

**EFFECTIVENESS OF A MONETARY
INCENTIVE ON GENERAL PRACTITIONERS'
BEHAVIOUR OF PROMOTING HIV TESTING
FOR PREGNANT WOMEN IN THE PRIVATE
SECTOR**

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A mini-thesis submitted in partial fulfilment of the requirements for
the degree of Master in Public Health at the School of Public Health,
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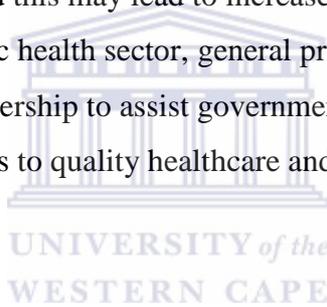
Supervisor: Professor Brian van Wyk

29 November 2015

ABSTRACT

Background

Early HIV testing is a crucial step for pregnant women in preventing mother-to-child transmission of HIV. In the public sector nearly all pregnant women presenting at antenatal clinics are screened for HIV. However, according to a large medical-aid administrator in South Africa, only 21.96% of pregnant women on their medical aid claimed for an HIV test as part of their antenatal care in 2012. Despite having frequent opportunities when consulting with pregnant women, general practitioners tend to be reluctant to offer HIV screening to these privately insured patients. In South Africa, private sector general practitioners are reimbursed for their services at pre-determined, negotiated rates. Previous studies indicate that monetary incentives over and above the negotiated rate may motivate health providers to promote screening to patients, and this may lead to increases in the uptake of testing. Due to limited resources within the public health sector, general practitioners are seen as key resources in a public private partnership to assist government achieve strategic health outcomes such as improved access to quality healthcare and improved compliance to treatment plans.



Methodology

A quasi-experimental, 'before and after' study design, was conducted among 2,934 Metropolitan Health network general practitioners in South Africa who managed a pregnant woman on a medical aid. The same population of general practitioners were used in the pre and post analysis with the general practitioners receiving information about the benefits of HIV testing in pregnant women before and after. The only difference was with the intervention related to a new HIV Counselling and Testing incentive process. Data was extracted from the billing system of a private medical insurance company in South Africa. Quantitative data and stratification was analysed using the Statistical Package for the Social Science software, version 16.0 and Epi Info version 7.1.0.6. The effectiveness of the intervention was assessed by comparing the pre intervention period between April 2011 and September 2012, and post intervention period between March 2013 and August 2014. A subgroup analysis was done to determine variations in the name it, by general practitioners and patient characteristics.

Results

There was no significant difference in HIV testing by general practitioners in this network pre and post the intervention (21.99% vs. 21.96%, $p=0.939$). Compared to general practitioners aged 25-44 years, general practitioners older than 65 years old were 13% less likely to test (OR 0.87, CI: 0.74-1.01) and general practitioners between 45 and 65 years were 9% less likely to do an HIV test (OR 0.91, CI: 0.85-0.98). This study found that as patients' age increased, they were more likely to be tested: beneficiaries aged 35-44 years were 15% more likely to be tested compared to beneficiaries aged 15-24 years (OR 1.15, CI: 1.1-1.21).

Beneficiaries who had a vaginal delivery were less likely to be tested compared to women who chose caesarean as a delivery method (OR 0.87, CI: 0.84-0.9). Medium income beneficiaries were more likely to be tested compared to low income beneficiaries (OR 1.09 CI: 1.03-1.16) and beneficiaries from the "high income" scheme grouping were less likely to be tested (OR 0.87, CI: 0.82-0.92) compared to the low income scheme grouping. The timing and frequency rates of HIV testing, for both caesarean and vaginal deliveries, occurred most between months two and six, peaking at month four. Overall, Eastern Cape and Mpumalanga had the lowest testing rates compared to all the other provinces (OR 0.96 CI: 0.89-1.05).

Conclusions

Most general practitioners' HIV testing rates of pregnant women in the private sector behaviour analysed in this study remained the same, despite the presence of a financial incentive. This study's findings suggest that healthcare provider behaviour to comply with clinical guidelines and best practice, has no association with the presence of financial incentives, especially with increased administration tasks to access the incentive. These study findings emphasise the need to continue to strive for improved compliance especially by older general practitioners' to adhere to clinical best practice and national HIV screening guidelines of pregnant women. The aspiration of achieving the highest quality of care in both private and public sector are principles that should continue to be pursued especially where private sector general practitioners' will be used to offer public health services in the future National Health Insurance.

KEYWORDS

Antenatal Screening, Antenatal Care, Anti-retroviral Therapy, General Practitioner, HIV testing, Incentive, Pregnant, Private Sector, Pay for Performance, Prevention of mother to child transmission, Quality of Care, Public Private Partnerships, National Health Insurance



DECLARATION

I declare that '**Effectiveness of a monetary incentive on General Practitioners' behaviour of promoting HIV testing for pregnant women in the private sector,**' is my own work, that is has not been submitted before for any degree or examination at any University or College, and that all the sources I have quoted or used have been indicated and acknowledged as complete references.

Sirraaj Adams

29 November 2015

Signed:



Acronyms

ART:	anti-retroviral therapy
HIV:	Human Immunodeficiency Virus
ICD-10:	International Classification of Diseases)
WHO:	World Health Organization



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Table of Contents

ABSTRACT	i
Background	i
Methodology	i
Results	ii
Conclusion	ii
Acronyms	v
Acknowledgements	vi
List of Figures	iii
List of Appendices	iii
CHAPTER ONE: INTRODUCTION	1
1.1. Background	1
1.2. Antenatal Care options in South Africa	2
1.3. Non-Compliance to guidelines	3
1.4. Pay for Performance	4
CHAPTER TWO: LITERATURE REVIEW	6
2.1. Pay for Performance Programmes	6
2.2. Factors associated with poor compliance to clinical guidelines	7
2.3. Benefits and challenges related to pay for performance models	8
2.3.1. Benefits of Pay for Performance models	9
2.3.2. Challenges related to P4P models	9
2.4. Multiple interventions required to change healthcare provider behaviours	11
2.5. Summary	13
CHAPTER THREE: METHODOLOGY	14
3.1. Aim and objectives of this study	14
3.2. Study Design	14
3.3. Study Population	15
3.4. Sampling Procedure	16
3.5. Sample Size	17
3.6. Data Collection	17
3.7. Data Analysis	18
3.8. Validity and Reliability	19
3.9. Pilot Study	21

3.10. Ethics considerations	21
CHAPTER FOUR: RESULTS	23
4.1. Description of study participants	23
4.2. Description of pregnant women	24
CHAPTER FIVE: DISCUSSION.....	32
5.1. Description of study participants	32
5.1.1. Age of GP's	32
5.2. Description of Pregnant Women	33
5.2.1. Lack of Contraception	33
5.2.2. Provincial Demographics of Pregnant Women	33
5.2.3. Age of pregnant women.....	34
5.2.4. Income levels of pregnant women	34
5.2.5. Pregnancy Delivery Options	35
5.3. HIV testing rates of pregnant women	35
5.4. Limitations.....	39
5.5. Summary	40
CHAPTER SIX: CONCLSUION AND RECOMMENDATIONS	41
6.1. Conclusion	41
6.2. Recommendations.....	42
6.2.1. GP Behaviour	42
6.2.2. Financial Incentives	42
6.2.3. Future Research	43
References.....	44
Appendices.....	51
Appendix 1 . Permission form from Metropolitan Health	52
Appendix 2: EthicsApproval from University of the Western Cape Research Ethics Committee	53

List of Tables

- Table 1:** HIV prevalence estimates among antenatal women by province, 2010 to 2012
- Table 2:** Billing information of ANC screening behaviour by GPs from the MH risk management system
- Table 3:** Age characteristics of participants (network GP doctors)
- Table 4:** Demographic characteristics of pregnant women
- Table 5:** Delivery characteristics of pregnant women
- Table 6:** Age group and delivery options pre and post intervention
- Table 7:** HIV testing of pregnant women before and after the intervention
- Table 8:** Odds ratio of pre versus post interventions

List of Figures

- Figure 1:** Demonstrates the Health Insurance Information Management System
- Figure 2:** Number of network providers included for pre and post intervention analysis
- Figure 3:** Number of pregnant women included for pre and post intervention analysis
- Figure 4:** A graphical display of when HIV testing was likely to be done for each delivery option
- Figure 5:** The frequency of repeat HIV testing during nine months of pregnancy

List of Appendices

- Appendix 1:** Permission form from Health Insurance Administrator Company
- Appendix 2:** Ethics Approval from University of the Western Cape Research Ethics Committee
- Appendix 3:** Questionnaire

CHAPTER ONE: INTRODUCTION

1.1. Background

The Human Sciences Research Council (hereafter HSRC), South African National HIV Prevalence, Incidence and Behaviour Survey for 2012, reported that South Africa has a HIV prevalence of 12.2% (6.4 million), which was 1.2 million more people living with HIV (hereafter PLHIV) compared to 2008 (10.6% or 5.2 million) (1). The HSRC estimated the prevalence of HIV was the highest among females aged 30–34 and in the female teenage population. The estimated HIV prevalence among females was 8 times that of their male counterparts, suggesting that female teenagers aged 15–19 years are more likely than their male counterparts to have sex, not with their peers, but with older sex partners (1). This data was correlated by 2012 National Antenatal survey that stated, the HIV prevalence among the 15-24 year old pregnant women remained stable approximately 20% and that HIV prevalence among women in the age group 30 - 34 years remains the highest, with a slight increase from 42.2% in 2011 to 42.8% in 2012 (2). Five provinces (Free State, Gauteng, KwaZulu-Natal, Mpumalanga and North West) out of the nine have recorded HIV prevalence estimates above the national estimate of 29.5% as illustrated below in table 1 (2).

Table 1.1: HIV prevalence estimates among antenatal women by province, 2010 to 2012.

	2010			2011			2012		
	N	%PREV	95% CI	N	%PREV	95% CI	N	%PREV	95% CI
South Africa	32225	30.2	29.4-30.9	33326	29.5	28.7-30.2	33865	29.5	28.8-30.2
Eastern Cape	3994	29.9	28.2-31.7	4099	29.3	27.5-31.1	4552	29.1	27.3-30.9
Free State	2223	30.6	28.3-33.0	2292	32.5	30.5-34.5	2309	32.1	29.8-34.3
Gauteng	6714	30.4	29.1-31.8	6948	28.7	27.3-30.1	6755	29.9	28.3-31.5
Kwazulu- Natal	6887	39.5	38.0-41.0	6714	37.4	35.8-39.1	6990	37.4	36.1-38.7
Limpopo	3117	21.9	20.3-23.6	3651	22.1	20.6-23.7	3553	22.3	20.7-23.9
Mpumulanga	2202	35.1	32.6-37.7	2116	36.7	34.3-39.2	2182	36.6	33.3-37.9
North-West	1963	29.6	27.3-31.9	2352	30.2	28.2-32.4	2443	29.7	27.5-32.0
Northern Cape	1144	18.4	16.1-21.1	1125	17.1	14.3-20.1	1173	17.8	15.3-20.7
Western Cape	3981	18.5	15.1-22.5	4029	18.2	14.3-22.8	3908	16.9	13.8-20.5

Source: National Department of Health. National Antenatal Sentinel HIV and Syphilis Prevalence Survey 2012

The United Nations Children's Fund (hereafter UNICEF), has warned that across sub-Saharan Africa mother-to-child-transmission (hereafter MTCT) of HIV remains an on-going threat to child health (3).

UNICEF has requested all governments commit to striving for an AIDS-free generation with the main component of the response being elimination of mother-to-child transmission (3). HIV infection in pregnancy drives premature birth, neo-natal complications, and increased risk of opportunistic infections in the first year of life which results in an increased risk of infant mortality (3).

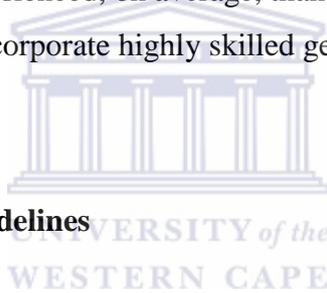
According to the Department of Health, antenatal care is used to identify risk factors and early diagnosis of pregnancy complications and appropriate management, and health education (4). The national Department of Health essential antenatal screening investigations include: Syphilis serology, Rhesus blood group; haemoglobin level; and HIV testing (4).

1.2. Antenatal Care options in South Africa

According to Barron *et al.*, pregnant women in South Africa, access antenatal screening care from two options: either via private or public care. Antenatal and postnatal care is free for pregnant women accessing public health facilities (5). In the public sector, pregnant women are managed by nurses in consultation with a medical officer used as a referral medical specialist and may not always have access to a gynaecologist or obstetrician.

In South Africa, private sector physicians are reimbursed for their services at negotiated rates that are pre-determined for the type of service offered, known as a fee for service (3). In South Africa, private general practitioners typically have a mixed clientele of insured and uninsured patients (6). Services to insured clients are most commonly reimbursed directly by insurers (known as medical aid schemes) on a fee-for-service basis (6). Uninsured (or cash paying) clients are provided with an all-inclusive package of care (consultation and drugs) in return for a fixed cash fee. A high proportion of the uninsured as well as the insured utilise private care. In the private sector, antenatal screening and HIV testing benefits are part of

Prescribed Minimum benefit packages across all medical programmes, which is a set of health care entitlements that all insurers would have to include and fund in any health insurance package (7). According to Chabikuli *et al.*, within the South African private sector the primary provider is a general practitioner with a gynaecologist or obstetrician as the referral specialist. Independent private health care providers (i.e. doctors, dentists, pharmacists, etc.) meet the primary care service needs for 8.1 million insured South Africans (6), whereas, the public health model looks after the balance of the 42 million uninsured patients. Chabikuli *et al.*, also noted that despite considerable efforts to improve access to public sector care for example , sexually transmitted diseases (STDs), general practitioners' in South Africa are still important providers of such care, possibly treating more STD cases than the public sector (6). Ease of access, privacy, confidentiality and short queues are some of the features of the private sector that generally attract patients with STDs (6). Soderlund *et al.*, found that approximately 56% of doctors in South Africa work in the private sector, and are better qualified and more experienced, on average, than their public sector counterparts (7). This illustrates the need to incorporate highly skilled general practitioners into the national health insurance model.



1.3. Non-Compliance to guidelines

Basu *et al.*, found that in low income countries diagnostic accuracy and adherence to medical management standards were worse among general practitioners' compared to public sector doctors (8). Most of these studies examined infectious disease management protocols, including for HIV, tuberculosis and malaria. They also found that private practitioners had significantly worse knowledge of correct diagnosis and treatment of infectious disease compared to non-communicable conditions (8).

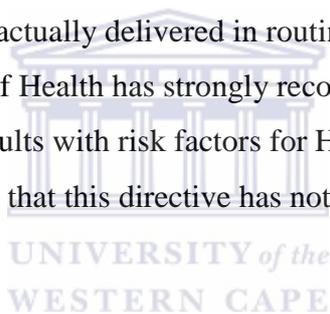
Despite frequent opportunities for pregnant women consulting their general practitioners the preliminary Metropolitan Health data for 2012 suggest that general practitioners tend to be reluctant to offer HIV screening, especially to their pregnant patients.

According to survey studies from India by Datye *et al.*, the following are common reasons for general practitioners' not offering a HIV test. Firstly, general practitioners' assume that the patient's gynaecologist will manage the pregnancy and thus perform the antenatal care,

secondly general practitioners’ ascribe lack of time to conduct tests, thirdly general practitioners’ do not wish to manage a HIV positive patient’s queries and finally general practitioners’ are reluctant to discuss HIV due to fear of offending the respective patient.

1.4. Pay for Performance

The concept of linking financial incentives to the quality of healthcare provided has been termed pay for performance (7). Compensation models that link financial incentives to performance have been widely implemented in other industries and are a powerful lever to influence behaviour payment for performance is seen as a way to create a “business case” for quality by better aligning payment with quality of service instead of quantity of service (9). According to Glickman *et al.*, pay-for-performance programmes may have the potential to improve overall quality of care by narrowing gaps between what national care guidelines recommend and those treatments actually delivered in routine community practice (9). However, while the Department of Health has strongly recommended all sectors, including the private sector, to target test adults with risk factors for HIV infection, such as pregnant women, this study has established that this directive has not been complied within the private sector.



1.5. Problem statement

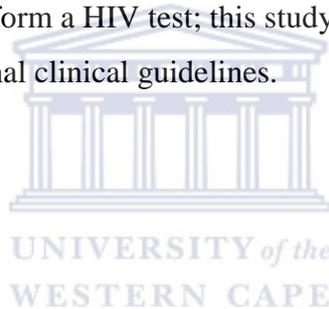
A leading Health Insurance Administrator Company’s preliminary data suggest low antenatal screening HIV testing rates of pregnant women (Table 2). From the claims data received from general practitioners’ and pathology laboratories, the data below suggests that all infectious disease screenings, in pregnant women is being under-screened, including the HIV.

Table 2: Billing information of HIV screening of pregnant women behaviour by general practitioners’ from the Health Insurance risk management system

Private Sector 2012	Actual ANC Tests	% ANC Tests
Total Pregnant Population	35969	
HIV	7908	21.99%

This research study demonstrated the low baseline level of HIV testing in the private sector and what impact a financial incentive intervention would have on changing the behaviour of general practitioners' to increase HIV testing provision. The analytic goal was intended to evaluate the effects of the intervention by comparing pre- to post changes specifically on the rate of HIV testing.

One of primary end points of the study was to determine if private sector general practitioners' have the potential to change their clinical behaviour with respect to preventative HIV testing screening of pregnant women; and whether an incentive would motivate the general practitioners' to initiate testing. Financial incentives that are linked to the quality of care rendered by the general practitioners', can serve as an effective approach to modifying the behaviour of general practitioners' that controls the type, quantity and quality of healthcare services being provided. By rewarding the general practitioners' for taking extra time to offer and perform a HIV test; this study aimed to address and remove any barriers to adherence to the national clinical guidelines.



1.6 Conclusion

One the benefits of the study was that, general practitioners' would move away from targeted HIV testing based on symptomatic, social or lifestyle risk factors and move towards routine screening for all pregnant women. Promotion of more routine screening has additional benefits over targeted testing because HIV-positive patients have high consultation visits, due to increased risk of opportunistic infection, prior to diagnosis and routine screening may identify persons who are unaware of their risk or who do not disclose high risk behaviours if they are asked. It is hoped that this financial incentive provided evidence that would justify the additional cost by demonstrating an improvement in the quality of service aligned with a specific health outcome.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter will deal with four themes. Firstly, defining pay for performance secondly, possible factors associated with poor compliance to clinical guidelines, thirdly, benefits and challenges related to pay for performance models and lastly, the theories used to explain the multiple interventions required to change healthcare provider behaviours.

The data source approach included descriptive information about paying for health care quality. We used Google Scholar, PubMed and Plos online for scientific literature using combinations of the following keywords: Doctor, General Practitioner, pay for performance, pay for quality improvement, financial incentive bonus, quality of care, provider payment, and performance improvement. Once the list of sources was identified, the various abstracts were read to determine if the study matched one of the four themes mentioned above.

2.1. Pay for Performance Programmes

The research of theme one attempted to understand the various incentive funding models and the design of the incentive models within the healthcare market.

In order to improve the gap that exists between evidence-based medical practices and the care that many patients actually receive, large health insurance purchasers such Metropolitan Heath, are experimenting with reimbursement arrangements called pay for performance that tie a portion of payments for physician services to measures of quality (9,10). In order to manage rising healthcare costs, pay for performance are viewed as a tool to promote more efficient use of healthcare resources while improving patient outcomes (9).

Christianson *et al.*, found that pay for performance standards for physicians focused on process, acceptance of information technology and outcome measures related to chronic disease management, as well as primary prevention, such as screening and immunisations (10). These pay for performance principles have been accepted and implemented in several countries in various models. More than half of commercial health plans in the United States

currently use pay for performance incentives in their provider contracts. According to Rosenthal *et al.*, the largest demonstration project in America is the Hospital Quality Improvement Demonstration (hereafter HQID) Project, which offers financial incentives to hospitals based on the inpatient quality of care for five clinical conditions; acute myocardial infarction, heart failure, pneumonia, coronary artery bypass surgery, and hip and knee replacement (11). Analysis by McDonald *et al.*, found that over £2 billion has been distributed to providers in England since 2004 who participated in the National Health Service (hereafter NHS) pay for performance Quality Outcomes Framework (QOF) model (12). The QOF model provided financial incentives to primary care physicians who achieved 146 quality indicators related to chronic disease and patient experience (12).

2.2. Factors associated with poor compliance to clinical guidelines

The second theme's research attempted to understand the factors associated with poor compliance to clinical guidelines which may explain the current low uptake of HIV screening in pregnant women. According to Berendes *et al.*, poor compliance to guidelines by health care providers plagues the delivery of health services (13). Poor compliance to clinical guidelines is not simply due to inadequate training or deficiencies in provider knowledge (13). Below we unpack the evidence associated with poor guideline compliance.

There are several factors that influence poor compliance of HIV testing by general practitioners', namely, interpersonal skills of general practitioners', lack of time and the logistics of offering a HIV test in a private practice (6). According to Martin *et al.*, the interpersonal dynamics of the GP–patient relationship play an important role in determining patient acceptance of testing (14). According to Datye *et al.*, general practitioners' also experience discomfort discussing 'difficult' issues, general practitioners' who have prejudices around HIV-related risk behaviours and 'risk groups' have been known to affect the quality of patient care and impede communication between the general practitioners' and their patients (15). The ability of the general practitioners' to earn the patients' trust is essential to ensure their emotional disclosure and is therefore a crucial component of the patient–GP relationship (14).

Besides the general practitioner, the type of patient also plays a role in discussion between the general practitioner and patient around HIV testing. Research by Mkwanazi *et al.* found that older and more educated women were less likely to accept testing, suggesting the need to specifically target these patients (16). Lack of interpersonal skills by general practitioners' to address sensitive issues with patients is suggested to be a major factor in poor adherence to the antenatal guidelines with regards to offering HIV testing to pregnant women (16). Patients who feel that their physicians communicate well with them and actively encourage them to be involved in their own care tend to be more motivated to testing (14).

According to Armington, 2005, the logistics of performing HIV testing is another deterrent, due the fact that implementing rapid HIV testing requires planning; firstly, there is the issue of space in the general practitioner practice to consider, as patients require a confidential space to review the written materials, including the informed consent and to receive the necessary pre-test counselling (17). Another factor, according to Armington, is the time involved in counselling and testing as he estimates that 5 to 10 minutes is required for pre-test counselling, 5 to 20 minutes is required for post-test counselling, and a further 5 to 20-minutes of processing time is required in between, depending on the test used (17). Thus, it is important for general practitioners' to provide a separate consultation area to ensure confidentiality is maintained and a comfortable space for the patient to be counselled in.

A study by Rayment *et al.*, investigating barriers to implementation of HIV testing by clinical staff, found challenges in the provision of HIV testing, related to a lack of time to conduct testing and being ill-prepared to answer patient queries. General practitioners felt that consent to test was too burdensome and time consuming to answer related questions (18).

2.3. Benefits and challenges related to pay for performance models

The research of the third theme, attempted to present both the benefits and challenges associated with P4P models. In the health insurance industry it has been accepted that some form of incentive models show promise to improve healthcare quality and reduce costs. However, it seems multiple approaches may be required to provide value for key stakeholders, including patients, providers, and payers (19). Despite monitoring and

evaluation mechanism being in place, even sophisticated pay for performance models does not eliminate the incentives for overtreatment, under treatment or abuse of the system (19).

2.3.1. Benefits of Pay for Performance models

According to Brindis *et al.*, linking financial incentive to quality is also viewed by many as a more acceptable approach compared to traditional managed care models where financial incentives are provided to physicians to limit referrals and to see more patients per day (19). Grumbach *et al.*, found the acceptance of incentives by doctors high when the model encouraged preventative care medicine, such as screening (20). This model encouraged better care for the patients and contributed to their overall net income for their practice (20).

Pay for performance models also holds promise because many of the traditional approaches to improving quality, such as physician education, provider certification and consumerism, have failed, largely due to the fragmented nature of the healthcare delivery system (19).

2.3.2. Challenges related to pay for performance models

Rosenthal *et al.* noted that most pay for performance initiatives reward achievement of a benchmark, and not quality improvement per se; physician practices that start at a lower level, but show substantial improvement, are less likely to be rewarded by these initiatives (11). A study by Chabikuli *et al.* found differences between the quality of care offered to insured and uninsured patients when general practitioners screened and treated patients with sexually transmitted infections (STIs) (6). The general practitioners' in this study prescribed cheaper but ineffective treatment regimens to uninsured patients but not to insured patients. Thus, suggesting that the cost of drugs, together with the financing mechanism, is at least one determinant of the quality of care offered. In addition, this study found that the fee for services on its own, in the absence of any incentive linked to a health outcome, can however contribute to over-treatment, excessive costs and wastage of resources. This was particularly prevalent by pharmaceutical company's incentivising general practitioners' to prescribe their expensive drugs to insured clients. According to Kenefick *et al.*, under traditional fee for-service reimbursement arrangements, financial incentives primarily are tied to the volume of procedures that rewards physicians for doing more and not necessarily for doing the right

thing (21). The aforementioned data suggests that activity based financial reimbursement models alone, may encourage perverse behaviour and may not achieve the desired health outcomes

One of other challenges to financial incentive models relate to how high the level of payment be to achieve the desired outcome. According to Young and Conrad, if a research study finds that, in a particular situation, providers did not respond to a financial incentive by changing their behaviours, it might seem reasonable to recommend that policy-makers increase the payment in order to achieve their goal (22). However, this would not be warranted if the value of the gains from the behaviour change was not sufficient to justify the higher payment, which in this case is the cost of avoiding a HIV positive baby being born (22).

Hillman *et al.*, found incentives directed at the individual physician-level versus physician's group's practices were found to be the most effective (23). In this study by Hillman *et al.*, they randomly assigned general practitioner practice sites serving children in a medical aid health maintenance organization (HMO) to one of three groups: a feedback group (where general practitioners' received written feedback about compliance scores), a feedback and incentive group (where physicians received feedback and a financial bonus when compliance criteria were met), and a control group (23). They then monitored compliance with paediatric preventive care guidelines through semi-annual chart audits during the years 1993 to 1995 (23). The Hillman *et al.* study, which combined the intervention of financial incentives and feedback, did not improve screening significantly (23). The authors speculated that the financial incentives may have been too small or the incentive was poorly communicated to physicians.

According to Kenefick *et al.*, if quality is the goal, payments need to be structured to maximize quality of care, not quantity (21). Kenefick *et al.* also agreed that small incentives have been shown to be ineffective in changing healthcare provider behaviour (21).

Christianson *et al.*, concurred around a cautious expectation as their research found that procedural aspects of care delivery seemed to have improved, but that there was little evidence regarding impact on the health of patients (10).

2.4. Multiple interventions required to change healthcare provider behaviours

The research of the fourth theme, attempted to bring the various successful methods together in an effective multiple intervention approach.

Doctors experience of financial incentives and pressure related to their practices differed according to practice settings and the level of income they can generate from incentives (20). Research on pay for performance by Dudley in 2005, found financial incentives have the potential to influence the recommendations providers when reaching a decision with their patient about the utilisation of services (24). The degree of change in the provider behaviour observed depends on many factors in addition to the amount of financial reward at stake, including the willingness of patients to accept the advice of their primary care physicians and the ability of primary care physicians to reconcile their recommendations with their role of patient advocate, for the patient's best interest (24).

An important outcome is adherence to guidelines, and research by Kahn *et al.*, who conducted an observational cohort study evaluating hospital quality and financial performance of two incentive programmes namely: the Premier Hospital Quality Incentive Demonstration programme and the Medicare Payment Advisory commission programme concluded that pay for performance had the potential for improving quality of care and generating greater funding for hospitals (25). The financial data of 4 203 hospitals and quality guideline adherence scores for heart attack, heart failure and pneumonia were examined. The top 10 per cent performing hospitals received a bonus equal to 2 per cent of payments made for discharges of patients with the corresponding condition, and those between the eightieth and ninetieth percentiles got a 1 per cent bonus (25). The study found that pay for performance models linked to quality health guidelines generated greater hospital funding than hospitals without pay for performance (25).

A systematic review of the effectiveness of healthcare in the National Health Service by University of York in 1999 concluded that passive dissemination of clinical guidelines was generally ineffective (26). The review found that it was unlikely to result in behaviour change when used alone, but it may be useful in raising awareness of the desired behaviour change, in terms of adherence to the clinical guidelines, especially diagnosis and treatment (26).

Davis *et al.*, found that certain single interventions such as educational outreach meetings, opinion leaders, patient-mediated interventions and reminders are likely to be effective in changing healthcare provider behaviour (27). However, multi-faceted interventions were more likely to be successful (27).

When general practitioners' were remunerated by government for their services related to primary care, HIV testing was high. Research by Hettige found that in countries where private sector HIV testing use was highest, the private sector was also highly utilised for other health services such as antenatal care, infectious disease, family planning, and sexually transmitted infection treatment (28).

A study by Sutton *et al.* found that pay for performance in all National Health Service hospitals in one region of England was associated with a clinically significant reduction in mortality (29). As compared with a similar United States programme, the United Kingdom programme had larger bonuses and a greater investment by hospitals in quality-improvement activities (29). The pay for performance model involved the early identification and targeting of high risk patients groups that eventually improved mortality and morbidity outcomes (29).

A study by De Walque *et al.*, examining the impact of a pay for performance intervention on individual and couple HIV Counselling and Testing found a positive impact of pay for performance with an increase of 6.1% in the probability of individuals having ever been tested (30). The results also indicated larger impacts of pay for performance on the likelihood that the respondent reports both partners have ever been tested, especially among discordant couples in which only one of the partners is HIV positive (30).

A systematic review of pay for performance programmes by Flodgren *et al.* found that payment for each service, episode or visit was generally effective, as was payment for providing care for a patient or specific population (31). However, a study by Doran *et al.* found that incentive initiatives in primary care resulted in early success, however improvement plateau for incentivised performance measures and quality deteriorated for non-incentivised measures like continuity of care (32). Simplicity of the model was also important to general practitioners' as compliance and understanding is affected when they are exposed to different incentives from various medical aids (19).

2.5. Summary

The study aimed to create awareness by the general practitioners to change their clinical behaviour with respect to preventive, diagnostic and treatment decisions, or both. Based on the preceding data, a large monetary incentive along with current guideline dissemination linked to a health outcome could be an effective intervention that could increase the adherence to antenatal clinical guidelines, which include offering a HIV test to all pregnant mothers. In addition practical implementations factors in the general practitioners' practice could also impact on poor adherence to the antenatal guidelines by general practitioners' such as poorly designed workflow and care systems, undue commercial influence, knowledge gaps, memory lapse, lack of time, poor interpersonal skills as well as whether the patient has medical insurance. These general practitioners claimed for consultations related to antenatal care using the MH billing system for re-imburement of services rendered.



CHAPTER THREE: METHODOLOGY

In this chapter, a description of the aim and objectives of the study is covered. This section covers the study design, study population, sample size, procedure, data collection and processing, data analysis, validity, as well as ethical considerations.

3.1. Aim and objectives of this study

The aim of the study was to determine the effectiveness of a monetary incentive to change the behaviour general practitioners, resulting in an increased uptake of HIV testing among pregnant women who have private medical-aid insurance throughout South Africa.

The objectives of the study were to firstly determine if there was an increase in the uptake of HIV testing among pregnant women receiving antenatal care at general practitioner practices following the offering of a monetary incentive to the general practitioners, secondly to determine variations in the uptake of HIV testing based on characteristics of pregnant women and the general practitioner. The hypothesis was that the financial incentive would encourage general practitioners' to increase HIV testing rates of pregnant women.

3.2. Study Design

According to Beaglehole *et al.*, intervention or experimental study designs involves attempting to change a variable in one or more groups of people (33). The effects of an intervention are measured by comparing the outcome in the experimental group with that in a control group (33). Non-randomised before and after studies measure general practitioner performance before and after the introduction of an intervention (e.g. incentive) in the same study site(s) and any observed differences in performance are assumed to be due to the intervention (34). In this case the control group of general practitioners' was same as the intervention group with their behaviour before the intervention being used as the baseline or historical control response. A quasi-experimental, before and after study design, was used to examine the effectiveness of a monetary incentive on the behaviour of general practitioner.

According to Terre Blanche *et al.*, experimental study designs such as before and after studies assisted in evaluating the impact of the incentive, cause and effect sequence (34).

However experimental studies tend to be expensive and difficult to organise due to ethical and informed consent challenges. These challenges were overcome as this study evaluated the impact of the incentive using routine data from the Health Insurance billing system in addition the data remained confidential and no- identifiable information of the patient or general practitioner will be published to maintain anonymity.

In the case of this incentive model, no patient was denied access to care; the medical scheme approved additional benefits for the incentive over and above normal antenatal care benefits. The intervention or incentive was already implemented and the research is analysing and comparing the impact of incentive on the exposed and unexposed group of general practitioners'. The benefit to the patients of increased testing and awareness of their status empowers the patient to access treatment early in their disease.

3.3. Study Population



The general practitioners' in South Africa are contracted to a fee for services with a large health insurance administrator. According to council of medical schemes there are 3500 general practitioners, as at October 2013, who are registered with the Health Professions Council of South Africa and who claim from medical schemes in South Africa (35).

The target population for the study were the general practitioners' who are contracted to the Health Insurance Provider Network and who consulted at least 1 pregnant woman for the year. As at February 2013, there were 2,630 distinct general practitioners' who met these criteria. Pregnancy related consultations was identified, by searching the Health Insurance company's data base for specific pregnancy related ICD-10 (International Classification of Diseases) codes the general practitioners' used on their consultation claims they submitted to Health Insurance administrator company for payment of services rendered. This ensured with reasonable confidence that the general practitioner had confirmed the patient was pregnant. If a general practitioner did not use a pregnancy related code or used an unspecified ICD-10, we could not assume with reasonable confidence the general practitioner was aware of the

patient's pregnancy state. This was done to avoid measurement bias or potential systematic errors.

Intervention: The intervention involved an email communication sent to all network general practitioners' who consult with at least one pregnant woman per annum. General practitioners' started receiving emails in October 2012 and then repeated monthly until February 2013. The email informed the general practitioners' of the benefits of HIV screening of pregnant women as well how to access the HIV testing incentive via the HIV Counselling and Testing web portal. Included in the email was a link to a self-training manual demonstrating and explaining how to use the HIV Counselling and Testing portal. All network general practitioners' had to have had a contact with a pregnant female beneficiary during a nine month period before delivery date. Follow-up time was divided into a pre- and post-intervention period, allowing for a 21-month interval of contact time with a network general practitioners' per period. Pre intervention period included deliveries between 1 April 2011 and 31 September 2012 and post intervention period deliveries between 1 March 2013 and 31 August 2014. Data from all provinces were included for analyses for women between the ages of 15 and 55 years. The network general practitioner, intervention group, would receive R200 if they performed an HIV test on a pregnant patient, over and above their normal consultation fee.

3.4. Sampling Procedure

Burns and Grove described eligibility criteria or inclusion as list of characteristics essential for eligibility in the study population (36). A quasi experimental study is similar to a controlled experimental design except that we were unable to randomly assign the general practitioner to either the experimental or the control group, therefore we were unable to control which group will receive the incentive (34). The general practitioners' do not all have the same chance of being in the control or the experimental groups, or of receiving or not receiving the incentive. This study's non randomised sample population consists of 2934 distinct general practitioners' who consult with at least one pregnant woman per annum. The email informed the general practitioners' of the benefits of HIV screening of pregnant women as well how to access the HIV testing incentive via the HIV Counselling and testing web portal.

3.5. Sample Size

The minimum sample size to provide a 95% confidence level for the pre- and post-intervention groups was estimated using Epi Info version 7.1.0.6 Stat Calc. The following parameters were used: to achieve 80% power and to detect a relative risk of 2 in a study with an allocation ratio of 1:1 non-exposed to exposed subjects, and with an expected incidence in the non-exposed group of 10%, with $1 - \alpha = .95$, EpiTable determined the minimum sample size of $n_1 = n_2$ was estimated to be 250. A group of 2321 network general practitioners qualified for both and pre and post intervention groups while only 304 network general practitioners qualified for the pre-intervention period and 309 for the post intervention period. All the data records were eventually used.

3.6. Data Collection

Permission to conduct the study was obtained from the, General Manager of Out of Hospital, at Health Insurance Administrator Company (Appendix 1). According to Ferver *et al.*, claims or billing databases are electronic records of transactions that have occurred between patients and healthcare providers (37). A major use of claims data is as a substitute for the information contained in patients' medical records. Medical records are often not available in electronic format, which makes them harder to access (37).

General practitioners' would capture the data required using the HIV Counselling and Testing web portal that was linked to a centralised data base housed by the Health Insurance Administrator Company. This routine data collected would include administrative, billing and clinical data from the pre-existing centralised within Health Insurance Administrator Company's data warehouse. The Health Insurance Administrator Company has an electronic integrated billing system that is able to provide a 'single view' of the member and service provider records. Real time validation of members and service provider records is performed during claims processing against the billing system master files. The Health Insurance Administrator Company billing system is currently receiving claims electronically through electronic data interchange (EDI) partners and the internet.

The data of the number of HIV tests being performed for pregnant women, was divided into a pre- and post-intervention period, allowing for a 21-month interval of contact time with a Foundation DSP network general practitioner per period. Pre intervention period included deliveries between 1 April 2011 and 31 September 2012 and post intervention period deliveries between 1 March 2013 and 31 August 2014. Data from all provinces were included for analyses for women between the ages of 15 and 55 years.

3.7. Data Analysis

Data was analysed to test the hypothesis of whether or not financial incentive would encourage general practitioners' to increase HIV testing rates of pregnant women. A sequel query to extract the data from the Health Insurance Administrator Company data warehouse was scripted by a data analyst. The routine data used in the analysis included patient demographics, clinical data, date service rendered, patient demographics, laboratory tests, diagnostic codes and billing tariffs for patient contacts and the link to the treatment programmes for the period 01 April 2011 to 31 August 2014.

The quantitative data extracted was sorted into five variables namely: Demographic data related to the patient such as: Identity Number, Age, Income band and Province of residence. Data related to the pregnancy such as, procedure codes to identity pregnancy, year of pregnancy, expected date of delivery, obstetric type (miscarriage, termination of pregnancy, vaginal delivery and caesarean section), demographic data related to the general practitioner such as: Age and Province of practice, data related to HIV claim such as, the date of HIV claim and that the general practitioner was a network doctor. The percentage compliance was calculated using the HIV test claims for each unique pregnant woman who claimed divided by the number of pregnant women. According to Varkevisser *et al.*, before and during data processing quality control checks are required to ensure completeness and internal consistency (38). The analysis of the data includes three statistical steps.

Firstly, the data was sorted in Excel according to categories such as demographic data of the patient and general practitioner, pregnancy and HIV test data. Categorical count of billing data and patient clinical data were used to determine trends and frequencies. Thereafter, a statistical analysis was performed on each variable for distribution of counts and the

numerical data was analysed to obtain means, range and standard deviation. Categorical data such as age bands were used to test the frequency distribution of the pregnant women per annum. Secondly, the data analysis paired variables that were relevant and stratified according to variables such as age, province, and income level of pregnant woman. This cross-tabulation was produced to show any association from the findings and for sensitivity analysis purposes to determine if there are any patterns.

Thirdly, analysis was done to look for association between network versus non network general practitioner HIV testing screening rates using t-tests were used to check if the difference before and after the intervention was significant or not. The statistical significance was assessed at $p < 0.05$ level. According to Gehlbach, statistical significance of $p < 0.05$ helps rule out an important threat to validity and that the result could be due to chance rather than to real difference (39). Data is presented using tables, bar charts and pie charts.

3.8. Validity and Reliability

According to Rungtusanatham, content validity is established by determining the extent to which a measure reflects a specific domain of content (40). All claims and clinical data captured and processed on the Metropolitan Health billing system, production system is copied and loaded into the data warehouse on a daily or weekly basis, depending on the frequency of the specific transaction. This ensures that the data warehouse reflects up-to-date information, thus facilitating data analysis and trend reporting.

All data that ends up on the operational data store (hereafter ODS) on the data warehouse coming from the Health Insurance Administrator Company's operational system is extensively scrubbed in order to impart value from a reporting and statistical point of view. Various statistical models such as Statistical Package for the Social Science software, can utilise the data in the ODS and data marts to do *in situ* risk stratification of service providers and beneficiaries on the Health Insurance Administrator Company system.

Pregnant women below the age of 15 and over the age of 55 were excluded due to possible data capture errors. Only HIV tests claimed 9 months prior to the expected date of delivery for any type of pregnancy (termination of pregnancy, miscarriage, normal vaginal delivery,

caesarean section) were included. Any HIV testing done prior to the nine months period of the pregnancy, or after the delivery would not be attributed to the study. The HIV test claim has to be linked to requesting general practitioners'; if no general practitioner is associated to the claim the record would be excluded. Possible reason could be a data capture error at the laboratory. The general practitioner must have agreed and contracted to the Health Insurance Administrator Company as a network general practitioner to have the network indicator added to his HIV test claim as part of the study. If the general practitioner is not indicated as network general practitioner his HIV testing claims will be counted as part of the non-network group. Patients and general practitioners' without accurate postal codes or provinces were highlighted and manually corrected by reviewing the original membership or general practitioner contract. Any missing income bands and ages of the patients or general practitioner was highlighted and corrected as mentioned above.

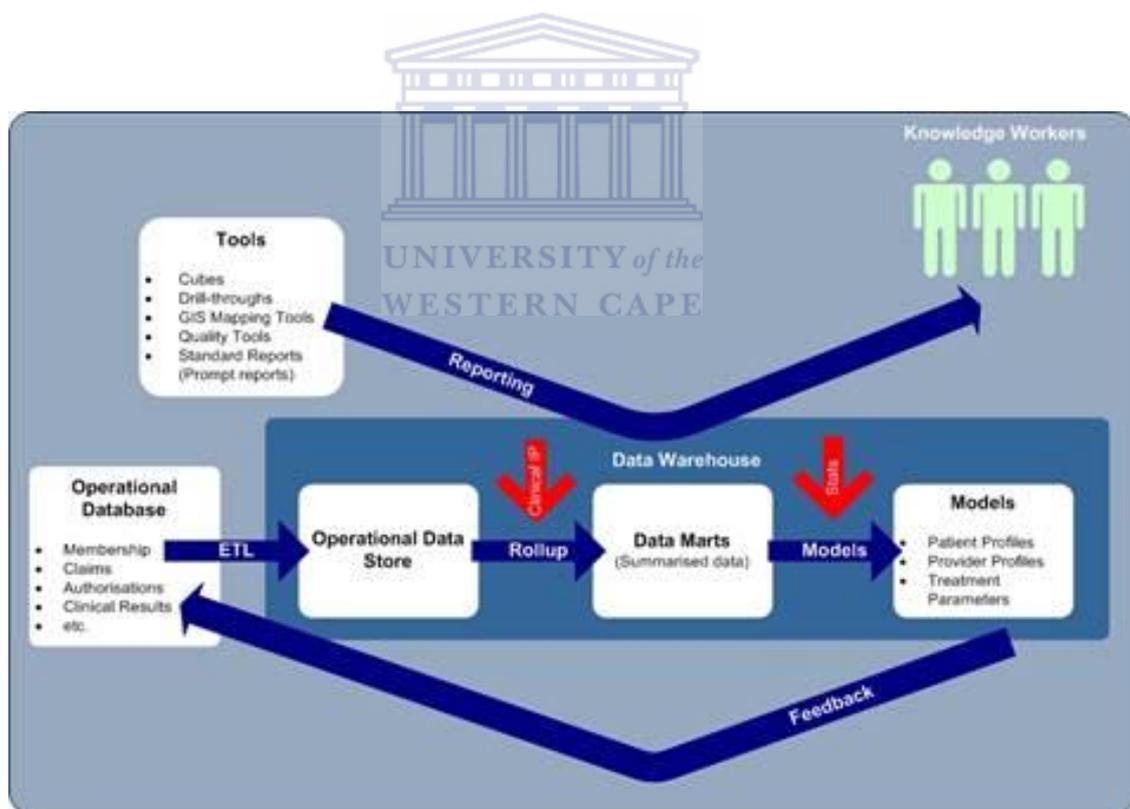


Figure 1: Demonstrates the Health Insurance Information Management System (Source :Metropolitan Health)

Figure 1 above illustrates how the clinical and claims data is collected and stored on the data warehouse for reporting analytics. The process is described below.

There could be other confounding factors or co-intervention programmes implemented by competing healthcare companies that could affect the response of the exposed and unexposed groups. This would be difficult to establish unless known prior to the start of the project. As all pregnant women have access to antenatal care on medical aid due to prescribed minimum benefits, the ability to pay for healthcare service will not be a potential confounder. The quantitative data was counted and pivoted in Excel to create results or information from the data and then stratified using the Statistical Package for the Social Science software.

3.9. Pilot Study

A pilot study was conducted prior to the main data of the study to test the acceptance of the incentive by general practitioners'. This was done to test the reliability of the HIV testing portal and billing instrument and if general practitioners' would agree offer HIV testing to pregnant women at an enhanced fee to compensate for additional time and effort required. In addition the pilot was conducted to determine the content validity of the billing and demographic data collected in MH billing system.



3.10. Ethics considerations

Polit *et al.* pointed out that research involving human beings may intend to advance knowledge, but should always adhere to the ethical rules that have been developed to protect rights of study participants (41). Permission to conduct the study and secondary data analysis was obtained from the General Manager of Out of Hospital at the Health Insurance Administrator Company (Appendix 1). An application for ethics approval was submitted, and was subsequently accepted by the University of the Western Cape Committee and Higher Degrees Committee (Appendix 2). In order to avoid any risk or harm to patients, no patient who consulted with a general practitioner was denied access to care as part of the study. The monetary incentive was over and above standard medical aid benefits as prescribed by the Medical Scheme Council. All participating general practitioners' were trained by the researcher about the benefits of HIV screening and the process of accessing the incentive, via the web portal. In addition the data remained confidential and no identifiable information of the patient or general practitioners' will be published to maintain anonymity. The intervention or incentive was already implemented and the research was analysing and

comparing the impact of incentive on the exposed and unexposed group of general practitioners’.

3.11 Summary

We were able to analyse and evaluate the effects of the intervention by comparing pre- to post changes in the rate of HIV testing due to the intervention .The descriptive incidence rate of ANC screening rate of the at risk patients, namely pregnant women, was compared before and after the intervention was introduced. As mentioned above, the primary outcome of the study was only to measure successful HIV tests performed by the general practitioners’ on pregnant women.



CHAPTER FOUR: RESULTS

In this chapter, the results of the study are presented. The first section contains a description of the study sample. Thereafter, the results from the finding will be presented according to the objectives of the study. Subsequently, statistical analysis will be covered in order to explore the associations between the different factors and the HIV testing rates of pregnant women in the private sector.

4.1. Description of study participants

In total, 2 934 distinct network general practitioner were included in the analysis. Figure 2 illustrates the number of network doctors included per intervention period and the overlap

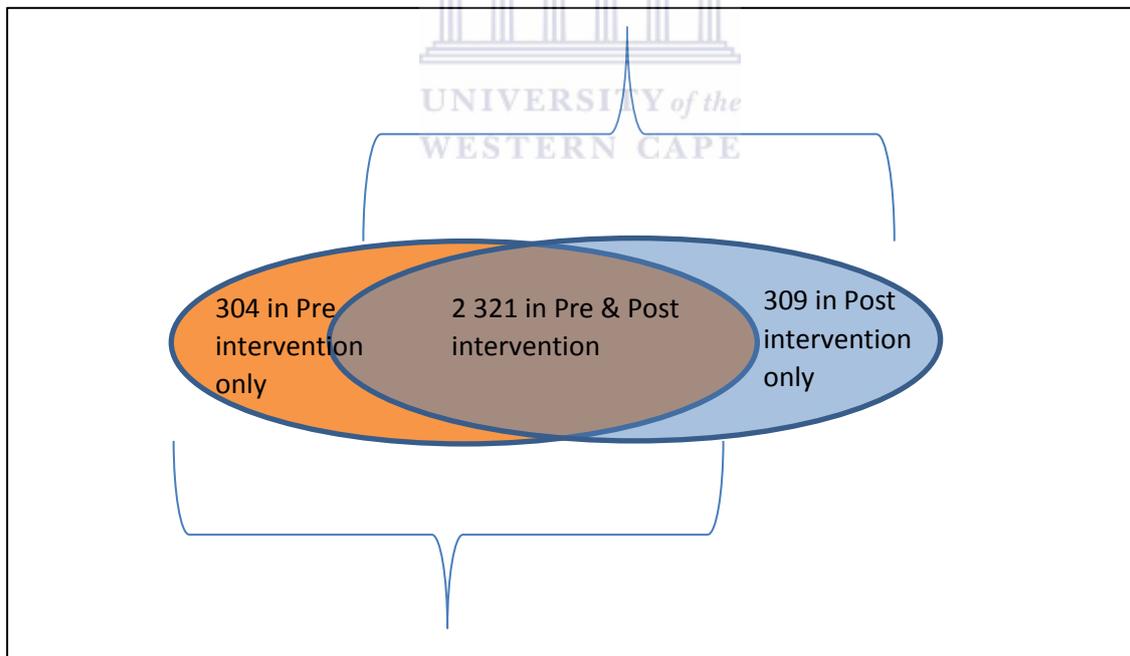


Figure 2: Number of network providers included for pre and post intervention analysis

Figure 2 above illustrates the number of general practitioners during the pre and post intervention stages. The pre intervention period included 2, 625 network general practitioners and post intervention period 2, 630 doctors. A group of 2, 321 network doctors qualified for both pre and post intervention groups while 304 network doctors qualified only for the pre intervention period and 309 for the post intervention period. Only 25.2% of participating GP's were between the age of 25 to 44 years. Median age of the participating network general practitioners' who performed HIV testing was 51 years (Inter Quartile Range (IQR): 43-59 years), 58.36% of the participating network general practitioners' were between the age of 45-65 years as illustrated in table 3 below. With general practitioners' over the age of 65 years old representing 12.6% of the study participants.

Table 3 : Age characteristics of participants (network general pracioners)

	Pre intervention period n (%)	Post intervention period n (%)	Overall n (%)
Network doctor, age in years			
N	2 625	2 630	2934
Mean (SD)	54.86 (10.68)	51.16 (10.87)	51.43 (10.99)
Median (IQR)	51 (43-60)	51 (43-59)	51 (43-59)
Network doctor, grouped per age categories (age in years?)			
25-44	633 (24.11)	691 (26.27)	1 324 (25.20)
45-65	1 554 (59.20)	1 513 (57.53)	3 067 (58.36)
>65	341 (12.99)	321 (3.99)	662 (12.60)

SD: Standard deviation

IQR: Inter quartile range

4.2. Description of pregnant women

A total of 67 507 distinct pregnant women contributed 71 066 records (pregnancy claims) for analysis, 35 969 pregnancy claims for pre intervention period and 35 097 pregnancy claims for post intervention period as illustrated in table 4. Nearly 50% of the pregnant women were from Gauteng and Kwazulu-Natal; representing 26.83 % and 21.66% respectively, of pregnant women included in the sample for analysis. The Eastern Cape and the Western Cape

represented 11.21% and 9.58% respectively, of pregnant women included in the sample for analysis. This provincial spread did not influence the outcome of the study and closely represented the normal population distribution of South Africa.

Table 4: Demographic characteristics of pregnant women

	Pre intervention period n (%)	Post intervention period n (%)	Overall women included in analysis n (%)
Pregnant women records	35 969 (50.61)	35 097 (49.39)	71 066
Pregnant women Province			
Eastern Cape	4 196 (11.67)	3 774 (10.75)	7 970 (11.21)
Free State	2 392 (6.65)	2 494 (7.11)	4 886 (6.88)
Gauteng	9 814 (27.28)	9 251 (26.36)	19 065 (26.83)
Kwazulu Natal	7 432 (20.66)	7 961 (22.68)	15 393 (21.66)
Limpopo	3 147 (8.75)	3 422 (9.75)	6 569 (9.24)
Mpumalanga	1 773 (4.93)	1 532 (4.37)	3 305 (4.65)
North West	2 347 (6.53)	2 317 (6.6)	4 664 (6.56)
Northern Cape	1 225 (3.41)	1 183 (3.37)	2 408 (3.39)
Western Cape	3 643 (10.13)	3 163 (9.01)	6 806 (9.58)
Age of pregnant women (unit)	Pre intervention period	Post intervention period	Overall
Mean (SD)	29.74 (5.96)	30.21 (6.06)	29.96 (6.01)
Median (IQR)	30 (26-34)	30 (26-34)	30 (26-34)
Beneficiary age category (unit)			
15-19	2 008 (5.58)	1 893 (5.39)	3 901 (5.49)
20-24	4 669 (12.98)	4 190 (11.94)	8 859 (12.47)
25-29	10 820 (30.08)	9 595 (27.34)	20 415 (28.73)
30-34	10 378 (28.85)	10 758 (30.65)	21 136 (29.74)
35-39	6 383 (17.75)	6 515 (18.56)	12 898 (18.15)
40-44	1 613 (4.48)	2 035 (5.8)	3 648 (5.13)
45-49	96 (0.27)	108 (0.31)	204 (0.29)
50-54	2 (0.01)	3 (0.01)	5 (0.01)
Beneficiary income category			
Low	3 190 (8.87)	3 167 (9.02)	6 357 (8.95)
Medium	6 613 (18.39)	6 904 (19.67)	13 517 (19.02)
High	26 166 (72.75)	25 026 (71.31)	51 192 (72.03)

Beneficiaries could have contributed more than one record for analysis e.g. a pregnancy during pre and post intervention period or two pregnancies either during pre or post period. A total of 67 507 distinct pregnancy claims contributed 71 066 records (pregnancy claims) for analysis, 35 969 pregnancy claims for pre intervention period and 35 097 pregnancy claims for post intervention period. A total of 2 476 women were pregnant twice contributed a pre and post pregnancy claim while 32 953 beneficiaries only contributed a pre intervention pregnancy claim and 32 078 contributed a post intervention pregnancy claim as illustrated by figure 3 below. Most of the deliveries occurred in the 25-29 years age group (28.73%), 30-34 years (29.74%) and 35-39 years age group (18.15%). Teenage pregnancy for the ages 15-19 years only represented 5.9% of pregnant population The median age of beneficiaries who delivered was 30 years (IQR: 26-34). Overall, 72.03% of patients were in the high income category, followed by medium income category (19.02%) and lastly low income category (8.95).

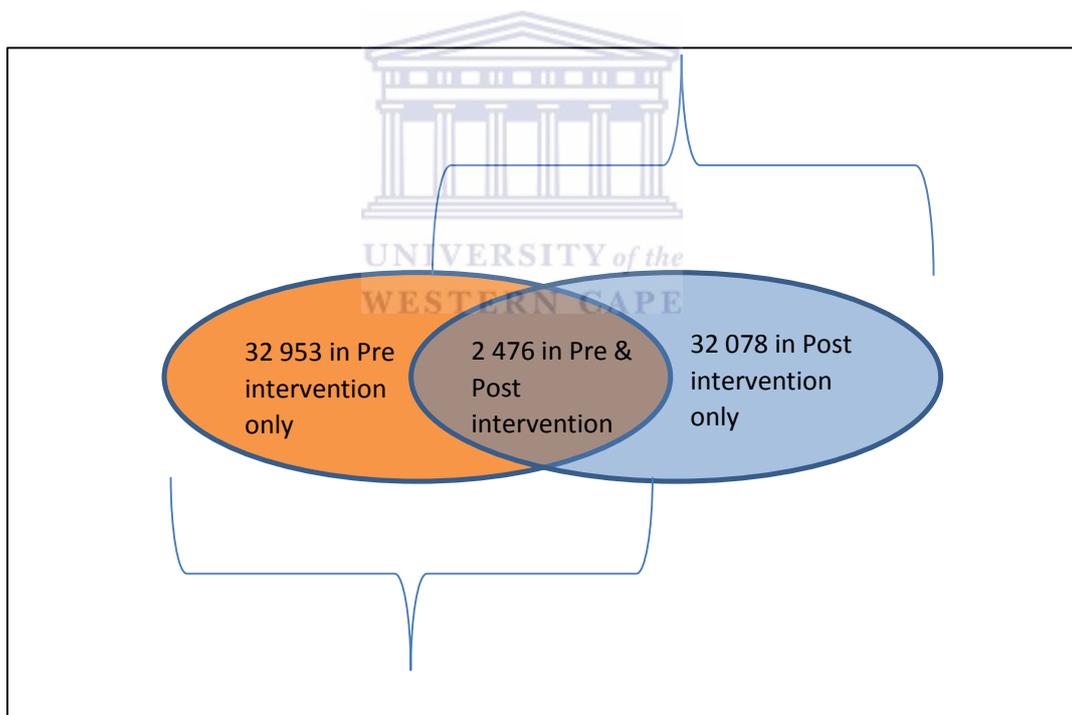


Figure 3: Number of pregnant women included for pre and post intervention analysis

Table 5: Delivery characteristics of pregnant women

Factors	Pre intervention period n (%)	Post intervention period n (%)	Overall n (%)
Delivery type			
Caesarean	22 002 (61.17)	22 141 (63.09)	44 143 (62.12)
Vaginal	9 122 (25.36)	7 913 (22.55)	17 035 (23.97)
Termination	4 845 (13.47)	5 043 (14.37)	9 888 (13.91)

Table 5 above illustrates the high rate of caesarean section (62.12%) rates relative to vaginal (23.97%) and termination of pregnancy's (13.91%).

Table 6: Age group and delivery options pre and post intervention

Age (in years)	Pre intervention n (%)			Post intervention n (%)		
	Caesarean	Vaginal	Termination	Caesarean	Vaginal	Termination
15-19	1,052 (52.39)	650 (32.37)	306 (15.24)	958 (50.61)	631 (33.33)	304 (16.06)
20-24	2,634 (56.41)	1,489 (31.89)	546 (11.69)	2,463 (58.78)	1,216 (29.02)	511 (12.2)
25-29	6,583 (60.84)	2,906 (26.86)	1,331 (12.3)	6,009 (62.63)	2,391 (24.92)	1,195 (12.45)
30-34	6,645 (64.03)	2,441 (23.52)	1,292 (12.45)	7,114 (66.13)	2,228 (20.71)	1,416 (13.16)
35-39	4,091 (64.09)	1,311 (20.54)	981 (15.37)	4,328 (66.43)	1,136 (17.44)	1,051 (16.13)
40-44	959 (59.45)	293 (18.16)	361 (22.38)	1,222 (60.05)	290 (14.25)	523 (25.7)
45-49	37 (38.54)	32 (33.33)	27 (28.13)	47 (43.52)	18 (16.67)	43 (39.81)
50-54	1 (50)	0 (0)	1 (50)	0 (0)	3 (100)	0 (0)
Total	22,002 (61.17)	9,122 (25.36)	4,845 (13.47)	22,141 (63.09)	7,913 (22.55)	5,043 (14.37)

Table 6 above illustrates the termination rates are highest in pregnant women aged 45 to 49 years old at 39.81% followed by 40 to 44 years old at 25.7% post intervention. Teenagers between the ages of 15 to 19 years old were terminating 16.0% of their pregnancies.

Table 7: HIV testing of pregnant women before and after the intervention

Factors	Pre intervention period n (%)	Post intervention period n (%)	Overall n (%)
Beneficiaries	35 429 (52.48)	34 554 (51.18)	67 507(51.83)
Beneficiary records	35 969 (50.61)	35 097 (49.39)	71 066 (50.01)
Tested during pregnancy by network doctor	7 908 (21.99)	7 708 (21.96)	15 616 (21.97)

Table 7 illustrates that there was no statistical significant improvement of the HIV testing rates pre (21.99%) versus post (21.96%) intervention ($p = 0.939$).

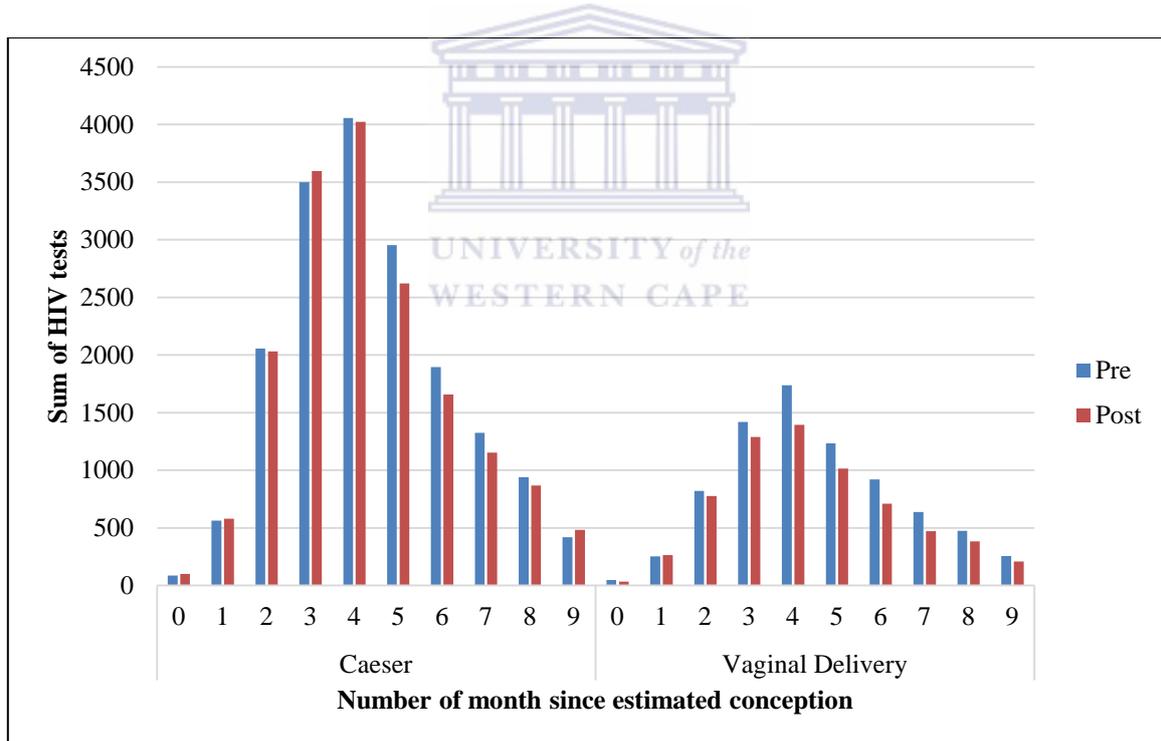


Figure 4: HIV testing was likely to be done for each delivery option

Figure 4 illustrates the month of the pregnancy when women are likely to test for HIV when either have a Caeser or Vaginal delivery.

For caesarean and vaginal delivery most of the HIV testing happened between months two and six of the pregnancy, peaking at month four.

A subset of pregnant women were identified who had more than one HIV test during the pregnancy period (n=5 406). Routine antenatal care protocols from public sector suggest a second HIV test at 34 weeks if the patient was negative at the booking visit. From Figure 5, it can be seen that second HIV tests were done mostly during the second and third trimester and the third HIV test, mostly in the third trimester.

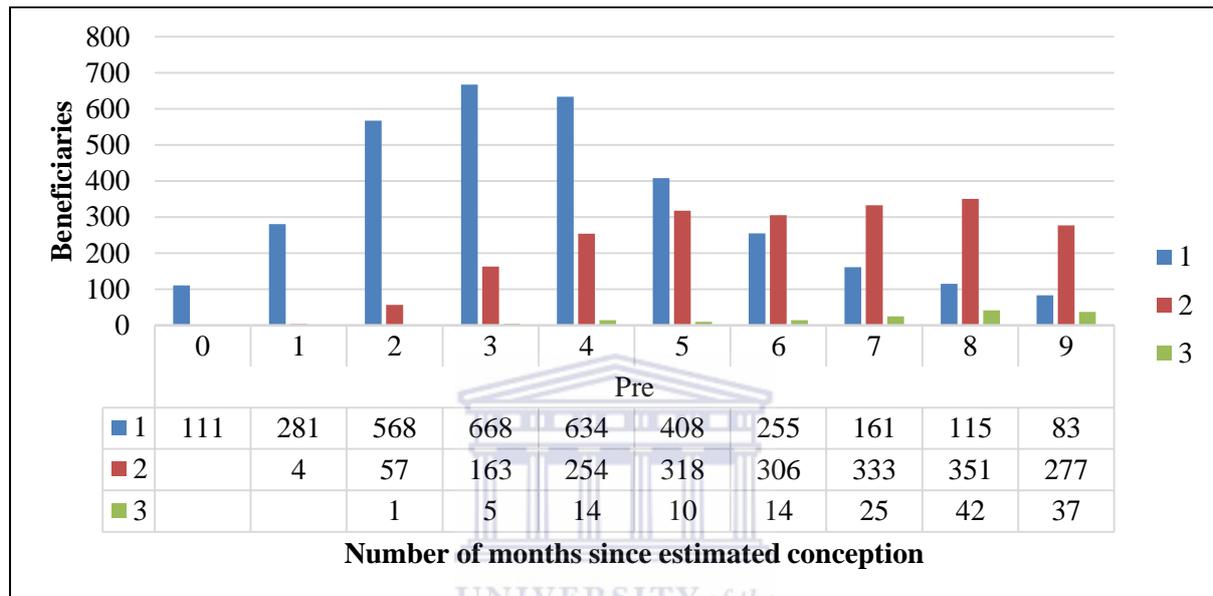


Figure 5: The frequency of repeat HIV testing during nine months of pregnancy

Figure 5 above illustrates how many pregnant women had repeat HIV tests with 1 equating the first test, 2 represents the pregnant women who had two HIV tests and 3 represents the pregnant women who had three tests during their pregnancy

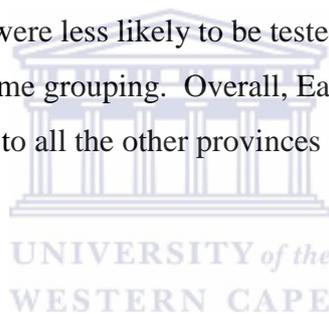
Table 8: characteristics of the general practitioner and pregnant women: pre versus post interventions by odds ratio and p value

HIV testing Factors	Odds ratio	95% CI (p value)
HIV test done by network GP		
Pre intervention	1	
Post intervention	0.98	0.87-1.09 (0.68)
Network GP age category (years)		
25-44	1	
45-65	0.91	0.85-0.98 (0.01)
>65	0.87	0.74-1.01 (0.07)
Beneficiary age category (years)		
15-24	1	
25-34	1.04	1-1.08 (0.06)
35-44	1.15	1.1-1.21 (<0.001)
45-54	1.23	0.93-1.61 (0.15)
Delivery type		
Caesarean	1	
Vaginal	0.87	0.84-0.9 (<0.001)
Termination	1.02	0.98-1.07 (0.28)
Beneficiary income category		
Low	1	
Medium	1.09	1.03-1.16 (0.004)
High	0.97	0.92-1.02 (0.22)
Beneficiary province		
Eastern Cape	1	
Free State	1.16	1.08-1.24 (<0.001)
Gauteng	1.07	1.02-1.13 (0.01)
Kwazulu-Natal	1.19	1.12-1.25 (<0.001)
Limpopo	1.22	1.14-1.3 (<0.001)
Mpumalanga	0.96	0.89-1.05 (0.38)
North West	1.1	1.02-1.18 (0.01)
Northern Cape	1.06	0.97-1.16 (0.21)
Western Cape	0.97	0.91-1.04 (0.4)

Summary

No significant difference in HIV testing by Network general practitioners' was found pre and post the intervention (CI: 0.87 – 1.09) as illustrated in table 8 . Compared to general practitioners' aged 25-44 years, older doctors (indicate ages) were 13% less likely to test and general practitioners' between 45 and 65 years were 9% less likely to do an HIV test . As pregnant women age increased they were more likely to be tested: participating pregnant women between the ages of 35 and 44 years were 15% more likely to be tested compared to 15-24 year old women (OR 1.15, CI: 1.1-1.21).

Beneficiaries who had a vaginal delivery were less likely to be tested compared to caesarean patients (OR 0.87, CI: 0.84-0.9). Medium income beneficiaries were more likely to be tested compared to low income beneficiaries (OR 1.09, CI: 1.03-1.16) and beneficiaries from the “high income” scheme grouping were less likely to be tested (OR 0.87, CI: 0.82-0.92) compared to the low income scheme grouping. Overall, Eastern Cape and Mpumalanga had the lowest testing rates compared to all the other provinces (OR 0.96, CI: 0.89-1.05).



CHAPTER FIVE: DISCUSSION

In this section, the discussion attempts to explain and interpret the current study findings and compare the results to trends in similar studies. Therefore, discussion of the results will follow the following sub-groups: description of study participants, private sector pregnant women and of antenatal care in the private sector as well as the factors associated with the impact of the incentive. Lastly, this section will also acknowledge the limitations of this study.

5.1. Description of study participants

In total, 2934 distinct network general practitioners were included in the analysis, same population of general practitioners' were used in the pre and post analysis.

5.1.1. Age of General Practitioners

The median age of the network general practitioners' in the study was 51 years (IQR 43-59). In addition over 75% of network general practitioners' were over 45 years old, which illustrates an aging population of practising general practitioners' within South Africa. This study found that compared to general practitioners' aged 25-44 years, general practitioners' older than 65 years old were 13% less likely to test (OR 0.87, CI: 0.74-1.01) and general practitioners' between 45 and 65 years were 9% less likely to do an HIV test (OR 0.91, CI: 0.85-0.98). Thus the age of general practitioners' was found to be a significant factor in low HIV testing rates, suggesting that older general practitioners' (over 45-years), may have lower adherence rates of clinical guidelines than younger general practitioners'. Research by Adedeji *et al.*, who analysed adherence of doctors to a clinical guideline for hypertension in South Africa, concurred that older doctors did not comply with clinical guidelines (43). Lee *et al.*, also adherence to hypertension guidelines in Malaysia, found that more senior medical specialists' recommendations differed from national clinical practice guidelines (44). More evidence from Brazil by Vargas Sanos *et al.*, found that older physicians, those with more than 10 years of practicing rheumatology or time since graduation from medical school showed a reduced chance of concordance to the guidelines (45). With a material number of older general practitioners' practicing in the private sector, this may imply a reason why there

was no significant difference in HIV testing by network general practitioners' pre and post the intervention. This suggests that there is a need for a study to understand why older general practitioners' do not adhere to revised guidelines.

5.2. Description of Pregnant Women

A total of 67 507 distinct pregnant women contributed 71 066 records (pregnancy claims) for analysis, 35 969 pregnancy claims were for pre intervention period and 35 097 pregnancy claims for post intervention period.

5.2.1. Lack of Contraception

During the study a total of 2 476 beneficiaries were pregnant twice, once during pre-intervention period and once again during post-intervention period. These 2476 women who fell pregnant again within the 21 months of the study represents 7% of the pre-intervention women ,who potentially , did not use family planning or protection to avoid falling pregnant again. According to the Department of Health's contraception guideline, this guideline recommends that all postpartum women be counselled about contraception (46).

According to Department of Health, after miscarriage or termination of pregnancy all women should be offered counselling and be provided with a contraceptive method of their choice from the full range of available methods (46). Early initiation of contraception is advisable because ovulation occurs as early as two weeks post- termination of pregnancy /miscarriage, so a woman can become pregnant almost immediately afterwards (46). Hence, it can be suggested that a future research study investigates the compliance of general practitioners' to recommend contraception after pregnancy. These pregnancies were included in the study as each pregnancy is an opportunity to offer an HIV test.

5.2.2. Provincial Demographics of Pregnant Women

Nearly 50% of the pregnant women were from Gauteng and Kwazulu-Natal representing 26.83 % and 21.66% respectively, of pregnant women included in the sample for analysis.

According to the South African National Antenatal Survey, Gauteng and Kwazulu-Natal were one of the five provinces (Free State, Gauteng, KwaZulu-Natal, Mpumalanga and North West) out of the nine who recorded HIV prevalence estimates above the national estimate of 29.5% (2).

5.2.3. Age of pregnant women

This study found the median age of the pregnant women was 30 years with an inter-quartile range of 26-34 years old. According to the South African National Antenatal survey, the HIV prevalence among women in the age group of 30 to 34 years remains the highest at 42.8% of pregnant women seeking antenatal care at public clinics (2). Thus the majority of women falling pregnant in South Africa aged 30-34 years are practising unprotected sex, falling pregnant and are therefore at risk of acquiring HIV.

Nearly 18% of the pregnant women in this study were under the age of 24 years old; which suggests that these young women who had unprotected sex may not have had access to contraception and therefore maybe also be at a higher risk of acquiring HIV at a younger age. According to Flanagan *et al.*, South Africa has one of the highest teenage pregnancy rates, with approximately 30% of 15 to 19 year olds reportedly pregnant (47). In addition, when considering teenage pregnancy and gendered drivers looking at intergenerational sex is critical as it places teenage girls at particular risk of HIV due to inequalities of power, which is exacerbated by poverty (47). Hence, the need for future research to compare the reasons for teenage pregnancy in the private sector versus public sector as poverty may not be the main social determinant linked to teenage pregnancy in the private sector.

This study highlights the importance and the need of HIV screening in the private sector of younger pregnant women.

5.2.4. Income levels of pregnant women

Overall, 72.03% of patients were in the high income category, followed by medium income category (19.02%) and lastly low income category (8.95%). A similar finding was identified in study by Panday *et al.*, which suggests low income or poverty may not be linked to risk of

pregnancy in women with medical aid cover compared to the public sector women who do not have medical aid (48).

5.2.5. Pregnancy Delivery Options

This study found that caesarean delivery (62.12%) occurred in almost two thirds of all cases and vaginal delivery in 23.97% of cases. According to research by Bateman, who found that higher rates of potentially unnecessary procedures, particularly caesarean sections (C-sections), were reported in private rather than at public settings (49). Bateman found that in South Africa, where 62%, confirming the finding from this study, of women delivering in the private sector had C-sections, compared with 18% in the public sector (49). Studies by Brugha *et al.*, in Mexico suggested that fee-for-service payment structures (which are more heavily present in private than in public care delivery settings) incentivised increased C-sections (50). This study found that termination of pregnancy represented 13.91 % of cases in the private sector. Table 6, illustrated that termination of pregnancy increased as beneficiary's age increased, especially in the 40-year and older categories. Research by Henshaw, found that even in countries where contraception is commonly used and easily available, the number of unintended pregnancies remains high, with a large proportion of these unintended pregnancies end in abortion (51). South Africa similarly has free contraception for all women, despite this there are high rates of teenage pregnancies and unwanted pregnancies (46). Reasons for terminations can be due to various reasons especially in older women. A study by Sivho *et al.*, found that among older women (≥ 35 years), who are in unstable relationship had a higher likelihood of abortion as well as due unsuitable work situation, higher education and being single (52). In addition the Sivho *et al.* study found that when a pregnancy is perceived as not suitable for the work situation, it is an important factor that influences the decision to have an abortion, especially for older women over the age of 35 years old (52). More research may be required to understand why older women in South Africa terminate pregnancies.

5.3. HIV testing rates of pregnant women

HIV testing utilisation rates by pregnant women maybe impacted by: timing and frequency rate of HIV testing, impact of pregnant womens age on HIV testing rates, impact of delivery

options on HIV testing rates, and provincial trends of uptake of HIV testing among pregnant women, these factors will be unpacked in turn.

5.3.1. Timing and Frequency rates of HIV testing

As illustrated in figure 4, for both caesarean and vaginal deliveries most of the testing happened between months two and six, peaking at month four. A subset of beneficiaries were identified who had more than one HIV test during the pregnancy period (n=5 406). Current guidelines in South Africa recommend testing pregnant women for HIV antibodies at the first antenatal care visit, retesting at 32 weeks gestation and again at labor, with the goal of this testing being the early identification of both existing undiagnosed HIV infection as well as incident infections occurring during pregnancy (4). This testing intervention, combined with the 2013 World Health Organization (WHO) recommendations for early initiation of triple antiretroviral therapy (ART) as soon as HIV infection is identified in pregnant and breastfeeding women, is crucial to preventing mother to child transmission of HIV, preserving the mother's health and reducing the number of HIV-infected children (53).

From figure 5, it can be seen that second HIV tests were done mostly during the second and third trimester and the third HIV test mostly in the third trimester. Possibly suggesting these pregnant women may be at high risk of acquiring HIV, thus being screened more regularly or that these general practitioners' are compliant with HIV screening guidelines, more research is required to understand the trend of repeat testing.

5.3.2. Impact of pregnant womens age on HIV testing rates

In this study as beneficiary's age increased they were more likely to be tested, e.g. beneficiaries between the age of 35 and 44 years were 15% more likely to be tested compared to 15-24 year old beneficiaries (OR 1.15, CI: 1.1-1.21).

A similar trend was found in a Sudanese study by Mahmoud *et al.*, women older than 26 years with more than one child, had a higher acceptance of HIV testing (54). Similarly, in a study conducted in Burkina Faso, by Pignatelli *et al.*, found the uptake rate of HIV testing rate increased linearly with age, being particularly low among adolescents (15-19 years) (55). It has been suggested that older women may be more aware of a higher cumulative risk of infection and are more likely to take autonomous decisions [55].

According to a study by Kirk *et al.*, postmenopausal older women, with reduced estrogen levels, and atrophic vaginitis, are also aware of the increased risk for acquiring HIV infection [56]. This population of older adults is less likely to utilize barrier methods to prevent pregnancy or STIs [56].

This contradicted findings by research done by Mkwanazi *et al.*, who found that older and more educated women were less likely to accept testing, suggesting the need to specifically target these patients (16). The age of pregnant women agreeing to have a HIV test may be a confounder based on the evidence and research.

The possible causes for the uptake in older women was not analysed in this study and may justify further research to understand why older women may take up HIV testing more readily compared to younger women.

5.3.3. Impact of delivery options on HIV testing rates

Beneficiaries who had a vaginal delivery were less likely to be tested compared to caesarean patients (OR 0.87, CI: 0.84-0.9). According to research by Paul, existing prevention of mother to child programmes have four primary focus areas: routine HIV counselling and testing for all pregnant women, as well as anti-retroviral prophylaxis, avoidance of breast feeding for HIV infected women and the inclusion of caesarian section (57).

The risk of transmission was 50% lower among women who delivered by caesarian section and a further 87% lower likelihood of transmission among women who underwent SCS and who received antiretroviral therapy during the antepartum, intrapartum, and postnatal periods (57). Thus, pregnant women who elect to have a caesarian section have a higher chance of

being offered HIV testing as part of the standard prevention of mother to child transmission programme.

5.3.4. Provincial trends of uptake of HIV testing among pregnant women

Overall, Eastern Cape and Mpumalanga had the lowest testing rates compared to all the other provinces (OR 0.96 CI: 0.89-1.05). All the other provinces aligned to the antenatal survey trends as illustrated in table 1 with Kwazulu-Natal (Ante-natal HIV prevalence of 37.6%) being the highest to test for HIV in the private sector . This was not the case in Mpumalanga which has the second highest ante-natal survey prevalence at 26.6 % (2). But in this study it had a the lowest rate of HIV testing , suggesting a poor compliance to HIV testing guidelines by private sector general practitioners' despite the high prevalence on HIV in the public sector. This may justify a futher study intervention to increase testing rates in Mpumalanga.

5.3.5. Effect of Incentive on HIV testing uptake

One of primary end points of the study was to determine if private sector general practitioners' have the potential to change their clinical behaviour with respect to preventative HIV testing screening of pregnant women; and whether an incentive would motivate the general practitioners' to initiate testing.

Table 7 illustrates that there was no statistically significant improvement in HIV testing rates pre (21.99%) versus post (21.96%) intervention.

Possible reasons could be due to lack of time, incentive was too small or lack of awareness of the latest clinical guidelines, these factors will be unpacked in turn

5.3.5.1. *Lack of time*

Lack of time could be a reason why the incentive did not work , as confirmed by Armington, the normal estimated time involved in counselling and testing was 5 to 10 minutes, required for pre-test counselling, 5 to 20 minutes is required for post-test counselling, and a further 5 to 20-minute processing time is required in between, depending on the test used (17). Private sector general practitioners' are more reluctant to accept an incentive if the process to access

the incentive prolongs their consultation time, affecting the workflow and ability to consult with more patients.

In addition evidence by study done by Rayment *et al.*, who also investigating barriers to implementation of HIV testing by clinical staff, found challenges in the provision of HIV testing, related to a lack of time to conduct testing and being ill-prepared to answer patient queries. General practitioners' felt that consent to test was too burdensome and time consuming to answer related questions (18).

5.3.5.2. *The incentive was too small*

The size of the incentive could be another reason the incentive did work as confirmed by research performed by Dudley who found degree of change in the provider behaviour observed depended on many factors in addition but importantly to the amount of financial reward at stake (24). In addition Kenefick *et al.*, also agreed that small incentives have been shown to be ineffective in changing healthcare provider behaviour (21).

5.3.5.3. *Lack of awareness of the latest guidelines*

In addition potentially, lack of awareness of the HIV testing guideline could be a contributing factor why the intervention did not work. As a systematic review of the effectiveness of healthcare in the National Health Service (by University of York in 1999 concluded that passive dissemination of clinical guidelines was generally ineffective (26).

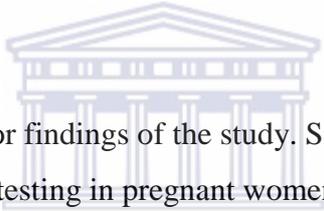
5.4. Limitations

There are several limitations to the present study that may affect the validity and generalisability of the results. Therefore, the findings of this study must be interpreted in the light of the limitations.

Firstly, due to gender and race not being a compulsory requirement to be registered as a network general practitioners', we were unable to identify gender and race of the general practitioner as a result this study was unable to attribute the impact of the intervention to race and gender of the general practitioners'. Secondly, due to race not being a compulsory requirement for patient to be registered on medical aid, we were unable to identify race of the pregnant women, as a result this study was unable to attribute the impact of the intervention

relative to race of the patients and the impact it may have on the general practitioners' behaviour. Thirdly, the reasons general practitioners' repeated HIV tests in small subset of pregnant women (n=5 406), was not obtained from the data as reasons for repeat testing was not part of the study objectives. Fourthly, as billing information was the primary source of data, the clinical results of the HIV test were unknown due to confidentiality and lack of access to the general practitioners' patient folders. Fifthly, the possible reasons for non-compliance was not measured such as lack of time, incentive was too small or lack of awareness of the latest clinical guidelines but could be part of future research. Finally, to access the financial incentive the general practitioners' had to complete a data capture process on a web portal to access the financial incentive, this administrative burden and the time to counsel and wait for the result may have affected the uptake . Appendix 3 illustrates the portal questionnaire

5.5. Summary



The discussion dealt with the major findings of the study. Similarities with other studies with found with regards trends of HIV testing in pregnant women and the impact of financial incentives on general practitioners' behaviour. The limitations of the study have also been described. The summary of the study, conclusion and recommendations based on the findings will be presented in the next chapter.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusions

The objectives of the study were to firstly determine if there was an increase in the uptake of HIV testing among pregnant women receiving antenatal care at general practitioner practices following the offering of a monetary incentive to the general practitioners, secondly to determine variations in the uptake of HIV testing based on characteristics of pregnant women and the general practitioner.

The finding of this study concluded that the financial incentive did not prove effective in demonstrating an improvement in the quality of service aligned with a specific health outcome.

The evidence of this study can be used to develop specific interventions aimed at older general practitioners' practicing in the private sector. The finding of this research can contribute to developing an understanding of financial incentives and the impact on healthcare provider behaviour. It was evident that general practitioners' in Mpumalanga required additional awareness of the benefits of routine HIV testing of pregnant women, considering the high HIV prevalence within that province at antenatal clinics.

This study revealed that older women and women who had a caesarean section had a higher testing rate. It is evident that there are still some challenges to overcome in order to achieve the promotion of routine screening over targeted testing in the private sector. In addition the research can be used by future researchers in the field to conduct research and improve on the current study. Raising the quality of care in a health system will still require some form of incentive structure and clinical training support, both areas in which government has an important role, to ensure highest standards for care. General practitioners' must still form part of the government's national strategic plan to achieve higher quality of care across both public and private sectors.

6.2. Recommendations

Recommendations are grouped into three themes, related to general practitioner Behaviour, Financial Incentives and Future Research.

6.2.1. General Practitioner Behaviour

It emerged from this study that older general practitioners' should be re-educated and informed about the benefits of HIV testing in pregnancy. The findings recommend general practitioners' encourage all pregnant women whether they carry full term, miscarriage or have a termination of pregnancy are counselled and encouraged to be on a contraceptive method especially to protect the women from HIV. The findings has suggested that general practitioners' in Mpumalanga should be proactive in promoting HIV screening of pregnant women considering the HIV prevalence rates within the public sector clinics. The findings has shown the need for general practitioners' should be more vigilant in recommending HIV screening for all pregnant women but especially for pregnant women under the age of 34 years old who according to the ante-natal survey are at highest risk of acquiring HIV. The study has noted that all general practitioners' should encourage all pregnant women to comply with prevention of mother to child transmission programme which encourages HIV testing, ART and caesarean sections.

6.2.2. Financial Incentives

The study found no improvement in HIV testing before and after the intervention in the presence of a financial incentive, possible recommendations include; firstly, reducing the administrative burden to access the incentive in a simpler more user friendly form, secondly, the provision of rapid test kits that can produce a result in less than three minutes and finally, to provide varying levels of incentives to determine what amount is too low and what amount of incentive will result in acceptance.

In addition maybe a multi-faceted intervention would provide to be more successful, as suggested by Davis *et al.*, who recommended educational outreach meetings, opinion leaders,

patient-mediated interventions and reminders are likely to be more effective in changing healthcare provider behaviour, than just emailing guidelines (27).

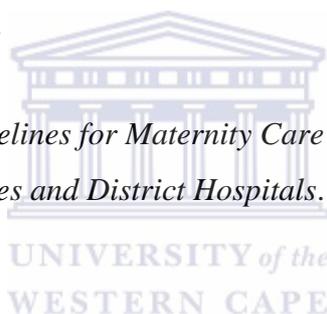
6.2.3. Future Research

As this study was a quantitative analysis using billing data, therefore there is a need to conduct a qualitative study to explore and describe the perceptions and knowledge of older general practitioners' around the importance of HIV testing of pregnant women. Further research aimed at assessing the preference of incentives general practitioners' are interested in may be linked to a change in HIV testing behaviour.



References

1. Shisana, O., Rehle, T., Simbayi ,L., Zuma, K., Jooste, S., Zungu N., Labadarios, D. & Onoya, D. 2014. *South African National HIV Prevalence, Incidence and Behaviour Survey, 2012*. Cape Town, HSRC Press.
2. National Department of Health. *National Antenatal Sentinel HIV and Syphilis Prevalence Survey 2012*. South Africa. Available: http://www.health-e.org.za/wp-content/uploads/2014/05/ASHIVHerp_Report2014_22May2014.pdf [2014, Sep 25]
3. UNAIDS 2013. *United Nations Children's Fund, Towards an AIDS-Free Generation – Children and AIDS: Sixth Stocktaking Report, 2013*, UNICEF, New York. Available: http://www.unaids.org/sites/default/files/media_asset/20131129_stocktaking_report_children_aids_en_0.pdf [2014, March 07].
4. Department of Health 2007. *Guidelines for Maternity Care in South Africa – A Manual for Clinics, Community Health Centres and District Hospitals*. 3rd edition. Pretoria: Department of Health.
5. Barron, P., Pillay, Y., Doherty, T. & Jackson, D. 2012. Eliminating mother-to-child HIV transmission in South Africa. *Bulletin of the World Health Organization*, <details missing>. Available: <http://www.who.int/bulletin/volumes/91/1/12-106807/en/> [2013, March 25]
6. Chabikuli, N., Schneider, H. & Blaauw, D. 2002. Equity in the provision of private primary care: the case of sexually transmitted diseases in South Africa. *Health Policy and Planning*; 17, p 40–46.
7. Söderlund, N., Schierhout, G. & Van den Heever, A. 1998. Private health care in South Africa. Technical Report. SA Health Review. Health Systems Trust. Available: http://www.healthlink.org.za/uploads/files/private_98.pdf [2015, March 05]
8. Basu ,S., Andrews ,J., Kishore ,S., Panjabi ,R. & Stuckler D .2012. Comparative Performance of Private and Public Healthcare Systems in Low- and Middle-Income Countries: A



Systematic Review. Available:

<http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1001244>
[2013, March 27].

9. Glickman, S. & Peterson, E. 2009. Innovative health reform models;. P4P initiative. *The America Journal of Managed Care*. Dec;15(10 Suppl): S300-5
10. Christianson, J., Knutson, J. & Mazze, R. 2006. Physician pay-for-performance: implementation and research issues. *Journal of General Internal Medicine*. Vol;21:Suppl 2:S9-S13
11. Rosenthal, M., Landon, B., & Normand, S .2006. Pay for performance in commercial HMOs. *New England Journal of Medicine*.355(18): 1895-1902.
12. McDonald, R. & Roland, M. 2009. Pay for performance in primary care in England and California: comparison of unintended consequences. *Annual of Family Medicine*. Volume 7(2):121-127.
13. Berendes, S., Heywood, P., Oliver, S., & Garner, P. 2011. Quality of private and public ambulatory health care in low and middle income countries: systematic review of comparative studies. *PLoS medicine*. Available
<http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1000433>
[2014, March 17].
14. Martin, L., Williams, S., Haskard, K. & Dimatteo, M. 2005. The challenge of patient adherence. *Therapeutics and Clinical Risk Management*. Vol 1(3):189–199.
15. Datye, V., Kielmann, K.& Sheikh, K. 2006. Private practitioners' communications with patients around HIV testing in Pune, India. *Health Policy Plan*. Vol 21:343-352.
16. Mkwanzazi, N., Patel, D., Newell, M., Rollins, N., & Coutsooudis, A. 2008. Rapid Testing May Not Improve Provision of HIV Testing and Same Day Results in a Rural South African

Community: A Cohort Study of 12,000 Women. Available:
<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0003501> [2014, April 01].

17. Armington, K. 2005. Integrating Rapid HIV Testing Into Fast-Paced Private Practice Settings. *The PRN Notebook*. New York. Available:
http://www.prn.org/images/pdfs/54_armington_kevin.pdf [2014, April 02].
18. Rayment, M., Thornton, A., Mandalia, S., Elam, G. & Atkins, M. 2012. HIV Testing in Non-Traditional Settings – The HINTS Study: A Multi-Centre Observational Study of Feasibility and Acceptability. *PLoS ONE* 7(6): e39530. [2014, April 02].
19. Brindis, R., Cacchione, J. & Drozda, J. 2006. Principles to Guide Physician Pay-for-Performance Programs. *Journal American College of Cardiology*. Vol;48(12):2603-2608.
20. Grumbach, K., Osmond, D., Vranizan, K., Jaffe, D. & Bindman, A. 1998. Primary care physicians' experience of financial incentives in managed-care systems. *New England Journal of Medicine*. Vol;339:1516-1521.
21. Kenefick, H., Lee, J., & Fleishman, V. Improving Physician Adherence to Clinical Practice Guidelines: Barriers and Strategies for Change. 2008. *New England Healthcare Institute*. Available from: www.nehi.net/uploads/full_report/cpg_report__final.pdf [2013, September 17].
22. Young, G. & Conrad, D. 2007. 'Practical issues in the design and implementation of pay-for-quality programs'. *Journal of Healthcare Management*, vol 52, pp 10–19. Available:
<http://www.hret.org/chmr/resources/cp05b.pdf> [2014, Oct 17].
23. Hillman, A., Ripley, K., Goldfarb, N., Weiner, J., Nuamah, I. & Lusk, E. 1999. 'The use of physician financial incentives and feedback to improve pediatric preventive care in Medicaid

managed care'. *Pediatrics*, vol 104, pp 931 Available:

<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0039530> [2014, July 03].

24. Dudley, R. 2005. 'Pay-for-performance research. How to learn what clinicians and policy makers need to know'. *Journal of the American Medical Association*, vol 294, pp 1821–23.
25. Kahn C., Ault ,T. & Isenstein, H. 2006. Snapshot Of Hospital Quality Reporting And Pay-For-Performance Under Medicare. *Health Affairs*. Vol. 25(1),p 148-162.
26. NHS Centre for Reviews and Dissemination. 1996. Effective health care bulletin getting evidence into practice. *The University of York Bulletin* . Volume 5(1):p 116.
27. Davis, D., Thomson, M, & Oxman, A.1995.Changing physician performance: a systematic review of the effect of continuing medical education strategies. *Journal of the American Medical Association*. Volume 274:p700-705.
28. Hettige, H. 2013. Celebrate Solutions: Private Sector Provides HIV Testing. Women Deliver. [Online]. Available: <http://www.womendeliver.org/updates/entry/celebrate-solutions-private-sector-provides-hiv-testing> [2013, April 02].
29. Sutton, M.2012. Reduced mortality with hospital pay for performance in England. *New England Journal of Medicine*. Volume 367: p 1821
30. De Walque, D. 2013.Using Provider Performance Incentives to Increase HIV Testing and Counseling Services in Rwanda. *World Bank Policy Research Working Paper* No. 6364.
31. Flodgren ,G., Eccles, M., Shepperd ,S., Scott, A., Parmelli ,E.& Beyer FR.2011. An overview of reviews evaluating the effectiveness of financial incentives in changing healthcare professional behaviours and patient outcomes. *Cochrane Database of Systematic Reviews*, Issue 7.
32. Doran, T., Fullwood ,C. & Gravelle H. 2006. Pay-for-performance programs in family practices in the United Kingdom. *New England Journal of Medicine*.355:p 375–84.

33. Beaglehole, R., Bonita, R. & Kjellstrom, T. 1997. Types of Study. In Basic Epidemiology. Geneva: *WHO Publications*. Ch 3,p 31-53
34. Terre Blanche, M., Durrheim, K., & Painter, D. 2006. Research in practice. University of Cape Town Press. Second edition, p 172-174
35. Council for Medical Schemes. Annual Report 2006-07.2006. Pretoria: Council for Medical Schemes. Available :
<http://www.medicalschemes.com/publications/publications.aspx?catid=7> [2013, April 07]
36. Burns, N. & Grove, S. 2005. The practice of nursing research ,critique and utilisation. Second Edition. Philadelphia: Lnodn. W.B. Saunders
37. Ferver, K., Burton, B. & Jesilow, P. 2009. The Use of Claims Data in Healthcare Research. *The Open Public Health Journal*. Vol,2, 11-24 Available :
<http://benthamopen.com/tophj/articles/V002/11TOPHJ.pdf> [2014, Oct 21]
38. Varkevisser, C., Indra, P., & Brownlee, A. 1991. Designing and Conducting Health Systems Projects. WO and International Development Research Centre, 2. Part 1. Geneva: WHO: 240 - 244
39. Gehlbach, S. 1993. Ch8- Interpretation : Statistical significance. Interpretation of the medical literature. USA. University of Massachussets press : 145 to 149.
40. Rungtusanatham, M. 1998. Lets not overlook Content Validity. *Research Issues. Decison Line*. 10-13
41. Polit, D.E. & Hungler, B.P. 1993. CH-5 The Ethical Context of Nursing Research . In *Essentials of Nursing Research : Methods Appraisals and Utilisation*. Philadelphia: J.B. Lippincott Company : 125-147
42. Shirreffs, A., Lee, D., Henry, J., Golden, M. & Stekler, J. 2012. Understanding Barriers to Routine HIV Screening: Knowledge, Attitudes, and Practices of Healthcare Providers in King

County, Washington. *PLoS ONE* 7(9): e44417. doi:10.1371/journal.pone.0044417. Available online at:

<http://www.plosone.org/article/fetchObject.action?uri=info%3Adoi%2F10.1371%2Fjournal.pone.0044417&representation=PDF> [2014, Oct 27].

43. Adedeji ,A., Tumbo, J. & Govender, I.2015. Adherence of doctors to a clinical guideline for hypertension in Bojanala district, North-West Province, South Africa. *African Journal of Primary Health Care Family Medicine*. Vol, 13;7(1): Available online at: <http://www.ncbi.nlm.nih.gov/pubmed/26245596> [2014, Oct 27].
44. Lee ,P., Liew ,S., Abdullah ,A. & Hanafi ,N. 2015. Healthcare Professionals’ and Policy Makers’ Views on Implementing a Clinical Practice Guideline of Hypertension Management: A Qualitative Study. Available online at: *PLoS ONE* 10(5): e0126191. doi:10.1371/journal.pone.0126191. [2014, Oct 27].
45. Vargas-Santos ,A., Castelar-Pinheiro, G., Coutinho ,E. & Schlesinger, N. 2015. Adherence to the 2012 American College of Rheumatology (ACR) Guidelines for Management of Gout: A Survey of Brazilian Rheumatologists. Available online at: *PLoS ONE* 10(8): e0135805. doi:10.1371/journal.pone.0135805 [2014, Oct 27].
46. National Department of Health. National Contraception Clinical Guideline .2012. Available online at: <http://www.health-e.org.za/wp-content/uploads/2014/05/National-contraception-clinical-guidelines.pdf> [2014, Nov 27].
47. Flanagan, A., Lince, N., Durao de Menezes, I & Mdlopane, L. 2013. Teen Pregnancy in South Africa: A Literature Review Examining Contributing Factors And Unique Interventions. *Ibis Reproductive Health* .Available online at: <http://www.rmchsa.org/wp-content/uploads/2013/08/Teenage-Pregnancy-in-South-Africa-2013.pdf>. [2014, Dec 25].
48. Panday, S., Makiwane, M., Ranchod, C., & Letsoalo, T. 2009. Teenage Pregnancy in South Africa – With A Specific Focus On School-Going Learners. *Child, Youth, Family and Social*

Development, Human Sciences Research Council. Pretoria: Department of Basic Education. Available online at: <http://www.rmchsa.org/wp-content/uploads/2013/08/Teenage-Pregnancy-in-South-Africa-2013.pdf> [2014, Dec 25].

49. Bateman, C. 2008. Private sector cannot be left to 'own devices'. *South African Medical Journal* 98: 77–78. Available online at: [http://www.ncbi.nlm.nih.gov/pubmed?term=Bateman\[author\]%20AND%20private%20sector%20cannot%20be%20left%20to%20own%20devices&cmd=correctspelling](http://www.ncbi.nlm.nih.gov/pubmed?term=Bateman[author]%20AND%20private%20sector%20cannot%20be%20left%20to%20own%20devices&cmd=correctspelling) [2015, Jan 25].
50. Brugha, R. & Pritze-Aliassime, S. 2003. Promoting safe motherhood through the private sector in low- and middle-income countries. *Bulletin of World Health Organisation* 81: 616–623. Available online at: <http://www.ncbi.nlm.nih.gov/pubmed?cmd=Search&doptcmdl=Citation&defaultField=Title%20Word&term=Brugha%5Bauthor%5D%20AND%20Promoting%20safe%20motherhood%20through%20the%20private%20sector%20in%20low-%20and%20middle-income%20countries>. [2015, Jan 25].
51. Henshaw, S. 1998. Unintended pregnancy in the United States. *Fam Plan Perspect*. Volume 30:24–29, 46. Available online at: <http://www.ncbi.nlm.nih.gov/pubmed/9494812> [2015, Jan 25].
52. Sihvo, S., Bajos, N. & Kaminski, M. 2003. Women's life cycle and abortion decision in unintended pregnancies. *Journal of Epidemiology and Community Health*. Vol 57:601–605 Available online at: <http://jech.bmj.com/content/57/8/601.full>. [2015, Jan 25].
53. World Health Organization 2013 [cited 2013 July 15]. Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection]. Available online at: <http://www.who.int/hiv/pub/guidelines/arv2013/en/index.html> [2015, Jan 25].
54. Mahmoud, M., Nasr, A., & Adam, I. 2007. Knowledge and attitude toward HIV voluntary counseling and testing services among pregnant women attending an antenatal clinic in Sudan. *Journal of Medical Virology*. Vol, 79:469–473. Available online: <http://www.ncbi.nlm.nih.gov/pubmed/17385672> [2015, Mar 13]

55. Pignatelli, S., Simpure. J., Pietra V, & Ouiminga, A. 2006. Factors predicting uptake of voluntary counselling and testing in a real-life setting in a mother-and-child center in Ouagadougou, Burkina Faso. *Journal of Tropical Medicine and International Health*. Vol ,11:350–357. Available online : <http://www.ncbi.nlm.nih.gov/pubmed/16553915> [2015, Apr 11]
56. Kirk, J. & Goetz , B. 2009. Human Immunodeficiency Virus in an Aging Population, a Complication of Success. *Journal of the American Geriatric Society*. Vol,57; Available online at: <http://onlinelibrary.wiley.com/doi/10.1111/j.1532-5415.2009.02494.x/abstract> [2015, Feb 21]
57. Read, J. 1999. Preventing mother-to-child transmission of HIV: the USA experience. *Prenatal and Neonatal Medical Journal* Vol,4:391–7.



Appendix 1 . Permission form from Metropolitan Health



PERMISSION FORM

Title of Research Project: Effectiveness of a monetary incentive on General Practitioners' behaviour of promoting HIV testing for pregnant women in the private sector

Student: Sirraaj Adams

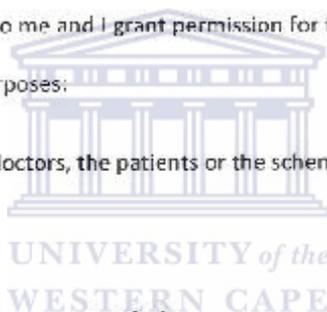
Student Number: 9837312

Type of Thesis: Mini-thesis

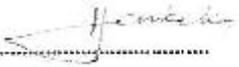
Degree: Master in Public Health

The study has been described to me and I grant permission for the data (clinical, demographic and claims) to be used for study purposes:

I understand that the medical doctors, the patients or the scheme identity will not be disclosed



General Manager Name: Dr Hermanus De Klerk

General Managers signature.....

Date.....21 September 2013

HIV YourLife PROGRAMME

PO Box 15488 Woodling Drive - B1 St George's Mall Cape Town 8001
Tel: 021 261 510 Fax: 021 538 701 E-mail: mylifeyourlife@uwc.ac.za

SABS
150 9001

Appendix 2: Ethical Approval from University of the Western Cape Research Ethics Committee



**OFFICE OF THE DEAN
DEPARTMENT OF RESEARCH DEVELOPMENT**

9 December 2013

To Whom It May Concern

I hereby certify that the Senate Research Committee of the University of the Western Cape approved the methodology and ethics of the following research project by:
Mr S Adams (School of Public Health)

Research Project: Effectiveness of a monetary incentive on general practitioners' behaviour of promoting HIV testing for pregnant women in the private sector

Registration no: 13/10/40

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

The Committee must be informed of any serious adverse event and/or termination of the study.

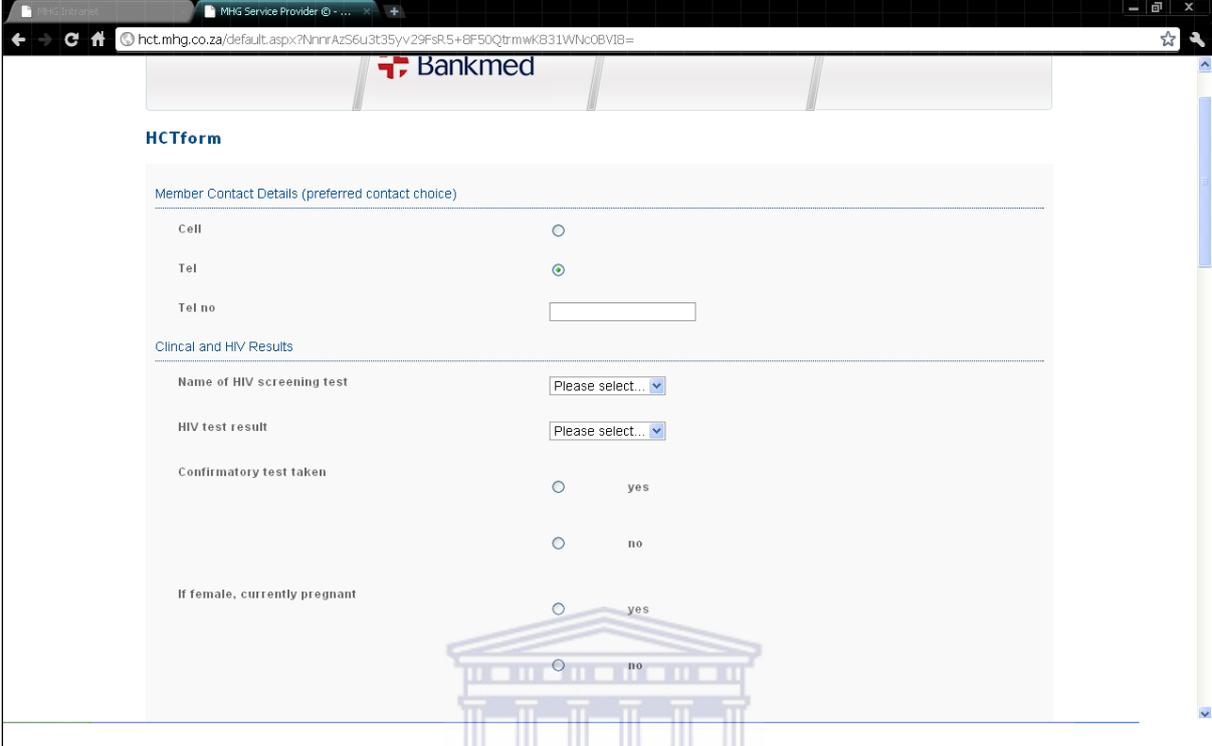
A handwritten signature in black ink, appearing to read 'P. Josias'.

*Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape*

Private Bag X17, Bellville 7535, South Africa
T: +27 21 959 2988/2948 . F: +27 21 959 3170
E: pjosias@uwc.ac.za
www.uwc.ac.za

A place of quality,
a place to grow, from hope
to action through knowledge

Appendix 3: Questionnaire



The screenshot shows a web browser window displaying the 'HCTform' questionnaire on the Bankmed website. The browser's address bar shows the URL: `hct.mhg.co.za/default.aspx?NnnrAzS6u3t35yv29F3R5+6F50QrmmwK831WN00BV18=`. The Bankmed logo is visible at the top of the page.

HCTform

Member Contact Details (preferred contact choice)

Cell

Tel

Tel no

Clinical and HIV Results

Name of HIV screening test

HIV test result

Confirmatory test taken

yes

no

If female, currently pregnant

yes

no

