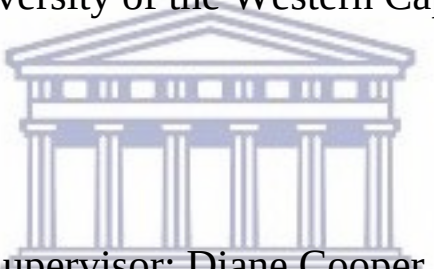
An Evaluation of the Effectiveness of Interventions to Change the Knowledge of, Attitudes towards, and Practices around, TB and HIV of Inmates in the Western and Eastern Cape of South Africa

ALISON MARGARET BEST

A mini-thesis submitted in partial fulfillment of the requirements for the degree of Master of Public Health at the School of Public Health, University of the Western Cape



Supervisor: Diane Cooper
Co-supervisor: Harry Hausler

March 2018

Keywords: Tuberculosis, TB, HIV, correctional centre, prison, knowledge, attitude, practice, peer education, HCT, condoms, healthcare worker

DECLARATION

Full name: Alison Margaret Best

Student number: 3409629

Degree: Master of Public Health

Title of mini-thesis: **An Evaluation of the Effectiveness of Interventions to Change the Knowledge of, Attitudes towards, and Practices around, TB and HIV of Inmates in the Western and Eastern Cape of South Africa**

I declare that this mini-thesis is my own work, that this work has not been submitted for any degree or examination in any university, and that all the sources used or quoted have been carefully acknowledged and referenced in accordance with university requirements.

I understand what plagiarism is and am aware of the university policy and implications in this regard.

15 March 2018

_____ _____

Signature **Date**

ACKNOWLEDGEMENTS

Thank you to:

Mrs Maria Mabena, Mrs Geraldine Pienaar, and Mrs Cynthia Ntleki-Louw, for acting as the Department of Correctional Services 'guides' for the research.

All of the Heads of Centre of the correctional centres where we worked.

All the officials who assisted with the fieldwork, but particularly Mr Rana and Mr Mhambi at Grahamstown Correctional Centre who were exceptionally helpful and efficient.

Mr Themba Molefe and especially, Mr Donovan Michaels, at Pollsmoor Medium C, for the extraordinary opportunity of letting us run the Community Advisory Group (CAG) at the centre, and for your support of the CAG.

Mr Antonio Passmore and Amanda Fonanda, for finding us solutions when we needed them.

Nocawe Manciya for going out of your way to assist us, and for the work you do every day.

Bonginkosi Moon, for letting me be his sidekick during the course of the fieldwork and the running of the CAG.

Kwezi Shumi, Marie Joshua and Danielle Esau for assisting with the CAG and facilitating the 'Kick TB/HIV' and peer education interventions.

Malusi Blou, Shannon Cupido, Bongiwe Cimi, Earl Titus, Vanessa Solomons, Nomfezeko Sikota, Nolubabalo Madondile, and Nongazi Nqayi, for making all of this possible through teamwork and patience during the interviewing process.

Dr Sizulu Moyo and her colleagues at the HSRC, for advice on the questionnaire and data analysis.

Theoni Photopoulou and Joe Rossouw, for their suggestions on how to tackle the statistical analysis.

Harry Hausler and Gareth Lowndes, for support at various points along the way.

Diane Cooper, for forbearance and firmness, both of which were necessary to get me through this.

The whole Communications team at TB HIV Care, but particularly Michelle Carey, for all the support, including caring enough to give me a push when required.

Robert Best, for helping me, profoundly, as he always has.

Peter and Maggi Best, for their example and love.

All the inmates who assisted us with this project, and especially the Pollsmoor Medium C CAG, for being open to speaking to us and sharing your insights. It was a pleasure to work with you.

CONTENTS

TABLE OF FIGURES

ABBREVIATIONS

AIDS	Autoimmune Deficiency Syndrome
ART	Antiretroviral therapy
CAG	Community advisory group
DCS	Department of Correctional Services
HCT	HIV counselling and testing
HIV	Human Immunodeficiency Virus
HIPP	Health in Prisons Programme
HPP	Health-promoting prison
HSRC	Human Sciences Research Council
KAP	Knowledge, attitudes and practices
NIMART	Nurse-initiated and managed-antiretroviral therapy
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
TB	Tuberculosis
WHO	World Health Organisation
MMC	Medical male circumcision

ABSTRACT

Background: Tuberculosis (TB) and the human immunodeficiency virus (HIV) are major public health issues within South Africa, with TB the leading cause of death in 2015 in the country (Statistics South Africa, 2017). TB and HIV rates within South African correctional centres (prisons) are higher than in the general population, a trend seen throughout the world (Baussano et al. 2010). Interventions that seek to improve the knowledge of, attitudes towards, and practices around, TB and HIV of inmates in correctional centres include a peer education programme, an edutainment programme called the 'Kick TB/HIV' programme, and routine HIV counselling and testing (HCT).

Aim: This research project assessed the effectiveness of the three above-mentioned interventions in correctional centres within the Eastern and Western Cape in changing TB and HIV-related knowledge, attitudes and practices of male inmates.

Methodology: A quantitative cross-sectional survey was conducted with 336 sentenced, male inmates over 18 years old in six correctional centres in the Western and Eastern Cape. Inmates who met specified criteria were randomly selected for inclusion in the study and were interviewed one-on-one and then completed a self-administered questionnaire evaluating their TB and HIV-related knowledge, attitudes and practices.

Results: After a multivariate analysis was performed, the following associations between the interventions and the TB- and HIV-related outcomes were independently significant. Inmates exposed to Kick TB/HIV had 1,64 (1,04-2,58) times greater odds of being able to name three of four symptoms of TB (p=0,03); 2,64 (1,55-4,50) times greater odds of knowing how TB is cured (p=0,0004); 3,87 (1,05-14,28) times greater odds of being willing to care for a family member with TB (p=0,04); and 10,45 (1,33-81,99) times greater odds of being willing to care for a family member with HIV than those not exposed. Inmates exposed to HCT had 3,47 (1,38-8,73) times greater odds of telling a cellmate about a diagnosis of TB (p=0,008) and 7,68 (2,32-25,39) times greater odds of being willing to care for a family member with TB (p=0,0008) than those not exposed to HCT. Inmates exposed to peer education had 0,32 (0,14-0,72) times lower odds of having shared a tattoo needle in the last month (p=0,006); had 1,11 (1,03-23,51)(using Fisher-Exact CI) times greater odds of having raped someone in a correctional centre than those unexposed (p=0,04). However other factors were also independently significant associated TB- and HIV-related knowledge, attitudes and practices. These included the sociodemographic factors age, race, education, employment status, and HIV status. Structural factors (access to healthcare workers and condoms) also showed

independent significance. Inmates who reported easy access to healthcare workers in a correctional centre had greater odds of reporting that after release they would be highly likely to adhere to TB treatment (OR 2,22 CI 1,03-4,81; p=0,04) and HIV treatment (OR 2,76 CI 1,26-6,03; p=0,03); and 2,67 (1,11-6,41) times greater odds of reporting being likely to use a condom the next time they had sex, than those with no easy access to a healthcare worker (p=0,03). Inmates who reported having easy access to condoms sometimes or always had 2,59 (1,19-5,65) times greater odds of reporting that condoms were used during sex in correctional centres (p=0,02), and 0,13 (0,04-0,44) times lower odds of reporting having ever been raped than those with no easy access to condoms (p=0,001).

Conclusion: The interventions had very limited association with TB and HIV-related knowledge, attitudes and practices, possibly due to limitations in the study and the implementation of the interventions. 'Kick TB/HIV' was associated with increased TB knowledge. Both HCT and 'Kick TB HIV' were associated with a more accepting attitude towards TB. Peer education was the only intervention to have an impact on practices, being associated with decreased sharing of tattoo needles. Other sociodemographic (race, age, education, employment status, HIV status) and structural factors were significantly associated with the TB- and HIV-related outcomes. Of particular interest was the association between access to healthcare workers and condoms and safer behaviour. This suggests that improving these health systems factors (and the structural framework that supports them) could encourage safer behaviours in correctional centres.

CHAPTER 1. INTRODUCTION

Both tuberculosis (TB) and HIV are global epidemics. In 2015, 10,4 million people developed TB (WHO 2017c) and 36,7 million people were living with HIV (WHO 2017d). In South Africa, these epidemics are highly prevalent, with an estimated 438 000 TB cases in 2016 (WHO 2017c) and an HIV prevalence among 15-49 year olds of 18% (Statistics South Africa 2017). TB and HIV are closely associated, with approximately 59% of TB patients coinfected with HIV (WHO 2017c).

Globally, prison populations have higher rates of TB and HIV than the general population (Baussano et al. 2010). Because of the overcrowding and poor ventilation common in prison settings, prisons have even been termed 'amplifiers' of the TB epidemic, making it much easier for TB to spread (Basu, Stuckler & McKee 2011). These conditions increase social tension which can increase the likelihood of coerced and unprotected sex, rape, and unsafe injecting practices in prisons, increasing risk of HV infection (Jurgens 2011, cited in Reid et al. 2012). There is substantial evidence of HIV transmission within prisons (Brewer et al. 1988; Krebs & Simmons 2002; Macher, Kibble & Wheeler 2002). A Zambian study showed HIV prevalence to be 14% higher among inmates on release from prison than on entrance (Henostroza et al. 2013).

In addition, Reid et al's review of sub-Saharan prisons identifies, 'slow and insensitive diagnostics, failing prison infrastructure, inadequate funding, and weak prevention and treatment interventions for human immunodeficiency virus (HIV)' (Reid et al. 2012:S265) as contributing to the breakdown of TB control in prisons.

The rates of TB and HIV in South African prison populations are not well documented, but they are likely to follow the worldwide trend in being significantly higher than in the general population. A recent study found a TB point prevalence of 3,4% among a sample of inmates, more than double that in the general population of South Africa (Department of Health 2013), and 23% of inmates who tested in the 2009/10 year were HIV positive (Department of Correctional Services 2010), compared to the national prevalence of 17% for the year (Statistics South Africa 2010). The South African National Strategic Plan for HIV, STIs and TB (2017-2022) identifies inmates in correctional services as a 'key population' for TB and HIV; meaning that they are at a higher risk of TB and HIV infection and are also key to the

dynamics of transmission (South African National AIDS Council 2017).

Because of the living conditions and limited access to healthcare described above, many of the drivers of TB and HIV infection within South African correctional centres could be seen to be outside the control of individual inmates. On the other hand, certain behaviours and practices commonly found in prison populations, such as tattooing, injecting drugs, sex between men, violence and the sharing of razors and toothbrushes put inmates at particular risk of acquiring HIV (Turnball 1992, cited in Kantor 2006; Audu et al. 2013; UNODC 2010). It could be argued that these behaviours lie more within the control of inmates. Reid et al. (2012) have called for further studies to document 'disease burdens, epidemiology and behavior dynamics' around TB and HIV within prisons and for 'targeted behavioral, structural, and biomedical prevention interventions' (Reid et al. 2012: S271).

The Global Fund to Fight AIDS, TB and Malaria and the US President's Emergency Plan for AIDS Relief (PEPFAR) have partially heeded the call to address HIV and TB in prison inmates, as a key population, by providing grants towards TB and HIV prevention and control interventions in South African correctional centres. Some of the interventions funded have targeted gaps in the health system, such as health-systems strengthening within prisons through clinical mentoring, for example to establish nurse-initiated-and-managed-antiretroviral therapy. Other interventions have targeted behaviour change and knowledge around TB and HIV among inmates. Among the latter are a once off event intervention programme called 'Kick TB/HIV'; a peer education programme for inmates; and HIV counselling and testing (HCT) and screening for TB, all described below.

1.1 <u>'Kick TB/HIV' activation:</u>

This intervention consists of a once-off 'activation' or event held at the correctional facility with a group of 50 - 300 inmates and a team of 2-3 facilitators. Facilitators conduct a high energy edutainment session including activities such as a dance competition, an interactive information session on TB and HIV, a talent show and a symbolic kicking activity in which the symptoms of TB are 'kicked' out of the correctional facility through the kicking of a ball branded with TB symptoms into a soccer goalpost. Each activation lasts around an hour.

1. 2 Peer education training:

This activity involves training of inmates to become 'peer educators' within the prison. Inmates who show an interest in the programme participate in three days of training to develop their knowledge of TB and HIV and basic communication skills. Thereafter the peers engage their fellow inmates in conversations around TB and HIV, encouraging health-seeking and safer behaviour and providing basic facts about these diseases.

1.3 HIV Counselling and Testing (HCT):

HCT, which includes screening for TB, is routinely provided on admission and biannually during incarceration. Non-inmate lay counsellors employed by NGOs provide the intervention during one-on-one sessions which usually last around 20 minutes. The counsellors use the 'ACTS model' of HCT, which consists of the following steps - advise (inform the client about the process and implications of the screening), consent (ask the client for their consent to go ahead with the screening and test process), test (test the client by pricking their finger and using a rapid response test kit), and support (provide support for the client after delivering their HIV result). The client is also screened for symptoms of TB, and if any are present, a sputum sample is collected for further testing (by GeneXpert and by culture if the inmate is HIV positive or confirmed to be rifampicin resistant by GeneXpert). The aim of HCT is to diagnose cases of HIV and TB, but because HCT involves counselling on risk reduction it is also an intervention aimed at increasing knowledge around TB and HIV and encouraging safer behaviours.

1.4 Problem Statement

The degree to which the 'Kick TB/HIV', peer education and HCT interventions are effective in increasing knowledge around TB and HIV and / or encouraging safer behaviours among inmates has not been established. It is also not clear, even if the interventions are effective, whether knowledge and attitude change results in significant behaviour change since some factors influencing behaviours may be beyond the control of inmates.

1.5 Purpose

The study is an evaluation of the effectiveness of the three interventions above in changing the knowledge of, attitudes towards and practices around TB and HIV among inmates in selected prisons in the Eastern and Western Cape. Such an evaluation will provide important evidence to funders, intervention implementers (in nongovernmental organisations (NGOs) and in the Department of Correctional Services (DCS)), policymakers and others working in the field of TB and HIV control in prisons as to whether it is worthwhile to continue devoting resources to these types of intervention programmes, or whether resources should be deployed in different aspects of TB and HIV control.

1.6 Study outline

Chapter 2 reviews the relevant literature on knowledge, attitude and practices studies pertaining to TB and HIV among the general population in South Africa and inmate populations around the world, and the literature evaluating similar interventions to the ones under study.

Chapter 3 focuses on the research methods used to conduct the study, outlining the aims and objectives, the study design, the population and sampling, data collection, management and analysis, the validity and reliability of the study, ethics considerations and its limitations.

Chapter 4 presents the results of the study, presenting the overall distribution of measures of knowledge, attitude and practices with regard to TB and HIV and then the results of whether there are differences in significant associations between TB or HIV knowledge, attitudes and practices for the interventions under study.

Chapter 5 discusses the findings of the study, discussing the variables which are associated with each of these outcomes and contextualizing the TB- and HIV-related knowledge, attitudes and practices of the inmates in terms of the general South African population and inmate populations within literature in the field, seeking similarities and contrasts.

Chapter 6 describes the conclusions and recommendations of the study.

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

This chapter briefly presents the concept of a Health-Promoting Prison and how it proposes to deal with the widespread phenomenon of ill health among prison inmates, before focusing on the opportunity provided by correctional centres to access hard-to-reach populations to provide healthcare and potentially change knowledge and behaviours. The chapter then describes what is known about the TB and HIV-related knowledge, attitudes and practices of inmates in South Africa, and in other countries, and how this compares to the general population. The chapter also explores what evaluations have been performed on HIV counselling and testing (HCT), peer education and 'Kick TB/HIV' or similar interventions. The purpose of presenting what has already been studied and published is to provide academic background to, and contextualise, the results of this study.

2.2 Ill health in correctional settings and the Health-Promoting Prison

It is widely acknowledged that inmates in correctional centres around the world bear a higher burden of ill health (social, mental and physical) than the general population (Fazel & Baillargeon 2011, cited in Reid et al. 2012). In response, the World Health Organisation set up a Health in Prisons Programme (HIPP) in 1995 to offer a specific, settings-based approach to addressing all aspects of health in prisons (Gatherer et al. 2005, cited in Santora, Espnes & Lillefjell 2014). This idea of the "Health-Promoting Prison" (HPP) is based on the 'healthy settings' view of

> "'an holistic vision of health and well-being which is determined by an interaction of environmental, organisational and personal factors within the places that people live their lives' (Dooris, 2009). The 'health- promoting prison', therefore, focuses on all facets of prison life from addressing individual health need through to recognising how organisational factors and physical and social fabric can promote and demote health (de Viggiani 2009b)." (Woodall, Dixey & South 2013:475)

However this programme appears to be focused on the Global North, largely within the European region, and has not been implemented in sub-Saharan correctional centres (Dixey

et al. 2015). This is despite the fact that, as mentioned in chapter one, sub-Saharan African correctional centres face a particularly high burden of HIV and TB because of a very high prevalence of TB and the generalised HIV epidemic in the region. Telisinghe et al. (2016) note that prevalence in sub-Saharan correctional centres is almost always higher than in the general population with prevalence of HIV infection ranging from 2,3% to 34,9%, and of tuberculosis from 0,4 to 16,3%. This is due both to the conditions within correctional centres (overcrowding, poor ventilation, high-risk sexual practices) and to the 'revolving door effect' of inmates cycling in and out of centres and concentrating TB and HIV in the correctional centres and within the communities to which they are released (Telisinghe et al. 2016). In response, but without making reference to the HPP concept, Reid et al. (2012) have drawn attention to the need to be 'thinking outside the prison cell', the title of their article, raising similar issues to those the HPP attempts to answer. Reid et al. (2012) emphasise the importance of using biomedical tools, such as innovative diagnostics, condom provision, medical male circumcision, antiretroviral therapy (ART), HCT, TB preventive treatment, and HIV pre- and post-exposure prophylaxis. However, they also flag the need to improve correctional centre infrastructure, staffing levels, funding, develop a human rights-based culture and attend to criminal justice reform (noncustodial sentences, better legal representation, enhanced bail processes and adapted sentencing policies). The latter is an idea supported by Todrys and Amon (2012) who propose criminal justice reform as a method of TB and HIV prevention.

Others see the correctional setting as an opportunity to access hard-to-reach and most-at-risk populations (Sifunda et al. 2006). Inmates around the world engage in behaviours, such as injecting drugs, unprotected sex, and tattooing, that put them at higher risk of acquiring HIV. These behaviours often precede their incarceration, and may continue during and after it. Any infection acquired during incarceration carries the risk of further transmission on release (Martin et al. 2008). TB is also an increased risk for prison inmates as they frequently occupy overcrowded cells with poor ventilation, and may have restricted time in the open air (Johnstone-Robertson 2011).

Interventions which might increase inmates' knowledge of TB and HIV, decrease their risky practices and increase safer practices are therefore of potential public health interest.

2.3 HIV knowledge and attitudes in the South African population and among inmates in different countries

The Human Science Research Council has conducted four national surveys that aim to estimate the prevalence of HIV, the prevalence of behaviours that affect HIV transmission, and knowledge of HIV among the general population within South Africa (Shisana et al. 2014).

The latest survey conducted in 2012 shows an alarming drop in knowledge of HIV among males over 15 years old since 2008. Shisana et al. (2014) also note that 21% of all participants were under the misconception that HIV can be cured and 14,5% believed it is risky to share food with someone who is HIV positive. Those with lower HIV knowledge tended to be older than 50 years, black African and not living in an urban area. In terms of perception of risk, 23% of black African respondents stated that they would 'probably get HIV', a massive margin above the next category ('mixed race') at 7%. Although recognising that knowledge or a perception of high-risk does not directly translate into safer behaviours, the authors conclude that HIV knowledge and awareness should continue to be promoted as a first step in curbing the HIV epidemic (Shisana et al., 2014).

Surveys on HIV knowledge among inmates have been conducted in prisons in Iran (Nakhaei 2005; Majdi et al. 2011; Eshrati et al. 2008); on HIV knowledge and sexually risky behaviours in prisons in Nigeria (Odujinrin & Adebajo 2001; Audu et al. 2013), and on knowledge of infectious diseases such as HIV in Armenia (Weilandt et al. 2007). The results suggest that even though the inmates surveyed in a variety of prison settings had a fair knowledge of HIV, a large portion of them also held a number of misconceptions about transmission. A study by Eshrati et al. (2008) showed that Iranian inmates had a 'high' knowledge of HIV transmission, but had misconceptions such as that one could acquire HIV through kissing or shaking hands. A study by Majdi et al. (2011) found that Iranian inmates in the Mazandaran province had 'average to fairly good knowledge' of HIV/AIDS but had misconceptions such as that mosquitoes could transmit HIV (49% believed this). A survey by Audu et al. (2013) showed that 96% of Nigerian prison inmates had knowledge of HIV, but that a substantial number believed that witchcraft (9%), mosquitoes (16%) and enemies (11%) were causative agents. Similarly, a study comparing South African inmates from two provinces (Mpumalanga and KwaZulu-Natal) revealed several disturbing misconceptions

(Stephens et al. 2009). Inmates from KwaZulu-Natal were more likely to believe Vaseline could help prevent HIV transmission, that it is not important to use a condom every time you have sex and that condoms can harm the body (Stephens et al. 2009). Unfortunately the absolute data is not given, so it is difficult to assess the overall prevalence of these ideas.

The knowledge of HIV among the South African population as a whole does not seem to be sufficiently high, especially in the situation of a generalised epidemic. One explanation for these results showing knowledge mixed with misconceptions among inmates could be that while inmates had been exposed to HIV/AIDS information, they may have been mistrustful of its source. Kantor points out, 'Because of the dynamics of the correctional setting, information provided by people who are not prisoners from general facts to specific medical advice, often is not trusted' (Kantor 2006[1]).

2.4 HIV practices in the South African population and among inmates in different countries

The 2012 HSRC survey described above also studied the prevalence of risky and safer HIV practices. Just as HIV knowledge appears to have declined among South Africans since the previous 2008 HSRC survey, so too do safer behaviours seem to have decreased. Just over a third of respondents indicated that they used a condom at last sex, with males having a slightly higher proportion at 39% (Shisana et al. 2014). Shisana et al. (2014) suggest that this is due to lower knowledge about sexual transmission of HIV because of reduced communication campaigns. While 92% of respondents knew of a place close to where they lived where they could receive HCT, only 59% of males over 15 years had ever tested.

The 2012 HSRC survey reported on recreational drug use as a whole so it is not useful for ascertaining the specific prevalence of injecting drug use in South Africa. However data from a 2008 household survey estimated the national number of people who inject drugs in South Africa to be 67 000 (Petersen et al. 2013, cited in Scheibe et al. 2017). However, since the practice is criminalised, it is possible that it was under-reported and the estimate should be used carefully.

Although South African inmates in one study mentioned by Booyens and Bezuidenhout

[1] As this published online, no page number for the quotation is available

(2015) were clear that substance use in correctional centres was rife, they did not stipulate the proportion of people injecting drugs (Jürgens, Ball & Verster 2009, cited in Booyens & Bezuidenhout 2015). Respondents did, however, report that it occurred – mentioning that needles have to be stolen from the correctional centre clinic or smuggled in (Booyens & Bezuidenhout 2015). The only statistic that could be located of injecting drug users using inside a correctional facility was in Siberia where 13% of inmates reported injecting drugs in their current prison (Dolan, Bijl & White 2004). However this particular prison mainly housed drug dependent inmates so the proportion is likely higher than average.

Dunkle et al. (2013) used a household survey to gather information about the prevalence of HIV risk behaviours in the general South African population, some of which might be encountered in a correctional setting. In the survey, which covered the Eastern Cape and KwaZulu-Natal, 5% of males reported ever having consensual sex with another male, 10% reported 'sexual victimisation' and 3% having perpetrated sexual violence against another male (Dunkle et al. 2013). Again, the stigma surrounding reporting sexual victimisation has likely led to under-reporting.

Consensual and coerced sex in South African correctional centres is a highly sensitive topic. As well as being stigmatised, these practices may be linked to gang activities and therefore dangerous to reveal (Gear & Ngubeni 2002). Those who are coerced into sex may be physically overpowered, intimidated or manipulated into the act. They may be targeted for a number of reasons, including being a first-time offender, a lack of resources, being young or small or being 'good-looking' (Gear & Ngubeni 2002). Sexual violence is unfortunately found in correctional centres globally, with an Australian survey confirming that first-time inmates, non-heterosexual inmates, and those with a history of sexual coercion outside prison were most at risk (Simpson 2016). The Australian study found that 2% of their sample had experienced sexual coercion and a national survey in the United States revealed that 4% of inmates had experienced sexual victimisation from other inmates (Simpson et al. 2016; Valera, Chang, & Lian 2017).

When consensual sex occurs in South African correctional centres, it is often between younger inmates (Gear & Ngubeni 2002). Booyens and Bezuidenhout (2015) note that transactional sex can occur in order to access commodities such as prepaid phone cards, cigarettes and clothing, and that inmates who are not visited and therefore do not have access

to outside resources, are often forced to engage in this type of sex. The majority of inmates (61%) in the Booyens and Bezuidenhout study (2015) believed that sex between inmates is the main cause of HIV transmission in the correctional centres.

2.5 TB knowledge in the South African population and among inmates in different countries

A national survey has been conducted to determine the South African population's knowledge of TB (Naidoo et al. 2016). The survey draws the conclusion that the population's knowledge of TB is relatively good, in particular with regard to TB prevention (79% could name how to prevent TB), cure (84% correctly identified that TB is curable and how) and the relationship between TB and HIV (>75% knew that people with HIV are more susceptible to TB)(Naidoo et al. 2016). However the study's authors raise concern over the low knowledge of symptoms of TB (only 22% could name three of six key symptoms of TB), and that only 63% could identify that TB is transmitted through the air (Naidoo et al. 2016). This is very disturbing in that it suggests people may not seek treatment for symptoms or implement prevention practices. The factors that were associated with higher TB knowledge were being mixed race vs black African, being male, having completed high school, being employed, having a history of TB, and learning about TB through the media (TV), health workers and teachers (Naidoo et al. 2016). Cramm et al's (2010) earlier study of a particular South African community in the Eastern Cape gives a slightly different picture, with respondents having a very high knowledge that TB is airborne (92%) and that TB can be cured if treatment is taken (98%) (Cramm et al. 2010). However there is a seemingly high level of stigma in the community, with 95% of respondents believing that people will hide their TB status because of fear of what people will say, and some concerning findings on knowledge; 60% believing that TB patients will develop HIV, and 63% believing people are delaying going to the clinic because they are afraid they will be told they are HIV positive (Cramm et al. 2010). A more recent study of patients in primary healthcare facilities in the Free State shows that while many respondents knew to prevent TB by opening the windows (97%) and taking treatment (97,2%), they also had misconceptions about how TB is transmitted, believing that this is possible through kissing (65%) or sharing toothbrushes (85%) (Kigozi et al 2017).

Several studies have explored the knowledge of TB of inmates in other countries. In Brazil, Ferreira Júnior, Bosco de Oliveira and Marin-Léon (2013) seem to document quite a low

level of TB knowledge among inmates in a São Paulo, correctional centre. Only 49% knew TB could be transmitted by air, 38,3% did not know how to prevent TB, and only 38,3% knew that treatment with medical supervision could cure TB (Ferreira Júnior, Bosco de Oliveira & Marin-Léon 2013). Two Ethiopian studies provide some context in terms of the knowledge of TB among African inmates. Abebe et al.'s (2011) study only surveyed TB patients and those who were identified as TB symptomatic and therefore cannot be generalised, even though many results were similar to a study performed by Adane et al. (2017) among Northern Ethiopian inmates with or without a history of TB. Nearly 75% of the inmates in Abebe's study described breath as a mode of TB transmission, but 30,7% did not know how to prevent TB (Abebe et al. 2011). The majority of the respondents in Abebe et al.'s study (61,5%) described their preferred means of treatment as being through modern health services (Abebe et al. 2011). Higher knowledge was significantly associated with higher education, being a pastoralist rather than non-pastoralist, the prison where the inmate was located and a history of TB (Abebe et al. 2011). In Adane's study, more inmates had a knowledge of TB transmission through the air (88%), 65% could name covering one's mouth when coughing as a method of preventing TB and 88,3% knew that TB is curable with modern drugs (Adane et al. 2017). The factors associated with higher knowledge in this group were, again, education, urban vs rural location and the particular prison an inmate was in (Adane et al. 2017).

A variety of sociodemographic and structural factors therefore seem to have an impact on TB knowledge. The impact of education on TB knowledge is demonstrated by Naidoo et al. (2016), Abebe et al. (2011) and Adane et al. (2017). This may be because a higher educational level may translate into a greater access to information through increased reading ability, and even potentially a higher socioeconomic status through better employment opportunities. This, in turn, could also lead to access to more channels of information (workplace programmes, television, magazines, internet). Being in an urban setting (Adane et al. 2017) may also provide better access to information and perhaps better access to healthcare workers, who made a difference to TB knowledge in Naidoo et al.'s (2016) study.

2.6 TB practices in the South African population and among inmates in different countries

Health-seeking behaviour is an important TB practice as it enables people with TB to be diagnosed and start treatment and arrests further transmission (Naidoo et al. 2016).

Unfortunately Naidoo's study does not mention respondents' willingness to seek care as soon as they realise they may have TB, but Skinner and Claassens (2016) do describe a gap in the continuum of care in South Africa immediately after diagnosis, when 17–25% of newly diagnosed smear positive patients do not start treatment. The factors associated with not starting or adhering to treatment were found to be poor knowledge, stigma around TB, living circumstances (poverty, lack of access to transport, the need to continue working) and problems in the health system (poor functioning health systems, negative staff attitudes) (Skinner & Claassens 2016).

Among inmate populations in other countries, the reported willingness to seek healthcare when TB symptoms arise, is relatively high – 84% of Brazilian inmates would seek treatment as soon as they suspected TB, although only 65% of Ethiopian inmates would do the same (Ferreira Júnior, Bosco de Oliveira & Marin-Léon 2013; Adane et al. 2017). A high proportion (83%) of the Ethiopian inmates in Adane's study, chose 'modern health care' as their preferred treatment for TB over traditional and other methods (Adane et al. 2017). While this is encouraging, these intentions may not translate into practice.

2.7 Health belief model

The health belief model is one theory used to understand which elements are most influential for particular behaviours. It proposes that people will adopt a particular behaviour based on threats (how susceptible they think they are to a disease, and how severe they think the disease is), benefits (how well they think the behaviour or avoiding the behaviour will protect them from the disease) or barriers (the costs of engaging in or avoiding the behaviour) associated with it (Rosenstock 1974). Eshrati et al. (2008) found that only when respondents perceived the benefits of specific behaviours to be high, did they engage in such behaviour. Abraham et al (2008) used the same model to predict condom use among Scottish adolescents, and found that perceived barriers to using condoms were associated with low condom use.

The heath belief model in this study may be useful in exploring some of the sociodemographic mechanisms associated with TB and HIV protective attitudes and behaviours, and whether the interventions under study have a positive impact on these attitudes and behaviours.

2.8 Peer education in the correctional setting

Bagnall et al. (2015) define peer education as involving "the teaching and communication of health information, values and behaviours between individuals who are of equal social status, or share similar characteristics, or have common experiences" (Bagnall et al. 2015:17). Peer education programmes have been used in a variety of settings (schools, universities, workplaces) to address issues such as substance use disorders, youth violence and HIV (Devilly et al. 2003). As Devilly et al. (2003) suggest, these programmes are appealing to inmates and organisations for a variety of reasons: peers are regarded as more credible than professionals as they are perceived to have undergone similar life experiences and can communicate in a familiar way (Cahill et al. 1979; Kerish 1975; Mathie & Ford 1998; McKay 2000; Milburn 1995; Parkin & McKeganey 2000; Turner & Shepherd 1999, cited in Devilly et al. 2003); peer educators often find the experience empowering and it can lead to insights into their own behaviour and increased self-confidence (Backett-Milburn & Wilson 2000; Keller 1993; Parkin & McKeganey 2000, cited in Devilly et al. 2003); and, lastly, peer education programmes can provide a cost-effective way to relieve demands on professional staff (Maheady 1998; Maruna 2001; Milburn 1995; Parkin & McKeganey 2000; Turner & Shepherd 1999, cited in Devilly et al. 2003). In addition to this, risk behaviours are often illegal in correctional facilities and peers may be in the best position to address specific practices and suggest practical ways to minimise risks (Devilly et al. 2003).

Devilly et al.'s (2003) review also identifies several potential risks of peer education programmes. Managing a peer education programme takes considerable time, resources and skill and a failure to invest these can result in a programme's failure (Lindsey 1997; Maheady 1998; Walker & Avis 1999, cited in Devilly et al. 2003). If peer programmes are not well integrated into other available professional services, they can create friction with these services (Kerish 1975; Walker & Avis 1999, cited in Devilly et al. 2003). Other risks that could affect HIV and TB prevention peer programmes are the need for ongoing training and supervision of peers to maintain the quality of the intervention, the need to ensure that peers refer cases to professionals when appropriate (Ender & Newton 2000; Maheady 1998, cited in Devilly et al. 2003), and the need to ensure that confidentiality is maintained where necessary (Ender & Newton 2000; Maheady 1998, cited in Devilly et al. 2003). This would be especially important in a potentially punitive context such as a correctional centre.

Sometimes clients trust and prefer programmes run by professionals more than peers. In one study reviewed by Devilly et al. (2003), inmates preferred a general counselling intervention (where topics ranged from alcohol to work release problems) to be run by a professional rather than a peer (Cahill, Jessell & Horne 1979, cited in Devilly et al. 2003). However, in the studies that compare professional vs peer-led approaches to HIV prevention, there seems to be ample evidence to suggest that peer programmes are both acceptable and preferred (Grinstead et al. 1997; Grinstead et al. 1999, cited in Devilly et al. 2003; Bagnall et al. 2015).

The impact that peer education can have on attitudes and behaviour that put inmates at risk of HIV infection is demonstrated by several studies conducted in the United States. Magura, Kang, and Shapiro (1994) showed that young inmates in a group HIV programme were more likely to increase their condom use, increase positive attitudes towards condoms, and decrease high-risk sexual partnerships, when compared with a control group (Magura et al. 1994, cited in Devilly et al 2003). A study by Wexler et al. (1994) showed that parolees engaged in a peer-led HIV prevention programme had a significant decrease in sexual and drug-related risk behaviours one year later (Wexler et al. 1994, cited in Devilly 2003). A study by Grinstead et al. (1999) which compared a peer-led HIV prevention pre-release intervention with a control group 17 days after inmates' release found the group exposed to peer education was more likely to wear condoms at first intercourse post-release, less likely to have shared needles, and more likely to have abstained from injecting drugs (Grinstead 1999, cited in Devilly 2003).

Bagnall et al.'s (2015) systematic review of studies on the effectiveness of peer education programmes in prisons mainly in the United States and United Kingdom confirms these findings. Although Bagnall et al. includes Grinstead's studies in the review, the other studies in Devilly et al.'s (2003) review are not included, and the results show that peer education reduced several risky behaviours. These behaviours included not using a condom at first intercourse after release from prison; being less likely to inject drugs after release from prison; being less likely to have injected in past 4 weeks; being less likely to share injectable drug equipment after release from prison; and being less likely that peer educators have never had an HIV test (Bagnall et al. 2015).

In terms of knowledge, Bagnall et al.'s (2015) study concludes that peer education can

improve knowledge of health issues. Of the 43 health questions the authors reviewed, 22 showed a favourable response to peer education, one an unfavourable response, and the other 20 showed no effect (Bagnall et al. 2015).

While it is included in Bagnall et al.'s review, Sifunda et al.'s (2008) study of the effect of a peer health education programme on HIV/AIDS and sexually-transmitted infections (STIs) in four correctional centres is worth drawing attention to as it is a South African study. Sifunda et al. (2008) compared pre-releasees placed in control groups or groups run by peer educators. They found that in two of three prisons (the fourth was excluded), those in the peer educator groups had a higher knowledge of STIs and a greater intention to reduce risky behaviour. Six to nine months after release, those exposed to peer education had better practical skills for practicing safer sex and sexual negotiation skills as well as intention to reduce risky behaviour in their sexual encounters. (Sifunda et al. 2008).

A recurring theme in many studies is the importance of the collaboration and support of the peer education programmes by the correctional centre staff, at all levels. As Devilly et al. (2003: 229) points out, 'Failure to address investment and logistical issues would likely decrease the success of the approach'.

2.9 HCT in the correctional setting

While the Department of Correctional Services has long offered HIV counselling and testing to inmates (the importance of addressing HIV/AIDS being referred to in its White Paper on Corrections in South Africa (Department of Correctional Services 2005)), the drive to implement HCT routinely and extensively was given a boost by the publication of the 'Guidelines for the management of Tuberculosis, Human Immunodeficiency Virus and Sexually-Transmitted Infections in Correctional facilities' by the National Department of Health in 2013. This was accompanied by the award of a grant from the Global Fund to Fight AIDS, TB and Malaria in the same year (National Department of Health 2013). The guidelines stipulated that HIV counselling and testing should be offered to inmates on admission to a correctional centre, during incarceration on request, routinely as part of campaigns and integrated primary health care services, and on release (National Department of Health 2013).

HIV counselling and testing, which provides participants the opportunity to know their HIV status, is viewed not only as a point of entry into the HIV care continuum, but also as an important part of HIV prevention; counselling provides participants with knowledge about HIV and encourages the adoption of safer behaviours (Fonner et al. 2012).

Fonner et al.'s (2012) meta-analysis of studies of voluntary counselling and testing (VCT)(also known in this study as HIV counselling and testing or HCT) in low and middle income countries, shows that people who received VCT were more likely to report reducing their number of sexual partners; and that those who were diagnosed as HIV positive were significantly more likely to report condom use than HIV positive people who did not receive HCT (Fonner et al. 2012). Most of the studies included in this meta-analysis examined VCT interventions based at clinics and Fonner et al. (2012) point out that different modalities of HCT, for example offering HCT in different settings, could produce different results. He notes a particularly high uptake of 70% for one HCT intervention based at a workplace (Fonner et al. 2012).

Not much research could be located on the effect of HCT as a behaviour change intervention in correctional settings. Motshabi, Pengpid, and Peltzer (2011) examine the uptake of HCT in a South Africa correctional centre and the male inmates' attitudes towards it. The two biggest barriers to HCT for inmates in this prison were the poor attitude of healthcare workers, and a lack of trust in these healthcare workers (Motshabi, Pengpid, & Peltzer 2011). It is not clear what the uptake of HCT was in Motshabi, Pengpid, and Peltzer's (2011) study, but Sifunda et al. (2006) noted that despite the availability of HTC services in the correctional centres they studied, inmate study participants recorded 'very low' uptake. Nevertheless, compared to the general population, the uptake is likely to be higher because of the accessibility of the service and the institutional environment.

2.10 Edutainment interventions in the correctional setting

The 2010 'Kick TB HIV' intervention was originally designed as a TB awareness and education intervention targeted at primary school learners (aged 5 – 14 years old) by the University of Stellenbosch. It was later adopted by the National Department of Health. In its original form aimed at learners, the intervention included a truck with a screen and a public

address system that drove to schools, and offered an interactive group edutainment session that involved music, playing a video about TB, and various games and competitions. A symbolic activity - kicking a soccer ball with the symptoms of TB into a net, was used to engage learners and convey messages about TB. Later, this intervention was adapted to include HIV information and to target inmates and the communities surrounding mines (South African Global Fund Country Coordinating Mechanism, 2013).

It is difficult to compare this intervention to others given its unique form, but several once-off, brief, edutainment-based interventions provide some context, and suggest that these kinds of interventions can be effective. Fish et al. (2008) developed a peer-led videotape and comic-book-style pamphlet about HIV, hepatitis and STIs, which were implemented in a once-off, brief intervention, to a group of prison inmates. Using pre and post testing, Fish et al. (2008) showed that knowledge that communicable diseases are treatable, that they can be asymptomatic, and that an HIV positive diagnosis is not 'a death sentence', improved among inmates after the intervention. Similarly, Martin et al. (2008) showed that a brief, peer-led and video-based intervention shown to pre-releasees can be effective in changing reports of risky behaviour of inmates on release. Inmates exposed to this intervention were less likely to report unprotected sex 90 days after release than those exposed to a standard intervention (Martin et al., 2008). A once-off comedy intervention aimed at improving knowledge and health-seeking behaviour around mental health implemented in a women's correctional centre in the United Kingdom showed that there was a post-intervention improvement in willingness to discuss mental health issues with several sources of help, but no increased intention to associate with someone with a mental illness (Wright et al. 2014).

2.11 Summary

The concept of a Health-Promoting Prison, which advocates a 'whole-system' approach to dealing with health through social, organisational and environmental elements, has been proposed to address the prevalence of ill health in correctional centres around the world. In the South African context, where TB and HIV are highly prevalent in correctional centres, several structural approaches which go beyond biomedical interventions, and which echo some aspects of the HPP, have been proposed to address the issues. Correctional settings are also excellent opportunities to access hard-to-reach, at risk populations. Levels of riskier behaviours (injecting drug use, unprotected sex, tattooing) are relatively high among inmates

before, during and after incarceration. Interventions which target these behaviours (often through increasing knowledge of TB and HIV) can therefore be of public health interest. A survey of South Africans' overall knowledge of HIV showed a drop in 2012, a drop that would likely also reflect in inmates' knowledge of HIV. Studies of knowledge of HIV among inmate populations in other countries demonstrate that even when knowledge is relatively high, high levels of misconceptions about HIV can be found in these populations, possibly because the source of information is not fully trusted. Behaviours which put people at risk of HIV such as unprotected sex are relatively high in the general South African population. Certain other behaviours, which have been identified as risky for the transmission of HIV within correctional centres, such as coerced sex and injecting drugs are not widely reported, either in the general population or correctional settings, but may be under-reported due to criminalisation. Within the general South African population, TB knowledge of transmission and prevention is relatively high, but there is concern over low knowledge of symptoms of TB, which could affect health-seeking behaviour. Knowledge of TB among inmates in other countries varies, with Brazilian inmates having a low level of knowledge and Ethiopian inmates a significantly higher one, particularly with regards to the transmission of TB. Although there are challenges with a significant proportion of South Africans not starting or adhering to treatment, inmate populations in other countries, reported relatively high willingness to seek healthcare when TB symptoms arise, although this may reflect a social desirability bias. Three interventions which aim to address knowledge, attitudes and practices of inmates around TB and HIV are peer education, HCT and 'Kick TB/HIV'. Several studies of peer education in correctional settings show that it may be effective in improving knowledge and practices around HIV, and may be preferred over interventions delivered by professionals. There are certain risks attached to peer education programmes, which need to be managed closely and ongoing training and supervision is essential for peers leading programmes. An overall recurring theme is the need for support for peer education programmes from correctional officials at all levels. HCT has been shown to decrease the levels of risky behaviour of participants among the general population and has been widely implemented in South African correctional centres. However its uptake depends on a positive view of the health workers delivering the intervention. Hence the accessibility, and particularly the quality, of care are essential if this intervention is to be of use. 'Kick TB/HIV' can be compared to other once-off, edutainment-based, brief interventions. These kinds of interventions have shown increases in knowledge and in one case, even a decrease in risky behaviour some time after implementation.

Having covered relevant literature in the field of study, the next chapter, chapter 3, will describe in detail the methods used in this study.

CHAPTER 3. METHODOLOGY

This Chapter describes the aims and objectives of the study, and provides an overview of the methodology used in this study. The latter includes a description of the study design and setting; the research population; participant sampling and recruitment procedures; data collection, management and analysis; study limitations and ethics considerations.

3.1 Aim and Objectives

3.1.1 Aim

The aim of the study was to evaluate the effectiveness of three interventions, a 'Kick TB/HIV' activation, a peer education intervention and routine HIV counselling and testing (HCT), in changing self-reported knowledge of, attitudes towards, and practices around, TB and HIV, among inmates in correctional services in the Western and Eastern Cape provinces of South Africa.

3.1.2 Research objectives

The study objectives were

I. To describe the socio-demographic profile of a male adult prison population in the Western and Eastern Cape
II. To investigate associations between their socio-demographic profile and knowledge, attitudes and behaviour with respect to TB and to HIV

To assess whether exposure to:

III. A 'Kick TB/HIV' intervention or a peer education intervention or HCT was associated with inmates' knowledge of TB and HIV

IV. A 'Kick TB/HIV' intervention or a peer education intervention or HCT was

associated with inmates' attitudes towards TB and HIV

V. A 'Kick TB/HIV' intervention or a peer education intervention or HCT was associated with inmates' practices that are deemed to be at higher risk of, or protective against, TB and HIV

And

VI. To compare which intervention ('Kick TB/HIV' or peer education or HCT) was most strongly associated with the knowledge of, attitudes towards, and the practices that may protect or place inmates at greater risk of TB and HIV.

3.2 Study design

A cross sectional survey was used to explore whether there were any associations between exposure to one of the interventions ('Kick TB/HIV', peer education or HCT) and knowledge, attitudes or practices related to TB and HIV. This study design can be used when data is collected in a population at a particular point in time and associations are sought (Coggon, Rose & Barker 2008).

Initially the project was planned as a quasi-experimental, before and after study whereby six correctional centres (three in the Eastern Cape and three in the Western Cape) would be selected for their lack of exposure to any of the three interventions, surveyed to establish a baseline of knowledge, attitudes and practices among inmates, exposed to particular interventions (two correctional centres being exposed per intervention), and then surveyed again to evaluate the effect of the interventions. Unintended cross-exposure complicated this design (discussed below), and instead the follow up survey was analysed as a cross-sectional survey. The total population of 336 individuals in the cross-sectional design was analysed according to (overlapping) groups based on exposure, with 162 inmates having been exposed to the Kick TB/HIV intervention, 154 inmates having been exposed to the peer education intervention, and 312 inmates having been exposed to the HCT intervention. Ten individuals had no exposure to the interventions, but this group was too small to show significance if analysed separately.

3.3 Population and study setting

3.3.1 Study setting

The setting for this study consisted of correctional centres within the Eastern and Western Cape province of South Africa. There are 89 centres in these provinces, grouped within 16 management areas, and housing around 50 000 inmates at any given point in time. The daily lock up figures for December 2014 and January 2015 for the Department of Correctional Services (DCS) Eastern Cape and Western Cape management areas showed an inmate population of 19 247, and 28 271 for the Eastern Cape and Western Cape, respectively. Within the two provinces combined, 3% of inmates are female and 97% are male. The majority, 93,1%, are adults over 21 years of age, 6,7% are between the ages of 18 and 20 and 0,2% are under 18 years of age. Sixty-nine percent are sentenced inmates, with the remaining 31% unsentenced. The racial breakdown of the national inmate population was reported by the DCS in 2012 as 0.5% Indian/Asian, 1.7% white, 17.5% coloured and 80.3% African (DCS 2012). The majority of inmates live within communal cells of 40 to 60 inmates, which are usually overcrowded. The average occupancy is 152% in the Eastern Cape and 151% in the Western Cape.

The specific correctional centres chosen for the study (rationale for selection explained below) were:

Eastern Cape:
Fort Beaufort Correctional Centre
Cradock Correctional Centre
Grahamstown Correctional Centre

Western Cape[2]:
Obiqua Correctional Centre
Allandale Correctional Centre
Paardeberg Correctional Centre

[2] Pollsmoor Medium C Correctional Centre (a seventh correctional centre) was also used to conduct the pilot study and to run the community advisory group, but it has not been mentioned above in an attempt to simplify the description.

3.3.2 Study Population

The study population was adult (≥18 years) sentenced male inmates, incarcerated at the six correctional services described in the study setting sub-section above.

3.3.3 Research site selection

Most correctional centres in the Western and Eastern Cape had already received one or all of the interventions being evaluated at the time of the start of the study. The six correctional centres in the study were therefore purposively selected for having had no exposure to the interventions (as stated by relevant Department of Correctional Services officials) and because they had a large enough population of sentenced, male inmates over 18 years to make up the required sample. In the case of HCT, it was not possible to find correctional centres that had not been exposed to the intervention because it had been so widely implemented.

3.3.4 Sample size

The sample size was calculated based on the original study design therefore this process is outlined below. The sample size was, however, adequate for the design that was ultimately used for analysis. The primary outcome of interest was defined as being able to name three of four TB symptoms (coughing, weight loss, fever and night sweats) as an indicator of TB knowledge. A 20% increase in the proportion of inmates correctly identifying three of the four TB symptoms was regarded as representing a significant increase in TB knowledge symptoms. Using this effect size of 20%, and assuming that at baseline 40% of inmates were able to correctly identify three of the four symptoms, a sample size of 107 for each study group (intervention vs no intervention at a ratio of 1:1) was calculated at 80% power and α =0.05 (two-sided) using the Fleiss formula with a continuity correction in EpiInfo statcalc. To allow for possible attrition and other data losses, the sample size for each study group was set at 120 inmates. Since there would be three study groups, one for each of the three interventions, the total sample size was 360 inmates.

3.3.5 *Procedure for participant selection*

Participants were deemed to be eligible for selection based on the following criteria:

Inclusion criteria:

- Age over 18 years old (There was no capacity to secure the parental or legal guardian consent needed to include younger inmates)
- Sentenced (The movement of remand detainees is too unpredictable to ensure they would be exposed to an intervention and then still incarcerated when the follow up survey was conducted)
- Male (Due to the small proportion of females in the total inmate population, only a few centres accommodate female inmates and it was impractical to include them in the study.)

Exclusion criteria

- Eligible for parole in next six months (This criterion was necessary for the initial study design so that inmates would be present for the baseline and follow up surveys. Nevertheless it is included here for the sake of completeness.)

Eligible participants within each designated correctional centre were selected through a random sampling method in centres in which the pool of eligible potential participants exceeded 60. In designated centres where the number of eligible potential participants did not exceed 60, all inmates were offered the opportunity to participate.

A sampling frame of eligible inmates was obtained from each correctional centre. Thereafter a number was assigned to the name of each inmate on the list and an online random number generator (www.random.org) was used to select the numbers of the inmates that would be interviewed. In situations in which the data collection team was not allowed to remove the list of eligible potential inmates from the correctional centre and therefore did not have access to the online random number generator, numbers assigned to inmates were randomly selected after being placed in a 'hat'.

3.3.6 Replacement:

Inmates who did not consent to participate in the surveys were not replaced. Inmates who were unavailable for other reasons (visiting the dentist, ill, etc) were replaced. Table 1 below summarises the rate of participation, refusals and replacements.

Table 1: Summary of number of individuals offered participation in the study, by correctional centre

Correctional Centre	Number of individuals offered participation	Number of individuals who consented	Number of individuals who declined	Number of individuals who did not participate for other reasons (and replaced)
Obiqua	68	63	4	1
Allandale	58	48	9	1
Paardeberg	71	62	9	0
Grahamstown	57	57	0	0
Fort Beaufort	52	47	5	0
Cradock	60	60	0	0
Total	**367**	**337**[3]	**27**	**2**

3.4 Data collection

3.4.1 Study instruments:

Data was collected by means of a standardized questionnaire available in English, Afrikaans and isiXhosa (appendices 2-4). The questionnaires were adapted from the United Nations Office on Drugs and Crime's (UNODC) 'HIV in prisons: situation and needs assessment toolkit (Advance Copy)' and the Human Sciences Research Council's (HSRC) 'South African National HIV prevalence, Incidence and Behaviour Survey, 2012'. The questionnaire

[3] One response was lost, possibly because an interviewer did not 'save' it, or during transfer to the database.

was translated from English into Afrikaans and isiXhosa by professional translators, and then back translated into English to check for accuracy.

The questionnaire was piloted at Pollsmoor Medium C Correctional Centre, and adjusted based on feedback from the interviewers.

The first part of the questionnaire (question A1 to L11) was administered face-to face by an interviewer using an electronic tablet to capture the responses. The second part of the questionnaire (question F3 to I7) was self-administered by the inmate on the tablet. This latter method was adopted because studies show that individuals are more likely to report sensitive information if they are assessed by means of anonymous, self-administered questionnaires rather than face-to-face interviews (Langhaug, Sherr & Cowan 2010). Questions about sensitive information such as sexual activity and injecting drug use were therefore included in the self-administered section. The interviewer stayed nearby to answer any questions the inmate might have during the self-administered section.

The use of electronic tablets allowed illiterate inmates to self-administer the questionnaire using audio recordings of questions, and by clicking on colours indicating answers.

The questionnaire was created on www.surveyanyplace.com. This platform allowed responses to be captured on the tablets while offline (which was necessary as devices with sim cards would not have been allowed inside correctional centres) and then to be uploaded to an electronic database the next time the devices were connected to the internet.

3.4.2 Interviewers

Interviews were conducted one-on-one with inmates, but interviewers worked in a team of three to four, with each team member interviewing an inmate separately. Due to the changing availability of interviewers and the different languages required in different regions, ten different interviewers were recruited and trained during the course of the study. The candidate acted as one of the interviewers in the team at all times.

The interviewers were provided with training in conducting quantitative interviews with participants using questionnaires loaded on tablets. They were also provided with a summary

of relevant definitions of terms used in the questionnaire in order to standardize how concepts were understood and explained to inmates. Safety, appropriate behavior in a correctional centre, the importance of consent and confidentiality, especially with vulnerable population such as prisoners, was explained to the interviewers during training (more information is included in ethics considerations below).

3.4.5 Measures

All information collected was based on inmates' self-report. Inmates' knowledge of TB and HIV were assessed by collecting quantitative data on knowledge of TB and HIV causation, transmission, prevention, symptoms and treatment.

Inmates' attitudes towards TB and HIV were assessed by collecting quantitative data on their attitudes towards their own risk of TB or HIV, how they perceived the severity of contracting TB or HIV, and their attitudes towards interacting with people living with HIV or with TB.

Inmates' practices around TB and HIV were assessed by collecting s quantitative data on their practice of: injecting drug use (sharing gear or not), consensual sex within correctional centres, smoking, transactional sex, sexual coercion, tattooing, sharing razors, keeping windows open for ventilation, condom use at last sex, testing for HIV, seeking care for TB symptoms and treatment adherence if on TB treatment or antiretroviral treatment.

Terms used to define race groups (African, coloured, white, Indian/Asian, other) were adopted from a questionnaire used for the South African National HIV prevalence, Incidence and Behaviour Survey, 2012 so that data could be compared with that survey.

3.5 Data Management

Data was uploaded from the questionnaire responses captured on the tablets to an online database after each data collection session. All data was stored in a password protected, cloud-based folder. The number of questionnaire responses was checked against the number of consent forms at the end of each day to ensure all responses had been captured.

Once all data had been collected it was exported to an excel spreadsheet. The exported data

were cleaned, coded into binary variables where necessary, and crosschecked against the original for accuracy. The data was then imported into EpiInfo for analysis.

3.6 Data analysis

Descriptive statistical analyses were used to summarise the data, showing distributions. Continuous data was analysed for central tendency and range, and binary data was summarized through the use of frequencies and proportions.

To test the associations between outcomes and exposures, a bivariate analysis using a Chi-squared test was performed on each outcome in relation to each exposure. A significance level of $p \leq 0,05$ was chosen. Variables measuring the outcomes (TB knowledge, TB attitudes, TB practices, HIV knowledge, HIV attitude, HIV practices) were tested for association against each of the interventions (HCT, peer education, 'Kick TB/HIV') and then against socio-demographic factors (race, age, employment status, educational level, history of TB, HIV status) and potential barriers to safer practices (access to healthcare workers, access to condoms, access to clean equipment for injecting drugs).

To control variables for independent associations, a multivariate logistic regression was then run for each outcome variable and all the exposure variables that had shown statistical significance (at a level of $p \leq 0,05$) for that outcome in bivariate analysis.

3.7 Validity and Reliability

3.7.1 Generalisability

The findings of the project are generalizable to sentenced, adult male inmates in similar correctional centres in the Western and Eastern Cape.

3.7.2 Validity

To improve the internal validity of the study, a pilot study was conducted in Pollsmoor Medium C to test that the questionnaire measured the outcomes correctly. The questionnaire was adjusted based on feedback received from the interviewers and analysis of the data

collected. The questionnaire was also reviewed by the community advisory group of inmates to ensure that understandings of the concepts in the questionnaire were the same among the study population and researchers. Selection bias was reduced through the use of random selection in the sampling.

3.7.3 Reliability

The use of standardized methodology (standardized questionnaires accepted internationally, standardized training for interviewers) and instrumentation (electronic tablets) increases the likelihood that the study could be replicated.

3.8 Methodological Limitations

Although it was intended that the inmates in certain correctional centres would only be exposed to specific interventions so that comparisons between groups were possible, this did not occur as planned. Cross-exposure occurred because of an unexpected mass implementation of certain interventions, the migration of inmates between correctional centres, and, in the case of peer education, the implementation of a similar intervention by a different party. In addition to this, the research project's implementation of the peer education intervention was hampered by difficulties obtaining access to centres.

Because of these challenges, the design of the study was changed to that of a cross sectional survey. The data gathered during the follow up survey carried out after the implementation of the interventions was used for this survey.

3.8.1 Potential for unreliability

Since a different party was implementing a peer education intervention in some of the correctional centres, and it is not possible to distinguish between those inmates exposed to the research project's peer education and those exposed to the other party's peer education, the exposures had to be considered together. However, since the format of the different peer education interventions could be very different, the reliability of the study outcome with regard to the effects of peer education becomes compromised. Only the very broad definition of peer education that was included in the questionnaire (an inmate who has been specially

trained on TB and HIV and talks to you about TB and HIV) can be considered to be true for both peer education interventions since that is what each inmate agreed he had or had not been exposed to.

3.9 Ethics Considerations:

Inmates in correctional services constitute a 'vulnerable group' as stated in the Helsinki Declaration (2013) and care was therefore taken to ensure that there was no element of coercion in their participation in this research.

3.9.1 The principle of collaborative research

A community advisory group (CAG) of inmates was recruited to advise on how to conduct the research, and to receive feedback on it, in line with the principle of 'collaborative research' outlined in the Institute of Medicine (US) Committee on Ethical Considerations for Revisions to DHHS Regulations for Protection of Prisoners Involved in Research's 'Ethical considerations for research involving prisoners' (2007).

The CAG was recruited from Pollsmoor Medium C Correctional Centre with the purpose of advising on a number of research and health service questions in return for information on health topics of their own selection. Members were recruited based on their interest and an anticipated stay in Medium C of at least two months. The CAG met from the 2nd July 2015 until July 2016, usually weekly. Because Medium C correctional centre is a pre-release centre, there was a high turnover of CAG participants as inmates were released, but the group ranged from about 8 to 25 members.

3.9.2 Benefits of research to research population

The outcomes of the research have the potential to inform the shaping and value of future interventions aimed at improving inmates' knowledge and attitudes towards TB and HIV, or those aimed at decreasing risky behaviours or increasing protective behaviours. Where practices lie outside the control of inmates or where barriers exist to them adopting safer behaviours, this research can inform advocacy aimed at improving the conditions that put inmates at risk of being infected with TB and HIV.

3.9.3 Written, Informed Consent

Written informed consent was obtained from all participants. Prior to beginning the interviewing activities, an interviewer verbally conveyed the information in the information sheet and consent forms to groups of eight to twenty inmates and provided an opportunity for questions and for inmates to decline. Participants were informed that participation was voluntary and of their rights to not participate, or to stop participation at any time, without any negative consequences to them.

Thereafter, in one-on-one conversations, the interviewers again provided an opportunity for each inmate to ask questions, and read through the consent form with the inmate prior to him signing it. If the inmate was in agreement, the interview then began.

Where a potential participant was illiterate and could not sign the consent form, he was offered the option of a person who was not a project staff member reading the consent form to him and that person signing as a witness. Since the only non-project staff members present were DCS officials, when this situation arose, the participant often preferred to have the interviewer read the consent form to them.

Consent forms and information sheets were available in English, Afrikaans and isiXhosa.

3.9.4 Confidentiality

The interviews were conducted in large open rooms in the correctional centres, usually dining halls or school rooms. Due to security concerns, it was not possible to conduct the interviews in separate rooms. However, to disguise the sound of the interviewers' and interviewees' voices, loud music was played from a laptop through speakers, making it impossible to distinguish what was being said by anyone speaking in a normal tone more than a few feet away.

The aggregated information collected during fieldwork activities was only accessible by the project leads and principal investigator. Consent forms which included the names of participants were kept in a locked filing cabinet and were separate from the anonymous, electronic data collected. Electronic databases where data was stored were password

protected. Only the principal investigator, the project leads, and a technical support person, has access to the database.

Participants' questionnaires were identified by codes, which could not be linked to their names, and were therefore entirely anonymous.

All interviewers signed a confidentiality agreement when they were recruited . This stipulated that they could not reveal anything discussed during the interviews or disclose someone's status as an inmate to others.

Despite all these measures, given that these were incarcerated individuals, fear of negative repercussions may have affected some respondents' answers as indicated in the results and discussion chapters.

3.9.5 Safety

a) Safety of fieldworkers

The Department of Correctional Services' research policy is that research staff will be accompanied by a correctional services official at all times while in the correctional services facilities. This was nearly always the case, and where not, was not under the control of the researchers. There were no safety incidents with fieldworkers during the course of the study.

b) Safety of participants

Interviews were conducted in contained spaces offering safety and privacy to the inmates. On completing the questionnaire, participants were debriefed individually and screened for signs of psychological distress as a result of the survey. This screening consisted of questions about how they were feeling and whether any questions had disturbed them.

A written action plan was developed with each head of centre detailing how to handle any open (not anonymously reported within the questionnaire) disclosure of having survived sexual violence. The plan detailed how physical safety for the reporting inmate would be assured and that opportunities for counseling and to formally report the crime would be

provided. There were three such reports made to researchers during the course of the study. They were reported to the respective heads of centre, as per the plans, and further action was taken by DCS.

3.9.6 Ethics and Regulatory Compliance

This study was conducted in accordance with the Declaration of Helsinki (2013) and The Department of Health: Ethics in Health Research: Principles, Structures and Processes (2004). Approval was obtained from the University of the Western Cape's Higher Degrees Committee and Research Ethics clearance from the University of the Western Cape's Biomedical Research Ethics Committee (appendix 5) and the DCS Research Ethics Committee (appendix 6) were obtained.

CHAPTER 4. RESULTS

This chapter presents the results of the study, beginning with a review of the sociodemographic characteristics and the clinical history of the study population. These factors are disaggregated in terms of exposure to the interventions under study to explore whether any substantial differences exist between the groups that could potentially confound associations with the interventions. The outcomes of interest (indicators of HIV knowledge, HIV attitudes, HIV practices, TB knowledge, TB attitude, TB practices) are then presented for the whole study population. Thereafter the outcomes of interest are examined for associations with sociodemographic and clinical factors and exposure to the interventions under study using their Chi-squared p values and the odds ratios (OR) of multivariate logistic regression. Certain TB and HIV practices are also examined for association with potential barriers to their uptake using the same statistical tests.

4.1 Characteristics of the study population

4.1.1 Sociodemographic information

The sociodemographic characteristics of the study population, and the study groups, in terms of their age, race, employment status and educational level, are described below. The decimal points in percentages have been rounded off, except when noting a difference.

There was little difference in terms of age of those individuals exposed to peer education (average 32,56 y.o, median age of 31 y.o., age range 18-60 y.o.), HCT (average 32,41 y.o, median age of 30 y.o., age range 18-73 y.o.) and ‘‘Kick TB/HIV’’ (average 30,48 y.o, median age of 29 y.o., age range 19-73 y.o.) or with that of the study population (average 32,21 y.o, median age of 30 y.o., age range 18-73 y.o.). The racial profiles of the groups exposed to the interventions were also similar to the total population which was (African 63%; coloured 35%; white 1 %; Indian/Asian 0%; other 1%) with the exception of white and ‘other’ individuals who were so few as to be unlikely to be evenly distributed, and with a slightly higher proportion of African and lower proportion of coloured respondents in the ’Kick TB/HIV’ group. The racial distribution of those exposed to peer education was African 62%; coloured 37%; white 0%; other 1%; of those exposed to HCT was African 62%; coloured 36%; white 1%; other 1%; and of those exposed to ‘Kick TB/HIV’ was African

76%; coloured 24%; white 0%; other 0%. A lower proportion of individuals exposed to ‘Kick TB/HIV’ were employed full-time prior to incarceration (30%), as opposed to the total study population (36%), peer education (38%) and HCT (37%). Those exposed to ’Kick TB/HIV’ also had a slightly different educational profile to the total study population, and those exposed to HCT and peer education. There was a lower proportion of individuals who had passed grade seven or below (18%), among those exposed to ‘Kick TB/HIV’ than in the study population as a whole (25%) or among those exposed to HCT (25%) or peer education (23%).

Despite some differences in the ’Kick TB/HIV’ group, there was therefore very little difference between the study groups that could confound the associations being measured. Hence the populations are comparable for the purposes of the study.

4.1.2 Clinical characteristics

The clinical characteristics of the study population, and the study groups, in terms of their history of TB and HIV status, are described below.

The study population had a total HIV prevalence of 11%, as compared to those exposed to peer education (12%); those exposed to HCT (10%) and those exposed to ‘Kick TB/HIV’ (9%). Of those with HIV (and who did not feel comfortable disclosing their status) 60% were taking ARVs. The number of individuals who had TB at the time of the survey was low, n=3 (1%). Only one of those individuals reported being on TB treatment. A significant proportion (18%; n=60) of individuals had a history of TB at an earlier point, with not a great difference between individuals exposed to ‘Kick TB/HIV’ (15%), peer education (16%) and HCT (18%).

The distribution of the clinical characteristics of the population across the intervention groups should not therefore be a major cause of confounding and are comparable.

4.2 Outcomes of interest

4.2.1 TB outcomes (TB knowledge, TB attitude, TB practices)

The outcomes of interest with regard to TB are outlined in appendix 1.

a) TB knowledge

A very high proportion of the study population were aware that TB is curable (98%), and of how TB is cured (72%). However other aspects of TB were less widely known. Only 25% of the study population could name all four major symptoms of TB (coughing, night sweats, fever and weight loss), although more could name three (60%). Just over half (51%) could identify how TB was transmitted and, worryingly, only 15% knew how TB could be prevented.

b) TB attitude

While a very high proportion of respondents seemed to indicate an accepting attitude towards TB, with 97% being willing to tell a family member if they were diagnosed with TB and 86% being willing to tell their cellmates, a much lower proportion (68%) were prepared to buy food from someone with TB. This is despite the fact that 96% were prepared to care for a family member with TB, an activity that would carry a greater risk of being infected with TB. Considering the conditions within correctional centres, it is surprising that only 60% believed themselves to be at high risk of contracting TB.

c) TB practices

A very high proportion of respondents reported positive healthcare-seeking behaviour for TB, with 84% believing they would be highly likely to adhere to treatment if they were released from a correctional centre while on TB treatment and 90% suggesting they would seek care as soon as they suspected they might have TB. However other safer practices were not widely reported - only 18% of respondents were non-smokers and only 23% spent more than three hours outdoors every day.

4.2.1 HIV outcomes (HIV knowledge, HIV attitude, HIV practices)

The outcomes of interest with regards to HIV are outlined in appendix 1.

a) HIV knowledge

A large majority, 78% of respondents knew that HIV is incurable, although this is still surprisingly low. A majority (59%) were able to correctly identify methods of HIV prevention without any errors. However only 11% could correctly identify various methods of HIV transmission without making any errors. Many of the others could identify some methods of HIV transmission correctly, but also included misconceptions, for example, 38% of inmates believed that HIV can be transmitted through mosquitoes.

b) HIV attitude

Most of the study population exhibited an accepting attitude towards HIV, with 97% reporting they would tell a family member if they were diagnosed with HIV, and 75% indicating they would tell a cellmate. The latter is lower than the 86% that would be prepared to share a diagnosis of TB with a cellmate, indicating that stigma may be higher with HIV. A very high proportion (96%) of the respondents indicated they would care for a family member with HIV. A higher proportion (82%) of respondents reported being prepared to buy food from someone with HIV than would from someone with TB (68%). A minority (41%) of the study population believed they were at high risk for HIV, but a large majority believed it is a very serious disease (88%).

c) HIV practices

When the study participants were asked to report on the general practices of inmates around HIV, 34% indicated that they believed condoms were used during sex in correctional centres, 48% reported that transactional sex occurred, 29% had witnessed or heard about rape occurring in a correctional centre and 26% believed inmates injected drugs in correctional centres.

When reporting on their own practices around HIV, only 4% respondents reported having engaged in consensual sex in a correctional centre, and the same number (although not all the same individuals) in transactional sex. Twelve (4%) individuals reported having ever been raped, and 10 (3%) reported having been raped in the last month. There was some internal inconsistency in the reporting of the perpetration of rape with 13 individuals (3,87%) reporting having ever raped someone else, but 15 (4,46%) reporting having raped someone in the last month. For that reason, the variable examining whether someone reported having raped someone during the last month was excluded from further analysis.

Despite only 13 individuals reporting consensual sex, 26 individuals (29% of those who believed the question relevant to them) reported having used a condom in a correctional centre in the last month, and 73 individuals (50% of those who believed the question relevant to them) anticipated that it was likely or highly likely they would use a condom the next time they had sex in a correctional centre. This inconsistency could be explained either by inaccurate reporting, or the use of condoms during masturbation – a practice which was mentioned by inmates during interviews.

Twenty-three individuals (7%) reported having injected drugs within a correctional centre with 12 reporting (4%) having done so within the last month. Of those who reported injecting, 10 (43%) reported having shared needles and syringes. Twenty-five (7%) individuals reported having shared a razor blade within the last month and 35 (10%) reported having shared a tattoo needle in the last month.

The vast majority of respondents reported positive healthcare-seeking behaviour, with 86% saying they would be highly likely to adhere to HIV treatment after release, if diagnosed as HIV positive. Nearly a third of the respondents (32%) had had a medical male circumcision. Very close to all the inmates (93%) reported having been tested for HIV while in a correctional centre. Most of the HCT services in correctional centres are provided by lay counsellors who work for NGOs, and who are often female. Inmates mentioned during interviews that they have tested multiple times because they enjoy talking to the counsellors and that it alleviates boredom.

Due to the low number of observations for several variables they were excluded from analysis. These were “has ever shared needles or syringes in correctional centre”; “injected drugs in the last month”; and “has been raped in last month”.

4.3 Association between respondents’ sociodemographic and clinical characteristics, exposure to interventions, barriers to safer TB practices and knowledge of TB, attitude towards TB and practices around TB

Measuring the association between the characteristics of the respondents, their exposure to the interventions under study, their exposure to certain barriers to safer TB practices, and their knowledge of TB, attitude towards TB and practices around TB was based on the Chi-squared p-values obtained when comparing variables from each category (sociodemographic, clinical, exposure to interventions, barriers to safer practices) with each outcome variable. Those variables that showed an association of p-value 0.05 and below were analysed further using multivariate logistic regression to control for other associations.

Only those associations which showed significance during bivariate analysis have been presented, and only those which show significance after multivariate analysis are explored in the narrative.

4.3.1 Association between sociodemographic characteristics of respondents and their knowledge of TB, attitude towards TB and practices around TB

a) Age

Respondents 18 to 30 years old were compared to those older than 30 years in terms of their knowledge of TB, attitude towards TB and practices around TB. The statistically significant results after bivariate analysis are presented in table 2 below:

Table 2: Association between the age of sentenced male inmates and their knowledge of TB, attitude towards TB and practices around TB.

Age (30 years old and younger compared with those older than 30)

		Exposed	Unexposed	x^2	P-value	Fisher-Exact	Multivariate logistic regression	
		n (%)	n(%)			2 Tailed P	Odds Ratio (95% CI)	P-value
TB practices								
Is a non-smoker	Yes	16 (10,39)	42 (26,58)	13,51	0,0002*		0,33 (0,17-0,63)*	0,0009*
	No	138 (89,61)	116 (73,42)					
Always have their cell windows open	Yes	101 (65,58)	129 (81,65)	10,38	0,001*		0,56 (0,32-0,98)*	0,04*
	No	53 (34,42)	29 (18,35)					
Spend more than 3 hours outdoors a day	Yes	27 (17,53)	44 (27,85)	4,72	0,03*		0,71 (0,40-1,27)	0,25
	No	127 (82,47)	114 (72,15)					

*Indicates statistical significance

There were significant differences in TB practices between younger and older inmates. When a multivariate logistic regression model was applied to the statistically significant variables to control for other potentially confounding factors, two of the variables remained significant - inmates 30 years and younger had 0,33 times lower odds of being non-smokers than those older than 30 years (p=0,0009), and inmates 30 years and younger had 0,56 times lower odds of reporting always having their windows open (p=0,04).

b) Race

Because there were only three individuals who identified as white, two who identified as other, and none who identified as Indian / Asian, these numbers are too few for a meaningful analysis. Therefore only the responses of individuals who identified as African and coloured were analysed in terms of race. African respondents were compared to coloured respondents in terms of their knowledge of TB, attitude towards TB and practices around TB. The statistically significant variables after bivariate analysis are presented in table 3 below:

Table 3: Association between the race (African or coloured) and knowledge of TB, attitude towards TB and practices around TB.

Race (African compared to coloured)

		Exposed	Unexposed	x2	P-value	Fisher-Exact	Multivariate logistic regression	
		n (%)	n(%)			2 Tailed P	Odds Ratio (95% CI)	P-value
TB knowledge								
Knowledge of how TB curable	Correct	172 (80,75)	66 (55,93)	23,15	0,000001*		2,67 (1,59-4,48)	0,0002*
	Incorrect	41 (19,25)	52 (44,07)					
Attitude to TB								
Believe at high risk of TB	Yes	139 (65,26)	61 (51,69)	5,84	0,02*		1,61 (1,01-2,56)	0,05*
	No	74 (34,74)	57 (48,31)					
TB practices								
Report highly likely to adhere to hypothetical TB treatment post-release	Yes	196 (92,02)	83 (70,34)	26,95	0,0000002*		4,79 (2,50-9,18)	0,0000*
	No	17 (7,98)	35 (29,66)					
Is a non smoker	Yes	46 (21,60)	15 (12,71)	3,99	0,05*		2,47 (1,22-4,98)	0,01*
	No	167 (78,40)	103 (87,29)					
Always have their cell windows open	Yes	152 (71,36)	96 (81,36)	4,03	0,04*		0,65 (0,36-1,18)	0,16
	No	61 (28,64)	22 (18,64)					
Spend more than 3 hours outdoors a day	Yes	36 (16,90)	40 (33,90)	12,40	0,0004*		0,48 (0,28-0,84)	0,01*
	No	177 (83,10)	78 (66,10)					

*Indicates statistical significance

After a multivariate logistic regression was applied to the statistically significant bivariate associations to control for other variables, the following associations remained significant – African inmates had 2,67 times greater odds of knowing how TB is cured than coloured inmates (p=0,0002); African inmates had 1,61 times greater odds of believing they are at high risk of TB than coloured inmates (p=0,05); African inmates had 4,79 times greater odds of reporting being highly likely to adhere to TB treatment post-release (p=0,0000); African inmates had 2,47 times greater odds of being non-smokers than coloured inmates (p=0,01); and African inmates had 0,48 times lower odds of spending more than three hours outdoors every day (p=0,01).

Other results of interest with regards to race that will be discussed later are that bivariate analysis showed that African inmates had 0,49 (0,30-0,82)(p=0,006) times lower odds of a

highest education level of grade seven or below and 0,51 (0,32 – 0,81)(p=0,004) times lower odds of reporting being employed full-time, than coloured inmates.

c) Employment status

The responses of individuals who reported being employed full-time prior to incarceration were compared with those who reported any other employment status prior to being incarcerated (unemployed, employed part-time, informally employed) in terms of their knowledge of TB, attitude towards TB and practices around TB. The statistically significant variables after bivariate analysis are presented in table 4 below:

Table 4: Association between the employment status prior to incarceration and knowledge of TB, attitude towards TB and practices around TB.

Employed full-time vs not		**Exposed**	**Unexposed**	**x2**	**P-value**	**Fisher-Exact 2 Tailed P**	**Multivariate logistic regression**	
		n (%)	**n(%)**				**Odds Ratio (95% CI)**	**P-value**
TB practices								
Always have their cell windows open	Yes	101 (82,79)	150 (70,09)	6,62	0,01*		1,62 (0,87-3,00)	0,13
	No	21 (17,21)	64 (29,91)					
Spend more than 3 hours outdoors a day	Yes	38 (31,15)	38 (17,76)	7,96	0,005*		1,85 (1,04-3,30)	0,04*
	No	84 (68,85)	176 (82,24)					

*Indicates statistical significance

A multivariate logistic regression model showed that only one variable was significantly associated with the employment status of the respondents prior to incarceration – inmates who were employed full-time prior to incarceration had 1,85 times greater odds of spending more than three hours outdoors every day (p=0,04).

d) Educational level

The knowledge of TB, attitude towards TB and practices around TB of respondents whose highest grade or standard passed at school was grade seven (standard five) and below were compared to those whose highest grade passed was less than that. The statistically significant results are presented in table 5 below.

Table 5: Association between the educational level (passed grade seven or lower, vs those who have passed grade eight or higher) and knowledge of TB, attitude towards TB and practices around TB.

Education (Grade 8 and above vs all others)

		Exposed	Unexposed	x2	P-value	Fisher -Exact	Multivariate logistic regression	
		n (%)	n(%)			2 Tailed P	Odds Ratio (95% CI)	P-value
TB knowledge								
Knowledge of TB prevention	Correct	6 (7,23)	43 (17,00)	4,79	0,03*			
	Incorrect	77 (92,77)	210 (83,00)					
Knowledge of three of four TB symptoms	Correct	38 (45,78)	164 (64,82)	9,45	0,002*		0,48 (0,28-0,79)	0,005*
	Incorrect	45 (54,22)	89 (35,18)					
Attitude to TB								
Believe at high risk of TB	Yes	38 (45,78)	164 (64,82)	9,45	0,002*		0,48 (0,29-0,80)	0,005*
	No	45 (54,22)	89 (35,18)					
Would tell family member about TB diagnosis	Yes	77 (92,77)	248 (98,02)	5,45	0,02*	0,03*	0,29 (0,09-1,01)	0,05
	No	6 (7,23)	5 (1,98)					
TB practices								
Report highly likely to adhere to hypothetical TB treatment post-release	Yes	63 (75,90)	220 (86,96)	5,75	0,02*		0,62 (0,32-1,21)	0,16
	No	20 (24,10)	33 (13,04)					

*Indicates statistical significance

When multivariate logistic regression was applied to the variables, the following associations were independently significant - those with grade seven or less had 0,48 times lower odds of being able to identify three of four symptoms of TB than those with higher levels of education (p=0,005); and those with lower education had 0,48 times lower odds of believing they are at high risk of TB (p=0,005). There were no other variables that impacted on knowledge of TB prevention and therefore a multivariate analysis was not run on this variable. Those who had passed grade seven or lower had 0,38 times lower odds of knowing how TB is prevented that those with a higher level of education (p=0,03). Although the p value of 0,05 was statistically significant for the variable 'would tell their family about a diagnosis of TB', the confidence intervals for the odds ratio straddle the value of 1, which makes the association invalid.

4.3.2 Association between clinical characteristics of respondents and their knowledge of TB, attitude towards TB and practices around TB

It is possible that those with a history of TB or those who are HIV positive, may be different in terms of their knowledge of TB or their attitudes towards, or practices around, TB, than those who have no history of TB, or who are HIV negative or of unknown status. These categories were therefore explored for association with TB knowledge, TB attitudes or TB practices.

a) History of TB

The association between the respondents' history of having had TB and their knowledge of TB, attitude towards TB and practices around TB, were examined, but there were no statistically significant associations between any indicator of TB knowledge, TB attitudes or TB practices and a history of having had TB.

b) HIV status

The responses of individuals who reported being HIV positive were compared with those who reported any other status (HIV negative, don't know, unwilling to disclose) in terms of their knowledge of TB, attitude towards TB and practices around TB. The statistically significant variables after bivariate analysis are presented in table 6 below:

Table 6: Association between the HIV status (HIV positive vs HIV negative or unknown), and knowledge of TB, attitude towards TB and practices around TB.

HIV positive		**Exposed** n (%)	**Unexposed** n(%)	**x2**	**P-value**	**Fisher-Exact 2 Tailed P**	**Multivariate logistic regression** Odds Ratio (95% CI)	**P-value**
Attitude to TB								
Would tell family member about TB diagnosis	Yes	32(88,89)	293 (97,67)	7,82	0,005*	0,02*	0,22 (0,06-0,82)	0,02*
	No	4 (11,11)	7 (2,33)					
Would tell cellmate about TB diagnosis	Yes	27 (75,00)	263 (87,67)	4,36	0,04*	0,07	0,44 (0,19-1,03)	0,06
	No	9 (25,00)	37 (12,33)					

*Indicates statistical significance

After multivariate logistic regression analysis, HIV positive inmates had 0,22 times lower odds of disclosing a TB diagnosis to a family member (p=0,02).

4.3.3 Association between the reporting of barriers to safer practices around TB and TB practices

Barriers to safer TB practices could influence TB practices and therefore confound the impact of the interventions under study. Therefore a potential barrier to safer TB practices, easy access to healthcare, has been analysed for its association with TB practices. The statistically significant results are presented in table 7 below:

Table 7: Association between reported access to healthcare workers (Always or sometimes able to access care as required vs not able to access care or unsure) and their knowledge of TB, attitude towards TB and practices around TB.

Easy access to healthcare		**Exposed**	**Unexposed**	**x2**	**P-value**	**Fisher-Exact 2 Tailed P**	**Multivariate logistic regression**	
		n (%)	**n(%)**				**Odds Ratio (95% CI)**	**P-value**
TB practices								
Report highly likely to adhere to hypothetical TB treatment post-release	Yes	244 (85,92)	39 (75,00)	3,94	0,05*		2,22 (1,03-4,81)	0,04*
	No	40 (14,08)	13 (25,0)					
Always have their cell windows open	Yes	218 (76,76)	33 (63,46)	4,11	0,04*		1,70 (0,86-3,39)	0,13
	No	66 (23,24)	19 (36,54)					

*Indicates statistical significance

After a multivariate logistic regression analysis, the only independent association that remained was that those inmates who reported having easy access to healthcare in a correctional centre had 2,22 times greater odds of reporting they would be highly likely to adhere to TB treatment after release than those who did not report easy access (p=0,04).

4.3.4 Association between the respondents' exposure to the interventions under study ('Kick TB/HIV', peer education, HCT) and their knowledge of TB, attitude towards TB and practices around TB

To evaluate the effect of exposure to the 'Kick TB/HIV' intervention, the peer education intervention, and the HCT intervention, respondents who had been exposed to each intervention were compared to others who had not, in terms of their knowledge of TB, attitudes towards TB and practices around TB.

a) Exposure to ‘Kick TB/HIV’

The statistically significant associations between the respondents’ exposure to a ’Kick TB/HIV’ intervention and their knowledge of TB, attitude towards TB and practices around TB, are outlined in table 8 below:

Table 8: Association between s exposure to a ’Kick TB/HIV’ intervention (exposed vs unexposed) and their knowledge of TB, attitude towards TB and practices around TB.

Exposed to ’Kick TB/HIV’		**Exposed**	**Unexposed**	**x2**	**P-value**	**Fisher-Exact 2 Tailed P**	**Multivariate logistic regression**	
		n (%)	**n(%)**				**Odds Ratio (95% CI)**	**P-value**
TB knowledge								
Knowledge of three of four TB symptoms	Correct	109 (67,28)	92 (53,49)	6,63	0,01*		1,64 (1,04-2,58)	0,03*
	Incorrect	53 (32,72)	80 (46,51)					
Knowledge of how TB curable	Correct	135 (83,33)	106 (61,63)	19,56	0,0000097*		2,64 (1,55-4,50)	0,0004*
	Incorrect	27 (16,67)	66 (38,37)					
Attitude to TB								
Would care for family member with TB	Yes	159 (98,15)	160 (93,02)	5,11	0,02*	0,03*	3,87 (1,05-14,28)	0,04*
	No	3 (1,85)	12 (6,98)					

*Indicates statistical significance

After a multivariate logistic regression analysis was performed, the following variables were independently significant. Inmates exposed to ’Kick TB/HIV’ had 1,64 times greater odds of being able to name three of four symptoms of TB (p=0,03); 2,64 times greater odds of knowing how TB is cured (p=0,0004) and 3,87 times greater odds of reporting being willing to care for a family member with TB (p=0,04), than those not exposed. There were wide confidence intervals in the last result. This suggests that the rarity of the outcome (not being willing to care for a family member with TB) necessitated a larger sample size, and the result should be interpreted with caution.

b) Exposure to peer education

The association between the respondents’ exposure to a peer education intervention and their knowledge of TB, attitude towards TB and practices around TB, is outlined in table 9 below:

Table 9: Association between exposure to a peer education intervention (exposed vs unexposed) and their knowledge of TB, attitude towards TB and practices around TB.

Exposed to peer education		Exposed n (%)	Unexposed n(%)	x2	P-value	Fisher-Exact 2 Tailed P	Multivariate logistic regression Odds Ratio (95% CI)	P-value
TB practices								
Is a non smoker	Yes	36 (23,38)	24 (13,33)	5,68	0,02*		1,61 (0,87-3,00)	0,13
	No	118 (76,62)	156 (86,67)					

*Indicates statistical significance

After a multivariate logistic regression was performed, no variables remained independently significant.

d) Exposure to HCT

The association between the respondents' exposure to HCT and their knowledge of TB, attitude towards TB and practices around TB, is outlined in table 10 below:

Table 10: Association between exposure to HIV counselling and testing (HCT) (exposed vs unexposed) and their knowledge of TB, attitude towards TB and practices around TB.

Exposed to HCT		Exposed n (%)	Unexposed n(%)	x2	P-value	Fisher-Exact 2 Tailed P	Multivariate logistic regression Odds Ratio (95% CI)	P-value
Attitude to TB								
Would tell cellmate about TB diagnosis	Yes	274 (87,82)	16 (66,67)	8,44	0,0036*	0,0089*	3,47 (1,38-8,73)	0,008*
	No	38 (12,18)	8 (33,33)					
Would care for family member with TB	Yes	302 (96,79)	19 (79,17)	16,24	0,000056*	0,0023*	7,68 (2,32-25,39)	0,0008*
	No	10 (3,21)	5 (20,83)					

*Indicates statistical significance

A multivariate logistic regression analysis showed that those inmates exposed to HCT had 3,47 times greater odds of telling a cellmate about a diagnosis of TB (p=0,008) and 7,68 times greater odds of reporting being willing to care for a family member with TB (p=0,0008) than those not exposed to HCT. Once again the last variable had wide confidence intervals but was nevertheless independently significant. As noted earlier, the confidence

intervals suggest that the rarity of the outcome (not willing to care for a family member with TB) requires a larger sample size to produce a reliable result.

4.4 Association between respondents' sociodemographic and clinical characteristics, exposure to interventions, barriers to safer HIV practices and their knowledge of HIV, attitude towards HIV and practices around HIV

Measuring the association between the characteristics of the respondents, their exposure to the interventions under study, their exposure to certain barriers to safer HIV practices, and their knowledge of HIV, attitude towards HIV and practices around HIV was based on the Chi-squared p-values obtained when comparing variables from each category (sociodemographic, clinical, exposure to interventions, barriers to safer practices) with each outcome variable. Those variables that showed an association of p-value 0.05 and below were analysed further using multivariate logistic regression to control for other associations.

4.4.1 Association between sociodemographic characteristics of respondents and their knowledge of HIV, attitude towards HIV and practices around HIV

a) Age

Respondents 18 to 30 years old were compared to those older than 30 years in terms of their knowledge of HIV, attitude towards HIV and practices around HIV and the statistically significant associations are presented in table 11 below:

Table 11: Association between the age of respondents (30 years and younger vs older) and their knowledge of HIV, attitude towards HIV and practices around HIV.

Age (30 years and younger or not)		**Exposed** n (%)	**Unexposed** n(%)	**x2**	**P-value**	**Fisher-Exact 2 Tailed P**	**Multivariate logistic regression** Odds Ratio (95% CI)	**P-value**
Attitude to HIV								
Would tell cellmate about HIV diagnosis	Yes	107 (69,48)	126 (79,75)	4,35	0,04*		0,60 (0,36-1,02)	0,06
	No	47 (30,25)	32 (20,25)					
HIV practices								
Perception that condoms used in sex in correctional centres	Yes	62 (40,26)	45 (28,48)	4,80	0,02*		1,79 (1,11-2,89)	0,02*
	No	92 (59,74)	113 (71,52)					
Perception that inmates inject drugs in correctional centres	Yes	51 (33,12)	32 (20,25)	6,61	0,01*		1,88 (1,06-3,31)	0,03*
	No	103 (66,88)	126 (79,75)					
Engaged in consensual sex	Yes	11 (7,14)	2 (1,27)	6,75	0,009	0,01*	4,54 (0,98-21,06)	0,05*
	No	143 (92,86)	156 (98,73)					
Has ever injected drugs in correctional centre	Yes	17 (11,04)	4 (2,53)	8,99	0,003	0,003*	2,79 (1,16-6,70)	0,02*
	No	137 (88,96)	154 (97,47)					
Ever had medical male circumcision	Yes	34 (22,08)	65 (41,14)	13,08	0,0003*		0,45 (0,22-0,93)	0,03*
	No	120 (77,92)	93 (58,86)					

*Indicates statistical significance

A multivariate logistic regression analysis showed that inmates 30 years and younger had 1,79 times greater odds of believing that condoms were used during sex in correctional centres (p=0,02); 1,88 times greater odds of believing inmates inject drugs in correctional centres (p=0,03), 2,79 times greater odds of having ever injected drugs in a correctional centre (p=0,02), 0,45 (0,22-0,93) times lower odds of having had a medical male circumcision and 4,54 times greater odds of having had consensual sex in a correctional centre (p=0,05) than those older than 30 years (p=0,03). However the association with consensual sex straddles the value of 1 (although only just) and has a wide confidence interval, indicating that the result is should be treated with caution and a larger sample size would be required to confirm this association.

b) Race

A similar process of analysis was applied to the exploration of the association between race and knowledge, attitudes and practices around HIV as was applied to that between race and knowledge, attitudes and practices around TB. Because of the very low number of individuals

who identified as white, other, or Indian / Asian, these were not amenable to inclusion and only the responses of individuals who identified as African and coloured were analysed in terms of race. African respondents were compared to coloured respondents in terms of their knowledge of HIV, attitude towards HIV and practices around HIV, and the statistically significant associations are presented in table 12 below:

Table 12: Association between the race and knowledge of HIV, attitude towards HIV and practices around HIV.

Race (African vs coloured)		**Exposed**	**Unexposed**	**x2**	**P-value**	**Fisher-Exact 2 Tailed P**	**Multivariate logistic regression**	
		n (%)	**n(%)**				**Odds Ratio (95% CI)**	**P-value**
HIV knowledge								
Knowledge of HIV prevention	Correct	115 (53,99)	82 (69,49)	7,57	0,006*		0,44 (0,27-0,72)	0,001*
	Incorrect	98 (46,01)	30,51)					
HIV practices								
Report highly likely to adhere to treatment post release	Yes	196 (92,02)	90 (76,27)	16,03	0,00006*		3,43 (1,70-6,92)	0,0006*
	No	17 (7,98)	28 (23,73)					
Perception that inmates inject drugs in correctional centres	Yes	73 (34,27)	12 (10,17)	23,11	0,000002*		4,71 (2,28-9,74)	0,0000*
	No	140 (65,73)	106 (89,83)					
Likely to use condom at next sex	Yes	51 (44,74)	22 (68,75)	5,76	0,02*		0,33 (0,14-0,79)	0,01*
	No	63 (55,26)	10 (31,25)					
Ever had medical male circumcision	Yes	18 (8,45)	87 (73,73)	149,39	0,00000000*		0,03 (0,01-0,06)	0,0000*
	No	195 (91,55)	31 (26,27)					
Has shared a razor blade in last month	Yes	21 (9,86)	4 (3,39)	4,55	0,03	0,04*	2,65 (0,87-8,08)	0,09
	No	192 (90,14)	114 (96,61)					

*Indicates statistical significance

A multivariate logistic regression analysis was performed to control for confounding variables and the following associations were independently significant – in comparison to coloured inmates, African inmates had 0,44 times lower odds of being able to correctly name methods of HIV prevention (p=0,001); 3,43 times greater odds of reporting being highly likely to adhere to HIV treatment post-release (p=0,0006); 4,71 times greater odds of believing inmates inject drugs in correctional centres (p=0,0000); and 0,03 times lower odds of having had a medical male circumcision (p=0,0000).

c) Employment status

The responses of individuals who reported being employed full-time prior to incarceration were compared with those who reported any other employment status prior to being incarcerated (unemployed, employed part-time, informally employed) in terms of their knowledge of HIV, attitude towards HIV and practices around HIV. The statistically significant results are outlined in table 13 below:

Table 13: Association between employment status prior to incarceration (employed full-time vs other employment status) and knowledge of HIV, attitude towards HIV and practices around HIV.

Employed full-time vs not		**Exposed**	**Unexposed**	**x2**	**P-value**	**Fisher-Exact 2 Tailed P**	**Multivariate logistic regression**	
		n (%)	**n(%)**				**Odds Ratio (95% CI)**	**P-value**
HIV knowledge								
Knowledge of HIV transmission	Correct	7 (5,74)	31 (14,49)	5,93	0,01*			
	Incorrect	115 (94,26)	183 (85,51)					
Attitude to HIV								
Believe at high risk of HIV	Yes	62 (50,82)	77 (35,98)	7,05	0,008*		1,76 (1,12-2,78)	0,02*
	No	60 (49,18)	137 (64,02)					
HIV practices								
Ever had medical male circumcision	Yes	52 (42,62)	57 (26,64)	9,06	0,003*		1,07 (0,51-2,24)	0,85
	No	70 (57,38)	157 (73,36)					
Has shared tattoo needle in last month	Yes	7 (5,74)	28 (13,08)	4,50	0,03*		0,42 (0,17-0,99)	0,05*
	No	115 (94,26)	186 (86,92)					

*Indicates statistical significance

After multivariate logistic regression analysis, the following associations were independently significant; compared to inmates with any other employment status, inmates who were employed prior to incarceration had 1,76 (1,12-2,78) times greater odds of believing they are at high risk of HIV; and 0,42 (0,17-0,99) times lower odds of reporting sharing a tattoo needle in the last month.

Since no other variable showed a level of significance with regards to knowledge of HIV transmission, no multivariate analysis was performed on its association with employment status. Inmates who were employed prior to incarceration had 0,36 times lower odds of being

able to name methods of HIV transmission correctly than those with a different employment status (p=0,01).

d) Educational level

The knowledge of HIV, attitude towards HIV and practices around HIV of respondents whose highest grade passed at school was grade seven (standard five) and below were compared to those whose highest grade passed was higher than that. The statistically significant results are presented in table 14 below:

Table 14: Association between the educational level (those who have passed grade seven or lower, vs those who have passed grade eight or higher) and knowledge of HIV, attitude towards HIV and practices around HIV.

Education (Grade 7 and below vs all others)

		Exposed	Unexposed	x2	P-value	Fisher-Exact 2 Tailed P	Multivariate logistic regression	
		n (%)	n(%)				Odds Ratio (95% CI)	P-value
HIV knowledge								
Knowledge of HIV prevention	Correct	38 (45,78)	161 (63,64)	8,25	0,004*		0,40 (0,24-0,68)	0,0007*
	Incorrect	45 (54,22)	92 (36,36)					
HIV practices								
Report highly likely to adhere to treatment post release	Yes	65 (78,31)	225 (88,93)	5,96	0,01*		0,60 (0,29-1,20)	0,15
	No	18 (21,69)	28 (11,07)					
Has ever injected drugs in correctional centre	Yes	11 (13,25)	12 (4,74)	7,10	0,008*			
	No	72 (86,75)	241 (95,26)					
Ever had medical male circumcision	Yes	35 (42,17)	74 (29,25)	4,76	0,03*		1,41 (0,66-3,02)	0,38
	No	48 (57,83)	179 (70,75)					

*Indicates statistical significance

After a multivariate logistic regression was performed to control for confounding where outcomes had multiple significant associations, the only independently significant association was that inmates with grade seven or below had 0,40 times lower odds of being able to name methods of HIV prevention correctly than those with a higher education level (p=0,0007). Because there were no other significant variables, a multivariate analysis was not applied to the association between educational level and the likelihood of reporting having injected drugs in correctional centres. Inmates who had only passed grade seven or lower were 3,07

times more likely to report having injected drugs in a correctional centre than those with more schooling (p=0,008).

4.4.2 Association between clinical characteristics of respondents and their knowledge of HIV, attitude towards HIV and practices around HIV

To explore the possibility that those with a history of having TB, or those who are HIV positive may be different in terms of their knowledge of HIV or their attitudes towards, or practices around HIV, than those with a different clinical history, the association between a history of TB and an HIV positive status and HIV knowledge, HIV attitudes and HIV practices, was examined. The statistically significant results are presented below:

a) History of TB

No statistically significant associations between inmates who had a history of TB as opposed to those who had not, in terms of their knowledge of HIV, attitude towards HIV and practices around HIV were found.

b) HIV status

The associations between the respondents' HIV status and their knowledge of HIV, attitude towards HIV and practices around HIV, are outlined in table 15 below:

Table 15: Association between the HIV status of respondents and their knowledge of HIV, attitude towards HIV and practices around HIV.

HIV status		Exposed n (%)	Unexposed n(%)	x2	P-value	Fisher-Exact 2 Tailed P	Multivariate logistic regression Odds Ratio (95% CI)	P-value
Attitude to HIV								
Would tell family member about HIV diagnosis	Yes	31 (86,11)	287 (95,67)	5,79	0,02	0,03*		
	No	5 (13,89)	13 (4,33)					
HIV practices								
Perception that inmates inject drugs in correctional centres	Yes	16 (44,44)	71 (23,67)	7,23	0,007*		2,93 (1,28-6,70)	0,01*
	No	20 (55,56)	229 (76,33)					
Has ever been raped	Yes	5 (13,89)	7 (2,33)	12,46	0,0004	0,004*	7,91 (2,18-28,63)	0,002*
	No	31 (86,11)	293 (97,67)					
Has ever injected drugs in correctional centre	Yes	7 (19,44)	16 (5,33)	10,04	0,002	0,006*	3,83 (1,43-10,28)	0,008*
	No	29 (80,56)	284 (94,67)					

*Indicates statistical significance

There was confusion around the question about HIV positive inmates reporting on whether they believed themselves to be at risk of HIV. Some interviewers interpreted and explained this to respondents as the risk of being re-infected with HIV, and others assumed those who were HIV positive were automatically at high risk. This association is therefore not examined.

A multivariate analysis showed the following statistically significant associations; compared to inmates of other HIV status (HIV negative or status unknown), HIV positive inmates had 2,93 times greater odds of believing inmates inject drugs in correctional centres (p=0,01); 7,91 times greater odds of reporting ever being raped and 3,83 times greater odds of reporting injecting drugs themselves in a correctional centre.

Since no other variable showed a significant association with the outcome 'willing to tell family member about HIV diagnosis', no multivariate analysis was run on the association that showed that HIV positive inmates had 0,28 times lower odds of telling a family member about a diagnosis of HIV positivity (p=0,03). This result is on the borderline of significance however, when the Fisher-Exact Test confidence levels are used (because the data points are few), they straddle the value 'one', making the result invalid.

4.4.3 Association between the reporting of barriers to safer practices around HIV and HIV practices

Barriers to safer HIV practices will likely influence whether safer HIV practices can be performed and therefore could confound the impact of the interventions under study. Potential barriers to safer HIV practices, were therefore analysed for their association with HIV practices. These potential barriers were access to condoms, access to razor blades, access to a healthcare worker, access to clean tattooing needles and access to clean needles and syringes for injecting drugs.

a) Access to condoms

The statistically significant associations between the respondents' reported access to condoms and their HIV practices are outlined in table 16 below:

Table 16: Association between reported access to condoms and knowledge of HIV, attitude towards HIV and practices around HIV.

Access to condoms		**Exposed**	**Unexposed**	**x2**	**P-value**	**Fisher-Exact**	**Multivariate logistic regression**	
		n (%)	**n(%)**			**2 Tailed P**	**Odds Ratio (95% CI)**	**P-value**
HIV practices								
Perception that condoms used in sex in correctional centres	Yes	106 (36,68)	9 (19,15)	5,52	0,02*		2,59 (1,19-5,65)	0,02*
	No	183 (63,32)	38 (80,85)					
Witnessed / heard about rape in correctional centre	Yes	90 (31,14)	7 (14,89)	5,20	0,02*		2,22 (0,94-5,22)	0,07
	No	199 (68,86)	40 (85,11)					
Has ever been raped	Yes	6 (2,08)	6 (12,77)	13,41	0,0002*	0,003*	0,13 (0,04-0,44)	0,001*
	No	283 (97,92)	41 (87,23)					

*Indicates statistical significance

After a multivariate logistic regression analysis was performed, the following associations were found to be significant; inmates who reported having easy access to condoms sometimes or always had 2,59 times greater odds of reporting that condoms were used during sex in correctional centres (p=0,02), and 0,13 times lower odds of reporting having ever been raped than those with no easy access to condoms (p=0,001).

b) Access to razor blades

The relationship between the respondents' reported access to razor blades and their HIV practices in terms of sharing razor blades was examined, but there was no significant association between those inmates who reported having easy access to razor blades vs those who did not, and their reporting of sharing a razor blade in the last month.

c) Access to a healthcare worker

The statistically significant associations between the respondents' reported access to a healthcare worker (doctor or nurse) and their HIV practices is outlined in table 17 below:

Table 17: Association between reported access to a healthcare worker and knowledge of HIV, attitude towards HIV and practices around HIV.

Access to healthcare worker		**Exposed** n (%)	**Unexposed** n(%)	**x2**	**P-value**	**Fisher-Exact 2 Tailed P**	**Multivariate logistic regression Odds Ratio (95% CI)**	**P-value**
HIV practices								
Report highly likely to adhere to treatment post release	Yes	251 (88,38)	39 (75,00)	6,66	0,01*		2,76 (1,26-6,03)	0,01*
	No	33 (11,62)	13 (25,00)					
Witnessed / heard about rape in correctional centre	Yes	89 (31,34)	8 (15,38)	5,45	0,02*		2,18 (0,97-4,89)	0,06
	No	195 (68,66)	44 (84,62)					
Likely to use condom at next sex	Yes	63 (54,31)	10 (33,33)	4,20	0,04*		2,67 (1,11-6,41)	0,03*
	No	53 (45,69)	20 (66,67)					
Engaged in consensual sex	Yes	8 (2,82)	5 (9,62)	5,46	0,02*	0,04*	0,33 (0,10-1,06)	0,06
	No	276 (97,18)	47 (90,38)					

*Indicates statistical significance

After a multivariate logistic regression analysis was performed, the following associations were found to be independently significant. Inmates who reported having easy access to a doctor or nurse always or sometimes had 2,76 times greater odds of reporting being highly likely to adhere to HIV treatment post-release (p=0,01); and 2,67 times greater odds of reporting being likely to use a condom the next time they had sex, than those with no easy access to a healthcare worker (p=0,03).

d) Access to clean tattoo needles

The relationship between the respondents' reported access to clean tattoo needles and their HIV practices in terms of sharing tattoo needles was examined, but there was no significant association between those inmates who reported having easy access to clean tattoo needles vs those who did not, and their reporting of sharing a tattoo needle in the last month.

e) Access to clean needles for injecting

The statistically significant associations between the respondents' reported access to clean needles for injecting and their HIV practices in terms of sharing needles when injecting drugs is outlined in table 18 below:

Table 18: Association between reported access to needles for injecting drugs and knowledge of HIV, attitude towards HIV and practices around HIV.

Access to needles for injecting		**Exposed** n (%)	**Unexposed** n(%)	**x2**	**P-value**	**Fisher-Exact 2 Tailed P**	**Multivariate logistic regression Odds Ratio (95% CI)**	**P-value**
Perception that inmates inject drugs in correctional centres	Yes	35 (35,35)	52 (21,94)	6,55	0,01		1,80 (1,02-3,17)	0,04
	No	64 (64,65)	185 (78,06)					

*Indicates statistical significance

After a multivariate logistic regression was performed including other statistically significant variables, the following were independently significant. Inmates who reported easy access to clean needles for injecting had 1,80 times greater odds of reporting that inmates inject drugs in correctional centres than those who did not report access to clean needles for injecting (p=0,04).

4.4.4 Association between the respondents' exposure to the interventions under study ('Kick TB/HIV', peer education, HCT) and their knowledge of TB, attitude towards TB and practices around TB

To evaluate the effect of exposure to the 'Kick TB/HIV' intervention, the peer education intervention, and the HCT intervention, respondents who had been exposed to each

intervention were compared to others who had not in terms of their knowledge of HIV, attitudes towards HIV and practices around HIV.

a) Exposure to 'Kick TB/HIV'

Statistically significant associations between the respondents' exposure to a 'Kick TB/HIV' intervention and their knowledge of HIV, attitude towards HIV and practices around HIV, are outlined in table 19 below:

Table 19: Association between exposure to a 'Kick TB/HIV' intervention (exposed vs unexposed) and knowledge of HIV, attitude towards HIV and practices around HIV.

Exposed to 'Kick TB/HIV'		**Exposed** n (%)	**Unexposed** n(%)	**x2**	**P-value**	**Fisher-Exact 2 Tailed P**	**Multivariate logistic regression Odds Ratio (95% CI)**	**P-value**
Attitude to HIV								
Would care for family member with HIV	Yes	161 (99,38)	161 (93,60)	8,04	0,004*	0,006*	10,45 (1,33-81,99)	0,03*
	No	1 (0,62)	11 (6,40)					
HIV practices								
Report highly likely to adhere to treatment post release	Yes	147 (90,74)	141 (81,98)	5,40	0,02*		1,41 (0,69-2,88)	0,34
	No	15 (9,26)	31 (18,02)					
Ever had medical male circumcision	Yes	40 (24,69)	68 (39,53)	8,40	0,004*		0,97 (0,47-2,00)	0,92
	No	122 (75,31)	104 (60,47)					
Has shared a razor blade in last month	Yes	17 (10,49)	8 (4,65)	4,11	0,04*		1,95 (0,80-4,73)	0,14
	No	145 (89,51)	164 (95,35)					

*Indicates statistical significance

After a multivariate logistic regression was performed, the only association that was independently significant was that inmates exposed to 'Kick TB/HIV' had 10,45 times greater odds of being willing to care for a family member with HIV than those who had not been exposed to 'Kick TB/HIV' (p=0,03). The extremely wide confidence intervals suggest that this result should be treated with caution however. Again, the confidence intervals suggest that the rarity of the outcome (not willing to care for a family member with HIV) required a larger sample size.

b) Exposure to peer education

The statistically significant association between the respondents' exposure to a peer education intervention and their knowledge of HIV, attitude towards HIV and practices around HIV, are outlined in table 20 below:

Table 20: Association between exposure to a peer education intervention (exposed vs unexposed) and knowledge of HIV, attitude towards HIV and practices around HIV.

Exposed to peer education		**Exposed** n (%)	**Unexposed** n(%)	**x2**	**P-value**	**Fisher-Exact 2 Tailed P**	**Multivariate logistic regression Odds Ratio (95% CI)**	**P-value**
Attitude to HIV								
Would care for family member with HIV	Yes	152 (98,70)	169 (93,89)	5,14	0,02	0,02*	4,17 (0,89-19,54)	0,07
	No	2 (1,30)	11 (6,11)					
HIV practices								
Report highly likely to adhere to treatment post release	Yes	139 (90,26)	149 (82,78)	3,91	0,05*		1,96 (0,98-3,94)	0,06
	No	15 (9,74)	31 (17,22)					
Has ever raped	Yes	10 (6,49)	3 (1,67)	5,17	0,02*	0,04*		
	No	144 (93,51)	177 (98,33)					
Has shared tattoo needle in last month	Yes	8 (5,19)	27 (15,00)	8,50	0,0035*		0,32 (0,14-0,72)	0,006*
	No	146 (94,81)	153 (85,00)					

*Indicates statistical significance

After a multivariate logistic regression was performed, the only variable that was independently significant was that inmates exposed to peer education had 0,32 times lower odds of reporting having shared a tattoo needle in the last month than inmates who had not been exposed (p=0,006).

Since no variable showed a significant association with the reporting of perpetrating rape, no multivariate analysis was performed for this variable. Inmates exposed to peer education had 1,11 (1,03-23,51)(using Fisher-Exact CI) times greater odds of reporting having raped someone in a correctional centre than those unexposed (p=0,04). The wide confidence intervals, however, means this result should be treated with caution, and that because of the rarity of the outcome (having ever perpetrated rape), a larger sample size was needed

c) Exposure to HCT

The statistically significant associations between the respondents' exposure to HCT and their knowledge of HIV, attitude towards HIV and practices around HIV, are outlined in table 21 below:

Table 21: Association between exposure to HIV counselling and testing (HCT) (exposed vs unexposed) and knowledge of HIV, attitude towards HIV and practices around HIV.

Exposed to HCT		**Exposed** n (%)	**Unexposed** n(%)	**x2**	**P-value**	**Fisher-Exact** 2 Tailed P	**Multivariate logistic regression** Odds Ratio (95% CI)	**P-value**
Attitude to HIV								
Would tell cellmate about HIV diagnosis	Yes	238 (76,28)	13 (54,17)	5,77	0,02*		3,07 (1,27-7,45)	0,01*
	No	74 (23,72)	11 (45,83)					
HIV practices								
Ever had medical male circumcision	Yes	106 (33,97)	3 (2,75)	4,69	0,03*	0,04*	0,87 (0,19-3,93)	0,86
	No	206 (66,03)	21 (87,50)					

*Indicates statistical significance

After a multivariate logistic regression analysis, the only independently significant result was that inmates exposed to HCT had 3,07 times greater odds of reporting being willing to tell a cellmate about a diagnosis of HIV than those who had not been exposed to HCT (p=0,01).

4.5 Summary

These results are based on 336 responses collected from sentenced male inmates over 18 years old in selected correctional centres in the Eastern and Western Cape of South Africa. The study population had a mean age of 32 years old. Nearly two-thirds comprised individuals who identified as African and just over a third identified as coloured. Just over a third were employed full-time prior to incarceration and the highest level of schooling that a quarter had passed was grade seven (standard five) or less. Three individuals in the study sample had current TB, with 70 (17,86%) having had TB previously. Eleven percent reported being HIV positive, with 7% not knowing their status and 3% being unwilling to disclose their status.

The study population's knowledge of TB was uneven. For example, almost all the study sample knew that TB is curable, but only just over half could identify how TB is transmitted and only 15% knew how TB is prevented. The only intervention under study which showed a significant association with increased TB knowledge was the 'Kick TB/HIV' intervention. Other variables associated with higher TB knowledge were higher levels of education, and race.

The attitude towards TB among the study sample was very accepting, although only 68% were prepared to buy food from someone with TB. The interventions under study which showed an association with TB attitude were HCT and 'Kick TB/HIV', with inmates exposed to these interventions being more willing to disclose a TB diagnosis or care for a family member with TB. Other variables associated with TB attitude were race, education, and HIV status.

Study participants reported high rates of safer TB practices, such as health-seeking behaviour and always keeping their windows open, which may reflect a social desirability bias. However only 18% of the study sample were non-smokers and only just under a quarter spent more than three hours outdoors every day. None of the interventions under study had any significant associations with TB practices. The variables that were associated with safer TB practices were race, age, employment status and access to healthcare workers.

HIV knowledge among the study population was lower than expected. Over three-quarters knew that HIV is incurable, but only 11% could correctly identify methods of HIV transmission without error. No significant associations were found between knowledge of HIV and any of the interventions under study. Instead, higher knowledge of HIV was associated with higher levels of education, not being employed full-time prior to incarceration and identifying as coloured rather than African.

The study population's attitude towards HIV was generally accepting; with a very large majority reporting being willing to disclose an HIV positive status, care for a family member with HIV, or buy food from someone with HIV. A surprisingly low less than half believed they were at high risk of getting HIV, but a very large majority believed it is a very serious disease. Being exposed to HCT or 'Kick TB/HIV' was associated with a more accepting

attitude. Having been employed full-time prior to incarceration was associated with the belief of being at high risk of HIV.

A significantly greater proportion of respondents reported that riskier HIV practices occurred in correctional centres than reported doing so themselves. This could be because all of the practices are highly stigmatised and some are criminalised. Just over a third of respondents reported that condoms were used during sex in correctional centres just over a quarter reported having used a condom in a correctional centre in the last month and just over a fifth anticipated using a condom the next time they had sex in a correctional centre.

The vast majority of study participants reported positive health-seeking behaviour, reporting they would be highly likely to adhere to hypothetical HIV treatment after release from a correctional centre. Nearly a third had had a medical male circumcision.

The only intervention under study which showed an independent association with HIV practices was peer education, with a reduction in tattoo needle sharing (and the likelihood of perpetrating rape and adhering to HIV treatment after release on the borderline of significance). Other variables not connected with the interventions appear to be more strongly associated with HIV practices. In particular, a younger age was associated with a greater likelihood of injecting drugs, engaging in consensual sex (on the borderline of significance), reporting that condoms were used during sex in correctional centres and not having a medical male circumcision. African inmates were more likely than coloured inmates to report being likely to adhere to HIV treatment after release, but were less likely to report anticipating using a condom at next sex or to have had a medical male circumcision. Inmates who were HIV positive were more likely to report having been raped, and more likely to report having ever injected drugs in a correctional centre. Inmates with lower education levels were more likely to report having injected drugs in a correctional centre and inmates who were employed prior to incarceration were less likely to report having shared a tattoo needle in the previous month.

The lack of certain barriers to safe HIV practices were associated with safer HIV practices and the lessening of riskier behaviours. Inmates who reported having easy access to condoms were more likely to report that condoms are used during sex in correctional centres; and less likely to report having ever been raped. Inmates who reported easy access to a doctor or nurse

in a correctional centre were more likely to report being highly likely to adhere to HIV treatment after release, more likely to use a condom the next time they had sex in a correctional centre; and less likely to engage in transactional sex.

CHAPTER 5. DISCUSSION

This chapter discusses the findings of the previous chapter in relation to literature, and the objectives of the study. The knowledge, attitude and practices around TB and HIV of the respondents are explored, comparing them to that of the general South African population, and other studies involving prison inmates. Thereafter the results of interventions or 'cues to action' on knowledge, attitudes, (seriousness and susceptibility) and practices, are placed within the context of the health belief model, and explored. Other elements of the health belief model such as barriers to practices, and the impact of socioeconomic and structural factors on TB and HIV-related knowledge, attitudes and practices are also examined. The limitations of the study are outlined. Lastly, the effectiveness of the interventions under study are considered in summary.

5.1 The health belief model and factors beyond it that may influence behaviour

As Ferreira Júnior, de Oliveira & Marin-Léon note,

> "Data obtained from KAP studies are often used to plan activities focused on behavioral changes related to certain health issues, based on the false premise that there is a direct relationship between knowledge and behavior. A number of studies have shown that knowledge is only one of the factors that influence practice. Therefore, for there to be changes in behavior, health programs must join socioeconomic, environmental and structural factors with practices when planning prevention programs." (Ferreira Júnior, de Oliveira & Marin-Léon 2013: 113)

As well as evaluating the interventions' association with knowledge and behaviour, or practices, the health belief model will be used to explore some of the other factors which influence behaviours. These factors could potentially inhibit or confound the effect of the interventions.

As discussed in the literature review, the health model proposes that people will take up a particular behaviour based on the threats (how susceptible they believe they are to a disease, and how severe they believe the disease is), benefits (how well they think the behaviour or avoiding the behaviour will protect them) and barriers (are they able to engage in or avoid the

behaviour) associated with it. Their behaviour can also be prompted by a 'cue to action' – in this case the interventions under study. Any number of 'modifying factors' (eg. age, socioeconomic status, race, sex) can affect the perceived threats, benefits or barriers (Rosenstock, 1966, cited in Carpenter 2010).

However the health belief model is limited in analysing the socioeconomic, environmental and structural factors that influence behaviour that Ferreira Júnior, de Oliveira & Marin-Léon (2013) mention above, except in the way they influence an individual's perceptions. These factors can be key to what is possible in individual behaviour change and will therefore be considered separately.

5.2 The TB knowledge of the study population as compared to other populations

Several studies have shown that knowledge of TB appears to be important in influencing delays in seeking TB treatment and treatment adherence behaviour (Naidoo et al. 2016; Skinner & Claassens 2016; Storla, Yimer & Bjune 2008). While the active TB case-finding in correctional centres (on admission, and routinely) may make health-seeking behaviour seem less critical in this setting, it is still important because TB cases which develop between routine screening have a high potential to transmit the disease to others before the next screening (Johnstone-Robertson 2011). Inmates may also develop symptoms after release and need to seek treatment. Adherence to TB treatment is also important, especially after release, where this population is at high risk of interrupting treatment (Sifunda et al.; Telisinghe et al. 2016; O'Grady et al. 2010). It is therefore important to establish the level of TB knowledge of the study population.

Just over half of the study population (50,60%; n=170) could identify how TB is transmitted. This seems to be comparable with a study of Brazilian prison inmates of whom 49,6% knew that TB is transmitted through the air (Ferreira Júnior, de Oliveira & Marin-Léon 2013), but lower than a study of prison inmates in Ethiopia where 88% mentioned that TB is transmitted through the air (Adane et al. 2017). It is also lower than knowledge of TB transmission in the general South African population as measured by Naidoo et al. (2016), where 63% of respondents could correctly identify the mode of TB transmission (Naidoo et al. 2016), and considerably lower than Cramm et al.'s (2010) study of an Eastern Cape community where 92% believed that 'anyone can get infected with TB because TB is in the air' (Cramm et al.

2010). Cramm et al.'s (2010) figure may be higher than other measurements because it seems to have been based on a single, binary question, whereas in this study, and that of Naidoo et al., (2016), the respondents could choose multiple options, thereby increasing the chance that they might nullify the effect of choosing a correct answer by also choosing a misconception. Nevertheless the low knowledge of how TB is transmitted is of concern, particularly for inmates, since this can lead to a poor understanding of their own high risk of infection in correctional centres and less adoption of infection control behaviours, such as opening windows, which could help reduce this risk.

Knowledge of how TB is prevented was much lower (14,58%; n=49) among inmates in this study, when compared to the general South African population, of whom 79% could identify covering their mouth when coughing or sneezing as a main method of TB prevention (Naidoo et al. 2016). Ethiopian prison inmates in Adane et al.'s study also had a higher knowledge of TB prevention at 65,7% (Adane et al. 2017).

However the study population had a similar rate of knowledge that TB is curable, and a higher rate of knowledge of the symptoms of TB, as compared to prison inmates in other countries and the general South African population. Nearly all of the study sample knew that TB is curable (98%), however fewer (72%) were able to correctly identify how it is cured with no errors. This is higher than the 84% in the general South African population (Naidoo et al. 2016) who knew that TB is curable (and how it is treated), and similar to 98% of a community-based study in the Eastern Cape who knew TB is curable (Cramm et al. 2010). Among Ethiopian prison inmates, 88% knew that TB is curable with modern drugs (Adane et al. 2017) in contrast with only 36,9% of Brazilian prison inmates (Ferreira Júnior, de Oliveira & Marin-Léon 2013). Knowledge of symptoms of TB seems to be generally low in South Africa, with only 49,15% of South African healthcare workers (who would be expected to have a high knowledge of TB) surveyed in one study being able to name the symptoms of TB (Bristow et al. 2013) and only 21,5% of the general South African population being able to name three of six WHO-listed TB symptoms. Among this inmate population, however, 25,30% could name four symptoms of TB with no errors and 60,12% could name three of four symptoms, without errors.

The inmates in this study therefore seemed to have similar knowledge of TB's curability, but a higher knowledge of TB symptoms to prison inmates in other countries and the general

South African population. It is of great concern that this key population, at greatly heightened risk for TB did not have better knowledge of how TB is cured. Knowing that it is important to complete treatment in order to be cured of TB, is the first step in ensuring that individuals adhere to treatment so that they can be cured. This also helps drug-resistant TB strains developing. The higher knowledge of TB symptoms is encouraging as this knowledge is necessary in order for someone to seek care if they become sick, but is still far from adequate. The low knowledge of TB transmission and prevention among the study population is once again highly concerning for TB control efforts in this key population and its effects on the general population. It suggests infection control measures are highly unlikely to be adopted among this population, with negative ramifications for TB transmission in this closely-in-contact population at great risk, as well as for those who visit them, and for surrounding communities when inmates are released.

5.3 The TB attitude of the study population as compared to other populations

The health belief model proposes that the more someone believes they are at risk of something, and the more seriously they regard whatever that is, the more likely they are to adopt behaviour to help avoid it. The degree to which inmates believed they are at risk of TB, and the seriousness with which they regard it, were measured in the survey.

The majority of inmates in this study (69%) regarded TB as a very serious disease, which is higher than Brazilian prison inmates of whom only 38,% believed the same (Ferreira Júnior, de Oliveira & Marin-Léon 2013), but lower than the 84% of Ethiopian inmates in Adane et al.'s (2017) study. Only 60% of the study sample believed they were at high risk of TB, which is very disturbing considering their location in a correctional centre where the risk of infection is extremely high (Johnstone-Robertson 2011). Comparable data could not be located to contextualize this, but this is higher than the 41% in the study who believed they were at high risk of HIV, hence more were aware of the increased risk of TB in correctional centres. A high perception of risk and seriousness may suggest that the population would be well motivated to adopt safer TB practices and avoid unsafe ones. However, considering the enormity of the risk of contracting TB in a South African correctional centre, it seems as though the risk is underappreciated by thirty percent of inmates, a large proportion, and the motivation for protective behaviour is likely to be negative affected.

The attitude towards having TB among those in the study sample was accepting, with inmates reporting high rates of willingness to disclose a TB diagnosis (98% willing to tell a family member; 86% willing to tell a cellmate) and willingness to care for a family member with TB (95%). This is encouraging given the stigma often associated with those with TB (Murray et al. 2013), although it reflected selective disclosure to those very close to them, who are at greatest risk of infection. However this reported acceptance may reflect a social desirability bias as it contradicts Cramm et al.'s study of a South African community, which indicated that 95% of respondents believed that people with TB tend to hide their status because they are afraid of what others might say (Cramm et al. 2010). This is reinforced by the fact that only 68% inmates were prepared to buy food from someone with TB (a practice which carries no risk of TB) which indicates that stigma surrounding TB may in fact still be prevalent. Unfortunately, stigma can lead to a delay in seeking treatment so an indication of stigma being present is of concern (Murray et al. 2013).

5.4 TB practices of the study population as compared to other populations

Study participants reported high rates of many safer, health-seeking TB practices: 84% reported being highly likely to adhere to hypothetical TB treatment if released, and 90% reported they would seek care as soon as they suspected they had TB. This is in line with Brazilian prison inmates, (Ferreira Júnior, de Oliveira & Marin-Léon 2013), and Ethiopian inmates, who reported they would seek TB care through modern health care (Adane et al. 2017). However, once again this most likely reflects a social desirability bias, as this reflects hypothetical behaviour. It is well-known that health-seeking behaviour and treatment adherence are major barriers to TB control, both within the general population (Kigozi et al. 2017; Cramm et al. 2010; Storla, Yimer & Bjune 2008) where 17–25% of people diagnosed with TB in South Africa may never start treatment (Skinner & Claassens 2016), and especially in the correctional centre setting where, although initiation of treatment may be higher due to being in a correctional centre, 'loss to follow up' after release or transfer, is widespread (Sifunda et al.; Telisinghe et al. 2016; O'Grady et al. 2010). Kantor comments on the situation of inmates on release from a correctional centre:

> "The transition for prisoners from custody to community often is chaotic and difficult, and health care concerns often take a lower priority than the search for jobs and housing, rebuilding personal relationships, and a myriad of other chores." (Kantor 2006[4])

While three-quarters of inmates in the study reported always having their cell windows open, other safer TB behaviours were not practiced as often; only 18 % of the study sample were non-smokers and only 23 % spent more than three hours outdoors every day. Allowing outside air to circulate is very important in TB control. The number of hours spent outdoors too can reduce the risk of TB transmission (Johnstone-Robertson et al. 2011), but this is often not within the control of the inmate. Time spent outdoors may depend on the particular correctional centre's routines, the official in charge of the section and whether an inmate is employed in an outdoor job at the correctional centre. Gear & Ngubeni (2002) also note that some inmates may place restrictions on other inmates, not allowing them to leave cells. The level of smoking appears to be much higher than the national average for adult males, which was estimated by the World Health Organisation's country profile on South Africa in the Global Tobacco Epidemic Report to be 33,4% in 2015 (WHO 2017a). This might be expected in an environmental that is stressful, and has limited alternative activities.

5.5 The HIV knowledge of the study population as compared to other populations

The knowledge of HIV of the inmates surveyed can be compared to that of the general South African population by examining the results of the South African National HIV Prevalence, Incidence and Behaviour Survey, 2012 conducted by the Human Sciences Research Council (HSRC). The latter surveyed both male and females, from 15 years upwards, and in all provinces of South Africa, and was conducted in 2012, four years before the survey under discussion. Inmates' knowledge of HIV appears to be comparable, and even slightly higher than that of the general population on certain topics. While only 70% respondents 15 years and older in the national survey knew that HIV is incurable (Shisana et al. 2014), 78% of inmates surveyed in this study knew that HIV cannot be cured. While the higher knowledge is encouraging, the prevalence of HIV in South Africa's correctional centres is believed to be higher than in the general population, so it is critically important that inmates have better

[4] Page number for quotation unavailable because source is online.

basic knowledge about HIV in order to be able to protect their own health.

It is difficult to compare the way respondents' knowledge of HIV prevention and transmission have been analysed in the HSRC study in the general population with the way the results have been analysed in this study. Although many of the individual questions asked are very similar, the way the variables have been combined in the respective studies are different. The variables have been combined because 'indices that take into account more than one variable at a time tend to give a more accurate picture of knowledge levels' (Shisana et al. 2014:95). The HSRC has collapsed prevention and transmission questions into one index, of which the outcome is that 26% of male respondents over 15 years old can name how HIV is transmitted and prevented and reject major misconceptions (Shisana et al. 2014). This study, on the other hand, presents the results of the questions related to transmission and prevention separately, with 59,% being able to identify methods of HIV prevention correctly, but only 11% able to correctly identify how HIV is transmitted. Knowledge of HIV transmission appeared to be an area of weakness in many other KAP surveys carried out around the world; 49% of Iranian prison inmates in the Mazandaran province believed mosquitoes could transmit HIV (Majdi et al. 2011), as did 16% of Nigerian inmates surveyed by Audu et al. (2013). In my study too, 38% of inmates believed that HIV can be transmitted through mosquitoes. However when the total number of people living with HIV in Iran (66 000) and Nigeria (3 200 000) is considered in comparison to the 7 100 000 living in South Africa, it becomes clear that that a low or incomplete knowledge of HIV transmission is much more dangerous in a South African context (WHO 2017b). Similarly, since inmates in correctional centres are a population most-at-risk of HIV infection, their knowledge needs to reflect and address this, and should be higher than in the general South African population and other prison populations elsewhere.

5.6 The HIV attitude of the study population as compared to other populations

As with TB attitude, the degree to which inmates believed they are at risk of HIV, and the seriousness with which they regard it, was measured in the survey to ascertain the effect of these attitudes within the health belief model and their ability to predict behaviour.

The measurements used in the HSRC National HIV Survey were slightly different to those used in this survey, but both surveys used a four point scale. In the HSRC study the

respondents chose between the statements; ‘I am definitely going to get infected with HIV.’, ‘I am probably going to get infected with HIV’, ‘I will probably not get infected with HIV’ or ‘I will definitely not get infected with HIV.’ whereas in this study respondents chose between being at ‘high risk’, ‘medium risk’, ‘low risk’, or ‘no risk’ of being infected with HIV. Nineteen percent of the HSRC’s survey respondents from the general population believed they would ‘probably’, and 5% ‘definitely’, get infected with HIV (Shisana et al. 2014). In this survey of inmates, 41% of respondents believed they were at high risk of being infected with HIV. This suggests that more inmates believe they are at higher risk of HIV infection than in the general population. This is indeed a realistic perception as prison inmates constitute a key population for HIV infection. A large majority of the study population believed HIV is a very serious disease. This suggests that there would be greater motivation to adopt safer behaviours and avoid risky ones, according to the health belief model. However, perceptions of risk do not on their own lead to safer sexual health behaviour. There are many other intervening barriers (access to condoms, coerced sex), particularly in a prison population, and these are explored later.

The study population’s attitude towards HIV was overwhelmingly accepting; 97% reported they would tell a family member if they were diagnosed with HIV, and 75% would tell a cellmate if diagnosed, 96% would care for a family member who was ill with HIV and 82% would buy food from someone with HIV. This was similar to rates found in the general South African population where 92% of respondents would care for a family member with HIV, and 79% would buy food from a shopkeeper with HIV (Shisana et al. 2014). While encouraging, it is possible that this accepting attitude may reflect a social desirability bias, as is discussed later in relation to how HIV positive inmates responded to these questions (section 5.9.5). The pattern of TB disclosure was different to HIV disclosure, being higher, especially for cellmates. This may be because TB disclosure has different consequences to HIV disclosure. While TB infection is easily spread to family and cellmates, HIV is not, unless the inmate is having sex with a cellmate. For this reason HIV status is realistically only disclosed to few people within the circle of the person affected, and, unless a sexual partner, would be for reasons of support rather than to prevent transmission. An alternative explanation is that the stigma surrounding HIV may be higher than that around TB, and this may explain the relative reluctance to disclose an HIV status.

5.7 The HIV practices of the study population as compared to other populations

Sex within South African correctional centres is a taboo topic and the rate at which consensual or coerced sex occurs is therefore not easily studied (Gear & Ngubeni 2002). The sections of the questionnaires which dealt with sensitive topics such as this were therefore self-administered, as other studies have shown higher (and presumably more accurate) reporting of sensitive information in self-administered surveys where anonymity is assured (Langhaug, Sherr & Cowan 2010). Respondents were also asked to comment on the behaviour of inmates in general, as well as their own behaviour, so that they could identify risky behaviours without necessarily identifying themselves as participants. Nearly half of the respondents in this survey (48%) reported that transactional sex occurred in correctional centres, although only 4% (n=13) respondents reported having engaged in transactional sex themselves. The same number reported having engaged in consensual sex in a correctional centre. Despite the care taken to provide anonymity, respondents may still have been afraid or embarrassed to report these practices fearing exposure and repercussions from correctional officials or even other inmates. The huge discrepancy in these figures means that the second (engaged in transactional sex) may be underreported and inaccurate. Even the reporting of others' transactional sex may be underreported, but it is less likely.

Although just over a third indicated that condoms were used in correctional centres, another 22% said they were not, with the rest of the respondents unsure. Of those who felt the question was relevant to them, 29% claimed to have used a condom the last time they had sex in a correctional centre, with (8%) having done so in the last month. This is even lower than the low rate reported by the general population (36%) in the HSRC survey (Shisana et al. 2014). This is extremely concerning since high risk sexual activities like anal sex and coerced sex occur in correctional centres (Gear & Ngubeni 2002). The rate of use may reflect low access to condoms, which can occur if they are only made available through health workers. This is an issue needing investigation. The number of inmates reporting using a condom in the previous month and reporting anticipating using a condom at next sex in a correctional centre (23%), is higher than the number that reported having sex in a correctional centre at all. The difference could be explained by a possible misunderstanding of the question as applying to sex outside of correctional centres, or through the practice of using a condom during masturbation, which was mentioned during interviews. However, it could also reflect an underreporting of consensual and transactional sex due to the sensitivity of the question,

which was then countered in the condom use questions by the social desirability effect of using condoms.

In correctional centres, the line between transactional and coerced sex, which potentially carries a greater risk of HIV infection due to more risk of injury and less power in negotiating protection, can be very blurred. Gear and Ngubeni (2002) explain how some inmates 'target' other inmates – often younger, first-time inmates and begin to manipulate them – creating dependency by giving them physical protection, toiletries, tobacco or drugs and then demanding that they are compensated (Gear & Ngubeni 2002). An annual report by the Judicial Inspectorate for Correctional Services in 2007 reported that nearly 50% of inmates report that sexual abuse happens 'sometimes', 'often' or 'very often' in South African correctional centres (Sonke Gender Justice Network & Just Detention International 2012). In this survey, 29% of inmates reported that they had witnessed or heard about rape in a correctional centre, with 4% reporting having been raped, and the same percentage reporting having raped someone else. This appears to be similar to rates reported in the United States where 4% of inmates reported being raped by another inmate, and in Australia where 3% of inmates reported coerced sex in a correctional centre (Simpson et al. 2016; Valera, Chang & Lian 2017). However this percentage is lower than the 9,6% of males who reported experiencing sexual victimization in Dunkle et al.'s (2014) household survey of the general population in the Eastern Cape and KwaZulu-Natal. However the definition of 'victimization' in Dunkle et al.'s (2014) study is broader than that of 'rape' used in this study, which could explain the higher proportion of sexual violence reported in that survey. Again, due to the extreme sensitivity of reporting rape, especially for males in this context, it is very difficult to ascertain the accuracy of the figures, but great underreporting seems very likely.

Practices that increase the risk of transmission of HV through blood, such as injecting drugs and tattooing have been less well studied in South African correctional centres (Booyens & Bezuidenhout 2015). According to a survey conducted in 2008, the number of people who inject drugs in South Africa as a whole, was estimated to be 67 000 (Petersen et al. 2013, cited in Scheibe et al. 2017). Dos Santos states that prison inmates reported injecting drugs to be the second most common mode of drug administration (after smoking) in correctional centres, but does not cover the overall prevalence of this practice in correctional settings in South Africa (dos Santos et al. 2014). Of the inmates surveyed in this study just over a quarter believed that inmates inject drugs while incarcerated and 7% reported injecting drugs

themselves, while incarcerated. Of those, 43% reported shared injecting equipment to do so. While the sensitivity of reporting on a criminalised act again makes the data difficult to rely on, it is understandable that such a high proportion of inmates engaging in injectable drug use (IDU) would be sharing injecting equipment since no needle and syringe programmes exist in South African correctional centres and they would therefore lack access to sterile equipment. In fact, it is surprising that only 43% of injecting drug report sharing equipment. The practice of injecting drugs places individuals at greater risk of HIV infection, both through exposure to blood and through behaviours associated with drug use, such as high risk sex (Strathdee & Sherman 2003, cited in Scheibe et al. 2017). This is an area of concern to be addressed, and a needle and syringe programme in correctional centres could be explored to help address the risks of injecting drugs as well as providing access to this population to help implement harm reduction in many aspects of behaviour.

Inmates were more likely to be exposed to potential HIV blood transmission through sharing tattoo needles and razor blades. Seven percent reported having shared a razor blade in the last month and 10% reported having shared a tattoo needle in the last month. The sharing of razor blades is avoidable since most correctional centres provide razors to inmates, however inmates mentioned during interviews that interruptions in supply can occur. Tattooing is perceived by many Department of Correctional Services (DCS) officials, often correctly, as being linked to gang activities and it is consequently, officially or unofficially, banned (Booyens & Bezuidenhout 2015). This means that tattooing is conducted surreptitiously with home-made equipment, and the risks of hepatitis C and HIV transmission under these conditions are high. A more accepting environment and a harm reduction approach to tattooing in correctional services may lead to safer conditions for tattooing. Early reports from a sterile tattooing pilot project in Canada appear to have been positive before the project was shut down due to a lack of political will (Kondro 2007).

However, as well as riskier behaviour, inmates also reported high rates of safer behaviour. The majority of study participants (86%) also reported they would be highly likely to adhere to hypothetical HIV treatment after release from a correctional centre. However this may not occur in practice. Nearly a third of respondents had had a medical male circumcision, which is significantly higher than in the general population where only 19% of males reported being medically circumcised (Shisana et al. 2014). This could be because MMC is actively promoted by DCS and NGO health workers within correctional centres because of the

opportunity of reaching many men at once (Zolani Barnes, VMMC Manager, TB HIV Care, personal communication 5 November 2017). Inmates may also feel that it is convenient to have an MMC while in a correctional centre since one is restricted from sexual activity for six weeks after the procedure and many of them would be abstaining from sex anyway. The accessibility (not having to travel or take time off work to have the procedure) may also play a role in the high uptake. Hence this may be an area of success. However, as discussed below, this success does not appear to extend to African inmates because of a perceived conflict with traditional circumcision practices (see section 5.9.1).

5.8 Interventions' associations with TB & HIV knowledge, attitude and practices

Within the context of the health belief model, there are three ways in which the interventions under study – HCT, 'Kick TB/HIV' and peer education – could potentially influence behaviour. The interventions are designed to increase participants' knowledge of HIV and TB, and to improve the attitude of the participants with regard to understanding their own susceptibility to the diseases and the severity of the diseases. Lastly, the interventions act as potential 'cues to action' which remind participants of the need to avoid or adopt certain behaviours. The degree to which the interventions succeeded in these tasks is discussed below.

5.8.1 HCT

Inmates in this study had excellent uptake of HCT services, with 93% having tested for HIV in a correctional centre and of those 43% having only tested in a correctional centre, meaning that for a substantial proportion this was a first point of contact to learn their HIV status and to access potential care. This is much higher than the general population as indicated by the HSRC survey which found that only 59% of males 15 years or older had ever tested for HIV (Shisana et al. 2014). The reasons may be due to convenience (as with MMC, traveling or taking time off work is not necessary to access HCT in a correctional centre) and an interest in social interaction, particularly with female counsellors, as females who are not correctional services staff are rare in correction facilities. Sifunda et al. (2006) also note that accessing healthcare can provide an opportunity for interaction, even smuggling, since it enables movement through the facility, which could be another reason for the high uptake of HCT. Offering dedicated services such as HCT in high risk and accessible settings such as

correctional centres therefore shows success in testing, and is encouraging.

HCT was not associated with increased knowledge of either TB or HIV. This could be explained by the high exposure of the population to HCT, which may have reduced the ability of the study to detect differences between those exposed and those unexposed to this intervention.

HCT was independently associated with a more open attitude towards disclosing a TB diagnosis to a cellmate, towards disclosing an HIV positive status to a cellmate and towards caring for a family member with TB. However since the attitude of the vast majority of inmates was fairly open, the differentiating data points are few and the results should be treated with caution. If the effect is real, it could indicate that the presence of HCT services within a correctional centre promotes a more accepting, health-promoting environment and is to be encouraged. The implications of such an environment are discussed later in the section 5.9.6 which discusses accessibility to a healthcare worker.

However no intervention was associated with a difference in the seriousness with which the respondents viewed TB or HIV or their idea of their own risk – two factors which, according to the heath belief model, might influence the behaviours the respondents adopted around TB and HIV. Carpenter (2010) in his meta-analysis of studies using the health belief model notes that severity (seriousness) and susceptibility (risk) are weak predictors of behaviour within the model. In addition, perception of risk may be influenced more by other psychosocial and structural factors (Maughan-Brown & Venkataramani 2017).

Despite the relatively high knowledge of TB, the fairly significant appreciation of the seriousness of TB, a high appreciation of the seriousness of HIV and their own susceptibility to the diseases, HCT did not have a detectable association with TB or HIV practices. This highlights the finding that knowledge and attitudes rarely in themselves translate into changed practices, especially within a controlled environment like a correctional centre, where structural issues likely play a larger role in influencing how people behave (Carpenter 2010).

5.8.2 'Kick TB/HIV'

Studies of brief, edutainment-based interventions comparable to that of the 'Kick TB/HIV' intervention that could be located show that these interventions can impact on both knowledge (Wright et al. 2014; Fish et al. 2008) and behaviour (Martin et al. 2008). Wright et al.'s study (2014) of a comedy intervention in a women's correctional centre in the United Kingdom aimed at improving knowledge and behaviours around mental illness, showed an increase in knowledge around mental illness, but a limited effect on changing behaviour – inmates were more willing to discuss mental health with potential sources of assistance but not significantly more likely to associate with someone with a mental illness. This once again emphasises the complexity of behaviour change.

This seems to be consistent with my study results although the difference in gender between this study and the Wright study must be kept in mind since gender does often influence health-seeking behaviour (WHO 2002). The 'Kick TB/HIV' intervention was associated with 1,64 times greater odds of knowing of three of four symptoms of TB and 2,64 times greater odds of being able to correctly name how TB is cured. However despite the increase in TB knowledge, 'Kick TB/HIV' apparently had no association with increased HIV knowledge.

The association between 'Kick TB/HIV' and a greater willingness to care for a family member with both TB (4 times greater odds) and HIV (11 times greater odds). However these associations have extremely wide confidence intervals, indicating that the sample size may not have been big enough to measure the rarity of one of the outcomes (not willing to care for a family with TB or HIV). On the other hand, the low reporting of not being willing to care for a family member with TB or HIV suggests either that the social desirability bias is overriding the accuracy of the reporting, or that this is in fact not an attitude worth targeting through interventions since it is already so high.

Like HCT, 'Kick TB/HIV' did not make any difference to the seriousness with which the respondents viewed TB or their idea of their own risk, and like HCT, there was no association with either TB or HIV practices. Despite the apparent association with an increase in TB knowledge, and despite the studies showing that TB knowledge does influence health-seeking behaviour, 'Kick TB/HIV' did not affect practices, including the likelihood of seeking care for TB symptoms or adhering to treatment (Naidoo et al. 2016; Skinner & Claassens 2016;

Storla, Yimer & Bjune 2008). Again, the health belief model's theory that knowledge will translate into behaviour is insufficient to explain changes in practices in which interpersonal and structural issues have more effect. This needs to be explored in greater details in correctional settings.

5.8.3 Peer Education

Peer education has been described by multiple sources as an effective way to increase knowledge and behaviour in a correctional setting and elsewhere (Sifunda et al. 2008; Scott, Harzke & Mizwa 2004; Devilly et al. 2003). However the results of this study show a limited effect.

Peer education had no association with TB or HIV knowledge, or respondents' attitude towards TB or HIV.

However, peer education was the only intervention under study which showed any independent association with HIV practices. Inmates exposed to peer education were 0,32 times less likely to report having shared a tattoo needle in the previous month than those who had not been exposed to the intervention. Other results on the borderline of significance are that those exposed to peer education were twice as likely to adhere to hypothetical HIV treatment post-release than those unexposed. The very slight increase in likelihood of reporting having ever perpetrated rape is unlikely to be relevant.

5.9. Association of structural, socioeconomic, environmental factors with TB & HIV knowledge, attitude and practices

The health belief model recognises that there may be both modifying variables (such as race, gender, age and other socioeconomic factors) and perceived barriers (cost, stigma, etc) which may influence whether an individual perceives a behaviour as beneficial and adopts it. However the health belief model only considers these factors to the degree that they affect an individual's perceptions and the model does not take into account how these factors may in fact actually interact with broader factors that negate the individual's ability to adopt a behaviour. The fact that there may be additional factors influencing behaviours is suggested by the fact that despite the success of 'Kick TB HIV' in being associated with increased TB

knowledge, and the study population's fairly significant appreciation of the seriousness of TB and their own susceptibility to it, 'Kick TB/HIV' does not appear to be associated with safer TB practices. This suggests that other factors outside the health belief model, and outside the control of the individual, may have had more impact on the behaviour of inmates. These are discussed below.

5.9.1 Race

Because of South Africa's history of racial segregation and discrimination, race is an important variable to consider and can often stand as a proxy for socioeconomic status. It also has significant cultural associations. Race seems to have been a significant variable in the study.

Naidoo et al.'s (2016) household study of South Africans' knowledge of TB finds an association between race and knowledge of TB, but her results are contrary to the results of this study. Naidoo et al. found that adults of mixed race (termed coloured in this study) (90,5%) had significantly higher knowledge of TB than black African adults (82,9%) (Naidoo et al. 2016), whereas this study showed that inmates identifying as African were three times more likely to be able to identify how TB is cured than inmates who identified as coloured. It is difficult to explain this. This may be because the prison population is different to the general population or there may be another confounding variable that has not been taken into consideration.

However, African inmates had 0,44 times lower odds of being able to correctly name methods of HIV prevention than coloured inmates. This is surprising and is contrary to the findings of this survey with regards to TB knowledge, as discussed above. It therefore seems likely that there is a confounding factor in the association of race and knowledge that has not been accounted for.

The only association that race had with attitude was with regards to perception of risk; African inmates had 1,61 times greater odds of believing they were at high risk of TB, perhaps because of their greater knowledge of TB.

Race, as a proxy for other factors, appears to have had an impact on several TB practices.

Inmates who identified as African were 3 times more likely to be a non-smoker. This seems to be in accordance with general historical trends in South Africa – van Walbeek used data from the All Media and Products Survey (AMPS) compiled by the South African Advertising Research Foundation (SAARF) and showed that the highest prevalence of smoking occurs among coloured people, and the lowest, among African people (van Walbeek 2005). This historical higher acceptability of smoking among coloured South Africans is also noted by Sitas et al. (2013) who writes that in 1977, 79% of coloured men smoked.

The race differences in how many hours were spent outdoor every day may be due to a confounding factor that multivariate analysis may not have fully accounted for. Unsurprisingly, African inmates were less likely to report being employed full-time than coloured inmates. This is likely a product of historical disparity under apartheid during which coloured people were given preferential (although still limited) access to certain educational and job opportunities (Møller & Radloff 2012). Inmates who were employed full-time prior to incarceration had twice the odds of spending more than three hours outdoors every day. Spending more than three hours outdoors is usually only possible for inmates who work in the kitchens or in various other jobs within the correctional centres. It is likely that inmates who were employed full-time prior to incarceration would have skills and experience which could increase their chances of a job within the correctional centre. This could also explain the greater likelihood that coloured inmates, who were more likely to have been employed prior to incarceration, were more likely to spend more time outdoors.

An association which is more difficult to explain is that African inmates were more likely to believe they would be highly likely to adhere to both TB (5 times greater odds) and HIV (3 times greater odds) treatment if released from a correctional centre. If one uses the health belief model to explain this, this may be linked to the fact that they also regarded themselves at being higher risk of TB than coloured inmates, and since they perceived the threat to themselves to be greater, they were more willing to adopt a safer behaviour. However this does not explain the HIV adherence result. There is another, highly speculative explanation. Don Pinnock argues that the emergence of gangsterism in the Western Cape is associated with forced removals and the creation of predominantly coloured residential areas (Pinnock 1984, cited in Beyers 2009). During an exploration of the factors that inhibit treatment adherence after release with a community advisory group (CAG) of inmates set up to guide the research, gangsterism was listed as a potentially inhibiting factor (Pollsmoor Medium C

CAG 2016). Although the association of gang activities with historically coloured areas is changing, this may explain why coloured inmates felt less sure about being able to adhere to treatment after release. However this result also refers to future behaviour and may not be real in practice.

The association of inmates identifying as African with the perception that inmates inject drugs in correctional centres is difficult to explain, and may be due to a confounding factor unaccounted for, or a misunderstanding of the question. One formative assessment which interviewed 137 PWID in three cities, found that only 18% of their respondents were black (or African in the terms used in this study), but this varied between cities from 5% to 44% (Scheibe et al. 2017).

African inmates having 0,33 times lower odds of using a condom at next sex in correctional centre is in direct contrast to data from the HSRC survey which shows that a significantly larger proportion of African inmates (41,9%) reported condom use at last sex when compared with all other race groups, including coloured respondents (18,4%) (Shisana et al. 2014). It is possible that inmates answered this question incorrectly – responding that they would be 'Not likely' to use a condom the next time they had sex in a correctional centre because they did not anticipate having sex in a correctional centre, instead of answering 'This question doesn't apply to me'. The result may also be questionable since it relies on predictions of future behaviour, which are not necessarily accurate.

One of the easiest associations to explain is that those inmates who identified as African were 0,03 times less likely to have had a medical male circumcision, than coloured inmates. Because of the population profile of the Eastern and Western Cape, most of the inmates who identified as African are likely to be amaXhosa men, who place great importance on traditional male initiation rites involving circumcision. It is very common for amaXhosa men to avoid medical male circumcisions because of a perceived conflict with the traditional practice (Mark et al. 2012) and it is therefore unsurprising to see an association between identifying as African and being less likely to have undergone a medical male circumcision.

5.9.2 Age

Age appears to be a highly significant predictor of riskier behaviour with both TB and HIV practices.

Inmates 30 years old and younger were less likely to be a non-smoker, and less likely to report always having their windows open than older inmates. The association between youth and smoking could reflect a greater concern with fitting in to established hierarchies and peer groups, especially given the vulnerability of younger inmates mentioned below. It may also reflect a higher risk-taking tolerance and experimentation, which is often also associated with youth. Younger inmates may potentially have less social power than older inmates in a cell, and therefore have less control over whether windows should be open or not.

Younger inmates were more likely to believe that inmates injected drugs in correctional centres, and they more likely to report having injected drugs in a correctional centre themselves. They were also more likely to believe that condoms were used during sex in correctional centres, perhaps reflecting their greater knowledge of sexual behaviour within correctional centres. Although it is on the borderline of significance since its confidence intervals are very wide and straddle the value of one, younger inmates had 4,54 times greater odds of reporting engaging in consensual sex. This is supported by Gear & Ngubeni's (2002) findings that consensual sex in particular, is associated with younger inmates, she quotes one respondent,

> "It's mostly young guys who are experimenting with sex ... and it will be mostly a mutual kind of thing. You find two young guys who do each other favours ... You'd have one time the one acting as a man and then the other time, the other one swopping ... They call it 'exchange *ipondo*'.": (Gear & Ngubeni 2002:48)

Gear & Ngubeni (2002) also note, however, that youth can also make an inmate a target for coerced sex. Hence younger inmates' reports of consensual sex may actually refer to sex that was less consensual that the inmate was willing to report in the survey.

Younger inmates also had 0,45 times lower odds of having had a medical male circumcision, than those older than 30 years. This may just be a result of older inmates having had more opportunity over their lifetime to have had an MMC.

5.9.3 Education level

In line with several other studies in both inmate populations (Adane et al. 2017; Abebe et al. 2011) and the general population, (Storla, Yimer & Bjune 2008; Naidoo et al. 2016), lower levels of education were associated with lower levels of TB knowledge. Inmates having a highest level of schooling at grade seven or below were less likely to be able to name three of four symptoms of TB or to correctly identify how TB is prevented than those who had passed a higher educational level. Similarly, they were less likely to be able to correctly identify all methods of HIV prevention.

Perhaps reflecting their lack of TB knowledge, inmates whose highest educational level was grade seven or lower were less likely to think they were at high risk of TB. They also seemed to have a less accepting attitude towards TB, being less likely to tell a family member about TB.

Despite the poorer knowledge and attitude towards TB of inmates with lower education levels, this factor was only associated with one risky practice – having 3,07 times greater odds of reporting having injected drugs in a correctional centre

5.9.4 Employment status

Inmates who were employed full-time prior to being incarcerated had 0,36 times lower odds of being able to correctly identify modes of HIV transmission than those who had a different employment status prior to incarceration. This is unexpected as one might assume those employed full-time were also more likely to have a higher educational status and to have come into contact with workplace-based HIV programs, and therefore to be more knowledgeable about HIV. However it appears that there is no association between educational level and being employed full-time in the study so that may be a false assumption and not relevant. In fact, if those employed full-time prior to incarceration were also more likely to be outside their cells and employed in jobs around the correctional centre, they may also be less likely to be exposed to some of the interventions under study. This is supported by the fact that those employed full-time prior to incarceration were also less likely to have been exposed to a 'Kick TB/HIV' intervention. However, this is speculative and would need further exploration, especially since there was no increase in HIV knowledge associated with

exposure to ‘Kick TB/HIV’. If this link between poor knowledge of transmission and employment is real, it suggests a need for workplace programmes that better address HIV knowledge.

Those inmates who had been employed full-time prior to incarceration had 1,76 times greater odds of believing they were at high risk of HIV than those who had been unemployed or employed informally or part-time prior to incarceration. It is perhaps significant that this group was also less likely to be able to correctly identify modes of HIV transmission, suggesting that this perception of risk may have been due to incorrect knowledge about how HIV is transmitted. This contradicts the earlier finding and strengthens the assumption that these are not a real associations.

The only practice associated with employment status was that inmates who were employed prior to incarceration were less likely to report having shared a tattoo needle in the previous month, perhaps because of their understanding that they are at high risk of HIV. Alternatively, it is possible that inmates who were previously employed are aware of the potential increased difficulty of finding a job when one has a tattoo, and were therefore less likely to engage in tattooing, and therefore less likely to share needles.

5.9.5 HIV positive status

Inmates who were HIV positive had 0,22 times lower odds of telling their family about a diagnosis of TB. Although the results are on the borderline of significance since their confidence interval straddles the value of 1, HIV positive inmates were also less likely to disclose their HIV status to a family member, or tell a cellmate about a diagnosis of TB. Perhaps this can be explained by the fact that those who are HIV positive have more experience of the realities of having to disclose a health condition and therefore may not have been as prone to give a socially desirable response.

Inmates who were HIV positive had 8 times greater odds of reporting having been raped (the wide confidence intervals suggest this result should be treated with caution even though rape is associated with higher risk of HIV infection); 3 times greater odds of believing inmates inject drugs in correctional centres; and 4 times greater odds of reporting having ever injected drugs in a correctional centre themselves, than those of unknown or negative HIV status.

These results are suggestive that there are certain inmates who are particularly vulnerable and at risk in correctional centres. Several authors point to this conclusion. Telisinghe et al. (2016) notes that certain marginalised social groups (including poor people, sex workers, and lesbian, gay, bisexual and transgendered individuals;) are 'at increased risk of abuse, poor conditions, or lack of access to care' (Telisinghe, et al. 2016:1218; Gear & Ngubeni 2002). Booyens & Beduizenhout (2015) also note that inmates who do not receive visits are vulnerable to transactional sex. Many people who inject drugs and who are then incarcerated, may be already highly marginalised, and often homeless at the time of incarceration, and would therefore have few resources to negotiate their protection. This, in combination with the withdrawal symptoms they would face without easy access to drugs in correctional centres, could make them highly vulnerable to transactional sex. While highly speculative, this could explain the association between being HIV positive, being raped, and injecting drugs above, as well as these being HIV risk factors in themselves.

5.9.6 Easy access to healthcare worker

Access to a healthcare worker was measured in this study to evaluate whether lack of access constituted a barrier to safer behaviours. The importance of access to healthcare workers is supported by Motshabi, Pengpid & Peltzer (2011) research into factors which inhibit the uptake of HCT services in correctional centres – he found that lack of trust and a poor attitude in healthcare professionals could be a major barrier to HCT (Motshabi, Pengpid & Peltzer 2011). Other studies have noted that relationships with healthcare workers are important in ensuring adherence to TB treatment (Skinner & Claassens 2016; Naidoo et al. 2016). Sifunda et al. (2006) note that accessing healthcare in a correctional centre can be complicated:

> "The route to care in correctional facility is controlled by custody policies, routines and spur of the moment decisions, which are primarily guided by policies and practices. These procedures can create significant delays, roadblocks and detours on the way to receiving medical attention" (Stoller 2003, cited in Sifunda et al. 2006: 2302).

This study supports those ideas. Access to a healthcare worker increased the likelihood of an inmate engaging in several safer behaviours. Inmates with easy access to a healthcare worker

while in a correctional centre were more likely to use a condom the next time they had sex in a correctional centre; and less likely to engage in transactional sex. They were also more likely to report being highly likely to adhere to both TB treatment and HIV treatment if released from a correctional centre. This is highly suggestive that the interaction with the healthcare worker created a positive impression of the services they could receive outside the correctional centre, and perhaps made them familiar with being in care. On the other hand, perhaps those inmates who had particular impediments to seeing a healthcare worker in a correctional centre felt that those impediments would continue outside the correctional centre. This highlights a pivotal role that availability of good health services can play in correctional service settings.

5.9.7 Easy access to condoms

Condoms have been made available in public areas in many correctional centres and are also available through healthcare workers. Interestingly, the association between these factors is significant with those reporting easy access to healthcare workers having 4,11 (2,06-8,22)(x^2=17,89; p=0,00002) times greater odds of reporting having easy access to condoms. There is limited evidence that suggests that the availability of condoms appears to be associated with safer sexual practices, with inmates with access to condoms more likely to report that condoms are used during sex in correctional centres; and less likely to report having ever been raped (although sparse data means the latter result may need to be treated with caution). If real, the latter association could be because the environment where condoms are freely available, and where healthcare workers are more accessible, is a more accepting one where inmates are not as isolated and therefore not as vulnerable to abuse. Making condoms available in public areas, and also in areas where condoms can be collected discreetly, is therefore critical to ensuring that protected sex is possible. It seems as though this accessibility is closely linked with the accessibility of the healthcare system, which in turn further creates a supporting environment for safer practices within correctional services settings.

5.9.8 Easy access to needles for injecting drugs

The association between inmates reporting easy access to needles for injecting drugs, and reporting that inmates inject drugs in correctional centres is to be expected since inmates are only likely to know about the accessibility of needles if they also know that inmates are injecting drugs. As such as a high proportion (43%) of those inmates who reported injecting drugs reported sharing needles and equipment to do so, it is likely that the inaccessibility of needles and criminalisation of drug use is leading to unsafe injecting practices. Needle and syringe programmes have been successfully implemented in correctional centres in a number of countries and are a feasible solution to reduce the risks of injecting drugs in correctional centres (WHO, UNAIDS, UNODC 2007).

5.10 Limitations

The study was subject to many limitations, some of which are discussed below.

5.10.1 Reliance on correctional services staff for peer education intervention

The evidence in the reviewed literature for the effectiveness of peer education is compelling and it is therefore surprising that this intervention was not more strongly associated with the knowledge, attitude and practices of inmates around TB and HIV. The reason for this could be due to one of the factors mentioned by several authors; peer education programmes rely heavily on the cooperation and collaboration of correctional centre staff, particularly security staff, for their success (Scott, Harzke & Mizwa 2004; Woodall et al. 2015). This became very clear during this study. Although the peer education programme was being implemented as part of a series of interventions designed by the National Department of Health and backed by the Department of Correctional Services, it was extremely difficult to book dates to implement the peer education training and follow up session for the study at the chosen correctional centres. The delays eventually meant that the follow up session for the peer education intervention had to be abandoned. According to the peer educator trainer, logistical challenges were common in the programme as a whole. Dates set for training were frequently cancelled, often with little notice, and venues booked for the training might be reallocated for other purposes. The trainer reported having to relocate peer education trainings to a courtyard or even a cell to ensure the programme could continue.

5.10.2 Alternative peer education programmes were unintentionally included

In addition, some of the peer education programmes which were implemented in the correctional centres were not interventions that were planned by the researchers, but independent programmes conducted by other nongovernmental organisations. These peer education interventions were focused on HIV, and did not cover TB intensively. It is therefore not surprising that peer education as a whole was not associated with TB knowledge, attitude or practices. Most of the exposures to peer education reported in the study were likely exposures to alternative peer education programmes, and not the intended programme as roll-out of the study intervention was so poor. This means that changes as a result of the programme were hard to discern.

5.10.3 Extensive and cross exposure of inmates to interventions

The study was initially planned so that inmates would have distinct exposures with few overlaps and so that follow up would be possible. However several factors made this impossible. During the period when the study was under research ethics review by the University of the Western Cape and thereafter, the Department of Correctional Services, a mass roll-out of HCT began as part of the grant mentioned previously. By the time the project could be implemented, the vast majority of the study population had been exposed to HCT. In addition, the extensive migration of inmates between correctional centres had not been anticipated during the planning of the study. Because many inmates had been in other correctional centres prior to arriving at one of the centres chosen for the study, they had often been exposed to one of the interventions. This was particularly the case for the 'Kick TB/HIV' intervention which was intensively implemented in the Pollsmoor correctional centres, many of which are an initial point of entry for inmates who are then transferred elsewhere.

This extensive exposure to certain interventions, particularly HCT, means that there was little comparative data available for those unexposed, which could have limited the ability to detect smaller associations with the interventions. The cross exposure to interventions could have confounded and hidden the associations with specific interventions if the multivariate analysis did not account for their effect. Hence some of the results close to significance may

have been significant if this had not occurred and there may have been a stronger level of significance in those that were independently significant. Therefore the positive associations with the interventions may be an underestimate. Unfortunately it is not possible to know whether this is the case as we were unable to control the environment.

5.10.4 Self-reporting of attitudes and behaviours

One of the major limitations of the study is the fact that it relied on self-reporting and is therefore subject to potential underreporting of socially undesirable opinions and practices and over-reporting of socially desirable ones, even though the survey was anonymous. In a highly-controlled institution such as a prison, this is even more likely. The evidence that this occurred seems very strong when the degree to which respondents reported being likely to adhere to treatment after release is considered in comparison to what is reported to actually happen.

5.10.5 Geographic associations and associations with particular correctional centres

Due to the large number of variables and outcomes tested for association, the association of TB and HIV-related knowledge, attitudes and practices with particular correctional centres or provinces was not examined. This could be a limitation of the study.

5.11 Summary

With a few exceptions the study population's knowledge, attitude and practices relating to TB, HIV seem to be comparable to other inmate populations and the South African population in general. The exceptions are that inmates in the study appear to have a slightly higher knowledge of TB symptoms, but a lower knowledge of TB prevention than the general population. The population also had a higher knowledge that HIV is incurable. With regard to the attitudes reported by inmates, although it seems it likely to have been influenced by social desirability bias, the inmates' attitudes are favourable, and very similar to the general population. The study population also believes itself to be at higher risk of HIV than the general population, and at even higher risk of TB, which is a realistic assessment. Despite their comparable knowledge and attitudes, the study populations appears to have higher rates of risk behaviours for which there is comparative date – the rate of smoking is higher than in

the general population, and the use of condom at last sex is lower, which may indicate a lack of access which needs to be addressed. However, in contrast to that, the study population has much higher rates of medical male circumcision, and uptake of HIV counselling and testing.

As 'cues to action' the interventions being evaluated appear to have had little association with behaviour, with the exception of peer education. Peer education was associated with a reduced risk in sharing tattoo needles, and possibly an increased likelihood of adhering to HIV treatment if released from a correctional centre, and having perpetrated rape (although the last two associations are on the borderline of significance). However, as mentioned previously, the real effects are hard to discern.

The interventions appear to have been more strongly associated with other elements of the health belief model. For example, 'Kick TB/HIV' was associated with increased knowledge of TB (ability to name three of four symptoms of TB, ability to name how TB is cured), and both 'Kick TB/HIV' (willingness to care for a family member with TB or HIV) and HCT (willingness to disclose a TB diagnosis or an HIV positive status to a cellmate, willingness to care for a family member with TB) were associated with a more accepting attitude towards TB and HIV.

It is possible that the association of the interventions with the outcomes of interest was hidden due to wide exposure to HCT, cross exposure to other interventions and due to poor implementation of peer education because of structural issues. More controlled research without this as a confounder would yield more accurate information.

However it seems as though other factors, as is to be expected, beyond the control of the individual inmate, were important in predicting knowledge, attitude and practices.

These factors and their most important associations were as follows: race (TB & HIV knowledge, smoking status, likelihood of adhering to TB and HIV treatment after release, likelihood of using condom at next sex, likelihood of having an MMC); age (smoking status, likelihood of injecting drugs, perception that condoms used during sex in correctional centres, likelihood of having an MMC); education (TB & HIV knowledge, perception of being at high risk of TB, likelihood of telling family member about TB diagnosis, likelihood of injecting drugs); employment status (HIV knowledge, perception of being at high risk of HIV,

likelihood of sharing tattoo needle); HIV positive status (likelihood of disclosing TB diagnosis to family; likelihood of having been raped; likelihood of having injected drugs); access to a healthcare worker (likelihood of adherence to TB & HIV treatment after release; likelihood of condom use at next sex; likelihood of engaging in transactional sex); access to condoms (perception that condoms are used in sex in correctional centres; likelihood of having been raped) and access to needles for injecting drugs (perception that inmates inject drugs). This indicates the influence of broader interpersonal and structural factors on people's ability to put into practice safer actions in situations, like correctional settings, which are not under their control and where changing behaviours is not necessarily promoted by others around them.

CHAPTER 6. CONCLUSION AND RECOMMENDATIONS

This chapter provides the conclusions to the aim under study and the results and discussion. It provides recommendations for how these interventions can perhaps be improved. It also suggests other interventions or factors which need to be addressed to improve the knowledge, attitudes and practices around TB and HIV of inmates in the Eastern and Western Cape and additonal research to improve our understanding.

The cross sectional survey of adult male inmates in correctional centres in the Eastern and Western Cape was originally conceived in order to evaluate the effectiveness of HCT, peer education and 'Kick TB/HIV', as interventions to inmates' knowledge of, attitude towards, and practices around, TB and HIV.

According to the health belief model, which outlines a theory of why individuals adopt certain health-related behaviours, the interventions could impact on the inmates' TB or HIV practices in three different ways. They could potentially increase the inmates' knowledge of TB or HIV; they could improve the inmates' understanding of their own risk of, and the severity of, the diseases; or the interventions could constitute 'cues to action' that prompt the behaviour.

However the interventions seem to have had only a limited effectiveness (as represented by association) when their independent associations with several measures of TB and HIV knowledge, attitude and practices are considered.

'Kick TB/HIV' appears to be associated with increased TB knowledge. Although the data is sparse, it suggests that 'Kick TB/HIV' may also be associated with a more accepting attitude towards TB.

HCT was only associated with attitudes; encouraging a more accepting attitude towards HIV.

Peer education, on the other hand, was associated with practices (inmates being less likely to share tattoo needles when exposed to peer education).

Therefore, only one intervention was associated with increased knowledge ('Kick TB/HIV'),

none of the interventions were associated with how serious the respondents believed the diseases to be or how susceptible to them they felt, and only peer education had a limited association with practices. Within the context of the health belief model, the interventions had little association with behaviours.

However it is possible that the study has not demonstrated the full effect of the interventions because of several limitations: the extensive exposure of the study group to HCT and the overlapping exposure to different interventions may have have diluted some of the potential associations of the interventions. Hence the associations may show potentially a 'worst case scenario' positive effect as a result of the interventions. Nevertheless, without being able to assess this in a truly controlled environment and through a prospective cohort study, it is not possible to know the extent of the possible increased associations and whether these are combined with the result of other interventions or exposures. Other exposures not related to the interventions are thought to have been fairly uniform in all facilities and populations were very similar.

An additional limitation is that the implementation of the peer education intervention was poor and may not reflect the true potential of the intervention as suggested by other studies (Sifunda et al. 2008; Scott, Harzke & Mizwa 2004; Devilly et al. 2003). However, the poor implementation of the intervention does highlight some of the structural challenges encountered in the correctional setting, which are critical to address to enable successful interventions.

Even beyond the limitations of the study itself, I propose that the health belief model, which only explores factors involved in an individual's decision-making process, is inadequate to analyse why certain behaviours occur in a context such as a correctional setting, where choice is curtailed and structural factors may play a larger role.

Within the general population, when considering how to impact positively on TB knowledge alone, Naidoo et al. (2016) raise the importance of considering complex structural issues:

> "Many factors such as race (mixed race vs black African), employment, income, personal experience with TB disease, the media and public service agents (health workers and teachers) are associated with a relatively good mean composite

knowledge score. This finding demonstrates the complexity in addressing the acquirement of TB knowledge and points to the fact that any intervention aimed at improving TB knowledge at a population level needs to factor in this complexity." (Naidoo et al. 2016:10)

Many of the factors mentioned above (race, employment, income, personal experience with disease, and interactions with health workers) were significantly associated with TB and HIV knowledge, attitudes and practices.

Race as a proxy for other factors given the history of apartheid in South Africa, appears to impact on TB and HIV knowledge, and on certain behaviours. African inmates were less likely to choose medical male circumcision (MMC), almost certainly due to conflict with traditional circumcision among AmaXhosa men, and less likely to smoke than coloured inmates, probably due to the historical prevalence of smoking among coloured South Africans. Interestingly, African inmates were more likely to anticipate adhering to both TB and HIV treatment after release than coloured inmates, which, although a tenuous argument, may have to do with the impact gangs have on accessing healthcare in historically coloured areas, an adherence-inhibiting factor mentioned by an advisory group of inmates. But may also not be a true finding as it relies on self-reports of anticipated behaviour.

Being of young age appears to be a factor for several riskier practices; including smoking, engaging in consensual sex, and injecting drugs. This may have to do with either a higher tolerance for risk-taking among the youth or their particular vulnerability in the correctional setting where they may be targeted by older inmates (Gear & Ngubeni 2002).

As might be expected, having a lower education level was associated with poorer TB and HIV knowledge.

That HIV positive inmates were more likely to report having been raped and to have injected drugs in a correctional centre raises an important question also suggested in the literature about whether there are particular groups who may be especially vulnerable in a correctional setting (Gear & Ngubeni 2002; Telisinghe et al. 2016; Booyens & Bezuidenhout 2015). If this is the case, then more research may be needed into what makes them vulnerable and tailored interventions should be developed to address their risk. However, in addition these

are in themselves risk factors for HIV.

One of the most interesting and encouraging association revealed by the research is the significance of access to a healthcare worker and access to condoms.

The data around transactional and coerced sex is tentative, but it is suggestive that in an environment where health is prioritised and healthcare workers are readily available, not only are safer behaviours adopted, but inmates have more support structures and may therefore be less vulnerable to abuse and sexual coercion.

The positive effect that healthcare in a correctional setting can have is similarly evident by the impressive uptake of HCT within the correctional setting far above the rate at which it is undertaken in the general population and indicating that this was possibly the first time a nearly half of the inmates had accessed HIV services.

Sifunda et al. (2006) has pointed out that correctional centres provide a first point of contact to the health system for many South African inmates, and that the conditions of incarceration provide an excellent opportunity to reach a population that is often otherwise inaccessible. This is an observation also made in other countries (Baybutt 2010, cited in Woodall, Dixey & South 2013).

While the sociodemographic factors mentioned above which impact on knowledge, attitude and practices around TB and HIV are difficult to influence, creating access to healthcare workers, condoms and an accepting healthcare system is a structural factor which is much easier to change.

The WHO has recognised the opportunity of correctional centres as health-promoting settings by proposing the idea of Health Promoting Prisons (HPP). This concept is a settings-based approach to addressing the social determinants of a community's health by changing the ways environmental, organisational and interpersonal structures impact on peoples' health in a particular place (Newman et al. 2015). In the context of a correctional centre, the HPP is a '…"whole-prison approach" in which health of inmates and staff as well as work and secure environment are crucial to assisting prisons to implement health promoting and reforming interventions' (Santora, Espnes & Lillefjell 2014: 28).

However, a health-promoting prison is a difficult concept to implement. It requires political commitment, resources and engagement from stakeholders at all levels of the organisation (Gatherer 2013; Whitehead 2006). As was seen in the implementation of peer education during this study, there is often a conflict between the security concerns of the organisation and the health needs of inmates (Sifunda et al. 2006). Woodall et al. (2015:30) propose that peer education is only effective when it is recognised that correctional centre staff at all levels of the organisation are 'co-constructors' of the intervention. This is likely to be very much the case with creating a health-promoting prison too.

Interventions such as the HCT, 'Kick TB/HIV' and peer education interventions described above can therefore only have a limited effect unless they form part of a greater prioritisation and integration of the healthcare system into correctional centres, and a whole-systems approach to heath. This would of necessity take place within correctional services but would also reach into the communities in which inmates, their partners and families live, and where the inmates will ultimately return.

6.1 Recommendations

6.1.1 Research the finding that access to healthcare impacts on risky and health-seeking behaviours using more robust designs

- Use these preliminary findings to develop studies on the effect of improved access to healthcare on risky and health-seeking behaviours of inmates in order to improve advocacy efforts for the prioritisation of healthcare in the correctional setting.
- Use the experience of this research to develop studies that can properly assess the impact of peer education and edutainment-based interventions like 'Kick TB/HIV' in a cohort study.

6.1.2 Strengthen the idea of a correctional centre as a health-promoting setting

- Create awareness among senior national Department of Correctional Services (DCS) officials in both the health and security arenas, of the potential of a prioritised healthcare system (along the lines of a Health-Promoting Prison) to effectively address health and social challenges.

- Encourage these senior national DCS officials to relay this potential to correctional centre heads, and to set targets aligned with the concept.

- Encourage correctional centre heads and management to meet and collaborate with local and provincial health authorities, and local community and civil society structures to ensure an integrated approach to healthcare, combining budgets and data to identify and address illness hotspots in communities, and developing support systems to manage the transition of inmates in and out of correctional centres.

- Make health care workers more accessible by formalising the role of lay healthcare workers in correctional centres (whether through nongovernmental organisations or employed directly by the DCS) who can participate in task-shifting, freeing up professional healthcare workers to attend to serious cases, while also extending the reach of the healthcare system in the centre.

6.1.3 Recognise the potential of the correctional setting to access difficult-to-reach populations

- Explore the use of budgets ringfenced for certain groups commonly found in correctional centres from provincial or national Department of Health in order to undertake health interventions.

- Research whether there are certain populations within correctional centres who are particularly vulnerable to abuse and accompanying health issues.

- Develop peer-led interventions which target these potentially vulnerable groups

- Implement needle and syringe programmes for injecting drug users in correctional centres, aligned with World Health Organisation best practice.

- Make condoms easily and discreetly available to all inmates to reduce the risks associated with unprotected sex.

- Encourage local community groups (faith-based and other) to set up visiting teams to visit and support inmates who have no outside contact to avoid situations where inmates are vulnerable to abuse through isolation.

- Develop peer-led health interventions, in collaboration with security officials and inmates, which target younger inmates and those with lower levels of education.

- Develop peer-led interventions which target the families and visitors of inmates, who may themselves be at greater risk for certain conditions, and who can also support the inmate with any health-related needs after release.

- Consider once-off edutainment sessions along the lines of the 'Kick TB/HIV' intervention for specific health campaigns, or integrate it into a peer education programme, if found to be truly effective.

6.2 Summary

The three interventions evaluated in this study (HCT, peer education and 'Kick TB/HIV') showed limited effectiveness in changing inmates' knowledge of, attitudes towards, and practices around, TB and HIV. 'Kick TB/HIV' appears to have been effective in increasing TB knowledge, and together with HCT, encouraging a more accepting attitude towards TB and HIV. The only intervention to show an association with practices was peer education, which showed a reduction in the odds of sharing a tattoo needle. The significant limitations experienced in the roll-out of peer education, the extensive exposure to HCT, and cross exposure between interventions may have hidden some effects of the interventions. However, the research showed that other sociodemographic and structural factors had a significant impact on knowledge, attitudes and practices around TB and HIV. These included race, age, education, employment status prior to incarceration and having an HIV positive status. Most importantly, and very actionable, is the finding that ready access to a healthcare worker and to condoms were associated with several safer practices including increased likelihood of using a condom at next sex in a correctional centre, decreased likelihood of engaging in transactional sex, increased likelihood of anticipated adherence to HIV and TB treatment, increased likelihood of reporting condoms are used during sex in correctional centres, and decreased likelihood of reporting having ever been raped. These findings suggest that the

concept of a Health-Promoting Prison, which prioritises a ‘whole-systems’ approach to health, is critical, both in ensuring that interventions such as those evaluated in this study are implemented effectively and rigourously evaluated, and in implementing other interventions which address structural issues such as the availability of healthcare workers and services and condoms.

REFERENCES

Abebe, D. S., Biffa, D., Bjune, G., Ameni,G. & Abebe, F., 2011, 'Assessment of knowledge and practice about tuberculosis among eastern Ethiopian prisoners', *International Journal of Tuberculosis and Lung Disease* 15(2), 228-223.

Abraham, C., Sheeran, P., Spears, R., Abrams, D., 1992, 'Health beliefs and promotion of HIV-preventive intentions among teenagers: a Scottish perspective' *Health Psychology* 11(6), 363-70.

Adane, K., Spigt, M., Johanna, L., Noortje, D., Abera, S. M. & Dinant, G., 2017 'Tuberculosis knowledge, attitudes, and practices among northern Ethiopian prisoners: Implications for TB control efforts' *PLoS ONE* 12(3).

Audu, O., Ogboi, S. J., Abdullahi, A. U., Sabitu, K., Abah, E. R. & Enokela, O. P., 2013, 'Sexual Risk Behaviour and Knowledge of HIV/AIDS among Male Prison Inmates in Kaduna State, North Western Nigeria', *International Journal of Tropical Disease & Health* 3(1), 57-67.

Bagnall, A., South, J., Hulme, C., Woodall, J., Vinall-Collier, K., Raine, G., Kinsella, K., Dixey, R., Harris, L. & Wright, N. M. J., 2015, 'A systematic review of the effectiveness and cost-effectiveness of peer education and peer support in prisons', *BioMed Central Public Health* 15(290).

Basu, S., Stuckler, D. & McKee, M., 2011, 'Addressing institutional amplifiers in the dynamics and control of tuberculosis epidemics' *American Journal of Tropical Medicine and Hygiene* 84(1).

Baussano, I., Williams, B., Nunn, P., Beggiato, M., Fedeli, U. and Scano, F, 2010, 'Tuberculosis in prisons: a systematic review', *PLoS Medicine* 7(12).

Beyers, C., 2009, 'Identity and forced displacement: community and colouredness in District Six', in Mohamed Adhikari (ed.), *Burdened by Race: Coloured identities in southern Africa*, 79-103, UCT Press, Cape Town.

Booyens, K. & Bezuidenhout, C., 2015, 'Sex, Drugs and Tattooing in Correctional Facilities and the Relationship to STIs, HIV AND AIDS', A*cta Criminologica: Southern African Journal of Criminology* Special Edition No 2/2015, 144-159.

Brewer, T. F., Vlahov, D., Taylor, E., Hall, D., Munoz, A. & Polk, B. F., 1988, 'Transmission of HIV-1 in statewide prison system', *AIDS* 2(5).

Bristow, C. C., Podewils, L. J., Bronner, L. E., Bantubani, N., van der Walt, M., Peters, A. & Mametja, D., 2013, 'TB tracer teams in South Africa: knowledge, practices and challenges of tracing TB patients to improve adherence', *BioMed Central Public Health* 13(801). http://www.biomedcentral.com/1471-2458/13/801

Carpenter, C. J., 2010, 'A meta-analysis of the effectiveness of health belief model variables in predicting behaviour', *Health Communication* 25(8).

Coggen, D., Rose, G. & Barker, D. J. P., 1997, *Epidemiology for the uninitiated*, BMJ (British Medical Journal) Publishing, viewed on 10 March 2018, from http://www.bmj.com/about-bmj/resources-readers/publications/epidemiology-uninitiated/8-case-control-and-cross-sectional

Cramm, J. M., Finkenflüge, H. J. M., Møller, V. & Nieboer, A. P., 2010, 'TB treatment, initiation and adherence in a South African community influenced more by perceptions than by knowledge of tuberculosis', *BioMed Central Public Health* 10(72).

Department of Correctional Services, 2005, *White Paper on Corrections in South Africa*, Department of Correctional Services, Pretoria.

Department of Correctional Services, 2010, *Department of Correctional Services Annual Report for the 2009/10 Financial Year*, Department of Correctional Services, Pretoria.

Department of Correctional Services, 2012, *Inmate gender and racial composition as on the last day of 2011/12*, viewed on 27 June 2015, from http://www.dcs.gov.za/WebStatistics/inmate-gen.aspx

Department of Health, 2004, *Ethics in health research: principles, structures, processes*, Department of Health, Pretoria.

Department of Health, 2013, *Guidelines for the Management of Tuberculosis, Human Immunodeficiency Virus and Sexually-Transmitted Infections in Correctional facilities 2013*, Department of Health, Pretoria.

Devilly, G. J., Sorbello, S., Eccleston, L. & Ward, T., 2003, 'Prison-based peer-education schemes', *Aggression and Violent Behavior* 10 (2005), 219–240.

Dixey, R., Nyambe, S., Foster, S., Woodall, J. & Baybutt, M., 2015, 'Health promoting prisons – An impossibility for women prisoners in Africa?', *Agenda* 29(4), 95-102.

Dolan, K. A., Bijl, M. & White, B., 2004, 'HIV education in a Siberian prison colony for drug dependent males', *International Journal for Equity in Health* 3:7.

Dunkle, K. L., Jewkes, R. K., Murdock, D. W., Sikweyiya, Y. & Morrell, R., 2014, 'Prevalence of Consensual Male–Male Sex and Sexual Violence, and Associations with HIV in South Africa: A Population-Based Cross-Sectional Study', *PLoS Medicine* 10(6), 1-11.

dos Santos, M. M. L., Trautmann, F., Wolvaardt, G. & Palakatsela, R., 2014, 'Rapid Assessment Response (RAR) study: drug use, health and systemic risks - Emthonjeni Correctional Centre, Pretoria, South Africa',*Harm Reduction Journal* 11(11).

Eshrati, B., Asl, R., T., Dell, C. A., Afshar, P., Millson, P. M. E., Kamali, M., Weekes, J., 2008, 'Preventing HIV transmission among Iranian prisoners: Initial support for providing education on the benefits of harm reduction practices', *Harm Reduction Journal* 5(21).

Ferreira Júnior, S., Bosco de Oliveira, H., Marin-Léon, L., 2013, 'Knowledge, attitudes and practices on tuberculosis in prisons and public health services', *Revista Brasileira de Epidemiologia* 16(1), 100-113.

Fish, D. G., Walker, S. J. W., Singaravelu, K., Fiore, R., Klopf, L., Hubbard, M. J., Gallucci, A., Stephens, P. C. & Wright, L. N., 2008, 'Improving Knowledge, Attitudes, and Testing for Communicable Diseases Among New York State Inmates', *Journal of Correctional Health Care* 14(4).

Fonner, V. A., Denison, J., Kennedy, C. E., O'Reilly, K. & Sweat, M., 2012, 'Voluntary counseling and testing (VCT) for changing HIV-related risk behavior in developing countries.', *Cochrane Database of Systematic Reviews* 2012(9).

Gatherer, A., 2013, 'Managing the health of prisoners: A challenge to our professionalism and commitment to protect public health' *BMJ* 346(f3463).

Gear, S. & Ngubeni, K., 2002, 'Daai Ding: Sex, Sexual Violence and Coercion in Men's Prisons', Research paper, Centre for the Study of Violence and Reconciliation.

Henostroza, G., Topp, S. M., Hatwiinda, S., Maggard, K. R., Phiri, W., Harris, J. B., Kruuner, A., Kapata, N., Ayles, H., Chileshe, C. & Reid, S. E, 2013, 'The high burden of tuberculosis (TB) and Human Immunodeficienct Virus (HIV) in a large Zambian prison: A public health alert',*PLos ONE* 8(8).

Institute of Medicine (US) Committee on Ethical Considerations for Revisions to DHHS Regulations for the Protection of Prisoners Involved in Research, 2007, *Ethical consideration for research involving prisoners*, Gostin, L. O., Vanchieri, C., & Pope, A. (Eds) National Academies Press (US), Washington DC.

Johnstone-Robertson, S., Lawn, S. D., Welte, A., Bekker, L.G. & Wood, R., 2011, 'Tuberculosis in a South African prison – a transmission modelling analysis', *The South African Medical Journal* 101(11).

Kantor, E., 2006, 'HIV Transmission and Prevention in Prisons', *HIV InSite Knowledge Base*, viewed on 29 August 2014, from http://hivinsite.ucsf.edu/insite?page=kb-07-04-13

Kigozi, N. G., Heunis, J. C., Engelbrecht, M. C., Janse van Rensburg, A. P. & H. C. J. Dingie van Rensburg, H. C. J., 2017, 'Tuberculosis knowledge, attitudes and practices of patients at primary health care facilities in a South African metropolitan: research towards improved health education', *BioMed Central Public Health* 17(795).

Kondro, W., 2007, 'Report supports cost-effective prison tattoo program' *CMAJ* 176(4).

Krebs, C.P. & Simmons, M., 2002, 'Intraprison HIV transmission: an assessment of whether it occurs, how it occurs, and who is at risk', *AIDS Education and Prevention* 14(5 Suppl B), 53-64.

Langhaug, L. F., Sherr, L. & Cowan, F.M., 2010, 'How to improve the validity of sexual behaviour reporting: systematic review of questionnaire delivery modes in developing countries', *Tropical Medicine and International Health* 15(3), 362-381.

Macher, A., Kibble, D. & Wheeler, D., 2006, 'HIV transmission in a correctional facility', *Emerging Infectious Diseases* 12(4).

Majdi, M. R., Khani, H., Azadmarzabadi, E., Montazeri, A., Hallajian, E., Babamahmodi, F. and Kariminasab, M. H., 2011, 'Knowledge, Attitude and Practices towards HIV/AIDS among Iranian prisoners in Mazandaran province in the south-coast area of the Caspian Sea', *Eastern Mediterranean Health Journal* 17(12).

Mark, D., Middelkoop,K., Black, S., Roux, S., Fleurs, L., Wood, R., Bekker, L.G., 2012, ' Low acceptability of medical male circumcision as an HIV/AIDS prevention intervention within a South African community that practises traditional circumcision', *South African Medical Journal* 102(6).

Martin, S. S., O'Connell, D. J., Inciardi, J. A., Surratt, H. L., & Maiden, K. M., 2008, 'Integrating an HIV/HCV Brief Intervention in Prisoner Reentry: Results of a Multisite Prospective Study', *Journal of Psychoactive Drugs* 40(4), 427-436.

Mason-Jones, A. J., Mathews, C., Flisher, A. J., 2011, 'Can Peer Education Make a Difference? Evaluation of a South African Adolescent Peer Education Program to Promote Sexual and Reproductive Health', *AIDS and Behavior* 15(1605).

Maughan-Brown, B. & Venkataramani, A. S., 2017, 'Accuracy and determinants of perceived HIV risk among young women in South Africa', *BioMed Central Public Health* 18:42.

Møller, V. & Radloff, S., 2012, 'Perceptions of Fortune and Misfortune in Older South African Households: Social Assistance and the 'Good Life'', *Social Indicators Research* 2013(111), 633–664.

Motshabi, L. C., Pengpid, & S., Peltzer, K., 2011, 'HIV counselling and testing utilisation and attitudes of male inmates in a South African prison', *SAHARA-J: Journal of Social Aspects of HIV/AIDS* 8(3), 107-114.

Murray, E., Bond, V., Marais, B., Godfrey-Faussett, P., Ayles, H., & Beyers, N., 2013, 'High levels of vulnerability and anticipated stigma reduce the impetus for tuberculosis diagnosis in Cape Town, South Africa', *Health Policy and Planning* 28(4), 410–418.

Naidoo, P., Simbayi, L., Labadarios, D., Ntsepe, Y., Bikitsha, N., Khan, G., Sewpaul, R., Moyo, S. & Rehle, T., 2016, 'Predictors of knowledge about tuberculosis: results from SANHANES I, a national, cross-sectional household survey in South Africa', *BioMed Central Public Health* 16(276).

Nakhaei, H. F., 2005, 'Prisoners' knowledge of HIV and its prevention in Kerman, Iran', *Iranian Journal of Public Heath*: 34(Supplementary issue), 5-6.

National Department of Health, 2013, *Guidelines for the management of tuberculosis, human immunodeficiency virus and sexually-transmitted infections in correctional facilities 2013,* National Department of Health, Pretoria.

Newman, L., Baum, F., Javanparast, S., O'Rourke, K & Carlon, L., 2015, 'Addressing social determinants of health inequities through settings: a rapid review', *Health Promotion International* 30(S2), ii126–ii143.
Odujinrin, M. T. & Adebajo, S. B., 2001, 'Social characteristics, HIV/AIDS knowledge, preventive practices and risk factors elicitation among prisoners in Lagos, Nigeria', *West African Journal of Medicine* 20(3), 191-8.

O'Grady, J., Hoelscher, M., Atun, R., Bates, M., Mwaba, P., Kapata, N., Ferrara, G., Maeurer, M. & Zumla, A., 2010, 'Tuberculosis in prisons in sub-Saharan Africa - the need for improved health services, surveillance and control', *Tuberculosis* 91(2011), 173-178.

Reid, S. E., Topp, S.M., Turnbull, E.R., Hatwiinda, S., Harris, J.B., Maggard, K. R., Roberts, S. T., Kruuner, A., Morse, J.C., Kapata, N., Chisela, C. & Henostroza, G., 2012, 'Tuberculosis and HIV control in Sub-Saharan African prisons: 'Thinking outside the prison cell'", *The Journal of Infectious Diseases* 205(suppl 2), S265-S273.

Santora, L., Espnes, G. A. & Lillefjell, M.,2014, 'Health promotion and prison settings', *International Journal of Prisoner Health* 10(1), 27-37

Scheibe, A., Shelly, S., Lambert, A., Schneider, A., Basson, R., Medeiros, N., Padayachee, K., Savva, H. & Hausler, H., 2017, 'Using a programmatic mapping approach to plan for HIV prevention and harm reduction interventions for people who inject drugs in three South African cities', 2017, *Harm Reduction Journal* 14(35), 1-12.

Scott, D. P., Harzke, A. J. & Mizwa, M. B., 2004, 'Evaluation of an HIV Peer Education Program in Texas Prisons', *Journal of Correctional Health* 10(2), 151-173.

Shisana, O., Rehle, T., Simbayi, L.C., Zuma, K., Jooste, S., Zungu, N., Labadarios, D., Onoya, D., 2014, *South African National HIV Prevalence, Incidence and Behaviour Survey, 2012*, HSRC Press, Cape Town.

Sifunda, S., Reddy, P. S., Braithwaite, R., Stephens, T., Ruiter, R. A. C., & van den Borne, B., 2006, 'Access point analysis on the state of health care services in South African prisons: A qualitative exploration of correctional health care workers' and inmates' perspectives in KwaZulu-Natal and Mpumalanga', *Social Science & Medicine* 63(2006), 2301-2309.

Sifunda, S., Reddy, P. S., Braithwaite, R., Stephens, T., Bhengu, S., Ruiter, R. A. C., & van den Borne, B., 2008, 'The Effectiveness of a Peer-Led HIV/AIDS and STI Health Education Intervention for Prison Inmates in South Africa' *Health Education & Behavior* 35(4),494–508.

Simpson, P. L., Reekie, J., Butler, T. G., Richters, J., Yap, L., Grant, L., Richards, A. & Donovan, B., 2016, 'Factors Associated With Sexual Coercion in a Representative Sample of Men in Australian Prisons', *Archives of Sexual Behavior 45(5), 1195-1205.*

Sitas, F. Egger, S., Bradshaw, D., Groenewald, P., Laubscher, R., Kielkowski, D. & Peto, R.,

2013,'Differences among the coloured, white, black, and other South African populations in smoking-attributed mortality at ages 35–74 years: a case-control study of 481 640 deaths', *Lancet* 382(9893), 685–693.

Skinner, D., & Claassens, M., 2016, 'It's complicated: why do tuberculosis patients not initiate or stay adherent to treatment? A qualitative study from South Africa', *BioMed Central Infectious Diseases* 16(712).

Sonke Gender Justice Network & Just Detention International, 2012, *Addressing HIV and Sexual Violence in Department of Correctional Services Facilities: A Guide to Working with Members of the Department of Correctional Services*. Johannesburg, Sonke Gender Justice Network & Just Detention International.

South African Global Fund Country Coordinating Mechanism, 2013, *South Africa Country Coordinating Mechanism Request TB Funding*, SANAC, Pretoria.

South African National AIDS Council, 2017, *South Africa's National Strategic Plan for HIV, TB and STIs 2017-2022*, South African National AIDS Council, Pretoria.

Storla, D. G., Yimer, S. & Bjune, G. A.,2008, 'A systematic review of delay in the diagnosis and treatment of tuberculosis' *BioMed Central Public* Health 8(15).

Statistics South Africa, 2010, *Mid-year population estimates 2010*, Statistics South Africa, Pretoria.

Statistics South Africa, 2017a, *Mid-year population estimates 2017*, Statistics South Africa, Pretoria.

Statistics South Africa, 2017b, *Mortality and causes of death in South Africa: Findings from death notification, 2015*, Statistics South Africa, Pretoria.

Stephens, T., Conerly, R., Braithwaite, R. L., Sifunda, S., Ogbuawa, N., Bhengu, S. & Reddy, P., 2009, 'HIV/AIDS, STIs and condom use beliefs among male prison inmates in two South African provinces: Mpumalanga and KwaZulu-Natal', *Global Public Health* 4(5), 423-432.

Telisinghe, L., Charalambous, S., Topp, S., Herce, M., Hoffman, C., Barron, P., Schouten, E., Jahn, A., Zachariah, R., Harries, A., Beyrer, C. & Amon, J., 2016, 'HIV and tuberculosis in prisons in sub-Saharan Africa', *Lancet* 388, 1215-1227

Todrys, K. W. & Amon, J. J., 2012, 'Criminal Justice Reform as HIV and TB prevention in African Prisons', *PLoS Medicine* 9(5), 1-6.

Rosenstock, I. M., 1974, 'Historical origins of the health belief model' *Health Education Monograph*. 2(328).

United Nations Office on Drugs and Crime. (2010). *HIV in prisons: situation and needs assessment toolkit (Advance Copy)*. Vienna: United Nations.

Valera, P., Chang, Y. & Lian, Z., 2017, 'HIV risk inside U.S. prisons: a systematic review of

risk reduction interventions conducted in U.S. prisons', *AIDS Care* 29(8), 943-952.

van Walbeek, C., 2002, 'Recent trends in smoking prevalence in South Africa-some evidence from AMPS data', *South African Medical Journal* 92(6), 468-472.

Weilandt, C., Stöver, H., Eckert, J. & Grigoryan, G, 2007, 'Anonymous survey on infectious diseases and related risk behaviour among Armenian prisoners and prison staff', *International Journal of Prisoner Health,* 3(1), 17-28.

Whitehead, D., 2006, 'The health promoting prison (HPP) and its imperative for nursing', *International Journal of Nursing Studies* 43(2006), 123-131.

Woodall, J., Dixey, R. & South, J., 2013, 'Control and choice in English prisons; developing health-promoting prisons', *Health Promotion International* 29(3), 474-482.

Woodall, J., South, J., Dixey, R., De Viggiani, N. & Penson, W, 2015, 'Factors that determine the effectiveness of peer interventions in prisons in England and Wales.' *Prison Service Journal* 219, 30-37.

Wright, S., Twardzicki, M., Gomez, F. & Henderson, C., 2014, 'Evaluation of a comedy intervention to improve coping and help-seeking for mental health problems in a women's prison', *International Review of Psychiatry,* 26(4), 423–429.

World Health Organisation, 2002, *Gender and Mental Health,* Department of Mental Health and Substance Dependence & Department of Gender and Women's Health, World Health Organisation, Geneva.

World Health Organisation, UNAIDS, UNODC, 2007, *Effectiveness of Interventions to Manage HIV in Prisons – Needle and syringe programmes and bleach and decontamination strategies,* Evidence for Action Technical Papers, World Health Organization, UNAIDS, UNODC, Geneva.

World Health Organisation, 2017a, 'Country profile South Africa', *WHO report on the global tobacco epidemic, 2017,* viewed on 3 November 2017, from http://www.who.int/tobacco/surveillance/policy/country_profile/zaf.pdf .

World Health Organisation, 2017b, 'Global Health Observatory data repository', viewed on 3 November 2017 from http://apps.who.int/gho/data/?theme=main&vid=22100 .

World Health Organisation, 2017c, *Global Tuberculosis Report 2017,* viewed on 5 November 2017, from http://www.who.int/tb/publications/global_report/en/.

World Health Organisation, 2017d, *HIV fact sheet,* viewed on 5 November 2017, from http://www.who.int/mediacentre/factsheets/fs360/en/

World Medical Association, 2013, *World Medical Association declaration of Helsinki – ethical principles for medical research involving human subjects*: Brazil.

Appendix 1: The TB and HIV knowledge, attitude towards TB and HIV and practices around TB and HIV of the study population

TB knowledge	**Yes n (%)**	**Total**
Knowledge of TB prevention (no errors)	49 (14,58)	336
Knowledge of four TB symptoms (no errors)	85 (25,30)	336
Knowledge of three of four TB symptoms (negative marking)	202 (60,12)	336
Knowledge that TB is curable	326 (97,92)	336
Knowledge of how TB curable (no errors)	242 (72,02)	336
Knowledge of TB transmission (no errors)	170 (50,60)	336
Attitude to TB		
Believe at high risk of TB	202 (60,12)	336
Believe TB a very serious disease	233 (69,35)	336
Would tell family member about TB diagnosis	325 (96,73)	336
Would tell cellmate about TB diagnosis	290 (86,31)	336
Would care for family member with TB	321 (95,54)	336
Would buy food from someone with TB	230 (68,45)	336
TB practices		
Report highly likely to adhere to hypothetical TB treatment post-release	283 (84,23)	336
Is a non-smoker	62 (18,45)	336
Always have their cell windows open	251 (74,70)	336
Would seek care as soon as suspect TB	302 (89,88)	336
Spend more than 3 hours outdoors a day	76 (22,62)	336

HIV knowledge	**Yes n (%)**	**Total**
Knowledge that HIV incurable	263 (78,27)	336
Knowledge of HIV prevention totally correct	199 (59,23)	336
Knowledge of HIV transmission totally correct	38 (11,31)	336
Attitude to HIV		
Believe at high risk of HIV	139 (41,37)	336
Believe HIV a very serious disease	296 (88,10)	336
Would tell family member about HIV diagnosis	318 (94,64)	336
Would tell cellmate about HIV diagnosis	251 (74,70)	336
Would care for family member with HIV	323 (96,13)	336
Would buy food from someone with HIV	275 (81,85)	336
HIV practices		
Perception that condoms used in sex in correctional centres	115 (34,23)	336
Perception that transactional sex occurs in correctional centres	160 (47,62)	336
Report highly likely to adhere to treatment post release	290 (86,31)	336
Perception that inmates inject drugs in correctional centres	87 (25,89)	336
Witnessed / heard about rape in correctional centre	97 (28,87)	336
Has ever been raped	12 (3,57)	336
Has been raped in last month	10 (2,98)	336
Highly likely or likely to use condom at next sex	73 (50,00)	146
Engaged in consensual sex	13 (3,87)	336
Has ever raped someone else	13 (3,87)	336
Raped someone else in last month	15 (4,46)	336
Has ever injected drugs in correctional centre	23 (6,85)	336
Injected drugs last month	12 (52,17)	23
Ever had medical male circumcision	109 (32,44)	336
Has ever shared needles or syringes in correctional centre	10 (43,48)	23
Has shared a razor blade in last month	25 (7,44)	336
Has shared tattoo needle in last month	35 (10,42)	336
Has engaged in transactional sex in correctional centre	13 (3,87)	336
Used a condom in the last month	26 (28,57)	91

Appendix 2: English questionnaire

Hello! Thank you for agreeing to assist us in our research by completing this questionnaire. The aim is to find out what you know about TB and HIV and how this knowledge affects what you do.

I will ask you most of the questions in the questionnaire and will show you how the tablet works. For the last section, which asks about sensitive things, I will hand over the tablet to you so that you can complete that section on your own in private.

If you have any questions about what I ask you, please let me know and I will do my best to answer them. If you feel uncomfortable about any of the questions asked in the questionnaire, please let me know and we can move to the next one.

The purpose of this section is to create a code that will be unique to you, but that won't allow anyone else to identify who you are. This code will stay the same for the second questionnaire you complete. In this way we will be able to link your first questionnaire with your second one, without knowing who completed each questionnaire.

A1	What are the last two letters of your mother's first name? (If mother unknown, ask for grandmother, if grandmother unknown, primary caretaker during childhood)	
A2	What are the last two letters of the place (town or village where) you were born?	
A3	How old were you in years when you first went to prison?	
A4	How many sisters do you have? Include all the female children born to your mother, living and deceased.	

Thank you! This next section will help us gather a little bit of information about your background.

B1	How old are you in years?	

B2	What race are you?	
	African	
	White	
	Coloured	
	Indian/Asian	
	Other	

B3	What was the highest level of education or schooling that you passed?	
	Grade 7 or below (standard 5 or below)	
	Between grade 8 and grade 11 (between standard 6 and standard 9)	
	Grade 12 (matric)	
	Tertiary education (university, FET college, technicon)	

B4	Before you were imprisoned, were you...?	
	Employed full-time	
	Employed part-time	
	Unemployed	
	Informally employed (piecework, oddjobs, selling goods)	

C1	Is this the first time you have been incarcerated (locked in prison)?		
	Yes		*If yes, skip to B3*
	No		*If no, continue with B2*

C2	How many times have you been incarcerated (locked in prison)?	

C3	How long have you been incarcerated (locked in prison) this time?
	--- years ----months ----days

Thanks for completing that section about you. The next section is about the disease tuberculosis or TB. We will cover questions about your knowledge of TB, what you think about it and how you go about dealing with it. We are first going to ask about your medical history of tuberculosis.

D1	Do you currently have TB?		
	Yes		*If 'yes', go to D2*
	No		*If 'no', go to D3*
	I don't know		*If 'If I don't know', go to D3*

D2	Are you on treatment (medication) for TB?	
	Yes	
	No	
	I don't know	

D3	Have you ever had TB before?		
	Yes		
	No		*If No, skip to E1*
	I don't know		*If I don't know, skip to E1*

D4	How long ago did you have TB?	
	--------- years ----------months --------days	

D5	Did you complete your treatment (medication) for TB?	
	Yes	
	No	
	I don't know	

D6	Was your treatment for TB interrupted because you came to prison or during your stay in prison?	
	Yes	
	No	
	I don't know	

Well done! Now we'll look at what you know and believe about the disease tuberculosis or TB.

E1	Which of these is a sign or symptom of TB? (You can choose more than one)	
	Losing weight / getting thin	
	Diarrhea / loose stools / runny tummy	
	Coughing for more than two weeks	
	Itchiness	
	Burning feeling when urinating/pissing	
	Ingrown fingernails	
	Sweating a lot at night	
	Vomiting / throwing up	
	Fever / temperature	

E2	How can a person get TB? (You can choose more than one)	
	Through handshakes	
	Through the air when a person coughs or sneezes	
	Through sharing dishes	
	Through touching items in public places (doorknobs, handles in transportation, etc)	
	Through bad spirits or witchcraft	
	I don't know	

E3	How can a person prevent getting TB? (You can choose more than one)	
	Avoid shaking hands	
	Covering mouth and nose when coughing or sneezing	
	Avoid sharing dishes	
	Washing hands after touching items in public places	
	Closing windows at home	
	Through good nutrition	
	By praying	
	I don't know	
	Something else	

E4	Can TB be cured?		
	Yes		*If 'yes', go to E5*
	No		*If 'no' go to F1*
	I don't know		*'I don't know' go to F1*

E5	How can someone with TB be cured? (You can choose more than one)	
	Herbal remedies	
	Home rest without medicine	
	Praying	
	Taking TB drugs for the prescribed duration of treatment	
	I don't know	
	Something else	

F1	If you knew that a shopkeeper or food seller had TB, would you buy food from them?	
	Yes	
	No	
	I'm not sure	

F2	Would you be willing to care for a family member with TB?	
	Yes	
	No	
	I'm not sure	

G1	In your opinion, how serious a disease is TB?	
	Very serious	
	Serious	
	Not serious	
	I don't know	

G2	How would you describe your risk of contracting TB?	
	High risk	
	Medium risk	
	Low risk	
	No risk	
	I don't know	

H1	In the past month, how often have the windows in your cell beenopen?	
	Always	
	Often	
	Sometimes	
	Never	

H2	In the last month, how many hours have you spent outdoors per day while in prison?	

H3	In the last month, about how many times a day have you smoked while in prison?	

H4	If you had symptoms of TB, at what point would you ask to go to the prison clinic or see a doctor or nurse?	
	When treatment on my own doesn't work	
	When symptoms that look like TB signs last for 3-4 weeks	
	As soon as I realise that my symptoms might be related to TB	
	I would not ask to go to the prison clinic or see a doctor or nurse	

You have now completed the section on tuberculosis and are about half way through the questionnaire. Keep going! Your input is important to us and could help improve services!

The next section is about HIV or the human immunodeficiency virus. The first part of the section will ask you for your medical history in relation to HIV. I'm not going to ask for your HIV status now, but there will be a question about your HIV status in the section of the questionnaire you will complete privately.

I1	Have you been tested for HIV while in prison?		
	Yes		*If 'yes', go to I2*
	No		*If 'no' go to I4*
	I don't know		*If 'I don't know', go to I4*

I2	About how long ago was the last time you tested for HIV in prison?	__years__months__days

I3	How many times have you tested for HIV in prison?	

I4	Have you been tested for HIV while out of prison?		
	Yes		
	No		
	I don't know		

Excellent! That's your medical history finished. The next section looks at what you know and believe about HIV.

J1	In which of the following ways can HIV be transmitted from someone who is HIV positive? (You can choose more than one)	
	by vaginal sex without a condom (sex in the vagina)	
	by anal sex without a condom (sex in the bum)	
	through oral sex without a condom (sex in the mouth)	
	by touching a toilet seat	
	by drinking from the glass of an HIV positive person	
	by kissing	
	by a mosquito bite	
	by an injection with a used needle	
	by sharing razor blades and toothbrushes	
	by tatooing with the same needle	
	by sharing blood in brotherhood rituals	
	by shaking hands	
	by breastfeeding	
	from mother to child during pregnancy and child birth	

J2	How can you protect yourself from HIV? (You can choose more than one)	
	By wearing a condom every time you have sex	
	By not sharing food with someone who has HIV	
	By having a medical male circumcision	
	By not shaking hands with someone who has HIV	
	I don't know	

J3	Can AIDS/HIV be cured?	
	Yes	
	No	
	I don't know	

J4	If you knew that a shopkeeper or food seller had HIV, would you buy food from them?	
	Yes	
	No	
	I'm not sure	

J5	Would you be willing to care for a family member with HIV?	
	Yes	
	No	
	I'm not sure	

J10	In your opinion, how serious a disease is HIV?	
	Very serious	
	Serious	
	Not serious	
	I don't know	

J11	How would you describe your own risk of contracting HIV?	
	High risk	
	Medium risk	
	Low risk	
	No risk	
	I don't know	

K1	Have you ever had a medical male circumcision?*Explain that that is the removal of the foreskin from the penis in a clinic or hospital, not during initiation. Other terms that might be understood are 'soenat'*		
	Yes		*If 'yes, go to K2*
	No		*If 'no', skip to L1*
	I don't know		

K2	How long ago did you have a medical male circumcision?	
	____years_____months_____days	

K3	Why did you have a medical male circumcision? *(Choose as many as applicable)*	
	To protect myself from HIV	
	To help keep myself clean	
	Because of the way it looks	
	Because women like it	
	Other	

L1	If you were put on TB treatment (medicine) while in prison, and then released, how likely would you be to go to a clinic to get more treatment and then complete your treatment?	
	Very likely	
	Likely	
	Not likely	
	I don't know	

L2	If you were diagnosed as HIV positive and put on antiretrovirals (ARVs) (medicine for HIV) while in prison, and then released, how likely would you be to go to a clinic to get more treatment?	
	Very likely	
	Likely	
	Not likely	
	I don't know	

L3	Inside prison, **and within the last month**, have you ever shared a razor blade (shaving or hair cut)?	
	Yes	
	No	
	I don't know	

L5	At the moment, are new razors easy to get while in prison?	
	Yes	
	No	
	Sometimes	
	I don't know	

L6	Inside prison, **and within the last month**, have you ever been tattooed with a tool someone else has used?		
	Yes		
	No		
	I don't know		

L7	At the moment, are clean tools for tattooing easy to get while in prison?		
	Yes		
	No		
	Sometimes		
	I don't know		

L8	A Kick TB/HIV activation is an event in prison where people in red overalls talk to you about TB and HIV and kick a soccer ball with the symptoms of TB on it into a goalpost. Have you attended a Kick TB/HIV activation while in prison?		
	Yes		*If 'yes', go to L9*
	No		*'If 'no', go to L10*
	I don't know		*If 'I don't know', go to L10*

L9	About how long ago did you last attend a Kick TB/HIV activation?	----years---- months---- days

L10	Have any fellow inmates, called peer educators, who have been specially trained on TB and HIV, given you information and talked to you about TB and HIV?		
	Yes		*If 'yes', go to L11*
	No		*'If 'no', go to solo section*
	I don't know		*If 'I don't know', go to*

		solo section

L11	How long ago did you last speak to a peer educator about TB or HIV?	---years---- months--- days

I am now going to ask you to complete a section on your own. This is so that no one will know what you have answered. This section is private because we are going to ask you questions about things that may be illegal or difficult to talk about. Remember that this questionnaire is confidential and anonymous. No one will know what you have answered.

However if you would like any help with the questions, please let me know. And if you feel uncomfortable at any point, let me know.

HAND OVER TABLET

	Is Jacob Zuma the president of South Africa?	
	Yes	
	No	
	I don't know	

	How likely is it that you will play soccer for Bafana Bafana?	
	Very likely	
	Likely	
	Not likely	
	I don't know	

Hello! Thank you again for helping us with this research.

This section will ask you about sexual activities in prison. We understand that it is difficult to talk about this, but we need to know what is happening in order to provide the right kind of health services. Please answer as honestly as you can. Your answers are anonymous and confidential.

F3	If you were diagnosed with TB would you tell your cellmates?	
	Yes	
	No	
	I'm not sure	

F4	If you were diagnosed with TB would you tell your family?	
	Yes	
	No	
	I'm not sure	

J6	If you were diagnosed with HIV would you tell your cellmates?	
	Yes	
	No	
	I'm not sure	

J7	If you were diagnosed with HIV would you tell your family?	
	Yes	
	No	
	I'm not sure	

M1	While in prison, and within the last month, have you ever had consensual sex, (that means sex where you both agree to it),either with an inmate or a staff member or a visitor?	
	Yes	
	No	
	I don't know	

M2	Do you think condoms are usually used during sex in prison?	
	Yes	
	No	
	I don't know	

M3	If you had sex in prison within the last month, did you use a condom?	
	Yes	
	No	
	I don't know	
	The question doesn't apply to me	

M4	Do some prisoners provide sex to others in exchange for money, things or services (like protection)?	
	Yes, often	
	Yes, sometimes	
	No	
	I don't know	

M5	Within the last month in prison, have you paid or accepted money, things or services for sex?	
	Yes	
	No	
	I don't know	

M6	While in prison, have you ever heard about or witnessed rape (sex which someone didn't want and which was forced)?	
	Yes	
	No	
	I don't know	

M7	While in prison, have you **ever** been forced to have sex?	
	Yes	
	No	
	I don't know	

M8	**Within the last month**, have you been forced to have sex?	
	Yes	
	No	
	I don't know	

M9	While in prison, have you **ever** forced someone else to have sex?	
	Yes	
	No	
	I don't know	

M10	**Within the last month**, have you forced someone else to have sex?	
	Yes	
	No	
	I don't know	

K16	At the moment, are condoms easy to get while you are in prison?	
	Yes	
	No	
	Sometimes	
	I don't know	

K17	Lubricant is also called 'lube' or 'gou glip' and is used to make the genitals (penis, vagina or bum) wet during sex. At the moment, is lubricant easy to get while you are in prison?	
	Yes	
	No	
	Sometimes	
	I don't know	

L1	How likely is it that you will use a condom the next time you have sex in prison?	
	Very likely	
	Likely	
	Not likely	
	I don't know	
	The question doesn't apply to me	

Thanks for answering that. The next section is about injecting drugs. Our question are about drugs that are injected with a needle and syringe, not drugs that are smoked or snorted / inhaled.

M11	According to you, how many prisoners are <u>injecting</u> drugs in this prison?	
	None	
	A few	
	Many	
	I don't know	

K10	Have you ever injected drugs in prison?		
	Yes		*If yes, go to K11*
	No		*If no, go to*
	I don't know		*If I don't know, go to*

K11	**Within the last month**, have you injected drugs in prison?	
	Yes	
	No	
	I don't know	

K12	While in prison, have you **ever** shared needles or syringes with someone else?	
	Always	
	Sometimes	
	Never	

K13	**Within the last month**, have you shared needles or syringes with someone else?	
	Always	
	Sometimes	
	Never	

K14	At the moment, are clean needles for injecting drugs easy to get while in prison?	
	Yes	
	No	
	Sometimes	
	I don't know	

Thanks for answering those questions. The last few questions are about health services and your HIV status.

K15	If you needed the help of a nurse or doctor, do you think you would be able to see one in prison?	
	Yes	
	No	
	Sometimes	
	I don't know	

I5	Are you HIV positive?		
	Yes		*If 'yes', go to I6*
	No		*if 'no', go to end*
	I don't know		*If 'I don't know', go to end*
	I don't want to say		*If 'I don't want to say', go to I6*

I6	Are you on antiretroviral treatment? Antiretroviral treatment is medicine for HIV.		
	Yes		*If 'yes', go to I7*
	No		*if 'no', go to end*
	I don't know		*If 'I don't know', go to end*

I7	Was your treatment for HIV interrupted because you came to prison or during your stay in prison?	
	Yes	
	No	
	I don't know	

Well done! You've made it to the end! We really appreciate the time you've taken to assist us. Please hand the tablet back to your interviewer.

Appendix 3: Afrikaans questionnaire

Hallo! Dankie dat jy ingestem het om hierdie vraelys te voltooi om ons met ons navorsing te help. Die doel is om uit te vind wat jy van TB en MIV weet, en hoe hierdie kennis dit wat jy doen, beïnvloed.

Ek gaan die meeste van die vrae in die vraelys vir jou vra, en vir jou wys hoe die tablet werk. By die laaste afdeling, wat vrae oor sensitiewe sake vra, sal ek die tablet vir jou gee, sodat jy daardie afdeling op jou eie kan voltooi.

Indien enigiets wat ek vir jou vra onduidelik is, sê asseblief vir my en ek sal my bes doen om dit op te klaar. Indien enige van die vrae in die vraelys jou ongemaklik laat voel, sê asseblief vir my, dan beweeg ons na die volgende vraag.

Die doel van hierdie afdeling is om vir jou 'n unieke kode te skep, maar niemand sal die kode kan gebruik om jou te identifiseer nie. Hierdie kode gaan dieselfde bly vir die tweede vraelys wat jy gaan voltooi. Op hierdie manier sal ons jou eerste vraelys aan jou tweede een kan koppel, sonder dat ons weet wie elke vraelys ingevul het.

A1	Wat is die laaste twee letters van jou ma se voornaam? (If mother unknown, ask for grandmother, if grandmother unknown, primary caretaker during childhood)	
A2	Wat is die laaste twee letters van jou geboorteplek (stad of dorp) se naam?	
A3	Hoeveel jaar oud was jy toe jy die eerste keer tronk toe gegaan het?	
A4	Hoeveel susters het jy?	

Dankie! Die volgende afdeling gaan ons help om 'n bietjie agtergrondinligting oor jou in te samel.

B1	Hoe oud is jy (in jare)?	

B2	Onder watter ras val jy?	
	African	
	White	
	Coloured	
	Indian/Asian	
	Other	

B3	Wat is die hoogste skoolstanderd of vlak van onderwys wat jy deurgekom het?	
	Graad 7 of laer (standerd 5 of laer)	
	Tussen graad 8 en graad 11 (tussen standerd 6 en standerd 9)	
	Graad 12 (matriek)	
	Tersiêre onderrig (universiteit, VOO-kollege, technikon)	

B4	Voor jy tronk toe gestuur is, het jy ...?	
	voltyds gewerk	
	deeltyds gewerk	
	sonder werk gesit	
	in die informele sektor gewerk (stukwerk, los werk, goedere verkoop)	

C1	Is dit die eerste keer wat jy gevangenisstraf kry (tronk toe gestuur word)?		
	Ja		*If Ja, skip to B3*
	Nee		*If no, continue with B2*

C2	Hoeveel keer is jy al tronk toe gestuur?	

C3	Hoeveel gevangenisstraf het jy hierdie keer gekry (hoe lank is jy tronk toe gestuur)?
	--- years ----months ----days

Dankie dat jy die afdeling oor jou inligting voltooi het. Die volgende afdeling gaan oor die siekte tuberkulose, oftewel TB. Ons gaan vrae oor jou kennis van TB, jou mening daaroor en hoe jy dit gewoonlik hanteer vra. Ons gaan jou eers uitvra oor jou mediese geskiedenis wat tuberkulose betref.

D1	Het jy op die oomblik TB?		
	Ja		*If 'Ja', go to D2*
	No		*If 'no', go to D3*
	Ek weet nie		*If 'If Ek weet nie', go to D3*

D2	Ontvang jy behandeling (medikasie) vir TB?	
	Ja	
	No	
	Ek weet nie	

D3	Het jy al voorheen TB gehad?		
	Ja		
	No		*If No, skip to E1*
	Ek weet nie		*f Ek weet nie, skip to E1*

D4	Hoe lank gelede het jy TB gehad?	
	--------- years ----------months --------days	

D5	Het jy jou behandeling vir TB voltooi (die medikasie opgebruik)?	
	Ja	
	No	
	Ek weet nie	

D6	Is jou TB-behandeling onderbreek omdat jy tronk toe gestuur is, of omdat jy in die tronk is?	
	Ja	
	No	
	Ek weet nie	

Mooi so! Nou gaan ons kyk wat jy oor die siekte tuberkulose of TB weet en wat jy daaromtrent glo.

E1	Watter van die volgende is 'n teken of simptoom van TB? (Jy kan meer as een kies)	
	Gewig verloor / maer word	
	Diarree / los stoelgange / loopmaag	
	Hoes vir langer as twee weke	
	Jeukerigheid	
	Branderigheid wanneer jy urineer/pis	
	Ingegroeide vingernaels	
	Oormatige sweet snags	
	Braking / opgooi	
	Koors / hoë temperatuur	

E2	Hoe doen 'n mens TB op? (Jy kan meer as een kies)	
	Deur iemand se hand te skud	
	Asem dit in wanneer iemand hoes of nies	
	Deur dieselfde eetgerei te deel	
	Deur aan voorwerpe in openbare plekke (deurknoppe, handvatsels in busse, treine, ens.) te vat	
	Deur bose geeste of toordery	
	Ek weet nie	

E3	Hoe kan iemand keer dat hy TB opdoen? (Jy kan meer as een kies)	
	Moenie met die hand groet nie	
	Bedek jou mond en neus wanneer jy hoes of nies	
	Moenie eetgerei met ander deel nie	
	Was hande nadat jy aan voorwerpe in openbare plekke geraak het	
	Maak jou huis se vensters toe	
	Eet gesond	
	Bid	
	Ek weet nie	
	Iets anders	

E4	Kan TB genees word?		
	Ja		*If 'Ja', go to E5*
	No		*If 'no' go to F1*
	Ek weet nie		*If 'Ek weet nie' go to F1*

E5	Hoe kan iemand met TB gesond gemaak word? (Jy kan meer as een kies)	
	Kruiemiddels	
	Sterk tuis aan sonder medisyne	
	Bid	
	Gebruik die voorgeskrewe TB-medisyne totdat dit op is	
	Ek weet nie	
	Iets anders	

F1	As jy weet dat 'n winkelier of kosverkoper TB het, sal jy by hulle kos koop?	
	Ja	
	No	
	Ek's nie seker nie	

F2	Sal jy bereid wees om 'n familielid met TB te versorg?	
	Ja	
	No	
	Ek is nie seker nie	

G1	Hoe ernstige siekte reken jy is TB?	
	Baie ernstig	
	Ernstig	
	Nie ernstig nie	
	Ek weet nie	

G2	Hoe sal jy jou risiko om TB op te doen beskryf?	
	Hoë risiko	
	Medium risiko	
	Lae risiko	
	Geen risiko nie	
	Ek weet nie	

H1	Hoe dikwels was die vensters in julle sel die afgelope maand oop?	
	Altyd	
	Dikwels	
	Partykeer	
	Nooit nie	

H2	Hoeveel uur per dag het jy die afgelope maand in die buitelug deurgebring terwyl jy in die tronk was?	

H3	Hoeveel keer per dag het jy die afgelope maand gerook terwyl jy in die tronk was?	

H4	As jy TB-simptome kry, wanneer sal jy vra om na die tronk se kliniek te gaan om 'n dokter of verpleegster te spreek?	
	Wanneer my eie behandeling nie werk nie	
	Wanneer simptome wat na TB lyk 3-4 weke lank aanhou	
	Sodra ek besef dat my simptome TB-verwant kan wees	
	Ek sal nie vra om na die tronk se kliniek te gaan, of 'n dokter of verpleegster spreek nie	

Jy het nou die afdeling oor tuberkulose voltooi, en trek omtrent halfpad deur die vraelys. Druk deur! Jou insette is vir ons belangrik en kan help om dienste te verbeter!

Die volgende afdeling gaan oor MIV, oftewel Menslike Immuniteitsgebreksvirus. Die eerste deel van die afdeling vra uit oor jou mediese geskiedenis ten opsigte van MIV. Ek gaan nie nou vra wat jou MIV-status is nie, maar daar is 'n vraag oor jou MIV-status in die afdeling van die vraelys wat jy op jou eie gaan voltooi.

I1	Is jy al in die tronk vir MIV getoets?		
	Ja		*If 'Ja', go to I2*
	No		*If 'no' go to I4*
	Ek weet nie		*If 'Ek weet nie', go to I4*

I2	Hoe lank gelede is jy die laaste keer in die tronk vir MIV getoets?	__years__ _months_ __days

I3	Hoeveel keer is jy al in die tronk vir MIV getoets?	

I4	Is jy al buite die tronk vir MIV getoets?	
	Ja	
	No	
	Ek weet nie	

Uitstekend! Jou mediese geskiedenis is nou afgehandel. Die volgende afdeling ondersoek hoeveel jy van MIV weet en wat jy daaromtrent glo.

J1	Op watter van die volgende maniere kan MIV oorgedra word van iemand af wat MIV-positief is? (Jy kan meer as een kies)	
	deur vaginale seks sonder 'n kondoom (seks in die vagina)	
	deur anale seks sonder 'n kondoom (seks in die hol)	
	deur orale seks sonder 'n kondoom (seks in die mond)	
	deur aan 'n toiletsitplek te raak	
	deur uit 'n MIV-positiewe persoon se glas te drink	
	deur te soen	
	deur 'n muskietbyt	
	deur jou met 'n gebruikte spuitnaald in te spuit	
	deur skeermeslemmetjies en tandeborsels te deel	
	deur met dieselfde naald te tatoeër	
	deur bloed in bloedbroer-rituele te meng	
	deur hand te skud	
	deur borsvoeding	
	oordrag van moeder na kind tydens swangerskap en geboorte	

J2	Hoe kan jy jouself teen MIV beskerm? (Jy kan meer as een kies)	
	Deur elke keer 'n kondoom te dra as jy seks het	
	Deur nie kos te deel met iemand wat MIV het nie	
	Deur mediese manlike besnydenis te ondergaan	
	Deur nie hand te skud met iemand wat MIV het nie	
	Ek weet nie	

J3	Kan VIGS/MIV genees word?	
	Ja	
	No	
	Ek weet nie	

J4	As jy weet dat 'n winkelier of kosverkoper MIV het, sal jy by hulle kos koop?	
	Ja	
	No	
	Ek is nie seker nie	

J5	Sal jy bereid wees om 'n familielid met MIV te versorg?	
	Ja	
	No	
	Ek is nie seker nie	

J10	Hoe ernstige siekte reken jy is MIV?	
	Very serious	
	Serious	
	Not serious	
	Ek weet nie	

J11	Hoe sal jy jou eie risiko om MIV op te doen beskryf?	
	High risk	
	Medium risk	
	Low risk	
	No risk	
	Ek weet nie	

K1	Het jy al mediese manlike besnydenis ondergaan? *Explain that that is the removal of the foreskin from the penis in a clinic or hospital, not during initiation. Other terms that might be understood are 'soenat'*		
	Ja		*If 'Ja, go to K2*
	No		*If 'no', skip to L1*
	Ek weet nie		

K2	Hoe lank gelede het jy 'n mediese manlike besnydenis ondergaan?	
	_____years_____months_____days	

K3	Hoekom het jy 'n mediese manlike besnydenis ondergaan? *(Choose as many as applicable)*	
	Om myself teen MIV te beskerm	
	Om myself skoon te help hou	
	Oor hoe dit lyk	
	Want vroue hou daarvan	
	Ander	

Amper klaar! Hierdie afdeling is kort

L1	As jy TB-behandeling (medisyne) in die tronk ontvang en dan vrygelaat word, hoe waarskynlik sal jy na 'n kliniek toe gaan om verdere behandeling te kry en jou behandeling te voltooi?	
	Baie waarskynlik	
	Waarskynlik	
	Waarskynlik nie	
	Ek weet nie	

L2	As jy as MIV-positief gediagnoseer word en antiretrovirale middels (ARV's) (MIV-medisyne) in die tronk ontvang en dan vrygelaat word, hoe waarskynlik sal jy na 'n kliniek toe gaan om verdere behandeling te kry?	
	Baie waarskynlik	
	Waarskynlik	
	Nie waarskynlik	
	Ek weet nie	

L3	Het jy **die afgelope maand** in die tronk ooit 'n skeermeslemmetjie met iemand gedeel (om te skeer of hare te sny)?	
	Ja	
	No	
	Ek weet nie	

L5	Is dit op die oomblik maklik om nuwe lemmetjies in die tronk te kry?	
	Ja	
	No	
	Partykeer	
	Ek weet nie	

L6	Is jy **die afgelope maand** in die tronk ooit met dieselfde gereedskapstuk as iemand anders getatoeër?	
	Ja	
	Nee	
	Ek weet nie	

L7	Is dit op die oomblik maklik om skoon gereedskap vir tatoeërwerk in die tronk te kry?	
	Ja	
	Nee	
	Partykeer	
	Ek weet nie	

L8	'n "Kick TB/HIV"-bekendstelling is 'n geleentheid in die tronk wanneer mense met rooi oorpakke met jou praat oor TB en MIV, en 'n sokkerbal met die TB-simptome daarop na 'n doelhok toe skop. Het jy al 'n "Kick TB/HIV"-bekendstelling in die tronk bygewoon?		
	Ja		*If 'Ja', go to L9*
	Nee		*'If 'Nee', go to L10*
	Ek weet nie		*If 'Ek weet nie', go to L10*

L9	Omtrent hoe lank gelede het jy laas 'n "Kick TB/HIV"-bekendstelling bygewoon?	

L10	Het enige medegevangenes bekend as portuurvoorligters, wat spesiaal in TB en MIV opgelei is, vir jou inligting oor TB en MIV gegee en met jou daaroor gesels?		
	Ja		*If 'Ja', go to L11*
	Nee		*'If 'no', go to solo section*
	Ek weet nie		*If 'Ek weet nie', go to solo section*

L11	Omtrent hoe lank gelede het jy laas met 'n portuurvoorligter oor TB en HIV gesels?	

Ek gaan jou nou vra om 'n afdeling op jou eie te voltooi. Die rede is sodat niemand kan weet wat jy geantwoord het nie. Hierdie afdeling is privaat, want ons gaan vir jou vrae vra oor sake wat onwettig of moeilik kan wees om oor te praat. Onthou, hierdie vraelys is vertroulik en anoniem. Niemand sal weet wat jy geantwoord het nie.

Jy kan my wel vra om jou te help as jy vashaak met enige van die vrae. En as jy op enige tydstip ongemaklik voel, sê vir my.

HAND OVER TABLET

Hallo! Dankie weer eens dat jy ons met hierdie navorsing help.

Hierdie afdeling vra jou uit oor jou seksuele aktiwiteite in die tronk. Ons weet dit is moeilik om oor sulke goed te praat, maar ons moet weet wat gebeur sodat ons die regte soort gesondheidsdienste kan verskaf. Antwoord asseblief so eerlik soos wat jy kan. Jou antwoorde is anoniem en vertroulik.

	Is Jacob Zuma die president van Suid Afrika?	
	Ja	
	Nee	
	Ek weet nie	

	Is dit waarskynlike dat jy sokker vir Bafana Bafana gaan speel?	
	Baie waarskynlik	
	Waarskynlik	
	Nie waarskynlik	
	Ek weet nie	

F3	As TB by jou gediagnoseer word, sal jy vir jou selmaats sê?	
	Ja	
	No	
	Ek is nie seker nie	

F4	As TB by jou gediagnoseer word, sal jy vir jou familie sê?	
	Ja	
	No	
	Ek is nie seker nie	

J6	As MIV by jou gediagnoseer word, sal jy vir jou selmaats sê?	
	Ja	
	No	
	Ek is nie seker nie	

J7	As MIV by jou gediagnoseer word, sal jy vir jou familie sê?	
	Ja	
	No	
	Ek is nie seker nie	

M1	Het jy die afgelope maand, terwyl jy in die tronk was, ooit konsensuele seks (seks waar albei partye daartoe instem) gehad, hetsy met 'n gevangene, personeellid of 'n besoeker?	
	Ja	
	Nee	
	Ek weet nie	

M2	Dink jy kondome word gewoonlik tydens seks in die tronk gebruik?	
	Ja	
	Nee	
	Ek weet nie	

M3	As jy die afgelope maand seks in die tronk gehad het, het jy 'n kondoom gebruik?	
	Ja	
	Nee	
	Ek weet nie	
	Die vraag is nie op my van toepassing nie	

M4	Gee party gevangenes vir ander seks in ruil vir geld, goed of dienste (soos beskerming)?	
	Ja, dikwels	
	Ja, partykeer	
	Nee	
	Ek weet nie	

M5	Het jy die afgelope maand in die tronk geld, goed of dienste in ruil vir seks ontvang of betaal?	
	Ja	
	Nee	
	Ek weet nie	

M6	Het jy al ooit terwyl jy in die tronk was verkragting (seks waar een party onwillig was en geforseer is) sien gebeur of daarvan gehoor?	
	Ja	
	Nee	
	Ek weet nie	

M7	Is jy al **ooit** in die tronk gedwing om seks te hê?	
	Ja	
	Nee	
	Ek weet nie	

M8	Is jy **die afgelope maand** gedwing om seks te hê?	
	Ja	
	Nee	
	Ek weet nie	

M9	Het jy al **ooit** iemand anders in die tronk gedwing om seks te hê?	
	Ja	
	Nee	
	Ek weet nie	

M10	Het jy **die afgelope maand** iemand anders gedwing om seks te hê?	
	Ja	
	Nee	
	Ek weet nie	

K16	Is dit op die oomblik maklik om kondome in die tronk te kry?	
	Ja	
	Nee	
	Partykeer	
	Ek weet nie	

K17	Smeermiddel word ook 'lube' of 'gou glip' genoem en word gebruik om die geslagsdele (penis, vagina of hol) glad te maak tydens seks. Is dit op die oomblik maklik om smeermiddel in die tronk te kry?	
	Ja	
	Nee	
	Partykeer	
	Ek weet nie	

L1	Hoe waarskynlik is dit dat jy volgende keer 'n kondoom sal gebruik as jy seks in die tronk het?	
	Baie waarskynlik	
	Waarskynlik	
	Nie waarskynlik	
	Ek weet nie	
	Die vraag is nie op my van toepassing nie	

Dankie dat jy dit geantwoord het. Die volgende afdeling gaan oor die inspuit van dwelms. Ons vrae gaan oor dwelms wat met 'n spuitnaald ingespuit word, nie dwelms wat gerook, gesnuif of ingeasem word nie.

M11	Hoeveel gevangenes in hierdie tronk, reken jy, gebruik inspuitdwelms?	
	Geen	
	'n Paar	
	Baie	
	Ek weet nie	

K10	Het jy al ooit inspuitdwelms in die tronk gebruik?		
	Ja		*If Ja, go to K11*
	Nee		*If no, go to*
	Ek weet nie		*If Ek weet nie, go to*

K11	Het jy **die afgelope maand** inspuitdwelms in die tronk gebruik?	
	Ja	
	Nee	
	Ek weet nie	

K12	Het jy al **ooit** in die tronk naalde of spuite met iemand anders gedeel?	
	Altyd	
	Partykeer	
	Nooit nie	

K13	Het jy **die afgelope maand** naalde of spuite met iemand anders gedeel?	
	Always	
	Partykeer	
	Never	

K14	Is dit op die oomblik maklik om skoon naalde vir inspuitdwelms in die tronk te kry?	
	Ja	
	Nee	
	Partykeer	
	Ek weet nie	

Dankie dat jy daardie vrae geantwoord het. Die laaste paar vrae gaan oor gesondheidsdienste en jou MIV-status.

K15	As jy 'n dokter of verpleegster se dienste benodig, dink jy jy sal een in die tronk kan spreek?	
	Ja	
	Nee	
	Partykeer	
	Ek weet nie	

I5	Is jy MIV-positief?		
	Ja		*If 'Ja', go to I6*
	Nee		*if 'Nee', go to end*
	Ek weet nie		*If 'Ek weet nie', go to end*
	Ek wil nie sê nie		*If 'I don't want to say', go to I6*

I6	Ontvang jy antiretrovirale behandeling? Antiretrovirale behandeling is medisyne vir MIV.		
	Ja		*If 'Ja', go to I7*
	Nee		*if 'Nee', go to end*
	Ek weet nie		*If 'Ek weet nie', go to end*

I7	Is jou MIV-behandeling onderbreek omdat jy tronk toe gestuur is, of omdat jy in die tronk is?	
	Ja	
	Nee	
	Ek weet nie	

Mooi so! Jy het die vraelys voltooi! Ons waardeer regtig dat jy tyd afgestaan het om ons te help. Gee asseblief die tablet vir jou onderhoudvoerder terug.

Appendix 4: isiXhosa questionnaire

Molo! Enkosi ngokuvuma ukuncedisa kuphando lwethu ngokugcwalisa olu xwebhu lwemibuzo. Injongo yalo kukufumanisa izinto ozaziyo nge-TB ne-HIV nangendlela olu lwazi oluchaphazela ngayo izinto ozenzayo.

Ndizakukubuza uninzi lwale mibuzo ikuxwebhu kwaye ndikubonise indlela ithablethi esebenza ngayo. Kweli candela lokugqibela, eli libuza malunga nezinto ezinochuku, ndizakukunika le thablethi ukuze uligcwalise ngokwakho bucala ela candelo..

Ukuba unemibuzo onayo ngezinto endikubuza zona, nceda undazise ndakwenza konke endinako ukuyiphendula. Ukuba kukho nawuphi na umbuzo obuzwayo okwenza ungaphatheki kakuhle, nceda undazise siyakuthi sigqithele kumbuzo olandelayo..

Intsusa yeli candela kukudala ikhowudi ezakuba yeyakho wedwa, ibe ingavumeli nawuphi na omnye umntu akuchonge ukuba ungubani na. Le khowudi iyakuhlala ingatshintshi nakuxwebhu lwemibuzo lwesibini olugcwalisayo. Ngale ndlela siyakukwazi ukunxibelelanisa uxwebhu lwemibuzo lokuqala nolu lwakho lwesibini, ngaphandle kokwazi ukuba ngubani ogcwalise uxwebhu lwemibuzo ngalinye.

A1	Ngoobani aba nobumba bokugqibela babini kwigama likamamakho? (If mother unknown, ask for grandmother, if grandmother unknown, primary caretaker during childhood)	
A2	Ngoobani aba nobumba babini bokugqibela bale ndawo (idolophu okanye ilali) wawuzelelwe kuyo?	
A3	Ubuneminyaka emingaphi ukuya kwakho entolongweni okokuqala?	
A4	Bangaphi oodade wene? Quka bonke abantwana abangamantombazana abazalwa ngumama wakho, abaphilayo nabaswelekayo.	

Enkosi! Eli candela lilandelayo liza kusinceda siqokelele iinkcukacha ezingephi ngemvelaphi yakho.

B1	Mingaphi iminyaka yakho?	

B2	Ulohluphi uhlanga?	
	African	
	White	
	Coloured	
	Indian/Asian	
	Other	

B3	Leliphi elona banga lezemfundo liphakamileyo walipasayo esikolweni?	
	U-Grade 7 okanye ngaphantsi (ibanga lesi-5 okanye ngaphantsi)	
	Phakathi ko-grade 8 no-11 (phakathi kwebanga lesi-6 nebanga lesi-9)	
	U-Grade 12 (imatriki)	
	Imfundo ephakamileyo (eyunivesithi, kwi-FET college, etekhnikhoni)	

B4	Ngaphambi kokuba uvalelwe, ingaba wawu...?	
	Qeshwe ixesha elipheleleyo	
	Qeshwe ngamaxesha athile	
	Ngaqeshwanga	
	Qeshwe ngokungekho sesikweni (izingxungxu, ingqokelela yemisebenzi, uthengisa izinto)	

C1	Ingaba uyala ukuvalelwa entolongweni ?		
	Ewe		*If Ewe, skip to B3*
	Hayi		*If hayi, continue with B2*

C2	Uvalelwe amatyeli amangaphi?	

C3	Uvalelwe ixesha elingakanani kwesi isihlandlo?
	--- years ----months ----days

Enkosi ngokugcwalisa eli candela malunga nawe. Icandelo elilandelayo limalunga nesifo sephepha okanye i-TB. Siza kubuza imibuzo malunga nolwazi lwakho lwe-TB, izinto ozicingayo ngayo nendlela oqubisana ngayo nayo. Kuqala siza kubuza malunga nembali yakho yezempilo ngesifo sephepha.

D1	Ingaba une-TB ngoku?		
	Ewe		*If 'Ewe', go to D2*
	Hayi		*If 'Hayi', go to D3*
	Andazi		*If 'If Andazi', go to D3*

D2	Ingaba uthatha unyango (amayeza) lwe-TB?	
	Ewe	
	Hayi	
	Andazi	

D3	Ingaba wakhe wane-TB ngaphambili?		
	Ewe		
	Hayi		*If Hayi, skip to E1*
	Andazi		*f Andazi, skip to E1*

D4	Wagqibela nini ukubane-TB?	
	--------- years ----------months --------days	

D5	Walugqiba unyango (amayeza) lwakho lwe-TB?	
	Ewe	
	Hayi	
	Andazi	

D6	Ingaba unyango lwakho lwe-TB lwaphazamiseka kuba uye entolongweni okanye ngexesha owasuhleli ngalo entolongweni?	
	Ewe	
	Hayi	
	Andazi	

Kwakuhle! Ngoku siza kujonga izinto ozaziyo nokholelwa kuzo malunga nesifo sephepha okanye i-TB.

E1	Yeyiphi kwezi zinto eluphawu lwe-TB? (Ungakhetha ngaphezu kwenye)	
	Ukuhla emzimbeni / ukubhitya	
	Urhudo / utyatyazo / ukuhambisa	
	Ukukhohlela ngaphezu kweeveki ezimbini	
	Urhawuzelelo	
	Ukutshotshozela xa untsontsa	
	Iinzipho ezigobele enyameni	
	Ukubila kakhulu ebusuku	
	Ukugabha / ukukhupha	
	Ifiva / ubushushu	

E2	Umntu angayifumana njani i-TB? (Ungakhetha ngaphezu kwenye)	
	Ngokubambana izandla	
	Emoyeni xa umntu ekhohlela okanye ethimla	
	Ngokusebenzisa izitya ezinye	
	Ngokuphatha izinto kwiindawo zikawonke-wonke (iindawo zokuvula iingcango, iihendili zezothutho, njl.njl.)	
	Ngemimoya emibi okanye ngokuthathwa	
	Andazi	

E3	Umntu angayithinela njani i-TB? (Ungakhetha ngaphezu kwenye)	
	Phepha ukubambana ngezandla	
	Ngkugquma umlomo nempumlo xa ukhohlela okanye uthimla	
	Ngokuphepha ukusebenzisa izitya ezinye nabanye	
	Ngokuhlamba izandla emva kokuphatha izinto kwiindawo zikawonke-wonke	
	Ngokuvala iifestile ekhayeni	
	Ngokutya ngendlela elungileyo	
	Ngokuthandaza	
	Andazi	
	Enye into	

E4	Ingaba i-TB iyanyangeka?		
	Ewe		*If 'Ewe', go to E5*
	Hayi		*If 'Hayi' go to F1*
	Andazi		*If 'Andazi' go to F1*

E5	Anganyangwa njani umntu one-TB? (Ungakhetha phezu kwenye)	
	Ngamachiza esintu	
	Ngokuphumla ekhaya ngaphandle kwamayeza	
	Ngokuthandaza	
	Ngokuthatha amachiza e-TB ngeli xesha liyalelweyo lonyango	
	Andazi	
	Ngenye into	

F1	Ukuba ubusazi ukuba unovenkile okanye umntu othengisa ukutya une-TB, ubungathenga ukutya kuye?	
	Ewe	
	Hayi	
	Andiqinisekanga	

F2	Ungavuma ukunakekela ilungu losapho eline-TB?	
	Ewe	
	Hayi	
	Andiqinisekanga	

G1	Ngokokubona kwakho, i-TB sisifo esimandundu kangakanani?	
	Simandundu kakhulu	
	Simandundu	
	Asikho mandundu	
	Andazi	

G2	Ungawuchaza njani umngcipheko okuwo wokufumana i-TB?	
	Ngumngcipheko ophakamileyo	
	Ngumngcipheko ophakathi	
	Ngumngcipheko ophantsi	
	Andikho semngciphekweni	
	Andazi	

H1	Kule nyanga idlulileyo, bezivulwe kaninzi kangakanani iifestile zeseli yakho?	
	Rhoqo	
	Kaninzi	
	Ngamanye amaxesha	
	Akhange zivulwe	

H2	Kule nyanga idlulileyo, zingaphi iiyure ozichithe phandle ngemini ngeli xa usentolongweni?	

H3	Kule nyanga idlulileyo, malunga neesigarethi ezingaphi ozitshayileyo ngemini entolongweni?	

H4	Ukuba ubuneempawu ze-TB, ungacela xa kutheni ukuya kwikliniki yasentolongweni okanye ukuya kubona ugqirha okanye umongi?	
	Xa ukuzinyanga ngokwam kungasebenzi	
	Xa iimpawu ezifana nemifuziselo ye-TB zihlala iiveki ezi-3-4	
	Nje ndakuphawula ukuba iimpawu zam zifana neze-TB	
	Andisayi kucela ukuya kwikliniki yasentolongweni okanye ukuya kubona ugqirha okanye umongi	

Ngoku uligqibile eli candela malunga nesifo sephepha kwaye usigqibile isiqingatha solu xwebhu lwemibuzo. Qhubeka! Iimbono zakho zibalulekile kuthi kwaye zingasinceda siphucule iinkonzo!

Eli candelo lilandelayo limalunga ne-HIV okanye i-human immunodeficiency virus. Le ndawo yokuqala kweli candela iza kukubuza ngembali yezonyango yakho mayelana ne-HIV. Andizukukubuza ngesimo sakho se-HIV ngoku, kodwa uzakubakho umbuzo wakho malunga nesimo sakho se-HIV kweli candela loxwebhu lwemibuzo ozakulugcwalisa bucala.

I1	Ingaba ukhe wenziwa uvavanyo lwe-HIV ngeli xa usentolongweni?		
	Ewe		*If 'Ewe', go to I2*
	Hayi		*If 'Hayi' go to I4*
	Andazi		*If 'Andazi', go to I4*

I2	Malunga nexesha elingakanani ukugqibela kwakho ukuvavanyelwa i-HIV entolongweni?	__years__months__days

I3	Uvavanyelwe i-HIV izihlandlo ezingaphi entolongweni?	

I4	Ingaba ukhe wavavanyelwa i-HIV ngeli xa uphumile entolongweni?		
	Ewe		
	Hayi		
	Andazi		

Kwakuhle! Uyigqibile imbali yakho yezempilo. Eli candelo lilandelayo lijonga izinto ozaziyo nokholelwa kuzo malunga ne-HIV.

J1	Ngeziphi kwezi ndlela zilandelayo ekunokugqithiselwa ngayo i-HIV ukusuka kumntu onalentsholongwane? (Ungakhetha ngaphezu kwenye)	
	ngokwabelana ngesondo ungenwa "kusisi" ngaphandle kwekhondom (ukwabelana ngesondo ekukwini)	
	Ngokwabelana ngesondo ungenwa ezimpundwini ngaphandle kwekhondom (ukwabelana ngesondo ezimpundwini)	
	Ngokwabelana ngesondo ungenwa emlomyeni ngaphandle kwekhondom (ukwabelana ngesondo emlonyeni)	
	Ngokubamba isithi yethoyilethi	
	Ngokusela kwiglasi yomntu one-HIV	
	ngokuphuzana	
	ngokulunywa yingcongconi	
	ngokuncuntswa ngenali esebenzileyo	
	Ngokwabelana ngeebhleyidi nangeebrashi zamazinyo	
	Ngokwenza iithathu ngenaliti enye	
	ngokwabelana ngegazi kwizithethe zoosaluka/zobudlelwane	
	Ngokubambana izandla	
	ngokuncancisa	
	ukusukela kunina ukuya elusaneni ngexesha lokuthwala nelokubeleka	

J2	Ungazikhusela njani kwi-HIV? (Ungakhetha ngaphezu kwenye)	
	Ngokunxiba ikhondom rhoqo usabelana ngesondo	
	Ngokungabelani ngokutya nomntu one-HIV	
	Ngokoluswa esibhedlele	
	Ngokungambambi isandla umntu one-HIV	
	Andazi	

J3	Ingaba i-AIDS/i-HIV iyanyangeka?	
	Ewe	
	Hayi	
	Andazi	

J4	Ukuba ubusazi ukuba unovenkile okanye umntu othengisa ukutya une-HIV, ubungathenga ukutya kuye?	
	Ewe	
	Hayi	
	Andiqinisekanga	

J5	Ungavuma ukunakekela ilungu losapho eline-HIV?	
	Ewe	
	Hayi	
	Andiqinisekanga	

J10	Ngokokubona kwakho, i-HIV sisifo esimandundu kangakanani?	
	Simandundu kakhulu	
	Simandundu	
	Asikho mandundu	
	Andazi	

J11	Ungawuchaza njani umngcipheko okuwo wokufumana i-HIV?	
	Ngumngcipheko ophakamileyo	
	Ngumngcipheko ophakathi	
	Ngumngcipheko ophantsi	
	Andikho semngciphekweni	
	Andazi	

K1	Wakhe woluswa esibhedlele? *Explain that that is the removal of the foreskin from the penis in a clinic or hospital, not during initiation. Other terms that might be understood are 'soenat'*		
	Ewe		*If 'Ewe, go to K2*
	Hayi		*If 'Hayi', skip to L1*
	Andazi		

K2	Kwakunini ngoko ukoluswa kwakho esibhedlele?	
	____years_____months_____days	

K3	Kwakutheni ukuze wolukele esibhedlele? *(Choose as many as applicable)*	
	Ukuzikhusela kwi-HIV	
	Ukuzinceda ndihlale ndicocekile	
	Ngenxa yendlela okukhangeleka ngayo	
	Kuba amadoda ayakuthanda	
	Okunye	

Sowuzakugqiba! Eli candelo lifutshane

L1	Ukuba ufakwe kunyango lwe-TB (amayeza) ngeli xa usentolongweni, waza wakhutshwa, ingafane yenzeke kangakanani into yokuba uye ekliniki ukuze ufumane olunye unyango uze ugqibe unyango lwakho?	
	Ingafane yenzeka kakhulu	
	Ingafane yenzeke	
	Ayingefani yenzeke	
	Andazi	

L2	Ukuba ubuxilongiwe wafunyaniswa une-HIV waza wafakwa kwii-antiretrovirals (ARVs) (iyeza le-HIV) ngeli xa usentolongweni, waza wakhutshwa, ingafane yenzeke kangakanani into yokuba uye ekliniki ukuze ufumane olunye unyango?	
	Ingafane yenzeka kakhulu	
	Ingafane yenzeke	
	Ayingefani yenzeke	
	Andazi	

L3	Ngaphakathi entolongweni, **naphakathi kule nyanga idlulileyo**, ingaba ukhe wasebenzisa ibhleyidi enye nomnye umntu (usheva okanye ucheba)?	
	Ewe	
	Hayi	
	Andazi	

L5	Ngoku, ingaba kulula ukufumana ibhleyidi entsha ngeli xa usentolongweni?	
	Ewe	
	Hayi	
	Ngamanye amaxesha	
	Andazi	

L6	Ngaphakathi entolongweni, **naphakathi kule nyanga idlulileyo**, ingaba ukhe wenza iithathu ngesixhobo esisetyenziswe ngomnye umntu?	
	Ewe	
	Hayi	
	Andazi	

L7	Ngoku ingaba izixhobo ezicocekile zokwenza iithathu ziyafumaneka entolongweni?	
	Ewe	
	Hayi	
	Ngamanye amaxesha	
	Andazi	

L8	Iphulo loKukhabela Pha i-TB/i-HIV ngumcimbi wasentolongweni apho abantu abanxibe ii-ovarolo ezibomvu bethetha nawe malunga ne-TB ne-HIV kuze kukhatywe ibhola yesoka eneempawu ze-TB ingeniswe ezipalini zokuskora. Wakhe waye kumcimbi woKukhabela Pha i-TB/i-HIV ngeli xa usentolongweni?		
	Ewe		*If 'Ewe', go to L9*
	Hayi		*'If 'Hayi', go to L10*
	Andazi		*If 'Andazi', go to L10*

L9	Malunga nexesha elingakanani wagqibela ukuya kwiphulo loKukhabela Pha i-TB/i-HIV?	----years---- months---- days

L10	Ingaba kuye kwakho oogxa bakho basentolongweni, ekuthiwa zii-peer educators, nabaqeqeshwe ngokukodwa malunga ne-TB ne-HIV, baye bakunika ulwazi malunga ne-TB ne-HIV?		
	Ewe		*If 'Ewe', go to L11*
	Hayi		*'If 'Hayi', go to solo section*
	Andazi		*If 'Andazi', go to solo section*

L11	Wagqibela nini ukuthetha ne-peer educator malunga ne-TB ne-HIV?	---years----months---days

Ngoku ndizakukucela ukuba ugcwalise icandelo ngokwakho. Oku kwenzelwa ukuba kungabikho mntu waziyo ukuba uphendule wathini. Eli candelo lelabucala kuba sizakubuza imibuzo malunga nezinto ezisenokungabikho semthethweni okanye ekunganzima ukuthetha ngazo. Khumbula ukuba olu xwebhu lwemibuzo lungayimfihlelo kwaye kungafakwa gama lamntu. Akukho mntu uyakukwazi ukuba uphendule wathini na.

Kodwa ukuba ufuna ukuncedwa ngale mibuzo, nceda undixelele. Kwaye ukuba uziva ungaphathekanga kakuhle nanini na, ndichazele.

HAND OVER TABLET

Molo! Enkosi kwakhona ngokusinceda ngoluphando.

Eli candela lizakukubuza malunga nezinto ezenziwayo zokwabelana ngesondo entolongweni. Siyayiqonda into yokuba kunzima ukuthetha malunga noku, kodwa siding ukwazi ukuba kwenzeka ntoni ukuze sinikezele ngohlobo lweenkonzo ezichanekileyo zezempilo. Nceda uphendule ngokunyaniseka kangangoko. Iimpendulo zakho azizukuba namagama lakho kwaye zizakuba yimfihlelo.

	Ingaba u Jacob Zuma ngumongameli welizwe laseMzantsi Afrika?	
	Ewe	
	Hayi	
	Andazi	

	Ingafane yenzeke kangakanani into yokuba udlalele iqela lesoka le bafana-bafana?	
	Akakho	
	Ambalwa	
	Maninzi	
	Andazi	

F3	Ukuba uxilongiwe wafunyaniswa une-TB ungabaxelela oogxa bakho baseseleni?	
	Ewe	
	Hayi	
	Andiqinisekanga	

F4	Ukuba uxilongiwe wafunyaniswa une-TB ungaluxelela usapho lwakho?	
	Ewe	
	Hayi	
	Andiqinisekanga	

J6	Ukuba uxilongiwe wafunyaniswa une-HIV ungabaxelela oogxa bakho baseseleni?	
	Ewe	
	Hayi	
	Andiqinisekanga	

J7	Ukuba uxilongiwe wafunyaniswa une-HIV ungaluxelela usapho lwakho?	
	Ewe	
	Hayi	
	Andiqinisekanga	

M1	Ngeli xa usentolongweni, kule nyanga idlulileyo, ingaba ukhe wabelana ngesondo ngemvumelwano, (oku kuthetha ukuba nobabini niye navumela ukwenza oku), nokuba nelinye ibanjwa okanye nomsebenzi okanye nomndwendweli?	
	Ewe	
	Hayi	
	Andazi	

M2	Ucinga ukuba iikhondom ziye zisetyenziswe xa kusabelwana ngesondo entolongweni?	
	Ewe	
	Hayi	
	Andazi	

M3	Ukuba uye wabelana ngesondo entolongweni kule nyanga idlulileyo, ingaba uye wasebenzisa ikhondom?	
	Ewe	
	Hayi	
	Andazi	
	Lo mbuzo awubhekisi kum	

M4	Ingaba amanye amabanjwa anikezela ngemizimba yabo kwamanye ukuze afumane imali, izinto okanye iinkonzo (njengokukhuselwa)?	
	Ewe, kaninzi	
	Ewe, ngamanye amaxesha	
	Hayi	
	Andazi	

M5	Kule nyanga idlulileyo entolongweni, ingaba uye wabhatala okanye wafumana imali, izinto okanye iinkonzo ngokwabelana ngesondo?	
	Ewe	
	Hayi	
	Andazi	

M6	Ngeli xa usentolongweni, wakhe weva malunga nodlwengulo okanye walubona lusenzeka (ukwabelana ngesondo abe omnye engafuni kwaye enyanzeliswa)?	
	Ewe	
	Hayi	
	Andazi	

M7	Ngeli xa usentolongweni, **wakhe** wanyanzeliswa ukuba wabelane ngesondo?	
	Ewe	
	Hayi	
	Andazi	

M8	**Kule nyanga idlulileyo**, ukhe wanyanzeliswa ukuba wabelane ngesondo?	
	Ewe	
	Hayi	
	Andazi	

M9	Ngeli xa usentolongweni, **wakhe** wanyanzelisa omnye umntu ukuba abelane ngesondo?	
	Ewe	
	Hayi	
	Andazi	

M10	**Kule nyanga idlulileyo**, ukhe wanyanzelisa omnye umntu ukuba abelane ngesondo?	
	Ewe	
	Hayi	
	Andazi	

K16	Ngoku, ingaba iikhondom zifumaneka lula xa usentolongweni?	
	Ewe	
	Hayi	
	Ngamanye amaxesha	
	Andazi	

K17	Isityibilikisi (i-lubricant) kukwathiwa yi-'lube' okanye yi-'gou glip' kwaye sisetyenziselwa ukwenza kube manzi apha ngaphantsi (umthondo, ikuku okanye iimpundu) xa kusabelwana ngesondo. Ngoku kulula ukufumana i-lubricant xa usentolongweni?	
	Ewe	
	Hayi	
	Ngamanye amaxesha	
	Andazi	

L1	Ingafane yenzeke kanganani into yokuba usebenzise ikhondom xa usabelana ngesondo entolongweni?	
	Very likely	
	Likely	
	Not likely	
	Andazi	
	Lo mbuzo awubhekisi kum	

Enkosi ngokuphendula le mibuzo. Icandelo elilandelayo limalunga nokuzihlaba ngeziyobisi. Imibuzo yethu imalunga neziyobisi ezihlatywa ngenaliti nesirinji, asithethi ngeziyobisi ezitshaywayo okanye ezisezelwayo / zibizelwe ngomphefumlo.

M11	Ngokokubona kwakho, mangaphi amabanjwa azihlaba ngeziyobisi kule ntolongo?	
	Akakho	
	Ambalwa	
	Maninzi	
	Andanzi	

K10	Ingaba ukhe wazihlaba ngeziyobisi entolongweni?		
	Ewe		*If Ewe, go to K11*
	Hayi		*If Hayi, go to*
	Andazi		*If Andazi, go to*

K11	**Kule nyanga idlulileyo**, ukhe wazihlaba ngeziyobisi entolongweni?	
	Ewe	
	Hayi	
	Andazi	

K12	Ngeli xa usentolongweni, ingaba **wakhe** wabelana ngeenaliti okanye iisirinji nomnye umntu?	
	Rhoqo	
	Ngamanye amaxesha	
	Azange	

K13	**Kule nyanga idlulileyo**, ingaba uye wabelana ngeenaliti okanye iisirinji nomnye umntu?	
	Rhoqo	
	Ngamanye amaxesha	
	Azange	

K14	Ngoku, ingaba iinaliti ezicocekileyo zifumaneka lula xa usentolongweni?	
	Ewe	
	Hayi	
	Ngamanye amaxesha	
	Andazi	

Enkosi ngokuphendula la mibuzo. Le mibuzo imbalwa yokugqibela imalunga neenkonzo zezempilo kunye nesimo sakho se-HIV.

K15	Ukuba ubudinga uncedo lomongi okanye logqirha, ucinga ukuba ungakwazi ukuba bona entolongweni?	
	Ewe	
	Hayi	
	Ngamanye amaxesha	
	Andazi	

I5	Ingaba une-HIV?		
	Ewe		*If 'Ewe', go to I6*
	Hayi		*if 'Hayi', go to end*
	Andazi		*If 'Andazi', go to end*
	Andifun' ukutsho		*If 'I don't want to say', go to I6*

I6	Ingaba uthatha unyango lwee-antiretroviral (lokulwa intsholongwane)? Unyango ii-antiretroviral liyeza le-HIV.		
	Ewe		*If 'Ewe', go to I7*
	Hayi		*if 'Hayi', go to end*
	Andazi		*If 'Andazi', go to end*

I7	Ingaba unyango lwakho lwe-HIV luye lwaphazimiseka kuba uye waza entolongweni okanye ngexesha obuhleli ngalo entolongweni?	
	Ewe	
	Hayi	
	Andazi	

Wenze kakuhle! Ude wagqiba! Siyabulela nyani ngexesha olithathileyo ukuze uncedisane nathi. Ncede ubuyisele ithablethi kulo mntu owenza udliwano-ndlebe.

Appendix 5: Ethics approval from the University of the Western Cape

UNIVERSITY of the WESTERN CAPE

OFFICE OF THE DIRECTOR: RESEARCH
RESEARCH AND INNOVATION DIVISION

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

29 August 2016

Ms A Best
School of Public Health
Faculty of Community and Health Sciences

Ethics Reference Number HS 16/6/8

Project Title: An evaluation of the effectiveness of interventions to change the knowledge of attitudes towards and practices around TB and HIV of inmates in the Western and Eastern Cape of South Africa.

Approval Period: 24 August 2016 to 24 August 2017

I hereby certify that the Humanities and Social Science Research Ethics Committee of the University of the Western Cape approved the methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval. Please remember to submit a progress report in good time for annual renewal.

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

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

PROVISIONAL REC NUMBER - 130416-049

FROM HOPE TO ACTION THROUGH KNOWLEDGE

Appendix 6: Ethics approval from the Department of Correctional Services

correctional services
Department:
Correctional Services
REPUBLIC OF SOUTH AFRICA

Private Bag X136, PRETORIA, 0001 Poyntons Building, C/O WF Nkomo and Sophie De Bruyn Street, PRETORIA
Tel (012) 307 2770, Fax 086 539 2693

Ms AM Best
6 Minlu Court
37 Alexander Road
Muizenberg
7945

Dear Ms AM Best

RE: APPLICATION TO CONDUCT RESEARCH IN THE DEPARTMENT OF CORRECTIONAL SERVICES ON: "AN EVALUATION OF THE EFFECTIVENESS OF INTERVENTIONS TO CHANGE THE KNOWLEDGE OF, ATTITUDES TOWARDS AND PRACTICES AROUND, TB AND HIV OF INMATES IN THE WESTERN CAPE AND EASTERN CAPE OF SOUTH AFRICA"

It is with pleasure to inform you that your request to conduct research in the Department of Correctional Services on the above topic has been approved.

Your attention is drawn to the following:

- The researcher's internal guide is **Regional Head: Development and Care, Ms G Pienaar, Western Cape Region.**
- You are requested to contact her at telephone number (021) 550 6006 before the commencement of your research.
- It is your responsibility to make arrangements for your interviewing times.
- Your identity document and this approval letter should be in your possession when visiting.
- You are required to use the terminology used in the White Paper on Corrections in South Africa (February 2005) e.g. "Offenders" not "Prisoners" and "Correctional Centres" not "Prisons".
- You are not allowed to use photographic or video equipment during your visits, however the audio recorder is allowed.
- You are required to submit your final report to the Department for approval by the Commissioner of Correctional Services before publication (including presentation at workshops, conferences, seminars, etc) of the report.
- Should you have any enquiries regarding this process, please contact the Directorate Research for assistance at telephone number (012) 307 2770 / (012) 305 8554.

Thank you for your application and interest to conduct research in the Department of Correctional Services.

Yours faithfully

ND SIHLEZANA
DC: POLICY COORDINATION & RESEARCH
DATE: 19/12/2016