South African National HIV Prevalence, Incidence, Behaviour and Communication Survey, 2008

A Turning Tide Among Teenagers?

With financial support from
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FOREWORD

South Africa has the largest burden of HIV/AIDS and is currently implementing the largest antiretroviral treatment (ART) programme in the world. It is therefore fitting that South Africa is the first in the world to conduct three repeated national HIV population-based surveys to help monitor our response as a nation to the HIV/AIDS epidemic. This report is the third in a time series of population-based HIV seroprevalence surveys which started in 2002 and were repeated in 2005 and again in 2008.

The 2002 survey on HIV/AIDS was commissioned by both the Nelson Mandela Foundation (NMF) and the Nelson Mandela Children's Fund and was also supported financially by both the Swiss Agency for Development and Cooperation (SDC) and the Human Sciences Research Council (HSRC). That first study had a significant impact nationally, in the sub-region, and internationally. The report (Shisana & Simbayi 2002) received widespread international attention, has been used to build the capacity of other Southern African Development Community (SADC) countries to implement similar studies.

The 2005 survey, the first national repeat survey of its kind, was also commissioned by the NMF and also supported financially by both the SDC and the USA's Centers for Disease Control and Prevention (CDC) as well as the HSRC. Both surveys had an impact on South Africa's ability to develop policies and strategies and improve practice in the area of HIV/AIDS, and the 2005 report (Shisana et al. 2005) served as one of the major sources of baseline information for populating indicators for the *HIV & AIDS and STI Strategic Plan* (NSP) *for South Africa, 2007–2011* (DOH 2007). Indeed, both reports have also been used by different national and international organisations such as Statistics South Africa (StatsSA), the Actuarial Society of Southern Africa (ASSA) and the Joint United Nations Programme on HIV/AIDS (UNAIDS) to estimate the magnitude of the HIV/AIDS situation in South Africa.

This report on the third survey conducted in 2008, comes at an opportune time nearly half-way through the implementation of the NSP and it therefore enables us to evaluate its impact. This report focuses mainly on providing information concerning how well we are doing in our national response in trying to achieve our goals set in the NSP, in particular, to reduce HIV incidence by 50% by 2011. Most importantly, it also presents a number of recommendations on practical ways in which some of the risk behaviours which increase HIV infection and that are still prevalent in some parts of our country can be addressed through evidence-based interventions.

The report includes behavioural information at a provincial level. This will help individual provinces to understand their respective epidemics and, most importantly, to inform further the development of their own provincial strategic and implementation plans in relation to the NSP. This is a most welcome development as the success of the implementation of the NSP will ultimately be judged on what happens in terms of social and behavioural change at provincial, district, and local government levels. We as the government hope that with such information now at our disposal we will be able to design and/or implement evidence-based social and behavioural change interventions aimed at continuing to reduce new infections. This will no doubt further strengthen the fight against HIV/AIDS in our country.

In addition to providing indicators for the NSP, the report also presents some indicators for possible inclusion in both the 2010 UN General Assembly Special Session's Declaration of Commitment on HIV/AIDS (UNGASS) national report and the 2015 Millennium Development Goals (MDGs) report to which our government and civil society have committed themselves.

We are indeed most fortunate as a country to have some of the best research institutions in the world in HIV surveillance such as the HSRC, the Medical Research Council of South Africa (MRC), and the Centre for AIDS Development, Research and Evaluation (CADRE), which have collaborated to produce this excellent report.

We appreciate the financial resources that the United States and President's Emergency Plan for AIDS Relief and UNICEF have contributed to ensure that South Africa is able to monitor the HIV epidemic.

With the NSP as a blueprint to mobilise our country to undertake collective and coordinated action against HIV/AIDS and this report, policy-makers and practitioners in both the government and civil society now have the data at their fingertips for measuring our progress in this ongoing struggle. It is clear that, armed with such knowledge, we are far better positioned to win our battle against this terrible disease.

Dr Aaron Motsoaledi
Minister of Health, South Africa

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To undertake a project of this magnitude requires a collective effort among many people who bring a range of expertise and experience at different stages. This project would not have been possible without the contribution of the many people listed below.

We wish to thank all the people of South Africa who willingly opened their doors and their hearts to give us some of the most private information about themselves, for the sake of contributing to a national effort to contain the spread of HIV/AIDS. Thousands were willing to give a dried blood spot (DBS) specimen for testing to enable us to estimate the HIV prevalence and incidence in South Africa. We sincerely thank them for their generosity. Without their participation we would never have been able to provide critical information necessary for planning more effective HIV prevention and treatment and care for HIV/AIDS patients, and mitigation of the impact of HIV/AIDS in South Africa.

We are grateful to our international partners, first to the Presidents Emergency Plan for AIDS Relief (PEPFAR), whose funding we received through the USA's Centers for Disease Control and Prevention (CDC), because without their financial support the study would not have been possible. In particular, the support of both Dr Okey Nwanyanwu and Ms Latasha Treger made it possible for us to develop this partnership. We would also like to thank the United Nations Children's Fund (UNICEF), which funded the inclusion of children under two years of age in the study.

A special note of appreciation is due to the members of the HSRC-led consortium: thank you to the Medical Research Council (MRC), led by Professor Gita Ramjee, who assigned Rashika Maharaj and Nirvana Rambaran to ably assist with the quality control of the specimen collection and testing as well as the training of fieldworkers.

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ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral therapy/treatment
ARV	Antiretroviral (drugs)
ASSA	Actuarial Society of Southern Africa
AUDIT	Alcohol Use Disorders Identification Test
CADRE	Centre for AIDS Development, Research and Evaluation
CDC	United States Centers for Disease Control and Prevention
CEIA	Capture enzyme immunoassay (BED assay)
CHAID	Chi-square automatic interaction detector
DBS	Dried blood spot
DHS	Demographic and Health Survey
EA	Enumeration area (census)
EIA	Enzyme immunoassay
GPS	Global positioning system
HIV	Human Immunodeficiency Virus
HSRC	Human Sciences Research Council
MARP	Most-at-risk population
MDG	Millennium Development Goals
MRC	Medical Research Council
MSM	Men who have sex with men
NICD	National Institute for Communicable Diseases
NSP	*HIV & AIDS and STI Strategic Plan for South Africa, 2007–2011*
PEPFAR	United States President's Emergency Plan for AIDS Relief
PI	Principal investigator
PLWHA	People living with HIV/AIDS
PMTCT	Prevention of mother-to-child transmission of HIV
PSU	Primary sampling unit
QA	Quality assurance
REC	Research Ethics Committee of the HSRC
SABC	South African Broadcasting Corporation
SADC	Southern African Development Community
SDC	Swiss Agency for Development and Cooperations
SSU	Secondary sampling unit
StatsSA	Statistics South Africa
STI	Sexually transmitted infections
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNGASS	United Nations General Assembly Special Session (on HIV/AIDS)
UNICEF	United Nations Children's Fund
VCT	Voluntary counselling and testing
VP	Visiting point
WHO	World Health Organization

EXECUTIVE SUMMARY

This survey, conducted from June 2008 to March 2009, is the third in a series of national population-based surveys conducted for surveillance of the HIV epidemic in South Africa. The previous two surveys were conducted in 2002 and 2005. The present report allows for an understanding of the progress and potential impact of the *HIV & AIDS and STI Strategic Plan for South Africa* (NSP) *2007–2011* (DOH 2007) close to the mid-point of its implementation.

Background and rationale

South Africa is experiencing a maturing generalised HIV epidemic in which heterosexual sex is the predominant mode of HIV transmission followed by mother-to-child transmission and other modes of transmission. Young adults, particularly females, are at greatest risk of acquiring HIV. Research on the burden of HIV among men who have sex with men (MSM) is currently being conducted in South Africa, and it points to a high prevalence. Injecting drug use is uncommon in South Africa and is not a major source of HIV infection at present. Blood donors and all donated blood are screened for HIV infection and the safety of blood products in South Africa is currently on a par with international standards. Transfusion-associated infections are rare.

The 2008 national survey was designed to investigate the overall HIV prevalence and incidence as well as HIV-related behaviour and communication. This survey enables us to measure trends and changes in the epidemic over time and to report essential data for national indicator reporting.

In March 2007, following extensive consultation with civil society and other stakeholders, the South African government released the NSP (DOH 2007). The two major goals of the NSP are to reduce the incidence of HIV in South Africa by 50% by 2011 and to ensure that at least 80% of those eligible for antiretroviral treatment (ART) have access to it.

The NSP calls on the Human Sciences Research Council (HSRC) and the Medical Research Council (MRC) to 'adapt and augment HIV prevalence surveys to meet national information requirements as part of HIV surveillance and monitoring activities' (DOH 2007: 131). The 2008 national household HIV survey is designed to provide as many of the primary indicators as possible for which the HSRC was given responsibility in the NSP as part of an enhanced monitoring and evaluation framework (see Appendix 2).

The specific objectives of this report are:

- To present data for monitoring and evaluation of the South African National HIV and AIDS and STI Strategic Plan for 2007–2011;
- To describe trends in HIV prevalence, HIV incidence, and risk behaviour in South Africa over the period 2002–2008;
- To present data for monitoring the indicators required for the preparation of the UN General Assembly Special Session (UNGASS) 2010 Report;
- To report on the Millennium Development Goals (MDG) in relation to poverty and HIV;
- To assess the extent of exposure to major national HIV communication programmes;
- To propose indicators to be used to monitor the South African HIV and AIDS epidemic and its management.

Study design: population-based household survey.

Study population: the population of South Africa. The present report refers only to those aged 2+ years.

Sample size: a total of 23 369 eligible individuals were sampled in the survey.

Sampling methods: multi-stage cluster stratified sample stratified by province, settlement geography (geotype) and predominant race group in each area. A systematic sample of 15 households was drawn from each of 1 000 census enumeration areas (EAs). In each household, one person was randomly selected in each of four mutually exclusive age groups (under 2 years; 2–14 years; 15–24 years; 25+ years).

Assessment of demographic, social and behavioural factors: demographic information and information on social and behavioural risk factors was collected through personal interviews using structured questionnaires.

HIV testing methods: dried blood spot (DBS) specimens, collected by finger-prick (or heel-prick in infants) were tested for HIV antibodies using a testing algorithm with three different enzyme immunoassays. Polymerase chain reaction testing for HIV-1 DNA was performed to confirm HIV infection in children under 2 years. HIV incidence was measured using the BED assay (also known as the capture enzyme immunoassay). All HIV testing was anonymous and unlinked to any personal identifiers. Individuals wanting to know their HIV status were referred to local voluntary counselling and testing (VCT) facilities in the area.

Data analysis: weighting of the sample by age, race group, and province was applied to ensure that the estimates of HIV prevalence and incidence are representative of the general population.

Findings

The 2002, 2005 and 2008 surveys are comparable for the population aged 2+ years and similar prevalence levels were found in all three studies – 11.4% in 2002, 10.8% in 2005 and 10.9% in 2008. HIV prevalence in the total population of South Africa has thus stabilised at a level of around 11%. However, HIV infection levels differ substantially by age and sex and also show a very uneven distribution among the nine provinces.

It is important to note that HIV prevalence is heterogeneous in South Africa's provinces, with the highest prevalence in 2008 being found in KwaZulu-Natal (15.8%) and Mpumalanga (15.4%). This is followed by Free State (12.6%), North West (11.3%), Gauteng (10.3%), Eastern Cape (9.0%) and Limpopo (8.8%). The two provinces with the lowest prevalence are Western Cape (3.8%) and Northern Cape (5.9%).

The interpretation of HIV prevalence trends in South Africa is increasingly complex as increased access to antiretroviral treatment (ART) has the potential effect of increasing HIV prevalence by reducing HIV-related mortality, making it difficult to draw conclusions about the epidemic over time using prevalence as the only measure. This should be borne in mind when interpreting the present findings on HIV prevalence.

While further analysis of this survey data will be presented in scientific journals, the present report includes analysis of outcomes necessary for monitoring and evaluating

the South African response to the epidemic. There are encouraging signs that change in prevalence and incidence is now occurring.

- HIV prevalence at a national level has decreased among children aged 2–14, from 5.6% in 2002 to 2.5% in 2008.
- HIV prevalence has decreased among youth aged 15–24 from 10.3% in 2005 to 8.6% in 2008.
- Using a mathematical approach for the 15–20-year-old age group, it was found that there was a substantial decrease in incidence in 2008 in comparison to 2002 and 2005, especially for the single age groups 15, 16, 17, 18, and 19.
- From 2002 to 2008 there have been marked changes in condom use, with both males and females reporting similar levels of condom use at last sex. Among people aged 15–49 reported last-sex condom use has risen significantly, from 31.3% in 2002 to 64.8% in 2008. Among males, the increase was from 36.1% in 2002 to 67.4% in 2008, with rates among females moving from 27.6% to 62.5%.
- Among youth, condom use has reached very high levels, with 87.4% of males and 73.1% of females reporting condom use at last sex. Condom use has also increased slightly among people aged 15–49 who have multiple sexual partners, from 70.8% in 2002 to 75.2% in 2008.
- Among individuals 15+ years, awareness of HIV status doubled from 2005 to 2008. This occurred among both females and males as well as in most-at-risk populations (MARPs).
- There has been an increase in exposure to one or more HIV/AIDS communication programmes from 2005 to 2008, with 90.2% of youth aged 15–24 being reached, followed by 83.6% of adults aged 25–49 and 62.2% of adults 50+ years.

It is commendable that South Africa is finally making progress against a number of indicators that are vital for an effective response to the epidemic. However, there are a number of areas requiring serious attention:

- HIV prevalence remains disproportionately high for females overall in comparison to males, and it peaks in the 25–29 age group, where one in three (32.7%), were found to be HIV-positive in 2008. This proportion has remained unchanged, and was at the same level in all three surveys.
- HIV prevalence among females is more than twice as high as that of males in the age groups 20–24, and 25–29. HIV prevalence among males peaks in the 30–34-year-old age group, where a quarter of males (25.8%) were found to be HIV-positive in 2008.
- Among youth, early sexual debut is related to entry into sexual relationships, and consequent vulnerability to HIV infection. Sexual debut before the age of 15 among males 15–24 years has declined from 13.1% in 2002 to 11.3% in 2008, but among females 15–24 years, 8.9% had had sex before the age of 15 in 2002, with 8.5% reporting the same in 2008.
- Among young people who reported having partners who were five or more years older than themselves, there was a substantive increase, from 9.6% in 2005 to 14.5% in 2008.The same pattern was also found among females, where the percentage increased substantively from 18.5% in 2005 to 27.6% in 2008.
- Having a high turnover of sexual partners influences the likelihood of exposure to HIV. Among people aged 15–49, the number of sexual partners reported in the past year has increased slightly since 2002, where 9.4% reported two or more partners in comparison to 10.6% in 2008. In the Free State, the number of people having two or more partners in the past year has risen significantly, from 5.7% in 2002 to 14.6% in 2008.

- HIV/AIDS knowledge has declined among MARPs between 2005 and 2008. For example, among African females aged 20–34 combined knowledge declined from 43.8% to 26.1%, and among African males aged 25–49 it declined from 40.6% to 28.0%
- HIV/AIDS programmes do not have comprehensive reach into older segments of the population. More than a third of adults 50+ years are not reached by any national programme, and even for adults aged 25–49 more than one in nine (16.4%) have no exposure to HIV/AIDS communication programmes.

Finally, the process of indicator development for the NSP is enriched through the suggestion of possible additional indicators tailored for the South African context.

In conclusion, although the overall situation remains dire, some solid progress has been achieved in the fight against the disease over the past few years, especially among teenagers and children. There is therefore a need for the country to re-double its efforts in the fight against HIV if it is to turn the tide among the other age groups by 2011 as stipulated by the NSP.

CHAPTER 1

Introduction

1.1 Background

South Africa's HIV epidemic is defined by the Joint United Nations Progamme on HIV/AIDS (UNAIDS) as being a hyper-endemic epidemic as a result of the country having more than 15% of the population aged 15–49 living with HIV (UNAIDS 2008).

UNAIDS estimated that in 2007, 33 million people were living with HIV globally. In the same year 2.7 million people became infected with HIV and 2 million people died of HIV related causes. Of the 2.7 million new infections it was estimated that 1.9 million occurred in sub-Saharan Africa (UNAIDS 2008). The region accounts for two-thirds (67%) of the global total of 33 million people living with HIV. Southern Africa continues to bear a disproportionate share of the global burden of HIV with 35% of HIV infections occurring in this sub-region.

Heterosexual transmission between couples is still the predominant mode of HIV spread in sub-Saharan Africa. However, recent epidemiological evidence has shown the region's epidemic to be more diverse than previously thought, with other focal areas, including sex work, intravenous drug use and sex between men, continuing to play a role in new infections (UNAIDS 2008).

In the section below, only a selection of indicators identified for tracking of the South African epidemic as outlined in the NSP are dealt with (see Appendix 2 for a list of indicators for which the HSRC is primarily responsible). The selection of indicators presented in this report was determined by the availability of data on the specific indicator in the national population-based survey of HIV, behaviour and communication. It is hoped that the report will be helpful as input for the mid-term review of South Africa's national strategic plan on HIV and AIDS (NSP) issued by the Department of Health (2007) that will be undertaken from June to September of 2009.

Sexual debut

Age of sexual debut has emerged as an important variable in the prevention of HIV both in South Africa and globally (UNAIDS 2008). In 2007, young people aged 15–24 accounted for an estimated 45% of new HIV infections worldwide (UNAIDS 2008). For this reason, it is important to understand the age at which young people become sexually active and, consequently, the age at which they are at risk of contracting HIV. An analysis of young people as a whole masks several disparities including those pertaining to gender. In South Africa, for example, young females have three to four times the prevalence of HIV than their male peers. HIV prevalence is overall higher for females and peaks at an earlier age than in males (Shisana et al. 2005). Gendered differences in HIV prevalence thus need to be taken into account.

A review of sexual relations among young people in developing countries found a variation in age at sexual debut by regions. For an example, data collected in Latin America showed that sexual debut occurs at an earlier age (age 15) compared to sub-Saharan Africa and Asia, where the median age at first sex is between 18 and 20 among females and 15 and 20 years of age among males (Brown et al. 2001). Further variations can also be observed when data are analysed using demographic variables such age, sex, and locality. For example, a study conducted in South Africa among rural males found

that 13% of 15–24-year-olds had their first sexual relationship before age 15 (Harrison et al. 2005). In addition, girls who report first sexual intercourse during their early teen years have much higher rates of teenage pregnancy and childbearing than girls who have a later debut. In South Africa, pregnancy is stronger predictor of HIV infection among 15–24-year-olds (Pettifor et al. 2004).

Intergenerational sex

In southern Africa, the practice of age mixing or intergenerational sex – particularly younger females having sex with older males – has been identified as an important factor contributing to the spread of HIV (Katz & Low-Beer 2008; SADC 2006). Other researchers have noted that such relationships are usually motivated by subsistence needs as well as being linked to materialism and consumption (Pettifor et al. 2004; Hunter 2002; Leclerc-Madlala 2008). Shisana and colleagues found a higher HIV prevalence among teenage males and females who reported having sexual partners who are five or more years older than themselves (Shisana et al. 2005). Owing to unequal power dynamics in such relationships, vulnerability may be exacerbated for young girls who do not have the skills and power to negotiate condom use (Mercer et al. 2009).

Multiple sexual partners

Concurrent sexual partnerships, where sexual relationships overlap in time are noted to be a major factor contributing to the rapid growth of HIV infections, and qualitative research illustrates that such partnerships are normative in South Africa (Parker et al. 2007). While risk of HIV infection increases as a product of having many sexual partners, it is particularly risky to have concurrent sexual partners as this creates multiple pathways for HIV transmission to occur. Modelling studies have illustrated that concurrent sexual partnerships result in sexual networks that have densely clustered pathways that do not occur when people have sequential relationships that do not overlap in time (Morris & Kretschmar 1997).

An additional factor influencing the rate of new HIV infections is the higher viral load of HIV that occurs in the first few months of HIV infection. This increases the likelihood of HIV transmission up to 10 times, and where there is a sexual network produced by overlapping sexual partnerships, HIV incidence and prevalence increase more rapidly (Halperin & Epstein 2007; Pilcher et al. 2004).

Condom use among people with multiple partners has increased, especially in the areas most affected by the HIV epidemic (UNAIDS 2008). Demographic and health surveys have found that 27% of females and 33% of males aged 15–49 years who had more than one partner in the last year used condoms over at least two time points (UNAIDS 2008).

Condom use

Although both male and female condoms are available in South Africa, male condoms have been far more widely available as a product of cost and other logistical concerns. Although there has been a marked overall increase in condom use, condom use with primary partners (either spouses or steady partners) is low. Low use, inconsistent use, and non-use are also noted to occur among people who have many sexual partners (Lichtenstein et al. 2008; Kalichman et al. 2007). The South African Demographic and Health Survey (DOH 2003) (DHS) reported that condom use among individuals with multiple sexual partners was 15.4% for primary partners in comparison to 46.5% among non-primary partners.

Gender

The NSP notes the variability in reach and intensity of HIV prevention programmes. For instance, although people are generally knowledgeable about HIV prevention, HIV incidence and overall HIV prevalence remain high. Vulnerability to HIV infection is also considerably higher among females in spite of prevention programmes addressing both genders.

UNAIDS (2008) maintains that although a large majority of countries have begun to recognise gender issues in their HIV planning processes, a substantial number of countries lacked budget and policy support for such issues. For example, only 52 % of countries are reported to have a budget dedicated to HIV programmes that aim to exclusively address challenges that women face as far as the epidemic is concerned. This is in spite of there being more than 80% of countries that report to focus on women as part of their HIV reduction strategy (UNGASS 2008). Asia (69%) and sub-Saharan Africa (68%) are reported to be the two regions that have the largest budget aimed at addressing such efforts (UNAIDS 2008).

One example, of a gendered orientation is the need to focus on women in relation to the prevention of mother-to-child transmission (PMTCT). According to the UNAIDS Policy Fact Sheet (2008), through the introduction of PMTCT in South Africa, the percentage of HIV-positive pregnant women receiving antiretroviral treatment increased from 30% in 2005 to 57% in 2007. Improved results were also apparent in Botswana whereby the percentage of women reached by PMTCT services increased from 58% in 2003[1] to more than 95% in 2007 (UNICEF 2008).

Most-at-risk populations

Most-at-risk populations (MARPs) are defined as those populations that are found to have a higher than average HIV prevalence when compared to the general population. According to UNAIDS (2006), MARPs engage in behaviours that put them at higher risk for HIV infection. At-risk populations are among the most marginalised and most likely to be stigmatised. In addition, resources and national HIV-prevention campaigns are not necessarily geared to their specific HIV prevention, treatment and care needs.

In the generalised epidemics of southern African the definition of MARPs is not clear cut, as higher than average prevalence may apply to large populations and sub-populations. While some of these populations are not necessarily stigmatised or marginalised to the same extent as those subgroups falling into the international definition, it remains true that their risks are higher.

Until recently, the HIV prevalence among men who have sex with men (MSM) in South Africa remained undocumented. Data presented recently at the 4th South African AIDS Conference, provides insight into the HIV prevalence among MSM in South Africa. Three studies presented on preliminary data collected respectively in Cape Town, Johannesburg and Durban and in Soweto, Gauteng have all consistently yielded results showing that the HIV-prevalence rates among MSM range from 12.6% to 47.2% among different sub-populations (Burrell et al. 2009; Lane et al. 2009; Rispel et al. 2009).

1 Integrated Regional Information Network (2004) 'Botswana: Few women accessing PMTCT services'. Accessed 29 April 2009, http://www.aegis.com/news/irin/2004/IR040334.html.

Several studies in sub-Saharan Africa have suggested strong links between substance use (that is, both alcohol and recreational drugs) and risky sexual behaviour such as having multiple sex partners, having unprotected sex, and engaging in sex for money and/or gifts (Fisher, Bang & Kapiga 2007; Kalichman et al. 2007; 2008; Morojele et al. 2005, 2006; Parry et al. 2009; Roerecke et al. 2008). Indeed, both alcohol and recreational drugs work through similar mechanisms in which there is an impairment in both judgement and decision-making which leads the users to risky sex behaviour (Kalichman et al. 2008; Wechsberg et al. 2008). The increase in risky sex behaviour in turn increases the risk of HIV infection among those who use substances.

People with disabilities are known to be marginalised and there is very little data available on HIV prevalence among this population.

In this report, we have defined of MARPs as follows:

- African females aged 20–34;
- African males aged 25–49;
- Males 50+;
- MSM;
- High-risk drinkers;
- People who use drugs for recreational purposes, and
- People with disabilities.

High-risk drinkers were categorised using the Alcohol Use Disorders Identification Test (AUDIT) developed by the World Health Organisation (WHO), and people scoring more than 8 were included. Recreational drug users were categorised based on any affirmative responses to questions about use of recreational drugs in the past three months. Drugs included marijuana, amphetamines, inhalants, hallucinogens, and opiates. People with disabilities included those who gave affirmative responses to questions about disabilities including physical, sensory, mental, and intellectual.

Awareness of HIV status

Voluntary counselling and testing (VCT) plays a pivotal role in the fight against the HIV/AIDS epidemic. Among other benefits, VCT has been useful for encouraging people to test and become aware of their HIV status; for providing HIV/AIDS-prevention education, particularly promoting safer sexual practices; and for paving the way for access to support services and antiretroviral treatment. An increase in the VCT uptake has been observed in South Africa. For instance, results from surveys conducted in 2002 and 2005 show that VCT in the form of HIV testing was reported to have increased from 18.9% to 30.3% (Shisana et al. 2005).

Awareness of one's HIV status has been deemed to be the cornerstone for individuals undergoing HIV testing to make use of VCT services. A variety of barriers, however, such as the fear of being seen at a healthcare facility for VCT (Kalichman & Simbayi 2003), transport difficulties (Matovu & Makumbi 2007), the type of testing (Kassler et al. 1998) and concerns about confidentiality as well as delays associated with reporting HIV test results (Creek et al. 2007) have all been noted to impede an individual's willingness to access VCT services resulting in the lack of knowledge about one's HIV status.

Studies have, however, shown that the mitigation of VCT-related barriers tends to improve VCT uptake. For instance, a study by Bhagwanjee et al. (2008) conducted among employees at a workplace showed that the increase in VCT was due to the convenience

provided by rapid testing, thus allowing employees to obtain their results immediately, as well the easy accessibility of the testing site, which was the workplace in this instance. In addition, in a study conducted in Zimbabwe, Morin et al. (2006) argued that the use of a mobile clinic as a tool for promoting VCT increased 98% of VCT uptake among over 1 000 women. Reasons provided for the increase in the uptake of VCT included females not having to ask their male partners for money to travel to a VCT site or to ask them for permission to visit the VCT site as services were easily accessible.

Concerning the possible impact of the awareness of HIV status on prevention, somewhat mixed evidence is available. The data obtained in the 2005 survey in South Africa suggested that awareness of their HIV status, irrespective of whether it was positive or negative, was associated with safer behaviour in so far as there was some significant increase in condom use among those who knew their HIV status compared to those who did not know it (Shisana et al. 2005; UNFPA 2004). The increase was much greater among those who were HIV positive (66.2% vs. 26.2%) than among those who were HIV-negative (50.8% vs. 35.0%). Inconsistent results have been found among individuals who test HIV-negative, with some studies finding an impact (JCSMF 2006) and others not (Cassell & Surdo 2007). In addition, no impact of VCT on HIV incidence has been reported at population-level (Denison et al. 2008).

VCT as a way of identifying those who qualify for antiretroviral treatment (ART) is also indirectly important for prevention as ART can reduce viral load and therefore infectivity. Therefore, HIV testing could also indirectly help reduce HIV transmission if this is done in conjunction with an extensive ART programme. In addition, there is evidence that sexually active HIV-positive individuals who receive ARVs are more likely to practise safe sex (Kalichman 2007; Kennedy et al. 2007; UNAIDS 2001).

HIV/AIDS communication programmes

A wide range of national and sub-national HIV/AIDS communication programmes exist in South Africa. These include national communication programmes conducted by government and non-governmental organisations (NGOs); programmes within schools, universities and workplaces; provincial government programmes; sub-national programmes led by NGOs; and interactive communication, including community-level campaigns such as door-to-door activities, community theatre, and events.

Four national-level HIV/AIDS communication programmes utilising media and interactive components have been run over multiple years in South Africa, including the period of the survey – the Department of Health's Khomanani Campaign, Soul City, Soul Buddyz and loveLife. All of these programmes utilise mass media in combination with interactive approaches and two of them – Soul Buddyz and loveLife – have an explicit focus on young people. Soul Buddyz is oriented towards children and loveLife is oriented towards teenagers.

According to the 2006 National HIV/AIDS Communication Survey, a total of 92.5% of the population was reached by national HIV/AIDS communication programmes (Kincaid et al. 2006). An analysis of the effects of exposure to communications found that there was a direct contribution to AIDS-related knowledge as well as indirect effects on increasing condom use, HIV testing and helping people who were sick with AIDS. Exposure to multiple programmes was related to higher levels of impact. It was also found, however, that 2 million adults were not being reached by the predominant HIV/AIDS communication programmes and there was also poor knowledge of the importance of having fewer partners and avoiding concurrent sexual partnerships (Kincaid et al. 2008).

1.2 Purpose of the report

The NSP sets out to halve new HIV infections by 2011. The HSRC and the MRC are two of a number of research institutions involved in supporting the monitoring and evaluation components of the NSP. This report presents findings relating to specific indicators identified in the HIV-prevention section of the NSP.

The report aims to:

- contribute to the information necessary for monitoring and evaluation of the progress South Africa is making in achieving the target for HIV prevention;
- present data to assist in preparing the United Nations General Assembly Special Session (UNGASS) report and the Millennium Development Goals (MDG) report;
- present a proposal which is expected to contribute to the development of baseline national indicators to monitor the South African epidemic in line with the stipulations of the NSP.

The report focuses on the indicators described below using data collected via HSRC national population-based surveys conducted in 2002, 2005 and 2008.

The broad objectives of the 2008 national survey are to:

- determine the prevalence of HIV infection in South Africa;
- examine the incidence of HIV infection in South Africa;
- assess the relationship between behavioural factors and HIV infection in South Africa;
- describe trends in HIV prevalence, HIV incidence, and risk behaviour in South Africa over the period 2002–2008;
- investigate the link between social, values, and cultural determinants and HIV infection in South Africa;
- assess the type and frequency of exposure to major national behavioural change communication programmes and assess their relationship to HIV prevention, AIDS treatment, care, and support;
- describe male circumcision practices in South Africa and assess its acceptability as a method of HIV prevention;
- collect data on the health conditions of South Africans;
- contribute to the analysis of the impact of HIV/AIDS on society.

Not all the above objectives are addressed in the present report. Instead, the focus is on:

- presenting data for monitoring and evaluation of the NSP;
- presenting data for monitoring the indicators required for the preparation of the UNGASS 2010 Report;
- reporting on MDG targets in relation to poverty and HIV;
- describing trends in HIV prevalence, HIV incidence, and risk behaviour in South Africa over the period 2002–2008;
- assessing the type and frequency of exposure to major national behavioural-change communication programmes;
- proposing indicators to be used to monitor the South African HIV and AIDS epidemic and its management.

CHAPTER 2

Methodology

2.1 Study design

A cross-sectional population-based household survey was conducted using a multi-stage stratified sampling approach. The study design and methods utilised in 2008 were based on the methods used previously in the 2002 and 2005 surveys; except in the 2002 survey, oral transudate specimens were used for HIV antibody testing, while in both 2005 and 2008 dry blood spot (DBS) specimens were used.

2.2 Study population

The 2002 and 2005 surveys included individuals aged 2+ years living in South Africa. The 2008 survey included individuals of all ages living in South Africa, including infants under 2 years of age. All persons living in the selected households were eligible to participate including those living in hostels, but individuals staying in educational institutions, old-age homes, hospitals, homeless people, and uniformed-service barracks were excluded from the survey.

2.3 Sampling

As in previous surveys, a multi-stage disproportionate, stratified sampling approach was used (see the steps listed below). A total of 1 000 census enumeration areas[2] (EAs) from the 2001 population census were selected from a database of 86 000 EAs and mapped in 2007 using aerial photography to create a new updated Master Sample[3] (Figure 2.1) as a basis for sampling visiting points/households. The selection of EAs was stratified by province and locality type. Locality types were identified as urban formal, urban informal, rural formal (including commercial farms), and rural informal. In the formal urban areas, race was also used as a third stratification variable (based on the predominant race group in the selected EA at the time of the 2001 census). The allocation of EAs to different stratification categories was disproportionate; that means, over-sampling or over-allocation of EAs was done, for example, in areas that were dominated by Indian, coloured or white race groups to ensure that the minimum required sample size in those smaller race groups was obtained.

Steps in sampling

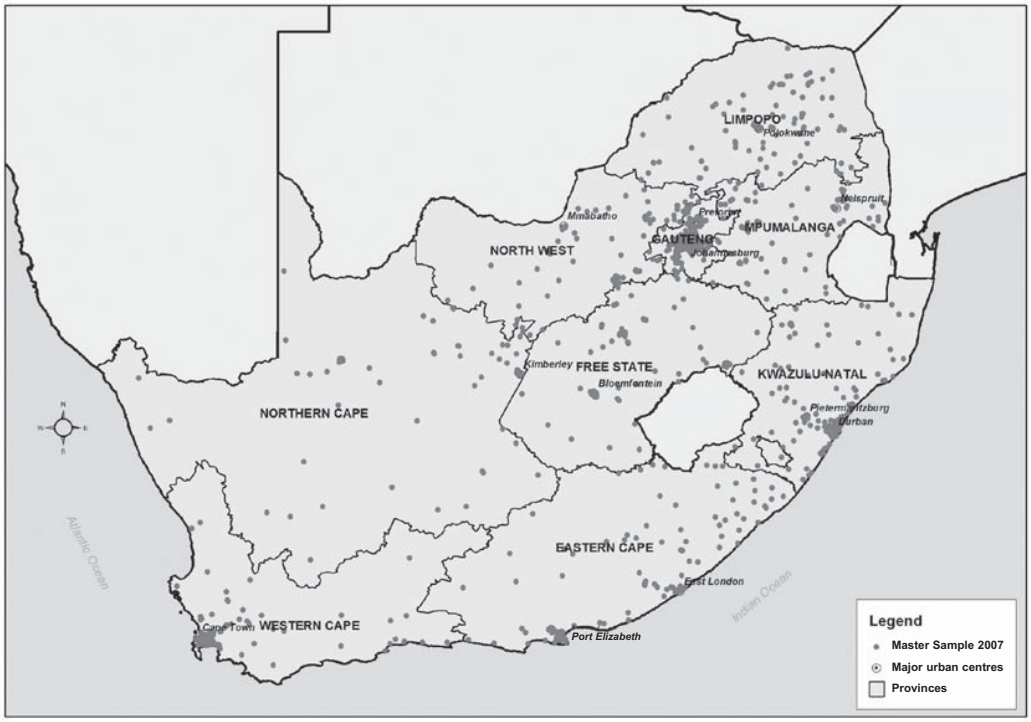
1. Define the target population: all people of South Africa living in households or hostels.
2. Define the sampling frame: 2001 national population census from which 1 000 EAs were sampled.
3. Define primary sampling units: 1 000 EAs sampled from census 2001 database of EAs.

2 An enumeration area (EA) is the spatial area used by Statistics South Africa (StatsSA) to collect census information on the South African population. An enumeration area consists of approximately 180 households in urban areas and 80–120 households in a deep rural areas and is considered to be of a small enough size for one person to collect census information for StatsSA. The country has been subdivided into about 86 000 EAs.

3 The Master Sample is defined as a selection, for the purpose of repeated community or household surveys, of a probability sample of census EAs throughout South Africa that are representative of the country's provincial, settlement, and racial diversity.

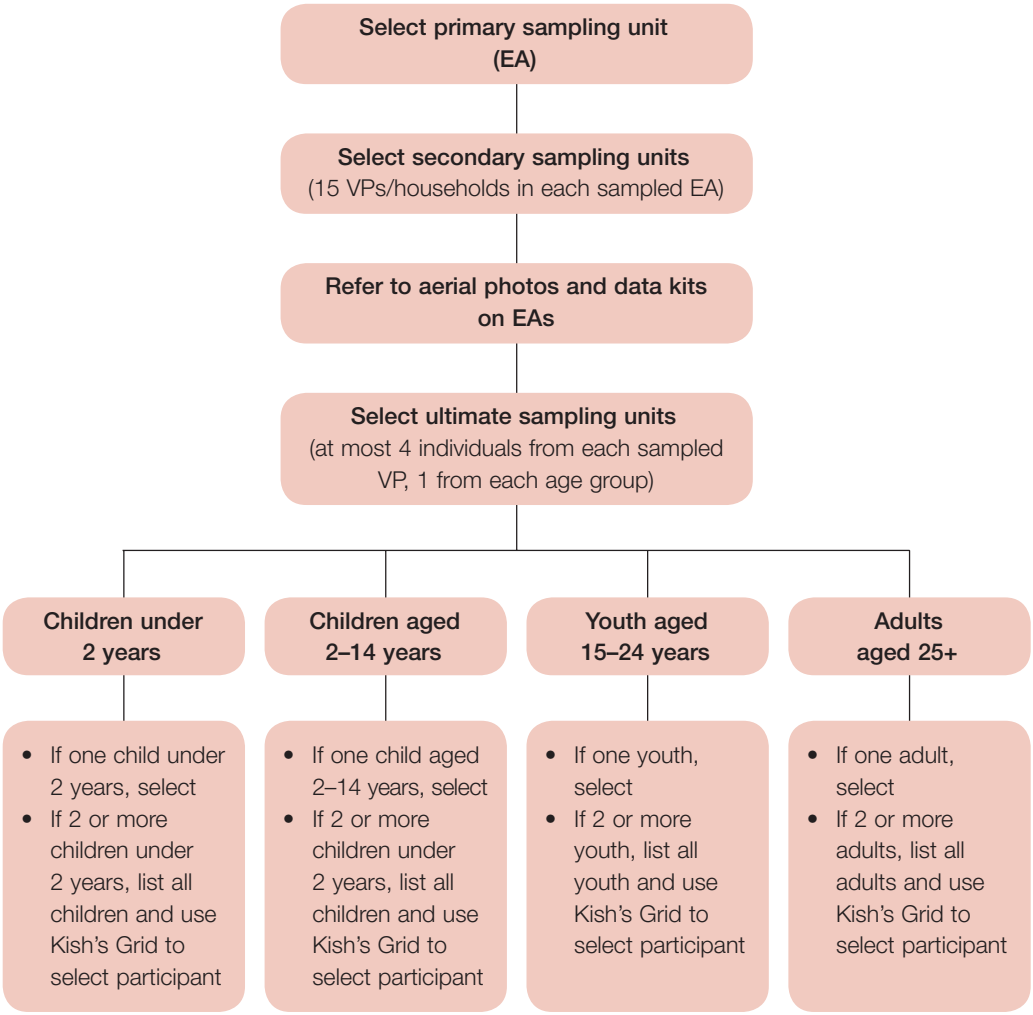
4. Define measure of size: 2001 estimate of visiting points (VPs), measure of size (MOS) was used in sampling 1 000 EAs.
5. Allocation of sample: disproportional allocation of EAs to province, race group, and genotype.
6. Define strata: province (n = 9) and geotype (n = 4).
7. Define reporting domains: geotype (n = 4), age group (n = 4), gender (n = 2), and race group (n = 4).
8. Define secondary sampling units: VPs; 15 VPs sampled from each of 1 000 EAs.
9. Define ultimate sampling unit: individual eligible to participate in the household.

Figure 2.1: HSRC Master Sample sites in South Africa, mapped in 2007



The selected 1 000 EAs formed the primary sampling units. VPs, or households, were used as secondary sampling units. Within each household, eligible individuals selected for the survey represented the ultimate sampling unit. With a view to obtaining an approximately self-weighted sample of VPs (i.e. secondary sampling units), the EAs were sampled with probability proportional to the size of the EA using the 2001 census estimate of the number of visiting points in the EA database as an MOS. A random sample of 15 VPs was selected from each of the 1 000 EAs, yielding a total sample size of 15 000 households or VPs.

Figure 2.2: Steps in drawing the sample



*Note: * The Kish Grid system ensures that the household member to be interviewed is selected entirely randomly and has an equal chance of being interviewed*

Within each household, only one person within each age group was selected, subject to there being at least one eligible person in the specified age group. Four mutually exclusive age groups were used for sampling respondents (Figure 2.2):

- under 2 years;
- 2–14 years;
- 15–24 years, and
- 25+ years.

Thus, up to four persons of different ages were selected per household, depending on the age groups represented in the household. A 'household member' was defined as any person who slept in the household on the night preceding the survey (including visitors).

This is the most widely accepted definition of 'household member' and is consistent with other surveys and the 2001 national population census.

The pre-selected households were identified using aerial maps with the aid of global positioning system (GPS) instruments. Up to four visits were made to the selected households in order to ensure maximum participation.

2.4 Sample size estimation

The sample size estimation was guided by two requirements:

- the requirement for measuring change over time in order to detect a change in HIV prevalence of 5 percentage points in each of the main reporting domains, namely gender, age-group, race, locality type, and province (5% level of significance, 80% power, two-sided test), and
- the requirement of an acceptable precision of estimates per reporting domain; that is, to be able to estimate HIV prevalence in each of the main reporting domains with a precision level of less than ± 4%, which is equivalent to the expected width of the 95% confidence interval (z–score at the 95% level for two-sided test). A design effect of 2 was assumed.

The total sample size of 15 000 households was based on the sample sizes needed for each reporting domain, and also took into account the multi-stage cluster sampling design and the expected response rates. There is no previous information on HIV testing coverage for infants under 2 years of age in a national household survey. As a minimum, a national estimate for HIV infection was expected to be calculated for this age group.

2.5 Measures

Questionnaires used in the 2008 survey were similar to those used in the 2002 and 2005 surveys. In addition, a new questionnaire for mothers/guardians of children under 2 years of age was added. The following six questionnaires were used:

- Visiting point questionnaire: this questionnaire was used to record a household census of each study household and to record household-level information. It will also be used to select one participant from each age group represented in the household.
- Questionnaire for mother/guardian of children aged under 2 years.
- Questionnaire for parent/guardian of children aged 2–11 years.
- Questionnaire for children aged 12–14 years.
- Youth questionnaire for individuals aged 15–24 years.
- Adult questionnaire for individuals aged 25+ years.

As in 2002 and 2005, all questionnaires, information sheets, and informed consent forms were translated into relevant local languages and pre-tested during the preparatory work.

Tables 2.1 and 2.2 show how the six questionnaires relate to the 11 main objectives of the original study and how the main themes were covered within the various modules in the five main questionnaires, with the exception of the one for VPs. The key changes in both the youth and adult questionnaires from 2005 to 2008 were the inclusion of a module on the prevalence of male circumcision as in 2002, as well as its acceptability, and a new module on social values and norms. Most of the modules not published in this or subsequent reports will be discussed in a set of peer-reviewed articles to be published in scientific journals.

Table 2.1: Objectives of the 2008 survey according to age group

Objective	Under 2 years	2–14 years	15–24 years	25+ years
1. To determine the prevalence of HIV infection in South Africa	X	X	X	X
2. To determine the incidence of HIV infection in South Africa	X	X	X	X
3. To assess the relationship between behavioural factors and HIV infection in South Africa	X	X	X	X
4. To describe trends in HIV prevalence, HIV incidence, and risk behaviour in South Africa over the period 2002–2008		X[a]	X	X
5. To assess the link between social, values, and cultural determinants and HIV infection in South Africa			X	X
6. To collect data for monitoring and evaluation of the NSP	X	X	X	X
7. Collect data for monitoring the indicators required for the preparation of the UNGASS 2010 Report	X	X	X	X
8. To assess the type and frequency of exposure to major national behavioural-change communication programmes addressing HIV and AIDS in South Africa as well as community-level HIV and AIDS communication and assess their relationship to HIV prevention, AIDS treatment, care and support			X	X
9. To describe male circumcision practices in South Africa; assess its acceptability as a method of HIV prevention[b]	X	X	X	X
11. To determine the health status of South Africans and its impact on the health system	X	X	X	X

Notes: [a] Risk behaviour only measured in persons aged 12–14 years.
[b] Measured among males only.

Table 2.2: Questionnaire modules by age group

Questionnaire module	Children under 2 years (reported by mother/ guardian)	Children aged 2–11 years (reported by parent/ guardian)	Children aged 12–14 years (self-reported)	Youth aged 15–24 years (self-reported)	Adults aged 25+ years (self-reported)
Demographics (age, sex, race, language, geotype or locality type, province, education, employment, language, marital status, etc.)	X	X	X	X	X
Care and protection of child; home environment; orphan status	X	X	X	X (only up to 18 years old)	
Health status including hospitalisation history	X	X	X	X	X
Mother's use of antenatal services, delivery services, and PMTCT services; infant feeding practices and weaning practices	X (mother)			X (females concerning pregnancy only)	X (females concerning pregnancy only)
HIV-testing history and risk perception	X (mother)	X	X	X	X
Circumcision status (males only)	X	X	X	X	X
Knowledge, attitudes, beliefs, and values about HIV and AIDS and about HIV-related practices and behaviours (KAP)	X (mother)	X (parent/ guardian)	X	X	X
Sexual behaviour			X	X	X
Drug and alcohol use				X	X
Exposure to HIV behavioural-change communication	X (mother)	X (parent/ guardian)	X	X	X
Social norms and values				X	X

Table 2.2: contd.

Questionnaire module	Children under 2 years (reported by mother/ guardian)	Children aged 2–11 years (reported by parent/ guardian)	Children aged 12–14 years (self-reported)	Youth aged 15–24 years (self-reported)	Adults aged 25+ years (self-reported)
Attitudes towards male circumcision	X (mother)	X (parent/ guardian)	X (mainly males)	X (mainly males)	X (mainly males)
Health status	X			X	X
Impact on health system	X			X	X

2.6 Ethical considerations

This proposal was approved by the HSRC's Research Ethics Committee (REC 2/23/10/07) and the CDC's Institutional Review Board (IRB) as well as the Global AIDS Programme before the fieldwork commenced. The HSRC's REC has Federalwide Assurance (FWA) for the Protection of Human Subjects accreditation with the USA's Department of Health and Human Services (DHHS). The study adhered to international ethical standards as stipulated below.

2.6.1 Informed consent procedures

All youth and adults who agreed to participate were required to provide either written or verbal (where respondent was illiterate) consent. A waiver of written consent per 45CFR46 was granted by CDC for cases where respondents are unable to provide written consent but consent verbally. Where such situations arose, field staff signed on behalf of the participant certifying that informed consent had been given verbally by the participant. Furthermore, a witness also signed the consent form to certify that informed consent had been given verbally by participant. Parents and guardians of children under 18 years were asked to give informed consent for inclusion of children in the survey and verbal assent was obtained from all children who gave a specimen for HIV testing. Fieldwork staff were trained in informed consent procedures to ensure that voluntary informed consent was obtained for all respondents.

The research that was undertaken on children adhered to the new South African Children's Act (No. 38 of 2005) which came into effect in 2007 (see Bamjee et al. 2007).

2.6.2 Procedures to ensure confidentiality

Interviews were held either inside or outside of the house with each individual respondent. Efforts were made to avoid interference from other members of the household. In addition, no names of individuals were recorded either on the questionnaires or on specimens. Instead, barcodes on questionnaires, blood samples, and HIV testing results were linked electronically. To ensure further confidentiality, data were analysed nationally, provincially, and by EA type and not by smaller geographic units. The EA number was also separated from the data files.

2.6.3 Motivation for conducting anonymous HIV testing

As with the previous two surveys, the respondents in the study were not given their HIV test results. The rationale included the potential for response rates to be reduced because

sampled respondents might not wish to know their status, and the potential for stigma. The approach also preserved the confidentiality of a person's status, as fieldworkers had no way of knowing HIV antibody test results.

2.6.4 Provision of HIV testing and counselling

This study followed the principles regarding linked anonymous testing:[4]

- Respondents were informed about the purpose of giving a dried blood spot (DBS) sample for HIV testing and HIV testing was conducted only on the specimens of respondents who gave their consent (or whose parent or guardian had consented in the case of children).
- Respondents were not offered any voluntary counselling and testing (VCT) during the interview process, but all those who wished to find out about their HIV status were given a card referring them to a nearby VCT site. (The financial implications of directly offering VCT as part of the study would have made the costs prohibitive. In addition, offering VCT instead of anonymous testing may have adversely affected participation. A follow-up study is planned to explore this issue.)

2.6.5 Other ethical considerations

In order to comply with mandatory reporting of child abuse in terms of the Child Care Act (No. 74 of 1983) and the new Children's Act (see Bamjee et al. 2007):

- no questions were asked directly about child abuse in the survey;
- voluntary information about a child's experiences of sexual abuse were handled on an individual case-by-case basis in consultation with the supervisors and the principal investigators or project directors of the study;
- details of the nearest social work offices and child protection units were made available automatically to each participating household if deemed necessary or upon request.

In order to make sure that the research was conducted according to the highest ethical standards, the following additional measures were used:

- Each section of the questionnaires contained a short introduction saying what was covered in the section, explaining why the questions were being asked, and assuring respondents of the confidentiality of their responses.
- Fieldworkers were trained in research ethics and the ethical guidelines included in the training manual. Special training was also given on the management of children and of crises that might arise in the field.
- Fieldworkers were monitored by their supervisors to ensure that they complied with all the ethical provisions in the study.

Vulnerable groups: This community-based household study covered the general population but also included some vulnerable groups, including people with terminal illness, children, adolescents, and pregnant women, and people living with HIV/AIDS. Where respondents were unable to take part in the survey due to poor health or mental capacity, fieldworkers made a decision (in consultation with a supervisor) to exclude them from the study.

4 see http://www.cdc.gov/mmwr/preview/mmwrhtm/rr481a.1.htm

2.7 Fieldwork procedures

The fieldwork was conducted in the period from end of May 2008 to the beginning of March 2009. Fourteen HSRC junior researchers and research trainees studying towards Master's, and PhD degrees acted as provincial survey coordinators. In addition, 165 nurse fieldworkers, 27 nurse supervisors, and 40 field editors (see Appendix 6) were recruited for the survey. A training manual adapted from the previous surveys was used for field worker training with a focus on informed consent procedures as well as interviewing skills and completion of study questionnaires, specimen collection, maintaining confidentiality, VCT referral procedures, and quality control procedures. Supervisors and field editors were also trained to identify the EAs using maps, GPS equipment and coordinates, identifying the pre-selected households, and age-stratified random selection of respondents within each household using Kish's Grid.

Each provincial coordinator was responsible for about two teams of fieldworkers. Each team comprised one nurse supervisor and three to five nurse fieldworkers accompanied by one field editor who was not a nurse. Where possible, fieldworker teams were matched to respondents according to demographic characteristics (e.g. race, ethnicity, language).

The selected household members (or child's parent/guardian in the case of children 11 years and younger) were asked to provide informed consent to be interviewed. After the interview, the participant (or child's parent/guardian) was asked to provide consent to give a blood specimen for HIV testing. In addition to obtaining consent for specimen collection from the child's parent/guardian, verbal assent for specimen collection was also obtained from children under 12 years.

2.7.1 Specimen collection

DBS specimens were collected from each participant who consented (or assented) to provide a specimen. Blood spots were collected on absorbent paper (Schleicher & Schuell 903 Guthrie Cards) by pricking a finger (heel or toe in the case of infants). This specimen collection strategy was chosen because it offers unique advantages for large-scale population-based surveys and the HSRC has used this strategy successfully in the 2005 national household HIV survey as well as other large-scale HIV surveillance surveys. Whole blood obtained by finger-prick was spotted onto each of the five circles of the Guthrie Card, spotting approximately 50 microlitres (µl) of blood per circle. Fieldworkers were instructed to fill at least three circles and encouraged to fill all five circles if sufficient blood could be obtained without causing discomfort to the participant.

2.7.2 Quality control of fieldwork

A broad range of quality control measures were implemented during data collection. Measures implemented before the start of fieldwork included:

- checking all maps for errors such as pixelisation, errors in the legend (e.g. incorrect route descriptions), and checking overall image quality;
- sorting all relevant maps and fieldwork materials according to EA and checking that all materials were accounted for and were in good condition;
- checking fieldwork kits and materials sent to field supervisors for completeness and correctness;
- rigorous record keeping and tracking of study forms, including the number of households and questionnaires completed, and specimen tracking;

- intensive training of fieldwork teams as well as assessing fieldworkers after training; prospective fieldworkers had to meet set minimum standards to take part in the study.

This study implemented a number of additional measures to enhance data quality during the field survey:

- As a first level of control, 14 HSRC junior researchers and research trainees studying towards Master's and PhD degrees acted as provincial survey coordinators, each in charge of two to three fieldwork teams. This group represented the interests of the HSRC in the field, and had to check that teams followed the stipulated fieldwork and administrative procedures.
- The second level of control consisted of the team supervisors. It was the duty of supervisors to carry out the study according to the agreed protocols, including finding the correct EA and identifying the selected VPs in each EA. In addition, the supervisors assisted with the selection of individual respondents by means of the Kish Grid at household level in order to reduce the chances of bias occurring because of erroneous selections carried out by fieldworkers. Another important task of the supervisors was to ensure the integrity of the specimen collection by checking bar-codes on the samples, tracking sheets, and questionnaires to ensure the right specimen would be linked to the right questionnaire.
- The third level of control in the survey was the use of editors in each team. The main task of editors was to check the completed questionnaire for any errors. This was done normally while the team was in the field to allow easy revisits if required. Another important task of editors was to assist the supervisors in identifying the EA and the selected VPs by means of the set of maps and a GPS device (using exact coordinates supplied by the office). In addition, editors also assisted in the correct selection of individual respondents. The close involvement of coordinators, supervisors, and editors in the fieldwork was intended to ensure that work done in each VP surveyed received the necessary supervision.
- A fourth level of control was a small team of independent 'checkers' who revisited EAs to ensure adherence to protocols. Checkers used a shortened questionnaire for this purpose. During revisits, checks were made on the correct spatial location of VPs, the listing of respondents, the selection of individual respondents, and the correct completion of household and individual questionnaires during interviews.

The independent checkers were utilised in two distinct roles. In the first role they were sent to EAs, where either the supervisor, editor, coordinator, or visiting researcher reported problems in the conduct of the field survey by either the team or individual fieldworkers. In such cases, all VPs in an EA, or those done by a particular fieldworker, were revisited, and all problems with regard to sampling/listing/selection/interviews noted down for corrective action. Erroneously selected VPs were redone at the correct location. Fieldworkers had to correct other errors by revisiting households. The second role of checkers was to conduct an independent revisit of a sample of completed EAs.

2.8 Community mobilisation for fieldwork

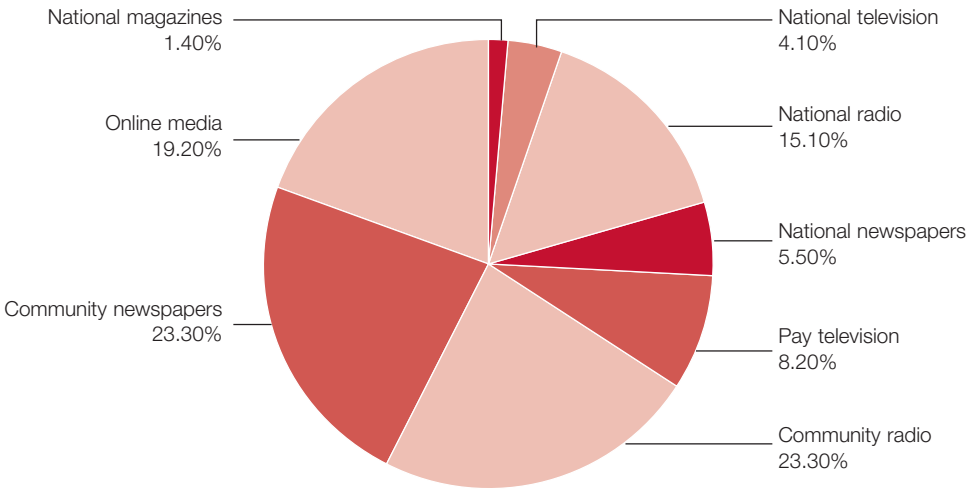
The HSRC and its partners designed and implemented a multi-faceted, study-specific, and proactive communication strategy to encourage and facilitate participation by households and individuals selected for the survey, especially in EAs that previously had low participation. The main purpose was to advise the general public that the survey was being conducted, the way in which it was going to be conducted and the importance of participating. This required a communication strategy that addressed the communities

located near sample EAs as well as the national audience. Flow Communications was appointed to implement the advocacy campaign.

Components of the strategy included:
- interpersonal briefings by HSRC research team and fieldworkers;
- posters and flyers in all official languages;
- press releases;
- communication via national broadcast and print media;
- communication via community radio and newspapers;
- use of online media;
- promotion of the study by 'survey champions'.

This media campaign (see Figure 2.3 for media coverage during the survey) was supported by a strong presence in the field by fieldworkers and over 40 000 flyers as well as 20 000 posters were distributed. To create interest in the objectives of the survey and its key messages, influential South African personalities served as 'survey champions' including Olympic medalist Natalie du Toit; musicians Yvonne Chaka Chaka and Loyiso Bala; actress Hlubi Mboya, and several media personalities, including Gareth Cliff, Jeremy Maggs, Redi Direko, and Brad Mears.

Figure 2.3: Coverage of the 2008 survey in the South African media, by media type



2.9 Laboratory methods

2.9.1 Specimen tracking

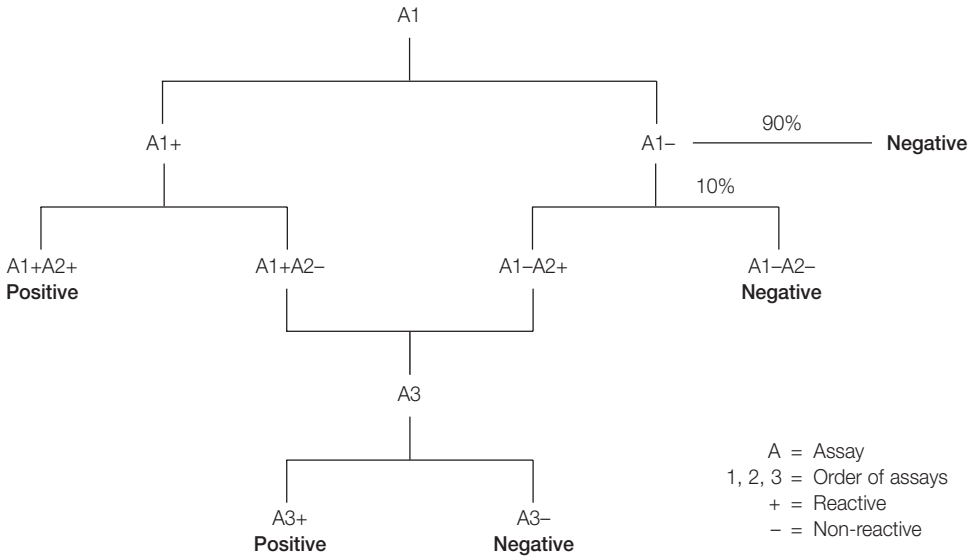
Specimens and specimen tracking sheets with the DBS barcode were sent to the laboratory in transparent, sealable plastic bags containing desiccant. Consecutively numbered laboratory bar-codes were assigned to the specimens as they were received by the laboratory. The specimen bar-codes were matched to the bar-codes on the laboratory tracking sheets. The specimen bar-code numbers were also scanned or typed into an Excel spreadsheet. The Guthrie Cards were labelled with the laboratory bar-code number. Laboratory managers performed a second quality control procedure (matching bar-codes to tracking sheets and examining specimen quality) and signed off the tracking sheets for laboratory processing.

2.9.2 HIV antibody testing

DBS spots were punched into a test-tube pre-labelled with the corresponding laboratory testing bar-code number. The puncher was decontaminated by punching four blank spots after each DBS spot to ensure no carryover. Each filter paper disc was eluted overnight at 4 °C with phosphate buffered saline (PBS, pH 7.3–7.4). An aliquot of the eluted sample was then used for performing the HIV testing assays, following the manufacturer's instructions.

The HIV testing strategy is shown in Figure 2.4. An algorithm of three latest-generation HIV enzyme immunoassays (EIAs) was used to test for HIV antibodies. All samples that tested positive in EIA 1 (Vironostika HIV Uni-Form II plus O, Biomerieux , Boxtel, The Netherlands) were re-tested using a second assay, EIA 2 (Advia Centaur XP, Siemens Medical Solutions Diagnostics, Tarrytown, NJ, USA). In addition, 10% of the samples that tested HIV-negative in the first EIA were re-tested with EIA 2. Any samples testing positive on EIA 1 and negative on EIA 2 (producing discordant results) were submitted to a third assay, EIA 3 (Roche Elecys 2010, Roche Diagnostics, Mannheim, Germany) for final interpretation of discordant samples.

Figure 2.4: HIV testing strategy



Children under 2 years were tested for the presence of HIV antibodies according to the methods described above. In addition, given that the HIV antibody test does not distinguish between HIV infection and the presence of passively acquired maternal HIV antibodies in infants, infants under 24 months of age were also tested for HIV infection using a polymerase chain reaction to test for the presence of HIV-1 infection (Roche Cobas Ampliprep/Taqman, Roche Diagnostics, Mannheim, Germany).

2.9.3 HIV incidence testing

HIV incidence testing was carried out at the National Institute for Communicable Diseases (NICD) in Sandringham, Johannesburg. The detection of recent infections was performed on confirmed HIV-positive samples, using the BED-CEIA (Calypte® HIV-1 BED Incidence EIA, Calypte Biomedical Corporation, Maryland, USA) optimised for DBS specimens.

Six millimetre punches for controls, calibrators, and samples were placed into a 96 well plate. DBS spots were punched into plastic test tubes following an ELISA plate format worksheet that contains the sample identification numbers. Each test tube was labelled with the sample ID and control. The samples were arranged on an ELISA plate rack following the positions indicated on the worksheet. 400 microlitres of specimen diluent from the kit was then added to each test tube using a single channel pipette. A new pipette tip was used to add the sample diluent for each sample and control. After addition of the sample diluent, each sample was mixed carefully three times using the same pipette tip that was used to add the diluent. The samples were then eluted overnight at 2–8 °C. After the overnight elution, samples were ready for testing; 100 microlitres of the eluted samples and controls was added to the test plate. A single-channel pipette was used to transfer each sample into the test plate. The eluted samples were mixed three to four times before they were added to the test plate. The specimens were then incubated at 37 °C on goat-anti-human IgG-coated micro-well plates to allow capture of HIV and non-HIV-IgG. HIV-specific IgG were detected by a multi-subtype derived branched peptide (BED-biotin), followed by streptavidin-peroxidase. The optical density values were normalised (OD-n) using a Calibrator specimen included on every run. Specimens with OD-n less than or equal to 1.2 during initial BED-CEIA testing were confirmed by further BED testing of the sample in triplicate, where the median value of the three results was considered the final OD-n for the confirmatory run. There was good concordance between the initial screening and confirmatory results. An HIV-1–positive specimen for which the confirmatory BED-CEIA gave an OD-n of less than or equal to 0.8 was considered to be a specimen of recent HIV-1 infection.

BED HIV incidence calculation will apply the same formula-based adjustment that was carried out for the 2005 incidence estimates (Rehle et al. 2007).[5] In addition, taking into account the extensive rollout of the antiretroviral treatment (ART) programme over the past three years, samples testing positive for antiretroviral drugs will be excluded from the incidence analysis. The BED assay misclassifies a substantial proportion of individuals on ART as recently infected – a result of successful viral load reduction.

2.9.4 Detection of antiretroviral drugs

The presence of antiretroviral drugs (ARVs) in HIV positive DBS samples was confirmed by means of High Performance Liquid Chromatography (HPLC) coupled to Tandem Mass Spectrometry. Qualitative detection of Lopinavir, Ritonavir, Nevirapine, Efavirenz, Indinavir, Saquinavir, Zidovudine, Lamivudine and Stavudine in DBS samples was carried out by a validated method using minor modifications of the method used by Koal et al.

Antiretroviral drugs were extracted from the DBS with 80% methanol, 20% 0.2M Zinc Sulphate containing an internal standard. HPLC was carried out on a Phenomonex Fusion RP column (5x2x4um) using a methanol/10 mM ammonium acetate gradient to effect elution. Detection of antiretroviral drugs was carried out using an Applied Biosystems API 4000 tandem mass spectrometer in the multiple reaction monitoring (MRM) detection mode for each drug using appropriate MRM transitions. Blank and quality control cutoff samples were included with each run. The limit of detection for each drug was set at 50 ng/ml, a sensitivity set point which is normally applied for the quantitative monitoring of drug levels in the blood. Values detected above this limit were considered as positive and those below as negative.[6]

5 BED HIV incidence testing and analysis was ongoing at the time this report was being prepared and thus the results are not included here.
6 ARV testing and analysis was ongoing at the time this report was being prepared and thus the results are not included.

2.10 HIV incidence among 15–20-year-olds derived from single year age prevalence

Indirect HIV incidence estimates can be mathematically derived from prevalence in young people using prevalence data by single year of age and assuming that HIV prevalence differences between the age strata represent incident HIV infections. This method is not applicable in older age groups when AIDS-related mortality has a major impact on HIV prevalence levels (Gregson et al. 1998; Rehle 2008).

The following simple calculation steps are applied:

- Calculate the difference in prevalence from year to year using smoothed prevalence data for single year age strata 14–20.
- Calculate the proportion of population at risk.
- Calculate the HIV incidence (%).
- Numerator: % difference in prevalence from year to year.
- Denominator: population at risk = 1% of smoothed HIV prevalence in the previous year.

Table 2.3: An example of the derivation of HIV incidence for 15-year-olds in the 2002 survey

Age (years)	Smooth age cohort prevalence (%)	Difference in prevalence	Proportion of population at risk	Incidence (%)
14	3.11			
15	3.89	0.78	0.9689	0.8
16				
17				

Table 2.3 provides an example of how HIV incidence was derived for the 15-year-olds in the 2002 survey:

- Numerator: percentage difference in prevalence from year 14 to year 15 = 0.78% (Smoothed prevalence for age 15 – smoothed prevalence for age 14: 3.89%–3.11% = 0.78%)
- Denominator: population at risk in 15-year-olds = 1% of smoothed HIV prevalence in 14-year-olds: 1 − 0.0311 = 0.9689 (96.9%)
- HIV incidence rate: 0.78/0.9689 = 0.8%.

2.11 Weighting of the sample

Owing to the sampling design of the survey, some individuals have a greater or lesser probability of selection than others. To correct this problem, sample weights are introduced to correct for bias at the EA, household, and individual levels and also adjust for non-response.

Weighting procedures were undertaken before analysis of the data as follows: the data file of drawn EAs contained the selection probabilities as well as the sampling weights of these EAs. These weights reflected the disproportionate allocation of EAs according to the stratification variables – race, locality type, and province. The VP sampling weight was then calculated. This weight is computed as the counted number of VPs in the EA, proportionally corrected for invalid VPs and divided by the number of VPs participating in the survey. The final VP sampling weight was the product of the EA sampling weight and the VP sampling weight.

Demographic and HIV testing information on all persons in all households in all responding EAs was then assembled in order to calculate individual sample weights. In each of the four age groups (0 to under 2, 2–14, 15–24 and 25+ years) the individual weight was the total number of individuals in that age group in each valid household/VP. Individual sample weights were benchmarked using the mid-year population estimates for 2008 provided by Stats SA. These individual sample weights were also adjusted for HIV testing non-response. In the final step, the information at the individual level was integrated and the final sampling weight for each data record was calculated. This weight is equal to the final VP sampling weights multiplied by the selected person's sampling weight per VP per age group. This process produces a final sample representative of the population in South Africa for gender, age, race, locality type and province.

2.12 Data management and analysis

Data capture was contracted out to Maphume Research Services. The data was doubled captured from the original questionnaires using Census and Survey Processing System (CSPro), a computer software program. A database was designed with range restrictions to ensure that data captured was not out of range. Once the data were received from data capture further data cleaning procedures were implemented. Duplicate records were identified and removed. Extensive internal consistency checks against the original questionnaire to ensure the data base accurately reflected the data captured in the field. Consistency checks were carried out to ensure that no more than four individuals from a household (aged less than 2, 2–14, 15–24 and older than 24) were included in the database and all individuals were linked to their respective EAs and VPs.

Internal data inconsistencies in terms of inappropriate sex-specific responses were recoded as missing (for example, respondents coded as males who reported using female specific contraceptive methods, pregnancy, etc.). In each instance less than 10 values were recoded as missing. Inappropriate ages of becoming pregnant (<10) were also recoded as missing. Other internal inconsistencies were left intact, reflecting the right of persons to refuse to answer particular questions and the natural errors that occur in long questionnaires administered in face-to-face interviews. Individual database were merged and managed using Statistical Analysis Software (SAS version 9).

Data analysis includes both a cross-sectional analysis of the 2008 survey findings and trend analysis of key indicator variables collected in the 2002, 2005 and 2008 surveys. The analysis focused on providing accurate measurements of key HIV indicators to assess progress, rather than to assess and quantify associations (for which multivariate analyses would be done at a later stage).

Weighted data were calculated with STATA 10 software taking into account the complex multi-level sampling design and adjusting for HIV testing non-response. STATA software (svy methods) was used to obtain the estimates of HIV prevalence, significance values (p-values) and confidence intervals (95% CI) that took into account the complex design and individual sample weights adjusting for HIV testing non-response. To verify results, data analysis was carried out independently by at least two biostatisticians and for HIV results, verified by a third off-site statistician.

Tables and figures in the results section of the report present weighted percentages and unweighted counts.

CHAPTER 3

Results

3.1 Assessment of 2008 survey data

This section addresses the generalisability of the results and the response rate with emphasis on HIV testing coverage.

3.1.1 Generalisability of the survey results

The degree to which the findings from a household survey such as this one can be extrapolated to the entire South African population depends on the extent to which the sample is representative of the population. Table 3.1 compares the socio-demographic structure of the survey sample to the 2008 mid-year South African population estimates provided by Statistics South Africa (StatsSA).[7] The socio-demographic characteristics of the weighted sample closely match those of the population estimates in terms of sex, race, and province. Less than 1% difference is seen between the sample and the StatsSA 2008 mid-year population estimates (except 1.3% for North West province). These results indicate that the 2008 survey sample is representative of the population from which it was drawn.

Table 3.1: Demographic characteristics of the sample compared to the 2008 mid-year population estimates

Demographics	Weighted sample		Mid-year pop. 2008	
Sex	**n**	**%**	**n**	**%**
Male	23 405 652	48.1	23 444 800	48.2
Female	25 258 904	51.9	25 242 200	51.8
Total	48 664 556	100.0	48 687 000	100.0
Age in years				
0–14	15 675 126	32.2	15 672 800	32.2
15–24	9 929 008	20.4	9 936 400	20.4
25–49	16 030 791	32.9	16 058 500	33.0
50+	7 029 631	14.4	7 019 300	14.4
Total	48 664 556	100.0	48 687 000	100.0
Race				
African	38 473 166	79.0	38 565 100	79.2
White	4 489 414	9.2	4 499 200	9.2
Coloured	4 370 046	9.0	4 379 200	9.0
Indian	1 241 338	2.5	1 243 500	2.6
Other	90 592	0.2	–	0.0
Total	48 664 556	100.0	48 687 000	100.0

➔

7 www.statssa.gov.za/publications/statsdownload.asp?PPN=P0302&SCH=4203.

Table 3.1: contd.

Demographics	Weighted sample		Mid-year pop. 2008	
Province	**n**	**%**	**n**	**%**
Western Cape	5 279 426	10.8	5 262 000	10.8
Eastern Cape	6 663 856	13.7	6 579 300	13.5
Northern Cape	948 156	1.9	1 125 900	2.3
Free State	2 871 672	5.9	2 877 700	5.9
KwaZulu-Natal	10 029 787	20.6	10 105 500	20.8
North West	4 040 122	8.3	3 425 000	7.0
Gauteng	9 963 456	20.5	10 447 100	21.5
Mpumalanga	3 435 803	7.1	3 590 000	7.4
Limpopo	5 432 278	11.2	5 274 800	10.8
Total	48 664 556	100.0	48 687 300	100.0

3.1.2 Response analysis

Every effort was made to ensure that the survey achieved a high response rate. The strategies used included: (i) notifying the population prior to the study and giving adequate explanation to potential respondents; (ii) utilising retired nurses, who are generally respected in communities, to facilitate fieldwork; (iii) utilising trained nurses to conduct interviews on a sensitive subjects including HIV/AIDS and sex; (iv) making a maximum of four revisits to each sampled household if necessary; (v) using a linked anonymous survey approach, and (vi) ensuring privacy when conducting interviews. Interviews were completed and specimens for HIV testing were taken from eligible respondents during the same session.

Household response rate

If the household or VP has been destroyed or vacated, there is no longer a household/VP that can be included in the response analysis at the household level. This is not considered to be a non-response. The household response rate and overall non-response is found by dividing the number of households/valid VPs with completed interviews by the number of occupied households/VPs.

Table 3.2 shows that of 15 000 households (VPs) sampled, 13 440 were valid, occupied households. 1 560 visiting points were invalid or clearly abandoned households/VPs. Of the valid 13 440 households/VPs, 10 856 (80.8%) were interviewed. Thus the household response rate for the 2008 survey was 80.8%. Proportions of non-response at household level were as follows:

- 1 252 (9.3%) refused to take part in the survey;
- 946 (7.0%) were valid households but empty after four repeated visits;
- 386 (2.9%) involved other reasons.

Table 3.2: Household/visiting point response rates, South Africa 2008

	Total VPs	Valid visiting points		Interviewed		Refused		Absent/other	
	n	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Households/VPs	15 000	13 440	89.6	10 856	80.8	1 252	9.3	1 332	9.9
Race									
Africans	8 056	6 974	86.6	6 081	87.2	327	4.7	568	8.1
Whites	3 007	2 721	90.5	1 604	59.0	607	22.3	509	18.7
Coloured	2 240	2 136	95.4	1 903	89.1	126	5.9	106	5.0
Indian	1 636	1 550	94.7	1 235	79.7	181	11.7	134	8.7
Other	33	33	100	33	100	0	0	0	0
Unknown	28	26	92.9	0	0	11	42.3	15	57.7
Total	15 000	13 440	89.6	10 856	80.8	1 252	9.3	1 332	9.9
Locality type									
Urban formal	9 360	8 772	93.7	6 858	78.2	1 008	11.5	906	10.3
Urban informal	1 455	1 323	90.9	1 184	89.5	40	3.0	99	7.5
Rural informal	2 655	2 322	87.5	2 074	89.3	81	3.5	167	7.2
Rural formal	1 530	1 023	66.9	740	72.3	123	12.0	160	15.6
Total	15 000	13 440	89.6	10 856	80.8	1 252	9.3	1 332	9.9
Province									
Western Cape	1 933	1 763	91.2	1 425	80.8	214	12.1	124	7.1
Eastern Cape	1 965	1 700	86.5	1 432	84.2	93	5.5	175	10.3
Northern Cape	1 125	951	84.5	806	84.8	58	6.1	87	9.2
Free State	1 126	976	86.7	737	75.5	95	9.7	144	14.8
KwaZulu-Natal	2 792	2 620	93.8	2 099	80.1	247	9.4	274	10.5
North West	1 122	992	88.4	838	84.5	72	7.3	82	8.3
Gauteng	2 478	2 331	94.1	1 789	76.5	305	13.1	237	10.2
Mpumalanga	1 124	999	88.9	817	81.8	73	7.3	109	10.9
Limpopo	1 335	1 108	83.0	913	82.4	95	8.6	100	9.3
Total	15 000	13 440	89.6	10 856	80.8	1 252	9.3	1 332	9.9

Table 3.2 also shows the household coverage and non-response rates for the reporting domains race, locality type and province. All provinces had a visiting point response rate of 80% and above, except Free State (75.5%) and Gauteng (76.5%). Households were categorised by the race of the oldest respondent and locality type. White households had the lowest response rate (59.0%), compared to coloured households with the highest response rate, (89.1%). Households in rural formal areas had the lowest response rate, (72.3%), and households in urban informal areas had the highest response rate (89.5%).

Individual interview response rate

In the 13 440 valid households/VPs that agreed to participate in the survey, 23 369 individuals (no more than 4 per household, including infants under 2 years) were eligible to be interviewed. A total of 20 826 individuals (89.1%) completed the interview.[8] Proportions of non-response were as follows:

- 1 312 (5.6%) refused to be interviewed;
- 824 (3.5%) were absent from the household;
- 407 (1.7%) were classified as missing/other.

HIV testing response rate

Of the 23 369 eligible individuals, 15 031 (64.3%) agreed to provide a blood specimen for HIV testing and were anonymously linked to the behavioural questionnaires. The categories of non-response were:

- 5 795 (24.8%) who were interviewed but refused HIV testing;
- 1 312 (5.6%) who refused both interview and HIV testing;
- 1 231 (5.3%) who were absent from the household or where there was missing data.

In order to compare HIV testing response with previous surveys conducted in 2002 and 2005, Table 3.3 presents the 2008 HIV testing coverage and non-response for the sample of the population 2 years and above by the main reporting domains: sex, age, race, province, and locality type. In addition to the categories for coverage (tested) and non-response (not tested), the tables break down non-response by reason for non-response: refused or absent.

HIV testing refusal was higher among males (31.0%) than females (26.8%). Coloureds (75.3%) and Africans (68.7%) were more likely to agree to HIV testing, whereas only 47.9% of Indians and 52.8% of Whites agreed to be tested. The 25 and older age group was the most likely to agree to participate (68.6%), and the 2–14 age group the least, 58.9%. Among the provinces, Northern Cape had the highest participation rate (80.1%) while Gauteng had the lowest participation rate (59.4%). The highest testing response rate was found in urban informal settlements (72.5%) and the lowest in rural formal areas (72.6%) and urban formal areas (62.8%).

8 Interview response rate for individuals 2+ years: 88.6%.

Table 3.3: HIV testing coverage by demographic characteristics: percentage distribution among respondents 2+ years for HIV testing, by testing status, South Africa 2008

	Tested %	Not tested %			Total
		Refused	Absent	Missing/ other	
Sex					
Male	62.0	31.0	4.8	2.2	9 607
Female	68.9	26.8	2.9	1.4	12 047
Race					
Africans	68.7	26.7	3.5	1.1	12 692
White	52.8	40.6	4.0	2.7	2 527
Coloured	75.3	19.6	3.6	1.5	4 076
Indian	47.9	42.2	4.8	4.8	2 307
Other	46.2	46.2	3.9	3.9	52
Age (years)					
2–14	58.9	37.6	2.2	1.3	5 809
15–24	67.8	24.6	5.5	2.2	5 344
25+	68.6	25.8	3.7	1.9	10 501
15–49	67.6	25.6	4.9	1.9	12 011
2+ years	65.8	28.7	3.7	1.8	21 654
Provinces					
Western Cape	71.7	24.0	2.6	1.7	2 925
Eastern Cape	68.8	23.9	5.6	1.8	2 885
Northern Cape	80.1	16.6	2.3	1.0	1 539
Free State	68.3	27.1	3.1	1.5	1 412
KwaZulu-Natal	59.6	35.0	2.2	3.2	4 145
North West	69.1	26.0	3.2	1.7	1 675
Gauteng	59.3	33.0	6.2	1.5	3 533
Mpumalanga	61.1	34.6	3.6	0.7	1 623
Limpopo	65.4	29.8	3.7	1.1	1 917
Locality type					
Urban formal	62.8	30.6	4.1	2.5	13 350
Urban informal	72.5	23.7	3.4	0.5	2 430
Rural Informal	69.1	26.9	3.3	0.7	4 575
Rural formal	72.6	25.0	1.8	0.6	1 299

The analysis of the HIV testing response showed that 8 338 of the 23 369 eligible individuals were not tested for HIV in this survey. The categories of HIV testing non-response were 7 109 (85.2%) due to refusals and 1 231 (14.8%) due to absence and/ or missing data. Table 3.4 compares the HIV risk associated characteristics in survey

respondents who were interviewed and tested with those who were interviewed but refused HIV testing in the age group 15+ years. If respondents with risky sexual behaviour or persons who were aware of their HIV status refused to participate, the survey could over- or underestimate HIV prevalence. It is important to note that information on background characteristics was available only for those interviewed but refused to be tested and not for those who were absent and therefore not interviewed.

Table 3.4: HIV risk-associated characteristics among respondents aged 15+ years who were interviewed and tested compared with those who were interviewed but refused HIV testing, South Africa 2008

	Interviewed and tested for HIV		Interviewed but not tested for HIV		Level of significance
	n	**%**	**n**	**%**	
Sex					
Males	4 238	39.1	1 263	42.1	P = 0.05
Females	6 590	60.9	1 737	57.9	P = 0.02
Total	10 828	100	3 000	100	
Marital status					
Single	4 798	47.2	1 370	46.6	P = 0.7
Married or cohabit	4 017	39.5	1 226	41.7	P = 0.2
Widowed	904	8.9	212	7.2	P = 0.5
Divorced (not married)	454	4.5	134	4.6	P = 0.9
Total	10 173	100	2 942	100	
Perceived risk of getting HIV					
At risk	2 355	23.2	585	20	P = 0.1
Not at risk	7 798	76.8	2 333	80	P <0.001
Total	10 153	100	2 918	100	
Ever had an HIV test					
Yes	4 999	49.1	1 353	46.5	P = 0.1
No	5 175	50.9	1 557	53.5	P = 0.07
Total	10 174	100	2 910	100	
Recency of HIV test					
Less than a year ago	2 334	46.8	632	47	P = 0.9
Between 1–2 years ago	1 371	27.5	337	25.1	P = 0.4
Between 2–3 years ago	536	10.7	148	11	P = 0.9
3 or more years ago	752	15.1	228	17	P = 0.5
Total	4 993	100	1 345	100	
Sexual activity in the last 12 months					
Yes	6 155	71.4	1 801	75.5	P <0.001
No	2 464	28.6	584	24.5	P = 0.05
Total	8 619	100	2 385	100	

Table 3.4: contd.

	Interviewed and tested for HIV		Interviewed but not tested for HIV		Level of significance
	n	%	n	%	
Number of partners in the last 12 months					
More than 2 partners	223	3.7	43	2.4	P = 0.7
2 partners	306	5	80	4.5	P = 0.9
1 partner	5 552	91.3	1 647	93.1	P = 0.02
Total	6 081	100	1 770	100	
Condom use at last sex					
Yes	2 750	58.5	789	57.6	P = 0.7
No	1 949	41.5	580	42.4	P = 0.7
Total	4 699	100	1 369	100	
STI symptoms* in the past 12 months					
Yes	435	7.1	90	5	P = 0.5
No	5 685	92.9	1 706	95	P = 0.002
Total	6 120	100	1 796	100	

Note: * Symptoms related to sexually transmitted infections, such as vaginal discharge/urethral discharge, genital ulcers/sores, burning pain during urination.

The proportion of females was slightly higher among those interviewed and tested (60.9% vs. 57.9%), whereas the proportion of males was slightly higher among the not tested for HIV (39.1% vs. 42.1%). However, neither awareness of own HIV status or number of sexual partners in the last 12 months was significantly associated with refusal of HIV testing. Although some associations were statistically significant due to the large sample sizes, the differences between those tested and not tested were all less than 10% and most were less than 5%. Based on this more detailed analysis of HIV risk-associated characteristics in survey respondents who were interviewed and tested and those who were interviewed but refused HIV testing we conclude that the HIV survey results were not biased due to HIV testing refusal.

This is in agreement with the findings of a recent review of 38 demographic and health surveys by Macro International (Mishra 2009), which concluded that (i) the overall effect of non-response bias on national HIV estimates was insignificant in all countries, and (ii) the exclusion of non-household population groups in the surveys had only a minimal effect on the national estimates based on the household populations.

3.2 National indicators for assessing progress in achieving NSP targets

This is the third population-based survey that investigated the status of HIV, behaviour and communication in South Africa. The survey is unique in that it links and integrates data on epidemiological and behavioural determinants, with communication programmes on prevention of HIV, which implements the concept of second generation HIV surveillance on a national scale. The 2008 survey also provides additional information

onto the 2002 and 2005 surveys. In addition to understanding the current epidemic, trend analysis on data from the three surveys provides critical information on the dynamics of the epidemic. The combined information enables us to assess the extent to which South Africa is making progress in so far as responding to the HIV challenge.

First, the presentation of results on national data focuses on the 2008 HIV prevalence estimates for the population aged 2+ years stratified by five-year age groups and sex of the respondent. Second, the focus is on national trend data that allows assessment of the impact of HIV prevention programmes based on outcomes on HIV prevalence and to some extent on the incidence of HIV.

Discussion on the national social determinants, specifically behaviours that increase the risk of HIV follows the presentation of national data on the prevalence and incidence of HIV. Key variables listed in the NSP were selected for the purpose of understanding the role they play in controlling or aggravating the risk (DOH 2007). These variables were high-risk sex, most-at-risk populations, mass media communication to prevent HIV, HIV testing and awareness of one's HIV status. The presentation of national data is followed by that of provincial data where similar variables were investigated on comparative basis also using the same outcomes and social determinants. The approach leads to deeper understanding of the prevalence and incidence observed at national level and within provinces over time (2002–2008).

South Africa is required to present indicators for the 2010 UN General Assembly Special Session (UNGASS) Country Progress Report as well as the MDG. This report includes some of the indicators derived from the population-based survey on HIV, behaviour and communication and contributes information on the progress South Africa is making in addressing various aspects of the HIV epidemic. The information is useful in explaining the success or shortcomings of national and provincial HIV interventions.

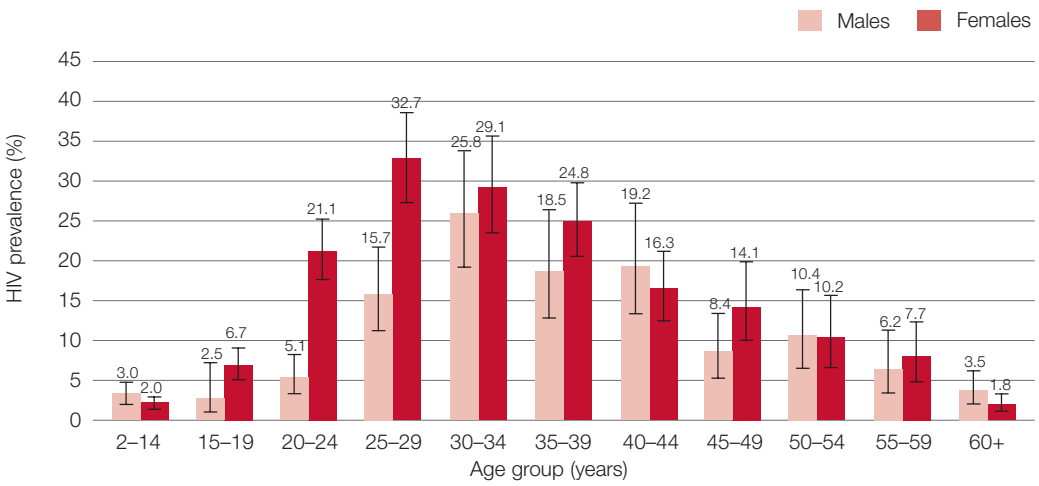
3.2.1 HIV prevalence

National estimates

The 2008 national estimate of HIV prevalence among South Africans of all age groups is 10.6%. Put differently, it is estimated that in 2008 about 5.2 million people of the total population were HIV-positive. These estimates provide valuable information arising from the population-based survey that includes children younger than 2 years of age, for the first time in 2008. Excluding children under 2 years of age in the analysis changes the estimate of HIV prevalence to 10.9% (95% CI: 10.0, 11.9). This estimate is comparable to the estimates obtained in 2005 (10.8%, 95% CI: 9.9, 11.8); and 2002 (11.4%, 95% CI: 10.0, 12.7).

Figure 3.1 illustrates detailed information on the prevalence of HIV by sex and age group for 2008. The results indicate HIV prevalence peaked in females aged 25–29 years at 32.7% and for males it peaked at 25.8% in the 30–34-year-old age group. Gender variations in HIV prevalence are noted to be established in younger age groups. One of the concerning findings of the 2008 survey is the sustained high levels of HIV infection among young females. For example, among 15–19-year-olds, female prevalence is 2.7 times higher than that of males. In contrast to males, HIV prevalence among females increases even more dramatically in subsequent age cohorts, reaching 21.1% among the 20–24-year-olds, and 32.7% among 25–29-year-olds. By age 30–34 the disproportions in HIV prevalence are much smaller, although with females still having a higher HIV prevalence.

Figure 3.1 HIV prevalence, by sex and age, South Africa 2008



HIV infection is high in older people, ranging from 6.2% among males aged 55–59 years and 10% among males aged 50–54 years.

Trend analysis of national HIV prevalence by age

Table 3.5 shows HIV prevalence by age group in South Africa from the 2002, 2005, and 2008 surveys. Observations on HIV prevalence of all people aged 2+ years show stabilisation from 2002–2008 to 11%. Although the overall prevalence has stabilised, there are changes occurring in different age groups. In children aged 2–14 years, the prevalence has decreased by a difference of 3.1% from 2002–2008. Among young people aged 15–24, the decline in HIV prevalence was only observed from 2005–2008. In adults aged 25+ years, the HIV prevalence increased by 1.3% from 2002–2008. A similar trend is observed in the 15–49-year-old age group.

Table 3.5: HIV prevalence by age, South Africa 2002, 2005, and 2008

	2002			2005			2008		
Age	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Children (2–14 years)	2 348	5.6	3.7–7.4	3 815	3.3	2.3–4.8	3 414	2.5	1.9–3.5
Youth (15–24 years)	2 099	9.3	7.3–11.2	4 120	10.3	8.7–12.0	3 617	8.7	7.2–10.4
Adults (≥25)	3 981	15.5	13.5–17.5	7 912	15.6	14.2–17.1	7 191	16.8	15.3–18.4
Total (≥2)	8 428	11.4	10.0–12.7	15 847	10.8	9.9–11.8	14 222	10.9	10.0–11.9
15–49 years	4 795	15.6	13.9–17.6	9 245	16.2	14.9–17.7	8 106	16.9	15.5–18.4

The epidemiological pattern observed in the three surveys shows that young females continue to be at higher risk of HIV infection than their male counterparts, despite observed declines in HIV among females. The epidemic curve peaked in 2002 in young females aged 25–29 at a high level of 33% and this has remained so throughout the period of the three surveys. For males, the epidemic has reached new peak of 25.8% in those aged 30–34%.

Provincial estimates

Table 3.6 presents HIV prevalence by province for 2002, 2005, and 2008 for the age group 2+ years. Three patterns emerge when 2002 is used as a base for comparison against 2008. In four provinces HIV prevalence has declined between the two surveys. In the Western Cape the prevalence difference was 6.9%; in Gauteng it was 4.4%; in the Northern Cape the difference was 2.5% and in the Free State it was 2.3%. In contrast, three other provinces had increases in HIV prevalence: KwaZulu-Natal had an increase by a difference of 4.1% and Eastern Cape a relatively small increase of 2.4%. In the remaining three provinces – North West, Mpumalanga, and Limpopo – there was no marked change.

Table 3.6: HIV prevalence by province in age group 2+ years, South Africa 2002, 2005, and 2008

	2002			2005			2008		
Province	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Western Cape	1 267	10.7	6.4–15.0	2 204	1.9	1.2–3.0	2 098	3.8	2.7–5.3
Eastern Cape	1 221	6.6	4.5–8.7	2 428	8.9	7.0–11.4	1 984	9.0	7.2–11.2
Northern Cape	694	8.4	5.0–11.7	1 144	5.4	4.0–7.2	1 227	5.9	4.5–7.8
Free State	540	14.9	9.5–20.3	1 066	12.6	9.5–16.7	960	12.6	10.5–15.1
KwaZulu-Natal	1 579	11.7	8.2–15.2	2 729	16.5	14.0–19.3	2 464	15.8	13.4–18.6
North West	626	10.3	6.8–13.8	1 056	10.9	8.4–14.0	1 156	11.3	9.1–14.0
Gauteng	1 272	14.7	11.3–18.1	2 430	10.8	8.9–12.9	2 093	10.3	8.3–12.7
Mpumalanga	550	14.1	9.7–18.5	1 224	15.2	12.3–18.5	988	15.4	11.9–19.7
Limpopo	679	9.8	5.9–13.7	1 570	8.0	6.0–10.6	1 252	8.8	6.5–11.9
National	8 428	11.4	10.0–12.7	15 847	10.8	9.9–11.8	14 222	10.9	10.0–11.9

Examining the change from 2005–2008, that is recent change as opposed to longer-term change, only the Western Cape had an upward change of 1.9%, while the remaining provinces have not had any change.

The 2008 HIV prevalence is lowest in the Western Cape followed by Northern Cape, Limpopo and Eastern Cape. The highest HIV prevalence remains in KwaZulu-Natal and Mpumalanga, followed by Free State. The North West and Gauteng provinces fell in between these two groups.

HIV prevalence trends for children aged 2–14 years are presented in Table 3.7. Using 2002 as a base, there has been an overall decline in the percentage of children living with HIV in all provinces except Mpumalanga, where there was no decrease.

In 2008, the Free State had the highest HIV prevalence among children, followed by Mpumalanga. The Western Cape had the lowest HIV prevalence in 2008. Of all provinces that had a decline in HIV prevalence between 2002 and 2008, only the Western Cape had a large reduction.

Comparing HIV prevalence in 2005 with 2008 estimates for each of the nine provinces, it was found that KwaZulu-Natal had the largest reduction of HIV prevalence among children from 7.9% to 2.8%, followed by Limpopo from 4.7% to 2.5% and Mpumalanga from 5.4% to 3.8%. In the Western Cape there was small increase over this period even though it continued to have the lowest HIV prevalence in 2008. In contrast, four provinces, Eastern Cape, Northern Cape, Free State and North West, had increases in HIV prevalence in children between 2005 and 2008.

Table 3.7: Prevalence of HIV by province, 2–14 age group, South Africa 2002, 2005, and 2008

	2002			2005			2008		
	n	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Western Cape	378	7.1	4.1–11.8	573	0.3	0.1–2.4	528	1.1	0.4–2.5
Eastern Cape	339	3.4	1.5–7.7	623	1.2	0.6–2.3	503	2.1	0.9–5.0
Northern Cape	193	3.8	1.6–8.6	283	0.6	0.2–2.1	314	2.3	0.8–6.1
Free State	145	4.7	1.9–11.8	264	2.3	0.9–5.6	217	4.1	1.6–10.2
KwaZulu-Natal	439	3.9	1.7–9.4	553	7.9	3.5–16.5	508	2.8	1.2–6.9
North West	171	4.3	1.9–9.5	259	1.4	0.4–5.1	282	3.2	1.2–8.3
Gauteng	312	5.0	2.7–9.2	520	2.9	1.6–5.1	478	2.2	1.2–3.8
Mpumalanga	165	3.7	1.9–7.1	316	5.4	3.3–8.9	258	3.8	1.7–8.1
Limpopo	207	4.7	2.4–8.9	424	4.7	2.8–8.0	326	2.5	1.2–5.1
National	2 348	5.6	3.7–7.4	3 815	3.3	2.3–4.8	3 414	2.5	1.9–3.5

Table 3.8 presents a comparison of provincial estimates of HIV prevalence in youth. Using 2002 as a base for comparison, overall there has been a decline in infections in young people in most provinces, except in KwaZulu-Natal and Mpumalanga. KwaZulu-Natal had a large increase from 7.2% in 2002 to 15.3% in 2008, making it the province with the highest HIV prevalence of HIV among youth. Mpumalanga increased to 13.5%, making it the province with the second highest HIV prevalence in youth in 2008, although the difference was only 1.8% from 2002. Seven provinces had a decline in HIV prevalence in youth when 2002 data were compared with the 2008 survey findings: Western Cape, Eastern Cape, Northern Cape, North West, Free State, Limpopo, and Gauteng. The largest decrease was observed in the Western Cape (8.2%), Northern Cape (7.9%) and Free State (4.9%).

When comparing HIV prevalence between 2005 and 2008 among youth, a similar pattern is evident. Four provinces, Eastern Cape, Northern Cape, Free State and Limpopo, had a reduction. Free State had the largest reduction of HIV prevalence in youth from 10.3% to 3.8%, – a difference of 6.5% – followed by Eastern Cape at 5.2%, Limpopo at 3.5%, and Northern Cape 2.5%. Western Cape ended 2008 with the lowest HIV prevalence in the youth group at 3.0%.

Table 3.8: HIV prevalence by province, 15–24 age group, South Africa 2002, 2005, and 2008

	2002			2005			2008		
	n	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Western Cape	311	11.2	6.0–19.9	559	2.3	1.2–4.4	553	3.0	1.5–5.8
Eastern Cape	320	9.2	5.4–15.2	676	11.7	7.1–18.7	495	6.6	3.8–11.0
Northern Cape	154	11.8	6.5–20.5	272	6.4	3.9–10.3	277	3.9	2.0–7.7
Free State	127	8.7	3.4–20.2	268	10.3	6.3–16.5	238	3.8	1.9–7.2
KwaZulu-Natal	420	7.2	3.5–14.0	727	16.1	12.5–20.4	618	15.3	11.8–19.7
North West	148	8.3	4.5–15.0	269	6.6	3.7–11.4	274	6.3	3.3–11.6
Gauteng	302	11.6	7.5–17.4	591	9.0	6.1–13.2	558	10.1	5.9–16.7
Mpumalanga	144	11.7	6.6–19.7	324	10.1	6.4–15.6	255	13.5	9.2–19.3
Limpopo	173	5.6	2.7–11.2	434	7.4	4.4–12.3	349	3.9	2.1–7.3
National	2 099	9.3	7.5–11.4	4 120	10.3	8.7–12.0	3 617	8.7	7.2–10.4

Gauteng has not had major changes in HIV prevalence in any of the three surveys; however, in 2008 Gauteng had the third-highest HIV prevalence (10.1%), following KwaZulu-Natal and Mpumalanga.

Comparisons of HIV prevalence over time among adults are presented in Table 3.9. Some of the provinces have had substantial increases in prevalence, while others declined and in some there was no change. Comparing again 2002 with 2008, prevalence in KwaZulu-Natal increased by 8.6%, from 14.9% to 23.5%, while in the Eastern Cape the difference was 7.5%, in Mpumalanga 3.5%, and in Limpopo 2.7%.

The remainder of the provinces, except North West, had a decrease in adult HIV prevalence. In the Western Cape the difference was 5.8%, followed by Gauteng at 3.7%. Northern Cape and Free State have also had declines, but of a small magnitude, about 2%.

Comparing 2005 with 2008, not much change is apparent in the Northern Cape, Free State, North West, Gauteng and Mpumalanga. In contrast, Limpopo, KwaZulu-Natal, Western Cape, and Eastern Cape had increases of 5.3%, 3.0%, 2.8%, and 1.8% respectively.

The 2008 estimates in the adult population show that Western Cape and Northern Cape have the lowest HIV prevalence while Mpumalanga and KwaZulu-Natal have the highest prevalence. Mpumalanga's prevalence at 24.5%, is more than four times that of the Western Cape, and nearly three times that of the Northern Cape. Three provinces have adult HIV prevalence exceeding 20% – Mpumalanga, KwaZulu-Natal, and Free State.

The remaining provinces had prevalence of between 14.0% and 17.7%, except for the Western Cape and Northern Cape, which were under 10%.

In comparison to HIV prevalence changes and declines in children and youth, there has been little significant change in HIV prevalence among adults.

Table 3.9: HIV prevalence by province, 25+ age group, South Africa 2002, 2005, and 2008

	2002			2005			2008		
	n	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Western Cape	579	11.2	6.6–18.3	1 072	2.7	1.6–4.6	1017	5.4	3.7–7.9
Eastern Cape	562	8.1	5.5–11.9	1 128	13.8	10.9–17.4	986	15.6	12.0–20.1
Northern Cape	347	10.6	7.0–15.6	588	8.0	5.6–11.4	636	8.6	6.2–11.9
Free State	368	22.0	14.3–32.2	534	19.7	13.2–28.4	505	20.4	17.0–24.3
KwaZulu-Natal	720	14.9	10.1–21.5	1 449	20.5	16.8–24.6	1 338	23.5	19.7–27.8
North West	307	17.8	13.4–23.3	528	18.9	14.3–24.5	600	17.7	13.9–22.2
Gauteng	658	18.1	13.8–28.8	1 317	14.9	11.9–18.4	1 057	14.4	11.4–18.0
Mpumalanga	241	21.0	14.8–28.8	584	24.4	19.6–30.0	475	24.5	18.4–31.9
Limpopo	299	14.0	8.8–21.8	712	11.4	8.7–14.9	577	16.7	12.2–22.4
National	3 981	15.5	13.6–17.6	7 912	15.6	14.2–17.1	7 191	16.8	15.3–18.4

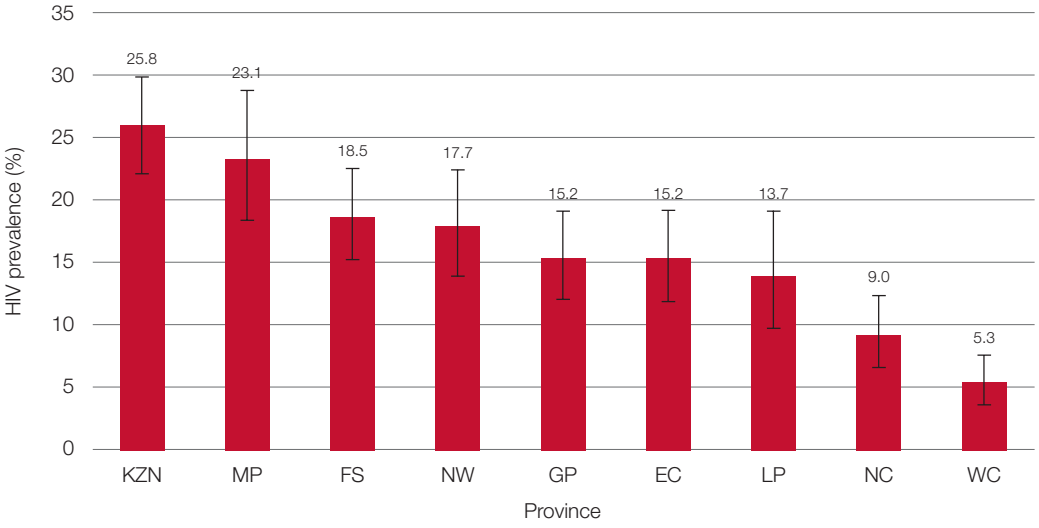
Table 3.10 shows changes in HIV prevalence for the population aged 15–49. Examining change from 2005–2008, Western Cape, KwaZulu-Natal, and Limpopo had increases in HIV prevalence, while in the remainder of the provinces, Eastern Cape, Northern Cape, Free State, North West, Gauteng, and Mpumalanga, HIV prevalence remained at levels similar to that observed in 2005.

With regard to the 2008 results, it is apparent that in the population aged 15–49 years, the Western Cape had the lowest HIV prevalence, followed by the Northern Cape. These two provinces have a prevalence of less than 10% in this age group. Provinces with HIV prevalence levels of between 10% and 19% are Limpopo, Eastern Cape, Gauteng, North West, and Free State. In two provinces, Mpumalanga and KwaZulu-Natal, there was an HIV prevalence of greater than 20% (Figure 3.2).

Table 3.10: HIV prevalence by province, 15–49 age group, South Africa 2002, 2005, and 2008

	2002			2005			2008		
	n	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Western Cape	728	13.2	8.4–20.2	1 250	3.2	1.9–5.3	1 240	5.3	3.7–7.5
Eastern Cape	653	10.2	7.2–14.2	1 353	15.5	12.1–19.8	1 069	15.2	11.9–19.1
Northern Cape	380	9.6	6.4–14.2	651	9.0	6.4–12.5	675	9.0	6.6–12.3
Free State	318	19.4	13.7–26.8	629	19.2	13.3–26.9	554	18.5	15.2–22.4
KwaZulu-Natal	902	15.7	11.6–21.1	1 616	21.9	18.3–25.9	1 426	25.8	22.1–29.8
North West	357	14.4	10.3–19.9	620	18.0	13.7–23.2	606	17.7	13.9–22.3
Gauteng	797	20.3	16.1–25.3	1 538	15.8	13.0–19.1	1 274	15.2	12.1–19.0
Mpumalanga	301	21.0	15.5–27.9	704	23.1	18.8–27.9	577	23.1	18.4–28.7
Limpopo	359	11.5	7.6–17.1	884	11.0	8.2–14.5	685	13.7	9.7–19.0
National	4 795	15.6	13.9–17.5	9 245	16.2	14.8–17.7	8 106	16.9	15.5–18.4

Figure 3.2: HIV prevalence among 15–49 age group by province, South Africa 2008



Note: KZN = KwaZulu-Natal; MP = Mpumalanga; FS = Free State; NW = North West; GP = Gauteng; EC = Eastern Cape; LP = Limpopo; NC = Northern Cape; WC = Western Cape

Estimates for most-at-risk populations

In this report the definition of most-at-risk populations (MARPs) is expanded to include (a) African females aged 20–34; (b) African males aged 25–49; (c) Males older than 50; (d) Men who have sex with men (MSM), (e) Persons who are high-risk drinkers; (f) Persons who use drugs for recreational purposes, and (g) people with disabilities. Table 3.11 shows the HIV prevalence among these groups. The table shows that African females aged 20–34 had the highest HIV prevalence followed by African males aged 25–49. Prevalence was lowest for both males 50+ years and MSM.

Table 3.11: HIV prevalence among the most-at-risk populations, South Africa 2008

At-risk population	n	HIV+ %	95% CI
African females 20–34	1 395	32.7	29.7–36.0
African males 25–49	944	23.7	20.1–27.7
Males 50+ years	946	6.0	4.4–8.1
MSM	86	9.9	4.6–20.2
High-risk drinkers	965	13.9	10.4–18.2
Recreational drug users	490	10.8	7.2–15.8
People with disabilities	458	14.1	9.9–19.6

3.2.2 HIV incidence

One of the major goals of the NSP is to reduce the national HIV incidence rate by 50% by 2011. We used two approaches to measure incidence: BED EIA and the mathematically derived incidence using prevalence data from the three population-based surveys for 2002, 2005, and 2008. The BED findings were not available at the time of writing of this report.

Indirect HIV incidence estimates were mathematically derived from HIV prevalence among young people using prevalence data by single year of age and assuming that HIV prevalence differences between the age strata represent incident HIV infections (see Methods, section 2.10). This method is best applicable in younger age groups when the effect of AIDS-related mortality on HIV prevalence levels is minimal.

Table 3.12 shows the HIV incidence derived from single year age prevalence in young people aged 15–20 years estimated for the survey years 2002, 2005, and 2008. The 15–20 year age group was the selected age range of the NSP indicator that is required to be calculated.

Table 3.12: HIV incidence derived from single year age prevalence in the 15–20 age group, South Africa 2002, 2005, and 2008

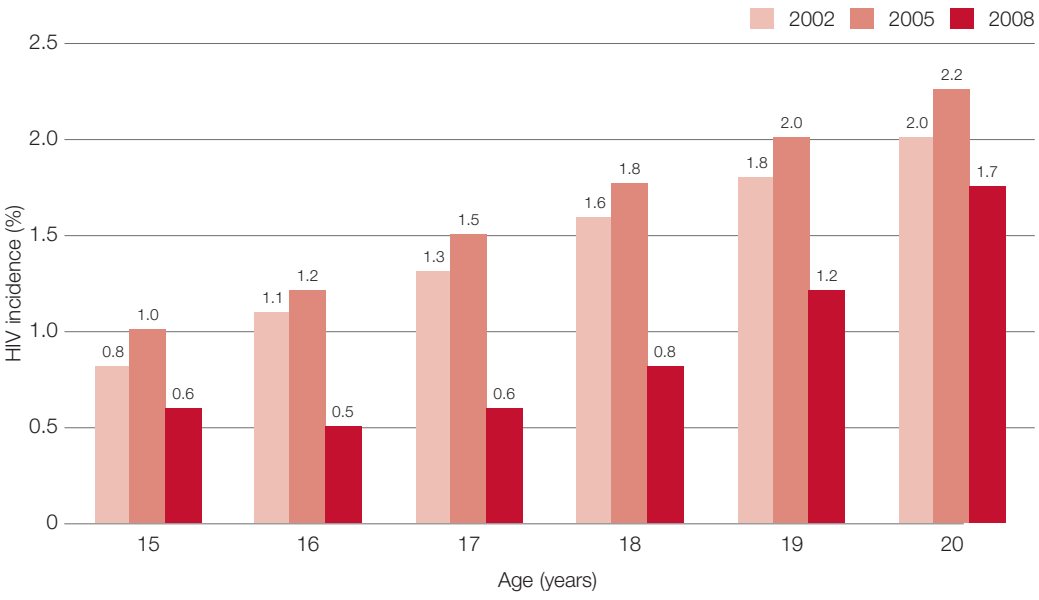
Age (years)	Smooth age cohort prevalence (%)	Difference in prevalence	Proportion of population at risk	Incidence (%)
2002 survey				
14	3.11			
15	3.89	0.78	0.9689	0.8
16	4.93	1.04	0.9611	1.1
17	6.21	1.28	0.9507	1.3
18	7.68	1.47	0.9379	1.6
19	9.32	1.64	0.9232	1.8
20	11.10	1.78	0.9068	2.0
2005 survey				
14	1.67			
15	2.64	0.97	0.9833	1.0
16	3.86	1.22	0.9736	1.2
17	5.30	1.45	0.9614	1.5
18	6.96	1.66	0.9470	1.8
19	8.82	1.86	0.9304	2.0
20	10.86	2.04	0.9118	2.2

Table 3.12: contd.

Age (years)	Smooth age cohort prevalence (%)	Difference in prevalence	Proportion of population at risk	Incidence (%)
2008 survey				
14	2.43			
15	2.97	0.54	0.9757	0.6
16	3.46	0.49	0.9703	0.5
17	4.02	0.56	0.9654	0.6
18	4.81	0.79	0.9598	0.8
19	5.95	1.14	0.9519	1.2
20	7.58	1.63	0.9405	1.7

The derived HIV incidence profile is illustrated in Figure 3.3. The drop in incidence among 15–20-year-olds is substantial for the 2008 survey year compared with the incidence figures calculated for the 2002 and 2005 survey years, especially for the single year age groups of 15, 16, 17, 18, and 19 years. The incidence in the 20-year-olds in the 2008 survey, however, appears to approximate the incidence levels observed in the previous surveys in respondents of the same age.

Figure 3.3: Comparison of HIV incidence in the 15–20 age group, South Africa 2002, 2005, and 2008



It should be noted that a single year age prevalence analysis among the 15–20-year-olds was not done for provinces due to the exceedingly small sample sizes.

3.2.3 Behavioural determinants of HIV

The most common mode of HIV transmission in South Africa is through heterosexual sex. The following section presents key NSP indicators related to sexual behaviour risks for

HIV infection, namely, the age of sexual debut, multiple sexual partnerships, unprotected sexual intercourse and age mixing.

Sexual debut

Early sexual debut increases vulnerability to HIV infection among young people, especially females. It is thus important to know the age at which sexual debut occurs in order to inform HIV prevention interventions targeted at young people.

Figure 3.4 shows the percentage of young people aged 15–24 who have had sex before age of 15 years. Overall, in all three surveys, less than 10% of young people had started having sex before the age of 15 years. Each year about twice as many males were found to have started having sex earlier in comparison to females and the differences were statistically significant. When the results from 2002 were compared to 2008 and also 2005–2008, there was no substantive change noted for youth as a whole, nor for females.

When examining 2008 results alone, it can be seen that the percentage of males who reported having started sex before the age of 15 was nearly twice the percentage of their female counterparts (11.3% vs. 5.9%). This difference is statistically significant.

Figure 3.4: Age of sexual debut by sex of respondents in the 15–24 age group, South Africa 2002, 2005, and 2008

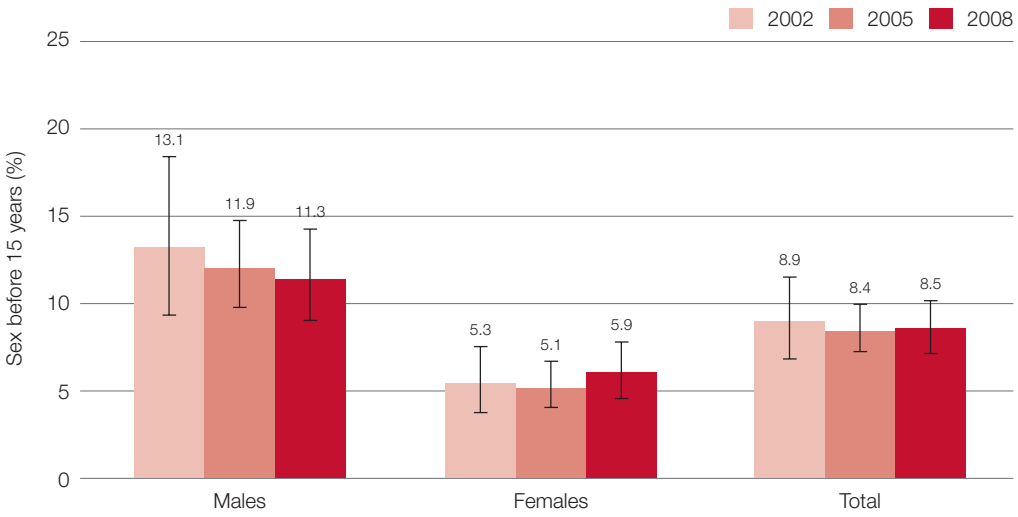


Table 3.13 shows percentage of youth aged 15–24 who have had sex before age 15 years by province. The information provided is based on data collected in 2002, 2005 and 2008. Using 2002 as a base year for comparison with 2008 results, there was an increase in the percentage of those who had their first sexual experience before age 15 in the Free State, North West and Mpumalanga.

In Limpopo, despite the observed increase from 5.5% to 11.2%, the change is not statistically significant – that is, the confidence intervals overlap and sample sizes are small. In the remaining provinces there has not been a change in the percentage of youth having early sexual debut. What emerges from these findings is that more young people were starting sex earlier in 2008 than they were in 2005.

The 2008 survey shows that there was variation in the rates of early sexual debut between provinces, even though the differences were not statistically significant. Mpumalanga and Limpopo had higher rates of young people who have had sex before reaching 15 years of age, whereas fewer Kwazulu-Natal youth (4.9%) in comparison with youth in Mpumalanga (15%) reported starting sex much earlier. The difference was statistically significant.

Table 3.13: Age of sexual debut by province in the 15–24 age group, South Africa 2002, 2005, and 2008

Province	2002			2005			2008		
	n	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Western Cape	201	6.0	3.3–10.8	341	10.4	7.3–14.6	324	9.3	6.1–13.9
Eastern Cape	225	7.7	4.0–14.4	495	6.7	4.5–9.9	333	7.8	5.2–11.5
Northern Cape	79	3.6	1.5–8.6	156	4.6	2.4–8.9	180	7.3	4.6–11.4
Free State	97	0.9	0.2–3.5	200	7.8	4.5–13.0	166	9.6	4.9–17.8
KwaZulu-Natal	228	4.9	2.3–10.3	535	4.5	2.7–7.4	391	4.9	2.8–8.3
North West	104	2.5	1.3–4.8	227	12.7	8.4–18.8	197	8.5	4.8–14.7
Gauteng	199	6.3	3.2–12.1	411	10.2	6.8–15.1	364	7.8	4.6–12.9
Mpumalanga	71	4.9	2.4–9.6	232	10.1	6.5–15.4	160	15.0	9.6–22.9
Limpopo	123	5.5	3.1–9.7	313	10.1	6.4–15.6	233	11.2	7.3-16.9
National	1 327	5.0	3.8–6.5	2 910	8.4	7.2–9.9	2 348	8.5	7.1–10.1

Intergenerational sex

Intergenerational sex, or age mixing, is an important social determinant of HIV infection. One way of determining age mixing is to calculate the difference between a person's age and the age of their sexual partner, the so-called 'age differential'. For example, youth who have partners five or more years older than themselves expose themselves to HIV, as it exposes them to a higher prevalence age group.

Table 3.14: Age difference with sexual partner by sex of respondent in the 15–19 age group, South Africa 2008

Sex	Within 5 years of own age		Partner is 5+ years older		Total
	%	**95% CI**	**%**	**95% CI**	**n**
2005					
Male	98.0	95.8–99.0	2.0	1.0–4.2	303
Female	81.4	75.5–86.1	18.5	13.7–24.4	363
Total	90.4	87.4–92.7	9.6	7.2–12.5	666
2008					
Male	98.5	95.8–99.4	0.7	0.2–2.7	265
Female	72.4	65.5–78.3	27.6	21.7–34.5	329
Total	85.1	80.9–88.4	14.5	11.2–18.6	594

Table 3.14 shows percentages of people aged 15–19 who reported having a sexual partner who is within five years of their own age, or is five or more years older than themselves. There was a substantive increase in the percentage of teenagers who had an older sex partner, from 9.6% in 2005 to 14.5% in 2008. The same pattern of findings was also found among females and the percentage increased substantively from 18.5% in 2005 to 27.6% in 2008.

In 2008, 14.5% of teenagers reported having partners who were five or more years older than themselves. The majority of people who reported having partners five or more years older than themselves were young females (at 27.6%).

Multiple sexual partnerships

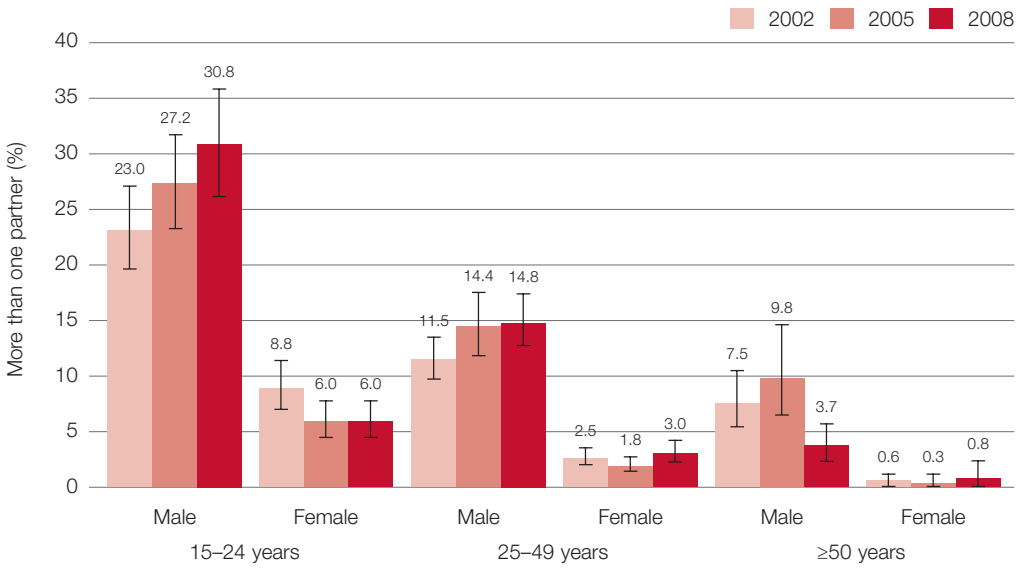
Multiple sexual partnerships substantially increase the chances of HIV transmission through sexual networks that facilitate HIV transmission to occur. When groups of people are linked in a sexual network, a new infection has the potential to move rapidly between people as a product of high viral load in the early phase of infection, where transmission is up to ten times more likely to occur than during the latent phase of HIV infection.

While the data presented is of multiple partners in the past 12 months, this is not a measure of overlapping or concurrent sexual partners. However, the measure does provide an indication of high partner turnover which is a factor contributing to concurrent sexual partnerships.

Figure 3.5 shows the data on multiple sexual partnerships among adults in the past 12 months by age group. In all three surveys statistically significant gender differences were found between percentages of males and females who reported having had multiple sexual partnerships in the past 12 months. Such partnerships were between 4 to 7 times more common in males than females.

The percentage of youth aged 15–24 years who reported multiple sexual partnerships did not change from 2002–2008.

Figure 3.5: Percentage of adults who reported having more than one sexual partner in the past 12 months by age group, South Africa 2002, 2005, and 2008



There was a slight increase from 15.9% in 2002 to 18.0% in 2008. However, this was not statistically significant. There was a substantive, but not significant, increase among males who reported having more than one sexual partner in the past 12 months from 23.0% in 2002 to 30.8% in 2008 but not among females where it remained below 10%. There was no change in percentages observed for both males and females from 2005–2008. In 2008, five times more males (30.8%) reported having had more than one sexual partner in the past 12 months than females (6.0%). This difference was statistically significant.

Among adults aged 25–49, there was no change in the percentages of people who reported having had more than one sexual partnership in the past 12 months from 2002–2008 and also from 2005–2008.

Among the group aged 50+ years, it was found that there was a substantive, but not significant, decrease for males who reported having more than one sexual partnership in the 12 months from 7.5% in 2002 to 3.7% in 2008. There was, however, a significant drop for the percentage of males doing so, from 9.8% in 2005 to 3.7% in 2008. For females in this age group, the percentage did not change markedly. It is important to note that multiple sexual partnerships were uncommon among females in this age group at less than 1% for each survey.

Table 3.15 shows the data on multiple sexual partnerships among males and females in the past 12 months disaggregated by age group. Overall, it was found that among adults aged 15+ years the percentage of people who reported that they had more than one sexual partner in the past 12 months remained unchanged at less than 10% from both 2002–2008 and from 2005–2008. Overall in 2008, less than 10% of adults aged 15+ years reported having more than one sexual partner. When the data are disaggregated by sex, the percentages of males who reported having more than one sexual partner in the past 12 months increased substantively, although not significantly, from 13.5% in 2002 to 16.2% in 2008. Among females in this age group there was no change from 2002–2008 at less than 4%. When 2005 is used as a baseline compared to 2008, there was no change observed in the percentages of both sexes. In 2008 alone, five times more males (16.2%) reported having more than one sexual partner in the past 12 months than their female counterparts (3.3%). This difference was statistically significant.

Table 3.15: Males and females reporting more than one sexual partner in the past 12 months by age group, South Africa 2002, 2005, and 2008

	2002			2005			2008		
Sex	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Total ≥ 15 years									
Males	2 106	13.5	12.1–15.1	3 823	16.3	14.3–18.6	3 355	16.2	14.5–18.1
Females	2 449	3.9	3.2–4.8	5 322	2.6	2.1–3.3	4 496	3.3	2.6–4.3
Total	4 555	8.7	7.9–9.6	9 145	9.3	8.2–10.6	7 851	9.3	8.3–10.3
15–49 years									
Males	1 666	9.4	8.1–10.9	3 033	17.9	15.5–20.6	2 580	19.3	17.3–21.6
Females	2 128	1.6	1.1–2.3	4 595	2.9	2.3–3.7	3 795	3.7	2.9–4.8
Total	3 794	5.5	4.8–6.3	7 628	9.8	8.6–11.3	6 375	10.6	9.5–11.9

In the 15–49 year age group, overall there was a significant increase in multiple sexual partnerships from 5.5% in 2002 to 10.6% in 2008. This means that the rate has doubled statistically over the period of the surveys. However, there was no change from 2005 to 2008. There were significant increases found in the percentages of both males and females who reported having more than one sexual partner in the past 12 months, from 9.4% in 2002 to 19.5% in 2008 among males and 1.6% in 2002 to 3.7% in 2008 among females.

Table 3.16 shows provincial percentages of people aged 15–49 who have had multiple sexual partners in the last 12 months. In the Free State, more respondents in the 15–49 age group, reported having multiple sexual partners in 2008 than they did in 2002. This change is statistically significant. Northern Cape and Limpopo respondents also reported higher rates of multiple partners than other provinces, although the change was not statistically significant; the change is substantive.

When assessing change from 2005 to 2008, people of reproductive age in the Free State again reported having more multiple sexual partners in 2008 than they did in 2005 (14.6% vs. 5.4%). Eastern Cape respondents also reported increased rates of multiple sexual partners (13.1% vs. 8.1%), although the increase is not statistically significant. Gauteng respondents reported lower rates of multiple sexual partners in 2008 compared with 2005, but the change was not statistically significant, though of substantive importance.

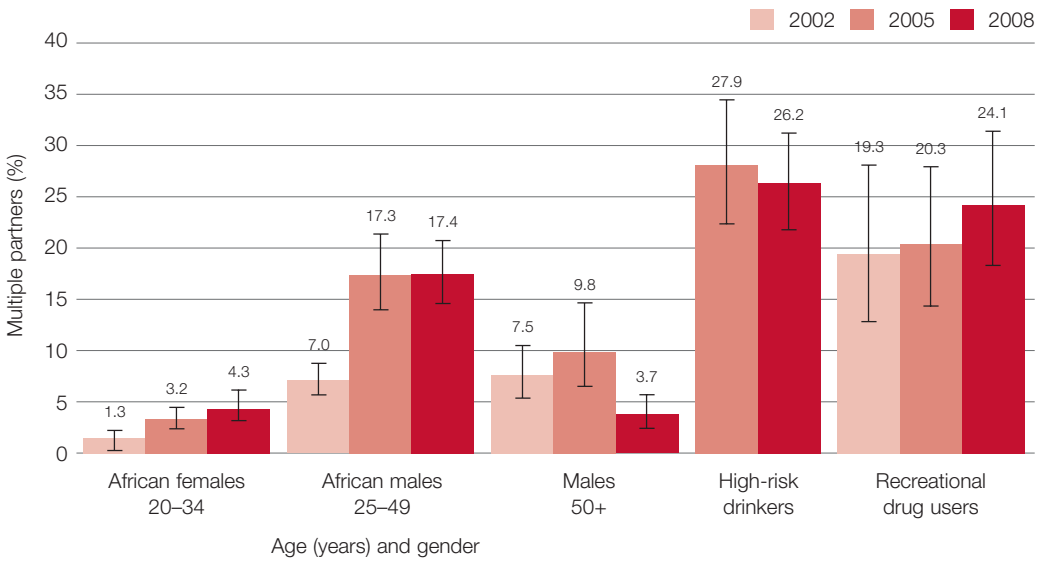
In 2008, multiple sexual partners among people of reproductive age ranged from 8.6% in Gauteng to 14.6% in the Free State. The rates of multiple sexual partners in this population are also noted for the other provinces in Table 3.16.

Table 3.16: Respondents reporting multiple sexual partners in the last 12 months by province in the 15–49 age group, South Africa 2005 and 2008

	2002			2005			2008		
Province	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Western Cape	532	10.9	8.4–13.9	972	11.3	8.4–15.1	853	9.9	7.5–13.1
Eastern Cape	462	12.1	9.3–15.5	1 065	8.1	5.6–11.5	816	13.1	10.1–16.9
Northern Cape	269	5.6	3.3–9.3	386	7.5	4.9–11.3	513	8.8	5.4–14.0
Free State	283	5.7	3.4–9.3	505	5.4	3.2–8.9	421	14.6	10.0–20.8
KwaZulu-Natal	735	9.3	7.3–11.7	1 453	10.6	7.4–15.0	1 140	10.2	7.5–13.6
North West	309	10.7	7.6–14.8	599	11.4	7.8–16.5	495	12.9	9.2–17.7
Gauteng	685	9.6	7.6–12.1	1 331	11.3	8.2–15.3	1 062	8.6	6.4–11.5
Mpumalanga	200	10.5	6.8–15.8	590	7.2	5.0–10.2	522	9.4	6.9–12.6
Limpopo	319	6.9	4.5–10.4	727	9.5	6.9–12.9	553	10.8	7.2–15.9
National	3 794	9.4	8.5–10.4	7 628	9.8	8.6–11.3	6 375	10.6	9.5–11.9

Figure 3.6 shows the percentages of MARPs who reported multiple sexual partnerships in 2002, 2005, and 2008. The AUDIT was not used in 2002 to measure high risk alcohol use. When 2002 is compared to 2008, there were significant increases in multiple sexual partnerships only among African females aged 20–34 from 1.3% to 4.3% and African males aged 25–49 from 7.0% to 17.4%. However, there was no change among people who used recreational drugs. In contrast, there was a substantive, but not significant, decrease among males aged 50+ years from 7.5% to 3.7%.

Figure 3.6: MARPs with multiple sexual partners, South Africa 2002, 2005, and 2008



Using 2005 as a baseline, there was a statistically significant decrease only in the percentages of males aged 50+ years who reported they had multiple partnerships from 9.8% in 2005 to 3.7% in 2008.

In 2008, persons who are high-risk drinkers and persons who use drugs for recreational purposes reported the highest percentages of multiple partnerships at 26.2% and 24.1% respectively. The lowest percentages of multiple partnerships were reported by males aged 50+ years and African females aged 20–34 at 3.7% and 4.3% respectively. The difference was statistically significant.

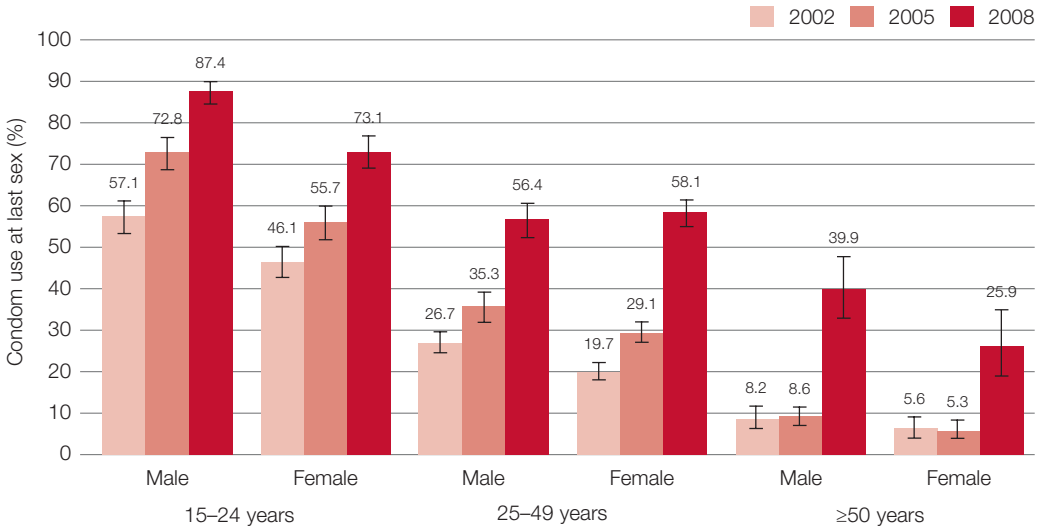
In view of lack of available comparable data for both 2002 and 2005, some baseline data were obtained from 98 MSM and 250 people with disabilities. The results showed that the two groups had moderately high levels of reported multiple sexual partnerships in 2008 of 17.5% (95% CI: 8.8–31.6) and 14.1% (95% CI: 8.3–22.9) respectively.

Condom use

Consistent and correct condom use is one of the most effective means for preventing HIV infection. In the surveys, condom use at last sex has been measured to illustrate uptake of condom use.

Figure 3.7 shows reported condom use at last sex by age group and sex in the three surveys. The graph shows that the same linear trend of statistically significant increases in condom use at last sex were found for both 15–24 and 25–49 age groups from 2002 to 2008.

Figure 3.7: Condom use at last sex by age group and sex, South Africa 2002, 2005, and 2008



The pattern among those older than 50+ years was slightly different as the rates of condom use at last sex reported by both sexes were unchanged from 2002–2005 but increased by as much as five-fold in 2008. The increase from 2005–2008 was statistically significant.

When one looks at 2008 alone, there was a significant negative linear trend with both males and females aged 15–24 respectively having the highest reported rates of condom use at last sex, followed by those aged 25–49, and those aged 50+ years had the lowest ones. All the differences between each age group by sex were statistically significant. It is interesting to note that although there was a statistically significant difference found between the reported rates of condom use at last sex by male and females youths, there was no difference found between sexes among both those aged 25–49 and 50+ years.

Table 3.17 shows the percentages of adults who reported condom use at last sex. For adults 15+ years, the overall proportion of people who reported using condoms at last sex more than doubled from 27.3% in 2002 to 62.4% in 2008. Similarly large increases were also found among both adult males and females from 2002 (30.3% and 24.7% respectively) to 2008 (64.6% and 60.4% respectively). The same pattern of results was found for adults aged 15–49 years.

Table 3.17: Condom use among adults at last sex, by age and sex, South Africa 2002, 2005, and 2008

	2002			2005			2008		
Sex	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
≥15 years									
Males	2 106	30.3	28.4–32.3	3 863	38.1	35.3-40.9	2 731	64.6	61.6–67.4
Females	2 449	24.7	23.0–26.5	5 393	32.8	30.5–35.1	3 337	60.4	57.6–63.2
Total	4 555	27.3	26.0–28.6	9 256	35.4	33.4–37.3	6 068	62.4	60.2–64.6

Table 3.17: contd.

	2002			2005			2008		
Sex	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
15–49 years									
Males	1 666	36.1	33.8–38.5	3 051	45.4	41.9–48.9	2 358	67.4	64.4–70.3
Females	2 128	27.6	25.7–29.6	4 651	35.9	33.4–38.5	3 063	62.5	59.7–65.3
Total	3 794	31.3	29.8–32.8	7 702	40.3	38.0–42.6	5 421	64.8	62.6–66.9

In 2008, almost two-thirds (62.4%) of adults aged 15+ years (64.6% vs. 60.4% for males and females respectively) reported condom use at last sex. The same pattern of results was found for adults aged 15–49 years.

Table 3.18 shows the percentage of people aged 15+ years reporting condom use at last sex in each of the nine provinces. The overall patterns of substantive and statistically significant increases wherein condom use doubled on average, found in the national data from 2002 to 2008 and from 2005 to 2008, were also found for all provinces. Condom use at last sex trebled between 2002 and 2008 in the Northern Cape and Mpumalanga.

In 2008 condom use at last sex was highest in Eastern Cape, Mpumalanga and Limpopo at about 70% and it was lowest in the Western Cape at 49.0% and in Northern Cape at 52.6%. All provinces except Northern Cape and Gauteng reported significantly higher levels of condom use at last sex than the Western Cape. Eastern Cape, Free State, KwaZulu-Natal, Mpumalanga and Limpopo reported significantly higher levels of condom use at last sex than the Northern Cape. Both Eastern Cape (70.0%) and Mpumalanga (70.2%) also reported significantly higher levels of condom use at last sex than Gauteng at 57%.

Table 3.18: Condom use at last sex, by province, South Africa 2002, 2005, and 2008

	2002			2005			2008		
Province	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Western Cape	615	21.3	18.2–24.8	1 209	22.5	17.6–28.4	804	49.0	42.1–56.0
Eastern Cape	571	31.5	27.7–35.5	1 267	35.8	30.1–41.9	762	70.0	63.7–75.5
Northern Cape	332	16.9	13.1–21.5	469	19.1	14.7–24.6	420	52.6	44.9–60.2
Free State	336	35.1	30.1–40.5	590	30.7	22.8–40.0	396	64.8	57.5–71.4
KwaZulu-Natal	898	26.7	23.9–29.8	1 805	36.3	32.2–40.7	1 073	66.2	61.0–71.1
North West	376	26.6	22.3–31.4	726	37.3	31.7–43.3	513	62.0	56.6–67.2
Gauteng	806	31.6	28.4–35.0	1 613	37.7	33.2–42.4	1 039	57.6	51.7–63.3
Mpumalanga	240	24.2	19.0–30.2	721	36.1	31.6–40.8	510	70.2	63.7–76.0
Limpopo	381	27.6	23.2–32.4	856	44.7	39.7–49.7	551	68.0	62.9–72.8
National	4 555	27.3	26.0–28.6	9 256	35.4	33.4–37.3	6 068	62.4	60.2–64.6

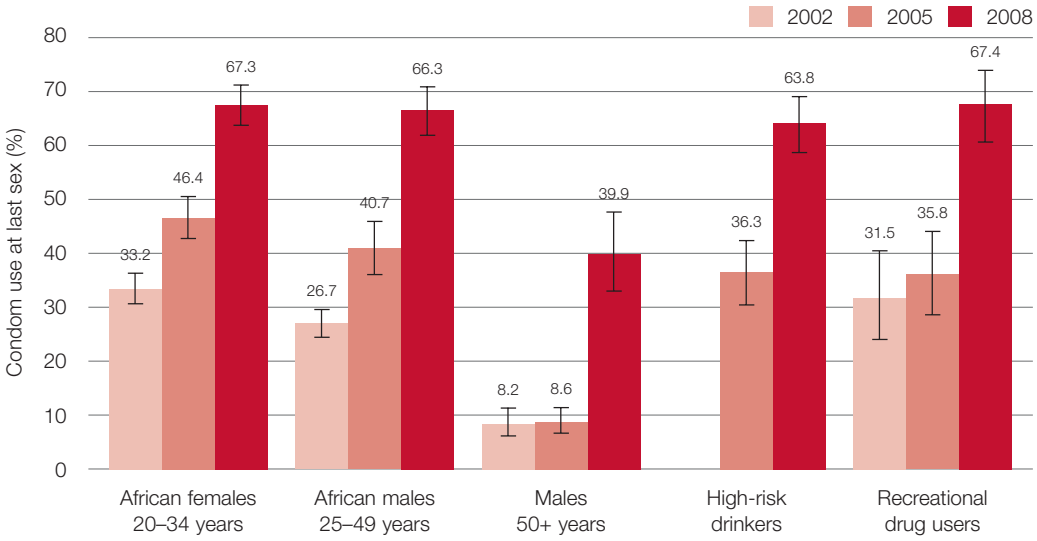
Note: 2002 data was unweighted

Figure 3.8 shows the percentages of most-at-risk populations who used a condom at last sex during the three surveys. When 2002 was compared to 2008, there were dramatic

increases noted as the rates more than doubled among African females aged 20–34 (33.2% vs. 67.3%), African males aged 25–49 (26.7% vs. 66.3%), and persons who use drugs for recreational purposes (31.5% vs. 67.4%) while it increased nearly five-fold among males 50+ years (8.2% vs. 39.9%). All of these increases were statistically significant. Using 2005 as a baseline, it was found that all five MARPs which had data for 2005 and 2008 showed significant increases over the two surveys: African females aged 20–34 from 46.5% to 67.3%, African males aged 25–49 from 40.7% to 66.3%, males aged 50+ years from 8.6% to 39.9%, persons who are high-risk drinkers from 36.3% to 63.8%, and persons who use drugs for recreational purposes from 35.8% to 67.4%; all respectively.

In 2008, four of the MARPs (viz., African females aged 20–34, African males aged 25–49, are high-risk drinkers, and people who use recreational drugs) shown in Figure 3.8 reported moderately high levels of condom use at about 60% or more, while males who were 50+ years reported the lowest levels of condom use at 39.9%. The difference between the levels of condom use at last sex reported by each of these four MARPs and males who were 50+ years studied was statistically significant. The remaining two groups for which there was no comparable baseline data available from 2002 and 2005, namely, MSM (n = 72) and people with disabilities (n = 162), also showed high rates of reported condom use at last sex in 2008 of 58.3% (42.6–72.5) and 62.7% (52.0–72.4) respectively.

Figure 3.8: Condom use at last sex by MARPs, South Africa 2005 and 2008



Condom use at last sex among people with multiple sexual partners

Unprotected sex with greater numbers of sexual partners increases risk of HIV acquisition. The risk is increased in the context of an overall high prevalence of HIV, and thus the risk of encountering a sexual partner who is HIV positive is high.

Table 3.19 shows condom use at last sex among males and females aged 15–49 years who reported that they had more than one sexual partner in the past 12 months. Overall, there was a relatively high rate of reported condom use at last sex at over 70% in all three surveys. From 2002 to 2008, there was no difference found in condom use at last sex

Table 3.19: Condom use at last sex, by sex of respondent, South Africa 2002, 2005 and 2008

	2002			2005			2008		
	n	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Males	184	71.0	59.8–79.4	401	81.1	75.5–85.6	439	77.1	70.4–82.6
Females	59	71.6	54.3–84.3	110	52.5	39.4–65.2	110	67.5	52.5–79.6
Total	243	70.8	61.9–78.9	511	76.3	70.6–81.1	549	75.2	69.2–80.4

reported by either sex. From 2005 to 2008, there was a substantive increase in condom use at last sex among females from 52.5% to 67.5%. However, this difference was not significant. Although a difference was found in 2008 (77.1% among males vs. 67.5% among females), the difference was not significant.

3.2.4 Awareness of HIV status

Voluntary counselling and testing (VCT) is important as an entry strategy for both prevention and access to treatment, care and support services. Increasing knowledge of HIV status is important as it has been linked to an increase in prevention behaviours among these who test positive through VCT.

Table 3.20 shows the proportion of respondents aged 15+ years who reported having had a history of HIV testing. The table shows that there were significant linear trend increases in HIV testing from 2002 through 2005 to 2008. This was true for both sexes. It is interesting to note that while HIV testing was equal between the two sexes in 2002, there was a significant sex disparity seen in both 2005 and 2008 with more females being tested that their male counterparts.

Table 3.20: Respondents aged 15+ years who had ever had an HIV test, South Africa 2002, 2005, and 2008

	n	Yes %	95% CI
2002			
Male	3 025	21.4	18.9–24.1
Female	4 059	21.4	19.2–23.9
Total	7 084	21.4	19.6–23.3
2005			
Male	6 209	27.6	25.5–29.8
Female	9 942	32.9	31.3–34.7
Total	16 151	30.5	29.0–32.0
2008			
Male	5 193	43.0	40.9–45.2
Female	7 891	56.7	55.0–58.3
Total	13 084	50.8	49.3–52.2

In 2008, half of the respondents indicated that they had been tested for HIV before. Significantly more females had tested than their male counterparts.

Figure 3.9 shows the percentages of the sample of males and females aged 15–49 who received an HIV test in the last 12 months and who know their results in 2005 and 2008 as there was no data for 2002. Overall, there was doubling of the percentage of people who were aware of their HIV status from 11.9% in 2005 to 24.7% in 2008. This was a significant increase. The same pattern of significant increase in the percentage was also seen both among males and females.

In 2008, significantly more females (28.7%) received an HIV test in the last 12 months and knew their results than their male counterparts (19.8%).

Figure 3.9: Awareness of HIV status in the last 12 months, by sex of respondent, South Africa 2005 and 2008

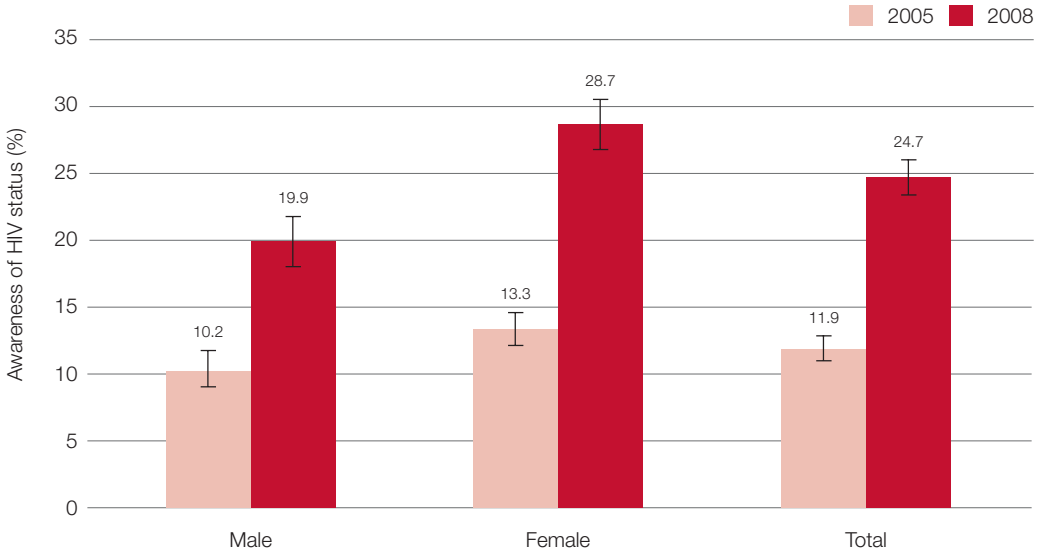


Table 3.21 shows the percentages of males and females aged 15–49 who had an HIV test in the last 12 months and who received their test results. It was found that overall there was a significant increase in the percentages of people aged 15–49 who had had an HIV test in the last 12 months and who had received their test results, from 92.8% in 2005 to 96.2% in 2008. A statistically significant increase also occurred among females, from 92.0% in 2005 to 97.2% in 2008. However, no change was seen among the percentages of males who did so.

Table 3.21: Percentage of respondents who have had an HIV test in the last 12 months, and received their results, South Africa 2005 and 2008

	2005			2008		
Sex	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Males	604	93.9	90.5–96.1	877	94.4	91.9–96.2
Females	1 132	92.0	87.6–94.9	1 611	97.2	95.7–98.2
Total	1 736	92.8	89.9–94.8	2 488	96.2	94.9–97.1

Table 3.22 shows the percentages of the entire sample aged 15–49 who had an HIV test in the last 12 months and who knew their results in the different provinces. When 2005 data were compared with those from 2008 data, it was found that there were significant increases in all provinces except for Eastern Cape and Northern Cape, where substantive increases did also occur but were not significant.

In 2008, the largest percentages of people aged 15–49 who received an HIV test in the last 12 months and who know their results were in Northern Cape, Gauteng, and Eastern Cape at 28%, 27.9%, and 27.7% respectively. The lowest percentage which did so was from the Free State, at 16.8%. The differences between the percentages in these two groups of provinces was significant.

Table 3.22: Percentage of the entire sample in the 15–49 age group who had an HIV test in the last 12 months and who know their results, by province, South Africa 2005 and 2008

	2005			2008		
Province	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Western Cape	1 560	17.0	14.6–19.8	1 398	24.2	21.5–27.2
Eastern Cape	1 949	9.0	7.0–11.4	1 308	27.7	24.1–31.6
Northern Cape	761	19.3	15.4–24.0	762	28.0	23.5–33.0
Free State	812	9.4	6.4–13.6	708	16.8	12.4–22.4
KwaZulu-Natal	2 478	10.4	8.6–12.6	1 985	24.1	21.4–27.0
North West	881	9.4	7.0–12.6	791	24.1	20.3–28.3
Gauteng	2 100	16.3	13.6–19.4	1 689	27.9	24.1–32.0
Mpumalanga	917	10.8	8.6–13.6	856	22.5	19.3–26.1
Limpopo	1 142	8.6	7.0–10.6	901	22.1	18.1–26.8
National	12 600	11.9	11.0–12.9	10 398	24.7	23.4–26.1

Table 3.23: Awareness of HIV status by MARPs, South Africa 2005 and 2008

	2005			2008		
Respondent characteristics	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
African females 20–34 years	2 173	15.0	13.0–17.2	1 770	35.7	32.5–39.0
African males 25–49 years	1 453	11.0	8.9–13.5	1 260	25.0	21.6–28.7
Males 50+ years	1 291	6.8	5.1–8.9	1 210	18.0	14.7–21.8
MSM	N/A	N/A	N/A	112	27.2	17.2–40.3
High-risk drinkers	1 107	13.3	10.7–16.4	1 190	23.1	19.4–27.4
Recreational drug users	597	14.3	10.4–19.3	582	22.5	17.7–28.2
People with disabilities	N/A	N/A	N/A	552	19.8	15.4–25.2

Table 3.23 shows the proportions of MARPs who were aware of the their HIV status in 2005 and 2008. The data for 2002 for some of the groups were unavailable. Using 2005 as a base year for comparison with 2008 results, HIV awareness more than doubled among African females aged 20–34 and African males while it almost tripled among males aged 50+. All increases in the three groups were statistically significant.

In 2008, African females reported the highest proportion of people who were aware of their HIV status, at 35.7%, followed by MSM at 27.2% and then African males aged 25–49, at 25.0%. Awareness of HIV status was least among males aged 50+ (at 18%) and people with disabilities (at 19.8%). Only the difference between African females and males aged 50+ was significant.

3.2.5 Knowledge of HIV/AIDS

Knowledge of various aspects of HIV/AIDS allows for appropriate actions to be taken in relation to prevention, among other aspects.

Table 3.24 utilises a composite measure of accurate knowledge of two questions related to HIV prevention in combination with rejecting four myths and misconceptions about the disease. These measures were only available in 2005 and 2008. The two questions on prevention of HIV transmission were 'To prevent HIV infection, a condom must be used for every round of sex' and 'One can reduce the risk of HIV by having fewer sexual partners' while the four questions about myths and misconceptions were 'There is a cure for AIDS', 'AIDS is caused by witchcraft', 'HIV causes AIDS', and 'AIDS is cured by having sex with a virgin'. In terms of knowledge about prevention of HIV transmission, if a participant answered both questions correctly they scored '1', whereas if they answered any of the two questions incorrectly they scored '0'. Concerning misconceptions about HIV transmission, if a participant answered all four questions correctly they scored '1', whereas if they answered any of the four questions incorrectly they scored '0'. The tables refer to proportions of people who either answered both prevention questions correctly, or rejected the four myths and misconceptions, or correctly answered both combinations of questions.

Table 3.24 shows the percentages of adults who correctly identify two ways of preventing the sexual transmission of HIV by age group. Using 2005 as a baseline compared to 2008, there were significant decreases in accurate knowledge about HIV transmission among all age groups from around 60% to 40–50% on average except for among those 50+ years which remained unchanged at 47.0% and 42.9% respectively.

In 2008, all levels of accurate knowledge about HIV transmission were below 50% with males aged 25–49 having the highest percentages at 49.2% followed by males aged 50 and older at 48.5%. Females aged 50 and older as well as females aged 15–24 had the lowest scores at 39.4% and 40.6% respectively. Males in both 15 and older and 25–49 age groups had significantly higher levels of accurate knowledge about HIV transmission than their female counterparts (15 and older: 47.1% for males vs. 42.2% for females; 25–49: 49.2% for males vs. 44.3% for females).

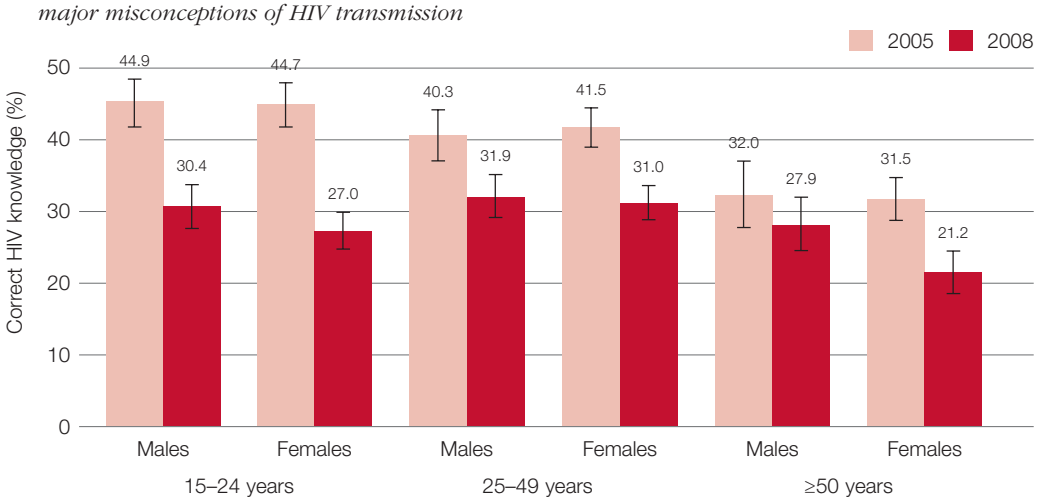
Table 3.24: Correct knowledge about prevention of sexual transmission of HIV by age group, South Africa 2005 and 2008

	2005			2008		
Sex	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
15–24 years						
Males	2 493	66.4	63.2–69.4	1 959	43.5	41.1–47.0
Females	3 137	66.5	63.7–69.1	2 260	40.6	37.5–43.8
Total	5 630	66.4	64.1–68.7	4 219	42.1	39.6–44.6
25–49 years						
Males	2 455	63.1	58.8–67.2	2 090	49.2	45.9–52.6
Females	4 332	63.2	60.5–65.8	3 518	44.3	41.7–47.0
Total	6 787	63.2	60.7–65.5	5 608	46.3	44.1–48.5
≥50 years						
Males	1 278	47.3	42.2–52.5	1 168	48.5	44.4–52.6
Females	2 485	46.7	43.4–50.1	2 132	39.4	36.1–42.7
Total	3 763	47.0	44.0–50.0	3 300	42.9	40.2–45.7
≥15						
Males	6 226	61.1	58.5–63.6	5 217	47.1	44.8–49.4
Females	9 954	60.4	58.4–62.4	7 910	42.2	40.3–44.3
Total	16 180	60.7	59.0–62. 5	13 127	44.4	42.6–46.1
15–49 years						
Males	4 948	64.6	61.7–67.3	4 049	46.8	44.2–49.4
Females	7 469	64.4	62.1–66.5	5 778	43.1	41.0–45.3
Total	12 417	64.4	62.5–66.3	9 827	44.8	42.9–46.7

Figure 3.10 shows the percentages of adults who both correctly identify ways of preventing the sexual transmission of HIV and who reject major misconceptions about HIV transmission by age group. Using 2005 as a baseline compared to 2008, there were significant decreases in accurate knowledge about HIV transmission among all age groups from mainly over 40% to below 32% on average except for among those males aged 50+ years, which remained unchanged at 32.0% and 27.9% respectively. In 2008, the 25–49 age group of both sexes (for males 31.9%, for females 31.0%) had the highest percentages of accurate knowledge while those aged 50+ years (23.8%), especially females (21.2%), had the lowest levels of accurate knowledge. These differences were all statistically significant.

Table 3.25 shows correct knowledge about prevention of sexual transmission of HIV and rejection of major misconceptions of HIV transmission among adults. The table shows that the same pattern of results was found for both age groups as was the case for those

Figure 3.10: Correct knowledge about prevention of sexual transmission of HIV and rejection of major misconceptions of HIV transmission



shown in Figure 3.10 in that the percentages of people who had accurate knowledge about HIV transmission significantly decreased from the low 40s in 2005 to about 30% in 2008. This was true for both sexes.

In 2008 the percentages of people who had accurate knowledge about HIV transmission was stable at about 30% in both sexes in both age groups, as shown in Table 3.25.

Table 3.25: Correct knowledge about prevention of sexual transmission of HIV and rejection of major misconceptions of HIV transmission by age, South Africa 2005 and 2008

	2005			2008		
Sex	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
≥15 years						
Males	6 226	40.3	37.8–42.8	5 217	30.6	28.6–32.7
Females	9 954	40.1	37.9–42.3	7 909	27.7	26.1–29.4
Total	16 180	40.2	38.2–42.2	13 126	29.0	27.5–30.5
15–49 years						
Males	4 948	42.4	39.7–45.0	4 049	31.3	29.0–33.6
Females	7 469	42.6	40.1–45.1	5 777	29.7	27.9–31.6
Total	12 417	42.5	40.4–44.6	9 826	30.4	28.8–32.0

Table 3.26 shows percentages of adult people aged 15–49 who correctly identify two ways of preventing the sexual transmission of HIV by province. Given that data was not available for 2002, and using 2005 as a baseline, only Western Cape increased significantly the percentage of people who correctly identified the two ways of preventing the sexual transmission of HIV in 2008 (65.2% vs 51.41% in 2005) while in Northern Cape there was a substantive, but not significant, increase (40.4% in 2005 vs. 49.5% in 2008). There were some significant reductions in percentages correctly doing so in KwaZulu-Natal, North West, Gauteng, Mpumalanga and Limpopo.

Table 3.26: Correct knowledge about prevention of sexual transmission of HIV among adults aged 15–49, by province, South Africa 2005 and 2008

	2005			2008		
Province	**n**	**%**	**95%CI**	**n**	**%**	**95%CI**
Western Cape	1 987	51.4	45.0–57.7	1 717	65.2	62.1–68.2
Eastern Cape	2 590	58.8	55.6–61.9	1 743	54.5	50.7–58.2
Northern Cape	1 001	40.4	35.6–45.5	999	49.5	45.0–54.0
Free State	1 013	56.3	47.1–65.2	876	58.8	53.0–64.5
KwaZulu-Natal	3 240	67.9	64.7–70.9	2 527	41.8	37.0–46.9
North West	1 130	45.0	39.0–51.2	1 065	28.5	23.9–33.6
Gauteng	2 560	64.8	60.8–68.7	2 021	47.4	43.3-51.5
Mpumalanga	1 176	59.9	55.4–64.2	1 026	28.2	23.4–33.5
Limpopo	1 483	69.9	65.1–74.3	1 153	22.3	18.2–27.0
National	16 180	60.7	59.0–62.6	13 127	44.4	42.6–46.1

In 2008, the Western Cape, Free State and Eastern Cape had the highest percentages of people who correctly identified the two ways of preventing the sexual transmission of HIV of between 55% and 65% whilst Limpopo, Mpumalanga and North West had the lowest percentages who could do so at between 22% to 29%. The percentage of people in the Western Cape who could correctly identify the two ways of preventing the sexual transmission of HIV was significantly higher than in all eight other provinces, the Free State significantly higher than in five (viz., KwaZulu-Natal, North West, Gauteng, Mpumalanga and Limpopo) and the Eastern Cape significantly higher than in four provinces (viz., KwaZulu-Natal, North West, Mpumalanga and Limpopo).

Table 3.27: Rejection of major misconceptions about HIV transmission by province, South Africa 2005 and 2008

	2005			2008		
Province	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Western Cape	1 986	65.1	58.9–70.9	1 717	53.0	49.7–56.2
Eastern Cape	2 589	69.2	64.3–73.7	1 750	63.1	59.5–66.5
Northern Cape	997	65.1	60.6–69.4	1 001	61.5	56.8–66.0
Free State	1 013	62.2	55.2–68.7	878	69.9	64.4–74.8
KwaZulu-Natal	3 238	65.9	60.2–71.2	2 533	66.2	62.8–69.5
North West	1 130	50.1	43.5–56.7	1 067	63.1	59.5–66.5
Gauteng	2 560	56.4	52.1–60.1	2 023	68.4	65.5–71.1
Mpumalanga	1 176	43.7	38.4–49.1	1 026	59.8	56.2–63.4
Limpopo	1 481	68.5	59.7–76.1	1 154	62.9	58.4–67.2
National	16 170	61.6	59.5–63.7	13 149	63.8	62.5–65.1

Table 3.27 shows percentages of people who correctly rejected myths and misconceptions about HIV transmission. When 2008 results were compared to 2005, it was found that three provinces had significant increases in the percentages of people who correctly rejected the four myths and misconceptions. These were North West which increased from 50.1% to 63.1%, Gauteng which increased from 56.4% to 68.4% and Mpumalanga which increased from 43.7% to 59.8%. There was, however, a significant drop in the percentage of people from the Western Cape from 65.1% to 53.0% who could also do the same.

In 2008 the Western Cape had the lowest percentage of people who correctly rejected myths and misconceptions about HIV transmission at 53.0%. All the other provinces had percentages of 60% or more who could correctly do so. All the differences in percentages between all the other provinces and the Western Cape were significant. In addition, Free State (69.9%), Gauteng (68.4%), and KwaZulu-Natal (66.2%) all had significantly higher percentages who correctly rejected myths and misconceptions about HIV transmission than Mpumalanga (at 59.8%) which was the second lowest among all the nine provinces after the Western Cape.

Table 3.28 shows the percentages of people, by province, who both correctly identify ways of preventing the sexual transmission of HIV and who reject myths and misconceptions about HIV transmission. Three provinces had significant decreases in the percentages of people who both correctly identify ways of preventing the sexual transmission of HIV and who reject myths and misconceptions about HIV transmission from 2005 to 2008. These were from Eastern Cape, which decreased from 44.3% to 36.0%, KwaZulu-Natal from 49.0% to 29.5%, and Mpumalanga from 27.9% to 18.2%.

Table 3.28: Correct knowledge about prevention of sexual transmission of HIV and rejection of major misconceptions about HIV transmission by province, South Africa 2005 and 2008

	2005			2008		
Province	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Western Cape	1 987	37.8	30.9–45.4	1 717	34.1	31.0–37.4
Eastern Cape	2 590	44.3	41.2–47.4	1 743	36.0	32.1–40.2
Northern Cape	1 001	28.9	25.0–33.2	999	32.1	28.0–36.4
Free State	1 013	33.3	27.7–39.4	876	41.3	35.5–47.5
KwaZulu-Natal	3 240	49.0	44.2–53.8	2 526	29.5	25.6–33.7
North West	1 130	22.5	18.3–27.4	1 065	18.5	15.2–22.4
Gauteng	2 560	38.1	34.3–42.1	2 021	32.8	29.4–36.4
Mpumalanga	1 176	27.9	23.8–32.3	1 026	18.2	14.7–22.5
Limpopo	1 483	51.3	43.2–59.3	1 153	14.0	10.8–18.0
National	16 180	40.2	38.2–42.1	13 126	29.0	27.5–30.5

In 2008, Free State had the highest percentage of people who both correctly identify ways of preventing the sexual transmission of HIV and who reject myths and misconceptions about HIV transmission at 41.3% while Limpopo, Mpumalanga, and North West had the lowest who could do so correctly, at 14.0%, 18.2% and 18.5% respectively. The Western Cape, Eastern Cape, Northern Cape, Free State, KwaZulu-Natal, and Gauteng all had

significantly higher percentages of people who both correctly identify ways of preventing the sexual transmission of HIV and who reject myths and misconceptions about HIV transmission than North West, Mpumalanga, and Limpopo. The Free State also had significantly higher percentages of people who could do so than KwaZulu-Natal.

Table 3.29 shows the percentages of MARPs who correctly identified the two ways of preventing the sexual transmission of HIV. When this is done, there was a significant decline in the percentages of both African females aged 20–34 and African males aged 25–49 having correct knowledge of HIV prevention from about 60–70% in 2005 to less than 50% in 2008. There was also a substantive, although not significant, decline among persons who are high-risk drinkers as measured using the AUDIT scale (who scored 16 and above), from 62.5% to 55.0%.

In 2008 alone, more than half (51.5%) of both persons who are high-risk drinkers and persons who use drugs for recreational purposes (55%) had the correct knowledge about HIV transmission. The rest of the groups had less than 50% who had the correct knowledge about HIV transmission. Four groups (viz., persons who use drugs for recreational purposes, persons who are high-risk drinkers, males older than 50, and African males aged 25–49) all had significantly higher percentages who reported the correct knowledge about HIV transmission than did African females aged 20–34 (37.8%). Similarly, persons who are high-risk drinkers had significantly higher percentages doing so than African males aged 25–49.

Table 3.29: Correct knowledge about prevention of sexual transmission of HIV by MARPs, South Africa 2005 and 2008

	2005			2008		
Respondent characteristics	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
African females 20–34	2 157	67.7	64.2–71.1	1 659	37.8	34.4–41.4
African males 25–49	1 421	63.7	58.3–68.7	1 206	43.8	39.9–47.8
Males 50+ years	1 278	47.3	42.2–52.4	1 167	48.5	44.5–52.6
MSM	N/A	N/A	N/A	111	45.0	33.1–57.5
High-risk drinkers	1 105	57.2	52.7–62.5	1 189	51.5	47.2–55.7
Recreational drug users	596	62.5	56.1–68.6	579	55.0	48.9–60.9
People with disabilities	N/A	N/A	N/A	548	40.5	34.2–47.1

Table 3.30 shows the percentages of MARPs who correctly reject the four myths and misconceptions about HIV transmission. The table shows that there was a significant increase in the percentages of African females aged 20–34 and African males aged 25–49 who correctly rejected the four myths and misconceptions about HIV transmission from 2002 to 2008. Although there was also a substantive increase among males older than 50, from 43.6% in 2002 to 53.2% in 2008, it was not statistically significant. When 2005 and 2008 data were compared, a significant increase in the percentages who correctly rejected the four myths and misconceptions about HIV transmission was found only among African females aged 20–34 (21.8% vs. 71.0% respectively). A substantive, but not significant, change was also found among individuals who use drugs for recreational purposes (58.0% vs. 63.5%).

Table 3.30: Rejection of major misconceptions about HIV transmission by MARPs, South Africa 2002, 2005, and 2008

	2002			2005			2008		
Respondent characteristics	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
African females 20–34	876	61.5	56.0–66.7	2 156	61.8	58.2–65.4	1 661	71.0	67.9–73.9
African males 25–49	757	53.5	47.3–59.5	1 420	63.6	59.1–66.9	1 209	65.9	62.0–69.5
Males 50+ years	595	43.6	36.4–51.0	1 277	58.4	52.6–64.0	1 169	53.2	49.2–57.1
MSM	N/A	N/A	N/A	N/A	N/A	N/A	111	56.9	43.7–69.1
High-risk drinkers	N/A	N/A	N/A	1 105	56.6	52.0–61.1	1 189	58.0	53.9–62.0
Recreational drug users	N/A	N/A	N/A	595	58.0	50.4–65.2	581	63.6	57.8–69.1
People with disabilities	N/A	N/A	N/A	N/A	N/A	N/A	550	54.0	48.1–59.8

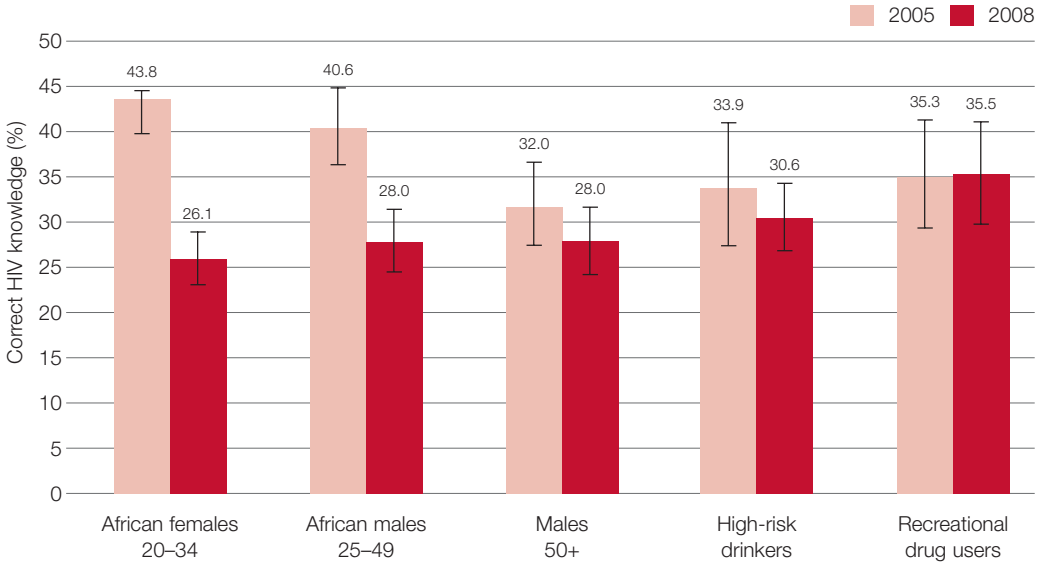
In 2008 alone, African females aged 20–34, African males aged 25–49, and persons who use drugs for recreational purposes had significantly higher percentages that correctly rejected the four myths and misconceptions about HIV transmission than the rest of the other most-at-risk groups at less than 60%. Both African females aged 20–34 and African males aged 25–49 had significantly higher percentages that correctly rejected the four myths and misconceptions about HIV transmission compared to males older than 50, persons who are high-risk drinkers, and persons with disabilities. Therefore, African females aged 20–34, African males aged 25–49, and individuals who use drugs for recreational purposes had more accurate information on HIV transmission compared to their counterparts in the other MARPs.

Figure 3.11 shows the percentages of MARPs correctly identified two ways of preventing the sexual transmission of HIV and rejection of four misconceptions about HIV transmission among all the MARPs studied. Participants had to answer all six questions correctly. Table 3.30 shows that there was a statistically significant reduction for both African females aged 20–34 and African males aged 25–49 from 2005 (43.8% vs. 40.6% respectively) to 2008 (26.1% vs. 28.0% respectively). The levels of knowledge remained unchanged over the two surveys among the other three most-at-risk groups.

A glance at 2008 data only shows the percentages of all most at-risk groups who had accurate knowledge of HIV transmission was below 40%. The highest percentage was among persons who use recreational drugs at 35.5%. This group had significantly higher percentages correctly identified two ways of preventing the sexual transmission of HIV and rejection of four misconceptions about HIV transmission than African females aged 20–34 (26.1%). Although there was a substantive difference between the percentages of persons who use recreational drugs (35.5%), doing so correctly, and African females aged 20–34 (26.1%), the difference was not significant. It is important also to note that both MSM and persons with disabilities who were evaluated for the first time in 2008 had the

lowest percentages of groups with accurate knowledge of HIV transmission, at 24% and 21% respectively.

Figure 3.11: Correct knowledge about prevention of sexual transmission of HIV and rejection of major misconceptions of HIV transmission by MARPs, South Africa 2005 and 2008



3.2.6 Exposure to HIV communication programmes

There are a wide range of national and sub-national HIV/AIDS communication programmes in South Africa. These include national communication programmes conducted by government and non-governmental organisations (NGOs); programmes within schools, universities and workplaces; provincial government programmes, sub-national programmes led by NGOs; and interactive communication including community-level campaigns such as door-to-door activities, community theatre, and events.

In the following tables, findings are presented on the reach of the four large-scale ongoing national programmes – Khomanani, Soul City, Soul Buddyz, and loveLife – over the 2005 and 2008 surveys. Reach was defined as having heard or seen at least one component of the communication programmes – for example, a radio advertisement, and/or television programme and/or other components.

Khomanani is a multi-year programme conducted through the national Department of Health with an annual budget of over R100 million. Activities include programming via mass media as well as promotional events that focus on thematic days – for example, World AIDS Day and Candlelight Memorial Day. The content spans a wide range of HIV/AIDS themes.

Soul City focuses on adults, whereas Soul Buddyz focuses on children. The programmes have run over multiple years with Soul City being initiated in the early 1990s and Soul Buddyz in the early 2000s. The combined annual budget is over R100 million annually and includes reach via broadcast, print and outdoor media, as well as interactive activities such as Soul Buddyz clubs. Both programmes address HIV/AIDS as well as other health-related issues with thematic focal areas varying annually.

loveLife focuses on youth, mainly in their teens, and has run since 1999. The programme has an annual budget of over R100 million and utilises broadcast, print, and outdoor media. Interactive activities include reaching youth through community-based Y-centres, and youth-friendly clinics. loveLife includes an HIV/AIDS focus, but also extends towards promoting aspiration among youth.

In 2008, data was also gathered about the 46664 campaign, a programme conducted by the Nelson Mandela Foundation. This campaign aims to promote HIV prevention through a series of AIDS charity of concerts played in honour of Nelson Mandela. The campaign is conducted nationally, but also extends globally.

Reach was defined as having heard or seen at least one component of the communication programmes – for example, a radio advertisement and/or television programme and/or other components.

Table 3.31 shows the reach of the four national HIV/AIDS communication programmes. There has been an increase in reach between 2005 and 2008, and youth aged 15–24 are most likely to be reached followed by adults 25–49 and older adults aged 50+ years.

It is important to note that a proportion of the population are not reached by any programme, and that less than half of all adults over 50 are reached by any national programme. In 2008, 9.8% of youth aged 15–24, 16.4% of adults aged 25–49, and 37.8% of older adults aged 50+ years were not reached by any programme.

Table 3.31: Reach of HIV and AIDS communication by age, South Africa 2005 and 2008

	2005			2008		
Age	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Youth (15–24)	5 331	86.3	83.9–88.4	4 214	90.2	88.5–91.6
Adults (25–49)	6 429	77.8	75.4–80.1	5 626	83.6	81.9–85.2
Adults (≥ 50)	3 515	47.2	43.5–50.9	3 311	62.2	59.3–65.0
Total	15 275	74.0	71.9–76.1	13 151	80.9	79.4–82.3

Table 3.32 shows reach of the four programmes by age group. Khomanani's reach is primarily into the youth audience (65.3%), with only around a third (38.9%) of adults 50+ years being reached.

loveLife and Soul City have high reach into the youth age ranges, with 79.1% of youth aged 15–24 being reached by loveLife in 2008, and 75.3% being reached by Soul City. loveLife also reaches 71.2% of adults aged 25–49.

The child-focused Soul Buddyz reaches into all age groups, as does the youth-focused loveLife programme.

There is poor reach by all programmes into the older age group, adults 50+ years, with the highest reach being Soul City at 44.1%, followed by loveLife at 42.5%.

Table 3.32: Reach of HIV/AIDS communication by programme and age, South Africa 2005 and 2008

	2005			2008		
Respondent characteristics	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Khomanani						
Youth (15–24)	5 150	44.9	41.7–48.1	4 200	65.3	62.6–67.9
Adults (25–49)	6 308	40.5	38.0–43.1	5 607	59.7	57.4–61.9
Adults (≥50)	3 549	24.4	21.5–27.6	3 300	38.9	35.9–41.9
Total	15 007	38.4	36.2–40.6	13 107	56.8	54.8–58.8
Soul City						
Youth (15–24)	5 437	79.9	77.4–82.3	4 211	75.3	73.0–77.5
Adults (25–49)	6 595	71.3	68.9–73.7	5 621	66.7	64.3–69.0
Adults (≥50)	3 610	37.9	34.4–65.6	3 309	44.1	41.0–47.3
Total	15 642	67.0	64.7–69.1	13 141	64.3	62.3–66.3
Soul Buddyz						
Youth (15–24)	5 168	67.6	64.3–70.8	4 200	65.6	62.8–68.4
Adults (25–49)	6 272	49.1	46.1–52.1	5 616	51.0	48.3–53.6
Adults (≥50)	3 538	22.6	19.7–25.8	3 303	21.3	18.9–23.9
Total	14 978	49.0	46.4–51.5	13 119	48.8	46.7–50.9
loveLife						
Youth (15–24)	4 732	67.7	64.7–70.5	4 206	79.1	76.8–81.3
Adults (25–49)	5 590	48.7	45.9–51.6	5 611	71.2	69.1–73.2
Adults (≥50)	3 217	20.9	17.9–24.2	3 300	42.5	39.8–45.3
Total	13 539	48.3	45.9–50.7	13 117	67.3	65.6–69.0

Table 3.33 shows that reach of communication programmes has increased over time for all MARPs. However, overall reach is poor for a number of risk groups.

The Khomanani programme improved its reach between 2005 and 2008, but overall reach is low – particularly given that the programme sets out to reach diverse audiences and is expected to reach into various risk groups. In 2008 the programme reached less than half the population of males aged 50 and older (41%), males who reported sex with a sex worker (39.5%), and males and females with disability (46.0%).

Soul City improved its reach between 2005 and 2008, and overall reach is high. More than half of each of the MARPs are reached by the programme, with the exception of males aged 50 and older, of whom only 43.3% are reached.

Soul Buddyz is a programme that is oriented towards a child audience rather than the MARPs identified in the table. However, the results illustrate the extent of this wider

reach, and the programme is shown to reach nearly two-thirds of African females aged 20–34.

loveLife improved its reach between 2005 and 2008, and its overall reach is high. loveLife has a youth orientation but includes reach into the MARPs. Reach is lowest among people with a disability (54.6%) and males aged 50 and older (45.5%).

Table 3.33: Reach of type of HIV/AIDS communication programme to most-at-risk population, South Africa 2005 and 2008

	2005			2008		
Respondent characteristics	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Khomanani						
African females aged 20–34	1 976	44.8	40.9–48.7	1 655	66.2	62.8–69.5
African males aged 25–49	1 320	46.01	41.1–51.0	1 209	66.9	63.2–70.3
Males aged 50+	1 214	27.5	23.2–32.2	1 165	41.0	36.3–45.8
MSM	N/A	N/A	N/A	111	51.1	38.7–63.4
High-risk drinkers	1 053	37.8	33.1–42.7	1 188	58.0	53.5–62.5
Recreational drug users	554	35.4	28.9–42.5	578	52.3	45.9–58.7
People with disability	N/A	N/A	N/A	548	46.0	40.3–51.8
Soul City						
African females aged 20–34	2 081	77.5	73.3–81.1	1 659	78.9	76.1–81.5
African males aged 25–49	1 381	77.5	73.7–80.9	1 212	75.6	72.2–78.8
Males aged 50+	1 217	38.6	33.3–44.0	1 168	43.3	38.6–48.1
MSM	N/A	N/A	N/A	111	59.5	46.1–71.6
High-risk drinkers	1 080	69.7	65.2–73.8	1 189	64.1	59.7–68.3
Recreational drug users	578	73.8	67.9–78.9	580	59.4	53.0–65.6
People with disability	N/A	N/A	N/A	548	62.0	55.8–67.9
Soul Buddyz						
African females aged 20–34	1 958	59.5	54.8–64.1	1 657	64.7	61.1–68.1
African males aged 25–49	1 305	52.0	46.8–57.2	1 210	54.1	50.1–58.1
Males aged 50+	1 205	23.8	19.5–28.8	1 166	19.1	15.9–22.8
MSM	N/A	N/A	N/A	111	35.7	23.7–49.8
High-risk drinkers	1 056	49.5	44.5–54.6	1 188	51.1	46.4–55.8
Recreational drug users	560	50.8	43.9–57.8	578	48.1	41.7–54.6
People with disability	N/A	N/A	N/A	547	36.1	29.7–43.1

Table 3.33: contd.

	2005			2008		
Respondent characteristics	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
loveLife						
African females aged 20–34	1 807	57.4	52.9–61.8	1 656	77.0	74.1–79.7
African males aged 25–49	1 172	54.5	50.2–58.9	1 210	73.9	70.2–77.4
Males aged 50+	1 080	24.0	19.3–29.5	1 166	45.5	41.2–50.0
MSM	N/A	N/A	N/A	111	63.9	50.8–75.2
High-risk drinkers	937	49.7	44.5–55.0	1 188	71.3	67.1–75.1
Recreational drug users	496	53.4	46.4–60.2	578	71.7	65.2–77.5
People with disability	N/A	N/A	N/A	547	54.6	48.2–60.8

Table 3.34 provides information on the reach of the 46664 campaign. The reach of the programme included knowledge of the 46664 brand and/or attending a 46668 event and was measured in 2008 only. Reach was highest for African males aged 25–49 (at 56.6%) and lowest for MSM (36.1%) and people with disability (40.1%).

Table 3.34: Reach of 46664 to most-at-risk population, South Africa 2008

	2008		
Respondent characteristics	**n**	**%**	**95% CI**
African females aged 20–34	1 660	51.4	47.6–55.2
African males aged 25–49	1 211	56.6	52.0–61.1
Males aged 50+	1 168	45.8	41.3–50.4
MSM	111	58.6	46.5–69.7
High-risk drinkers	1 187	59.3	54.9–63.5
Recreational drug users	580	59.1	53.0–64.8
People with disability	548	40.1	34.4–46.1

CHAPTER 4

Discussion

4.1 HIV prevalence

The interpretation of HIV prevalence trends in South Africa is increasingly complex as the epidemic matures and prevention, care and treatment efforts are implemented. Increased access to antiretroviral treatment (ART) has increased the survival time of people living with HIV (Jahn et al. 2008) and, as a consequence, HIV prevalence is likely to increase predominantly in the older age groups who are more likely to be in need of receiving ART. Successful prevention programmes, on the other hand, may have contributed to a reduction in new infections, that is, HIV incidence. Increasing coverage of ART programming in conjunction with reduction in new infections may have the potential effect of maintaining prevalence at the same level, thus making it difficult to draw conclusions about the epidemic over time using prevalence as the only measure. This should be borne in mind when interpreting the present findings on HIV prevalence.

The 2002, 2005, and 2008 surveys are comparable for the population aged 2+ years and similar prevalence levels were found in all three studies. HIV prevalence in the total population of South Africa has stabilised at a level of around 11%.

A decline in HIV prevalence at national level has been observed among children aged 2–14, from 5.6% in 2002 to 2.5% in 2008. This drop could probably be attributed to programmes that address the issue of mother-to-child transmission. There was a slight decrease of HIV prevalence among youth 15–24, from 10.3% in 2005 to 8.6% in 2008. Such a decrease is probably attributable to the significant increase in condom use observed among males and females within this age group. Also, the fact that HIV communication programmes have been shown to reach a large population within this age group may have played a role in terms of HIV education.

HIV prevalence remains disproportionately high for females in comparison to males, and peaks in the 25–29 year age group, where one in three (32.7%) were found to be HIV positive in 2008. This proportion has remained unchanged since 2002, and was at the same level in all three surveys. The sustained high levels of HIV infection among young females is one of the most concerning findings of the 2008 survey and needs urgent attention for effective HIV prevention among females in their prime child-bearing age.

HIV prevalence levels in the age group 15–49 years slightly increased from 15.6% in 2002 to 16.2% in 2005 and 16.9% in 2008. The increase in HIV prevalence was predominantly observed among females 30+ years. As discussed above, the interpretation of HIV prevalence trends in this age group is difficult without an in-depth analysis of HIV incidence and the impact of increasing access to ART.

Our efforts to monitor and respond to the South African HIV/AIDS epidemic are still complicated by the temporal and geographical evolution of the many sub-epidemics at the provincial or even sub-district level. Not surprisingly, HIV infection levels showed a very uneven distribution among the nine provinces. HIV prevalence increased in two provinces: in KwaZulu-Natal, HIV prevalence was 11.7% in 2002 and 15.8% in 2008 (a difference of 4.1%), and in Eastern Cape from 6.6% to 9.0% (a difference of 2.4%). Three provinces showed a proportional decline in HIV prevalence between 2005 and 2008 in the population aged 2+ years – Gauteng, Northern Cape, and Free State. However, the confidence intervals around the estimates indicate that the changes did not reach statistical significance.

The interpretation of epidemiological trends is made more difficult by an inadequate understanding of how different social, behavioral and epidemiological factors influence the dynamics of the epidemic within different settings. The challenge for programme designers now lies in identifying the most effective ways to decrease HIV transmission by influencing these factors and to translate these findings into specific interventions in the field (Rehle et al. 2004).

4.2 HIV incidence

HIV incidence measures are generally more appropriate than prevalence measures for assessing the impact of national prevention programs because HIV incidence is a more timely measure and better reflects the underlying transmission dynamics that are currently at work in South Africa.

We have produced mathematically derived HIV incidence for young people aged 15–20 as required in the NSP. This method is not applicable in older age groups when AIDS-related mortality has a major impact on HIV prevalence levels. A substantial decrease in incidence among the 15–20-year-olds was found for the 2008 survey year compared with the incidence calculated for the 2002 and 2005 survey years, especially for the single year age groups of 15, 16, 17, 18, and 19 years. This finding supports the observed HIV prevalence pattern in study participants aged 15–19 years.

The following section on behavioural determinants will provide essential information on the complex interaction between factors facilitating or inhibiting HIV transmission. An important point to emerge from this analysis is that factors facilitating HIV spread, for example the reported increase of multiple sexual partners in 2008, was probably compensated for by the very substantial increase in condom use at last sex reported by the sexually active population in 2008. HIV incidence data become ever more crucial to substantiate such inferences!

4.3 Behavioural determinants

4.3.1 Sexual debut

Sexual debut remains a crucial factor in vulnerability of youth to HIV infection. The study found that generally a small proportion of young people had started having sex before the age of 15 years and this was the case over the last three surveys. However, more males aged 15–24 years reported having sex before the age of 15 years when compared to their female counterparts.

These results are similar to those found by to Harrison et al. (2005). They found that 13.1% of young males aged 15–24 years reported having their first sexual act before the age of 15, commonly ranging between 9 and 14 years. There are several explanations of why this occurs. These include: experimenting with alcohol and drugs which result in experimentation with sex; pressure from mixing with older groups that have already had sex, and peer pressure in order to 'fit' in with peers who are sexually active (HSRC, 2008). Furthermore, in some communities young girls are being targeted by older men for sex, especially if the young girls are virgins (HSRC, 2008).

According to Geary et al. (2008), early sexual debut is linked to youth being less likely to use contraceptives and unplanned pregnancies (Baumgartner et al. 2009). Sexual abuse

is also another factor in early sexual debut and evidence suggests that girls experiencing sexual abuse are more likely to engage in riskier sexual behaviours compared to their peers. Thus it is critical to protect children from sexual abuse and encourage youth to delay sexual debut for as long as possible (Geary et al. 2008).

Even though the rates of sexual debut before the age of 15 have declined over the past seven years, the fact that a small proportion of teenagers are still initiating sex at an early age has major implications for HIV and STI infection as early sexual debut can be associated with higher HIV exposure because it is linked to more frequent sexual intercourse, more lifetime sexually transmitted infections, less consistent contraceptive use, and more sexual partners (Donenberg et al. 2003).

In view of the above, delayed sexual debut among girls should therefore be commended and focus should be given to target young boys to delay their age of sexual debut. In particular, moulding of masculine identities in ways which discourage early sexual experience must be promoted.

4.3.2 Intergenerational sex

The finding that there has been an increase in the percentage of young females aged 15–19 who have older sexual partners in 2008 when compared to 2005 is a matter of concern. Shisana et al. (2005) found a higher HIV prevalence among teenage males and females who reported having sexual partners who are five or more years older than themselves. This finding is also consistent with another South African study which found that the partners of pregnant teenagers were significantly older, less likely to be in school and more likely to have other girl friends (Jewkes et al. 2001). Similarly, in the USA it was found that having a partner 5–9 years older was associated with initiating sex before the age of 15 (Terry-Humen et al. 2006)). In the same study, females who reported having a partner 5–9 years older at first sex were less likely to report using a family planning method at last sex.

There is increasing evidence of sex between young girls and older men from other South African studies (Leclerc-Madlala 2008; Pettifor et al. 2004). These relationships are mostly based on material gains and in some cases are sanctioned by families who benefit directly and indirectly financially from these relationships (HSRC, unpublished data). Poverty remains a motivator for younger girls seeking older partners. There is therefore a need to discourage young girls from having sex with men who are five or more years or older, as this puts the young girls at even higher risk of HIV infection.

4.3.3 Multiple sexual partners

Although there were no changes in the levels of multiple partnerships over the three surveys, it is important to note that young males were more likely to be engaged in this behaviour than their female counterparts. This is not surprising as multiple sexual partnerships are often more acceptable among males but somewhat less condoned among females in most cultures (Leclerc-Madlala et al. in press).

Multiple sexual partnerships include intergenerational relationships motivated by financial exchange – usually between younger females and older males. Such relationships are sometimes also condoned by families as a product of family members benefiting from the material proceeds of such relationships (HSRC, 2008). Other reasons for having multiple sexual partners include sexual exploration, peer pressure, acquisition of status as a

product of being sexually desirable, seeking sexual pleasure, and a de-emphasis on long-term relationships (HSRC, 2008).

While the extent of partner overlap or partner concurrency is not explored in the present report, it must be noted that having multiple sexual partners includes the likelihood of partner overlap. The densely clustered sexual networks that result from partner overlap pose a high risk for HIV transmission. Given the poor levels of knowledge about the risk posed by this factor there is a need to address this issue in future HIV prevention campaigns in the country to ensure that the message on multiple partners targets all age groups and most-at-risk populations (MARPs).

The observation of an increase in multiple sexual partners found in the Free State deserves comment. This could be explained as part of common cultural practices as have been observed among the Basotho in neighbouring Lesotho, where 36% of females and 60% of males reported high levels of multiple partnerships in a demographic and health survey (MOHSW et al. 2005).

As expected for all of the MARPs, high-risk drinkers and persons who use drugs for recreational purposes reported the highest levels of multiple sexual partnerships in the previous year. This finding is consistent with those of some previous studies which show that both alcohol and drug use are associated with increased risks for HIV infection due to the impairment in both judgement and decision-making which leads the users to risky sexual behaviour (Kalichman et al. 2008; Wechsberg et al. 2008). Although much lower than high-risk drinkers and persons who use drugs for recreational purposes, significant increases in multiple sexual partnerships were also found among African females aged 20–34 and African males aged 25–49. This justifies the inclusion of these two groups as MARPs and the recommendation of possible additional indicators for both the NSP and UNGASS. Although males aged 50+ years showed a substantive, but not significant, decrease in multiple sexual partnerships, this suggests the possibility that the elderly may also be heeding HIV prevention messages. This is partly corroborated by the evidence from the reach of HIV communication programmes, as discussed later.

4.3.4 Condom use

A key finding of this study is that there has been a dramatic increase in the number of people reporting using condoms at last sex. The greatest improvement was seen among youth (15–24 years), adult males, and even among females who have traditionally had low rates of reported condom use, where we have seen an improvement in 2008. What is most encouraging is that this pattern of improvement in reported condom use at last sex is evident in all provinces except in the Western Cape.

Apart from the highly successful condom promotion and distribution system developed by the South African government, the improvement seen in condom use at last sex among females may also point to the fact that females are becoming more empowered to negotiate condom use than before. One possible explanation of the findings is that not only might there have been a shift in the levels of condom negotiating skills, but there is also an increased openness in the community to discuss sex and condoms among youth. This is corroborated by new qualitative research findings (HSRC 2008).

This increase in reported condom use at last sex is consistent with the findings reported by a recent longitudinal community panel study among youth conducted by Dinkelman

et al. (2007) in South Africa. They found a statistically significant increase in condom use between 2002 and 2005 for young females aged 17–22 years. The results on condom use are also supported by the reduction in HIV incidence and prevalence of HIV in the youth group reported on in this survey. In the same period where we are seeing an increase in condom use there is also an increase in coverage of HIV prevention programmes targeting youth.

Even within the 25–49 age groups where HIV prevalence is the highest we are seeing a change with regard to adults who report using condoms at last sex. However, HIV incidence remains high in this group, requiring further investigation into why HIV prevalence has remained unchanged in this group compared to others. One likely reason could be pregnancy in this age group, which is sometimes due to culturally sanctioned fertility obligations for young females to have a baby before they are married to show that they are fertile (Leclerc-Madlala, et al., in press). Evidence also suggests that pregnancy is a major risk factor for HIV infection (Petiffor et al. 2004). This result may suggest a need to focus HIV interventions on the risks of pregnancy and promote safer ways for discordant couples to become pregnant. This would include encouraging HIV testing before conception, where one of the partners is HIV-positive and promoting other safer methods for conception that have been shown to protect the partner.

Risk groups are a target of most prevention interventions; it is most encouraging to observe that reported condom use at last sex among the MARPs (defined as African females aged 20–34 years, African males 25–49 years, men who have sex with men, high risk drinkers and recreational drug users) also increased in the latest survey. This suggests that prevention interventions may indeed be reaching these groups.

Although the findings show that males, especially among youth, continue to have more sexual partners compared to their female counterparts, it is also most encouraging they also use condoms more, thus protecting themselves from infection. It also stands to reason that this might be happening even in intergenerational sexual relationships as there have been notable increases in condom use especially among African females aged 20–34 years, African males 25–49 years, and males older than 50 years. It is not at all surprising that this is happening as, according to most theories of behavioural change, people who are aware that their behaviour puts them as high risk of infection will take the necessary precautions to protect themselves.

With regard to provincial data on condom use at last sex, we saw an increase in all provinces when results are compared to the results of the 2005 survey. This is commendable and more effort needs to be made to reach the population who are not using condoms in each province. In 2008 the provinces with the most improved condom use rates were the Eastern Cape, Mpumalanga, and Limpopo. Condom use was the lowest in the Western Cape followed by the Northern Cape. This result in the two provinces is of concern as condom use is key in preventing HIV infection. This result may point to a possible complacency in the population of both provinces in that both provinces have the lowest HIV prevalence in the country and HIV prevalence is declining, as seen in the 2008 data. It is important to take cognisance of the possibility that provincial figures may mask many differences and disparities in the population in that within the same province there could be areas that remain epicentres of the epidemic. It is these areas that need attention as experience in some European countries with injecting drug use-driven epidemics has taught us that epidemics left unchecked have the potential to explode within a short period of time.

4.4 Awareness of HIV status

The finding that there has been a dramatic increase from 2005 to 2008 in the percentage of the population reporting awareness of their HIV serostatus both nationally and provincially as well as among MARPs is most encouraging. Apart from Botswana, South Africa is one of the few countries with the highest levels of HIV testing and HIV status awareness in its general population in the world (UNAIDS 2008). Granted the hyper-endemic nature of the HIV epidemic in South Africa and also the size of the population, this is indeed an achievement. It would seem that the scaling up of ART in the country, the availability of testing sites and the promotion of HIV testing by the various behavioural-change communication prevention campaigns have resulted in this achievement. This could also be the result of a reduction in the levels of stigma and discrimination associated with HIV/AIDS. However, this issue requires further investigation.

4.5 Knowledge of HIV transmission

The declines found in knowledge are surprising. Two key questions, one related to condoms preventing HIV and the other related to the risks of having multiple partners, are basic, and one would expect such knowledge to have increased over time. Declining knowledge of the risks of multiple partnerships may be linked to the fact that multiple partnerships are common and are seen as normal. While levels of knowledge are generally high in South Africa, there are some major gaps in knowledge, as illustrated by responses to questions on the issue of HIV risk and multiple partners. Kincaid et al. (2008) reported similar findings in the national HIV Communication Survey. This finding is not unique to South Africa; it is fairly common throughout the world (UNAIDS 2008).

4.6 Exposure to HIV and AIDS communication programmes

The proportions of the general population and MARPs that have been reached with any HIV/AIDS communication programme have improved between 2005 and 2008. However, reach is still poor in some categories.

The Khomanani 'Coming Together' programme of the national government has a low overall reach, given that it is intended to reach all populations in South Africa. Khomanani's reach is lower than any of the other national programmes.

Soul City has a good overall reach, but among the MARP of males aged 50+, the reach of Soul City is low (at 43.3%), and the potential for reaching this group should be further explored.

Soul Buddyz is intended for chidren aged 8–12, but also reaches into wider audiences – for example African females aged 20–34, but also other MARPs and older audiences. The implications of this wider reach should be explored by programme strategists.

Although loveLife has a youth-oriented focus, its reach has extended to MARPS and older age groups. The implications of this wider reach should be explored by programme strategists.

The 46664 campaign was included in the 2008 survey only, and while its reach is lower than that of the other, more intensive national programmes, the campaign has reached diverse audiences.

For all national communication programmes reach was low among people with disabilities and males aged 50 and older. This poor reach is correlated with lower knowledge in the older age groups, as well as lower levels of adoption of prevention behaviours. Older age groups as well as MARPs with lower reach are relevant audiences for national communication programmes, and strategies need to address how such audiences can be expanded.

4.7 Strengths and limitations of the study

4.7.1 Strengths

First, the sample sizes (n = 20 826 for interviews and 15 031 for HIV testing) are large enough to allow for meaningful analyses of data on key socio-behavioural determinants and mass media information to enable generalisation of the results to the whole South African population.

Secondly, as was the case with the 2002 and 2005 surveys, the study is based on a sampling approach that ensures representativeness of the South African population. The study used a multi-stage, stratified, cluster sampling approach to draw the census enumerator areas (EAs). For this reason, the results obtained are generalisable to the nation, provinces, youth, and adults, and also to each of the four geotypes or locality types of EA: urban formal, urban informal, rural informal, and rural formal (farm) areas. For the third time, South African policy-makers, planners, NGOs and the public will have information on HIV prevalence for people of different races and for those living in urban areas, whether in formal or informal dwellings, rural formal and rural informal areas.

Thirdly, as was the case with the 2002 and 2005 surveys, the study used a Master Sample that allows for repeated surveys to track changes in population behaviour, exposure to information for HIV prevention, and HIV status.

Fourthly, this is the second national population-based survey of HIV/AIDS to include HIV incidence measures. This clearly adds to the critical scientific evidence required by the government and NGOs as well as donors to determine the levels of new HIV infections. This information will be crucial to assessing the effectiveness of the national response in reducing new HIV infections.

Finally, this is the third national South African study on the general population that we have conducted and we have also conducted other large-scale surveys since the 2002 survey among South African health workers (e.g., Shisana et al. 2004) and also among educators (e.g., Shisana et al. 2005).

Apart from the experience gained and confidence in the methodology applied, the fact that this is the third follow-up study is also important in its own right. In particular, having data collected in 2008 allows us to investigate the trends in changes in both HIV prevalence rates and behavioural risks as well as the impact of communication compared to the 2002 and 2005 survey data as a baseline. This is indeed a major strength of the study.

4.7.2 Limitations

As was the case with the 2002 and 2005 surveys, there are two types of limitations, those inherent in any cross-sectional socio-behavioural studies and those specific to this study, as discussed below.

In all cross-sectional studies, exposures and outcomes are measured at the same time and hence there can be difficulties in determining causality. The difficulties in determining the temporal sequence of HIV infection and potential risk factors are exacerbated when using prevalent rather than incident cases of HIV because some of the infections may have occurred up to ten years previously whereas questionnaires enquire about current risk behaviours. Individuals may well have changed their behaviour since becoming infected for a variety of reasons that may or may not be due to their HIV status. This limitation has, however, been taken into account when interpreting the results.

Another limitation, common to nearly all surveys about knowledge, attitudes, beliefs, and behaviours related to HIV/AIDS, is that they are based on respondents' self-declarations. Self-declarations may be affected by recall biases and, when it comes to behaviours in the sphere of individual private lives (such as sexual or addictive behaviours), respondents' answers may also be affected by a social desirability bias, that is, respondents tend to provide the answers they think are socially acceptable. It must, however, be pointed out that questions used for self-declaration of intimate or socially stigmatised behaviours were questions that have been validated in other scientific surveys dealing with similar issues.

A further limitation of the study, which is also common to most surveys in general populations using a household survey type of design, relates to exclusion of people not living in homes. The study sample includes people who live in homes and hostels. The study also excluded homeless people, those who live on the streets or in shelters or hotels. The design of the sample purposely excluded people confined to institutions, such as soldiers, prisoners, and students living in boarding schools. Some of these groups may have higher HIV prevalence than the general community. For this reason, the study results are generalisable to people who regularly live in homes.

Finally, the design of this household survey has been conceived in order to allow for detailed analysis of the major sub-populations in South Africa, including oversampling when necessary to guarantee meaningful comparisons (e.g. between the different races in the South African population). However, this design and the goal of ensuring national representativeness implies that some groups that may be of particular interest for understanding the epidemic could not be captured in sufficient numbers in this survey (individuals with homosexual and bisexual practices, injecting drug users, sex workers, etc.). It must, however, be acknowledged that similar limitations are encountered by all surveys about sexual and HIV-related risk behaviours based on general population samples in other countries.

Other limitations specific to this study are presented below.

Although researchers and fieldworkers made every attempt to encourage participation, as was the case with the 2002 and 2005 Survey, the low HIV test participation rates of specific groups may have biased HIV prevalence estimates in some sub-populations. Although the overall participation rates were good in the study, the participation among Indians and whites remained a major issue. The overall response rate for HIV testing in this study was 64.3%. However, when data on response rates was disagregated by race,

it was found that coloureds (75.3%) and Africans (68.7%) were more likely to agree to be tested and that Indians (47.9%) and whites (52.8%) were less likely to agree to be tested in the study. This is despite a massive community and communication mobilisation campaign to reach these two groups (see section 2.8).

The unwillingness of Indian and white groups to participate in surveys has been observed in previous studies in South Africa, including both the 2002 and the 2005 HIV surveys (Shisana & Simbayi 2002; Shisana et al. 2005). When it comes to participation in HIV surveys, it was found that the perception that HIV was not a problem in their communities played a major role in refusal to participate in both groups (HSRC 2008). The groups believed that they are not vulnerable to HIV and that HIV is not a problem in their community and thus they were not interested in taking part in such surveys. Another issue of concern seems to be that of security due to high crime levels which are reported in some parts of the country: many Indians and whites did not open their doors to our fieldworkers during fieldwork.

Respondents from both groups were also more likely to look at incentives or benefits to themselves as motivation for HIV testing. The fact that the benefit for participation in such surveys does not accrue directly to the individual was seen as a turn-off for both groups. Testing was considered to be beneficial if it was attached to things such as testing for an insurance policy, or an application for a visa or a job. Fear of being stigmatised for participating in HIV surveys was more prominent among the Indian group. Access to private practitioners was also seen as a reason for refusing HIV testing in surveys among Indians as many of them already knew their status (HSRC 2008). More needs to be done to increase interest and participation in these groups in future studies as data gathered from them on HIV testing cannot be accepted with confidence. The lack of participation of this group may also increase the perception that the two groups are not affected by HIV/AIDS and therefore not needing interventions to be directed to them. This sense of security, while realistic at present, might indeed be dangerous as the communities concerned could also soon find themselves having a major burden of HIV/AIDS in the near future, as was the case back in the early 1990s for the African majority.

Another challenge faced when accessing the homes of these two communities included security concerns, with respondents not being reached at times due to high walls, security complexes not allowing access to fieldworkers, and respondents' fear of crime.

Finally, it would have been useful to compare the results of this study to the 2008 antenatal clinic-based survey of pregnant women, as was done in the two previous surveys; however, the 2008 antenatal survey report was not available when this report was completed.

CHAPTER 5

Conclusions and recommendations

The focus of this report is on outcomes over the period of the three surveys with specific reference to changes in HIV prevalence, incidence, behaviour, knowledge of HIV prevention, and the reach of communication programmes.

5.1 Successes

Reduction in HIV prevalence among children

There has been a steady decline in HIV prevalence among children over the three surveys, with a significant reduction in national HIV prevalence by 3.1 percentage points among children aged 2–14 between 2002 and 2008. This reduction in HIV prevalence occurred in all provinces except Mpumalanga – which remained at a high level of 3.8%. The change in HIV prevalence in children is accompanied by a reduction in HIV incidence and is likely to be attributable to the successful implementation of several HIV prevention interventions related to addressing HIV in early childhood, particularly programmes to prevent mother-to-child transmission in the Western Cape, where the largest decline of 6 percentage points occurred. The dynamics of HIV among children will be further elaborated upon in a children's report that will examine factors contributing to this decrease in HIV prevalence.

Reduction of HIV among teenagers

The reduction in HIV prevalence in the teenage population is encouraging, and this contributed to the overall decline in HIV prevalence among youth. All provinces, except KwaZulu-Natal and Mpumalanga, were found to have a lower HIV prevalence among youth in 2008 when compared to 2002, although the increases in both these provinces were not significant. The decline in HIV prevalence in the teenage population of 15–19 years in 2008 is corroborated by decreases in mathematically derived HIV incidence in this age group.

Increased awareness of HIV serostatus

There has been an increase in the percentage of the population reporting awareness of their HIV serostatus. The percentage of people aged 15–49 years who are aware of their HIV status doubled between 2005 and 2008. This was found to be true for both males and females, although the rates among females were significantly higher than those of males. Furthermore, there was an increase in the population aware of their HIV status in all provinces. This is attributable to multisectoral communication and other programmes throughout the country that have focused on promoting knowledge of HIV status in combination with an upscaling of the availability of VCT services over the period.

Condom use among youth

There is a larger proportion of the population who reported using a condom at last sex, and this has reached particularly high levels among youth aged 15–24 years. Reported condom use at last sex increased dramatically from 57% in 2002 to 87% in 2008 among young males and correspondingly from 46% to 73% among young females. This increase in reported condom use shows that there is a very strong orientation towards condom use and an understanding of the value of condoms as an important prevention measure. The finding that females report condom use at last sex at similar levels to males leads to the conclusion that gendered power relations are shifting when it comes to the use of

condoms. At these levels, condom use is likely to contribute to incidence reduction in the younger population. Over the three surveys there has also been a marked increase in condom use among people aged 25–49 and also among people aged 50+. Among males aged 25–49, reported condom use at last sex has nearly doubled in the two time periods, while among females of the same age it has tripled.

HIV prevalence decreased among adults in four provinces

HIV prevalence among adults aged 15–49 has declined in four provinces, although there is a variation in the magnitude of change. The Western Cape, Gauteng, Northern Cape, and Free State have had decreases in HIV prevalence between 2002 and 2008, with the largest decrease of 7.9 percentage points being in the Western Cape. In all these provinces, except Gauteng, HIV-prevention knowledge has increased.

Increase in the population reached by national communication programmes

In examining the reach of ongoing national programmes between 2005 and 2008, there has been an increase in the population of youth and adults reached by at least one HIV communication programme. This trend is in an upward direction, and is particularly for youth, where 90% are already reached by at least one programme. Communication programme reach for South Africans aged 50+ has increased, though there is still room for improvement.

5.2 Challenges

Despite important successes, there are still major challenges that need coordinated, concerted and intensive effort over the short term to complement and sustain achievements to date.

HIV prevalence has stabilised at high levels

Since 2002 the HIV prevalence has stabilised at high levels with the result that South Africa continues to have the largest number of people living with HIV globally. This large proportion of people living with HIV, particularly in the young adult and adult populations, contributes to a situation where HIV infection risks are high and changes in sexual behaviour required to counter new infections have to occur throughout the country.

Persistent high HIV prevalence among females aged 25–29 years

Females aged 25–29 continue to have a very high level of HIV prevalence. In this group, a prevalence of 33% has been sustained over the period of the three surveys without any change.

Increase in intergenerational sex among female teenagers

Intergenerational sex has increased substantively among female teenagers aged 15–19 years. This is a risk factor for HIV infection, as it facilitates exposure to a higher prevalence age group – that is, older males.

Multiple sexual partnerships have increased markedly in the Free State

High partner turnover was measured in the surveys by asking about the number of sexual partners in the past year. In the context of overall high HIV prevalence, this is a risk

factor for HIV infection. The rate of increase of multiple sexual partnerships in the Free State exceeds that of all other provinces.

Reported condom use at last sex is low in the Western Cape

Condoms provide a barrier to HIV transmission and condom use has risen markedly throughout the country. However, it is of concern that condom use at last sex was lowest in the Western Cape in comparison to all other provinces.

Rising HIV prevalence among adults in some provinces

HIV prevalence levels among adults aged 15–49 years has increased in KwaZulu-Natal by 10.1 percentage points and Eastern Cape by 5.0 percentage points, between 2002 and 2008, both of which have large populations. Smaller increases were noted in North West, Mpumalanga, and Limpopo.

HIV prevention knowledge has declined in some provinces

Correctly identifying ways to prevent sexual transmission of HIV has declined among the population 15–49 years at national level, from 64.4% in 2005 to 44.8% in 2008. The percentage of the population of people aged 15–49 years who correctly identified ways of preventing HIV infection has declined in Eastern Cape, KwaZulu-Natal, North West, Gauteng, Mpumalanga, and Limpopo.

The percentage of most-at-risk populations who both correctly identify ways of preventing the sexual transmission of HIV and who reject major misconceptions about HIV transmission has also declined over time. This is an indication that insufficient attention has been given to promoting basic knowledge about the disease.

The Khomanani campaign has a low reach compared to the other programmes

Although the main HIV prevention campaign of the government, Khomanani, has improved its reach, it has the lowest reach of all the national programmes. This is of concern, given that the goal of the national programme should be to reach people of all age groups in all sectors of society.

5.3 Recommendations

Need for targeted intervention programmes in some provinces

Large differences were seen in the patterns of HIV prevalence in the various provinces, as well as in risk behaviours and the reach of HIV communication programmes. This requires a diversification of approach, including variations of focus by national communication programmes and other interventions. There is clearly a need for more targeted interventions in provinces such as KwaZulu-Natal and the Eastern Cape, where HIV prevalence appears to be continuing to increase, as well as in Mpumalanga, where HIV prevalence continues to be very high. It is recommended that interventions, including HIV communication programmes, that take into account epidemiological and socio-cultural factors, be developed and implemented at a provincial level.

Need for programmes to help people to have children without risking HIV

The decrease in HIV prevalence among children and youth is important in South Africa's efforts to control this epidemic. What is of concern is that while many have escaped HIV during these early ages, they are likely to become infected when they reach the ages of

25–29, where the chances of becoming HIV-positive are one in three among females. For males the chances increase to one in four when they reach the ages of 30–34. During these child-bearing ages, young men and women have no way to have children without risking HIV. It is recommended that guidelines be developed and programmes be implemented that help HIV-negative young men and women who choose to have children to find other, safe ways of conceiving without risking HIV infection.

Address high sexual partner turnover and intergenerational sex by focusing on changing norms at community level

There is inadequate awareness of the risks of high partner turnover, and there have been increases in sexual partner turnover and intergenerational sex. While communication programmes need to intensify the focus in these areas, a shift in the normative acceptance of such practices at community level is also required. Anti-smoking campaigns provide a point of reference for illustrating how normative shifts combined with sanctions at community level can bring about change in relation to individual and social health risks. Family and community-based interventions that have been shown to work, such as the Community HIV/AIDS Mobilisation Project (CHAMP) Family Programme that was culturally adapted and tested for use in South Africa, should be recognised as resources and expanded.[9]

Implement provider-initiated routine HIV testing at all health care facilities

Although there have been encouraging improvements that have taken place in the level of awareness of HIV status overall from 2005 to 2008, there is still a need to further improve the uptake of HIV testing. One strategy that is available to dramatically improve the overall level of awareness of HIV status is provider-initiated routine HIV testing (Jaffe 2009). This has, for example, been successfully implemented at public healthcare facilities in Botswana (UNAIDS 2008). This will help reduce the potential fears of utilising VCT services and will contribute to ensuring that people with HIV are made aware of their status and situated on a pathway that addresses prevention, care, and treatment. Mobile VCT services should also be implemented for MARPs. It is also important that HIV-negative individuals are provided with risk-reduction counselling to prevent them from seroconverting soon afterwards.

Increase communication programme reach

The finding that 10% of the adult population has not been reached by any of the programmes is of concern, as is the additional finding that around four out of ten South Africans are not aware of the Khomanani campaign. At this point in the epidemic it is expected that at least one or more national programmes should reach the entire population. In addition, some provinces could also launch their own communication programmes which offer more focused and culturally nuanced communication messaging.

Although some national programmes have particular age groups as their focus, it was found that the child-focused Soul-Buddyz and youth-focused loveLife programmes reached into all age groups, but at relatively low levels. Reach into this wider audience should be considered in relation to programming.

9 For more information on this, contact the Child, Youth, Family & Social Development research programme at the HSRC.

All communication programmes have poor reach into older age groups and people over 50 remain marginalised. High prevalence among older people illustrates the importance of expanding prevention communication to the older population.

Need for defining country-specific indicators including for most-at-risk populations

The inclusion of additional indicators in this study for MARPs expands the standard definitions which have usually been applied to relatively small populations such as MSM, intravenous drug users or sex workers. The expanded definitions used in this report were based on defining most-at-risk in relation to having a prevalence of more than ten percent, or having an unusually high relative HIV prevalence. The definition thus included: African females aged 20–34; African males aged 25–49; males older than 50, persons who drink alcohol excessively, and people with disabilities. It is important to highlight that the NSP does also allow for this orientation, and we recommend this approach to reporting MARPs for other countries in the southern Africa region with hyper-endemic epidemics.

Additional indicators for the NSP and UNGASS

Based on this report, we recommend the following indicators to supplement those presented in Appendix 2 for monitoring the implementation of the NSP:

Indicator 1: National HIV prevalence in males and females aged 15–49 years
Indicator 2: National HIV prevalence in males and females aged 50+ years
Indicator 3: National incidence in males and females aged 15–19 years
Indicator 4: National HIV incidence in males and females aged 15–49 years
Indicator 5: National HIV incidence in males and females aged 50+ years
Indicator 6: National HIV incidence derived from single year age prevalence in 15–20-year-olds
Indicator 7: National HIV incidence among most-at-risk populations (African females aged 20–34, African males aged 25–49, males aged 50+, high-risk drinkers, recreational drug users, and people with disabilities)
Indicator 8: Condom use at last sex, by age group and sex (all adult ages, 15–24, 25–49, 50 and older)
Indicator 9: Percentage of males and females who report more than one sexual partner in the past 12 months by age group (15–24, 25–49, 50+)
Indicator 10: Percentage of men and women who report more than one sexual partner in the last month by age group (15–24, 25–49, 50+)
Indicator 11: Percentage of MARPs who report more than one sexual partner in the past 12 months
Indicator 12: Percentage of MARPs who report more than one sexual partner in the last month
Indicator 13: Condom use at last sex, by age group and sex (15–24, 25–49, 50 and older, 15–49)
Indicator 14: Percentage of condom use at last sex by MARPs
Indicator 15: Percentage of condom use at last sex by MARPs who had more than one sexual partner in the last 12 months
Indicator 16: Percentage of condom use at last sex by people who had more than one sexual partner in the past 12 months, by sex and age group (All adult ages, 15–24, 25–49, 50 and older)
Indicator 17: Percentage of people who know their HIV status in the last 12 months by sex and age group (15–24, 25–49, 50 and older)
Indicator 18: Percentage of MARPs who know their HIV status in the last 12 months

Indicator 19: Percentage of males and females by age group who are reached with HIV/AIDS communication programmes (All adult ages, 15–24, 25–49, 50 and older, 15–49)
Indicator 20: Percentage of MARPs who are reached with HIV/AIDS communication programmes
Indicator 21: Percentage of MARPs who correctly identify ways of preventing sexual transmission of HIV and who reject major misconceptions about HIV transmission
Indicator 22: Percentage of MARPs who correctly identify ways of preventing sexual transmission of HIV (All adult ages, 15–24, 25–49, 50 and older, 15–49)
Indicator 23: Percentage of MARPs who reject major misconceptions about HIV transmission
Indicator 24: Percentage of males and females by age group who correctly identify ways of preventing sexual transmission of HIV (All adult ages, 15–24, 25–49, 50 and older, 15–49)
Indicator 25: Percentage of males and females by age group who reject major misconceptions about HIV transmission (All adult ages, 15–24, 25–49, 50 and older, 15–49)

In the case of UNGASS indicators, we recommend the use of indicators for MARPs as defined in this report. We believe that they are more useful in hyper-endemic epidemic countries in the southern African region for monitoring and evaluation of HIV programmes, than the traditionally identified MARPs, namely MSM, injecting drug users, and sex workers.

Appendix 1: HIV prevalence by sex, age, race and province, South Africa 2008

Variable	n	HIV+ (%)	95% CI
Sex			
Male	5 938	7.9	6.8–9.2
Female	8 284	13.6	12.5–14.8
Total	14 222	10.9	10.0–11.9
Age group			
2–14	3 414	2.5	1.9–3.5
15–24	3 617	8.7	7.2–10.4
25+	7 191	16.8	15.3–18.4
Population group			
African	8 702	13.6	12.6–14.8
White	1 327	0.3	0.1–0.9
Coloured	3 067	1.7	1.3–2.4
Indian	1 102	0.3	0.1–1.2
Province			
Western Cape	2 098	3.8	2.7–5.3
Eastern Cape	1 984	9.0	7.2–11.2
Northern Cape	1 227	5.9	4.5–7.8
Free State	960	12.6	10.5–15.1
KwaZulu-Natal	2 464	15.8	13.4–18.6
North West	1 156	11.3	9.1–14.0
Gauteng	2 093	10.3	8.3–12.7
Mpumalanga	988	15.4	11.9–19.7
Limpopo	1 252	8.8	6.5–11.9

Appendix 2: Primary indicators in the NSP for which the HSRC and partner organisations are responsible

Indicator	Data sources	Frequency of reporting
Percentage of males and females aged 15–49 who had more than one sexual partner in the past 12 months reporting the use of a condom during their last sexual intercourse	Population-based survey	Every 4–5 years
Percentage of young males and females aged 15–24 who have had sexual intercourse before age 15 (age of sexual debut)	Population-based survey	Every 4–5 years
Percentage of males and females aged 15–49 who have had more than one sexual partner in the past 12 months	Population-based survey	Every 4–5 years
Median age of partner among pregnant females aged 15–19	Population-based survey	Every 4–5 years
Percentage of MARPs reached with HIV prevention programmes	Behavioural surveys	Every 2 years
Percentage of MARPs who both correctly identify ways of preventing the sexual transmission of HIV and who reject major misconceptions about HIV transmission	Behavioural surveys	Every 2 years
Percentage of males and females aged 15–49 who received an HIV test in the last 12 months and who know their results	Population-based survey	Every 4–5 years
Percentage of female and male sex workers reporting the use of a condom with their most recent client	Behavioural surveys	Every 2 years
Current school attendance among orphans and among non-orphans aged 10–14	Population-based survey	Not specified
Percentage of adults (by sex) who have had an HIV test*	Population-based survey	Not specified
Proportion of adults tested for HIV in the last 12 months*	Population-based survey	Not specified

Source: DOH (2007:110–114)
*Note: * Additional indicators added by HSRC for tracking; for a full list of indicators and other responsible agencies, see DOH (2007:110–114)*

Appendix 3: Performance against UNGASS indicators

The United Nations General Assembly Special Session on HIV/AIDS (UNGASS) has provided national indicators that allow for the monitoring of progress in the implementation of HIV/AIDS programmes. There are about 25 indicators divided into five categories as follows:
1) Expenditure;
2) Policy development and implementation status;
3) National programmes;
4) Knowledge and behaviour, and
5) Impact.

The 2008 survey as a whole collected data that can be used to track indicators 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 20, 21, 22, and 23. The Table below provides a detailed explanation of each indicator, the shaded rows representing indicators for which data is presented in this report that is Report 1 of the series. Below the table, the methods of measurement used for calculations in the 2008 survey are reported.

Indicators	Data collection frequency	Method of collection
National programmes[11]		
7. Percentage of males and females aged 15–49 who received an HIV test in the last 12 months and who know the results	Every 4–5 years	Population-based survey
8. Percentage of MARPs that have received an HIV test in the last 12 months and who know the results	Every 2 years	Behavioural surveys
9. Percentage of MARPs reached with HIV prevention programmes	Every 2 years	Behavioural surveys
10. Percentage of orphans and vulnerable children whose households received free basic external support in caring for the child	Every 4–5 years	Population-based survey
Knowledge and behaviour		
12. Current school attendance among orphans and among non-orphans aged 10–14*	Every 4–5 years	Population-based survey
13. Percentage of young males and females aged 15–24 who both correctly identify ways of preventing the sexual transmission of HIV and who reject major misconceptions about HIV transmission*	Every 4–5 years	Population-based survey

11 National programmes include (blood safety, ART coverage, PMTCT programmes, co-management of TB and HIV treatment, HIV testing, prevention programmes, services for orphans and vulnerable children, and education).

Indicators	Data collection frequency	Method of collection
Knowledge and behaviour		
14. Percentage of most-at-risk populations who both correctly identify ways of preventing the sexual transmission of HIV and who reject major misconceptions about HIV transmission	Every 2 years	Behavioural surveys
15. Percentage of young males and females who have had sexual intercourse before the age of 15	Every 4–5 years	Population-based survey
16. Percentage of adults aged 15–49 who have had sexual intercourse with more than one partner in the last 12 months	Every 4–5 years	Population-based survey
17. Percentage of adults aged 15–49 who had more than one sexual partner in the past 12 months who report the use of a condom during their last intercourse*	Every 4–5 years	Population-based survey
20. Percentage of injecting drug users who reported using sterile injecting equipment the last time they injected	Every 2 years	Special survey
21. Percentage of injecting drug users who report the use of a condom at last sexual intercourse	Every 2 years	Special survey
Impact		
22. Percentage of young males and females aged 15–24 who are HIV infected*	Annual	HIV sentinel surveillance and population-based survey
23. Percentage of MARPs who are HIV infected	Annual	HIV sentinel surveillance

Note: Shaded sections highlight indicators where data can be presented
** = Millennium Development Goals indicator*

Weighted estimates for indicators and methods of measurement used in the 2008 survey

Indicator 7: Percentage of males and females aged 15–49 who received an HIV test in the last 12 months and who know their results

Method of measurement:
- Have you ever had an HIV test?
- How long ago did you have your most recent HIV test?
- Have you been told/informed of the result of your most recent test?

Numerator: number of respondents aged 15–49 who have been tested for HIV during the last 12 months and who know their status

Denominator: all respondents aged 15–49

Result: percentage of males and females aged 15–49 who received an HIV test in the last 12 months and who know their results, South Africa 2008

Total	Females	Males	15–19 yrs	20–24 yrs	25–49 yrs
24.7	28.7	19.8	11.4	24.6	29.0

Indicator 12: Current school attendance among orphans and among non-orphans aged 10–14

Method of measurement: For selected respondents aged 10–14 living in the household the following questions were answered:
- Is your mother alive?
- Is your father alive?
- Do you currently attend school?

Numerator: Number of respondents aged 10–14 who have lost both parents or their father or mother and who attend school.

Denominator: All respondents aged 10–14 who have lost both parents or their father or mother.

Result 1: current school attendance among orphans, by type of orphan and among non-orphans aged 10–14

	All 10–14 yrs	Males	Females
Maternal	99.4	100	98.8
Paternal	97.5	97.1	97.9
Double orphan	100	100	100

Result 2: Current school attendance among orphans and among non-orphans aged 10–14

	All 10–14 yrs	Males	Females
Orphans	97.9	97.9	97.8
Non-orphans	99.3	99.1	99.5

Indicator 13: Percentage of young males and females aged 15–24 who both correctly identify ways of preventing the sexual transmission of HIV and who reject major misconceptions about HIV transmission

HSRC's 2008 national household survey did not ask verbatim the same questions as the UNGASS indicator. However, the survey has addressed the areas related to correct knowledge and/or misconceptions about HIV transmission.

Method of measurement:
- To prevent HIV infection, a condom must be used for every round of sex.
- One can reduce the risk of HIV by having fewer sexual partners.
- There is a cure for AIDS.
- AIDS is caused by witchcraft.
- HIV causes AIDS.
- AIDS is cured by having sex with a virgin.

Numerator: Number of respondents aged 15–24 who gave the correct answer to all six questions.

Denominator: Number of respondents aged 15–24 who gave answers, to all five questions.

Result: percentage of young males and females aged 15–24 who both correctly identify ways of preventing the sexual transmission of HIV and who reject major misconceptions about HIV transmission.

All 15–24 yrs	Females	Males	15–19 yrs	20–25 yrs
28.7	27.0	30.4	28.1	29.5

Indicator 15: Percentage of females and males aged 15–24 who have had sexual intercourse before the age of 15

Method of measurement:
- Sexual behaviour: virgins, abstainers or sexually activity in the last 12 months.
- How old were you when you had sex for the first time?

Numerator: Number of respondents aged 15–24 who report the age which they first have sexual intercourse as under 15 years.

Denominator: Number of all respondents aged 15–24 years who reported ever having sex.

Result: percentage of females and males aged 15–24 who have had sexual intercourse before the age of 15, South Africa 2008.

All 15–24 yrs	Females	Males
8.5	5.9	11.3

Indicator 16: Percentage females and males aged 15–49 who have had sexual intercourse with more than one partner in the last 12 months

Method of measurement:
- How many sexual partners did you have in the past 12 months?

Numerator: Number of respondents (aged 15–49) who report having had more than one sexual partner in the past 12 months.

Denominator: Number of all respondents aged 15–49 years who reported sexual activity in the past 12 months.

Result: percentage of females and males aged 15–49 who had sexual intercourse with more than one partner in the last 12 months, South Africa 2008.

All 15–49 yrs	Females	Males	15–19 yrs	20–24 yrs	25–49 yrs
10.6	3.7	19.3	20.6	16.7	8.0

Indicator 17: Percentage of females and males aged 15–49 who have had more than one partner in the last 12 months, reporting the use of a condom during their last sexual intercourse

Method of measurement:
- How many sexual partners did you have for the past 12 months?
- Did you use a condom the last time you had sex?

Numerator: Number of respondents (aged 15–49) who report having had more than one sexual partner in the past 12 months who also report that a condom was used the last time they had sex.

Denominator: Number of respondents (aged 15–49) who report having had more than one sexual partner in the last 12 months

Result: percentage females and males aged 15–49 who had more than one partner in the last 12 months, reporting the use of a condom during their last sexual intercourse, South Africa 2008

All 15–49 yrs	Females	Males	15–19 yrs	20–24 yrs	25–49 yrs
75.2	67.5	77.1	88.1	86.7	65.1

Indicator 22: Percentage of young people who are HIV infected

Method of measurement:
The 2008 HSRC household survey did not collect information on whether females were currently attending antenatal clinic. The survey does, however, report HIV prevalence for females and males 15–24 years

Numerator: All respondents 15–24 years who tested HIV positive.

Denominator: All respondents 15–24 years were tested for HIV.

Result: HIV prevalence among youth aged 15–24 years, South Africa 2008.

All 15–24 yrs	Females	Males	15–19 yrs	20–24 yrs
8.7	13.9	3.6	4.4	13.6

Appendix 4: Performance against MDG indicators

The following section reports the weighted estimates for the indicators and methods of measurement used for the calculations of the 2008 national HIV, behaviour and health survey.

Goal 1: Eradicate extreme poverty and hunger

Target 1a: Reduce by half the proportion of people living on less than 1 US$ per day									
(1.1) Proportion of population below R500.00 per month					(1.6) Proportion of employed people living below R500.00 per month				
Age group	Sex	n	%	95% CI	Age group	Sex	n	%	95% CI
15+	Female	1 374	43.3	40.0–46.7	15+	Female	2 242	21.8	19.0–24.8
15+	Male	2 897	30.8	27.9–33.9	15+	Male	2 308	17.7	15.2–20.5
	Total	6 322	37.0	34.5–39.6		Total	4 550	19.5	17.4–21.8

Goal 3: Promote gender equality and empower women

Target 3a: Eliminate gender disparity in primary and secondary education preferably by 2005, and at all levels by 2015									
(3.1) Ratios of girls to boys in primary school					(3.1) Ratios of girls to boys in secondary school				
Age group	Sex	n	%	95% CI	Age group	Sex	n	%	95% CI
6–13 yrs	Female	1 404	99.2	98.2–99.7	13–19 yrs	Female	1 092	77.9	74.2–81.2
6–13 yrs	Male	1 367	99.6	98.7–99.9	13–19 yrs	Male	1 101	68.3	63.8–72.5
	Ratio		0.99			Ratio		1.14	

Goal 6: Combat HIV/AIDS, malaria and other diseases

Target 6a: Halt and begin to reverse the spread of HIV/AIDS				
(6.1) HIV prevalence among youth aged 15–24 years, South Africa 2008				
All 15–24 yrs	Females	Males	15–19 yrs	20–24 yrs
8.7	13.9	3.6	4.4	13.6

Target 6a: Condom use at last high-risk sex

(6.2) Percentage females and males aged 15–49 who had more than one partner in the last 12 months reporting the use of a condom during their last sexual intercourse, South Africa 2008

All 15–49 yrs	Females	Males	15–19 yrs	20–24 yrs	25–49 yrs
75.2	67.5	77.1	88.1	86.7	65.1

Target 6a: Proportion of population aged 15–24 years with comprehensive correct knowledge of HIV/AIDS

(6.3) Percentage of young females and males aged 15–24 who both correctly identify ways of preventing the sexual transmission of HIV and who reject major misconceptions about HIV transmission

All 15–24 yrs	Females	Males	15–19 yrs	20–25 yrs	All 15–24 yrs
28.7	27.0	30.4	28.1	29.5	28.7

Target 6a: Ratio of school attendance of orphans to school attendance of non-orphans aged 10–14 years

(6.4) Current school attendance among orphans and among non-orphans aged 10–14

	All 10–14 years	Males	Females
Orphans	97.9	97.9	97.8
Non-orphans	99.3	99.1	99.5
Ratio	0.98		

Appendix 5: Quality control of HIV testing

The role of the Medical Research Council's HIV Prevention Research Unit (HPRU) in the National Survey was to serve as an external monitoring body that was responsible for quality control of the tests preformed on the dry blood spots (DBS) collected by the field-workers for the detection of the HIV.

The following validation and proficiency assessment was conducted:

- A laboratory assessment was done by the MRC HPRU of Global Virology and Clinical Laboratory on the 19 of June 2008.
- The assessment revealed that all analyzers and manual methods of testing were validated.
- The laboratory was enrolled on the CDC proficiency programme for DBS analysis, scoring 100% on this programme.
- The laboratory had all required documentation, for example, standard operating procedures for the tests being preformed.

It was confirmed that the HIV-testing algorithm as set out in Figure 2.4 of this report was followed.

With regard to the method of laboratory quality control by MRC HPRU:

- A 100% quality control was done on all positive samples collected, prior to shipment to NICD for BED incidence testing. A 100% quality control was also requested on the last two batches of samples collected namely batch 16 and 17 for both negative and positive samples.
- DBS collected by fieldworkers were examined. If the samples collected were adequate for testing, a comment was made on collection technique.
- Packing and checking of study kits and additional barcodes was conducted. Fieldworkers were required to envelop the Guthrie cards with wax paper to prevent smudges and possible contamination.
- Verification of specimen tracking sheets, global identification numbers and tracking numbers as confirmation on the DBS cards and tracking sheets was conducted.
- Missing information such as fieldworker numbers, EA numbers and supervisor numbers were reported.
- There was quality control of specimen tracking sheets against the results database to ensure correct transcription of information.
- There was verification of the HIV algorithm on tests performed. All raw data was quality checked to verify that two negative and two positive controls had passed. Two ELISAs were used to confirm a client's status: the Vironostika and Centaur Advia. If results were discordant then a third ELISA was preformed on the Elecys. This indicated that the correct HIV-testing algorithm was followed.
- There was verification and quality control of raw data for all three ELISAs (EIA) performed against the results data base. All EIA results were confirmed on the results database as positive or negative, checked against the global number and tracking number and checked that there were no result entry errors on the database. Optical density values were used to confirm the true positive results for all three ELISAs and verify that control values were in range.

- EIA raw data quality control included verification of optical density results and confirmation of all true positive results. Checks were done to ensure the assay control pass for that run, the lot number used, the accountability of staff that performed the tests and the authorisation of results.

In conclusion, trends were noted with poor sample collection by certain fieldworkers. These individuals were subsequently re-trained and the quality improved. The standard of testing and the internal quality control data was excellent and all findings were always resolved by laboratory staff. All laboratory data was well maintained and available for review.

Appendix 6: List of field staff

Supervisors
Parvathy Anthony
Harmony da Gama
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Susannah Forbes
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Sophia James
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Thembeka Lokwe
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Julia Mojalelo
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Jacob Mongoato
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Zamandlovu Ndlovu
Ntombizanele Nobatana
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Friddah Soke
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Michael Essau
Barbara Freer
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Jansen van Rensburg
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Wesley Kew
Tlahabanelo Kgowe
Tebogo Lefete
Ursula Leukes
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Arnord Mapopo
Fezile Mazwai
Thembinkosi Mbeko
Tertuis Minnie
Phumla Mngese
Collen Mnisi
Faizal Mohamed
Khaulelo Mokgosi
Sizakele Myeni
Bongani Ngwenya
Wada Nikodem
Sibongile Nkwanteni
Fatima Peters
Sipho Radebe
Moferefere Sekhoto
Thembalethu Siko
Owen Siko
Inge Smith
Caren Soper
Patricia Soper
Kolisang Thabane
Tshegofatso Tshukudu
Lynne Teresa van Rooy
Renzo van Wyk
Pieter Venter

Data collectors
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Aeesha Amerdien
Nora Assegai
Alice Baloyi
Shirley Basson
Luddy Beelders
Katrina Beukes
Matshidiso Bhunu
Rubie Botha
Sally Brooks
Tabata Bukeka
Lou-Anne Chinsamy
Emily Chounyane
Regina Classen
Christina Coetzee
Carol Colenut
May Collop
Leigh-Anne Coutinho
Charlotta de Bruin
Janet Diedericks
Pinkana Ditshego
Daphney Dladla
Paula Dunbleby
Nontsikelelo Duru
Nosisa Dyani
Herculine Erasmus
Hendrina Foley
Lydia Gittens
Natasha Govenden
Viveca Govender
Manonjatham Govender
Ernest Grobbelaar
Tholakele Gumede
Debra Harmuth
Prudence Herandine
Sarah Hermanus
Sandra Honiball
Ruth Hopa
Jean Isaacs
Jane Jali
Ann Janse van Vuuren
Sanet Jansen van Rensburg
Rosie Jantjies
Blossom Johnson
Rosina Joubert
Sannah Joyi
Mpho Khiba
Irene Khoapa
Maxwell Lamour
Constance Lefete
Nkosazana Lekensie
Grace Lekubu
Matilda Letsapa
Sheilah Louw
Nokuthula Lutuka
Gertrude Mabizela
Dumisile Magagula

Busisiwe Mahlalela
Anna Mahlangu
Caroline Mahlangu
Mamosetle Maimane
Kathleen Maite
Viveca Major
Basani Makhubela
Funiwe Malaza
Thenjiwe Malgas
Khensani Maluleka
Virginia Mango
Miriam Mangoale
Nalan Manikhum
Disebo Mapisa
Thokozile Masemola
Ntombi Mashele
Josephine Masipa
Daphney Matome
Princess Matwa
Nellie Mavangwa
Nomhle Mbambo
Janet Mbekeni
Nontsikelelo Mbolekwa
Nontobeko Mchunu
Mamothithelo Mckay
Vuyiswa McKonie
Julia Mehlomakhulu
Virginia Mfuphi
Rita Mhlongo
Andrianna Miles
Oscarina Mkhabela
Oscarina Mkhabela
Sibongile Mnisi
Riyana Mohamed
Farhana Mohamed
Nthabiseng Mokhele
Lindeni Mokoena
Elizabeth Mokubung
Nompumelelo Molelo
Sabrina Moodley
Vinola Moodley
Selvarani Moodley
Palesa Morabe
Jenna Morgan
Thandiwe Moshesh
Welhemina Moshimane
Matiti Mosoeu
Salome Mosupa
Emily Motaung
Edna Mseleku
Cynthia Mtana
Nester Mtshali
Patricia Muller
Sarah Mullins
Poppy Mushi
Mavis Mvula
Lynette Myburgh
Leelavathi Naidoo
Rajanee Naidoo
Pushpum Naidu
Farieda Nair
Eslina Ngcobo
Pauline Nkebe
Msomi Nomsa
Doris Ntshinga
Funeka Nxokwana
Monica Ohlson
Gaga Parkies
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Renell Pillay
Valencia Prince
Vuyelwa Qwesha
Deshmi Raghoo
Alice Ramagaga
Gontse Rampeng
Hazel Rashe
Dhunam Reddy
Schunmoogum Reddy
Patricia Rheeder
Jade Richards
Jane Rossouw
Alida Schelhase
Glynis Schreuder
Nomsa Sebokolodi
Edith Sechoaro
Irene Seekoei
Bessy Seshabela
Suveena Singh
Petru Smith
Khangekile Soni
Salome Stokes
Ria Sutton
Anna Swart
Goitsemang Thage
Mercy Thipe
Zuanne van der Merwe
Sonja van Niekerk
Magdalene van Rooyen
Julene van Wyk
Sophie van Wyk
Beatrice Victor
Marie Vorster
Gillian Wainwright
Anette Wilkinson
Lizelle Zaayman
Sithembile Zwane

REFERENCES

Ainsworth M & Filmer D (2002) *Poverty, AIDS and children's schooling: A targeting dilemma*. World Bank Policy Research Working Paper 2885

Bamjee S, Grant K, Mushariwa M, Slack C & Strode A (2007) *Building stakeholder skills to manage legal complexities in child and adolescent research: A directory of the legal rights of minor research participants including children & adolescents*. HIV/AIDS Vaccine Ethics Group, SSAVI, MRC, University of KwaZulu-Natal. Accessed 30 April 2009, http://www.saavi.org.za/childresearch.pdf

Baumgartner JL, Geary Waszak C, Tucker H & Wedderburn, M (2009) The influence of early sexual debut and sexual violence on adolescent pregnancy: A matched case-control study in Jamaica. *International Perspectives on Sexual and Reproductive Health* 35(1): 21–28

Bhagwanjee A, Petersen I, Akintola O & George G (2008) Bridging the gap between VCT and HIV/AIDS treatment uptake: Perspectives from a mining sector workplace in South Africa. *African Journal of AIDS Research* 7: 271–279

Bond L, Wheeler DP, Millett GA, LaPollo AB, Carson, LF & Liau A (2009) Black men who have sex with men and the association of down-low identity with HIV risk behaviour. A*merican Journal of Public Health* 99 (Suppl. 1) S92–95

Brown A, Jejeebhoy SJ, Shah I & Yount KM (2001) *Sexual relations among young people in developing countries: Evidence from WHO case studies*. Geneva, Switzerland: World Health Organization

Burrell E, Baral S, Beyrer C, Wood R & Bekker LG (2009) Comparison of sexual risk behaviours and HIV prevalence among men who have sex with men (MSM) in traditionally black and coloured townships in Cape Town, South Africa. Paper presented at the 4th South African AIDS Conference, 31 March – 3 April

Case A & Ardington C (2004) *The impact of parental death on school enrolment and achievement: Longitudinal evidence from South Africa*. Centre for Social Science Research (CSSR) Working Paper 04/97. Accessed 1 April 2009, http://econpapers.repec.org/paper/prirpdevs/168.htm

Cassell MM & Surdo A (2007) Testing the limits of case finding for HIV prevention. *Lancet Infectious Diseases* 7(7): 491–495

Creek TL, Ntumy R, Seipone K, Smith M, Mogodi M, Smith M, Legwaila K, Molokwane I, Tebele G, Mazhani L, Shaffer N & Kilmarx PH (2007) Successful introduction of routine opt-out HIV testing in antenatal care in Botswana. *Journal of Acquired Immune Deficiency Syndrome* 45: 102–107

Denison JA, O'Reilly KR, Schmid GP, Kennedy CE & Sweat MD (2008) HIV voluntary counseling and testing and behavioral risk reduction in developing countries: A meta-analysis, 1990–2005. *AIDS & Behavior* 12(3): 63–73

DOH (Department of Health, South Africa) (2003). *South African demographic and health survey: Preliminary report*. Pretoria: DOH. Accessed 1 April 2009, http://www.doh.gov.za/facts/sadhs2003/main.html

DOH (2007) *HIV & AIDS and STI strategic plan for south Africa 2007–2011*. Pretoria: DOH

DOH (2008) *Annual report 2007/08*. Pretoria: DOH. Accessed 29 April 2009, http://www.doh.gov.za/docs/report07-f.html

Dinkelman T, Lam D & Leibrandt M (2007) Household and community income, economic shocks and risky sexual behaviour of young adults: Evidence from the Cape Area Panel Study 2002 and 2005. *AIDS* 2: S49–S56

Dlamini N (2007) Khomanani back on track. *BuaNews*

Donenberg GR, Brynat FB, Emerson MA, Wilson BA & Pasch BA (2003) Tracing the roots of early sexual debut among adolescents in psychiatric care. *Journal of the American Academy of Child & Adolescent Psychiatry* 42(5): 594–608

Evans D & Miguel E (2007) Orphans and schooling in Africa: A longitudinal analysis. *Demography* 44(1): 35–57

Fisher JC, Bang H & Kapiga SH (2007) The association between HIV infection and alcohol use: A systematic review and meta-analysis of African studies. *Sexually Transmitted Diseases* 34: 856–863

Geary Waszak C, Baumgartner JL, Tucker H, Johnson L, Wedderburn M & Wagman J (2008) *Early sexual debut, sexual violence, and sexual risk-taking among pregnant adolescents and their peers in Jamaica and Uganda*. FHI Working Paper Series, USA

Global Primary Care (2007) *HIV and orphans*: *Support for HIV orphans in Lesotho.* Accessed 25 April 2009, http://www.globalprimarycare.org/our-programs/providing-school-tuition

Goldstein S, Scheepers E, Usdin S, Maker A, Tshabalala A, Shongwe T & Japhet G (2000) *HIV/AIDS and behaviour change: The impact of Soul City at an individual and broader community level of analysis*. 8th Cochrane Colloquium, Cape Town

Goldstein S, Usdin S, Scheepers E, Anderson A & Japhet G (2002) The treatment of AIDS in 'Soul Buddyz': A multimedia campaign for children's health in South Africa. *Soul City Institute for Health and Development Communication*

Goldstein S, Usdin S, Scheepers E & Japhet G (2005) Communicating HIV and AIDS, what works? A report on the impact evaluation of Soul City's fourth series. *Journal of Health Communication* 10: 465–483 [Taylor & Francis, UK]

Gregson S, Machekano R, Donnelly CA, Mbizvo MT, Anderson RM & Katzenstein, DA (1998) Estimating HIV incidence from age-specific prevalence data: Comparison with concurrent cohort estimates in a study of male factory workers, Harare, Zimbabwe. *AIDS* 12(15): 2049–2058

Groce N (2004) *HIV/AIDS and disability: Capturing hidden voices*: *Global survey on HIV/AIDS and disability.* Global Health Division, Yale School of Public Health, Yale University, New Haven

Groce N & Trasi R (2004) Rape of individuals with disability: AIDS and the folk belief of virgin cleansing. *The Lancet* 363*:* 1663–1664

Halperin D & Epstein H (2007) Why is HIV prevalence so severe in Southern Africa? The role of multiple concurrent partnerships and lack of male circumcision: Implications for AIDS prevention. *Southern African Journal of HIV Medicine* 26: 19–25

Harrison A, Cleland J, Gouws E & Frohlich J (2005) Early sexual debut among young men in rural South Africa: Heightened vulnerability to sexual risk? *Sexually Transmitted Infections* 81: 259–261

Human Sciences Research Council (HSRC) (2008) Social cultural values and norms relating to HIV risk perception and behaviour: National qualitative study, South Africa. Unpublished

Hutchinson PL & Mahlalela X (2006) Utilization of voluntary counselling and testing services in the Eastern Cape, South Africa. *AIDS Care* 18(5): 446–455

Hunter M (2002) The materiality of everyday sex: Thinking beyond 'prostitution'. *African Studies* 6: 99–120

Jaffe HW (2009) Increasing knowledge of HIV infection status through opt-out HIV testing. *Journal of Bioethical Inquiry* (Online)

Jahn A, Floyd S, Crampin A, Mwaungulu F, Mvula H, Munthali F, McGrath N, Mwafilaso J, Mwinuka V, Mangongo B, Fine PEM, Zaba B & Glynn JR (2008) Population level-impact of HIV on adult mortality and early evidence of reversal following roll-out of antiretroviral therapy in Malawi. *The Lancet* 371(9624): 1603–1611

JCSMF (Joint Civil Society Monitoring Forum) (2006) Scaling up voluntary HIV counselling and testing (VCT) in South Africa: Time for new models. Consensus statement of the 9th National Meeting in October 2006. Accessed 30 April, http://www.unfpa.org/upload/lib_pub_file/245_filename_hiv_publication.pdf

Jewkes R, Vundule C, Maforah F & Jordaan E (2001) Relationship dynamics and teenage pregnancy in South Africa. *Social Science and Medicine* 52: 733–744.

Johnson S, Skenjana T, Delany A, Russell B, & Goldstein S (2004) What can we learn from the Khomanani campaign? Lessons from South Africa's ambitious AIDS communication programme. International Conference on AIDS (Bangkok, Thailand). Abstract no. ThOrE1386. Health and Development Africa, Johannesburg, South Africa

Kalichman SC (2007) Positive prevention: HIV transmission risk reduction interventions for people living with HIV/AIDS. *South African Journal of HIV Medicine* 8(3): 40–45

Kalichman SC & Simbayi LC (2003) HIV testing attitudes, AIDS stigma, and voluntary HIV counselling and testing in a black township in Cape Town, South Africa. *Sexually Transmitted Infections* 79: 442–447

Kalichman SC, Simbayi LC, Kaufman M, Cain D & Jooste S (2007) Alcohol use and sexual risks for HIV/AIDS in sub-Saharan Africa: Systematic review of empirical findings. *Prevention Science* 8: 141–151

Kalichman SC, Simbayi LC, Vermaak R, Jooste S & Cain D (2008) HIV/AIDS risks among men and women who drink at informal alcohol serving establishments (shebeens) in Cape Town, South Africa. *Prevention Science* 9: 55–62

Kassler WJ, Alwano-Edyegu MG, Marum E, Biryahwaho B, Kataaha P & Dillon B. (1998) Rapid HIV testing with same day results: A field trial in Uganda. *International journal of STD & AIDS* 9(3): 134–138.

Kassler WJ, Dillon BA, Haley C, Jones WK & Goldman A (1997) On site, rapid HIV testing with same-day results and counselling. *AIDS* 11: 1045–1051

Katz I & Low-Beer D (2008) Why has HIV stabilized in South Africa, yet not declined further? Age and sexual behavior patterns among youth. *Sexually Transmitted Diseases* 35: 837–842

Kennedy C, O'Reilly K, Medley A & Sweat M (2007) The impact of HIV treatment on risk behaviour in developing countries: A systematic review. *AIDS Care* 19(6): 707–720

Kincaid DL, Parker W, Schierhout G, Connolly C & Pham VHT (2008) *AIDS communication programmes, HIV prevention and living with HIV and AIDS in South Africa, 2006*. Pretoria: JHHESA

Koal T, Burhenne H, Romling R, Svoboda M, Resch K & Kaever V (2005) Quantification of antiretroviral drugs in dried blood spot samples by means of liquid chromatography/ tandem mass spectrometry. *Rapid Communications in Mass Spectrometry* 19: 2995–3001

Lane T, Fisher RH, Dladla S, Rasethe J, Struthers H, McFarland W & McIntyre J (2009) High HIV prevalence among men who have sex with men in Soweto: Preliminary results from the Soweto Men's Study. Paper presented at the 4th South African AIDS Conference, 31 March – 3 April

Leclerc-Madlala S (2008) Age disparate and intergenerational sex in Southern Africa: The dynamics of hypervulnerability. *AIDS* 22: S17–S25

Leclerc-Madlala S, Simbayi LC & Cloete A (In press) The sociocultural aspects of HIV/ AIDS in South Africa. In Rohleder et al. (Eds) *HIV/AIDS in South Africa 25 years on: Psychosocial perspectives*. New York: Springer

MOHSW (Ministry of Health and Social Welfare, Lesotho), BOS (Bureau of Statistics, Lesotho) & ORC Macro (2005) *Lesotho Demographic and Health Survey 2004*. Calverton, Maryland: MOH, BOS & ORC Macro. Accessed http://www.who.int/ nutgrowthdb/database/countries/who_standards/lso_ref.pdf

Lichenstein B, Desmond AR & Schwebke JR (2008) Partnership concurrency status and condom use among women diagnosed with trichomonas vaginalis. *Women's Health Issues* 18(5): 369–374

Luseno WK & Wechsberg WM (2009) Correlates of HIV testing among South African women with high sexual and substance-use risk behaviours. *AIDS Care* 21(2): 178–184

MacPhail C, Pettifor A, Moyo W & Rees H (2009) Factors associated with HIV testing among sexually active South African youth aged 15–24 years. *AIDS Care* 21(4): 456–467

Maharaj P (2005) Patterns of condom use: Perspectives of men in KwaZulu-Natal, South Africa. *Development Southern Africa* 22(2): 187–197

Matovu JKB & Makumbi F (2007) Expanding access to voluntary HIV counselling and testing in sub-Saharan Africa: Alternative approaches for improving uptake, 2001–2007 *Tropical Medicine & International Health* 12: 1315–1322

Mercer CH, Copas AJ, Sonnenberg P, Johnson AM, McManus S, Erens B & Cassell JA (2009) Who has sex with whom? Characteristics of heterosexual partnerships reported in a national probability survey and implications for STI risk. *International Journal of Epidemiology* 38: 206–214

Mishra V (2009) Non-response issues in population-based surveys with HIV testing. Paper presented at the 2nd Global HIV/AIDS Surveillance Meeting, Bangkok, Thailand, 2–5 March

Morin SF, Khumalo-Sakutukwa G, Charlebois ED, Routh J, Fritz K, Lane T, Vaki T, Fiamma A & Coates TJ (2006) Removing barriers to knowing HIV status: Same-day mobile testing in Zimbabwe. *Journal of Acquired Immune Deficiency Syndrome* 24: 218–224

Morojele NK, Flisher AJ & Parry CDH (2005) Urbanisation, youth and substance abuse in South Africa. In S Obot & Shekhar Saxena (Eds) *Substance use among young people in urban environments*. Geneva: World Health Organization

Morojele NK, Kachieng'a MA, Mokoko E, Nkoko MA, Parry CDH, Nkowane AM, et al. (2006) Alcohol use and sexual behaviour among risky drinkers and bar and shebeen patrons in Gauteng province, South Africa. *Social Science Medicine* 62: 217–227

Morris M & Kretschmar M (1997) Concurrent partnerships and the spread of HIV. *AIDS* 11: 681–683

Nyamukapa CA, Gregson S, Lopman B, Saito S, Watts HJ, Monasch R, Matthew CH & Jukes MCH (2007) HIV-associated orphanhood and children's psychosocial distress: Theoretical framework tested with data from Zimbabwe. *American Journal of Public Health* 98(1): 133–141

Parker W (2006) Communication campaigns in the context of a severe HIV and AIDS epidemic in South Africa. National Workshops: Johannesburg, Durban, Cape Town, November 2006. Centre for AIDS Development, Research and Evaluation. Accessed April 2009, www.jhuccp.org/legacy/countries/south_africa/Cadre_CommunicationSurvey.ppt

Parker W, Makhubele B, Ntlabathi P & Connolly C (2007) *Concurrent sexual partnering amongst young adults in South Africa: Challenges for HIV prevention*. Centre for AIDS Development, Research and Evaluation (CADRE), South Africa. Accessed *27* March 2009, http://www.jhuccp.org/legacy/countries/south_africa/CADRESexualPartnershipsMainReport.pdf

Parry C, Rehm J, Poznyak V & Room R (2009) Editorial. Alcohol and infectious diseases: An overlooked causal linkage? *Addiction* 104: 331–332

Pettifor AE, Maesham DM, Rees HV & Padian NS (2004) Sexual power and HIV risk, South Africa. *Emerging Infectious Diseases* 10: 1996–2004

Pilcher CD, Tien HC, Eron JJ, Vernazza PL, Leu S, Stewart PW, Goh L & Cohen M (2004) Brief but efficient: Acute HIV infection and the sexual transmission of HIV. *Journal of Infectious Diseases* 189: 1785–1792

Rehle T (2008) Strategies for national HIV incidence surveillance. Paper presented at the International Conference on Emerging Infectious Disease (ICEID), Atlanta, USA, 16–19 March

Rehle T, Lazzari S, Dallabetta G & Asamoah-Odei E (2004) Second generation HIV surveillance: Better data for decision making. *Bulletin of the World Health Organization* 82: 121–127

Rehle T, Shisana O, Pillay V, Zuma K, Puren A & Parker W (2007) National HIV incidence measures: New insights into the South African epidemic. *South African Medical Journal* 97(3): 194–199

Richards D (2007) Us and them: loveLife, commercial brands and everyday Life. Master's thesis submitted to the University of KwaZulu-Natal. Accessed 30 April 2009, http://ccms.ukzn.ac.za/index.php?option=com_content&task=view&id=810&Itemid=34

Rispel L, Metcalf C, Cloete A, Reddy V, Townsend T & Zembe Y (2009) A hidden HIV epidemic among men who have sex with men (MSM)? Preliminary findings from the Johannesburg/eThekwini Men's Study. Paper presented at the 4th South African AIDS Conference, Durban, South Africa, 31 March – 3 April

Roerecke M, Obot IS, Patra J & Rehm J (2008) Volume of alcohol consumption, patterns of drinking and burden of disease in sub-Saharan Africa, 2002. *African Journal of Drug and Alcohol Studies* 7(1): 1–16

SADC (2006) Press Release: Launching of the SADC Report on the Expert Think Tank Meeting on HIV Prevention in the Region. Accessed 25 April 2009, http://www.unaidsrstesa.org/userfiles/file/Press%20Release-Prevention%20Report.doc

Scheepers E, Christofides NJ, Goldstein S, Usdin S, Patel DS & Japhet G (2004) Evaluating health communication: A holistic overview of the impact of Soul City IV. *Health Promotion Journal of Australia* 15: 121–133

Shisana O, Rehle T, Simbayi LC, Parker W, Zuma K, Bhana A, Connolly C, Jooste S, Pillay V, et al. (2005) *South African national HIV prevalence, HIV incidence, behaviour and communication survey, 2005*. Cape Town: HSRC Press

Shisana O & Simbayi L (2002) *Nelson Mandela/HSRC study of HIV/AIDS: South African national HIV prevalence, behavioural risks and mass media household survey 2002*. Cape Town: HSRC Press

Terry-Humen E, Manlove J & Cottingham S (2006) *Trends and recent estimates: Sexual activity among US teens*. Child Trends Research Brief 8, Washington, DC

Turner AN, Miller WC, Padian NS, Kaufman JS, Behets FM, Chipato T, Mmiro FA, Salata RA & Morrison CS (2009) Unprotected sex following HIV testing among women in Uganda and Zimbabwe: Short- and long-term comparisons with pre-test behaviour. *International Journal of Epidemiology*. http:ije.oxfordjournals.org/cgi/reprint/dyp171v1.pdf

United Nations Population Fund (2004) *Integrating HIV voluntary counselling and testing services into reproductive health settings: Stepwise guidelines for programme planners, managers and service providers*. Accessed 26 April 2009, http://www.unfpa.org/upload/lib_pub_file/245_filename_hiv_publication.pdf

UNAIDS (2000) *Voluntary counselling and testing: Technical update*. Geneva: UNAIDS

UNAIDS (2001) *Report on the global AIDS epidemic*. Geneva: UNAIDS

UNAIDS (2006) *Report on the global AIDS epidemic*. Geneva: UNAIDS

UNAIDS (2008) *Report on the global AIDS epidemic*. Geneva: UNAIDS

UNICEF (1999) *Global survey of adolescents with disability: An overview of young people living with disabilities, their needs and their rights*. New York: UNICEF Inter-Divisional Working Group on Young People, Programme Division

UNICEF (2008) *Scaling up HIV prevention, diagnosis and treatment for mothers and babies in Southern Africa*. Accessed 30 April 2009, http://www.unicef.org/sowc09/docs/SOWC09-CountryExample-SouthAfrica.pdf

UNGASS (United Nations General Assembly Special Session on HIV and AIDS) (2001): Resolution adopted by the General Assembly. Declaration of commitment on HIV/AIDS. Accessed 25 April 2009, http://www.un.org/ga/aids/docs/aress262.pdf

UNGASS (2008): Progress report on the declaration of commitment on HIV and AIDS. Republic of South Africa: Reporting period: January 2006 – December 2007. Accessed 26 April 2009, http://data.unaids.org/pub/Report/2008/south_africa_2008_country_progress_report_en.pdf

Wechsberg WM, Luseno WK, Karg RS, Young S, Rodman N, Bronwyn Myers B & Parry CDH (2008) Alcohol, cannabis, and methamphetamine use and other risk behaviours among black and coloured South African women: A small randomized trial in the Western Cape. *International Journal of Drug Policy* 19: 130–139