Uptake of HIV Testing: Assessing the impact of a Home-Based intervention in rural South Africa

Hanani Tabana
From DEPARTMENT OF PUBLIC HEALTH SCIENCES
Karolinska Institutet, Stockholm, Sweden

UPTAKE OF HIV TESTING:
ASSESSING THE IMPACT OF A HOME-BASED INTERVENTION
IN RURAL SOUTH AFRICA

Hanani Tabane

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TO MY NIECES AND NEPHEWS
ABSTRACT

Background: Despite the introduction of HIV counselling and testing (HCT) methods about 30 years ago, HIV testing uptake remains low in most high HIV prevalence settings. To date, knowledge of status still remains a critical approach in the fight against HIV and a first step to prevention, access to care, treatment, and support. Home-based HIV counselling and testing (HBHCT) is a novel approach that may complement the long-standing approaches for delivering HIV testing.

Main Aim: To assess the impact of an HBHCT intervention on the uptake of HIV testing in a rural community in KwaZulu-Natal province, South Africa, using a pragmatic cluster randomised control trial design.

Methods: All 4 research studies (Paper I-IV) were sub-studies of a cluster randomised control trial called Good Start HBHCT. The studies were conducted in rural Umzimkhulu sub-district. The intervention was HBHCT offered by trained lay counsellors to all adults residing in the intervention clusters (8 communities). In the control arm (8 communities) people accessed the standard of care (mainly clinic based HIV testing). The primary outcome measured in the trial was uptake of HIV testing. A baseline survey was conducted prior to the intervention in all 16 community clusters to measure uptake of HIV testing using an interviewer administered questionnaire (Paper I). Post-intervention, the same questionnaire (with additional questions on secondary outcomes) was administered (Paper II). In-depth qualitative interviews were conducted with couples who tested and received results together during the intervention (Paper III). We also conducted a cost-effectiveness analysis to compare the HBHCT approach versus clinic HCT (Paper IV).

Results: The reported uptake of previous HIV testing among 5,821 participants in 16 community clusters was 32% at baseline. Women reported higher testing rates than men, 39% versus 17% respectively (Paper I). The HBHCT intervention increased testing rates from 32% to 69% in the intervention arm, while a smaller increase was observed in the control arm, from 31% to 47% (Paper II). People who received HBHCT had a higher likelihood of having tested compared to those in the control arm, (PR 1.54, 95% CI: 1.32-1.81). The prevalence of couple HIV counselling and testing was about twice as high in the intervention arm as it was in the control arm (PR 2.24, 95% CI: 1.49-3.03). The intervention had a significant effect on some secondary outcomes; notably, a protective effect against having more than one sexual partner in the past three months, which was 55% lower in the intervention arm (Paper II). For couples tested together, mutual knowledge of status challenged their relationships in different ways, depending on HIV status and gender. For discordant and concordant positive couples, the HIV status confirmed suspicions of infidelity, while negative couples were happy and regained trust. Concordant positive couples expected their positive status. Men reported that knowledge of status was an incentive to change their behaviour (Paper III). The economic evaluation demonstrated that HBHCT was more cost-effective in increasing uptake of HCT. The average cost per client was $29 for HBHCT compared to $38 for HCT in the clinic (Paper IV).

Conclusions: HBHCT increased HIV counselling and testing and encouraged couple HCT. In addition to increasing HCT uptake, HBHCT was more cost-effective. The intervention also had protective effects on HIV risk behaviour. Thus, the findings provided evidence for wider implementation of the HBHCT approach.

Key words: HIV counselling and testing, home-based, cost-effectiveness, South Africa
LIST OF PUBLICATIONS


III. Hanani Tabana, Tanya Doherty, Birgitta Rubenson, Debra Jackson, Anna Mia Ekström and Anna Thorson. ‘Testing together challenges the relationship’: Consequences of HIV testing as a couple in a high HIV prevalence setting in rural South Africa. *PLoS ONE* 2013; 8(6)

IV. Hanani Tabana, Lungiswa Nkonki, Charles Hongoro, Tanya Doherty, Anna Mia Ekström Reshma Naik, Wanga Zembe, Debra Jackson, Anna Thorson. A cost-effectiveness analysis of a home-based HIV counselling and testing intervention in rural South Africa. *Manuscript*

The papers will be referred to by their roman numerals I-IV.
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<td>ARV</td>
<td>Antiretroviral</td>
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<td>ANC</td>
<td>Antiretroviral</td>
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<td>ART</td>
<td>Antiretroviral Therapy</td>
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<td>CD4</td>
<td>The absolute CD4 cell count measures the number of CD4-T-cells in each cubic ml of blood</td>
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<tr>
<td>CDC</td>
<td>Centers of Disease Control and Prevention, Atlanta, United States of America</td>
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<td>DHS</td>
<td>Demographic Health Surveillance</td>
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<tr>
<td>HAART</td>
<td>Highly Active Anti-Retroviral Therapy</td>
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<td>HBHCT</td>
<td>Home-based HIV counselling and testing</td>
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<td>HCT</td>
<td>HIV counselling and testing</td>
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<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<td>IPV</td>
<td>Intimate Partner Violence</td>
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<td>LMIC</td>
<td>Low and Middle income</td>
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<td>MARPs</td>
<td>Most at risk populations</td>
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<td>MTCT</td>
<td>Mother-to-child transmission</td>
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<td>MMC</td>
<td>Medical Male Circumcision</td>
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<td>MOU</td>
<td>Midwife-run Obstetric Units</td>
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<td>MSM</td>
<td>Men who have sex with men</td>
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<td>NDOH</td>
<td>National Department of Health</td>
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<td>NSP</td>
<td>National Strategic Plan</td>
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<td>PICT</td>
<td>Provider-Initiated Counselling and Testing</td>
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<tr>
<td>PrEP</td>
<td>Pre-exposure prophylaxis</td>
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<tr>
<td>PMTCT</td>
<td>Prevention of Mother to Child Transmission of HIV</td>
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<td>RCT</td>
<td>Randomised Control Trial</td>
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<td>SSA</td>
<td>Sub-Saharan Africa</td>
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<td>STI</td>
<td>Sexually Transmitted Infections</td>
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<td>TasP</td>
<td>Treatment as Prevention</td>
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<td>UNAIDS</td>
<td>The Joint United Nations Programme on HIV/AIDS</td>
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<tr>
<td>VCT</td>
<td>Voluntary Counselling and Testing</td>
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<tr>
<td>VMMC</td>
<td>Voluntary Medical Male Circumcision</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<tr>
<td>PEPFAR</td>
<td>United States of America President’s Emergency Plan for AIDS Relief</td>
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**OPERATIONAL DEFINITIONS**

Voluntary counselling and testing (VCT) refers to client-initiated testing and counselling) and describes a process initiated by an individual who wants to learn his or her HIV status.

Provider-initiated testing and counselling (PITC) is HIV testing and counselling recommended by a health-care provider in a clinical setting as a standard component of medical care.

HIV counselling and testing (HCT) refers to HIV counselling and testing both recommended by a provider and sought by a client. All forms of HIV testing and counselling should be voluntary and adhere to the five C’s: consent, confidentiality, counselling, correct test results and connections to care, treatment and prevention services.
1 BACKGROUND

1.1 THE HIV/AIDS EPIDEMIC

The annual number of new HIV infections among adults and adolescents decreased by about 50% or more in 26 countries between 2001 and 2012. Globally, there were 2.3 million new HIV infections, a decrease of about 33% compared to the 2001, 3.4 million new infections. In the same year, there were 35 million people living with HIV worldwide, an increase from previous years. As access to antiretroviral therapy in low- and middle-income (LMIC) countries continues to improve, (about 10 million people in these countries received treatment in 2012) it is expected that the HIV prevalence will continue to grow as fewer people die from AIDS related causes. In 2012, 1.6 million people died from AIDS related causes worldwide.

Sub-Saharan Africa (SSA) remains the hardest hit by the HIV epidemic accounting for 70% of the global HIV burden. Further, in 2011, 92% of pregnant women living with HIV resided in the region. Heterosexual exposure is the primary mode of HIV transmission in SSA and accounts for 80% of new infections globally. Women in general remain disproportionately impacted by the HIV epidemic accounting for 58% of all people living with HIV/AIDS in 2011.

However, there have been some achievements in the region. Notably, a 34% decline in HIV incidence between 2001 and 2012, a shift from 2.4 million new infections to 1.8 million new infections respectively. Other improvements in the region include, a decline in incidence among children. The region also made considerable achievements in prevention of mother-to-child transmission (PMTCT). Six countries (including South Africa) achieved PMTCT coverage of more than 75%.

These global and regional statistics demonstrate an urgent need to implement a prioritised agenda that puts emphasis on addressing challenges faced by key populations that remain vulnerable such as injecting drug users, men who have sex with men (MSM), and the disproportionate and continued spread of HIV in adolescent women in Southern Africa.

1.1.1 Progression of the HIV/AIDS epidemic in South Africa

South Africa still bears the highest HIV prevalence rates in the world, home to 17% of all people living with HIV infection globally. The HIV prevalence for the adult population (15-29 years) is estimated at 16.6%, and the overall population prevalence rate is 10.6%. In 2011, there were 5.6 million people living with HIV in South Africa. Despite a 41% reduction in new HIV infections since 2001, an estimated 316,900 new HIV infections occurred in 2011. Further, 270,000 South Africans died of AIDS related causes, reflecting the huge number of lives that the country has lost due to AIDS over the last three decades.
Substantial progress towards millennium development goals (MDGs) 4 and 5 although large gaps still remain among and within countries has been made in reducing maternal mortality. PMTCT services have been rolled out to success enabling about 99% of pregnant women attending antenatal care (ANC) to receive HIV counselling and testing (HCT). Further, about 92% of these ANC attendees receive either antiretroviral (ARV) treatment or PMTCT prophylaxis. The impact of the HIV epidemic directly affects progress towards meeting several of the (MDGs). In South Africa, the HIV epidemic consumes a substantial share of the health budget. In 2011, just above US$1.4 million was spent to finance the HIV response with 10% allocated to prevention and 63% to treatment yet South Africa’s GDP (gross domestic product) spending on healthcare is about 8.3%. Approximately US$900 per capita is spent on health annually. Despite this high expenditure, health outcomes remain poor when compared to similar middle-income countries.

1.1.1.1 Contextual factors and epidemiological transition in South Africa

The South African history of social disruption and racial and gender discrimination associated with the inequitable distribution of resources has contributed to how the HIV epidemic has evolved in the country. Thus, many factors influence the heterogeneity, inequity in the HIV burden between segments of the population and the overall explosive HIV epidemic in South Africa. These include biological, individual, and social/contextual factors. Contextual factors include: poverty, gender and gender based violence, cultural attitudes and practices; stigma, denial, exclusion, and discrimination; mobility and labour migration, and informal settlements.

The apartheid government pre 1994 was characterised by imposed structural conditions where black men were separated from their families to work in mines and temporarily live in the cities in overcrowded, poorly ventilated hostels served by commercial sex workers. This ‘circular labour migration’ lifestyle is key to the spread of sexually transmitted infections (STIs) including HIV in the last century. Traces of the apartheid era still cloud South Africa’s mining industry where circular migration remains the source of mining labour and not much improvement in working conditions hence the persistent high HIV incidence among mine workers.

A steep increase in South Africa’s HIV new infections took place between 1993 and 2000 a time when the government did not pay attention to the epidemic. During this time, the country’s response was hampered by denial, a lack of political will and poor implementation of evidence based programmes. Unfortunately the apartheid government’s mistakes of paying no attention to the epidemic were repeated in the Thabo Mbeki era (1999-2008) marked by ignorance, dismissal and deliberate undermining of scientific evidence and global efforts to curb the epidemic. These historical accounts explain South Africa’s slow progress in the fight against the HIV epidemic while other LMIC advanced.

Since the beginning of the HIV/AIDS epidemic struggle in South Africa, the highest HIV prevalence rates were reported among young women compared to men of the same
age group. Teenage girls had higher rates of HIV than boys in 1992. Peak prevalence rates in men occurred at an age 5-7 years older than peak prevalence in women, a result of age mixing/intergenerational partnering. Further, the 2005 and 2008 national population based surveys found that age specific HIV prevalence in young women age group 25-29 years had worsened exceeding 30%.\textsuperscript{16,23}

The HIV/AIDS epidemic in South Africa has been described to evolve around four phases since the first reported cases of AIDS in 1982: (i) an initial concentrated epidemic phase in the period 1982-1987, (ii) generalised epidemic phase between 1988-1994, (iii) steep increase in HIV prevalence between 1995-2000, and (iv) post 2000, an increase in AIDS mortality.\textsuperscript{17} The first cases of AIDS were identified in MSM, which led to the belief that AIDS was a ‘gay disease’. This widespread belief created a sense of complacency in the general public as many people perceived themselves to be risk free. Reports from HIV prevalence surveys among ANC attendees, and hospital patients indicated zero infections.\textsuperscript{24} A survey conducted among mine workers, indicated there was a spread in HIV infection in this group, findings that led to forced repatriation of mineworkers from neighbouring countries.\textsuperscript{25} However, the HIV spread did not stop among mineworkers.\textsuperscript{19,26,27} Multiple partnerships especially concurrency became the norm.\textsuperscript{25} Migrant couples where at least one partner is a migrant worker were more likely than non-migrant workers to have one or both partners infected (35% versus 19%, p=0.0026).\textsuperscript{28}

Among pregnant women attending ANC, HIV infection increased rapidly for about a decade in the period 1994-2005, resulting in HIV prevalence rate increases from 4.3% to 30.2% (Figure 1a). Thereafter, there was a slight non-significant decrease in HIV prevalence to 29.1% in 2006 and has now stabilised at a very high level, 29.5%.\textsuperscript{9} The spread of HIV in South Africa has shown marked geographical variations in distribution with the east cost provinces of KwaZulu-Natal and Mpumalanga experiencing the highest rates of HIV in the general population and among ANC attendees (Figure 1b). In KwaZulu-Natal province, the HIV prevalence among pregnant women (20-24 years) increased from 21.1% in 1995 to 39.3% in 1998 and 50.8% in 2001.\textsuperscript{29} The HIV prevalence in KwaZulu-Natal was about 16% in 2008 (about 12 times higher than the Western Cape province with the lowest prevalence), and has remained one of the highest in the country. The antenatal HIV prevalence has also been consistently higher than other provinces over the years.\textsuperscript{16} More than 50% of the adult population living with HIV resides in KwaZulu-Natal.\textsuperscript{9}

Rehle at al., 2010 estimated the national HIV incidence based on the 2002-2008 large nationally representative population prevalence surveys. Authors found that, for the interval between 2005-2008, a lower HIV incidence rate of 1.3 per 100 (0.6–2.1) person years at risk (pyar)\textsuperscript{1} was estimated for women and men aged 15-49 years. Overall, incidence declined by 35% between the two inter-survey periods 2002-2005 and 2005-

\textsuperscript{1} Refers to 100 person years of follow up, i.e. if 100 people were followed for a year, then this number (in this case 1.3) would become infected with HIV.
2008 among adults aged 15-49 years, although non-significant. The overall decline was mostly due to changes in incidence among young women aged 15-24 years, among whom there was a statistically significant 60% reduction in incidence from 5.5 to 2.2 per 100 pyar (1.3-3.1). Incidence among men and women aged 25-49 years was similar for the two inter-survey periods.30

However, although the overall HIV incidence decreased by 35%, new HIV infections are still increasing with an additional 100,000 people living with HIV (PLHIV) each year.6 For a while, South Africa was lagging behind in efforts to curb the HIV epidemic due to the mistakes of the apartheid government and later the Thabo Mbeki denial era. The epidemic trajectories are slowly being reversed as a result of the commitment from the government.
Figure 1(a): HIV prevalence epidemic curve among women attending antenatal care in South Africa, 1990-2011.

Figure 1(b): Antenatal HIV prevalence distribution by province, 2011.
1.1.2 Gender and sexuality

It is widely acknowledged that gender plays an integral role in determining an individual’s vulnerability to HIV infection, their access to care, treatment and support. It is also recognized that it is mostly women who bear the consequences of gender imbalances (due to subordination or male dominance) in most countries hardest hit by the HIV epidemic.\textsuperscript{31} Women continue to be disproportionately affected, a somewhat untenable situation in sub-Saharan Africa.\textsuperscript{2} The ability of young women to protect themselves from HIV is frequently compromised by a combination of biological, social, cultural, legal and economic factors. In SSA, young women under the age of 20 have a 8-fold higher risk of being infected with HIV than men of same age range.\textsuperscript{32} Notwithstanding the efforts on new advances (e.g. microbicide gels, female condoms, PMTCT) that are tailored to address the needs of young women, gender based violence is an important driver of women’s increased vulnerability to HIV, inadvertently exposing their inability to insist on safer sex practices.\textsuperscript{33}

Gender and sexuality are significant factors in the sexual transmission of HIV. Gender refers to shared expectations and norms within a society about womanliness and manliness, the roles, characteristics and behaviours assumed by men and women. It is a social and cultural construct that distinguishes between men and women and essentially defines the way they interact.\textsuperscript{34} The world health organisation (WHO) defines gender as:

‘Gender is a culture-specific construct. As a result there are significant differences in what women and men can or cannot do in one culture as compared to another. But what is fairly consistent across cultures is that there is always a difference between women’s and men’s roles. In almost every country worldwide women have less access to and control of productive resources than men, creating unequal balance of power that favours men.’\textsuperscript{35}

Sexuality on the other end is distinct from gender but the two constructs are intertwined. Sexuality is the sexual construction of a biological drive. Fundamental to both sexuality and gender is power. The unequal balance in gender relations that favours men translates into unequal balance in heterosexual interactions in which males have greater control over where, when and how sex takes place.\textsuperscript{34} Thus, to understand gender and sexuality, there ought to be an interrogation of the underpinnings of these constructs as interplay of social, cultural and economic factors that determine power distributions in intimate relationships.\textsuperscript{36}

In the context of HIV, the gendered nature of sexual relationships subjects both men and women under vulnerability to HIV infection. Within the global literature, women are often deemed ‘more’ vulnerable to HIV infection than men due to an interaction between biological and social factors. Women are often taught to be passive about their sexual needs and appease the sexual desires of their male partner.\textsuperscript{37,38} This manifestation of men’s dominance over women exacerbates women’s vulnerability to HIV infection as it often leads to sexual violence, rape\textsuperscript{39} and women’s inability to make sexual decisions.\textsuperscript{38} Studies in different contexts have demonstrated a correlation between intimate partner violence and increased risk of HIV infection.\textsuperscript{40,41}

Women’s economic dependency increases their vulnerability to HIV\textsuperscript{1}. They (women) engage in sex work, transactional sexual relationships to exchange sex for money or other gifts.\textsuperscript{31} Further, meanings of motherhood, the expectation to have children presents a dilemma on
women in the use of HIV prevention methods. Long-term partnering where desires of trust, intimacy and pleasure may lead to assumptions of safety in a primary relationship has been cited as another factor for HIV infection among couples in certain contexts.

Among young adolescent women, norms of preserved virginity create barriers to accessing treatment, care and support in fear of being questioned about their behaviour since they are not expected to engage in sexual practices and get tested for virginity for example, during the ‘reed dance’ in South Africa. Also, the institution of marriage where women are transacted as gifts with men being the beneficiaries has placed women in a position where men establish their dominance and constrains women into being responsive to men’s needs.

Continued promotion of gender equality and empowerment of women is critical in the fight against the HIV epidemic. In South Africa, gender equality is enshrined in the country’s constitution. The government recently established a ministry of women, children and people with disabilities, a demonstration of its support in efforts to empower women.

1.1.3 Ending the HIV epidemic

The United Nations (UN) states that the best HIV prevention responses have been transformative in their impact. Such efforts have been seen in some countries, for example, in South Africa where mass mobilisations have been implemented using democracy and bringing together different stakeholders in the fight against HIV. The introduction of a new government in 1994 post apartheid resulted in a shift in priorities (e.g. addressing inequalities in health services access) with the aim to bring together HIV services, foster knowledge of HIV status and health changing behaviour among previously marginalised populations. Other examples include, scaling up of voluntary medical male circumcision (VMMC) in the context of HIV education and behaviour change, and scaling up of ART for drug users.

In an effort to halt the HIV epidemic, the UNAIDS proposed a transition where avoided infections would result in less new cases being on treatment in the far future. The vision behind this is that of, zero new HIV infections, zero discrimination, and zero AIDS related deaths. This means ending HIV related stigma, gender inequality, and violence against women and girls that drive the risk of, and vulnerability to, HIV infection by keeping people from accessing prevention, treatment, care and support services. Further, laws, policies and programmes should be put in place to create a legal environment to provide justice and decriminalise HIV in certain contexts. The UNAIDS reported that between 2008-2013 in Gauteng and Eastern Cape provinces of South Africa, 5% of people living with HIV had been denied dental health, while 7% were denied family planning services and 3% had been denied employment because of their HIV status in the last 12 months. It is encouraging that South Africa is making efforts in ensuring rights based responses for key vulnerable populations. For example, the South African commission on gender equity has recommended the decriminalisation of sex work on human rights ground.

1.1.3.1 South Africa’s response

In order to reach South Africa’s and UNAIDS’ ‘ambitious’ shared vision of zero new HIV infections: zero AIDS and TB related deaths; zero HIV transmission between mother and

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child, and: zero stigma, a renewed emphasis on HIV prevention has been placed by the South African government. The national HIV/AIDS and STI strategic plan (NSP) 2012-2016 aims to reduce the HIV incidence by 50%, get 30 million people tested by 2016 and a further reduction in PMTCT to less than 2% at 6 weeks of birth among many other objectives. Specific interventions are also outlined in the NSP to ensure key populations (including MSM, sex workers and injecting drug users) have access to HIV, STI and TB services. The NSP explicitly identifies the potential role that novel biomedical prevention strategies and health system improvements may have in reducing HIV infections and transmission.

Post the denial period (1999-2008) there have been changes in the nation’s ministry of health portfolio with the new administration of a committed health minister. South Africa’s health is characterised by a complex transition with the highest peak of mortality occurring between 1990 and 2005 among all age groups because of HIV/AIDS. Ill health has been largely attributable to co-existing infections (including HIV/AIDS), non-communicable diseases, child diarrhoea and malnutrition, and interpersonal violence and accidents. Children under 5 years and maternal mortality are high up in the list of all mortality, a measure of the country’s performance in MDGs 4 and 5.

It is encouraging that the South African government has increased investments towards HIV prevention. Antiretroviral treatment (ART) has been scaled up with 1.4 million (21% of those on ART globally) people on ART as of June 2011, and out of these 1.1 million received support from United States of America President’s Emergency Plan for AIDS Relief (PEPFAR). In October 2012, the country reached the target of universal access (according to WHO classifications) to treatment as the total number of people receiving treatment reached 2 million, an 80% coverage. However, this ‘high’ coverage figure should be interpreted with caution. It is likely inflated since the number of AIDS related deaths (270,000 in 2011) per year is still so high in South Africa. Perhaps the coverage does not take into account people who died undiagnosed, or untreated. Further, it is unclear if adherence to ART has been considered when estimating the coverage. Other prevention efforts include the scale up of condom distribution and medical male circumcision (MMC). Both male and female condom distribution increased between 2006 and 2010, although the distribution of female condoms was at a much lower scale in comparison.

Epidemics vary between and within contexts. Many countries are striving towards better set priorities among national HIV prevention responses by putting into practice the principle ‘know your epidemic, know your response’ based on understanding and responding to the local specifics of an epidemic. The response requires strong political commitment, evidence based responses and up to date strategic information on how and why people are contracting HIV including the influence of social, political, economic and legal environments. The global HIV response finds itself at a turning point in which the past gains are at risk of being undermined and current approaches exhausting maximum potential. Choices will be shaped by scarcity of resources, repositioning of global priorities and the kinds of new alliances formed.

1.1.4 HIV prevention

Thirty years after the first reported case of AIDS, there is evidence to drastically reduce HIV transmission and countries have demonstrated control of the epidemic. The advances and
progress in HIV prevention have resurrected the new optimism that the epidemic can be halted and possibly achieve an AIDS free generation. However, much work still needs to be done.

The high levels of stigma and negative consequences of HIV testing have forced researchers to rethink HIV prevention ways and come up with innovative advances including the use of microbicidal gels to prevent HIV transmission, male circumcision to protect men from contracting HIV, treatment as prevention (TasP) to all individuals with a CD4 threshold of 500 cells/mm³ or less and pre-exposure prophylaxis (PrEP) initiatives. Some of the long-standing efforts include PMTCT and use of condoms.

Proof that PrEP protects against HIV acquisition has been demonstrated in clinical trials conducted among MSM and heterosexual men and women. A pertinent question in the use of PrEP is whether implementation outside of clinical trials is feasible. In generalised epidemics, key populations for prioritising novel HIV prevention interventions include young women who face very high incidence particularly in Southern Africa. TasP could be beneficial in South Africa given the high prevalence of HIV (with the number of new HIV infections remaining very high). The South African budget allocation for HIV is distributed such that treatment has a bigger share compared to prevention, perhaps emphasising the treatment as prevention efforts.

Medical male circumcision (MMC) has proven to biologically decrease the incidence of HIV infection among heterosexual men by as much as two-thirds. Approximately 321,180 MMCs have been conducted in South Africa between 2011-2012. Further, there is demonstrated evidence of MMC cost-effectiveness. Mathematical modelling estimated that for every 5-15 procedures, one new HIV infection is averted which in turn leads to savings from US$150 to US$900, using a 10 year time horizon.

1.1.5 HIV counselling and testing as prevention

The diversity and dynamic nature of the epidemic requires context specific approaches. An important starting point to knowing the magnitude of the HIV epidemic in a given country is when everyone has had access to and undergone HCT, and know their status for appropriate access to prevention, care and treatment services. Further, HCT facilitates access to HIV prevention services including, PMTCT, medical male circumcision (MMC), ARV interventions including PreP and microbicides. However, barriers to HIV status knowledge remain. Globally, some of the barriers include human rights violations or laws criminalising sexual orientation, injecting drug users and sex work and also the unrelenting stigma and discrimination. These barriers hamper new approaches of delivering HCT such as home-based HIV counselling and testing.

In the 1980’s, the absence of ART led to most HIV infected individuals facing discrimination and stigmatisation, thus HCT was seen to have little individual benefits. However, others believed that testing was the key to promoting a change in behaviour. As evidence of ART use became available, there were arguments for HCT to be a standard practice where patients had symptoms of an HIV infection and where ART was available. However, it took a while before ART was available with only 1% of individuals eligible having access to ART in 2003. This was followed by the declaration of a
global health emergency by the WHO in 2003. Further, PEPFAR, the World bank’s multi-
country HIV program and the global fund increased funding to extend treatment in
developing countries including the 2003 WHO 3-by-5 initiative. At this time, less than 10% of
those infected with HIV knew their status and most were diagnosed when terminally ill
with less effectiveness of ART.64

HIV testing began with clinic personnel recommending testing to individuals who had
symptoms suggestive of HIV infection or whose presumed behaviour suggested exposure.
Later the approach seemed insufficient, then voluntary counselling and testing (VCT)
developed as the first programmatic form of HCT usually provided in stand-alone facilities
where people volunteer to test. VCT was later also seen as insufficient in enabling people to
know their status, thus other approaches emerged with time. One such development was
PITC, which has become popular.61 Recently, community and home-based testing have
emerged as promising strategies for populations who otherwise lack ready access to HCT.
Couple counselling is another promising approach. Self-testing may offer opportunities for
some people to learn their status even if they are unable or unwilling to seek HCT through
other approaches.59

Before the WHO issued guidance on PITC in 2007, approximately 50% of African countries
had adopted PITC in healthcare facilities.65,66 Baggaley and colleagues reviewed policies,
guidelines, and strategic plans on PITC from 52 African countries and found that 42 of 52
countries had adopted a policy between 2003 and 2010.51 In 2003, only 52% of pregnant
women in Botswana knew their status. The government then instituted the ‘routine’ PITC
policy in various health facilities countrywide in 2004.57 In 2005, Uganda also implemented
PITC in referral hospitals.68 In 2006, the Centres of Disease Control and Prevention, Atlanta,
United States of America (US CDC) recommended that PITC should be offered to adults
aged 13-64 years in all health care settings with consent being assumed unless the patient
explicitly denied.59,69 PITC then became popular and HCT uptake increased. In 2007,
guidelines for PITC in health care facilities were introduced by the WHO and UNAIDS.70

Literature on patient’s perspective of PITC demonstrates acceptance of the approach.91 In
South Africa, 93% of women offered HCT while attending midwife obstetric units (MOU)
agreed that all pregnant women should be tested for HIV.71 In another study among ANC
attendees, 20% felt that their voluntariness had been compromised.72 In some instances,
pregnant women were not aware they could decline HIV testing during ANC,72,73 In
Zimbabwe, 89% of women who opted in for HCT in a study stated that the routine offer of
HCT was helpful and enabled women to make an informed decision about PMTCT and
infant feeding.74 However, these data on acceptability are on pregnant women’s views71, and
thus may not be generalisable as these women may be more willing to undergo HIV testing
to benefit their babies.75 In other regions, there are suggestions that women may find routine
offer of HCT acceptable because it normalizes the process of taking an HIV test.76

A 2012 WHO report on universal access stated that testing rates in eastern and southern
Africa rose from 48% in 2008 to 50% in 2009.77 Further, introducing PITC in some settings
led to increased HIV testing for other programmes where HCT was offered, e.g. TB and STI
clinics. In an RCT in Cape Town in 2005, HCT uptake increased from 6.5% (opt in) to
20.2% (with opt out).78 In most parts of Africa, HCT became a standard for TB patients.79 In
most of the countries where an increase in HCT is reported, it is unclear how much of this
increase is attributable to first time testing. Getting this information would assist in identifying if the increase in numbers tested means that there are more new people (first time testers), or if these are repeat tests in which case it will be the same people testing.\textsuperscript{59}

Knowledge of HIV status is a critical intervention for HIV prevention and should be coupled with investments in scale-up of ART programmes. A successful public health response to HIV requires robust HCT services, as one approach is unlikely to achieve universal access (Figure 2). Examples include having PITC, home-based testing, household/community based interventions and rapid testing technologies to complement each other.\textsuperscript{3} Context specific, and acceptable approaches should be optimised to increase HIV testing. The WHO criteria for selecting the best combination of approaches includes nature of the epidemic, cost-effectiveness, equity of access, and resource availability.\textsuperscript{59} However, without linkages to care, HCT loses its value. Its usefulness lies in identifying as many people as possible early on.

\textbf{Figure 2:} Universal HIV counselling and testing for universal prevention and treatment (source: A strategic HCT programme framework, WHO.2012)
1.1.5.1 Barriers and access to HIV counselling and testing

Barriers to testing for both women and men include fear of stigma and lack of confidentiality, official and unofficial costs, long distances to VCT sites, lack of perceived benefits and delays in receiving results (before rapid testing was available). To date, the documented list of barriers to accessing HCT services has become extensive and can be broadly placed as, socio-economic, geographical and structural factors. The geographical factors may include distances to health care facilities while economic factors mainly include, lack of money for transport to health facilities, and in some contexts where health care is out of pocket, lack of money to pay for HCT services.

Confidentiality, informed consent and voluntariness are central to HIV counselling and testing regardless of the approach used. There have been questions around implications of PITC for rights to informed consent, voluntary and confidentiality, whether confidentiality would be protected in health facilities, whether clinical settings would provide adequate post-test counselling support and linkages to treatment and whether benefits would outweigh the risks of adverse effects/consequences such as stigma, rejection and spousal abuse. Trying to balance these fundamental issues with the need to prevent transmission to others and to diagnose partners living with HIV remains a challenge. Ensuring equitable access to testing and treatment for those who face barriers to testing and care in SSA especially for the most at risk populations (MARPs) is concerning.

Some countries are adopting ways of ensuring equity in access to HCT services. Malawi used decentralization and task shifting to lower level health personnel to scale up testing in the context of resource constraints. Burkina Faso expanded HIV services through community-based organisations, and national campaigns. In Kenya, a number of HCT approaches were recommended including door-to-door VCT, outreach and mobile, integrated rural campaigns of combined care. Uganda implemented HCT campaigns, VCT, PITC, and large home-based testing efforts in rural areas. Much of HCT in these countries and others occurred through increased PITC within clinical services such as ANC, TB care and hospital inpatient settings.

1.1.5.2 Couple counselling and testing

In most SSA countries with generalised HIV epidemics, 75% of adults age 20-24 years report being in cohabiting relationships. Among those HIV positive in a couple, half are in a sero-discordant relationship. Couple-centred approaches to HIV prevention were first developed in the 1990s. In the early 2000s, the UNAIDS and others were advocating for couple-centred approaches to HIV prevention. Also studies in PMTCT encouraged partner involvement. However, couple-centred approaches to HIV prevention have not been widely implemented.

A couple focused approach to HCT would facilitate communication and adaptation of preventive behaviours within couples. Until recently, most of the studies on sero-discordant couples have shown that women were at especially higher risk of HIV infection from within their partnerships presumably due to their higher biological susceptibility and infidelity of the men. Individual representations indicated that women feared being infected by their spouse or regular partner while men feared infection from ‘outside’ partners.
from the demographic and health survey (DHS) revealed that at least two thirds of cohabiting couples in Burkina Faso, Cameroon, Ghana, Kenya and Tanzania had one member of the couple positive. In 50% of the sero-discordant couples, the positive partner was a woman.\textsuperscript{103} Analysis has also shown that extramarital sexual activity among women and among men is an important source of HIV infection vulnerability.\textsuperscript{103} Further, in fourteen African countries, DHS data indicated that the proportion of HIV positive women in stable heterosexual sero-discordant couples was 47%.\textsuperscript{104}

A study in rural South Africa also showed that the direction of the epidemic was not only from returning migrant men to their wives but also from women to their migrant husbands.\textsuperscript{28} Another study in KwaZulu-Natal, South Africa reported that 65% of rural women interviewed had a negative attitude towards condom use.\textsuperscript{104} Thus it is not only men who are not willing to use condoms. Couples should be listed as a high priority group for HIV prevention.

In 2012, the WHO released guidelines on recommendations for couple HCT. The guidelines recommend offering voluntary HCT for couples or partners with mutual support for disclosure, support for mutual disclosure in ANC settings and for the partners of people who have tested alone. The WHO also recommends, as a way of reducing transmission, offering ART for HIV positive individuals in a sero-discordant couple even when that person is not yet eligible for ART.\textsuperscript{105} However, implementation of such programmes is complicated. It is critical for countries to assess feasibility, acceptability, potential impact and potential adverse clinical and social consequences in its setting. Thus implementation should be context specific and will depend on available resources, health systems capacity and epidemic profile.

Clear evidence of effectiveness of early ART initiation among couples to prevent transmission in sero-discordant couples\textsuperscript{106} confirms earlier cohort studies.\textsuperscript{107} This evidence highlights the need to expand access to testing services that reach couples.

### 1.1.6 HIV treatment

While people in LMIC represented about 61% of all who were eligible for ART in 2012 under the 2010 WHO guidelines, under the 2013 guidelines\textsuperscript{11} this translates to only 34% of the 28 million people eligible.\textsuperscript{1} In 2012, approximately 56% of people eligible for HIV treatment were receiving it compared with a global average of 54%. In the years 1996-2012, ART averted about 6 million AIDS related deaths globally, with approximately 5 million of these from LMIC.\textsuperscript{1} Botswana, Swaziland and Zambia reached more than 80% coverage of HIV treatment while South Africa, Kenya, Benin, Malawi and Zimbabwe reached more than 60% treatment coverage under the 2010 WHO treatment guidelines.\textsuperscript{5} However the need to retain people enrolled in HIV treatment and care remains urgent especially in light of the new WHO guidelines.\textsuperscript{21}

The past decade has seen a marked scale up of ART worldwide with declines in HIV related morbidity and mortality as a result.\textsuperscript{80} However, the incidence both worldwide and in well-resourced settings like the United States of America, has been stable. As a result, the HIV prevalence in some settings has continued to increase resulting an ever-growing treatment and care burden.\textsuperscript{5} Thus, after more than 30 years into the epidemic, novel, effective, primary HIV prevention strategies remain urgently needed.
Data from rural South Africa demonstrated the effectiveness of modest coverage rates of treatment on survival and reductions of HIV incidence rates at a population level. South Africa, even through a middle-income country, has not achieved 100% coverage for ART. However, there is political will and commitment to increase coverage. ART services are now available in more than 2,552 approved facilities countrywide. The government is also in the process of transitioning thousands of patients to treatment programmes supported by the US’s PEPFAR programme. The expansion of treatment access has started to show treatment benefits as AIDS deaths continue to show a decline since 2006. The life expectancy at birth for men and women is 55 and 59 years respectively. HIV remains the most important cause of non-accidental death among adults in South Africa.

1.2 RATIONALE FOR THIS RESEARCH

HIV counselling and testing still remains a critical approach in HIV prevention since knowledge of status is the first step to prevention, treatment, support and access to HIV care. South Africa has particularly low rates of HIV testing and many people in the country are living with HIV/AIDS often unaware of their status. A 2008 national survey reported that only about 25% of adults age 15-49 years had an HIV test and knew their status in the past 12 months. Sixty percent (60%) of all men and women (63% men, 59% women) reported being tested in the past 12 months in 2010. HIV testing approaches have been developed in the past 30 years since HIV/AIDS was discovered yet testing rates remain low. In South Africa, long mainstay barriers to HIV testing include economic, geographical, social and structural factors. To maximise HIV prevention efforts, there needs to be universal access to HCT services and uptake thereof.

The response to the HIV epidemic thus requires a holistic approach that caters for entire populations to achieve equity in access to care. HIV testing approaches should go beyond facility based strategies and explore use of innovative approaches such as home-based HCT (HBHCT). HBHCT is a novel approach that compliments existing models of delivering HCT. The unique opportunity offered by HBHCT as evidenced by previous studies is reaching the ‘hard-to-reach’ marginalised populations such as people living in rural areas and men who do not frequent health care centres. HBHCT has demonstrated effectiveness in the identification of HIV positive people in their early stages of infection.

To date, results from a few randomised control trials to rigorously assess HBHCT have been published. One study in Zambia reported that those randomised to home-based HCT were 4.7 times more likely to accept HIV testing compared to those randomised to clinic HCT (56.8% VS. 12.4%). The feasibility, acceptability and effectiveness of HIV prevention strategies that are being developed should be integrally connected with issues of cost efficiency, and priorities for resource allocation. There is currently a dearth of economic evidence to support wide scale implementation of HIV prevention programmes including the home-based HCT approach.

In South Africa, no rigorous evidence of the effectiveness of HBHCT exists despite its high prevalence of HIV and relatively low national HIV testing rates. Thus generalisability of the results from previous studies to South Africa is not clear-cut. It is against this background that this doctoral thesis aimed to assess the impact and cost-effectiveness of a HBHCT intervention on the uptake of HIV testing in a rural community in KwaZulu-Natal province, South Africa, using a pragmatic randomised cluster control trial design.
2 GENERAL AIM

The overall aim of this research was to assess the impact and cost-effectiveness of a home-based HIV counselling and testing (HBHCT) intervention on the uptake of HIV testing in a high HIV prevalence rural community in KwaZulu-Natal province of South Africa.

2.1 SPECIFIC OBJECTIVES

• To determine base-line HIV testing rates and predictors of knowledge of HIV status among inhabitants of rural Umzimkhulu sub-district (Paper I)
• To assess the effect of HBHCT on the prevalence of HIV testing and reported behavioural changes in a rural sub-district of South Africa (Paper II)
• To explore the experiences of couples undergoing home-based HCT together and receiving the test result together as part of a HBHCT (Paper III)
• To conduct a cost-effectiveness analysis comparing home-based with clinic based HIV counselling and testing (Paper IV)
3 METHODS

3.1 GENERAL STUDY DESIGN

All 4 research papers are based on sub-studies of a cluster randomised control trial called Good Start home-based HIV testing and counselling. Table 1 summarises the research questions, study population, design, data collection and analysis methods used to conduct this research. Both qualitative and quantitative research methods were used.

3.1.1 Good Start home-based HCT trial

Sixteen community clusters were randomised in a 1:1 ratio to home-based HCT or standard of care (mainly clinic based HCT). The intervention was door-to-door HIV counselling and testing implemented between September 2009 and December 2010. All households in intervention clusters (approximately 200 per cluster) were included to receive the intervention. All consenting adults (and 14-17 year olds with guardian/parental consent) were tested for HIV. The HIV testing algorithm followed the national HIV testing guidelines and involved rapid HIV tests. In addition, a dried blood spot was taken at the same time as the rapid test for quality control purposes. Of the 6,757 people approached during the intervention, 75% (5,086) agreed to test. The HIV prevalence during the intervention was about 10%.118

3.1.2 The control arm

In the 8 control areas, no intervention was offered, people accessed standard HCT services, mainly from local clinics. Home-based and clinic HIV testing follow similar procedures including; pre-test counselling, testing and post-test counselling between a trained counsellor and a client, couple or group of people. During our intervention implementation, the government launched a mass national HCT campaign.9 In Umzimkhulu sub-district, the HCT campaign was organised in public venues located in the control communities.
<table>
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<td>1. (a) What is the prevalence of reported HIV testing in rural Umzimkhulu sub-</td>
<td>Adults 18 years and above</td>
<td>Quantitative, cross-sectional survey</td>
<td>Structured interviews</td>
<td>Descriptive &amp; multivariate analysis (mixed effect logistic</td>
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<td>(n= 5821)</td>
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<td>regression models)</td>
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<td>2. What is the impact of a home-based HCT intervention on; (a) Uptake of HIV</td>
<td>Adults 18 years and above</td>
<td>Quantitative, cross-sectional survey</td>
<td>Structured interviews</td>
<td>Descriptive &amp; multivariate analysis (Generalised linear</td>
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<td>testing? (b) HIV awareness and knowledge, HIV risk behaviour, stigma and, access</td>
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<td>3. What are the experiences of discordant and concordant couples undergoing home</td>
<td>Adult couples, age 18 years and</td>
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*Study was based on a review of financial records from the trial (HBHCT and clinic)
STUDY SETTING

The study community, Umzimkhulu sub-district, is located in KwaZulu-Natal province, Sisonke district in South Africa. Located in the southeast part of KwaZulu-Natal, Sisonke district is at the border of KwaZulu-Natal and the Eastern Cape province (Figure 3). The entire municipality falls within the former Transkei homeland area. The Umzimkhulu Municipality is a black African dominant area. The majority of the population are women. The area is characterised by dispersed rural settlements with minimum economic activity except for trading stores and subsistence agriculture.

![Figure 3: Location of Umzimkhulu sub-district including intervention and control clusters](image)

The total population of Sisonke district is about 500,082 people while Umzimkhulu is the largest of 5 sub-districts in Sisonke with a population of approximately 243,242 people. This is one of the poorest rural areas in South Africa where 77% of households live below the poverty line with poor access to basic services like electricity, piped water, and toilets. The district has seven hospitals, and about 30 clinics that offer HCT. The antenatal HIV prevalence in Sisonke district was 37% in 2011. KwaZulu-Natal province is characterised by low levels of HIV testing. National surveys conducted in 2005 and 2008 revealed that only 10% and 24% of individuals age 24-49 years reported having had an HIV test in the past 12 months respectively. Most households in Umzimkhulu are female headed mostly due to the long existing system of migrant labour whereby men leave their partners for work in urban areas, mostly in the mining sector and return home periodically.
3.3 RATIONALE FOR CHOSEN STUDY DESIGNS

Quantitative and qualitative methods have been used in this thesis. The research questions guided the choice of method used in each paper. In the past years, qualitative research methods have received attention in the public health domain, and are now widely acknowledged as useful in public health, contrary to previous beliefs and misunderstandings. Qualitative research methods in addition to their use in independently exploring phenomena are now used as complimentary methods to quantitative methods.

Paper I & II were cross-sectional surveys. In epidemiology, cross-sectional surveys are conducted to measure the prevalence of disease or outcome of interest at one point in time and often called prevalence studies. We sought to measure point prevalence of HIV testing in this rural population. In Paper I, we also explored factors associated with having had an HIV test. In this case, the disadvantage of using a cross-sectional survey is that we don’t know what came first between exposures and effect hence; reasons for any associations cannot be ascertained unless otherwise known prior. Although for most phenomena studied, longitudinal studies would be ideal in order to ascertain causality, these studies usually take a long time to conduct hence expensive. On the other hand, cross-sectional surveys are quick, relatively easy and economical to conduct.

While implementing the home-based HCT intervention, it became apparent that couples were interested in receiving an HIV test and their results together. This was quite striking since couple testing in health facilities is very low in South Africa. We chose to explore these couples’ experiences of testing together. I was interested in their personal stories, and also acknowledging that HIV testing is a sensitive subject in the study setting, we thus considered qualitative methods appropriate. In this way, I was able to get insights on how life was for these couples since they had tested, information that I would not have accessed through quantitative methods.

In paper IV, we chose to do a cost-effectiveness analysis because the aim of this paper was to compare two alternatives with a single common outcome (HIV testing uptake, an intermediate outcome). Resources (including people, money, time, facilities, equipment and knowledge) are scarce, and choices have to be made for their commitment. Therefore, there needs to be a systematic way of identifying clearly, relevant alternatives for deployment of specific resources. Economic evaluations, defined as ‘comparative analysis of alternative courses of action in terms of both their costs and consequences’ are often conducted to help reach decisions on resource allocation or choices between alternative programmes. Commonly used economic evaluation methods include; cost minimisation analysis, cost-effectiveness analysis, cost-utility analysis and cost-benefit analysis. Cost effectiveness looks at the economic efficiency of different alternatives and is often used by programme managers to make informed decisions about resource allocations.
3.4 DATA COLLECTION AND STUDY PARTICIPANTS

3.4.1 Sampling

Paper I & II were conducted in 16 community clusters. A cluster is defined as an administrative unit, most often a village. The study setting was purposefully chosen based on its high prevalence rates of HIV, and also because the study team had a research base in the area. Maps from statistics South Africa (STATSA) were used to identify clusters with suitable boundaries including natural borders such as hills to minimise contamination between clusters. Thereafter, lower Umzimkhulu sub-district was selected as the study site. The adult population in the 16 clusters was approximately 45,963 people. The 16 clusters were similar in size with households ranging between 100 and 250, and an average household size of about 3 people. For paper I, the cross-sectional survey was conducted in all 16 clusters before randomisation. Prior to implementing the home-based HCT intervention, clusters were randomised to 8 control vs. 8 intervention communities. All households and eligible individuals within households in the 16 clusters were included in paper I and II. Figure 4 shows the flow of study participants included in this thesis.

![Flow diagram](image)

**Figure 4:** Flow of participants in Paper I, II & III

The baseline (Paper I) and endline (II) were based on a cluster sampling design. Thus, to take into account the design effect, we adjusted for clustering at the level of communities that were randomised to intervention and control arm. The intra-cluster correlation coefficient
ICC), or ρ (the Greek rho), represents the likelihood that two elements in the same cluster have the same value, for a given statistic, compared to two elements chosen completely at random in the population. A very small value for ρ implies that the within-cluster variance is much greater than the between-cluster variance, and a ρ of 0 shows that there is no correlation of responses within a cluster. Similarities among subjects in clusters can reduce the variability of responses from a cluster compared with those expected from a simple random sample. The ICC estimated at baseline (paper I) was 0.02, calculated for the primary outcome, HIV testing uptake.\textsuperscript{124,127} Approximately 250 participants were required per cluster in order to detect an effect size of 13%, a conservative estimate to avoid a type II error. The sample size was calculated for a 1-sided test with 90% power and a 5% significance level.

In paper III, of all 229 couples tested together during the HBHCT intervention, fourteen couples were selected to include discordant and concordant positive and negative couples who tested and received test results together during the home-based HCT intervention. A purposeful and emergent sampling strategy was utilised in order to get a variety of experiences from the three different couple statuses, and also from couples of different age groups. To recruit couples to participate in the study, I drew up a list of all couples tested during the intervention, and stratified them according to HIV status. The aim was to interview equal numbers across statuses and mix young and old couples. However, it was a challenge to get young couples (less than 25 years old) especially those who had tested concordant positive or discordant as they had separated at the time of conducting interviews.

To compare the HBHCT intervention and standard of care (clinic HCT) by their costs and effects in paper IV, four clinics were sampled from a possible 7 clinics in the study area. The chosen clinics were representative of the rest in terms of catchment populations, and resourcing.

3.4.2 Participants and data collection: Paper I (baseline) & Paper II (evaluating the intervention)

In both papers (I & II) we used separate structured questionnaires (Appendix I & II) administered face-to-face by trained data collectors (two different groups of data collectors at each time point). Structured questionnaires often constitute of closed questions to gather data for quantitative analysis. These tools are widely used in health research and other sectors. Unlike open-ended questionnaires, structured closed questionnaires limit participant responses, and thus fall short in gathering extensive information.

In each household, eligible adults (18 years and older) were invited to participate. Upon agreeing, verbal consent was sought. Interviews took place in a private place in the participant’s home. Questionnaires, uploaded on mobile phones were administered in Zulu/Xhosa, the local languages in the study area. Once the survey was completed in the mobile phone, it was sent and all responses transmitted into a central database created by the mobile technology supplier, Mobenzi researcher.\textsuperscript{128} Since the mobile technology allowed real time data collection, we were able to view the data as soon as the data collector sent the responses file. This allowed for immediate error checks.

In paper I, the questionnaire was structured to include household related questions (where responses applied to all individuals within a household), and also questions for each
individual in the household. Thus data was collected in a ‘wide format’ and I transformed the data to ‘long form snap-shot’ using the ‘reshape’ command in STATA in preparation for analysis. Questions asked included demographic characteristics, socio-economic position indicators, HIV testing history, and PMTCT indicators.

In addition to questions asked at baseline (Paper I), secondary outcomes including, sexual risk behaviour, HIV knowledge, and stigma were collected only post-intervention (Paper II). Questions for the secondary outcomes were validated and adapted from other studies conducted in South Africa.129-131

3.4.3 Participants and data collection: Paper III (Exploring couple experiences of HBHCT)

An interview is a data collection tool for exploring the ‘insider perspectives’, to capture thoughts, experiences, and emotions in the participant’s own words. Interviews can either be telephonic, web-based or face-to-face, usually in a conversational or informal style depending on the nature of the questioning. It is a two-way process where the researcher and respondent engage in a dialogue to explore the topic discussed.132 In-depth interviews are recommended for collecting data on individuals’ personal histories, perspectives, and experiences, particularly when sensitive topics are being explored.133

I conducted face-to-face in-depth interviews with the 14 couples in October 2011. Interviewees were initially contacted to make an appointment. While in the field, I was accompanied by an assistant researcher, (a woman older than myself) who made introductions (including project details) in all households that we visited since most participants were older, age range 23-59 years for women and 33-68 years for men. We did this to ensure an atmosphere of trust, acceptance and mutual respect and to gather if the participants would not have problems being asked sensitive questions by a young woman (myself). All interviews were conducted in the local language (IsiXhosa/IsiZulu). An interview guide (Appendix III) with open-ended questions was used. The interview guide covered questions on (1) the decision making process around testing as a couple in the context of a home, (2) experiences of mutual testing and receiving HIV test results as a couple, (3) impact of receiving HIV counselling and testing as a couple on the couple’s relationship (4) perceptions of home based HIV counselling and testing, (5) impact of testing together on sexual behaviour, (6) couple communication and couple decision making, and (7) intimate partner violence.

I begun doing interim analysis in the process of collecting data.134,135 The interim analyses helped to shape and refine further data collection and interrogate the depth of data collected. During the data collection, the emerging content was discussed and that helped to ensure saturation was reached. While conducting interviews, interviewee responses were paraphrased to ensure that I understood what the participant reported without any meaning lost. Interviews were extensive including 3 interviews per couple (overall, 42 interviews from 14 couples and 28 individuals). Interviews were audio-recorded and lasted between 20-60 minutes, thereafter transcribed verbatim and translated to English.
3.4.4 Data collection: Paper IV (Cost-effectiveness analysis of HBHCT)

Cost activities for a period of 1 year (January-December 2010) were included in the analysis. For both the clinic and HBHCT project, costing data were collected retrospectively through a review of financial records. In addition, in the clinic, these data were supplemented by interviews conducted with key people.

Good Start HBHCT was a research project thus, for the home-based HCT intervention; inputs were shared between research and intervention activities. The research team achieved this collectively. These cost variations are presented in Annexe A, Table 1 (Paper IV). We adapted the data collection tools from validated costing tools.\textsuperscript{116,136}

3.5 DATA ANALYSIS

3.5.1 Statistical analysis (Paper I)

Data from a central database was exported into excel and imported into STATA version 10 software (StataCorp LP, USA) for analysis. With the knowledge that demographic characteristics are usually associated with a variety of factors and given the fact that Umzimkhulu sub-district has more female headed households than men, we suspected that gender could have an influence on HIV testing. Thus, we computed TREE regression analysis using the Salford Predictive Modeller: CART(R) version 6 software (CART ©1984-2012, California) prior to running the logistic regression.

The analysis indicated that many variables (including ‘current pregnancy’, ‘children under 5’, ‘children born in the past year’ and also ‘socio-economic status’) had strong interactions with gender, thus we computed gender specific models. Further the TREE regression analysis estimated variable relative importance when modelled against the outcome variable, ‘HIV testing’ (Table 2). This information was important for running and interpreting multivariate regression analysis.
Univariate and multivariate logistic regression was used to investigate factors associated with previous HIV testing. Exploratory data analysis including frequencies, chi-square tests for associations between the outcome ‘previous HIV testing’ and independent variables was conducted.

A stepwise logistic regression analysis, which involved entering variables into the model one at a time when their $p<0.05$, was run to determine the variables to be included in multivariate analysis. Thereafter, both a forward and backward selection procedure with a $p$(to enter) of 0.05 and a $p$(to remove) of 0.10 was run to see whether this variable selection procedure would yield the same model. Variables that remained in the model were then included in multivariate regression analysis taking into account the between and within cluster effects by including random effects in the models.

A mixed effect logistic regression model was deemed appropriate as it models binary outcome variables, in which the log odds of the outcomes are modelled as a linear combination of the predictor variables when data are clustered or there are both fixed and random effects to be taken into account. This was to take into account the dependency and hierarchical data structure between clusters and within households. A random effect has levels that are generated from a random selection from a population. If the survey were repeated, different levels would be selected. In this study, cluster is a fixed effect while ‘household’ was fit as a random effect because participants within households are assumed to be a random sample from the whole population residing in the study community. If the study had to be repeated, it is possible that a different sample of participants would be included. Random effect models fit the similarity between individuals within the same cluster and hence adjusting for the cluster effect.137

### Table 2: Summary of variable relative importance when modelled against ‘HIV testing’ in TREE regression analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Relative importance</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child under 5 in *HH</td>
<td>100.00</td>
<td>2</td>
</tr>
<tr>
<td>Gender</td>
<td>61.33</td>
<td>2</td>
</tr>
<tr>
<td>Age</td>
<td>48.67</td>
<td>2</td>
</tr>
<tr>
<td>Age category</td>
<td>36.32</td>
<td>4</td>
</tr>
<tr>
<td>Currently pregnant</td>
<td>16.24</td>
<td>2</td>
</tr>
<tr>
<td>Tested last pregnancy</td>
<td>9.50</td>
<td>2</td>
</tr>
<tr>
<td>Education</td>
<td>7.96</td>
<td>4</td>
</tr>
<tr>
<td>Infant deaths in *HH</td>
<td>4.69</td>
<td>2</td>
</tr>
<tr>
<td>SES index 1</td>
<td>3.19</td>
<td></td>
</tr>
<tr>
<td>SES index 2</td>
<td>2.52</td>
<td></td>
</tr>
<tr>
<td>SES index 3</td>
<td>2.37</td>
<td></td>
</tr>
<tr>
<td>Births in *HH in the past year</td>
<td>1.18</td>
<td>2</td>
</tr>
</tbody>
</table>

*HH = household
Thus, a mixed effect model imposes a constant nonzero (exchangeable) within subject correlation structure, which means that the sequence of random variables is such that future samples would behave in a similar way as the earlier ones if we sampled a number of times from a finite or infinite population. The correlation matrix I computed showed that there was no strong correlation between the outcome (HIV tested) and individuals within households in the different clusters.

3.5.2 Statistical analysis (Paper II)

Univariate analysis was computed for continuous and categorical variables and presented as means and standard deviations and proportions respectively. Hierarchical generalised linear models (GLMs) were used to analyse data. GLM generalises linear regression by allowing the linear model (when dealing with linear relationships) to be related to a binary response variable via a link function. Generalised linear models can be generally expressed in an equation as:

\[
E(Y) = \mu = g^{-1}(X\beta) \quad \text{Equation (1)}
\]

where \(E(Y)\) is the expected value of \(Y\), \(X\beta\) is the linear predictor, a linear combination of unknown parameters, \(\beta\); \(g\) is the link function. The appropriate link function depends on the modelled distribution of the exponential family.

Unlike the baseline survey (Paper I), there were no gender interactions with any of the primary and secondary outcomes at endline (Paper II). The primary outcome was HIV testing uptake. Secondary outcomes were as follows:

- **HIV awareness**: this outcome assessed knowledge about HIV/AIDS, HIV status disclosure and whether participants received couple counselling during their most recent HIV test
- **Stigma**: this outcome interrogated experiences of stigma in the community, self-enacted stigma, and personal views on stigma across
- **Sexual behaviour**: here we assessed sexual partnering patterns and condom use
- **Violence**: this outcome was used to assess if participants ever experienced intimate partner sexual violence and further if there were experiences of physical or verbal violence due to HIV status disclosure
- **Access to care**: HIV positive individuals were asked if they had a CD4 count performed since knowing their status

A GLM for the negative binomial family was used for all outcomes except two, and the model was run in SAS. For the outcomes on self-experienced stigma and CD4 count test, the GLM for the binomial family with a log link was run in STATA (version 11.0) software. All statistical analyses were by intention to treat.

3.5.3 Qualitative Content analysis (Paper III)

Qualitative content analysis is one of numerous research methods used to analyse text data in order to provide knowledge and understanding of the phenomenon under study. Others have defined qualitative content analysis as a research method for the subjective interpretation of the content of text data through the systematic classification process of
coding and identifying themes or patterns. In qualitative research, content analysis presents in two forms, manifest or latent. Latent analysis involves interpretation of underlying meanings of text and would require further abstraction, as being more in-depth, while manifest involves analysis of visible and obvious components of the text. Graneheim and Lundman, 2003 define a category as a descriptive level of content and thus can be seen as an expression of manifest content of text. On the other hand, a theme refers to a thread of an underlying meaning through, condensed meaning units, codes or categories, on an interpretative level, thus it can be seen as an expression of the latent content of the text.

The data was analysed using qualitative latent content analysis. The analysis was inductive since the research started with a research question. The first stage included repeatedly reading interviews, then identification of meaning units that we highlighted in text for each couple interview, and individual interviews. To distinguish between couple combined and individual interviews, we labelled the text accordingly. Meaning units from all couple interviews were then grouped together in one word document, condensed and labelled with a few codes. We then grouped the codes, compared and merged them into analytical sub-themes thereafter one overarching theme. All this was done in Microsoft word manually (See Figure 5 for an example of the process). In the findings, quotes were used to illustrate the informants’ views. The data was analysed by myself, together with two team members [Birgitta Rubenson (BR) who is a qualitative researcher and Anna Thorson (AT), a medical doctor and researcher who has experience in HIV research in the South African context].
Figure 5: Example of the process of identifying meaning units, assigning codes to text and formulation of a sub-theme.
3.5.4 Cost-effectiveness analysis (Paper IV)

3.5.4.1 Costing

Two alternative approaches of delivering HCT were compared. The outcome measured in
the two alternatives was HIV testing uptake. A provider’s perspective\textsuperscript{116} was used, thus
client costs were not included in this analysis. The perspective was deemed appropriate as
the study sought to inform the government for programme scale up.

Activity based costing and an ingredients approach\textsuperscript{116} were utilised. Activity based costing is
an approach whereby cost data are presented by activity instead of inputs. In this study the
main activities identified were; start-up, overheads, training, HIV counselling and testing,
and lay counsellor supervision. Each activity constituted of a number of inputs that were
identified, measured and valued (Table 1 (Annexe A), Paper IV). I was part of the
intervention from inception to end of implementation, hence I fully understood all the
activities.

Economists conceptualise costs in a broader way. They define costs in terms of the
alternative uses that have been forgone by using a resource in a particular way. These
economic or opportunity costs recognise the cost of using resources, as these resources are
then unavailable for productive use elsewhere.\textsuperscript{116} We therefore calculated and report
economic costs to indicate the full economic value of goods including donated items. Costs
per client tested were calculated for each alternative by dividing total costs by effectiveness
(number of people tested as a function of an increase in uptake).

3.5.4.2 Sensitivity analysis

Sensitivity analysis is a useful technique to assess the impact of the various sources of
uncertainty. It involves varying parameters over a chosen range using some or all of the
following methods: one-way, two-way, extreme scenario, threshold analysis and
probabilistic analysis. In the one-way method, one variable is varied at a time over a possible
range to assess the impact on the cost-effectiveness ratio.\textsuperscript{142} We examined the effect of
variations in uncertain variables on the cost-effectiveness ratios (CER) through one-way
sensitivity analysis. Variables tested were annual salaries of professional nurses and costs of
test kits.

3.6 MY ROLE IN THIS RESEARCH

As described earlier, the studies in this thesis were part of a randomised control trial, Good
Start. I was involved in all the studies presented in this thesis. My roles included; designing
of the studies, tool development, applying for ethical clearance, recruitment of data
collectors, lay counsellors and other project staff, training of data collectors and lay
counsellors, data collection, data collection supervision, data management, data analysis and
writing of research reports and manuscripts.

Specifically, I initiated and developed the endline survey tool (Paper II) with my colleagues,
designed the qualitative couples study (Paper III) and the economic evaluation study (Paper
IV). I also designed tools for the later two studies, sought and obtained ethical clearance,
implemented and oversaw study implementation and other related activities.
Further, for the analysis, I was involved in data analysis of all the papers (I-IV), and had full access to the data. I led and conducted the analysis for Paper I, in collaboration with my colleagues and statisticians. For paper II, I did parallel analysis when I needed to, as data for reporting had to be conducted independently by a statistician outside of the research team since the study was a trial. I contributed in clarifying any discrepancies in the reported results and revising the relevant statistics in the manuscript.

For paper III & IV, I led and conducted the analysis. In paper III, I conducted the analysis with two other colleagues. In Paper IV, I led and ran the analysis with the assistance of a health economist.

3.7 ETHICAL CONSIDERATIONS

The research protocols for Study I (Paper I) and the randomised control trial were granted ethics approval by the University of Western Cape (UWC) and the Medical Research Council (MRC) ethics boards. The Research Ethics Committee of the Medical Research Council granted ethics permission for both Paper III and IV. All participants gave their written and informed consent to participate in the studies. The trial was registered (ISRCTN31271935 http://www.controlledtrials.com/ISRCTN31271935).

To maintain confidentiality in Paper I, II and III, unique identifiers instead of names were used for participants during data collection and analysis.

However, during the home-based testing intervention, some participants had to be followed up, e.g. in cases of HIV positives, hence if these individuals lived in a household with other people, the counsellor needed to know their name for the specific follow up. This would not break confidentiality but it could be a risk to the individual (especially in instances where the individual did not want to disclose his/her HIV status), as other family members may have been curious about the counsellor visits.

In Paper III, a big ethical challenge was the process of couples revisiting their painful experiences since testing, as they had to relate them. Some individuals cried, related suicidal moments and other negative consequences yet as a researcher I often found myself not capacitated to offer them any immediate help other than letting them know where they could seek help, and yet knowing they were highly unlikely to seek that care.
4 MAIN FINDINGS

In this section, main findings taken from the results of all studies (Papers I-IV) are presented. Further, this section also includes unpublished data as we found them critical in enhancing understanding of study aims. There were crosscutting results from the 4 papers, thus main findings are presented under thematic sub-headings.

4.1 UPTAKE OF HIV TESTING (PAPER I & II)

The uptake of previous HIV testing was low at baseline in all the 16 study clusters (control and intervention communities combined). In total, 5,821 individuals participated of which 3,863 (66%) were women (Figure 6). Only 1,833 (32%) of adults in this community had ever tested for HIV. Prior testing was higher amongst women, with 39% of women reporting ever having an HIV test. We found an even lower (17%) testing rate among men (about half that of women), which could be attributable to the limited ‘non-clinical’ HCT services in this rural area where men are known to refrain from clinics and only access health care services when they are very ill.

![Figure 6: Graph depicting numbers of males and females and the total population who had previously tested for HIV compared to those not tested](image)

At endline (Paper II), the HIV testing uptake increased in the control and intervention communities, 31% to 47% and 32% to 69% respectively. The increase was higher in the intervention (HBHCT) arm, with a likelihood of testing about 1.5 times more than for people residing in the control communities, prevalence ratio, PR 1.54 (95% CI: 1.32-1.81) (Table 3). Worth noting is that the intervention effect on testing rates for men and women was similar with a prevalence ratio, PR 1.51 (95% CI: 1.29-1.78) for women and PR 1.52 (95% CI: 1.19-1.95) for men (Table 3).
Table 3: Estimates of effects of home-based HCT on prevalence of HIV testing

<table>
<thead>
<tr>
<th>Testing for HIV during the study period</th>
<th>Intervention arm n/N (%)</th>
<th>Control arm n/N (%)</th>
<th>Prevalence ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>1392/2025 (69)</td>
<td>997/2129 (47)</td>
<td>1.54 (1.32 - 1.81)</td>
</tr>
<tr>
<td>Women</td>
<td>1162/1541 (75)</td>
<td>808/1551 (52)</td>
<td>1.51 (1.29 - 1.78)</td>
</tr>
<tr>
<td>Men</td>
<td>229/484 (47)</td>
<td>189/578 (32)</td>
<td>1.52 (1.19 - 1.95)</td>
</tr>
<tr>
<td>First ever HV tested</td>
<td>640/1391 (46)</td>
<td>373/997 (37)</td>
<td>1.20 (0.97 - 1.49)</td>
</tr>
<tr>
<td>Test results received</td>
<td>1376/1391 (99)</td>
<td>966/997 (97)</td>
<td>1.02 (0.94 – 1.11)</td>
</tr>
<tr>
<td>HIV positive result</td>
<td>76/1276 (6)</td>
<td>85/841 (10)</td>
<td>0.65 (0.47 - 0.90)</td>
</tr>
</tbody>
</table>

At endline, 58% of the HIV testing uptake was attributable to being tested at home during the study period, while about 40% of respondents had tested in the clinic, an indication of the possible extended (secondary) effects of the intervention on overall increased awareness of HIV testing in this community. The proportion of first time testers was slightly higher for the intervention arm compared to control, 46% and 37% respectively, although the difference was not significant.

The prevalence of couple HIV counselling and testing was about twice as much as it was in the control arm PR 2.24 (95% CI: 1.49-3.03) (paper II).

4.2 FACTORS ASSOCIATED WITH HIV TESTING AND REASONS FOR NOT TESTING (PAPER I & II)

In gender stratified multivariate analysis, we found that significant factors associated with testing among women were; age, education, having a child under five, and current pregnancy while among men these included, age and socio-economic position (Table 4).

Women aged 25-34 years had the highest likelihood of having been previously tested adjusted OR 1.30 (95% CI: 1.05-1.66). As expected, a current pregnancy was a high predictor of HIV testing for women adjusted OR 3.31 (95% CI: 2.29-4.78). Further since women who have children under the age of 5 years are likely to have undergone antenatal care visits, having a child less than five years adjusted OR 7.00 (95% CI: 5.84-8.39) was also associated with previous HIV testing.

Older men (> 24 years) were more likely to report having tested for HIV previously, with the highest likelihood adjusted OR 4.02 (95% CI: 2.71-5.99) among men in age group, 35-49 years. In addition, men who used electricity as a source of cooking fuel and who had piped water inside the house or yard were more likely to test than those who used other sources of fuel and water respectively (Table 4). These variables were measures of socio-economic
position. Higher education attainment was associated with a higher likelihood of having tested among women adjusted OR 2.99 (95% CI: 1.68-5.33).
Table 4: Multivariate analysis of factors (selected) associated with previous HIV testing among women and men in rural Umzimkhulu sub-district of South Africa

<table>
<thead>
<tr>
<th>Variable</th>
<th>Females (n = 3863)</th>
<th>Males (n = 1958)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age group, years</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-24</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>25-34</td>
<td>1.32 (1.05-1.66)</td>
<td>3.44 (2.30-5.18)</td>
</tr>
<tr>
<td>35-49</td>
<td>1.00 (0.80-1.25)</td>
<td>4.02 (2.71-5.99)</td>
</tr>
<tr>
<td>50+</td>
<td>0.39 (0.31-0.51)</td>
<td>0.39 (0.31-0.51)</td>
</tr>
<tr>
<td><strong>Education Level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Primary school</td>
<td>1.82 (1.16-2.87)</td>
<td>1.22 (0.74-2.03)</td>
</tr>
<tr>
<td>Completed high school</td>
<td>2.03 (1.23-3.36)</td>
<td>1.28 (0.69-2.36)</td>
</tr>
<tr>
<td>Tertiary</td>
<td>2.99 (1.68-5.33)</td>
<td>1.17 (0.58-2.39)</td>
</tr>
<tr>
<td>Child under 5</td>
<td>*N/A</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7.00 (5.84-8.39)</td>
<td></td>
</tr>
<tr>
<td>Currently pregnant</td>
<td>*N/A</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3.31 (2.29-4.78)</td>
<td></td>
</tr>
<tr>
<td><strong>Cooking fuel</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Paraffin/kerosene/gas</td>
<td>0.96 (0.72-1.28)</td>
<td>1.18 (0.77-1.78)</td>
</tr>
<tr>
<td>Electricity</td>
<td>1.05 (0.85-1.31)</td>
<td>1.42 (1.04-1.93)</td>
</tr>
<tr>
<td><strong>Drinking water source</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All other sources</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Piped (inside house and yard)</td>
<td>0.88 (0.65-1.18)</td>
<td>1.66 (1.14-2.4)</td>
</tr>
</tbody>
</table>

*Variable was either not applicable for the gender specific model or it was dropped by the model while running the multivariate regression

At endline survey (Paper II), participants who had never had an HIV test cited the most common reason for not testing as “didn’t think I was at risk of getting HIV” (74% in the intervention arm; 78% in the control arm).

4.3 IMPACT OF HBHCT ON SEXUAL BEHAVIOURS (PAPER II & III)

Post-intervention, the HBHCT intervention demonstrated benefits beyond increasing HIV testing prevalence. We found a significant effect on sexual behaviour, where the intervention had a protective effect against having more than one sexual partner in the past three months, which was 55% lower in the intervention arm (Figure 7). The effect was strongest among those who had been tested as they were 63% less likely to report having multiple partners, PR 0.37 (95% CI: 0.24-0.58). The intervention showed a smaller effect on casual partnering in the past 3 months where people in the intervention had a 45% less likelihood of having
had a casual partner. Similarly, the effect was strongest among those who reported having tested for HIV, PR 0.50 (95% CI: 0.36-0.72), Figure 7.

![Figure 7: Prevalence ratios and 95% confidence interval of effect of HBHCT on sexual behaviour outcomes](image)

These findings were complemented by in-depth qualitative interviews with couples who reported reducing partners once they knew their status (Paper III). In all cases, it was men who reported having had multiple sexual partners.

I was sexually active with other people before I was tested. There were two of them and one of them got married and I had not been tested during that time when she got married. I left them once I found out about my status (discordant couple, individual interview, man 50 years, unpublished data)

I have been in too many relationships in the past, I can’t even remember. I had them, yes, but since I tested I don’t have them, I had them before… I did it (quitting extra sexual relationships) because I was sick. I saw that I had to forget about it now (concordant positive, individual interview, man, 57 years)

In Paper III, although knowledge of status illuminated women’s vulnerabilities, we found that men especially in concordant negative couples were empowered by knowledge of their HIV status and it made them consider abstaining from risky sexual behaviour. Testing seemed to have been an awakening of the importance of fidelity as men expressed wanting to end any extra sexual relationships. Men were relieved to know they were HIV negative and for them this was an incentive for fidelity and change of behaviour.

…After the counsellor tested us, we were relieved and then I thought if I was doing something on the side then I would have made up my mind to stop now that I know my status. (Concordant negative, combined interview, man, 41 years)

Condom use at last sex was 24% (206/868) in the intervention arm and 28% (332/1185) in the control arm, PR 0.86 (95% CI: 0.65-1.15). Condom use seems very low in this population which is concerning especially in such a high HIV prevalence setting. Data from
qualitative couple interviews (study III) showed that even after getting an HIV positive status, some men still did not want to use condoms while for women, it was apparent that condoms became important if they had to engage in sexual activities. These accounts were from concordant positive partners since they still engaged in sexual activities while, sexual intimacy was lost among discordant couples.

…That tends to be difficult here at home because my husband is not comfortable with it; he says it is difficult for him to use it, so we don’t use condoms at all. That is the reason why I asked if he were to have another woman not knowing how healthy the other woman is and we are already infected, will that not be adding on to us? The second thing is that, I know that he doesn’t like using a condom so we don’t use it so, I am sure he is not using it outside as well (Concordant positive, combined interview, woman, 37 years, unpublished data).

4.4 PARTICIPANT PERCEPTIONS OF HOME-BASED TESTING (PAPER II & STUDY III UNPUBLISHED DATA)

During the endline survey (Paper II), when asked how they perceived home-based testing from their experience of testing at home, 85% of participants rated the quality of counselling given by the lay counsellors as good or very good and only 3% said that they did not trust that the counsellor would keep their information confidential.

Similarly, during in-depth interviews in Paper III, couples mentioned that they preferred home-based HIV testing to facility based testing as they felt that they had a choice to refuse or agree to test when in their own space. Participants also had confidence in the lay counsellors.

…I thought it was a good thing young lady; I also liked the fact that we didn’t have to go to the clinic. Because if you go to the clinic, and maybe start getting scared, then you change your mind. I think it’s better at home, you feel free at your own home, she explained everything to us here and told us it is important to test and know your status. Another thing that we liked is that the counsellor would do her business then leave, there is no problem, if you decide you do not want to test then it is up to you why you don’t want, then she would leave. Unlike going to the clinic, you might go to the clinic, then get scared and then end up coming back home without doing what you were there for (Concordant negative, combined interview, woman, 35 years, unpublished data).

4.5 EXPERIENCES OF COUPLES TESTED TOGETHER DURING HBHCT (III)

In paper III, couples interviewed had remained together for two years since mutual knowledge of their HIV status. In many of the couples’ accounts, learning about each other’s status together challenged relationships of the couples in different ways depending on HIV status and gender. In discordant partnerships, men were in all cases but one the positive partners. In the analysis the main theme, ‘testing together challenges the relationship’ was developed based on the sub-themes: ‘Knowledge (of HIV status) is empowering?’ ‘Intimacy lost and found?’ and ‘To trust or mistrust?’. There was evidence that supports but also contradicts positive outcomes and experiences of the testing, which we attempt at reflecting in the ambiguity of the sub-themes. The testing experience is evidently not placed in a
neutral ground, but is highly dependent on prevailing gender structures, which e.g. seemed to impair the potential of empowerment for women.

4.5.1 Knowledge (of HIV status) is empowering?

The study setting is that of a patriarchal society, characterised by prescribed roles for men and women. Women are socialised to be powerless, economically dependent on men and constrained within discourses of cultural obedience while men make decisions (including those of sexual nature) on their behalf\(^{48,143}\). In Paper III, women’s stories revealed their vulnerabilities and lack of decision-making power. By learning their partner’s HIV status, women’s immediate emotions ranged from anger, hurt, and even separation where they left their husbands. Further, in this setting, the society expects women to endure hardships that come with marriage. Women, who had left their partners, were obliged to come back. Reasons for coming back included, persuasion by in-laws, and fear of being gossiped.

…. He would come and look for us and apologize and I would come back and his family would come as well and they would apologize as well on his behalf and beg me to stay. I get tired living with someone who doesn’t even support his household because he doesn’t even give me money, because now I live off the children’s grants, before that life was very difficult for us. (Discordant, individual interview, woman, 32 years)

…. I was afraid that if I stayed a long time at home people were going to start gossiping about me and say I left my husband because he was sick. That is why I came back. (Concordant positive, individual interview, woman, 23 years)

Men especially in concordant negative couples were empowered by knowledge of their HIV status and it made them consider abstaining from risk behaviour. Testing seemed to have been an awakening of the importance of fidelity as men expressed wanting to end any extra sexual relationships while for their partners, a concordant negative status meant women were willing to start afresh and overlook infidelity. Men were relieved and for them this was an incentive for fidelity and change of behaviour.

….After the counsellor tested us, we were relieved and then I thought if I was doing something on the side then I would have made up my mind to stop now that I know my status. (Couple 3, concordant negative, combined interview, man, 41 years)

….I learnt to behave myself in a good way. I must just focus on my wife and no one else, not other women (Concordant negative, combined interview, man, 68 years)

4.5.2 Intimacy lost and found?

Discordant couples particularly faced more challenges than other couples. Women found themselves in a situation where they were constantly scared of being infected by their positive partner. These couples were ultimately characterised by loss of sexual intimacy, strife and women receiving threats of being left for a ‘girlfriend’. Women did not know how to cope with their situations and came up with excuses to not engage in sexual intercourse even in the presence of condoms. However, due to the deeply rooted power imbalance that resurfaces women subordination in these relationships, women were coerced into having sex. Sex refusal thus subjected women to possible physical and sexual intimate partner violence.

It was clear that regardless of the men still dominating women, there had to be negotiations
of men’s actions, for example when and how they have sex with their partner which was highly unlikely the case before knowledge of HIV status.

**Woman**… Ever since we found out about his status, I just don’t feel like having sex with him. Sometimes when he asks me, I tell him that I’m tired and sometimes tell him that I don’t want to have sex with him… Sometimes he pushes me away and says that the reason I’m like this is because of his status, and I would say I just don’t have any feelings… I do it (have sex) even when I don’t want to sometimes. (Discordant, individual interview, woman, 32 years)

**Man**… Things have changed, when we get into bed, things get difficult. She doesn’t want to have sex with me anymore, she just gets irritated, and when we do have sex I see that she is not into it even though I have a condom, I can feel her body tense, she gets like that you see. With other things, she is ok, she cares, she is her old self with other things but when we have sex, she just doesn’t want anymore, she even told me that she doesn’t want to have any more babies… I told her I think it’s best that she leaves so that I know I don’t have a wife, I would rather have a girl friend who I will tell that I will only use a condom when we have sex (Discordant, individual interview, man, 50 years, unpublished data)

Contrary to feelings and experiences of discordant couples; concordant positive couples easily accepted their positive HIV status and were ready to take further steps to access the care and treatment they needed since they had suspected infection. As such, for these couples, issues of blame, fighting and anger were subtle.

**Woman**: … I was relieved young lady because we found out something we suspected that we had, we knew there was a possibility of us having it…. So we had the results and we saw that we needed help. So we were happy when we saw people from Good Start. They were a huge help I don’t want to lie. There was a change between us because we had differences we were arguing about. This thing made us sit down and talk things through. No shame everything is now good, we live for each other. We are very happy. (Concordant positive, combined interview, woman, 37 years)

**Man**: … I would like to add on what my wife had already said. We do have our differences sometimes but we also see that what we are doing is not going to get us anywhere. Because we know we need to support each other so we can carry on with our lives, and be there for each other. Our relationship is very good, and she supports and encourages me most of the time. She is the one who has made me accept my status. She tries and builds me up when I’m feeling down. She counsels me and supports me, and she doesn’t blame me for anything. (Concordant positive, combined interview, man, 37 years)

4.5.3 To trust or mistrust?

The meanings of HIV status became critical for couples and introduced new ways of relating to each other. There were both negative and positive consequences of mutual HIV status knowledge. In this setting, where multiple sexual partnering by is a celebrated norm by men mistrust is constantly present. Concordant negative couples were ecstatic about their status and men in these couples promised behaviour change, while women forgave suspicions of infidelity and chose to move on and continue with their partner, as they felt relieved. Trust was renewed in these couple relationships.
...I saw it as a way to regain our trust because in as much as we never mentioned this, there was mistrust, and so it brought relief, and renewed our trust. We might not have been saying it but we didn’t trust each other. It is good, very good because you feel free after you have tested (Concordant negative, combined interview, man, 62 years)

...Testing made us have trust in one another and to keep in mind that we must keep ourselves for one another (Concordant negative, combined interview, woman, 44 years)

Meanwhile, for discordant couples, women mentioned that their suspicions were proven by the test result since having a discordant result where the man was positive was translated as infidelity from the male partner. Further, characteristic of relationships in a gendered society where power is imbalanced in favour of men, the HIV test result exposed distinct vulnerabilities for women. Though some women reported that it was unnecessary to ask questions, it was apparent that they did not have the capacity for any actions but to live with the newly found status and accept the situation.

... I suspect he had sexual partners here in the village. Our test results would have been the same if he did not have other sexual relations but they were different. I did not need to ask him about his extra sexual partners, those questions were not needed as the results speak for themselves (Discordant couple, woman, 54 years)

4.6 COST-EFFECTIVENESS OF HBHCT INTERVENTION (PAPER II & IV)

Overall, home-based HIV testing was accepted in this community. Notwithstanding the importance of other HCT delivery approaches, home-based HIV testing has been shown to be effective and acceptable in other African contexts. Our findings demonstrated that HBHCT was more cost-effective than clinic HCT (Paper IV). The total annual cost of implementing the vertical Good Start HBHCT intervention was US$233,239 while the clinic HCT total annual cost was US$146,615. Although the total economic cost was higher for the HBHCT intervention, calculating the cost-effectiveness demonstrated that the intervention was more cost-effective. Thus, the costs per client were US$29 for HBHCT intervention and US$38 for clinic HCT (Table 5).

<table>
<thead>
<tr>
<th></th>
<th>HBHCT intervention</th>
<th>Clinic HCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target population</td>
<td>22,099</td>
<td>23,864</td>
</tr>
<tr>
<td>Increase in uptake (%)</td>
<td>37%</td>
<td>16%</td>
</tr>
<tr>
<td>Effectiveness (% increase in uptake x target population)</td>
<td>8177</td>
<td>3818</td>
</tr>
<tr>
<td>Total annual costs (US$)</td>
<td>233,239.02</td>
<td>146,615.12</td>
</tr>
<tr>
<td>Cost (US$) per client (Total annual cost/effectiveness)</td>
<td>29</td>
<td>38</td>
</tr>
</tbody>
</table>

The biggest cost drivers for clinic HCT were: overheads making up 8% of the total cost; training (4% of total cost); and the activity HIV counselling contributing 80% to the total cost. For the HBHCT intervention, activities that accounted for the biggest share of the total
cost included, lay counsellor supervision, accounting for 56% of the total cost, HIV counselling and testing (38%) and start up costs contributing 3% to the total cost. In both alternatives, personnel costs were the biggest cost driver for supervision and HIV testing activities. (Paper IV, Table 3)

Since the presented HBHCT intervention was a vertical run programme, we estimated costs of running a community home-based HCT intervention (operational scenario) integrated into other community care activities, as this would likely be the approach adopted by many governments for wider implementation. The operational scenario costs were compared with the standard of care, clinic HIV counselling and testing (Paper IV, Table 5). The total annual cost of the clinic was $146,615 per 23,864 people while the operational scenario cost $24,430 per 7,660 people. If the same population of 23,864 people were to be covered by the operational scenario, the cost would be approximately $73,291 still less than clinic HCT costs. Cost drivers in the operational scenario were in the same direction as those of the intervention. The biggest cuts in cost were in the following activities: overheads, supervision and HIV testing activities due to time apportionment between activities. The biggest variations in costs between clinic HCT and the operational scenario were again due to personnel costs.
5 DISCUSSION

5.1 METHODOLOGICAL CONSIDERATIONS

Strengths and Limitations
This section discusses strengths and weaknesses of the study design, sampling, data collection and analysis, which may have contributed to strengthening or threatening internal validity.

Overall, the strength of this thesis and findings thereof is that all the papers are based on studies nested within a cluster randomised control trial (RCT). A RCT design has several advantages, including reduced selection bias through use of computer generated randomising clusters in the ratio 1:1, resulting in even distribution of any confounders in the different arms. HBHCT studies have mostly been descriptive and observational in design.117

Adjusting for clustering allows for estimation of valid standard errors and confidence intervals, otherwise, failure to adjust for clusters results in invalid statistical significance of results.124,127

A possible limitation to the trial reported findings in this thesis (Paper II) is that during the study period, the national department of health launched a mass HCT campaign that probably contributed to the observed increase in HCT uptake, thus perhaps reducing the actual differences in impact of HBHCT versus clinic HCT.

The strengths for both Paper I and II is that they were based on large community-wide surveys with a high participation rate, which minimises any selection bias

Both Paper I & II used cross-sectional surveys. Use of this method over longitudinal cohorts and possible advantages, disadvantages and relevance of each method were discussed under the section ‘rationale for chosen study designs’.

The surveys on which Paper I and II are based were carried out by two different groups of female data collectors at each point in time. During training sessions for the endline repeat survey, due to the nature of questions in the tool, it was not possible to blind data collectors to details of the intervention.

We cannot rule out social desirability causing a bias in the respondent’s answers during both surveys for Paper I & II since respondents may have felt they should report having tested. However, there is no reason to believe this bias would have been systematic, thus it would not result in overall over-reporting of the outcome. In addition, it is possible that some people may have tested for HIV but forgot thus introducing a recall bias that would underestimate HIV testing prevalence. However it is highly unlikely that people would forget testing for HIV due to the high stigma levels associated with HIV infection.

In paper I, a limitation was that we did not ask the participants why they tested or did not test previously and are thus unable to understand the underlying motivations to test or avoid
testing in this specific population for that time period. Thus we could not compare baseline and endline reasons for testing or not testing. Such a comparison would have allowed us to ascertain some reported barriers to testing and whether HBHCT is an appropriate approach for addressing these barriers. Also, for Paper I, it would have been valuable to ask participants how recently they had tested since this would have indicated whether individuals are testing regularly according to the national guidelines. Since people may have tested several years prior to the survey, recall bias regarding place of testing is possible.

In Paper II, secondary outcomes were only measured at endline. It would have been valuable to measure these both at baseline and endline and observe their patterns over 2 years, especially for sexual behaviour outcomes. However, due to the RCT design, we were able to compare the impact of the HBHCT on these outcomes by comparing the intervention arm versus the control arm.

We had low precision of effect estimates for some secondary outcomes in Paper II, e.g. stigma, and that limited our ability to detect significant differences. For questions related to sexual risk behaviour, validated tools with indices of self-reported sexual activities were used. These questions included whether a person has performed the behaviour and frequency, stratified by partner type. Furthermore, we restricted the questions related to number of partners to the previous three months and for condom use to the previous 30 days to minimize measurement error. We did not ask about long-term concurrent partnerships, which may pose a major risk for HIV acquisition.

**Generalisability (Paper I, II & IV)**

The generalisability of these study results should be considered in light of the context. This study was undertaken in a rural, predominantly female-headed area of South Africa, with migration of males for work. The mean age of participants for both paper I & II was 41 years. Further, uMzimkhulu is a hard to reach rural area with poor infrastructure and the intervention being evaluated utilized district standard operating procedures, and testing equipment obtained from local clinics. Thus the study provides insights on operational issues that are likely to be similar for many rural settings utilizing HBHCT, and the results could hence advise wider implementation. For paper IV, our findings may be adaptable to similar settings but differences in infrastructure, health system functioning and economic climate should be considered.

**Reflexivity (Paper III)**

In qualitative research, the researcher is a tool through whom meanings of data are constructed, thus reflecting on what the researcher contributes, researcher’s qualifications and experience is critical. In order to avoid imputing meaning, the first step of moving from meaning units to codes was at the manifest level of content qualitative analysis.

I was the only interviewer during the data collection. As a female, relatively younger than most of the individuals interviewed, asking men and women sensitive issues including their sexual activities may have affected the responses that I got from them. We do not know how couples would have responded if the interviewer was a man. Perhaps men would have opened up more seeing that the study setting is patriarchal and gives a higher status to man. However, the community is used to research activities and often carried out by women researchers.
Trustworthiness (Paper III)

In qualitative research, the concepts credibility, transferability and dependability are used to describe various aspects of trustworthiness. Graneheim and Lundman., 2003 describe that one way of assessing credibility is to seek for agreement among co-researchers, experts and participants. To facilitate credibility in the couple interviews (paper III), interviews were conducted with both partners together (14 couples), then individually (28 individuals). Having both couple and individual interviews would give us the opportunity to hear the views of the couple, what they were prepared to say in each other’s presence, and what they would say as individuals. It gave the interviewer the opportunity to compare the information shared and follow-up on things said in the couples’ interviews and ask for clarifications. Individual conversations gave participants the opportunity to express themselves without feeling the pressure of their partner. To avoid misunderstandings, interviews were continuously summarised and the participants asked to confirm. To further strengthen credibility, the results were discussed within the research team including both insider (first author and a local researcher) and outsider (Swedish HIV and AIDS researchers’) perspectives. Discussing of results was a process and we kept referring back to the original transcripts to ensure that interpretation remained close to descriptions in the interviews.

Transferability (Paper III)

Transferability is the extent to which findings can be transferred to other settings or groups. The findings in this study refer to a local community in rural South Africa, but the findings relate to phenomena common in many societies such as gender imbalances outweighing knowledge about needed behaviour change, the difficulty of upholding fidelity and ability to trust each other in a context of accepted multi-partnering (by men for men) and the difficulties in managing sexual desire and intimacy in a discordant couple. Thus the findings can be relevant in many settings with similar social constructions.

The findings in this study represent what the participants shared about having tested together two years after the test. It gives information about the experiences of how couples managed their lives together after the mutual knowledge about their status. Views and attitudes to testing together among those who decided not to take the test will be different and needs further study. During interviews some participants did not speak openly about their situations probably due to the sensitive nature of the issues discussed. Furthermore, the four youngest couples had all separated and could not be interviewed, as they were not available as a couple. These younger couples did not have the same motivations as older couples to remain in their relationships. These were the discordant couples with a positive woman; unfortunately no discordant couple where the woman is positive was available for interviewing.

Internal and external validity of the economic evaluation (Paper IV)

Economic evaluation’s assessment for validity (both internal and external) is not identical to that of epidemiological studies. Drummond et al., 2007 provides a ten point checklist for assessing economic evaluations. The checklist statements considered when conducting this cost-effectiveness analysis were; formulate a well-defined question in answerable form, describe the competing alternatives, try to establish the effectiveness of the intervention, try to identify all important costs and consequences, try to measure costs and consequences in appropriate physical units, if necessary, adjust costs and consequences for differential timing, and try to make a sensitivity analysis. Uncertainty in economic evaluations can arise from
data sampling variation, extrapolation, generalizability, and analytical methodology. Uncertainty was addressed using a sensitivity analysis.\textsuperscript{142}

The costing perspective was a provider’s perspective\textsuperscript{116}, thus client costs were excluded. We suggest that there were very minimal client costs if any. Costs that would have been incurred by clients include; transport costs to health services, absenteeism from daily activities such as working in the fields, and time spent accessing health care. We consider client costs minimal here, because we visited and tested people at their home, thereby benefiting the patients/clients by avoiding transport costs that would otherwise have been incurred if they had to access HCT services at health care centres.

Testing uptake is an important public health preventative measure; however, it is not an end point measure.\textsuperscript{116} Knowledge of HIV status facilitates access to treatment for those who are infected and can promote preventative behaviour for those who are negative. Hence, end point outcomes for an HIV prevention strategy include: HIV infections averted or time to accessing care (e.g. CD4 count performed, initiating ART) for HIV positive individuals. HIV infections averted would have been the ideal outcome. However, estimating HIV infections averted would have required modelling, since infections averted were not measured in the trial.

Data for the cost-effectiveness analysis were collected retrospectively, thus we cannot rule out recall bias during the informal interviews conducted.

We did not compare HBHCT with other alternatives of delivering HCT that are also utilised in the study setting, for example mobile VCT, HCT campaigns etc. This was beyond the scope of our aim. Further, we decided to specifically cost clinic HCT, as it is the standard of care often used in South Africa and in this area as demonstrated by results in paper I where the distribution of testing locations was highest in clinics followed by hospital. Also, in paper II, testing locations in the control arm were consistent with those reported in paper I.

**Triangulation (Paper I-IV)**

There are different forms of triangulation, but overall the concept refers to applying multiple methods to examine a single problem. Patton, 1999 identifies four types of triangulation; methods triangulation, analyst triangulation, triangulation of data sources, and theory/perspective triangulation. To give a holistic picture of the impact of HBHCT, this thesis used methods triangulation through a combination of qualitative and quantitative methods and analyst triangulation.\textsuperscript{145} Paper I and II used cross-sectional surveys for data collection and mixed effects models for analysis, while in paper III, we used qualitative interviews to collect data and content analysis to understand meanings of these interviews. Further, in paper III, we employed analyst triangulation as different researchers conducted the analysis by reading transcripts, discussing codes, categorising codes and developing sub-themes and an overarching theme. This process was achieved through several meetings until consensus was reached.\textsuperscript{145} In paper IV, triangulation of data sources was employed through use of records and supplementing and complementing these through informal interviews with key personal in the different arms. Findings in this thesis are presented in a way that demonstrates how different sources of data and analysis answered one overall aim.
5.2 DISCUSSION OF FINDINGS

5.2.1 Use of HIV testing services in South Africa

In paper I, only 32% of participants reported ever having an HIV test. KwaZulu-Natal province, is one of the three provinces with the highest prevalence of HIV (national and antenatal) in the country and yet HIV uptake is low.\textsuperscript{11} Lack of HIV status knowledge, and denial about HIV status are some of the barriers to HIV prevention and treatment. Social marginalisation and discrimination continue to perpetuate among people affected by HIV.\textsuperscript{146} This has hampered efforts that encourage knowledge of status as few people end up testing. Previous studies demonstrated that one in five South Africans who had knowledge of HIV counselling and testing services actually accessed them.\textsuperscript{146}

Rehle et al., 2010 demonstrated an increase in the proportion of young women who tested for HIV in the last 12 months, from about 13% in 2005 to 30% in 2008. By 2008, more than 50% of 15–24 year old women [52.7% (49.6–55.9%)] had ever been tested for HIV, compared with only one in eight [13.2% (10.8–16.2%)] reported in 2002.\textsuperscript{30} South Africa adopted the provider initiated counselling and testing (PITC) policy between 2007 and 2008.\textsuperscript{61} In the period 2005-2009, there was an increase in HCT nationally. In 2008/9, 96% of public health facilities in the country offered VCT against a target of 100%, and about 25% of adults had been tested and received their results in the past 12 months against a target of 11%, still relatively low for a country like South Africa with the highest burden of HIV in the world.

In an effort to increase HCT rates in the country, the government launched a national mass HCT campaign in April 2010 to encourage 15 million people to test for HIV. At the end of the campaign in June 2011, 14.8 million counselling sessions, 13 million HIV tests and 8 million tests for TB had been conducted, although there was no record of referrals for HIV positive clients.\textsuperscript{9} In addition, South Africa is currently still scaling-up its PITC model to extend access to HCT at health facilities. However, despite the efforts of local and international HIV groups, and increased HCT services at public health and non-governmental sites, utilisation of HCT services remains low while the epidemic is unrelenting.\textsuperscript{9}

5.2.2 HIV testing: facilitators of and barriers to uptake

Reasons for low uptake exist at the individual level, as well as the broader institutional and structural levels that influence individual behaviour. Individual factors include, fear of getting a HIV positive result, disclosure of an HIV positive status, and discrimination, among others.\textsuperscript{146} In paper II, a high percentage of participants considered themselves not at risk hence they had not tested. It has previously been shown that perceived low risk of HIV infection has contributed to low HIV testing rates.\textsuperscript{16,23} Women’s fear of violence by an intimate sex partner has been cited as one of the major barriers to HCT uptake.\textsuperscript{147} Real and perceived stigma and discrimination remain the biggest barriers to widespread implementation of HCT in many high prevalence contexts\textsuperscript{15}, inadvertently undermining the benefits of HCT delivery approaches. In South Africa, lack of trust in the health system, and health worker attitudes\textsuperscript{148} are some of the health system factors contributing to low uptake of HCT.

To understand why testing rates were low in rural Umzimkulu sub-district, we examined factors associated with testing by gender and found that men who were likely to report having tested were older in age, 35-49 years (Paper I). This is an encouraging finding in the
South African context since the national HIV prevalence and behaviour surveys conducted since 2002 to 2008 have revealed that men in this age group (30-44 years) have particularly high HIV prevalence rates compared to age groups outside of this bracket. Further, given the history of intergenerational sex (age mixing), an important social determinant of HIV infection that characterizes the sexual patterns in this context, men in this age group can be classified as a high-risk for teenage girls. In South Africa, there was a substantial increase in percentage of teenagers who had an older sex partner, from 9.6% in 2005 to 14.5% in 2008. Among females, the same pattern was observed with a percentage increase from 18.5% in 2005 to 27.6% in 2008. Thus concerted efforts on HIV prevention among these groups should be realised.

Men of higher socio-economic position were also more likely to report testing compared to those of lower status, an indication of inequalities in access to care and inadequacy in universal access by the current HCT delivery approaches for certain populations. Evidence from previous research also indicated that higher socio-economic groups were found to be more likely to use HCT.

In the review by Sabapathy et al., 2012, 47% of those tested during HBHCT were men, a considerably higher rate compared to the 9% testing rate among males presenting in clinics. Men in this setting usually refrain from HIV testing services and sometimes use proxy testing where they rely on their partner’s HIV status with the belief that their statuses will be the same. In general, the patterns of HIV testing among men have been consistently showing low levels. In 2012, the UNAIDS reported that surveys conducted between 2004 and 2011 in 14 SSA countries showed that women’s testing rates tended to be higher. The report also indicated that the proportion of adults who had taken an HIV test in the previous 12 months had significantly increased.

In the baseline (Paper I), there were differences in testing and factors associated with having had an HIV test between men and women, while at endline (Paper II), men and women in the intervention group had similar likelihood for HIV testing. The intervention data of the trial being evaluated in this thesis also showed a relative increase in men’s testing rates with 70% of all men testing while in the whole study sample, 26% of men were tested for HIV. The increase in HCT uptake among both men and women is evidence that the HBHCT approach may achieve an equitable coverage than clinic based HCT. HBHCT first became popular in Uganda and Zambia as part of population based HIV surveys. Consequently, more studies in high HIV prevalence settings in SSA consistently reported high acceptability and feasibility of HBHCT.

Worth highlighting are findings from Fylkesnes et al., 2013, in an RCT of HBHCT that demonstrated a strong effect of HBHCT on acceptance and equity. At baseline, this study showed that the likelihood of being tested was higher for women than men and for more educated people. However, at the end of the study, these social differences in uptake were diminished in the intervention arm. Mutale et al., 2010 and Helleringer et al., 2009 also indicated that the home-based approach might achieve a more equitable service coverage than clinic based HCT. Paper I showed that, among women, factors associated with testing included; current pregnancy, having a child under 5, age group 25-34 years and having attained tertiary education. All (except education) these are PMTCT related factors and this may be an indication that PMTCT services are well functioning in this area. In fact, South Africa’s PMTCT programme has seen very commendable achievements with about 87% of HIV
positive women receiving ARVs to reduce the risk of mother-to-child transmission (MTCT) in 2011. Further, a 2010 national PMTCT evaluation survey showed that MTCT rates declined from 8.5% in 2008 to less than 4% in 2010, a direct impact of the accelerated programme for the elimination of vertical transmission.6

Our finding that pregnant women and those who had children were more likely to test explains the emphasis that has been previously placed on male involvement in PMTCT or ANC services.100 In this way, these programmes may reach more men and increase HIV testing rates for both men and women. The example of the Rwandan model of couple HCT that fosters male involvement in PMTCT provided promising evidence of this.160 Previous studies have reported barriers to male involvement in PMTCT including, health worker attitudes, unstable and distrustful marriages, and fear of conflicts with partners.7 These barriers highlight some of the complex issues that undermine efforts to get more men to test.

In line with our findings of high education attainment association with prior testing among women, Peltzer et al., 2009 found that among other factors, being female, higher educational level, age group 25-34 years old were associated with having had an HIV test in the past 12 months.160 Further, a national HIV incidence and behavioural survey also reported that testing was positively associated with education, household resources, knowledge that HIV causes AIDS, discussions with partners about HIV prevention and condom use at last intercourse (among those testing positive) but negatively associated with African race, the number of sexual partners and living in rural areas.23 In another study conducted in rural Eastern Cape province of South Africa, authors reported that, for both males and females, the probability of being tested was generally tied to age and education, as well as to psychosocial indicators such as absence of stigma and knowing someone with HIV/AIDS. Women with a secondary education were more than five times as likely to use VCT. Among men, HIV testing was not significantly different between education levels.150

Given the discussed reasons for low HCT uptake, HBHCT has potential to address some of the barriers especially for rural populations and other 'hard to reach' groups such as men and couples. Hutchinson and Mahlaelela., 2006 found that, distance to a clinic was a predictor for uptake of testing. Every kilometre in distance from the clinic offering HCT reduced the likelihood of testing by 0.7% among men, while among women, each additional kilometre was associated with a 0.4% reduction in the likelihood of testing.150 Bringing services closer to communities will address among others, barriers such as transport costs, and distance to health facilities and in turn contribute to increases in uptake of HIV testing.

In line with evidence from other studies, this thesis contributes findings demonstrating a higher likelihood of testing for people in the intervention arm versus the control arm [PR 1.54, 95% CI: 1.32 to 1.81] (Paper II). Our finding that 58% uptake of testing was attributable to having received testing at home (Paper II), although modest, shows that HBHCT was acceptable in this community where prior testing rates were as low as 32% (Paper I). Further, the overall effect of the intervention resulting in an increase to 69% is evidence that people in this community had become aware of HCT. The increased HCT uptake also observed in the control arm is possibly attributable to the HCT campaign that was launched by the department of health during the study period. In reality, multiple interventions occur simultaneously and it is often a challenge to distinguish the impact of specific interventions where there are no external influences.

We demonstrated that HBHCT is a cost-effective alternative compared to clinic HCT with the average cost per client, $29 and $38 for HBHCT versus the clinic respectively (Paper IV). The notable differences in costs between HBHCT and clinic HCT were in the start up,
supervision and HIV counselling and testing activities. Supervision was a central and critical part of the intervention hence it was of high intensity with one supervisor in charge of two lay counsellors. Overall, salaries had the biggest share of total costs for both HBHCT and clinic HCT. In the clinic arm, nurses provided supervision to lay counsellors for about 8% of their time; hence the cost incurred for this input was low. In addition clinic nurses also tested clients for approximately 7% of their time. As a result, the activity ‘HIV counselling and testing’ had high costs for personnel (Table 3, Paper IV). In settings where lay counsellors/community health workers (CHWs) have demonstrated competence in conducting HIV testing, task shifting this role from nurses would likely save costs.

One of the reasons why implementation of effective programs is not happening at a big enough scale is due to scarcity of evidence on cost-effectiveness of HIV prevention programs. A cost-effectiveness study of clinic HCT by Sweat et al. 2000 reported per client costs of US$29 in Tanzania and $27 in Kenya.162 In another study, Menzies et al., 2009 reported per client costs of US$8.29 and US$19.26 for door-to-door and clinic HCT respectively.93 It is difficult to compare cost-effectiveness results across studies due to perhaps different parameters and assumptions used in calculating costs, time horizon, economic climate and contexts.

We modelled the operational scenario based on the current South African PHC re-engineering outreach teams structure to reflect real life setting costs. Through the operational scenario, we showed that integrating HBHCT into community programmes substantially reduces costs, thus HBHCT is a relatively cheap way of delivering HCT compared to the clinic. The scenario may be used to inform program scale up. It should be noted though that in scaling up, factors such as administrative infrastructure and other critical inputs might be lacking or different in other settings hence would need to be established prior. Further, the cost of scaling up depends on the patient demand for the services offered.163

This evidence should inform policy for wide scale implementation of the HBHCT approach. The evidence that HBHCT is a cost effective approach (Paper IV) and reaches ‘hard to reach’ populations (Paper II) should be coupled with previous findings that the approach allows for early identification of asymptomatic HIV infection117 to optimise its benefits, to individuals who otherwise do not have a health seeking behaviour or whose access to health services is limited.

5.2.3 Experiences of couples tested together

In paper III, we found that testing together had both negative and positive consequences for couples. Couples were forced to face their situation and find ways of coping in their relationships. Our findings highlight the couples’ ability to act on knowledge, while illuminating women’s (for those in concordant positive and discordant partnerships) lack of power to act in a way that protected them.

Couple testing benefitted concordant negative couples since trust was regained in these relationships. Moreover, men realised the need for behaviour change including ending extra sexual relationships. The question though is how sustainable this behaviour change would be if implemented. This has important implications for long term HIV prevention. A focus on the number of couples tested without paying attention to the short and long-term effects on behaviour change will not reap benefits of the prevention efforts.

Discordant couples faced more challenges than concordant couples. In discordant couples, the negative partner, usually the woman was faced with the challenge of maintaining an HIV
negative status in a relationship that was characterized by male dominance. As a consequence, women refused to engage in sexual activities due to fear of infection, a finding that has been reported by others previously.\textsuperscript{164,165} For both men and women this was difficult to handle, and often fostered subordination, intimate partner violence (IPV) or the man mentioned finding other sexual partners to satisfy his desire, which would increase the woman’s vulnerability. This has implications on long term sexual desires not only for men but women too. If women refused to have sex with men because of an HIV positive status, these women are likely to end up having sex with other men and the same for the male partners. This represents the complexity of HIV/AIDS, whereby knowing a positive HIV status might increase the risk of HIV transmission by widening/broadening the sexual networks.

Communication about STIs and HIV/AIDS is difficult in many contexts as it may be interpreted to mean suspected infidelity. Either partner could be accused of having extramarital partners, being infected, or promiscuous if they brought up the subject especially in high HIV prevalence settings.\textsuperscript{166} Often the mutual responsibilities of both men and women in reducing risks of HIV transmission cannot be realised partly because women have unequal access to prevention methods for example distribution and availability of condoms has been higher for men. Further, in the South African context, men have not been actively involved in reproductive health and maternity care.\textsuperscript{167}

Similar to our findings of the impact of societal prescribed roles for men and women, Bhagwanjee et al., 2013 found that gendered positioning (by self and others) is critical in the way couples experienced HIV and ARV treatment, and undermined the positive role of a couples counselling approach in the negotiation of the illness experience.\textsuperscript{38} However, authors reported that at the same time, interviews provided evidence of the fluidity of gendered identities, with women partners resisting, and at times, challenging their subjugated gender positions for example challenging the traditional heterosexual script of males being the ones who decide how and when to have sex.\textsuperscript{38}

Prescribed roles of men and societal expectations of manliness are an important factor in the control of HIV acquisition and spread. For example, in societies where traditional male circumcision is practiced (e.g. most of rural South Africa), challenges that increase the risk of HIV acquisition include: conceptions of false protection among men who have undergone traditional male circumcision (TMC), which may in turn lead to risk compensation, non-adherence to sexual abstinence during the healing period after TMC, due to inadequate counselling or even pressure to take sexual risks to prove one’s transition from ‘boyhood’ to manhood after TMC.\textsuperscript{54} These behaviours expose men and women to possible HIV infection.

Where norms include male control over sexual decision-making, it is uncommon for women to refuse sex and when this happens it may introduce or exacerbate IPV.\textsuperscript{168} Our findings confirm previous reports of occurrences of IPV (in the form of sexual coercion) and loss of sexual intimacy as a consequence of a positive HIV test result among couples. After two years of living together with mutual knowledge of status, these negative consequences still prevailed in the relationships without concrete ways of coping with the situation. Women’s lack of self-assertiveness in a gendered, male dominated society leads to a lack of ability to protect themselves from the risk of infection.

The reported reactions among couples who tested positive or being discordant, revealed beliefs of erroneous interpretations of HIV transmission, such as the fact that HIV infection
had come post-marriage (as opposed to before), or that sexual interaction with an HIV positive individual would always lead to transmission. HIV transmission is a complex issue, whether treatment is available or not, and this needs to be better addressed and communicated in couples’ testing programmes for these to draw on all potential benefits of shared knowledge for the couple. Issues of trust due to newly diagnosed HIV infection and how to cope with the negative consequences of this knowledge are challenges that have been previously reported on experiences of both homosexual\textsuperscript{170} and heterosexual couples.\textsuperscript{171,172} Future interventions should address the social consequences of knowledge of HIV status within couples and give guidelines on how to live with HIV, and to cope with discordance in a relationship. Actions to increase early treatment start will have immense implications in terms of reducing the actual transmission risk for the women and home-based couple testing could be one way to reach this goal.

There is evidence of the ‘test and treat’ strategy and this could be an incentive for couple HCT. In a study conducted by Cohen et al., 2011 on sero-discordant couples in nine countries, authors reported that initiation of ART at the time of diagnosis significantly reduced transmission of HIV to spouse in a couple.\textsuperscript{106} The study (HPTN 052) demonstrated that early treatment at CD4 counts of between 350-500 reduced morbidity and mortality in the infected individual and reduced transmission to the uninfected partner by 96%.\textsuperscript{106} The 2012 WHO guidelines on couple HCT recommend offering ART for the HIV positive individual in a sero-discordant couple even when he or she is not eligible for treatment, as a way of reducing HIV transmission, an effort to increase and encourage couple HCT in high HIV prevalence settings.\textsuperscript{173}

5.2.4 Impact of home-based HCT

We found positive effects of the intervention on couple counselling and testing (Paper II), a finding similar to previous research reporting relatively high uptake of couple HCT in HBHCT studies compared to antenatal clinics\textsuperscript{174} and community based HCT.\textsuperscript{175} On the contrary, Wolff et al., 2005 found that home-based testing was less acceptable for couples who may have conflicting attitudes about testing or those who were afraid that disclosure may result in abandonment or marital problems.\textsuperscript{115} Thus, moving forward, efforts are needed to educate couples and individuals on importance of status knowledge (mutual in case of couples) and disclosure. Importantly, understanding the reasons or fears cited by couples is needed in order to inform development of innovative and relevant approaches to address these barriers. It is encouraging that the WHO released guidelines for couple testing.\textsuperscript{105} However, thinking about couple counselling will need to go beyond ensuring treatment for both partners in a couple. The day-to-day life of these couples after mutual knowledge of status will determine whether couple HCT has managed to address barriers e.g. of abandonment, intimate partner violence and discrimination due to an HIV positive status.

Our findings, which demonstrated that the intervention had a protective effect on sexual partnering especially for individuals who tested (Paper II), have important implications for HIV prevention. Supported by accounts from couples in Paper III, it is clear that knowledge of HIV status led to a change in risky sexual behaviours. A study in Uganda showed that after implementation of a community HBHCT programme, indicators of risk behaviour improved. Notably, the proportion of people who exchanged money for sex reduced from 12% to 4% (p<0.001), who used a condom when money was exchanged during a sexual act increased from 39% to 80% (p<0.001).\textsuperscript{176} Other studies have reported contradictory findings. Outside of home-based testing, a prospective cohort study of adult men and women conducted in Zimbabwe found that individuals who had tested HIV negative were more
likely to engage in risky sexual behaviours compared to those who tested positive. Despite receiving counselling, individuals who received a negative result were more likely to become risky in terms of beer hall attendance (AOR 1.45, p<0.1), new partners in the last year (AOR 1.34, p<0.1), and number of concurrent partnerships (AOR 1.50, p<0.05). On the other hand, receiving a positive result and counselling had a protective effect on sexual partnering for men (AOR 0.53, P<0.05) while women reported higher levels of condom use with their regular partners.177 Our findings are based on reports in the previous three months and previous one month for condom. We do not know if these would be sustained. On the other hand, the later study asked participants about behaviours in the past year, which is more long term. However, importantly is the sustainability of such behaviours. Future research should explore reasons how a change in sexual behaviours can be sustained for a long duration to realise effects of interventions such as HBHCT.

A systematic review of HCT of studies (including one HBHCT) examining efficacy of VCT in changing risk sexual behaviours in low- and middle-income countries found that, there was an insignificant increase in the odds of condom use/protected sex among participants who received VCT compared to those who did not, OR=1.39 (95% CI: 0.97-1.99, p=0.076). When stratified by HIV status, this effect became significant among HIV positive participants, OR= 3.24 (95% CI: 2.29-4.58, p<0.001).178 The UNAIDS 2013 report indicates that there are signs of increased risky sexual behaviour (increase in number of sexual partner) in some countries (including South Africa) while others show a decline in condom use.1 Overall, high levels of testing reported in most of the HBHCT studies conducted so far indicate acceptability of HBHCT in the communities studied especially in rural areas where access to testing and treatment is usually lower than in urban areas.154 However, the extent to which HBHCT links HIV positive individuals into clinical care remains unclear. In our study (Paper II), there was no difference in CD4 count uptake by HIV positive participants in the intervention versus control arm. In a Kenyan study, only 42% of HIV positive individuals reported seeking HIV care. Factors associated with seeking care included having disclosed status to someone (OR 2.10, 95% CI: 1.50-2.94), living with someone attending HIV care (OR 4.15, 95% CI: 1.76-9.74) and wanting to seek care after diagnosis (OR 3.04, 1.58-5.84).179 Those in denial [425 (85%)] of their HBHCT results or who perceived their health status to be excellent were less likely to report attendance.180-182

A study by Medley et al., 2012, showed that the length of time between diagnosis and enrolment into care was 26.5 days (SD 87.6).179 In Kenya, 63% of individuals diagnosed HIV positive during community based testing had enrolled into care within 3 months of diagnosis.183 In the later study, peer navigators facilitated enrolment to care for individuals diagnosed HIV positive.

While HBHCT reaches individuals with high CD4 counts and asymptomatic disease, knowledge of HIV status alone is insufficient to optimise these benefits. A study in South Africa showed that 86% of HIV positive participants initiated ART, which resulted in a decrease in viral load by month six.184 These findings indicate that it is important not only to know one’s HIV status but linkage to HIV care is equally critical.

Only recently, the WHO released some guidelines on implementing HBHCT.112 As such, there is a wide variation in standards of implementation and research of HBHCT. In a recent review, out of 21 HBHCT studies included, 10 indicated that clients were given ‘some’ advise on linkage to care and one study presented data on the proportion of individuals
linked to care upon testing. Guidelines on HBHCT should emphasize linkage to care as a compulsory component for home-testing approaches.
6 CONCLUSIONS

- The HBHCT approach increased HIV counselling and testing among ‘hard to reach’ rural populations including men. (Paper I & II)

- At endline, there was no significant difference in the likelihood to undergo HIV testing between men and women, thus HBHCT has potential to reduce inequalities in access to HCT services and should be used as a complementary HIV testing approach. (Paper I & II)

- HBHCT was effective in increasing couple HCT and encouraging mutual couple receipt of HIV test results. (Paper II & III)

- HBHCT facilitated identification of concordant negative couples and thus lead to a change in behaviour as reported by men. (Paper III)

- HBHCT had a protective effect against having more than one sexual partner. (Paper II)

- HBHCT also had negative consequences for discordant and concordant positive couples who faced major challenges after mutual HIV testing. For example, discordant couples separated, experienced loss of intimacy, and sexual coercion, because of an HIV positive status. (Paper III)

- HBHCT was more cost-effective than clinic HCT in this setting, and hence provided evidence for wider implementation of the approach. (Paper IV)
7 IMPLICATIONS FOR FUTURE RESEARCH

• Despite evidence of feasibility and acceptability, there is a dearth of evidence on the impact of HBHCT on providing linkages to treatment, care and support services and ART adherence (for those who initiate) following a positive test result.

• There should be concerted efforts in devising uniform standards in implementation of HBHCT. The WHO emphasizes that, as countries continue to adopt national policies for the implementation of HBHCT, there are concerns that, in the absence of international guidelines, HBHCT strategies lack uniform standards and hence may be of limited quality.

• Discordant couples continue to experience challenges of coping with an HIV positive status and ensuring that the negative partner remains protected from infection. Structural interventions to increase gender equity, improve trust, partner communication and other couple relationship dynamics such as sexual intimacy are urgently needed. Further, couple counselling should address misconceptions about the meanings of HIV infection attributed to unfaithfulness to avoid issues of blame as this might act as a barrier to couple testing or disclosing of results.

• Attention should be given to concordant negative couples as they present a critical opportunity for intervening to prevent HIV acquisition if they maintain their status. However, the challenge is how to maintain a long-term change in behaviour in contexts where behaviours such as multiple sexual partnering are a norm.

• More economic evaluations of HBHCT are needed especially to investigate the impact of HBHCT on final outcomes such as HIV infections averted.
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130. USAID. Can we measure HIV/AIDS-related stigma and discrimination? Current knowledge about quantifying stigma in developing countries. 2006.


157. Angotti N, Bula A, Gaydosh L, Kimchi EZ, Thornton RL, Yeatman SE. Increasing the acceptability of HIV counseling and testing with three C's:


Baseline Survey (English)

Section 1. Cluster

1.1 Cluster Name

Select the cluster:

- □ Maboyane
- □ Nazareth
- □ Phumamuncu
- □ Longkloof
- □ Cacadu
- □ Vuka
- □ Ntlangwini
- □ Mthwana
- □ Ibis
- □ Fourteen
- □ Senti
- □ Madakeni
- □ James
- □ Rietvlei
- □ Dresini
- □ Mantunzeleni

1.2 Survey Date

Please confirm the date of the survey:

Expect a date response (required)

-----------------------------

Section 2. Household
2.1 HH Code

Enter the household code:

Expects a numeric response (required)

2.2 HH Main Wall Material

From observation, select the type of house / structure. (Select which constitutes > 50% of walls).

Expects a single option response (required)

- [ ] Bare brick / cement block / plaster
- [ ] Corrugated iron / zinc / tin
- [ ] Wood / plastic / cardboard
- [ ] Mud / cement
- [ ] Mud / grass / poles
- [ ] Other
- [ ] Don't know

Prerequisites
Skip when HH Main Wall Material (2.2) Not Equal 'Other [6]'

2.3 HH Main Wall Material Other

Please specify the material:

Expects a single line text response (required)

2.4 Survey Possible

Can the survey be conducted? (Final status after at least 3 attempts to interview)

Expects a single option response (required)

- [ ] Yes
- [ ] No
- [ ] Refused
- [ ] Vacant Dwelling
- [ ] Listing Error
- [ ] Other

Branches
If response Not Equal 'Yes [1]' then skip to Survey Not Possible Reason (6.1)
2.5 Drinking Water Source

What is the main source of water used for drinking in this household at this time?

Expect a single option response (required)

- Piped - inside house
- Piped - yard
- Piped - public
- Borehole / well
- River / stream
- Water tanker / Bower
- Rainwater tank
- Other
- Don't know

2.6 Toilet Type

What type of toilet do you use in this household?

Expect a single option response (required)

- Flush toilet
- Pit latrine
- Ventilated pit latrine
- None
- Other
- Don't know

2.7 Cooking Fuel

What is the main fuel used for cooking in this house?

Expect a single option response (required)

- Electricity
- Paraffin / Kerosene / Gas
- Wood
- Any other fuel
- Don't know

2.8 Household Items Owned

Do you have any of the following? (Working items only)
2.9 Household Births in Past Year

Have there been any babies born in the past year in this household?

Expect a single option response (required)

☐ Yes
☐ No

Prerequisites
Skip when Household Births in Past Year (2.9) Equals 'No [2]'

2.10 Household Births Past Year Count

How many?

Expect a numeric response (required)

Constraints
Response must be Greater Than or Equal '1'

2.11 Household Infant Deaths

Have there been any infants / babies who died before their first birthday in this household in the last 12 months?

Expect a single option response (required)

☐ Yes - infant death
☐ No infant death

Branches
If response Equals 'No infant death [2]' then skip to HH Member Count (4.1)

2.12 Infant Death Count
Section 3. Infant Deaths

3.1 Infant Age at Death

Referring to infant #REPEAT IDX, how old were they when they died?

- [ ] 1 - 12 months
- [ ] Under 1 month

Section 4. HH Member Intro

4.1 HH Member Count

How many adults over 18 live in this household on a regular basis (include only people who live there for more than 6 months of the year)

- [ ] Expected numeric response (required)

Constraints

Response must be Greater Than or Equal to ‘1’

4.2 Member Enumeration Instruction

You will now capture information on each household member, one at a time.

Section 5. Household Members

5.1 Member Instruction

Repeat this section for value of HH Member Count (4.1)
You will now capture information for member #REPEAT IDX.

5.2 Member Gender

Referring to member #REPEAT IDX, what is their gender?

- Male
- Female

Branches

If response Equals 'Male [M]' then skip to Member Age (5.5)

5.3 Member Has Child Under 5

Does she (member #REPEAT IDX) have a child younger than 5 years?

- Yes
- No

5.4 Member Pregnant

Is she (member #REPEAT IDX) currently pregnant?

- Yes
- No

5.5 Member Age

Referring to this member (#REPEAT IDX), what is their age in years?

- Constraints
  - Response must be Greater Than or Equal '18'.

5.6 Member Education Level

Referring to this member (#REPEAT IDX), what is their level of education?

- None
- Some primary
5.7 Member Tested

Referring to this member (#REPEAT IDX), have they ever been tested for HIV?

Expect a single option response (required)

☐ Yes
☐ No
☐ Don't know

Prerequisites
Skip when Member Tested (5.7) Not Equal 'Yes [Y]'

5.8 Member Tested Location

Referring to this member (#REPEAT IDX), where were they tested?

Expect a single option response (required)

☐ Clinic
☐ Mobile van
☐ Other non-health facility / NGO
☐ Private doctor
☐ Hospital

Prerequisites
Skip when Member Gender (5.2) Equals 'Male [M]'
Skip when Member Has Child Under 5 (5.3) Equals 'No [N]'

5.9 Member Tested Last Pregnancy

Referring to this member (#REPEAT IDX), was she tested for HIV in her most recent pregnancy?

Expect a single option response (required)

☐ Yes
☐ No

Section 6. End
Prerequisites
Skip when Survey Possible (2.4) Equals 'Yes [1]'  
Skip when Survey Possible (2.4) Equals 'Refused [3]'  
Skip when Survey Possible (2.4) Equals 'Vacant Dwelling [6]'  
Skip when Survey Possible (2.4) Equals 'Listing Error [7]'  

6.1 Survey Not Possible Reason

Please specify why the survey could not be conducted.

Expects a single line text response (required)

6.2 End Instruction

You have reached the end of the survey. Select Next to store.
Section 1. Participant Demographic Information

1.1 Date of Visit

Please confirm the date of the survey:

Expect a date response (required)

1.2 Data Collector Name

Please select the data collector's name:

- □ Dlomo Jabalile [1]
-   □ Gwaza Connie [2]
-   □ Khanyisile Ntloba [3]
-   □ Lindelwa Mhlakaza [4]
-   □ Nolisiwe Nyanazane [5]
-   □ Xoliswa Ntebelo [6]
-   □ Nomila Mano [7]
-   □ Nomonde Khuboni [8]
-   □ Nontuthuzelo Nyeswana [9]
-   □ Nokwakwa Ilumini [10]
-   □ Nomiko Dzudile [11]
-   □ Sophia Ramimbi [12]
-   □ Silangile Jiba [13]
-   □ Silangile Zware [14]
-   □ Sibongazwa Sibambe [15]
-   □ Thembiwe Hlotshwa [16]
-   □ Yolisa Sothaka [17]
1.3 Cluster Name

Please select the name of the cluster:

- Mvoti
- Phekamane
- Carodu
- Vuka
- Nhlabana
- Sendl
- Jumes
- Mantumzeleni
- Kritiyle
- Dresiti
- Ilha
- Longkloof
- Modokeni
- Fourteen
- Nilangwini
- Nongdi
- Mitshambale
- Matsbeni
- Sphahleni
- Gerebeni
- Summerfield
- Scambele
- Kradalde
- Durnsa
- St. Barnabas
- Sibulu
- Mahobe

1.4 Household Number

Please fill in household number:

- Expects a numeric response (required)

1.5 Participant ID

Please insert participant number:

- Expects a valid ID1 identifier (required)

1.6 Member Gender

Please indicate if the participant is a male or a female.

- Male
- Female
1.7 Participant Age

How old are you (in completed years)?

Expects a numeric response (required)

Constraints
Response must be Greater Than or Equal '14'

Prerequisites
Skip when Participant Age (1.7) Less Than '18'

1.8 Information and Consent Over 18

Was the information sheet read and verbal consent obtained for study participation?

Expects a single option response (required)

☐ Yes [1]
☐ No [2]

Branches
If response Not Equal 'Yes [1]' then skip to End (34.1)

Prerequisites
Skip when Participant Age (1.7) Greater Than '17'

1.9 Parental/guardian Consent

Was parental/guardian consent obtained for study participation?

Expects a single option response (required)

☐ Yes [1]
☐ No [2]

Branches
If response Not Equal 'Yes [1]' then skip to End (34.1)

1.10 Relationship Status

What is your current relationship status?

Expects a single option response (required)

☐ Single [1]
☐ Married [2]
☐ Long term partner; don't live together [3]
☐ Living together/living as married [4]
☐ Widowed [5]
☐ Separated/divorced [6]

1.11 Education

What is the highest level of schooling that you have completed?

Expects a single option response (required)

☐ None [1]
☐ Some primary [2]
☐ Completed primary school [3]
☐ Completed high school [4]
☐ Completed tertiary [5]
☐ Unknown [6]
1.12 Source of Income

What is your current source of livelihood? (Tick all that apply) [DC: Ask, wait, then read out responses for clarity]

- ☐ Job in a formal business, farm, organisation or agency
- ☐ Work in the informal sector for someone else (including domestic service, agricultural work)
- ☐ Self-employed (formal or informal)
- ☐ Subsistence farming
- ☐ Unemployed
- ☐ Pension
- ☐ Grant
- ☐ Other

Prerequisites
Stop when Source of Income (1.12) Excludes 'Other (8)'

1.13 Source of Income - Other

Please specify:

Expects a single-line text response (required):
Section 2. Familiarity Questions

2.1 Diabetes - Tested
Ask the participant whether they have ever been tested for diabetes.

2.2 Diabetes - Result
If the participant has said that they have tested for diabetes, ask them what the result was. If they have not tested, go to the next question.

2.3 Diabetes - Date
If the participant said that they have tested for diabetes, ask when they tested. If they have not, then go to the next question.

2.4 Blood Pressure - Tested
Ask the participant whether they have ever been tested for high blood pressure.

2.5 Blood Pressure - Result
If the participant has said that they have tested for high blood pressure, ask them what the result was. If they have not tested, go to the next question.

2.6 Blood Pressure - Date
If the participant said that they have tested for high blood pressure, ask when they tested. If they have not, then go to the next question.
Section 3. Testing History

3.1 Testing instruction

Now I would like to ask you questions about your HIV testing history.

3.2 Testing history

Have you ever been tested for HIV?

- Yes [1]
- No [2]
- Don’t know [0]

Branches:
If response Not Equal “Yes [1]” then skip to Section 3.5

3.3 Most recent test

How long ago was your most recent test?

- Within the last 3 months [1]
- Between 4 and 6 months ago [2]
- Between 7 and 12 months ago [3]
- Between 1-2 years ago [4]
- Over 2 years ago [5]

3.4 First test

Was this your first time to have an HIV test?

- Yes [1]
- No [2]

If response Not Equal “Yes [1]” then skip to Section 3.5

3.5 Past 2 years - testing

In the past 2 years, how many times did you test for HIV?

- One time [1]
- Two times [2]
- Three times [3]
- More than three times [4]

3.6 Test location - recently

Where were you tested the most recent time?

- Clinic [1]
- Mobile van [2]
- Private doctor [2]
- Hospital [4]
- Good Start HBCT [1]
- Non Good Start HBCT [6]
- Other [7]
Prerequisites
Skip when Text location - recently (3.6) Not Equal 'Other [7']

3.7 Text location - recently - Other

Please specify:

Expects a single line text response (required):

---

3.8 Why recently tested

Why were you tested (most recent time)? Tick the most important reason.

Expects a single option response (required):

- [ ] Wanted to know my status [1]
- [ ] Involved in risky behaviour [2]
- [ ] Encouraged by partner/family members [3]
- [ ] Part of a PACTCT programme [4]
- [ ] Felt unwell and was concerned about my status [5]
- [ ] Sexually abused [6]
- [ ] Testing related to a health care visit [7]
- [ ] Counsellor convinced me it was important [8]
- [ ] Wanted a Good Start/kit [9]
- [ ] Felt more comfortable testing at home than at a clinic [10]
- [ ] Felt pressured/difficult to say no [11]
- [ ] Motivated because others in the home were testing [12]
- [ ] Suspicious about partner’s behaviour/status [13]
- [ ] Need it for insurance or other official purposes [14]
- [ ] Other [15]

---

3.9 Why recently tested - Other

Please specify:

Expects a single line text response (required):

---

3.10 Result received

Did you receive the test result last time you were tested?

Expects a single option response (required):

- [ ] Yes [1]
- [ ] No [2]

Branches
If response Equals 'No [2]' then Skip to Counselling (3.13)

---

3.11 Willing to share result

Are you willing to share your HIV test result?

Expects a single option response (required):

- [ ] Yes [1]
- [ ] No [2]

Branches
If response Equals 'No [2]' then Skip to Counselling (3.13)
2.12 Result status

What was the result?

- Positive [1]
- Negative [2]
- Indeterminate [3]

2.13 Counselling

Did you receive counselling and testing together with your partner?

- Yes [1]
- No [2]
- I don’t have a partner [3]

Prerequisites: Skip when Counselling (2.13) Equals 'I don’t have a partner [3]

2.14 Test results with partner

Did you receive the results of your last test together with your partner?

- Yes [1]
- No [2]

Prerequisites: Skip when Result status (2.12) Equals 'Positive [1]

2.15 Planning another test

Are you planning to go for another HIV test?

- Yes [1]
- No [2]
- Maybe/not sure [3]

Prerequisites: Skip when Result status (2.12) Equals 'Positive [1]

2.16 Preferred test location

If you were to have an HIV test again, where would you prefer to test?

- Clinic [1]
- Mobile van [2]
- Private doctor [3]
- Hospital [4]
- Good Start HBBCT [5]
- Non-Good Start HBBCT [6]
- Other [7]

Prerequisites: Skip when Preferred test location (2.16) Not Equal 'Other [7]

2.17 Preferred test location - Other

Please specify:

- Expects a single line text response (required)
Section 4. Home Based Testing

4.1 Home counselling and testing

Have you ever had home-based counselling and testing for HIV?

- [ ] Yes
- [ ] No

Branches
- If response Equals 'No' [2] then skip to Partner tested [4.12]

4.2 Good Start

Was it with the Good Start study? [DC: Describe key elements of the Good Start counsellor].

- [ ] Yes
- [ ] No, Other HBC (2)
- [ ] Don't know/not sure [97]

Branches
- If response Not Equal 'Yes' [1] then skip to HBC (2) - Other [4.12]

4.3 Was it first HIV test

Was it your first time to have an HIV test?

- [ ] Yes
- [ ] No

Branches
- If response Equals 'No' [2] then skip to Counselling before test [4.4]

4.4 Reason for not testing

What is the reason you hadn't tested before the counsellor came to your home? (Choose one).

- [ ] No transport to go to clinic/doctor/health facility [1]
- [ ] Don’t see any benefit to HIV testing [2]
- [ ] Didn’t think I was at risk of getting HIV [3]
- [ ] Fear of testing procedure/finger prick [4]
- [ ] Fear of stigma/people finding out [5]
- [ ] My religion is against HIV testing [6]
- [ ] I was scared what my partner would think/say [7]
- [ ] No confidentiality at the clinic [8]
- [ ] Other [9]

Branches
- Skip when Reason for not testing [4.4] Not Equal 'Other' [9]

4.5 Reason for not testing - Other

Please specify:

- [ ] Requires a single line text response (required)
4.6 Counselling before test

Did you receive counselling before the HIV test? (DC: Counselling should at least consist of an explanation of procedures and a discussion of what the results will mean for the client.)

- Yes [1]
- No [2]

Prerequisites
Skip when Counselling before test (4.6) Equals 'No' [2]

4.7 Rate counselling

How would you rate the counselling you were given?

- Very poor [1]
- Poor [2]
- Fair [3]
- Good [4]
- Very good [5]
- Don't know/unsure [7]

4.8 Confidentiality

To what extent did you trust that the counsellor would keep your information confidential?

- Not at all [1]
- Some extent [2]
- Large extent [3]
- Not sure [4]

Prerequisites
Skip when Counselling (3.12) Equals 'I don't have a partner' [3]

4.9 Counselling with partner

Did you receive home-based counselling and testing together with your partner?

- Yes [1]
- No [2]

Prerequisites
Skip when Counselling (3.12) Equals 'I don't have a partner' [3]

4.10 Results with partner

Did you receive the results of your home-based counselling and testing together with your partner?

- Yes [1]
- No [2]

Prerequisites
Skip when Good Start (4.2) Not Equal 'No, Other HBCCT' [2]

4.11 HBCCT - Other

Please specify:

- Single line text response (required)
4.12 Partner tested

Has your spouse/regular partner ever been tested?

*Requires a single option response (required):

- [ ] Yes [1]
- [ ] No [2]
- [ ] No partner [3]
- [ ] Don’t know [97]
Section 5. Participants Not Tested

5.1 Why not test

Why have you never taken the test?

Expects a single option response (required)

☐ No transport to go to clinic/doctor/health facility
☐ Don’t see any benefit to HIV testing
☐ Didn’t think I was at risk of getting HIV
☐ Fear of testing procedure/finger prick
☐ Fear of stigma/people finding out
☐ My religion is against HIV testing
☐ I was scared what my partner would think/say
☐ No confidentiality at the clinic
☐ Other

5.2 Why not test - Other

Please specify:

Expects a single-line text response (required):


5.3 Considered HIV test

Have you considered going for an HIV test?

Expects a single option response (required)

☐ Yes
☐ No
☐ Maybe/Not sure

5.4 Where would you test

If you were to have an HIV test, where would you prefer to test?

Expects a single option response (required)

☐ Clinic
☐ Mobile van
☐ Other non-health facility / NGO
☐ Private doctor
☐ Hospital
☐ Good Start HIEECT
☐ New Start
☐ Community event
☐ Other
5.5 Where Text - Specify

Please specify:

**Expected a single line text response (required)**
### Section 6. Knowledge and Beliefs about HIV/AIDS

#### 6.1 Knowledge and beliefs instruction

Now I'd like to ask you about your views on HIV/AIDS. I'm going to read you some statements and would like you to tell me whether you agree or disagree with the statement. It is okay if you are unsure of the response or prefer not to answer the question. Just let me know if this is the case.

#### 6.2 No cure for AIDS

There is no cure for AIDS

- Agree [1]
- Disagree [2]
- Don't know / Not sure [97]

#### 6.3 A person can be infected with HIV and not have AIDS

- Agree [1]
- Disagree [2]
- Don't know / Not sure [97]

#### 6.4 Feel healthy with HIV/AIDS

A person with HIV/AIDS can look and feel healthy for many years

- Agree [1]
- Disagree [2]
- Don't know / Not sure [97]

#### 6.5 Infected by attending school

A person can get infected attending school with a child who has HIV

- Agree [1]
- Disagree [2]
- Don't know / Not sure [97]

#### 6.6 Avoid infection by staying faithful

A couple can avoid being infected by staying faithful to one another

- Agree [1]
- Disagree [2]
- Don't know / Not sure [97]

#### 6.7 Availability of drugs to lengthen life

Drugs (ARVs) are available that can lengthen the life of an infected person

- Agree [1]
- Disagree [2]
- Don't know / Not sure [97]
6.8 HIV passed on during sexual intercourse

A person with HIV can pass it on during sexual intercourse

- Agree [ ]
- Disagree [ ]
- Don’t know / Not sure [ ]

6.9 Avoid infection by using condoms

A person can avoid being infected by using condoms when having sex

- Agree [ ]
- Disagree [ ]
- Don’t know / Not sure [ ]

6.10 Pregnant woman can pass HIV to her baby

A pregnant woman who has HIV can pass it on to her baby

- Agree [ ]
- Disagree [ ]
- Don’t know / Not sure [ ]
Section 7. Stigma

7.1 Agree/disagree - Stigma
I will now read some statements. Do you agree or disagree with the following statements:

7.2 Ashamed
I would be ashamed if I were to be infected with HIV.
Expects a single option response (required)
- Agree [ ]
- Disagree [ ]
- Don’t know/not sure [ ]

7.3 Bad treatment
People with HIV are treated badly in this community as a result of their HIV status.
Expects a single option response (required)
- Agree [ ]
- Disagree [ ]
- Don’t know/not sure [ ]

7.4 Occurrences due to status
In the past year, have you seen any of the following happen to someone in your community because of their HIV/AIDS status? [DC: Read responses out to the participant and tick options. Can choose more than one option].
Expects multiple selected options (required)
- Excluded from a social gathering/community event [ ]
- Abandoned by their spouse/partner [ ]
- Isolated in their household [ ]
- No longer visited or visited less frequently by family and friends [ ]
- Teased, insulted or sworn at [ ]
- Lost customers or lost work or lost a job [ ]
- Lost housing or not been able to rent housing [ ]
- Denied religious rites/services [ ]
- Had property taken away [ ]
- Gossip about [ ]
- Lost respect/standing within the family and/or community [ ]
- Threatened with violence [ ]
- Given poorer quality health services [ ]
- Physically assaulted [ ]
- Denied promotion/further training [ ]
- Abandoned by their family/went away to the village [ ]
- Abused verbally or rejected by peers [ ]
- None [ ]
Prerequisites
Skip when Result status (3.12) Not Equal ‘Positive’ [13]

7.8 Occurrences due to status • Participant

In the last year, have you ever experienced any of the following because of your HIV status? [DC: Read responses out to the participant and tick options. Can choose more than one]:

- [ ] Excluded from a social gathering/community events [1]
- [ ] Abandoned by your spouse/partner [2]
- [ ] Isolated in your household [3]
- [ ] No longer visited or visited less frequently by family and friends [4]
- [ ] Teased, insulted or sworn at [5]
- [ ] Lost customers to buy produce/goods or lost a job [6]
- [ ] Lost housing or not been able to rent housing [7]
- [ ] Denied religious rites/services [8]
- [ ] Had property taken away [9]
- [ ] Groped about [10]
- [ ] Lost respect/standing within the family and/or community [11]
- [ ] Threatened with violence [12]
- [ ] Given poorer quality health services [13]
- [ ] Physically assaulted [14]
- [ ] Denied promotion/further training [15]
- [ ] Abandoned by your family/sent away to the village [16]
- [ ] Abused verbally or rejected by peers [17]
- [ ] None [18]
Section 8. Community Norms

8.1 Talk openly

Do people in your community talk about HIV/AIDS openly?

- Yes [1]
- No [2]
- Don’t know/not sure [17]

8.2 Open communication about HIV/AIDS

In your community, over the past two years, has it become easy, difficult, or stayed about the same to communicate openly about HIV/AIDS?

- Easy [1]
- Very easy [2]
- Difficult [3]
- Very difficult [4]
- Has stayed about the same [5]
- Don’t know/not sure [17]

8.3 Chief/headman

Does the chief or headman ever talk about HIV/AIDS related issues in a community gathering or any public place in your community?

- Yes [1]
- No [2]
- Don’t know/not sure [17]
Section 9. HIV Risk Behaviour

9.1 HIV Risk behaviour instruction 1
Now I would like to ask you some questions about your sexuality. It may be hard to talk about this, but it will help our research if you can answer these questions as truthfully as possible.

9.2 HIV Risk behaviour instruction 2
Remember no one will see your answers. No one in this community will know how you answered. We know that it is common that people sometimes have different types of partners.

9.3 HIV Risk behaviour instruction 3
We have our Fasti/ main partners, our kwapheni/ casual partners, and sometimes we have sex with a person who we never see again or never have sex with again (once off partners).

9.4 HIV Risk behaviour instruction 4
We are going to ask you about these and ask you to answer honestly. If you would rather not answer a question, you can say that you do not want to answer.

9.5 Recent partner
Think about your most recent sexual partner. How would you describe this partner?
- Fasti/ main sexual partner
- Kwapheni/ Casual sexual partner
- Once off partner
- I’ve never had a partner
- Unsure
- Has no sexual partner
- Refuse to answer

9.6 Main partner
How many fastis/main partners have you had sex with in the past 3 months?
- Enter a numeric response (required)

Constraints
- Response must be Greater than or Equal to 0
- Response must be Less than or Equal to 99

9.7 Kwapheni
How many kwaphenis/casual partners have you had sex with in the past 3 months?
- Enter a numeric response (required)

Constraints
- Response must be Greater than or Equal to 0
- Response must be Less than or Equal to 99
9.8 Once-off partners

How many one-night stands/one-off partners have you had sex with in the past 3 months?

Expects a numeric response (required)

Constraints
Response must be Greater Than or Equal '0'
Response must be Less Than or Equal '99'

Prerequisites
Skip when Result received (2.10) Not Equal 'Yes' [1]

9.9 Since learning status

Since learning your HIV status, do you have the same, fewer or more sexual partners?

Expects a single option response (required)

☑ None [4]
☐ Same [1]
☐ Fewer [2]
☐ More [1]
☐ Refuse to answer [98]

Prerequisites
Skip when Main partner (9.6) Equals 'O'
Skip when Main partner (9.6) Equals '0'

9.10 Main partner questions

Now we are going to ask you about your sexual partners. I would like us to talk about your Fasti/main partner sexual partner.

Prerequisites
Skip when Result received (2.10) Not Equal 'Yes' [1]
Skip when Main partner (9.6) Equals 'O'
Skip when Main partner (9.6) Equals '0'

9.11 Main partner - Condoms

Since learning your HIV status, are you more, less or about the same likely to use a condom with you fasti/main sexual partner?

Expects a single option response (required)

☐ More likely [1]
☐ Less likely [2]
☐ About the same likelihood [2]
☐ Refuse to answer [98]

Prerequisites
Skip when Main partner (9.6) Equals 'O'
Skip when Main partner (9.6) Equals '0'

9.12 Main partner - Last time

The last time you had sex with your Fasti/main partner, did you use a condom?

Expects a single option response (required)

☑ Yes [1]
☐ No [2]
☐ Refuse to answer [98]
9.13 Main partner - Last 30 days

Think about your most recent fast/main sexual partner. How often have you used a condom with this partner in the last 30 days?

- Always [1]
- Often [2]
- Rarely [2]
- Never [2]
- Refuse to answer [0]

9.14 Main Partner - Logic Error

Please note that you indicated that the participant did not use a condom the last time they had sex, but indicates that they always use a condom. One of these are incorrect. Please go back and correct the survey.

9.15 Main partner - Why no condom usage

Why didn't you use a condom all the times you had sex? [DC: Ask, wait, read out responses if none of the options comes up. Ticks all that apply].

- Not available [1]
- Too expensive [2]
- Partner refused/don't like them [2]
- Partner didn't suggest it and I didn't feel comfortable to suggest [4]
- I don't like them [5]
- Used other contraceptive [6]
- Didn't think it was necessary as my partner and I are HIV negative [7]
- Didn't think of it [9]
- Wanted to get pregnant [9]
- Married/ don't believe in using condoms in marriage [10]
- Other [11]
- Don't know [9]
- Refuse to answer [0]

9.16 Main Partner - No Condom Other

Please specify:

- Expecta single line text response (required):
9.17 Main partner - Forced sex

We're still talking about your fast/main sexual partner. Has this person ever forced you to have sex with him/her when you didn't want to?

Expect a single option response (required)

- Yes he/she has forced me [1]
- No, he/she hasn't ever forced me [2]
- Refuse to answer [3]

9.18 Main partner - Other partners

We are still talking about your fast/main sexual partner. Do you think this person has other sex partners?

Expect a single option response (required)

- Yes, I think he/she has other partners [1]
- No, I don't think so [2]
- Don't know [3]
- Refuse to answer [4]
9.22 Casual partner - Last time

The last time you had sex with your kwapheni/casual sexual partner, did you use a condom?

- Yes [ ]
- No [ ]
- Refuse to answer [90]

9.23 Casual partner - Condoms in the last 30 days

Think about your most recent kwapheni/casual sexual partner. How frequently have you used a condom with this partner in the last 30 days?

- Always [ ]
- Often [ ]
- Rarely [ ]
- Never [ ]
- Refuse to answer [90]

9.24 Casual Partner - Logic Error

Please note that you indicated that the participant did not use a condom the last time they had sex, but indicates that they always use a condom. One of these are incorrect. Please go back and correct the survey.

9.25 Casual partner - Why condom wasn’t used

Why didn’t you use a condom all the times you had sex? [DC: Ask, wait, read out responses if none of the options comes up. Check all that apply].

- Not available [ ]
- Too expensive [ ]
- Partner refused/doesn’t like them [ ]
- Partner didn’t suggest it and I didn’t feel comfortable to suggest [ ]
- I don’t like them [ ]
- Used other contraceptive [ ]
- Didn’t think it was necessary as my partner and I are HIV negative [ ]
- Didn’t think of it [ ]
- Wanted to get pregnant [ ]
- Other [ ]
- Don’t know [ ]
- Refuse to answer [90]

9.26 Casual partner - Why condom wasn’t used Other

Please specify:

- [ ]
9.27 Casual partner - Force sex

We're still talking about your luvpheni/casual sexual partner. Has this person ever forced you to have sex with him/her when you didn't want to?

- Yes, he/she has forced me [1]
- No, he/she has never forced me [2]
- Refuse to answer [0]

9.28 Casual partner - other partners

We are still talking about your luvpheni/casual sexual partner. Do you think this person has other sex partners?

- Yes, I think he/ she has other partners [1]
- No, I don't think so [2]
- Don't know [0]
- Refuse to answer [0]

9.29 Once-off partner

Now I would like you to think about your once-off partner/ one-night stand.

9.30 Once-off partner - condom usage

Since learning your HIV status, are you more, less or about the same likely to use a condom with once-off sexual partners?

- Less likely [2]
- About the same likelihood [3]
- Refuse to answer [0]

9.31 Once-off partner - last time with partner

The last time you had sex with a once-off sexual partner did you use a condom?

- Yes [1]
- No [2]
- Refuse to answer [0]
9.32 Once-off partner - Last 30 days

Think about your most recent once-off sexual partner. How frequently have you used a condom with this partner in the last 30 days?

- Always [1]
- Often [2]
- Rarely [3]
- Never [4]
- Refuse to answer [99]

9.33 Once-off Partner - Logic Error

Please note that you indicated that the participant did not use a condom the last time they had sex, but indicates that they always use a condom. One of these are incorrect. Please go back and correct the survey.

9.34 Once-off partner - why no condom

Why didn’t you use a condom all the times you had sex? (Check all that apply).

- Not available [1]
- Too expensive [2]
- Partner refused to use one [3]
- Partner didn’t suggest it and I didn’t feel comfortable to suggest it [4]
- I don’t like them [5]
- Used other contraceptive [6]
- Didn’t think it was necessary as my partner and I are HIV negative [7]
- Didn’t think of it [8]
- Wanted to get pregnant [9]
- Other [10]
- Don’t know [97]
- Refuse to answer [99]

9.35 Once-off partner - why no condom Other

Please specify:

9.36 Once-off partner - forced sex

We’re still talking about your once-off sexual partner. Has this person ever forced you to have sex with him/her when you didn’t want to?

- Yes, he/she has forced me [1]
- No, he/she has never forced me [2]
- Refuse to answer [99]
9.37 Once-off partner - other partners

We are still talking about your once-off sexual partner. Do you think this person has other sex partners?

- Yes, I think he/she has other partners [1]
- No, I don't think so [2]
- Don't know [97]
- Refuse to answer [98]

9.38 Level of risk

Given your situation and behaviours, what level of risk would you say that you have of getting HIV?

- Not at risk [1]
- Risk is very low [2]
- Risk is low [3]
- Risk is moderate [4]
- Risk is high [5]
- Risk is very high [6]
- Don't know/unsure [97]
- Refuse to answer [98]
Section 10. Disclosure

Prerequisites
Skip when Result received (3.10) Not Equal "Yes [1]"
Skip when Result status (3.12) Equals "Indeterminate [3]"
Skip when Testing history (3.2) Not Equal "Yes [1]"

10.1 Disclosure instruction

Now I would like to ask you some questions about who you have discussed your HIV status with.

Prerequisites
Skip when Result received (3.10) Not Equal "Yes [1]"
Skip when Result status (3.12) Equals "Indeterminate [3]"
Skip when Testing history (3.2) Not Equal "Yes [1]"

10.2 Did you tell anyone the results

Did you tell anyone the results of your most recent test?

- Yes [1]
- No [2]

Prerequisites
Skip when Did anyone the results (10.3) Not Equal "Yes [1]"
Skip when Testing history (3.2) Not Equal "Yes [1]"

10.3 Whom did you tell

Whom did you tell?

- Spouse/main sexual partner [1]
- Kwabeni/sexual casual partner [2]
- One night stand/once off sexual partner [3]
- Friend (s) [4]
- Family member(s) [5]
- Health care worker [6]
- Co-worker [7]
- Religious leader [8]
- Other [9]

Prerequisites
Skip when Whom did you tell (10.3) Excludes 'Other [9]'
Skip when Testing history (3.2) Not Equal "Yes [1]"

10.4 Whom did you tell - Other

Please specify:

- Expects a single line text response (required)

Prerequisites
Skip when Result received (3.10) Not Equal "Yes [1]"
Skip when Result status (3.12) Equals "Indeterminate [3]"
Skip when Testing history (3.2) Not Equal "Yes [1]"

10.5 Planning to tell anyone

Are you planning to tell someone/anyone else about your test results?

- Yes [1]
- No [2]
10.6 Who are you planning to tell?

Who are you planning to tell?

Expect multiple selection options (required)

- Fast/ main sexual partner (1)
- Kwapheni (one sexual partner) (2)
- One night stand/ once-off sexual partner (3)
- Friend(s) (4)
- Family member(s) (5)
- Health care worker (6)
- Co-worker (7)
- Religious leader (8)
- Other (9)

10.7 Who are you planning to tell - Other

Please specify:

Expect a single line text response (required)
Section 11. Intimate Partner Violence (IPV)

11.1 Feelings of fast/main sexual partner

How did your fast/main sexual partner feel about your HIV status?

Select a single option response (required):
- Angry (1)
- Disappointed (2)
- Relieved (3)
- Happy (4)
- Supportive (5)
- Don't know/Not sure (57)
- Refuse to answer (90)

11.2 Fast/main sexual partner shout or insult

Did your fast/main sexual partner shout at or insult you because of your status?

Select a single option response (required):
- Yes (1)
- No (2)
- They were supportive (3)
- Refuse to answer (90)

11.3 Fast/main sexual partner threaten to leave

Did your fast/main sexual partner threaten to leave you because of your status?

Select a single option response (required):
- Yes (1)
- No (2)
- Refuse to answer (90)

11.4 Fast/main sexual partner gossip/talk badly

Did your fast/main sexual partner gossip/talk badly about you to others because of your status?

Select a single option response (required):
- Yes (1)
- No (2)
- Don't know (57)
- Refuse to answer (90)
11.5 Did your main sexual partner kick or hit you because of your status?
Expect a single option response (required)
- Yes [ ]
- No [ ]
- Refuse to answer [ ]

11.6 Feelings of kwapheni/sexual partner
How did your kwapheni/sexual partner feel about your HIV status?
Expect a single option response (optional)
- Angry [ ]
- Disappointed [ ]
- Relieved [ ]
- Happy [ ]
- Supportive [ ]
- Don’t know/Not sure [ ]
- Refuse to answer [ ]

11.7 Did your kwapheni/sexual partner shout or insult you because of your status?
Expect a single option response (required)
- Yes [ ]
- No [ ]
- They were supportive [ ]
- Refuse to answer [ ]

11.8 Did your kwapheni/sexual partner threaten to leave you because of your status?
Expect a single option response (required)
- Yes [ ]
- No [ ]
- Refuse to answer [ ]

11.9 Did your kwapheni/sexual partner gossip/talk badly about you because of your status?
Expect a single option response (required)
- Yes [ ]
- No [ ]
- Don’t know [ ]
- Refuse to answer [ ]
11.10 Kwapheni/casual sexual partner kick or hit

Did your kwapheni/casual sexual partner kick or hit you because of your status?

- Yes [1]
- No [2]
- Refuse to answer [90]

11.11 Feelings of once-off sexual partner

How did your once-off sexual partner feel about your HIV status?

- Angry [2]
- Disappointed [2]
- Knew [2]
- Happy [4]
- Supportive [5]
- Don't know/Not sure [97]
- Refuse to answer [98]

11.12 Once-off sexual partner shout or insult

Did your once-off sexual partner shout at or insult you because of your status?

- Yes [1]
- No [2]
- They were supportive [3]
- Refuse to answer [90]

11.13 Once-off sexual partner gosip talk badly

Did your once-off sexual partner gosip/talk badly about you because of your status?

- Yes [1]
- No [2]
- Don't know [97]
- Refuse to answer [98]

11.14 Once-off sexual partner kick or hit

Did your once-off partner kick or hit you because of your status?

- Yes [1]
- No [2]
- Refuse to answer [98]
Section 12. PMTCT History

Prerequisites
Skip when Member Gender (1.6) Equals 'Male' [1]

12.1 Pregnant

Are you currently pregnant?

Expect a single option response (required)

☐ Yes [1]
☐ No [2]

Branches
If response Equals 'Yes' [1] then skip to Member tested last pregnancy (12.4)

Prerequisites
Skip when Member Gender (1.6) Equals 'Male' [1]

12.2 Ever gave birth

Have you ever given birth?

Expect a single option response (required)

☐ Yes [1]
☐ No [2]

Branches
If response Equals 'No' [2] then skip to Instruction (13.1)

Prerequisites
Skip when Member Gender (1.6) Equals 'Male' [1]

12.3 How long since gave birth

How long is it since you last gave birth?

Expect a single option response (required)

☐ Less than a year [1]
☐ Between 1 and 2 years [2]
☐ More than 2 years [3]

Prerequisites
Skip when Member Gender (1.6) Equals 'Male' [1]

12.4 Member tested last pregnancy

Were you tested for HIV during your most recent/current pregnancy?

Expect a single option response (required)

☐ Yes [1]
☐ No [2]

Branches
If response Equals 'No' [2] then skip to Instruction (13.1)
12.5 Tested where

Where were you tested?

- [ ] Clinic [1]
- [ ] Mobile van [2]
- [ ] Other non-health facility / NGO [3]
- [ ] Private doctor [6]
- [ ] Hospital [5]
- [ ] Good Start HMBCT [6]
- [ ] New Start [7]
- [ ] Community event [9]
- [ ] Non Good Start HMBCT [9]

12.6 HIV status on last pregnancy test

What was your HIV Status when you tested the last time during your pregnancy?

- [ ] HIV negative [1]
- [ ] HIV positive [2]
- [ ] Unsure [2]
- [ ] Refuse to answer [10]

Branches

If response Not Equal 'HIV positive' [2] then skip to Instruction (13.3)

12.7 Given ARVs if HIV positive on last pregnancy

Were you given any ARVs during your pregnancy?

- [ ] Yes [1]
- [ ] No [2]
- [ ] Refuse to answer [10]

12.8 Which ARVs

Which ARVs were you given?

- [ ] AZT, the one to take during pregnancy but stopped after delivery [2]
- [ ] HAART, the one to take your whole life [2]
- [ ] Other [3]
- [ ] Don’t know [97]
- [ ] Refuse to answer [10]

12.9 Which ARVs - Other

Please specify:

- [ ] Expects a single line text response (required)
12.10 Given a pill during labour to prevent transmission

Were you given or instructed to take a drug during labour to prevent HIV transmission to your baby?

- Yes [1]
- No [2]
- Don't know [37]

12.11 Baby given ARVs at birth

Did your baby get any ARVs at birth?

- Yes [1]
- No [2]
- Don't know [37]
- Refuse to answer [95]
Section 13. Follow-up Behaviour of Positive Participants

13.1 Instruction
DC: Ask for clinic card before starting this section and look through it for CD4 information.

13.2 CD4 count
Have you had a CD4 count?
Expect a single option response (required):
- Yes [1]
- No [2]
- Don’t know [97]

Branches
If response Not Equal 'Yes [1]' then skip to TB test (13.6)

13.3 CD4 count known
Do you know your CD4 count?
Expect a single option response (required):
- Yes [1]
- No, didn’t get it from the clinic [2]
- No, got it but don’t remember what it was [3]
- Refuse to answer [99]

Branches
If response Not Equal 'Yes [1]' then skip to TB test (13.6)

13.4 First CD4 count
What was your CD4 count the first time after testing positive?
Expect a numeric response (required)

Constraints
Response must be Greater Than or Equal '0'
Response must be Less Than or Equal '2000'

13.5 Actual CD4 verified
Actual CD4 count verified on clinic card? (DC: Look for first CD4 count result on clinic card).
Expect a single option response (required):
- Yes [1]
- No [2]
13.6 When CD4 count was received

How long after you tested did you have your first CD4 count?

Expect a single option response (required)

- Within 1 month [1]
- Between 1-3 months [2]
- Between 4-6 months [3]
- Between 7 months - 1 year [4]
- More than a year [5]
- Cannot remember [6]

13.7 Taking ARVs

Have you started taking ARVs?

Expect a single option response (required)

- Yes [1]
- No [2]
- Refuse to answer [98]

13.8 TB test

Since the last time you tested for HIV, have you tested for TB?

Expect a single option response (required)

- Yes [1]
- No [2]
- Not sure/don’t remember [3]
- Refuse to answer [98]

13.9 TB test results

What was the result of the TB test?

Expect a single option response (required)

- Positive [1]
- Negative [2]
- Don’t know [97]

13.10 TB treatment

Did you take/are you taking TB treatment?

Expect a single option response (required)

- Yes [1]
- No [2]
- Refuse to answer [98]
Section 14. End

14.1 End

Thank you for your time and participation in this survey. To make changes, select Back. Otherwise, please select Next to submit the survey.
Section 1. Identification

1.1 Cluster Name

Please select the name of the cluster:

- [ ] Moodi
- [ ] Phumamvela
- [ ] Corade
- [ ] Yuka
- [ ] Mithwana
- [ ] Senti
- [ ] James
- [ ] Mantuzeleni
- [ ] Reitsle
- [ ] Doubini
- [ ] Bibi
- [ ] Longilele
- [ ] Madakeni
- [ ] Fourteen
- [ ] Mlangwini
- [ ] Nongili
- [ ] Mfolambe
- [ ] Matikini
- [ ] Sphakaleni
- [ ] Gelebe
- [ ] Summerfield
- [ ] Nambele
- [ ] Reabsdale
- [ ] Denmark
- [ ] St. Barnabas
- [ ] Shikulu
- [ ] Mahobe

1.2 Household Number

Please fill in household number:

Expects a numeric response (required)

1.3 Date of Visit

Please confirm the date of the survey:

Expects a date response (required)
1.4 Data Collector Name

Please select the data collector's name:

- [ ] Dlomo Jabulile [1]
- [ ] Gwaza Connie [2]
- [ ] Khanyilele Sibeko [3]
- [ ] Lindelwa Mhikana [4]
- [ ] Nebiwo Nyamzane [5]
- [ ] Xholiswa Ncoba [6]
- [ ] Nomisa Hani [7]
- [ ] Nomonde Khumbi [8]
- [ ] Nontuthuzelo Nsimulo [9]
- [ ] Nomwe Dihamini [10]
- [ ] Nomso Dzambe [11]
- [ ] Sephonise Dihamini [12]
- [ ] Silungile Ziba [13]
- [ ] Silungile Zwane [14]
- [ ] Sweetsness Mngxwengxwe [15]
- [ ] Thembisile Hlotshana [16]
- [ ] Yolisa Sodlaka [17]

1.5 Survey Possible

Can the survey be conducted?

- [ ] Yes [1]
- [ ] No [2]

Branches

If response equals 'No' [2] then skip to Reason Why Not Possible (5.1)
Section 2. Background Characteristics

2.1 HH Main Wall Material

From observation, select the type of house/structure. (Select which constitutes > 50% of walls)

Expects a single option response (required):

- Bare brick/rendezplaster [1]
- Corrugated iron/zinc/ Tin [2]
- Wood/plastic/cardboard [2]
- Mud/rent [4]
- Mud/grass/poles [5]
- Other [6]
- Don’t know [97]

Prerequisites
Skip when HH Main Wall Material (2.1) Not Equal ‘Other’ [6]

2.2 HH Main Wall Material - Other

Please specify:

Expects a single line text response (required)

2.3 Drinking Water Source

What is the main source of water used for drinking in this household at this time?

Expects a single option response (required):

- Piped-inside house [1]
- Piped- yard [5]
- Piped-public [5]
- Borehole/ well [4]
- River/stream [6]
- Water tanker/bakwary [6]
- Rainwater tank [7]
- Other [8]
- Don’t know [97]

Prerequisites
Skip when Drinking Water Source (2.3) Not Equal ‘Other’ [8]

2.4 Drinking Water Source - Other

Please specify:

Expects a single line text response (required)

2.5 Toilet Type

What type of toilet do you use in this household?

Expects a single option response (required):

- Flush toilet [1]
- Pit latrine [2]
- Ventilated pit latrine [2]
- None [6]
- Other [9]
- Don’t know [97]
2.6 Toilet Type - Other

Please specify:

Expects a single line text response (required):

2.7 Cooking Fuel

What is the main fuel used for COOKING in this house?

Expects a single option response (required):

- Electricity (1)
- Paraffin/kerosene/gas (2)
- Wood (3)
- Any other fuel (4)
- Don't know (5)

2.8 Cooking Fuel - Other

Please specify:

Expects a single line text response (required):

2.9 Household Items Owned

Do you have any of the following items in your household? (Working items only) May select multiple items.

Expects multiple selected options (required):

- Refrigerator (1)
- Knife (2)
- Television (3)
- Stove (4)
- Telephone/cell phone (5)
- Cupboard (6)
- Bicycle (7)
- Motorcycle/scooter (8)
- None (9)
Section 3. Socio-economic Status

3.1 Food Assistance

In the last year (2010), was there a time when you and your family ran out of food and had to ask for help?

Expect a single option response (required)

☐ Yes [1]
☐ No [2]
☐ Don’t know [97]
☐ Refused to answer [16]
Section 4. Household Members

4.1 HH Member Count - 14-17
How many people 14-17 years live in this household on a regular basis (include only people who live there for more than 6 months of the year).

Expect a numeric response (required)

Constraints
Response must be Greater Than or Equal '0'

4.2 HH Member Count - 18+
How many people 18 years and above live in this household on a regular basis (include only people who live there for more than 6 months of the year).

Expect a numeric response (required)

Constraints
Response must be Greater Than or Equal '0'
Section 5. End

5.1 Reason Why Not Possible

Please specify why the survey cannot be conducted:

- Refused (1)
- Vacant Dwelling (2)
- Repeatedly didn’t meet anyone at home (house not vacant) (3)
- Other (4)

5.2 Reason Not Possible - Other

Please specify:

Expects a single line text response (required)

5.3 End Instruction

Please select 'Next' to complete the survey. If you would like to edit any responses, please select back to make changes.
APPENDIX III: Topic guide (Paper III)

Questions asked in the interviews will be centered on the following issues:

- Perceptions of the counseling during the home-based HIV Counseling and Testing Intervention
- Perceptions of Home-based HCT
- Why an HIV test? What facilitated the decision
- Why testing as a couple
- Impact of testing as a couple
- What happened during and after HIV testing
- Experiences (any related to testing together)
- Any changes in the couple’s relationship since the HIV test
- Any changes in sexual risk behavior
- Any lessons from knowledge of HIV status
- Consequences of testing as a couple (Intimate partner violence)