mg      | TAB  | 30        | 59.98                     | 2.00               | Generic             | 6.10      | 0.20              | 0.010               |
| Austell Laboratories (Pty) Ltd   | Austell-Amlodipine 5mg                | 5mg      | TAB  | 30        | 67.66                     | 2.26               | Generic             | 6.88      | 0.23              | 0.01                |

## Felodipine

| Applicant Name                                     | Proprietary Name   | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|--|--------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Astrazeneca Pharmaceuticals (Pty) Ltd- Sunninghill | Plendil            | 5mg      | SRT  | 30        | 257.44                    | 8.58               | Originator          | 26.18     | 0.87              | Not Avail           |
| Sandoz SA (Pty) Ltd                                | Felodipine-Hexal 5 | 5mg      | SRT  | 30        | 109.44                    | 3.65               | Generic             | 11.13     | 0.37              | Not Avail           |

## Propranolol

| Applicant Name                                     | Proprietary Name   | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator / Generic | SEP(US \$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|--|--------------------|----------|------|-----------|---------------------------|--------------------|----------------------|------------|-------------------|---------------------|
| Astrazeneca Pharmaceuticals (Pty) Ltd- Sunninghill | Inderal 10         | 10mg     | TAB  | 50        | 79.61                     | 1.59               | Originator           | 8.10       | 0.16              | 0.05                |
| Be-Tabs Pharmaceuticals (Pty) Ltd                  | Prodorol           | 10mg     | TAB  | 1000      | 101.35                    | 0.10               | Generic              | 10.31      | 0.01              | 0.05                |
| Gulf Drug Company                                  | Indoblok 10        | 10mg     | TAB  | 1000      | 78.18                     | 0.08               | Generic              | 7.95       | 0.01              | 0.05                |
| Pharmacare Limited, Woodmead                       | Purbloka           | 10mg     | TAB  | 50        | 7.57                      | 0.15               | Generic              | 0.77       | 0.02              | 0.05                |
| Pharmacare Limited, Woodmead                       | Purbloka           | 10mg     | TAB  | 1000      | 151.61                    | 0.15               | Generic              | 15.42      | 0.01              | 0.05                |
| Sandoz Sa (Pty) Ltd                                | Sandoz Propranolol | 10mg     | TAB  | 50        | 5.68                      | 0.11               | Generic              | 0.582      | 0.01              | 0.05                |
|  |                    |          |      |           |                           |                    |                      |            |                   |                     |
| Astrazeneca Pharmaceuticals (Pty) Ltd- Sunninghill | Inderal La 160     | 160mg    | CAP  | 28        | 254.29                    | 9.08               | Originator           | 25.86      | 0.92              | Not Avail           |
|  |                    |          |      |           |                           |                    |                      |            |                   |                     |
| Astrazeneca Pharmaceuticals (Pty) Ltd- Sunninghill | Inderal 40         | 40mg     | TAB  | 50        | 199.28                    | 3.99               | Originator           | 20.27      | 0.41              | 0.01                |
| Be-Tabs Pharmaceuticals (Pty) Ltd                  | Prodorol           | 40mg     | TAB  | 500       | 92.29                     | 0.18               | Generic              | 9.39       | 0.02              | 0.01                |
| Gulf Drug Company                                  | Indoblok 40        | 40mg     | TAB  | 1000      | 135.81                    | 0.14               | Generic              | 13.81      | 0.01              | 0.01                |
| Pharmacare Limited, Woodmead                       | Purbloka           | 40mg     | TAB  | 50        | 9.98                      | 0.20               | Generic              | 1.02       | 0.02              | 0.01                |
| Pharmacare Limited, Woodmead                       | Purbloka           | 40mg     | TAB  | 250       | 49.98                     | 0.20               | Generic              | 5.08       | 0.02              | 0.01                |
| Pharmacare Limited, Woodmead                       | Purbloka           | 40mg     | TAB  | 1000      | 199.88                    | 0.20               | Generic              | 20.33      | 0.02              | 0.01                |
| Sandoz Sa (Pty) Ltd                                | Sandoz Propranolol | 40mg     | TAB  | 50        | 7.54                      | 0.15               | Generic              | 0.77       | 0.02              | 0.01                |
|  |                    |          |      |           |                           |                    |                      |            |                   |                     |
| Astrazeneca Pharmaceuticals (Pty) Ltd- Sunninghill | Inderal La-80      | 80mg     | CAP  | 28        | 160.44                    | 5.73               | Originator           | 16.32      | 0.58              | Not Avail           |

## Atenolol

| Applicant Name                                     | Proprietary Name    | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|--|---------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Astrazeneca Pharmaceuticals (Pty) Ltd- Sunninghill | Tenormin 100        | 100mg    | TAB  | 30        | 300.37                    | 10.01              | Originator          | 30.55     | 1.021             | 0.01                |
| Pharmacare Limited, Woodmead                       | Ten-Bloka           | 100mg    | TAB  | 30        | 52.48                     | 1.75               | Generic             | 5.34      | 0.18              | 0.01                |
| Sandoz Sa (Pty) Ltd                                | Sandoz Atenolol 100 | 100mg    | TAB  | 30        | 35.20                     | 1.17               | Generic             | 3.58      | 0.12              | 0.01                |
| Sandoz Sa (Pty) Ltd                                | Hexa-Blok 100       | 100mg    | TAB  | 30        | 46.31                     | 1.54               | Generic             | 4.71      | 0.16              | 0.01                |
| Adcock Ingram Limited                              | Adco-Atenolol 100   | 100mg    | TAB  | 28        | 48.97                     | 1.75               | Generic             | 4.98      | 0.18              | 0.01                |
| Austell Laboratories (Pty) Ltd                     | Tenopress 100       | 100mg    | TAB  | 30        | 32.57                     | 1.09               | Generic             | 3.31      | 0.11              | 0.01                |
| Be-Tabs Pharmaceuticals (Pty) Ltd                  | B-Block             | 100mg    | TAB  | 30        | 23.72                     | 0.79               | Generic             | 2.41      | 0.08              | 0.01                |
| Biotech Laboratories (Pty) Ltd                     | Bio-Atenolol 100    | 100mg    | TAB  | 30        | 27.10                     | 0.90               | Generic             | 2.76      | 0.09              | 0.01                |
|  |                     |          |      |           |                           |                    |                     |           |                   |                     |
| Astrazeneca Pharmaceuticals (Pty) Ltd- Sunninghill | Tenormin 25         | 25mg     | TAB  | 30        | 111.02                    | 3.70               | Originator          | 11.291    | 0.38              | Not Avail           |
| Austell Laboratories (Pty) Ltd                     | Tenopress 25 Mg     | 25mg     | TAB  | 30        | 14.45                     | 0.48               | Generic             | 1.47      | 0.05              | Not Avail           |
|  |                     |          |      |           |                           |                    |                     |           |                   |                     |
| Astrazeneca Pharmaceuticals (Pty) Ltd- Sunninghill | Tenormin 50         | 50mg     | TAB  | 30        | 184.74                    | 6.16               | Originator          | 18.79     | 0.6               | 0.01                |
| Pharmacare Limited, Woodmead                       | Ten-Bloka           | 50mg     | TAB  | 30        | 35.83                     | 1.19               | Generic             | 3.64      | 0.12              | 0.01                |
| Sandoz Sa (Pty) Ltd                                | Sandoz Atenolol 50  | 50mg     | TAB  | 30        | 18.45                     | 0.61               | Generic             | 1.88      | 0.06              | 0.01                |
| Sandoz Sa (Pty) Ltd                                | Hexa-Blok 50        | 50mg     | TAB  | 30        | 23.15                     | 0.77               | Generic             | 2.35      | 0.08              | 0.01                |
| Adcock Ingram Limited                              | Adco-Atenolol 50mg  | 50mg     | TAB  | 30        | 35.82                     | 1.19               | Generic             | 3.64      | 0.12              | 0.01                |
| Austell Laboratories (Pty) Ltd                     | Tenopress 50 Mg T   | 50mg     | TAB  | 30        | 24.75                     | 0.82               | Generic             | 2.52      | 0.08              | 0.01                |
| Be-Tabs Pharmaceuticals (Pty) Ltd                  | B-Block             | 50mg     | TAB  | 30        | 18.73                     | 0.62               | Generic             | 1.90      | 0.06              | 0.01                |
| Biotech Laboratories (Pty) Ltd                     | Bio-Atenolol 50     | 50mg     | TAB  | 30        | 15.59                     | 0.52               | Generic             | 1.59      | 0.05              | 0.01                |
| Gulf Drug Company                                  | Gulf Atenolol 50    | 50mg     | FCT  | 28        | 15.56                     | 0.56               | Generic             | 1.58      | 0.06              | 0.01                |

## Acebutolol

| Applicant Name                       | Proprietary Name | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|--------------------------------------|------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Sanofi-Aventis South Africa (Pty)Ltd | Sectral 100      | 100mg    | CAP  | 60        | 174.55                    | 2.91               | Originator          | 17.75     | 0.30              | Not avail           |
| Sanofi-Aventis South Africa (Pty)Ltd | Sectral 200      | 200mg    | CAP  | 60        | 347.28                    | 5.79               | Originator          | 35.32     | 0.59              | Not avail           |
| Sanofi-Aventis South Africa (Pty)Ltd | Sectral 400      | 400mg    | TAB  | 30        | 280.02                    | 9.33               | Originator          | 28.48     | 0.95              | Not avail           |
| Pharmacare Limited, Woodmead         | Butobloc         | 400mg    | TAB  | 30        | 205.80                    | 6.86               | Generic             | 20.93     | 0.70              | Not avail           |

## Bisoprolol

| Applicant Name               | Proprietary Name      | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$)  | Unit Price (US\$) | IRP(US\$)Unit Price |
|------------------------------|-----------------------|----------|------|-----------|---------------------------|--------------------|---------------------|------------|-------------------|---------------------|
| Merck                        | Cardicor              | 10mg     | TAB  | 30        | 147.15                    | 4.91               | Originator          | 14.965155  | 0.50              | Not avail           |
| Merck                        | Concor                | 10mg     | TAB  | 30        | 147.15                    | 4.91               | Originator          | 14.965155  | 0.50              | Not avail           |
| Adcock Ingram Limited        | Adco-Bisocor          | 10mg     | TAB  | 30        | 75.86                     | 2.53               | Generic             | 7.71481962 | 0.26              | Not avail           |
| Merck (Pty) Ltd              | Betacor               | 10mg     | TAB  | 30        | 80.70                     | 2.69               | Originator          | 8.20719    | 0.27              | Not avail           |
| Pharma Dynamics (Pty) Ltd    | Bilocor 10            | 10mg     | TAB  | 30        | 80.70                     | 2.69               | Generic             | 8.20719    | 0.27              | Not avail           |
| Pharma Dynamics (Pty) Ltd    | Bisoprolol Unicorn 10 | 10mg     | TAB  | 30        | 80.72                     | 2.69               | Generic             | 8.209224   | 0.27              | Not avail           |
| Pharmacare Limited, Woodmead | Ziapro 10 Mg          | 10mg     | TAB  | 30        | 75.86                     | 2.53               | Generic             | 7.71481962 | 0.26              | Not avail           |
| Sandoz Sa (Pty) Ltd          | Bisohexal 10          | 10mg     | TAB  | 30        | 85.38                     | 2.85               | Generic             | 8.68327158 | 0.29              | Not avail           |
|                              |                       |          |      |           |                           |                    |                     |            |                   |                     |
| Merck                        | Cardicor              | 2.5mg    | TAB  | 30        | 88.42                     | 2.95               | Originator          | 8.992314   | 0.30              | Not avail           |
|                              |                       |          |      |           |                           |                    |                     |            |                   |                     |
| Merck                        | Cardicor              | 5mg      | TAB  | 30        | 93.05                     | 3.10               | Originator          | 9.463185   | 0.32              | Not avail           |
| Merck                        | Concor                | 5mg      | TAB  | 30        | 93.05                     | 3.10               | Originator          | 9.463185   | 0.32              | Not avail           |
| Merck (Pty) Ltd              | Betacor               | 5mg      | TAB  | 30        | 48.00                     | 1.60               | Generic             | 4.8816     | 0.16              | Not avail           |
| Adcock Ingram Limited        | Adco Bisocor          | 5mg      | TAB  | 30        | 45.07                     | 1.50               | Generic             | 4.58370036 | 0.15              | Not avail           |
| Pharma Dynamics (Pty) Ltd    | Bilocor 5             | 5mg      | TAB  | 30        | 48.00                     | 1.60               | Generic             | 4.8816     | 0.16              | Not avail           |
| Pharma Dynamics (Pty) Ltd    | Bisoprolol Unicorn 5  | 5mg      | TAB  | 30        | 48.14                     | 1.60               | Generic             | 4.895838   | 0.16              | Not avail           |
| Pharmacare Limited, Woodmead | Ziapro 5 Mg           | 5mg      | TAB  | 30        | 44.97                     | 1.50               | Generic             | 4.5729405  | 0.15              | Not avail           |
| Sandoz Sa (Pty) Ltd          | Bisohexal 5           | 5mg      | TAB  | 30        | 50.79                     | 1.69               | Generic             | 5.16531383 | 0.17              | Not avail           |

## Carvedilol

| Applicant Name                  | Proprietary Name      | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|---------------------------------|-----------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Roche Products (Pty) Ltd        | Dilatrend             | 12.5mg   | TAB  | 30        | 139.68                    | 4.66               | Originator          | 14.21     | 0.47              | 0.05                |
| Arrow Pharma SA (Pty) Ltd       | Vediblok 12.5mg       | 12.5mg   | TAB  | 30        | 62.28                     | 2.08               | Generic             | 6.33      | 0.21              | 0.05                |
| Cipla Medpro (Pty) Ltd          | Carloc 12.5           | 12.5mg   | TAB  | 30        | 71.26                     | 2.38               | Generic             | 7.25      | 0.24              | 0.05                |
| Pharma Dynamics (Pty) Ltd       | Carvetrend 12.5Mg     | 12.5mg   | TAB  | 30        | 65.62                     | 2.19               | Generic             | 6.67      | 0.22              | 0.05                |
| Pharma Dynamics (Pty) Ltd       | Carvedilol Unicorn    | 12.5mg   | TAB  | 30        | 63.92                     | 2.13               | Generic             | 6.50      | 0.22              | 0.05                |
| Pharmacare Limited, Woodmead    | Aspen-Carvidelol      | 12.5mg   | TAB  | 30        | 68.21                     | 2.27               | Generic             | 6.94      | 0.23              | 0.05                |
| Sandoz Sa (Pty) Ltd             | Carvedilol-Hexal 12.5 | 12.5mg   | TAB  | 30        | 68.31                     | 2.28               | Generic             | 6.95      | 0.23              | 0.05                |
| Xixia Pharmaceuticals (Pty) Ltd | Merck-Carvedilol      | 12.5mg   | TAB  | 28        | 57.94                     | 2.07               | Generic             | 5.89      | 0.21              | 0.05                |
|                                 |                       |          |      |           |                           |                    |                     |           |                   |                     |
| Roche Products (Pty) Ltd        | Dilatrend             | 25mg     | TAB  | 30        | 139.68                    | 4.66               | Originator          | 14.21     | 0.47              | 0.05                |
| Arrow Pharma SA (Pty) Ltd       | Vediblok 25mg         | 25mg     | TAB  | 30        | 78.17                     | 2.61               | Generic             | 7.95      | 0.26              | 0.05                |
| Cipla Medpro (Pty) Ltd          | Carloc 25             | 25mg     | TAB  | 30        | 96.31                     | 3.21               | Generic             | 9.79      | 0.33              | 0.05                |
| Pharma Dynamics (Pty) Ltd       | Carvetrend 25 Mg      | 25mg     | TAB  | 30        | 78.30                     | 2.61               | Generic             | 7.96      | 0.27              | 0.05                |
| Pharma Dynamics (Pty) Ltd       | Carvedilol Unicorn 25 | 25mg     | TAB  | 30        | 83.23                     | 2.77               | Generic             | 8.46      | 0.28              | 0.05                |
| Pharmacare Limited, Woodmead    | Aspen-Carvidelol      | 25mg     | TAB  | 30        | 88.77                     | 2.96               | Generic             | 9.03      | 0.30              | 0.05                |
| Sandoz Sa (Pty) Ltd             | Carvedilol-Hexal 25   | 25mg     | TAB  | 30        | 88.82                     | 2.96               | Generic             | 9.03      | 0.30              | 0.05                |
| Xixia Pharmaceuticals (Pty) Ltd | Merck-Carvedilol 25Mg | 25mg     | TAB  | 28        | 75.02                     | 2.68               | Generic             | 7.62      | 0.27              | 0.05                |
|                                 |                       |          |      |           |                           |                    |                     |           |                   |                     |
| Roche Products (Pty) Ltd        | Dilatrend             | 6.25mg   | TAB  | 30        | 133.95                    | 4.47               | Originator          | 13.62     | 0.451             | 0.09                |
| Arrow Pharma SA (Pty) Ltd       | Vediblok 6.25mg       | 6.25mg   | TAB  | 30        | 57.32                     | 1.91               | Generic             | 5.83      | 0.19              | 0.09                |
| Cipla Medpro (Pty) Ltd          | Carloc 6.25           | 6.25mg   | TAB  | 30        | 62.90                     | 2.10               | Generic             | 6.40      | 0.21              | 0.09                |
| Pharma Dynamics (Pty) Ltd       | Carvetrend6,25Mg      | 6.25mg   | TAB  | 30        | 62.36                     | 2.08               | Generic             | 6.34      | 0.21              | 0.09                |
| Pharma Dynamics (Pty) Ltd       | Carvedilol Unicorn    | 6.25mg   | TAB  | 30        | 61.03                     | 2.03               | Generic             | 6.21      | 0.21              | 0.09                |
| Pharmacare Limited, Woodmead    | Aspen Carvedilol      | 6.25mg   | TAB  | 30        | 60.85                     | 2.03               | Generic             | 6.19      | 0.21              | 0.09                |
| Sandoz Sa (Pty) Ltd             | Carvedilol-Hexal 6.25 | 6.25mg   | TAB  | 30        | 62.41                     | 2.08               | Generic             | 6.35      | 0.21              | 0.09                |
| Xixia Pharmaceuticals (Pty) Ltd | Merck-Carvedilol      | 6.25mg   | TAB  | 28        | 48.27                     | 1.72               | Generic             | 4.91      | 0.17              | 0.09                |

## Hydrochlorothiazide

| Applicant Name               | Proprietary Name | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|------------------------------|------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Pharmacare Limited, Woodmead | Ridaq            | 12.5mg   | TAB  | 30        | 10.32                     | 0.34               | Generic             | 1.05      | 0.03              | 0.01                |
| Pharmacare Limited, Woodmead | Ridaq            | 12.5mg   | TAB  | 500       | 388.64                    | 0.78               | Generic             | 39.52     | 0.08              | 0.01                |
| Sandoz Sa (Pty) Ltd          | Hexazide 25      | 25mg     | TAB  | 100       | 38.59                     | 0.39               | Generic             | 3.93      | 0.04              | 0.017               |

## Indapamide

| Applicant Name                    | Proprietary Name      | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|-----------------------------------|-----------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Servier Laboratories SA (Pty) Ltd | Natrilix SR           | 1.5mg    | TAB  | 30        | 91.04                     | 3.03               | Originator          | 9.26      | 0.30              | Not Avail           |
| Pharma Dynamics (Pty) Ltd         | Dyna Indapamide Sr    | 1.5mg    | SRT  | 30        | 31.74                     | 1.06               | Generic             | 3.23      | 0.11              | Not Avail           |
|                                   |                       |          |      |           |                           |                    |                     |           |                   |                     |
| Servier Laboratories SA (Pty) Ltd | Natrilix              | 2.5mg    | TAB  | 30        | 114.85                    | 3.83               | Originator          | 11.68     | 0.39              | Not Avail           |
| Sandoz Sa Pty Ltd                 | Sandoz Indapamide 2.5 | 2.5mg    | TAB  | 30        | 17.88                     | 0.60               | Generic             | 1.82      | 0.06              | Not Avail           |
| Adcock Ingram Limited             | Adco-Dapamax          | 2.5mg    | TAB  | 30        | 18.78                     | 0.63               | Generic             | 1.91      | 0.06              | Not Avail           |
| Adcock Ingram Limited             | Adco-Dapamax          | 2.5mg    | TAB  | 600       | 375.60                    | 0.63               | Generic             | 38.20     | 0.06              | Not Avail           |
| Biogaran South Africa (Pty) Ltd   | Catexan               | 2.5mg    | TAB  | 30        | 28.62                     | 0.95               | Generic             | 2.91      | 0.10              | Not Avail           |
| Cipla Medpro (Pty) Ltd            | Cipla Indapamide      | 2.5mg    | TAB  | 30        | 13.47                     | 0.45               | Generic             | 1.37      | 0.05              | Not Avail           |
| Mylan (Pty) Ltd                   | Mylan Indapamide      | 2.5mg    | TAB  | 30        | 13.33                     | 0.44               | Generic             | 1.36      | 0.04              | Not Avail           |
| Pharma Q (Pty) Ltd                | Dapril                | 2.5mg    | TAB  | 30        | 13.58                     | 0.45               | Generic             | 1.38      | 0.05              | Not Avail           |
| Pharma Q (Pty) Ltd                | Dapril                | 2.5mg    | TAB  | 600       | 271.79                    | 0.45               | Generic             | 27.64     | 0.05              | Not Avail           |
| Pharmacare Limited, Woodmead      | Hydro-Less            | 2.5mg    | TAB  | 30        | 19.87                     | 0.66               | Generic             | 2.02      | 0.07              | Not Avail           |
| Pharmacare Limited, Woodmead      | Hydro-Less            | 2.5mg    | TAB  | 600       | 342.35                    | 0.57               | Generic             | 34.82     | 0.06              | Not Avail           |
| Pharmacare Limited, Woodmead      | Indalix               | 2.5mg    | TAB  | 30        | 36.33                     | 1.21               | Generic             | 3.70      | 0.12              | Not Avail           |

## Furosemide

| Applicant Name                        | Proprietary Name    | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|---------------------------------------|---------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Sanofi-Aventis South Africa (Pty)Ltd  | Lasix 20 Mg         | 20mg     | TAB  | 30        | 100.00                    | 3.33               | Originator          | 10.17     | 0.34              | Not Avail           |
| Sanofi-Aventis South Africa (Pty)Ltd  | Lasix 40 Mg         | 40mg     | TAB  | 30        | 128.66                    | 4.29               | Originator          | 13.08     | 0.44              | 0.01                |
| Alliance Pharmaceuticals              | Aquarid             | 40mg     | CAP  | 30        | 12.39                     | 0.41               | Generic             | 1.26      | 0.04              | 0.01                |
| Austell Laboratories (Pty) Ltd        | Austell-Furosemide  | 40mg     | TAB  | 30        | 19.70                     | 0.66               | Generic             | 2.00      | 0.07              | 0.01                |
| Be-Tabs Pharmaceuticals (Pty) Ltd     | Beurises            | 40mg     | TAB  | 250       | 37.76                     | 0.15               | Generic             | 3.84      | 0.02              | 0.01                |
| Innovata Pharmaceuticals cc           | Diuresix            | 40mg     | TAB  | 250       | 45.44                     | 0.18               | Generic             | 4.62      | 0.02              | 0.01                |
| Mylan (Pty) Ltd                       | Mylan Furosemide 40 | 40mg     | TAB  | 250       | 30.73                     | 0.12               | Generic             | 3.13      | 0.01              | 0.01                |
| Pharma Q (Pty) Ltd                    | Dino-Retic          | 40mg     | TAB  | 250       | 40.77                     | 0.16               | Generic             | 4.15      | 0.02              | 0.01                |
| Pharmacare Limited, Woodmead          | Puresis             | 40mg     | TAB  | 30        | 17.95                     | 0.60               | Generic             | 1.83      | 0.06              | 0.01                |
| Pharma-Q (Pty) Ltd                    | Dino-Retic          | 40mg     | TAB  | 1000      | 163.06                    | 0.16               | Generic             | 16.58     | 0.02              | 0.01                |
| Sandoz (Pty) Ltd                      | Furosemide 40Mg     | 40mg     | TAB  | 28        | 13.80                     | 0.49               | Generic             | 1.40      | 0.05              | 0.01                |
| Sandoz Sa Pty Ltd                     | Sandoz Furosemide   | 40mg     | TAB  | 30        | 15.05                     | 0.50               | Generic             | 1.53      | 0.05              | 0.01                |
| Sanofi-Aventis South Africa (Pty) Ltd | Lasix 500mg         | 500mg    | TAB  | 30        | 1,077.54                  | 35.92              | Originator          | 109.59    | 3.65              | Not Avail           |
| Sanofi-Aventis South Africa (Pty)Ltd  | Lasix 500 Mg        | 500mg    | TAB  | 100       | 3,800.14                  | 38.00              | Originator          | 386.47    | 3.86              | Not Avail           |
| Sanofi-Aventis South Africa (Pty)Ltd  | Lasix 80 Mg         | 80mg     | TAB  | 30        | 385.82                    | 12.86              | Originator          | 39.24     | 1.301             | Not Avail           |

## Spirolactone

| Applicant Name                | Proprietary Name    | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|-------------------------------|---------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Pfizer Laboratories (Pty) Ltd | Aldactone 100       | 100mg    | TAB  | 30        | 207.17                    | 6.91               | Originator          | 21.07     | 0.70              | 0.09                |
| Pharmacare Limited, Woodmead  | Spiractin           | 100mg    | TAB  | 60        | 414.33                    | 6.91               | Generic             | 42.14     | 0.70              | 0.09                |
|                               |                     |          |      |           |                           |                    |                     |           |                   |                     |
| Pfizer Laboratories (Pty) Ltd | Aldactone 25        | 25mg     | TAB  | 60        | 67.08                     | 1.12               | Originator          | 6.82      | 0.11              | 0.03                |
| Pharmacare Limited, Woodmead  | Spiractin           | 25mg     | TAB  | 200       | 223.73                    | 1.12               | Generic             | 22.75     | 0.11              | 0.03                |
| Sandoz Sa (Pty) Ltd           | Sandoz Spirolactone | 25mg     | TAB  | 200       | 213.70                    | 1.07               | Generic             | 21.73     | 0.11              | 0.03                |

**Losartan**

| Applicant Name                     | Proprietary Name            | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|------------------------------------|-----------------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| MSD (Pty) Ltd                      | Cozaar                      | 100mg    | TAB  | 30        | 90.45                     | 3.02               | Originator          | 9.20      | 0.31              | Not Avail           |
| Specpharm (Pty) Ltd                | Spec Losartan 100           | 100mg    | TAB  | 30        | 83.01                     | 2.77               | Generic             | 8.44      | 0.28              | Not Avail           |
| Aurobindo Pharma (Pty) Ltd         | Auro Losartan 100 mg        | 100mg    | TAB  | 30        | 80.41                     | 2.68               | Generic             | 8.18      | 0.27              | Not Avail           |
| Aurobindo Pharma (Pty) Ltd         | Rasol 100                   | 100mg    | TAB  | 30        | 86.76                     | 2.89               | Generic             | 8.82      | 0.29              | Not Avail           |
| Austell Laboratories (Pty) Ltd     | Austell Losartan 100        | 100mg    | TAB  | 30        | 81.05                     | 2.70               | Generic             | 8.24      | 0.27              | Not Avail           |
| Cipla Life Sciences (Pty) Ltd      | Cipla-Losartan 100          | 100mg    | TAB  | 30        | 92.07                     | 3.07               | Generic             | 9.36      | 0.31              | Not Avail           |
| Cipla Medpro (Pty) Ltd             | Ciplazar 100                | 100mg    | TAB  | 30        | 86.93                     | 2.90               | Generic             | 8.84      | 0.29              | Not Avail           |
| Lasara Traders (Pty) Ltd           | Hytenza 100                 | 100mg    | TAB  | 30        | 75.98                     | 2.53               | Generic             | 7.73      | 0.26              | Not Avail           |
| Pharma Dynamics (Pty) Ltd          | Zartan 100 Mg               | 100mg    | TAB  | 30        | 90.04                     | 3.00               | Generic             | 9.16      | 0.31              | Not Avail           |
| Ranbaxy (SA)(Pty) Ltd              | Losartan Unicorn 100        | 100mg    | TAB  | 30        | 76.48                     | 2.54               | Generic             | 7.78      | 0.26              | Not Avail           |
| Specpharm (Pty) Ltd                | Spec Losartan 100           | 100mg    | TAB  | 30        | 83.01                     | 2.77               | Generic             | 8.44      | 0.28              | Not Avail           |
|                                    |                             |          |      |           |                           |                    |                     |           |                   |                     |
| MSD (Pty) Ltd                      | Cozaar                      | 50mg     | TAB  | 30        | 90.45                     | 3.02               | Originator          | 9.20      | 0.31              | 0.02                |
| Specpharm (Pty) Ltd                | Spec Losartan 50            | 50mg     | TAB  | 30        | 73.50                     | 2.45               | Generic             | 7.47      | 0.25              | 0.02                |
| Unichem SA (Pty) Ltd               | Renicard 50                 | 50mg     | TAB  | 30        | 64.04                     | 2.13               | Generic             | 6.51      | 0.22              | 0.02                |
| Winthrop Pharmaceuticals (Pty) Ltd | Losartan-Winthrop 50Mg      | 50mg     | TAB  | 30        | 73.92                     | 2.46               | Generic             | 7.52      | 0.25              | 0.02                |
| Adcock Ingram Limited              | Lepitrin 50 Mg              | 50mg     | TAB  | 30        | 40.62                     | 1.35               | Generic             | 4.13      | 0.14              | 0.02                |
| Aurobindo Pharma (Pty) Ltd         | Auro Losartan Tablets 50 mg | 50mg     | TAB  | 30        | 70.89                     | 2.36               | Generic             | 7.21      | 0.24              | 0.02                |
| Aurobindo Pharma (Pty) Ltd         | Rasol 50                    | 50mg     | TAB  | 30        | 77.23                     | 2.57               | Generic             | 7.85      | 0.26              | 0.02                |
| Austell Laboratories (Pty) Ltd     | Austell Losartan 50         | 50mg     | TAB  | 30        | 71.38                     | 2.38               | Generic             | 7.26      | 0.24              | 0.02                |
| Cipla Life Sciences (Pty) Ltd      | Cipla-Losartan 50           | 50mg     | TAB  | 30        | 88.78                     | 2.96               | Generic             | 9.03      | 0.30              | 0.02                |
| Cipla Medpro (Pty) Ltd             | Ciplazar 50                 | 50mg     | TAB  | 30        | 86.93                     | 2.90               | Generic             | 8.84      | 0.29              | 0.02                |
| Lasara Traders (Pty) Ltd           | Hytenza 50                  | 50mg     | TAB  | 30        | 66.98                     | 2.23               | Generic             | 6.81      | 0.23              | 0.02                |
| Pharma Dynamics (Pty) Ltd          | Zartan 50 Mg                | 50mg     | TAB  | 30        | 83.52                     | 2.78               | Generic             | 8.49.     | 0.28              | 0.02                |

## Losartan

| Applicant Name        | Proprietary Name    | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|-----------------------|---------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Ranbaxy (SA)(Pty) Ltd | Losartan Unicorn 50 | 50mg     | TAB  | 30        | 69.82                     | 2.32               | Generic             | 7.10      | 0.24              | 0.02                |
| Sandoz Sa (Pty) Ltd   | Los-Arb 50          | 50mg     | TAB  | 30        | 72.86                     | 2.43               | Generic             | 7.41      | 0.25              | 0.02                |
| Specpharm (Pty) Ltd   | Spec Losartan 50    | 50mg     | TAB  | 30        | 73.50                     | 2.45               | Generic             | 7.47      | 0.25              | 0.02                |

## Irbesartan

| Applicant Name                       | Proprietary Name | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | t\SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|--------------------------------------|------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-------------|-------------------|---------------------|
| Sanofi-Aventis South Africa (Pty)Ltd | Approvel 150 Mg  | 150mg    | TAB  | 28        | 228.41                    | 8.16               | Originator          | 23.23       | 0.83              | Not Avail           |
| Winthrop Pharmaceuticals (Pty) Ltd   | Irbewin 150      | 150mg    | TAB  | 28        | 153.48                    | 5.48               | Originator          | 15.61       | 0.56              | Not Avail           |
| Brimpharm SA (Pty) Ltd               | Irtanel 150      | 150mg    | TAB  | 28        | 110.00                    | 3.93               | Generic             | 11.19       | 0.40              | Not Avail           |
| Pharma Dynamics (Pty) Ltd            | Dynarb 150 Mg    | 150mg    | TAB  | 30        | 90.46                     | 3.02               | Generic             | 9.20        | 0.31              | Not Avail           |
|                                      |                  |          |      |           |                           |                    |                     |             |                   |                     |
| Sanofi-Aventis South Africa (Pty)Ltd | Approvel 300 Mg  | 300mg    | TAB  | 28        | 223.62                    | 7.99               | Originator          | 22.74       | 0.81              | Not Avail           |
| Winthrop Pharmaceuticals (Pty) Ltd   | Irbewin 300      | 300mg    | TAB  | 28        | 153.48                    | 5.48               | Originator          | 15.61       | 0.56              | Not Avail           |
| Brimpharm SA (Pty) Ltd               | Irtanel 300      | 300mg    | TAB  | 28        | 110.00                    | 3.93               | Generic             | 11.19       | 0.40              | Not Avail           |
| Pharma Dynamics (Pty) Ltd            | Dynarb 300 Mg    | 300mg    | TAB  | 30        | 103.73                    | 3.46               | Generic             | 10.55       | 0.35              | Not Avail           |

## Valsartan

| Applicant Name                  | Proprietary Name      | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US \$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|---------------------------------|-----------------------|----------|------|-----------|---------------------------|--------------------|---------------------|------------|-------------------|---------------------|
| Novartis SA (Pty) Ltd           | Diovan                | 160mg    | TAB  | 28        | 209.96                    | 7.49               | Originator          | 21.35      | 0.76              | Not Avail           |
| Novartis SA (Pty) Ltd           | Tareg 160             | 160mg    | TAB  | 28        | 104.71                    | 3.74               | Generic             | 10.653     | 0.38              | Not Avail           |
| NOVARTIS SOUTH AFRICA (PTY) LTD | Zomevek 160           | 160mg    | TAB  | 28        | 104.71                    | 3.73               | Generic             | 10.65      | 0.38              | Not Avail           |
| Ranbaxy (SA) (Pty) Ltd          | Diolo 160             | 160mg    | TAB  | 28        | 35.00                     | 1.25               | Generic             | 3.56       | 0.13              | Not Avail           |
| Ranbaxy (SA)(Pty) Ltd           | Valsartan Unicorn 160 | 160mg    | TAB  | 28        | 89.83                     | 3.21               | Generic             | 9.14       | 0.33              | Not Avail           |
| NOVARTIS SOUTH AFRICA (PTY) LTD | Migroben 160          | 160mg    | TAB  | 28        | 104.71                    | 3.73               | Generic             | 10.65      | 0.38              | Not Avail           |
|                                 |                       |          |      |           |                           |                    |                     |            |                   |                     |
| Novartis SA (Pty) Ltd           | Diovan                | 80mg     | TAB  | 28        | 209.96                    | 7.49               | Originator          | 21.35      | 0.76              | Not Avail           |
| Novartis SA (Pty) Ltd           | Tareg 80              | 80mg     | TAB  | 28        | 104.71                    | 3.74               | Generic             | 10.65      | 0.38              | Not Avail           |
| NOVARTIS SOUTH AFRICA (PTY) LTD | Zomevek 80 Tablet     | 80mg     | TAB  | 28        | 104.71                    | 3.73               | Generic             | 10.65      | 0.38              | Not Avail           |
| Ranbaxy (SA) (Pty) Ltd          | Diolo 80              | 80mg     | TAB  | 28        | 35.00                     | 1.25               | Generic             | 3.56       | 0.13              | Not Avail           |
| Ranbaxy (SA)(Pty) Ltd           | Valsartan Unicorn 80  | 80mg     | TAB  | 28        | 89.83                     | 3.21               | Generic             | 9.141      | 0.32              | Not Avail           |
| NOVARTIS SOUTH AFRICA (PTY) LTD | Migroben 80 Tablet    | 80mg     | TAB  | 28        | 104.71                    | 3.73               | Generic             | 10.65      | 0.381             | Not Avail           |

## Telmisartan

| Applicant Name                      | Proprietary Name | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|-------------------------------------|------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Ingelheim Pharmaceuticals (Pty) Ltd | Micardis 40 mg   | 40mg     | TAB  | 28        | 233.16                    | 8.33               | Originator          | 23.71     | 0.85              | Not Avail           |
| Ingelheim Pharmaceuticals (Pty) Ltd | Pritor 40 mg     | 40mg     | TAB  | 28        | 135.50                    | 4.84               | Originator          | 13.78     | 0.49              | Not Avail           |
|                                     |                  |          |      |           |                           |                    |                     |           |                   |                     |
| Ingelheim Pharmaceuticals (Pty) Ltd | Micardis 80 mg   | 80mg     | TAB  | 28        | 233.16                    | 8.33               | Originator          | 23.71     | 0.85              | Not Avail           |
| Ingelheim Pharmaceuticals (Pty) Ltd | Pritor 80 mg     | 80mg     | TAB  | 28        | 135.50                    | 4.84               | Originator          | 13.78     | 0.49              | Not Avail           |

## Verapamil

| Applicant Name                    | Proprietary Name         | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator / Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|-----------------------------------|--------------------------|----------|------|-----------|---------------------------|--------------------|----------------------|-----------|-------------------|---------------------|
| Sandoz Sa (Pty) Ltd               | Sandoz Verapamil Hcl 120 | 120mg    | TAB  | 50        | 98.82                     | 1.98               | Generic              | 10.05     | 0.20              | Not Avail           |
| Sandoz Sa (Pty) Ltd               | Sandoz Verapamil Hcl 120 | 120mg    | TAB  | 250       | 494.12                    | 1.98               | Generic              | 50.25     | 0.20              | Not Avail           |
| Abbott Laboratories SA Pty Ltd    | Tarka                    | 180mg    | SRC  | 30        | 284.96                    | 9.50               | Generic              | 28.98     | 0.97              | Not Avail           |
| Abbott Laboratories SA Pty Ltd    | Isoptin SR               | 240mg    | SRT  | 30        | 176.62                    | 5.89               | Originator           | 17.96     | 0.60              | 0.1164              |
| Merck (Pty) Ltd                   | Ravamil Sr 240 Mg        | 240mg    | TAB  | 30        | 155.09                    | 5.17               | Originator           | 15.77     | 0.53              | 0.1164              |
| Pharma Dynamics (Pty) Ltd         | Calcicard Sr 240         | 240mg    | SRT  | 30        | 146.59                    | 4.89               | Generic              | 14.91     | 0.50              | 0.1164              |
| Sandoz Sa (Pty) Ltd               | Verahexal 240 Sr         | 240mg    | SRT  | 30        | 120.61                    | 4.02               | Generic              | 12.27     | 0.41              | 0.1164              |
| Sandoz-Hexal (a Novartis company) | VeraHexal                | 240mg    | SRT  | 100       | 379.98                    | 3.80               |                      | 38.64     | 0.39              | 0.1164              |
| Abbott Laboratories SA Pty Ltd    | Isoptin 40mg             | 40mg     | TAB  | 100       | 90.07                     | 0.90               | Originator           | 9.16      | 0.09              | 0.034               |
| Pharmacare Limited, Woodmead      | Vasomil                  | 40mg     | TAB  | 100       | 43.82                     | 0.44               | Generic              | 4.46      | 0.04              | 0.034               |
| Pharmacare Limited, Woodmead      | Vasomil                  | 40mg     | TAB  | 500       | 219.15                    | 0.44               | Generic              | 22.29     | 0.04              | 0.034               |
| Sandoz Sa (Pty) Ltd               | Sandoz Verapamil         | 40mg     | TAB  | 30        | 11.35                     | 0.38               | Generic              | 1.15      | 0.04              | 0.034               |
| Pharmacare Limited, Woodmead      | Vasomil                  | 80mg     | TAB  | 100       | 93.73                     | 0.94               | Generic              | 9.53      | 0.10              | 0.0327              |
| Pharmacare Limited, Woodmead      | Vasomil                  | 80mg     | TAB  | 250       | 234.35                    | 0.94               | Generic              | 23.83     | 0.10              | 0.0327              |
| Sandoz Sa (Pty) Ltd               | Sandoz Verapamil Hcl 80  | 80mg     | TAB  | 250       | 212.18                    | 0.85               | Generic              | 21.58     | 0.09              | 0.0327              |
| Sandoz-Hexal (A Novartis Company) | Sandoz Verapamil         | 80mg     | TAB  | 50        | 42.44                     | 0.85               | Generic              | 4.3158    | 0.09              | 0.0327              |

## Diltiazem

| Applicant Name                | Proprietary Name   | Strength | Unit | Pack Size | Single Exit Price (Rands) | Unit Price (Rands) | Originator/ Generic | SEP(US\$) | Unit Price (US\$) | IRP(US\$)Unit Price |
|-------------------------------|--------------------|----------|------|-----------|---------------------------|--------------------|---------------------|-----------|-------------------|---------------------|
| Pfizer Laboratories (Pty) Ltd | Tilazem 180 Cr     | 180mg    | SRC  | 30        | 262.98                    | 8.77               | Originator          | 26.75     | 0.89              | Not avail           |
| Pfizer Laboratories (Pty) Ltd | Tilazem 240 Cr     | 240mg    | SRC  | 30        | 276.33                    | 9.21               | Originator          | 28.10     | 0.94              | Not avail           |
| Adcock Ingram Limited         | Adco-Zildem 240 Sr | 240mg    | SRC  | 30        | 217.63                    | 7.25               | Generic             | 22.13     | 0.74              | Not avail           |
| Pharmacare Limited, Woodmead  | Dilatam            | 60mg     | TAB  | 60        | 83.87                     | 1.40               | Generic             | 8.53      | 0.14              | 0.02                |
| Sandoz Sa (Pty) Ltd           | Sandoz Diltiazem   | 60mg     | TAB  | 50        | 51.50                     | 1.03               | Generic             | 5.24      | 0.10              | 0.02                |
| Sandoz Sa (Pty) Ltd           | Sandoz Diltiazem   | 60mg     | TAB  | 250       | 257.48                    | 1.03               | Generic             | 26.16     | 0.10              | 0.02                |
| Adcock Ingram Limited         | Adco-Zildem 60     | 60mg     | TAB  | 50        | 121.26                    | 2.43               | Generic             | 12.33     | 0.25              | 0.02                |
| Adcock Ingram Limited         | Adco-Zildem 60     | 60mg     | TAB  | 60        | 145.53                    | 2.43               | Generic             | 14.80     | 0.25              | 0.02                |
| Adcock Ingram Limited         | Adco-Zildem 90     | 90mg     | TAB  | 60        | 333.46                    | 5.56               | Generic             | 33.91     | 0.56              | 0.02                |

## **APPENDIX 2**

### **Comparison of Median Price Ratio values and International Reference Price values**

|                    | Originator Unit Price (US\$) | Lowest Price Generic unit Price (US\$) | IRP Unit Price (US\$)(Buyer Price) | Originator Unit Price (US\$) /IRP Unit Price (US\$)(Buyer Price) | Lowest Price Generic unit Price (US\$)/IRP Unit Price (US\$)(Buyer Price) |
|--------------------|------------------------------|--|------------------------------------|--|---|
| Captopril 25mg     | 0.29                         | 0.02                                   | 0.01                               | 25.41  | 2.16  |
| Enalapril 10mg     | 0.16                         | 0.10                                   | 0.01                               | 28.71  | 18.78   |
| Enalapril 20mg     | 0.29                         | 0.14                                   | 0.01                               | 38.03  | 18.02   |
| Perindopril 4mg    | 0.46                         | 0.13                                   | 0.04                               | 11.98  | 3.48  |
| Nifedipine 20mg Sr | 0.94                         | 0.06                                   | 0.02                               | 62.36  | 4.27  |
| Amlodipine 10mg    | 0.72                         | 0.21                                   | 0.01                               | 55.93  | 16.48   |
| Amlodipine 5mg     | 0.51                         | 0.12                                   | 0.01                               | 47.59  | 11.11   |
| Propranolol 10mg   | 0.16                         | 0.01                                   | 0.05                               | 3.28   | 0.16  |
| Propranolol 40mg   | 0.41                         | 0.01                                   | 0.01                               | 52.64  | 1.79  |
| Atenolol 100mg     | 1.02                         | 0.08                                   | 0.01                               | 99.83  | 7.88  |
| Atenolol 50mg      | 0.63                         | 0.05                                   | 0.01                               | 115.97   | 9.79  |
| Carvedilol 12.5mg  | 0.47                         | 0.21                                   | 0.05                               | 9.64   | 4.29  |
| Carvedilol 25mg    | 0.47                         | 0.27                                   | 0.05                               | 8.79   | 4.92  |
| Carvedilol 6.25mg  | 0.45                         | 0.17                                   | 0.09                               | 4.94   | 1.90  |
| Furosemide 40mg    | 0.44                         | 0.01                                   | 0.01                               | 65.09  | 1.82  |
| Spirolactone 100mg | 0.70                         | 0.70                                   | 0.09                               | 8.026  | 8.03  |
| Spirolactone 25mg  | 0.11                         | 0.11                                   | 0.03                               | 3.37   | 3.22  |
| Losartan 50mg      | 0.31                         | 0.14                                   | 0.02                               | 16.57  | 7.44  |
| Verapamil 40mg     | 0.09                         | 0.038                                  | 0.03                               | 2.69   | 1.13  |
| Verapamil 240mg SR | 0.59                         | 0.39                                   | 0.11                               | 5.14   | 3.32  |

## **APPENDIX 3**

**Consumption Data per unit drug from January 2012 –June 2013: IMS Health (Proprietary) Limited (South Africa) information service**

| <b>Bisoprolol</b>            |               |               |               |               |               |                |                |               |                |               |               |               |
|------------------------------|---------------|---------------|---------------|---------------|---------------|----------------|----------------|---------------|----------------|---------------|---------------|---------------|
|                              | <b>Jan 12</b> | <b>Feb 12</b> | <b>Mar 12</b> | <b>Apr 12</b> | <b>May 12</b> | <b>June 12</b> | <b>July 12</b> | <b>Aug 12</b> | <b>Sept 12</b> | <b>Oct 12</b> | <b>Nov 12</b> | <b>Dec 12</b> |
| <b>Lowest Priced Generic</b> | 22,999        | 25,220        | 25,076        | 32,615        | 20,761        | 23,806         | 26,262         | 22,682        | 17,671         | 26,744        | 20,374        | 18,140        |
| <b>Originator Generic</b>    | 10,694        | 12,831        | 11,776        | 14,863        | 12,397        | 12,835         | 13,997         | 14,443        | 14,860         | 14,794        | 15,507        | 15,887        |
| <b>Originator</b>            | 17,989        | 18,917        | 19,095        | 20,543        | 19,013        | 18,497         | 19,271         | 18,079        | 19,870         | 19,120        | 18,236        | 19,849        |
|                              |               |               |               |               |               |                |                |               |                |               |               |               |
| <b>Verapamil 240mg SR</b>    |               |               |               |               |               |                |                |               |                |               |               |               |
|                              | <b>Jan 12</b> | <b>Feb 12</b> | <b>Mar 12</b> | <b>Apr 12</b> | <b>May 12</b> | <b>June 12</b> | <b>July 12</b> | <b>Aug 12</b> | <b>Sept 12</b> | <b>Oct 12</b> | <b>Nov 12</b> | <b>Dec 12</b> |
| <b>Lowest Priced Generic</b> | 12,677        | 12,605        | 13,467        | 17,783        | 15,302        | 13,431         | 15,101         | 19,518        | 19,532         | 18,016        | 19,362        | 15,990        |
| <b>Originator Generic</b>    | 2,511         | 2,826         | 2,757         | 3,033         | 2,636         | 2,681          | 3,195          | 3,093         | 3,671          | 3,487         | 6,018         | 3,386         |
| <b>Originator</b>            | 1,259         | 1,198         | 1,244         | 1,394         | 1,198         | 1,323          | 1,139          | 1,436         | 1,382          | 1,415         | 1,391         | 1,305         |
|                              |               |               |               |               |               |                |                |               |                |               |               |               |
| <b>Telmisartan</b>           |               |               |               |               |               |                |                |               |                |               |               |               |
|                              | <b>Jan 12</b> | <b>Feb 12</b> | <b>Mar 12</b> | <b>Apr 12</b> | <b>May 12</b> | <b>June 12</b> | <b>July 12</b> | <b>Aug 12</b> | <b>Sept 12</b> | <b>Oct 12</b> | <b>Nov 12</b> | <b>Dec 12</b> |
| <b>Originator Generic</b>    | 15,966        | 15,573        | 18,104        | 19,127        | 17,524        | 18,222         | 20,353         | 16,946        | 19,845         | 19,065        | 22,607        | 19,844        |
| <b>Originator</b>            | 3,651         | 3,588         | 3,324         | 3,705         | 3,089         | 3,108          | 3,219          | 3,160         | 3,088          | 2,995         | 3,058         | 3,119         |
|                              |               |               |               |               |               |                |                |               |                |               |               |               |
| <b>Irbesartan</b>            |               |               |               |               |               |                |                |               |                |               |               |               |
|                              | <b>Jan 12</b> | <b>Feb 12</b> | <b>Mar 12</b> | <b>Apr 12</b> | <b>May 12</b> | <b>June 12</b> | <b>July 12</b> | <b>Aug 12</b> | <b>Sept 12</b> | <b>Oct 12</b> | <b>Nov 12</b> | <b>Dec 12</b> |
| <b>Lowest Priced Generic</b> | 0             | 0             | 0             | 0             | 0             | 0              | 0              | 0             | 0              | 0             | 280           | 34            |
| <b>Originator Generic</b>    | 6,018         | 6,404         | 6,132         | 8,338         | 6,260         | 6,432          | 8,090          | 6,713         | 8,567          | 7,209         | 6,649         | 10,048        |
| <b>Originator</b>            | 3,088         | 3,268         | 2,786         | 3,280         | 2,705         | 2,833          | 2,847          | 2,686         | 2,578          | 2,915         | 2,480         | 2,564         |
|                              |               |               |               |               |               |                |                |               |                |               |               |               |

| <b>Bisoprolol</b>            |               |               |               |               |               |                |
|------------------------------|---------------|---------------|---------------|---------------|---------------|----------------|
|                              | <b>Jan 13</b> | <b>Feb 13</b> | <b>Mar 13</b> | <b>Apr 13</b> | <b>May 13</b> | <b>June 13</b> |
| <b>Lowest Priced Generic</b> | 21,496        | 30,201        | 19,335        | 18,201        | 20,232        | 22,151         |
| <b>Originator Generic</b>    | 14,610        | 14,535        | 18,821        | 14,312        | 15,391        | 16,984         |
| <b>Originator</b>            | 17,613        | 16,850        | 23,625        | 15,580        | 16,198        | 17,619         |
|                              |               |               |               |               |               |                |
| <b>Verapamil 240mg SR</b>    |               |               |               |               |               |                |
|                              | <b>Jan 13</b> | <b>Feb 13</b> | <b>Mar 13</b> | <b>Apr 13</b> | <b>May 13</b> | <b>June 13</b> |
| <b>Lowest Priced Generic</b> | 15,958        | 9,182         | 14,747        | 22,744        | 10,111        | 17,664         |
| <b>Originator Generic</b>    | 3,296         | 3,635         | 7,996         | 5,962         | 6,397         | 5,293          |
| <b>Originator</b>            | 1,179         | 1,238         | 2,223         | 1,380         | 1,217         | 1,754          |
|                              |               |               |               |               |               |                |
| <b>Telmisartan</b>           |               |               |               |               |               |                |
|                              | <b>Jan 13</b> | <b>Feb 13</b> | <b>Mar 13</b> | <b>Apr 13</b> | <b>May 13</b> | <b>June 13</b> |
| <b>Originator Generic</b>    | 17,582        | 18,553        | 19,379        | 22,186        | 19,860        | 22,573         |
| <b>Originator</b>            | 2,757         | 2,374         | 2,505         | 3,705         | 2,279         | 2,569          |
|                              |               |               |               |               |               |                |
| <b>Irbesartan</b>            |               |               |               |               |               |                |
|                              | <b>Jan 13</b> | <b>Feb 13</b> | <b>Mar 13</b> | <b>Apr 13</b> | <b>May 13</b> | <b>June 13</b> |
| <b>Lowest Priced Generic</b> | 68            | 1,035         | 325           | 476           | 436           | 553            |
| <b>Originator Generic</b>    | 5,598         | 6,731         | 8,229         | 6,253         | 6,513         | 8,764          |
| <b>Originator</b>            | 2,441         | 2,400         | 2,350         | 2,365         | 2,146         | 2,270          |

## **APPENDIX 4**

### **Ethical Clearance Documentation**



UNIVERSITY OF  
KWAZULU-NATAL<sup>TM</sup>  
INYUVESI  
YAKWAZULU-NATALI

12 April 2013

Professor Fatima Suleman 621698  
School of Health Sciences  
Westville Campus

Protocol reference number: HSS/0154/013

Project title: Assessment and evaluation of South Africa's private sector pricing and public sector pharmaceutical policies, strategies and other interventions on access to and appropriate use of quality medicines – lessons for LMICs

Dear Professor Suleman

Expedited Approval

I wish to inform you that your application has been granted full approval.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. Please note: Research data should be securely stored in the school/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Professor Steven Collings (Chair)

/px

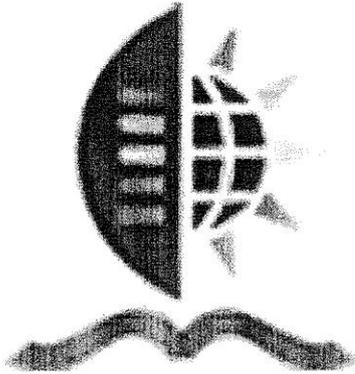
Humanities & Social Sc Research Ethics Committee  
Professor S Collings (Chair)  
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Founding Campuses: ■ Edgewood ■ Howard College ■ Medical School ■ Pietermaritzburg ■ Westville

INSPIRING GREATNESS





# University of KwaZulu-Natal

HPCSA CPD Accreditation No:  
A003/005/10/2005  
Category 4  
No. of CPD Points = 10

**HEREBY ACKNOWLEDGES THAT**

**Mrs Varsha Bangalee**

MP0017419

**HAS COMPLETED A COURSE IN**

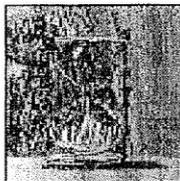
Human Subject Research Ethics

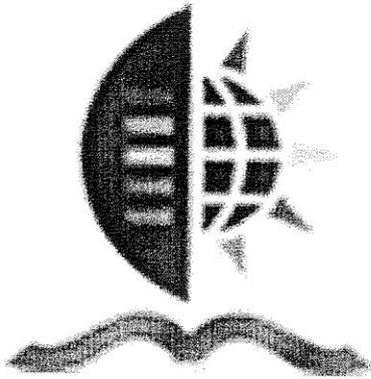
Completed On  
30 - 7 - 2012

Valid Until  
7 - 2015

**THE FOLLOWING MODULES WERE COMPLETED IN THIS  
COURSE**

Research Ethics in South Africa - An Overview  
Guiding Principles of Ethical Research  
Informed Consent  
Research Vulnerabilities  
Researcher Responsibilities





# University of KwaZulu-Natal

**HEREBY ACKNOWLEDGES THAT**

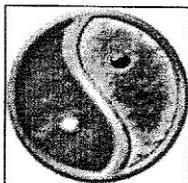
**Mrs Varsha Bangalee**

**HAS COMPLETED A COURSE IN**

**RESEARCH POLICY V: RESEARCH ETHICS**

Completed On  
30 - 7 - 2012

Valid Until  
7 - 2015



**THE FOLLOWING SUBJECTS WERE COMPLETED IN THIS  
COURSE**

- RESEARCH ETHICS POLICY**
- CODE OF CONDUCT FOR RESEARCH**