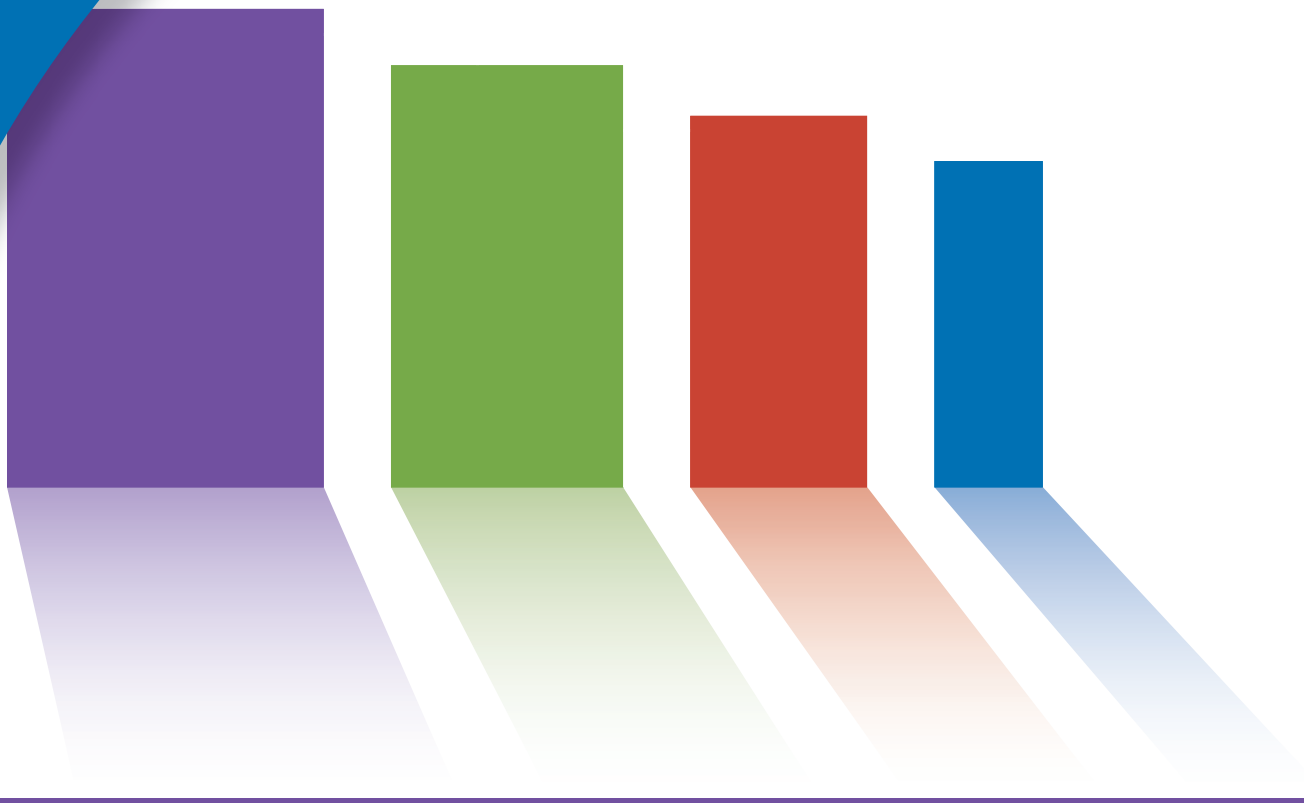
A gauge of HIV prevention in South Africa

2009



love life make your move

A gauge of HIV prevention in South Africa, 2009

About loveLife

loveLife promotes healthy, HIV-free living among South African teenagers. Organised under the auspices of the loveLife Trust, loveLife combines a sustained high-powered multi-media campaign with nationwide community-level outreach and support programmes for youth. loveLife's programmes are implemented by a national youth volunteer service corps known as groundBREAKERS in partnership with community-based non-government organisations, schools and government clinics across South Africa. Major funding for loveLife is provided by the South African Government and the Henry J Kaiser Family Foundation. Additional support is provided by Barloworld, BMW, Cellsmart Technologies, ChangeWright Consulting, Dewey & Le Boeuf, IBM, Independent Newspapers, Jumpstart, Murray & Roberts, Rapport, the South African Broadcasting Corporation, South African Institute for Entrepreneurship, Southern Sun, Ster-Kinekor and the Vodacom Foundation.

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The data contained in this report may be searched in an electronic database.
Visit www.lovelife.org.za/preventiongauge

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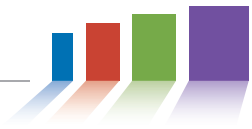


About this document

Purpose of prevention gauge

This document summarises published information about the state of the HIV epidemic in South Africa, in order to:

- Identify trends in prevalence and incidence of HIV and self-reported sexual behaviour
- Identify gaps in knowledge, or key indicators that would help fill the gaps
- Consider policy and programmematic implications of the findings.

Sources of information

This report draws on published information from nationally representative sample surveys, as well as from sub-national and local studies. Its intent is to show trends, differentiated where possible by age, gender and geotype. For this reason, the gauge presents comparative information, and omits some data series where comparable information is not available. The gauge is not intended to include all available information, but to highlight key indicators that should be tracked through time.

Where published analysis is incomplete, such as the exclusion of confidence intervals for point estimates, the data is similarly presented. As new data sources are identified or become available, we will update this information.

We have included case studies from more localised studies that help explain, qualify or even contradict national findings. They are referenced and the full set of references is provided at the end. Finally, we have included a set of reference tables with some of the main indicators.

Please forward comments and suggestions to *gauge@lovelife.org.za*

Primary sources of information for national analysis

Department of Health (1990 – 2007). National HIV and Syphilis Prevalence Antenatal Surveys

Henry J Kaiser Family Foundation and the South African Broadcasting Corporation (2007). *Young South Africans, Broadcast Media and HIV Awareness: results of a national survey*.

Health Systems Trust (2009). District Health Barometer 2007/8, Durban

Pettifor A, Rees H, Steffenson A, Hlongwa-Madikizela L, MacPhail C, Vermaak K, Kleinschmidt I (2004). *HIV and sexual behaviour among young South Africans: a national survey of 15 – 24 year olds*. Reproductive Health Research Unit, University of the Witwatersrand, 2004

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*. HSRC Press, Cape Town

Shisana O, Rehle T, Simbayi L, 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 HSRC Press, Cape Town

Shisana O, Rehle T, Simbayi L C, Zuma K, Jooste S, Pillay-van-Wyk V, Mbelle N, Van Zyl J, Parker W, Zungu N P, Pezi S, Nwanyanwu O, and SABSSM III Implementation Team. *Third South African national HIV, behaviour and health survey 2008: Outcome Indicators for assessing mid-term progress on the NSP 2007-2011. Report 1: A turning tide among teenagers?* Cape Town: HSRC Press

Statistics South Africa (2006). *Adult mortality (Age 15-64): Based in death notification data in South Africa 1994-2004*. Report no. 03-09-05

Opportunity now

Every day, twice as many South Africans die than did ten years ago. One thousand people die each day from HIV, and over 1,300 are newly infected. Antiretroviral treatment (ART) is critical, both for prolonging life and for reducing the national viral load. Yet even if we achieved 90% coverage with ART for people with CD4 counts below 350, there would still be 750 deaths a day from AIDS and more than a thousand new HIV infections.

The puzzle of our inaction

HIV/AIDS is a national crisis that requires a massive response. We should be using every tool at our disposal – deployed to maximum effect. But we're not. What we do, we do at half-steam. It does not make sense – not from a social perspective, nor an economic one. We could save R5 billion over the next five years and R20 billion over the next decade if we did HIV prevention at full steam. Why we don't is really puzzling.

If the problem were cynicism about the efficacy of some HIV prevention strategies, then you'd expect us to implement the ones that have been shown to work, like prevention of mother-to-child transmission and large-scale condom distribution. Yet 30,000 babies still contract HIV each year, just because we don't do a good job of PMTCT. And we still cluck about the advisability of condom distribution in prisons and attach conditions to their use, while thousands of prisoners are becoming infected every year.

As health workers, we balk at doing chest x-rays for babies who fail to thrive and tell them to come back again in three months' time. This in a country where one in thirty babies has HIV, and those infected are twenty-four times more likely to have TB.

As educators, we blush at the word 'sex' and provide a sanitised version of the lifeskills curriculum, despite evidence that frank discussion of sex and sexual risk reduction is needed to combat teen pregnancy and HIV infection.

As parents, we're too scared to even say S-E-X, and vaguely admonish our children about the dangers of HIV. Yet early, honest talk by parents is known to delay sexual debut and lead to safer sexual behaviour.

As communities, we tolerate the fact that hundreds of thousands of learners drop out of high school every year – yet we know that they are far safer, in every respect, in school.

As companies, we prospect for new mines and build new roads without regard for the impact on HIV, nor make any real attempt to mitigate it.

As a society, we obsess about the morality of decriminalising sex work, yet scarcely blink at the unequal patterns of wealth, education and housing that shape the distribution of HIV.

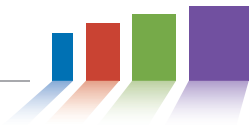
Quite frankly, we are crazy to miss the opportunities that exist to prevent HIV infection. This prevention gauge tries to show where we are doing things right, where we are doing things badly and where we're not doing anything at all. This is not to say that HIV prevention is easy, nor that we have all the answers – but if we did what we know works well, we'd be a lot further. And if we try what we think works – even if we're not sure – we would have a much greater likelihood of success than waiting in vain for the magic pill. Here's what we know works:

What we know works

- Massive condom distribution, linked to condom promotion: Yet some of the worst affected districts in South Africa distribute fewer than five condoms per adult male per year! And we're too skittish in saturating the networks of people most-at-risk with condoms – men who have sex with men, commercial sex workers and prisoners. There are real gains in expanding condom distribution in underserved districts and to high risk groups. Increasing access to female condoms – through family planning and STI services, in the first instance, could help crack the intransigence of HIV among people over thirty years of age.

- Prevention of mother-to-child transmission: The earlier mothers-to-be are seen at antenatal clinics, the more likely they are to get the best PMTCT. For HIV+ mothers with a CD4 count lower than 350, initiation of highly active antiretroviral treatment (HAART) as close to conception as possible (and preferably before!) virtually eliminates vertical transmission and helps keep mothers healthy during the formative years of their child's life. But we chase away early antenatal bookers and tell them to come back late in their first trimester.

- We only test 80% of antenatal bookers for HIV, and give the prescribed ARV regimen to only three quarters of women who test HIV +ve. If we eliminated missed opportunities in the health service, we would prevent 30,000 new infections in infants every year.



- Male circumcision: Male circumcision reduces female-to-male transmission and could avert a fifth of all new infections over the next decade. It needs smart health services to cope with the massive load of millions of surgical procedures. It needs even smarter communication to persuade men to get circumcised without increasing their sense of bravado and consequent risk to their partners. We need to get smart quick!

What we think works

- Large-scale, differentiated behaviour change programmes: We think that we can reduce the incidence of HIV further with sustained and intensive behaviour change communication. We think we have greatest effect when mass media is combined with intensive face-to-face interaction. Yet we reach less than 30% of people face-to-face. If we reached double that number, our prospects for success would be much greater.

- Reduction of risk tolerance: The lack of opportunity in marginalised communities across South Africa makes young people tolerate risk more – a problem made worse by alcohol abuse. Young people are at greatest risk when they leave the relative security and support of school, and face an uncertain future where only a minority will get jobs or study further. We must find new ways to build their sense of real and immediate possibility, by building personal initiative, helping them navigate life transitions such as school-leaving and creating new links to opportunity.

- Focus on teenage pregnancy: We know that teen pregnancy and HIV infection are very strongly associated with each other, and that being pregnant may further predispose to HIV infection. We must find better ways of preventing teen pregnancy and protecting pregnant teenagers – not least by getting them back into school as soon as possible.

There are also a number of health services that could boost HIV prevention. They include:

- *Provider-initiated HIV testing:* This may increase the uptake of PMTCT and ARVs, and allow prompt referral to a range of other services (including male circumcision, STI treatment, PAP smears, early TB detection etc).

- *Early detection of TB:* TB and HIV feed off each other. Preventing HIV will reduce the prevalence of TB, and detecting TB early can reduce the co-morbidity and associated costs of TB/HIV co-infection. Yet we miss opportunities by failing to test HIV+ people for TB and rely on smear diagnostics alone, which could miss up to half of all TB infections in people with HIV.

- *'Package deal' for STI management:* Over 8.5 million STI episodes are treated a year, spread equally between the public and private sectors. Yet probably only a fifth of episodes are treated properly, and we don't realise that our client may well be the transmitter or recipient of the next HIV infection in South Africa. A package deal provided to people with STIs in both public and private sectors would ensure HIV testing, curable STI treatment, male & female condom provision, PAP smear, alcohol abuse counselling and information resources.

- *Focused service quality improvement for young people, men and groups most-at-risk:* High risk groups – in most need of sexual and reproductive healthcare – are typically treated worst in health services. Focused strategies can improve both accessibility and quality of services and management systems, with knock-on benefit to the health system.

We'll save far more than we spend

These are the key ingredients for successful HIV prevention in South Africa. At scale, they could avert up to 50% of new infections over the next five years. That's over 1 million infections averted.
It will cost over a billion rand a year more than our current commitment to HIV prevention, but will save a billion rand more every year in infections averted over the next five years. That saving will be tripled within a decade.

Gains have been made over the past decade. There's proof that HIV can be prevented in South Africa. But it now requires unprecedented national leadership to commit the funding and drive implementation – and extraordinary commitment from all of us to ensure that funds are used effectively to halve the rate of HIV infection by 2013.

Time to change the way we measure progress

Even if we halve the incidence of HIV over the next five years, showing this impact will be difficult, as the life-prolonging effect of antiretroviral treatment will keep the overall prevalence pretty constant for

the next five years. Our measures of progress will need to become smarter and sharper. In this regard, annual antenatal surveillance is now a blunt gauge. The increasing prevalence in older age groups will become near-impossible to interpret – and anyway, by definition pregnant women have had unprotected sex and constitute a group at high risk. Changes in HIV prevalence among pregnant women will become increasingly inelastic relative to the general population. It now makes far more sense to reduce the frequency of antenatal surveys and increase the statistical power of national random probability surveys so that we can better understand the spurts of infection in young adulthood, for example.

Call for vigilance and vigour

A final note concerns the risk that we might fail in our efforts to reduce the incidence of HIV. Most of the possible pitfalls are obvious: inadequate political commitment, insufficient programme scale, half-baked programmes and service inefficiencies. All of these will damage our ability to reduce current levels of infection. But we must be alert to new hot spots that can flare up as we try to beat the obvious flames. Two million orphans by 2012 are going to change South African society – not least by increasing the population's overall vulnerability to HIV infection. We must commit now to a nationwide, concerted effort to make orphaned children and teenagers feel that they belong, keep them in school, ensure their access to social grants, prevent their physical and sexual abuse and increase the food security.

Other potential hot spots include expansion of mining in Limpopo, the opening up of the N2 highway through the Eastern Cape and the Trans-Kgalakgadi Highway in the Northern Cape. These sites have the potential to push the prevalence of HIV up in provinces that, so far, have settled at slightly lower levels.

There is not one person or sector of South African society that can opt out of preventing HIV. We have had opportunities in the past that we have largely ignored. But we should never forget, that each year, a new cohort of babies is born, children become teenagers, and teenagers, adults. Most of them are HIV free. We have the opportunity, now, to keep them that way.

Prevalence of HIV

TRENDS AT A GLANCE

Table 1. Trends in HIV prevalence (2002 – 2008)

Prevalence	Trends	
	Male	Female
Total		

Colour	Prevalence trend
	Improvement
	Equivocal (+-)
	Worsening

KEY

Table 2. Trends in age-specific HIV prevalence (2002 – 2008)

Age group	Trends	
	Male	Female
2-14		
15 – 19		
20 – 24		
25 – 29		
30 – 34		
35 – 39		
40 – 44		
45 – 49		
50 – 54		
55 – 59		
60+		

Table 3. Trends in HIV prevalence by province (2002 – 2008)

Province	Trends in 2008 compared to:	
	2002	2005
KwaZulu-Natal		
Mpumalanga		
Free State		
North West		
Gauteng		
Eastern Cape		
Limpopo		
Western Cape	Spurious	

Table 4. Trends in age-specific HIV prevalence among women attending public antenatal clinics

Age group	Trends 2007 cf. 2005
	Pregnant women
15 – 19	
20 – 24	
25 – 29	
30 – 34	
35 – 39	
40+	

Colour	Prevalence trend
	Improvement
	Equivocal (+-)
	Worsening

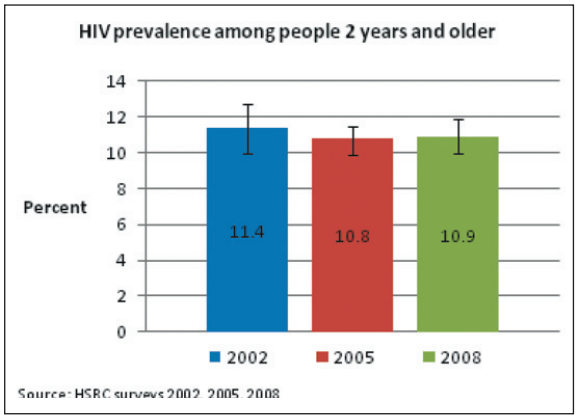
KEY

Overall HIV prevalence

Overall trends in HIV prevalence in South Africa, 2008

- Peaked at about 11% in the general population, but has yet to show any significant declines overall.
- Declined significantly among 15 – 24 year olds over the past three years to 8.7%.
- Still increases sharply in 18 – 21 year old women and men in their early twenties
- Still edging upwards among older people as a result of continuing new infection and the life-prolonging effect of antiretroviral medications
- Highest among marginalised people in transition, mainly those living in informal settlements on the edges of towns and urbanising areas of rural districts, as well as those in farming areas.
- High among defined groups who are most-at-risk, including men who have sex with men, commercial sex workers and the growing numbers of orphans and vulnerable children.
- Declining among children < 2years, but continues to be sustained by 30,000 infections every year through mother-to-child transmission.

Figure 1. HIV prevalence among people 2 years and older



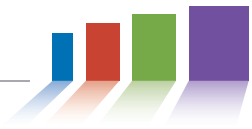
Trends: The prevalence of HIV infection in the total population of South Africa has stabilised at about 11%. Based on the mid-year population projections by Statistics South Africa for 2009, this means that about 5.35 million people are living with HIV.

Data validity and reliability: The primary data source for HIV prevalence in the general population is the South African National Prevalence, Incidence, Behaviour and Communication Surveys conducted by the Human Sciences Research Council in 2002, 2005 and 2008. The survey design applies a multi-stage cluster sample stratified by province, settlement geography (geotype) and predominant race group in each area. In 2008, a systematic sample of 15 households was drawn from each of 1,000 census enumerator areas (EAs), which were also sampled in 2002 and 2005.

The biggest threat to external validity is the high non-response rate among those eligible to be tested. The non-response rate for HIV testing in 2008 was 35%, with refusals accounting for 85% of all non-response. Comparison between those interviewed and tested, and those interviewed and not tested, found some statistically significantly differences with respect to demography and self-reported sexual behaviour. But these differences are not regarded as substantive enough to introduce any significant systematic bias. The number of people tested in 2008 was 15,031. In 2005, the number was 15,851. Although the testing response rate in 2002 (62%) was not much lower than subsequent surveys, the smaller total sample size of 13,518 reduced the statistical power to compare findings by province, race and age.

The 2002 survey made use of an Orasure ® HIV-1 Oral Specimen Collection Device to detect HIV antibodies in oral transudate. While this measure has been shown to have 99% sensitivity and specificity in higher prevalence populations, it may have lower specificity in lower prevalence groups (which could over-estimate prevalence among children and other low prevalence groups). In 2005, use was made of dried blood spot (DBS) analysis to test for HIV-1 antibodies which improved specificity, while sensitivity and specificity among children <2 years old was further improved in 2008 by the use of polymerase chain reaction (PCR) testing for HIV-1 DNA.

In summary, data validity and reliability for national prevalence testing in South Africa is very good, but some of the anomalous findings in the 2002 survey compared to the later surveys (such as the relatively high HIV prevalence among children, whites and in



the Western Cape) may be explained by less reliable measurement in these relatively low prevalence populations.

Implications for policy and planning: Even if the incidence of HIV in the South African population is halved by 2013, the prevalence of HIV is likely to remain at current levels for at least the next five years, for the following reasons:

- First, the epidemic in South Africa is still relatively young and it has still not reached its peak in older age groups. As the highest-incidence cohorts get older, a higher proportion of older people will have HIV – even if the incidence in older age groups drops. The prevalence-bolstering effect of the 'maturation of the epidemic' is likely to be significant for at least the next decade.
- Second, as more people receive Antiretroviral treatment and live longer, a higher proportion of the population will have HIV. In effect, this means that in order for the prevalence to drop, fewer people will need to be infected each year than the number of people who live a year longer on ART.

Dorrington estimates that the effect of the current ART programme is to elevate the prevalence among people over thirty years of age by 1%, and those below thirty by 0.5% (Dorrington, 2009). In fact, a decline in prevalence over the next five years could imply that our ART programme is not reaching enough people or is not working well. Assuming ART coverage of over 90% and a 50% decline in incidence by 2013, the total prevalence will only start to drop slowly from about 2015.

HIV prevalence, by age-group

Figure 2. Distribution of HIV prevalence by age and gender, 2008

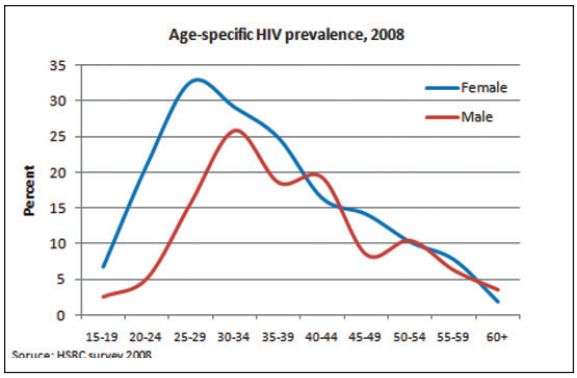


Figure 3. Trends in HIV prevalence among men 15 years and older

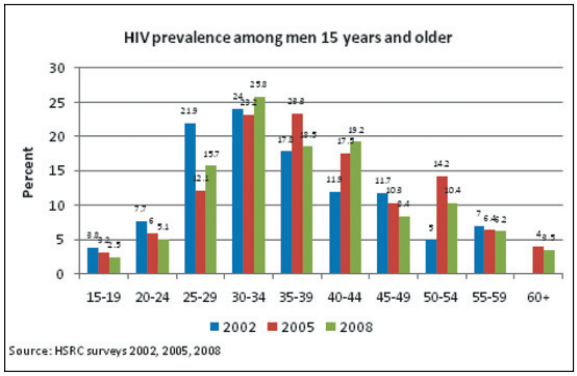
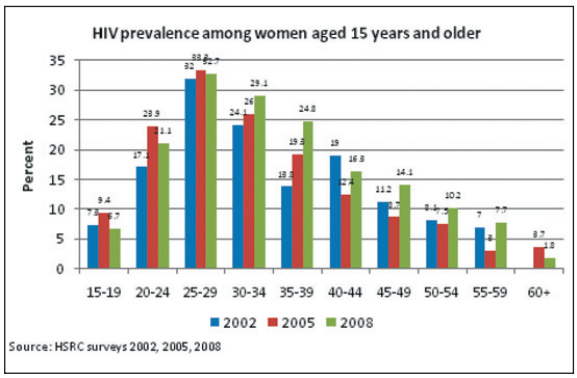


Figure 4. Trends in HIV prevalence among women 15 years and older



Trends by age group: The HIV prevalence in women rises earlier and higher than that of men, equalising only in people in their mid-thirties and older. The steepest prevalence trajectory for women is from 19 to 29 years of age, while for men it is from 24 – 34 years of age. For women, HIV prevalence peaks in the 25 – 29 year age group at about 33%, while among men it peaks at about 25% between 30 and 34 years of age. The undulating variability in prevalence trends in 30 – 50 year old men apparent in the smoothed graph [Figure 2] above is not statistically significant.

Age-specific prevalence trends as deduced from three cross-sectional surveys (HSRC 2002, 2005 and 2008) may be characterised as follows:

- Decreasing among children aged 2 – 14 years
- Decreasing among 15 – 19 year olds
- Decreasing among 20 – 24 year olds
- Stable among 25 – 29 year olds
- Increasing among 30 – 39 year old women, but equivocal among men of the same age
- An apparent increase among 40 – 44 year old men, with an equivocal picture among 40 – 44 year old women
- Equivocal trends over time among people aged 45 and above

Implications for policy and planning: The smoothed age-specific profile of HIV prevalence illustrates its variation through the trajectory of life:

- The prevalence of HIV among teenagers has fallen, and cross-sectional studies show that those young people who are still in school are relatively protected. However, there is still a spike of new infection in late adolescence that is sustained well into their thirties. This spike probably reflects changes in life circumstance that lead to higher risk tolerance. It represents a point of concentration in the epidemic that accounts for at least half of the lifetime probability of HIV infection, and understanding and addressing the factors associated with high risk tolerance in late adolescence and early adulthood are critical to new gains in HIV prevention.

- Similarly, the factors sustaining a relatively high incidence in people over 30 (~1.7% p.a.) should be better understood. The marked increase in condom use in older age groups over the past few years will begin to have an impact on the rate of infection in older people. However, this will be offset by the expansion of ART and continued aging of high-incidence cohort, so that the total prevalence in people over 25 years of age will likely remain relatively unchanged for the next five to ten years.

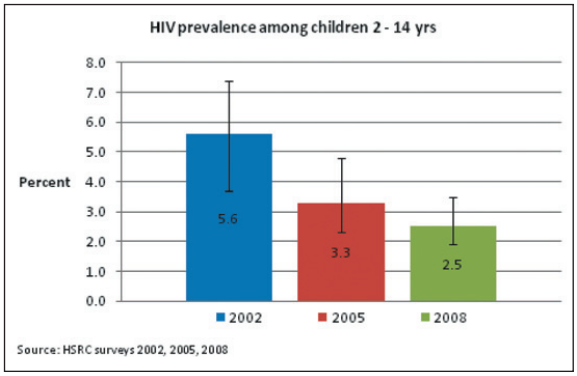
- As the incidence of HIV infection in younger people continues to fall, we can expect the slope of the upward curves to flatten somewhat, peaking at slightly older age groups and declining more slowly in older age groups.

Children under 2 years

The prevalence of children under two years of age was measured for the first time in the 2008 as part of the national survey of HIV prevalence conducted by the Human Sciences Research Council. This data is not yet available, but will likely under-represent true rates of vertical transmission because of the high mortality still associated with paediatric AIDS. Improved uptake and efficiency of the PMTCT programme will reduce the prevalence to below 1% by 2013, but a prevalence of 2-3% should still be expected in the HSRC survey planned for 2011.

Children 2 – 14 years

Figure 5. HIV prevalence among children aged 2 – 14 years



Trends: The prevalence of HIV among children 2 – 14 years of age has declined, probably reflecting the partial success to date of the national programme to prevent mother-to-child transmission.

Data validity and reliability: For reasons related to sample size and Orasure ®test reliability in low prevalence populations (described above), it is possible that the point prevalence was overestimated in the 2002 sample. Nevertheless, there is still enough evidence to show a decline among 2 – 14 year olds since 2002.

Implications for policy and planning: Improved access to Antiretroviral treatment should extend the lifespan of children with HIV and keep the prevalence among 2 – 14 year olds above 1% for the next 5 – 10 years. Near elimination of vertical transmission (< 3,750 cases p.a) within the next two years should result in a low prevalence (< 0.5%) among 0 – 14 year olds by 2020.

Young people (aged 15 – 24 years)

Figure 6. HIV prevalence among 15 – 24 year olds

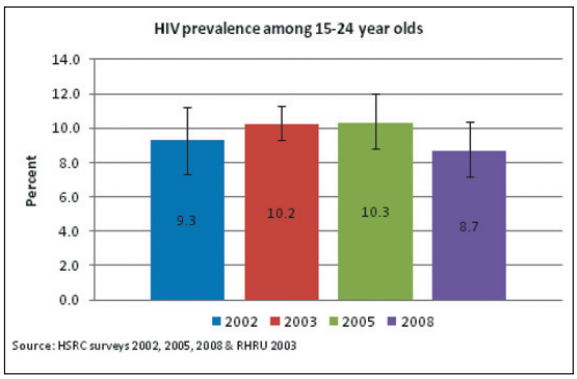
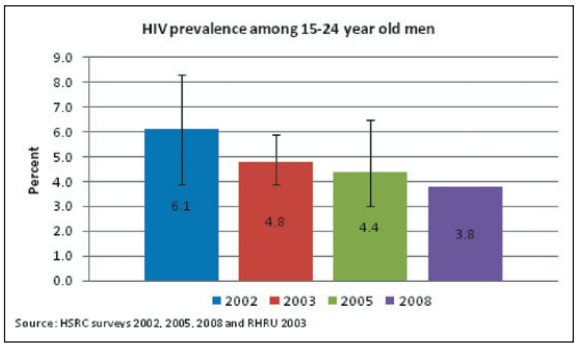


Figure 7. HIV prevalence among 15 – 24 year olds, by gender



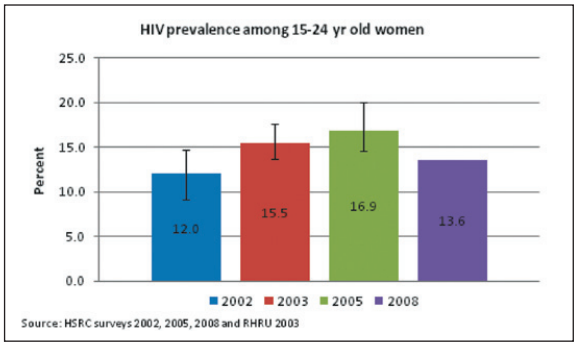
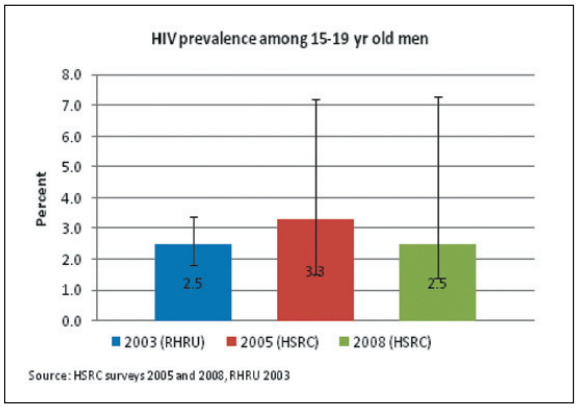


Figure 8. HIV prevalence among 15 – 19 year olds, by gender



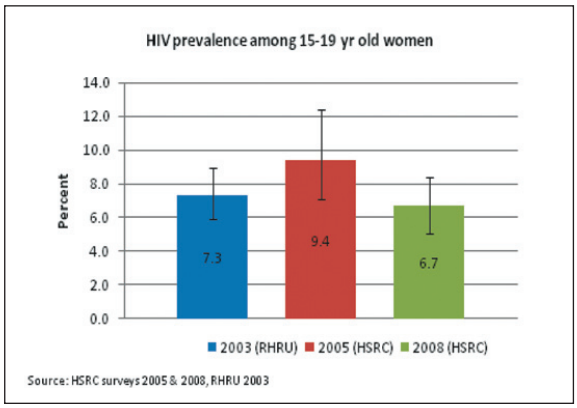
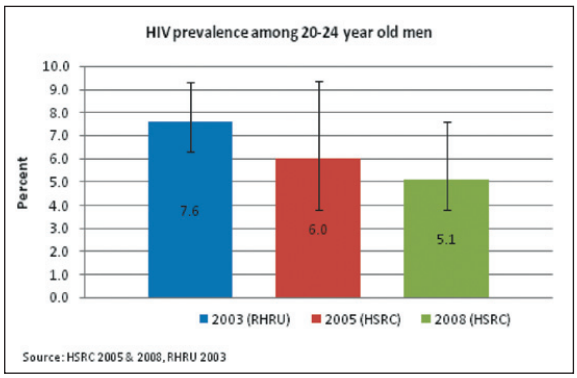
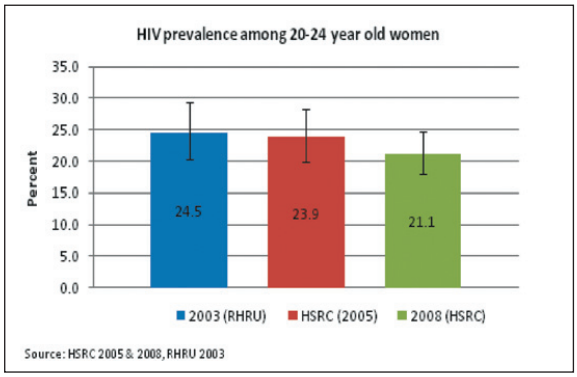


Figure 9. HIV prevalence among 20 – 24 year olds, by gender





Trends: The prevalence of HIV among young people 15 – 24 years of age has declined significantly over the past five years [Figure 6].

This overall decline was expected, given that levels of infection among young men have been decreasing since 2002. The time-lag in the declines between young women and young men is explained by the age-disparity in sexual partnerships: In 2008, 27.6% of women said that their sexual partner was at least 5 years older than they are, compared with just 0.7% of men. The higher probability of male-female transmission in such relationships (because of the prevalence differential between older men and younger women) keeps the prevalence of HIV infection higher in younger women than their same-age male counterparts.

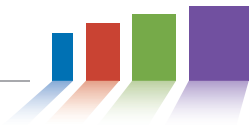
These dynamics are clearly reflected in the changing prevalence of HIV among 15 – 19 year old men and women. The prevalence of HIV among 15 – 19 year old men has been consistently low – because teenage boys tend to have sex with girls their own age. On the other hand, the prevalence of HIV among young women aged 15 – 19 years climbed to close to 10% before dropping back to 6.7% [Figure 8]. The reason for the peak and decline in prevalence in 15 – 19 year old women is the steady decrease in prevalence among 20 – 24 year old men, who are typically their sexual partners.

In turn, the lower prevalence among 15 – 19 year old women is working through into a lower prevalence in 20 – 24 year old women [Figure 9]. There may also be a significantly lower incidence of HIV among 20 – 24 year old women, although this cannot yet be said with confidence.

Data validity and reliability: The decline in prevalence among 15 – 24 year olds from 10.3% in 2005 to 8.7% in 2008 is statistically significant.

Implications for policy and planning: The fact that HIV prevalence among teenagers has declined markedly since 2002 means that infection in this age group contributes a lower proportion of total incidence than it has in the past. Nevertheless, decreases among teenagers should be sustained for the following reasons:

- First, the 'youth bubble' in the South African population (43% of the population under twenty) means that marginal changes in incidence in younger five-year age bands translate into a greater number of infections than among older people. For instance, a decrease of half a percentage point in the incidence in 15 – 19 year olds would avert 25,764 infections, compared to 11,023 infections averted among 45 – 49 year olds. Conversely, a 0.5 percentage point increase



in incidence among 15 – 24 year olds would increase the total prevalence more than a similar proportional increase in 35 – 44 year olds.

- Second, there is still scope to reduce the baseline prevalence for young adults: halving the incidence in 15 – 19 year olds would allow young people to enter their twenties with an overall prevalence about one third lower (4%) than if the incidence among teenagers dropped no further (6%). Among young women, the percentage point reduction in prevalence will be even higher. This will reduce: morbidity and mortality among young mothers; the need for PMTCT; the number of children orphaned as babies or preschoolers; and the total requirement for ART over the long-term. Conversely, failure to avert new infections in this age group will sustain the epidemic at high levels as the 'youth bubble' cohort ages.

- Third, there is still a spike of infection in late adolescence, with a doubling of incidence between the ages of 18 (0.8%) and 20 (1.7%). Cross-sectional survey data suggests that marked changes in sexual outcomes for young women are associated with leaving school, and that changes in life circumstance create new pressures and expectations that encourage risk tolerance (Hargreaves et al 2007, Pettifor et al 2005). If this spike of infection is to be addressed, HIV prevention programmes need to assist young people to better anticipate and navigate life transitions. This requires intensive and re-doubled effort among 15 – 18 year olds – and in fact points to the need for sustained HIV prevention from childhood through parent-support and schools-based programmes.

- Fourth, reductions in the incidence of HIV infection among young people represent significant progress in combating the epidemic. These gains must be sustained even as we seek to address gaps in our response and areas of intractability, or the gains already made may be reversed.

Box 1 Employment may work against HIV

Between 1997 and 2007, Colvin, Connolly and Madurai (2007), measured the prevalence and distribution of HIV among employed individuals in the South African workplace. The epidemiological description includes data from 22 different surveys, in both the public and private sector, across all nine provinces. The crude estimate of HIV prevalence in the working population was calculated to be 10.9% (n= 32,015). Within this population, it appears that the growth rate of the epidemic may be stabilising. Multivariate analysis indicated that while there was a significant increase in prevalence between 1999/2000 and 2001/02, there was no significant growth rate over the 2002/2004 phase.

The distribution of prevalence across provinces was roughly comparable to national study estimates; from a low 5.5% and 6.1% in the Western and Northern Cape respectively, to 16.7% in KwaZulu-Natal and 18.5% in the North West. The comparable prevalence figures among working men (11.3%) and working women (9.8%) suggests that employment may be a protective factor for women. (Colvin, Connolly & Madurai, 2007)

HIV prevalence among people 25 years and older

Figure 10. Trends in HIV prevalence among people 25 years and older

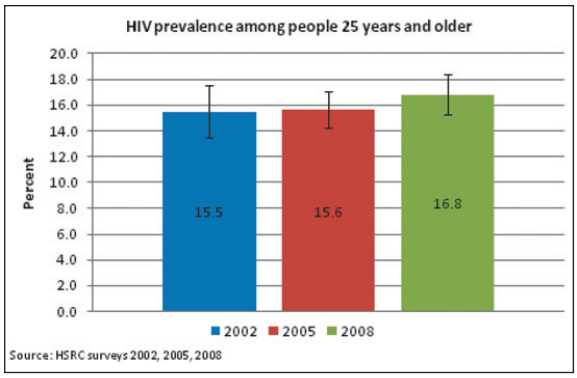
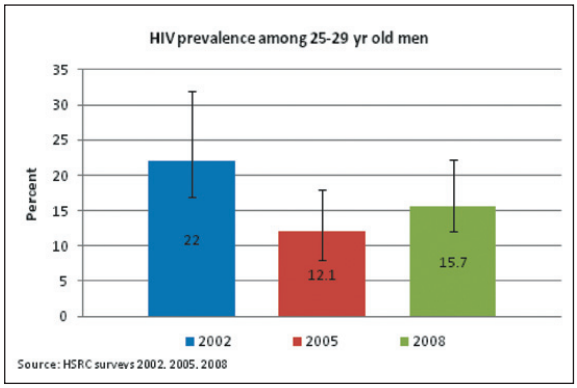


Figure 11. Trends in HIV prevalence among 25 – 29 year olds, by gender



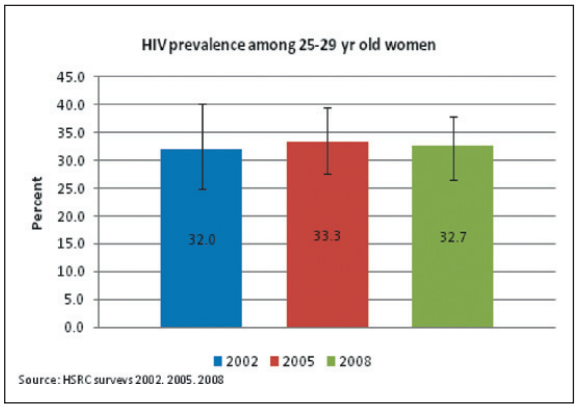
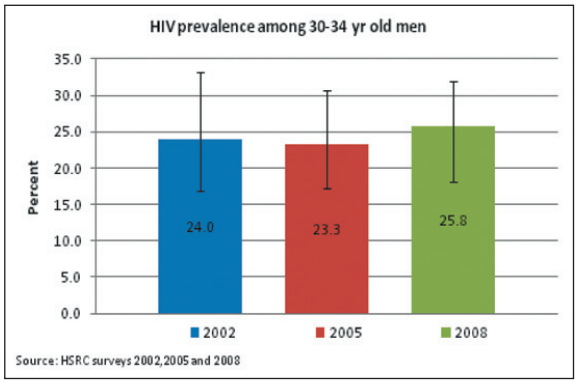


Figure 12. Trends in HIV prevalence among 30 – 34 year olds, by gender



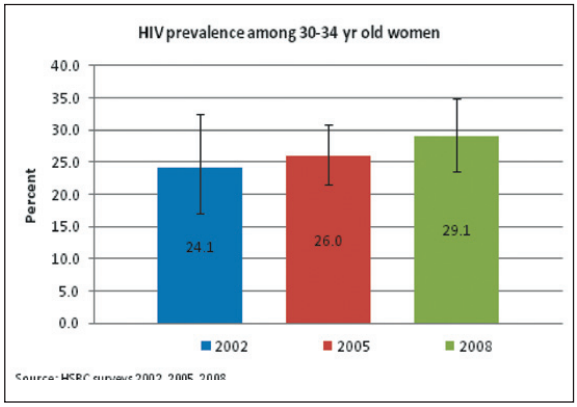
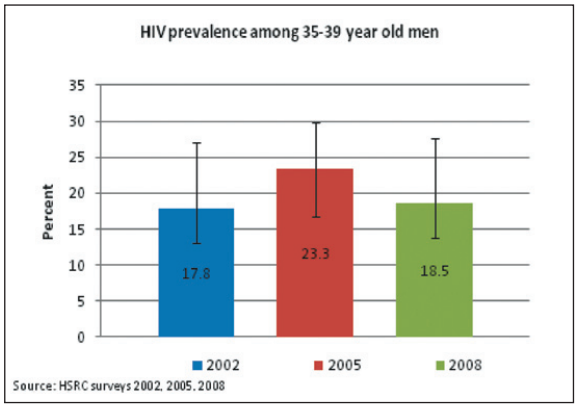


Figure 13. Trends in HIV prevalence among 34 – 39 year olds, by gender



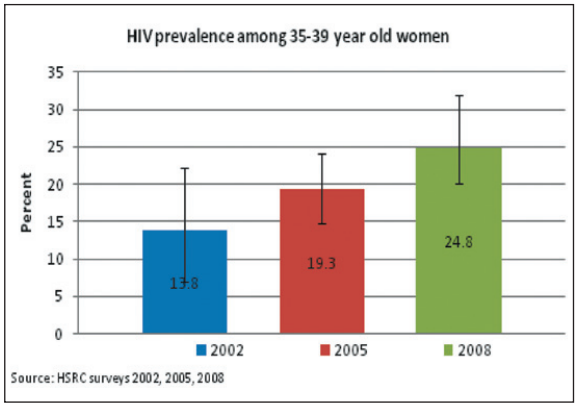
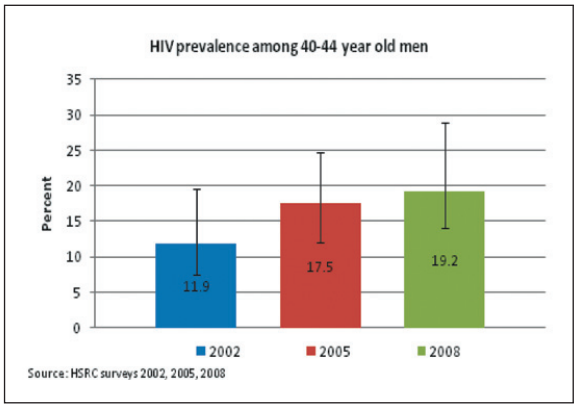


Figure 14. Trends in HIV prevalence among 40 – 44 year olds, by gender



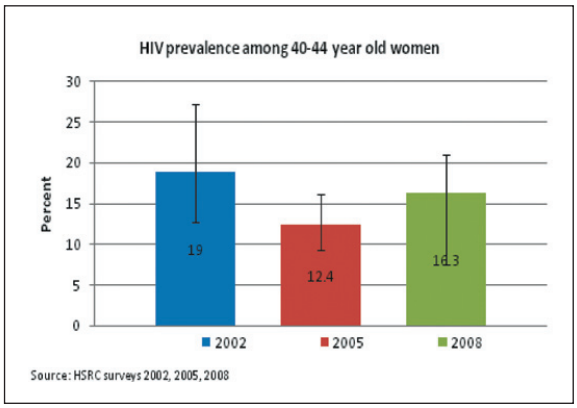
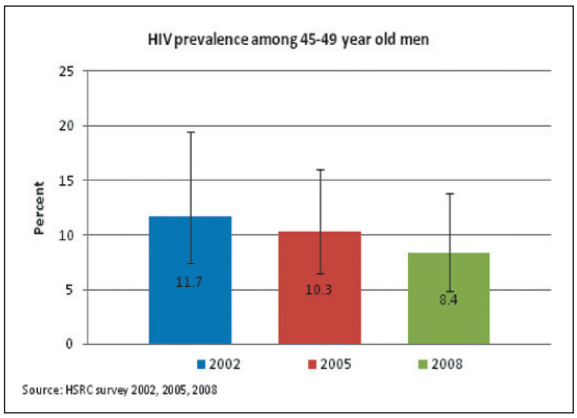


Figure 15. Trends in HIV prevalence among 45 – 49 year olds, by gender



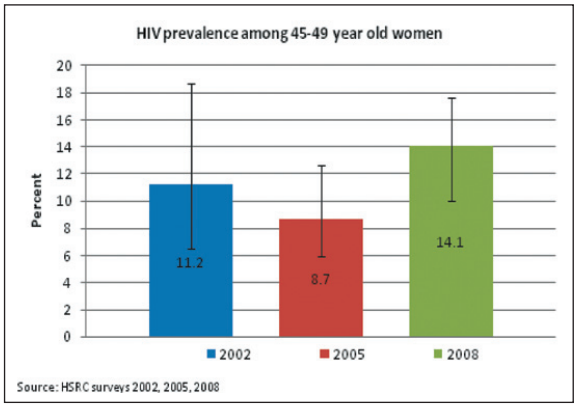
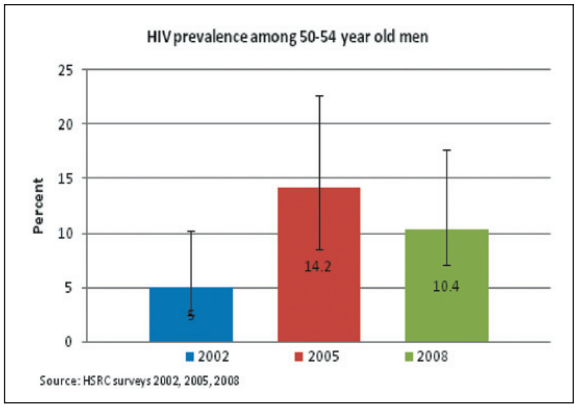


Figure 16. Trends in HIV prevalence among 50 – 54 year olds, by gender



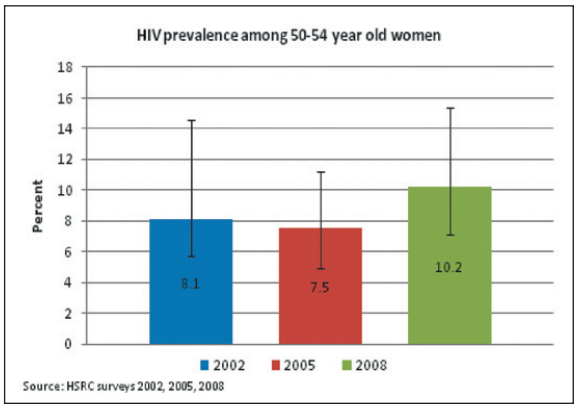
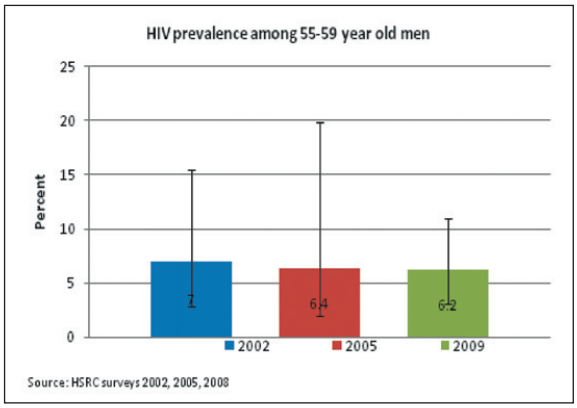


Figure 17. Trends in HIV prevalence among 55 – 59 year olds, by gender



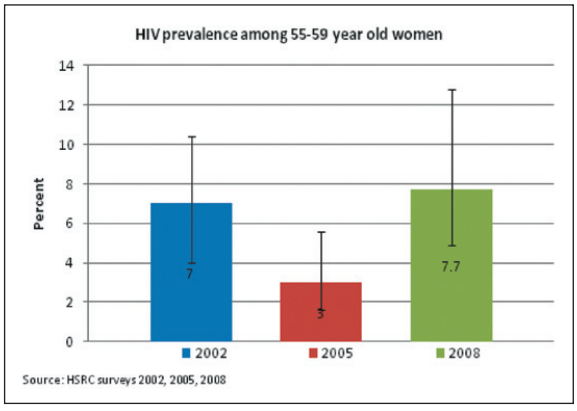
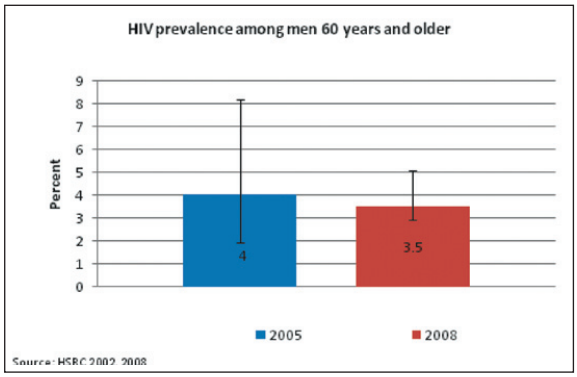
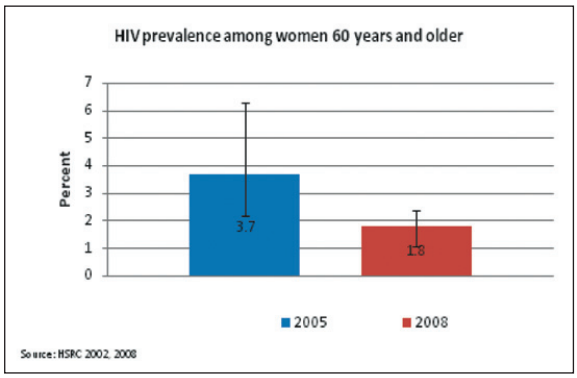


Figure 18. Trends in HIV prevalence among 60+ year olds, by gender





Trends: The prevalence of HIV among people 25 years and older continues to creep up as the most heavily infected cohorts grow older and ART coverage is extended.

25 – 29 year olds: The epidemic has stabilised among 25 – 29 year olds, and taking into account the effect of ART, there may in fact be a decline in incidence in this age group [Figure 11]. Based on antenatal data, Dorrington estimates that the incidence among women under thirty may have fallen from a peak of 2.5% to as low as 0.5% (Dorrington 2009). However, confidence limits are wide (95% CI 0.0 – 2.5%) and the HSRC 2008 incidence estimates based on serological testing (BED-CEIA) may provide further clarity.

30 – 34 years: Similarly, the prevalence among 30 – 34 year olds has stabilised. Prevalence among men peaks in this age group at about 25% [Figure 12], while the slightly lower prevalence of HIV among women aged 30 – 34 years (cf. 25 – 29 years) still reflects high mortality in this age group. On the other hand, the increasing prevalence among 30 – 34 year old women over time probably reflects the effect of the ART programmes, against the backdrop of persistently high incidence rates (>1.5%).

35 – 39 years: While the prevalence among 35 – 39 year old men is stable, that among women has increased sharply since 2002 [Figure 13]. This increase probably reflects aging of the high-incidence cohort of those who were in their twenties a decade ago, a persistently high current incidence and expanding access to ART. On the other hand, increasing condom use among older men may help explain the stability of HIV prevalence in this age group.

40 – 44 years: The pattern is reversed among 40 – 44 year olds. Here, the prevalence of HIV among men shows a steady increase, while that among women is equivocal [Figure 14]. Given the average age-differential of about 4 years between men and women in relationships, it may be helpful to compare the HIV prevalence among 40 – 44 year old men with that of 35 – 39 year old women. This comparison appears to shows a steady increase in prevalence in both sub-groups – and it may be that, while condom use has increased among 40 – 44 year old men, levels are still too low to be protective. However, while the increase among men is marked (1.7 percentage points), 95% confidence limits overlap significantly and definitive trends cannot be established.

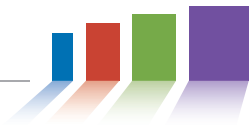
45 – 49 year olds: Although it would appear that the prevalence among 45 – 49 year old men is decreasing, 95% confidence intervals for the three survey years overlap considerably – and no significant trend can be deduced from this data. A real decline in prevalence would be difficult to explain given the apparent increase in prevalence among men just five years younger. Similarly, although there appears to be an increase in prevalence among 45 – 49 year old women, no trends can be defined [Figure 15].

50 – 54 year olds: No significant trends over time can be deduced from the data for 50 – 54 year old men or women [Figure 16]. There may be a spike of new infection among 50 – 54 year old men (and possibly women) that requires further analysis and interpretation. However, the surveys in both 2005 and 2008 show a high degree of overlap between 95% confidence intervals for 45 – 49 and 50 – 54 year old men respectively. The apparent spike in infection may be a statistical artefact.

55 – 59 year olds: The prevalence among 55 – 59 year old men and women has shown no significant change [Figure 17].

60 years +: Data is available only from 2005 and 2008, and so trends cannot yet be established. However, there has been no significant change in HIV prevalence among men and women aged 60 years and older in the past three years [Figure 18].

Data validity and reliability: Disaggregation by 5-year age-bands produces relatively small sample



sizes, and consequently less ability to detect statistically significant change.

Implications for policy and planning: The two major variables that will determine prevalence trends over the next decade are (i) underlying incidence and (ii) reductions in mortality associated with an expanded ART programme. These variables work in opposite directions, with lower incidence decreasing total prevalence; while lower mortality increases longevity of people living with HIV and thus increases the prevalence. Table 5 illustrates the range of prevalence possibilities by 2013, under different scenarios that vary the projected incidence and ART coverage respectively.

The four variable conditions considered are:

- No change: current estimated incidence and 50% ART coverage
- 50% reduction in incidence (holding ART coverage constant at 50%)
- 90% ART coverage (holding incidence constant at current estimates
- 50% reduction in incidence and 90% ART coverage

The basis for these projections is described in Appendix 1.

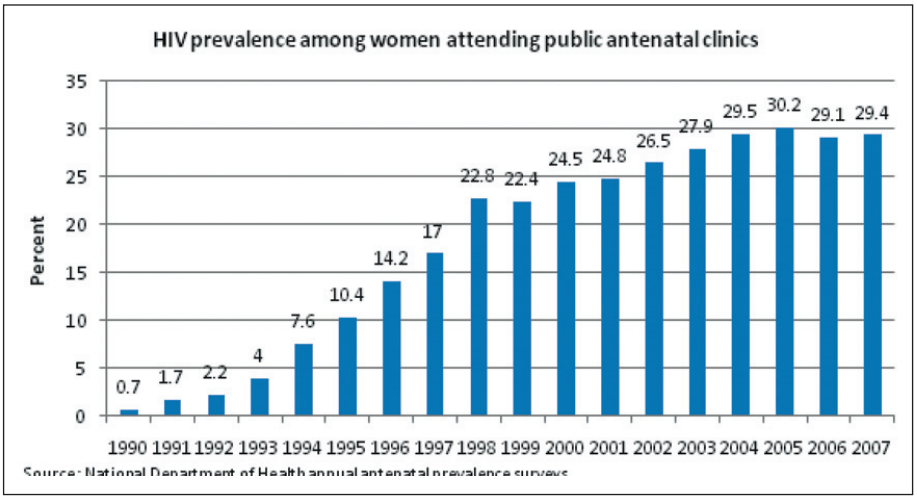
Table 5. Projections of effect on prevalence under differing assumptions of programme success and ART coverage

Age group	Actual prevalence 2008	Projected prevalence by 2013 under the following assumptions			
		No change in incidence & 50% ART coverage	50% reduction in incidence (holding ART coverage constant at 50%)	90% ART coverage (holding incidence constant)	Both 50% incidence reduction & 90% ART coverage
Total	10.9%	11.3%	9.9%	12.1%	10.6%
15 – 19 years*	4.6%	4.3%	3.4%	4.3%	3.4%
20 – 24 years	13.2%	9.3%	8.9%	9.7%	9.1%
25 – 64 years	16.8%	17.3%	14.8%	19.1%	16.5%

** Assumes negligible AIDS-related mortality in 15 – 19 year olds*

HIV prevalence among women attending public antenatal clinics

Figure 19. Trends in HIV prevalence among women attending public antenatal clinics



Overall prevalence among pregnant women who use public health services

Trends: The prevalence among women attending public antenatal clinics has stabilised at about 29.5% since 2004 [Figure 19].

Data validity and reliability: Data is obtained from an anonymous, unlinked survey of close to 36,000 women in 1,415 clinics which serve as nationally representative surveillance sites (approximately 40% of the total number of clinics). Sampling within sites is based on probability proportional to size (PPS) methods, with the sample size allocated to each clinics based on the numbers attending each facility in the prior year. In order to increase comparative power across districts, the number of primary sampling units (sentinel clinics) was increased from 861 to 1,415 in 2006 and sample size was doubled.

The point estimate for 2007 was adjusted upwards from 28.0% to 28.4% once it was established that an incorrect age-weighting had been applied (Dorrington & Bourne, 2008). The Department of Health has published these reweighted figures (Department of Health 2009).

Implications for policy and planning: Given that this sub-population comprises individuals who have had sex without a condom, prevalence trends are likely to be less elastic than those in the general population. Nevertheless, the high proportion of pregnancies among women aged 15 – 29 years and the declining HIV incidence in this age group means that the overall prevalence of HIV among pregnant women should begin to fall gradually. Consideration should now be given to reducing the frequency of antenatal surveillance, given that year-on-year changes are likely to be insignificant.

Age-specific prevalence among pregnant women who use public health services

Figure 20. Trends in HIV prevalence among 15 – 29 year old women attending public antenatal clinics, 1999-2007

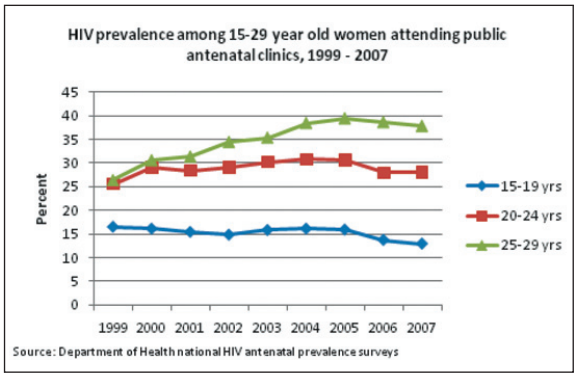
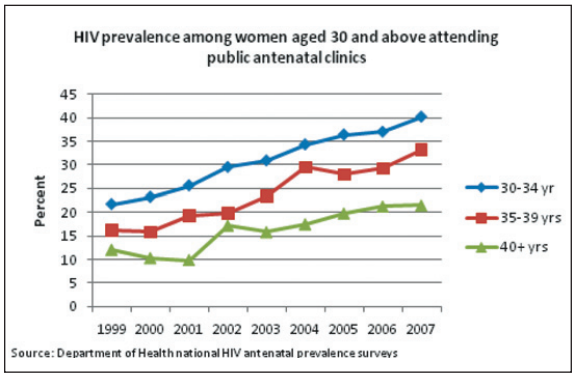


Figure 21. Trends in HIV prevalence among women >30 years attending public antenatal clinics, 1999-2007



Trends: The HIV prevalence among pregnant women aged 15 – 29 years has started to decline. Although the prevalence among 20 – 24 year olds did not vary between 2006 and 2007, there was a significant decline compared to 2005. Among 15 – 19 year olds, the prevalence has declined by 20% (3.2 percentage points) since 2004. These findings point to a significant decrease in incidence among 15 – 29 year old women [Figure 20].

Conversely, the prevalence of HIV among older pregnant women (30 years and above) has not yet peaked [Figure 21]. This is consistent with the increasing prevalence among 30 – 34 year old women in general shown above [Figure 12].

Data validity and reliability: Although national representativeness is firstly a function of the distribution of the primary sampling units (clinics), a higher number of individuals sampled increases the certainty of the point estimates. There are good sample sizes for age groups <20, 20 – 24, 25 – 29, 30 – 34 and 35 – 39 years (2007: n= 6 377, 10 614, 7 912, 5 091 and 2 722 respectively), but the relatively low number of births to women >40 years limits the sample size in this age group (2007: n=782). Variation in trends in this older age group should be interpreted with caution.

Implications for policy and planning: These findings support the trends in the general population, of declining prevalence among 15 – 29 year olds and increasing prevalence among those 30 years and above. It is however likely that declines in HIV among younger pregnant women will not be as marked as that in the general population – as they represent a higher risk group.

There is also evidence that the physiological conditions of pregnancy and lactation may heighten transmissibility of the virus (Gray et al 2005), reinforcing the importance of sustained condom use throughout pregnancy.

Box 2 Does rural life protect against HIV?

A study from mid-2003 to late-2004 estimated the HIV prevalence in a rural population in KwaZulu-Natal (n = 11,551). Using longitudinal surveillance data in Umkhanyakude, it also investigated socio-demographic factors such as mobility and migration. 27% of the female residents (aged 15 – 49 years) and 13.5% of the male residents (aged 15-54 years) were HIV infected. In comparison, 41% of non-resident, migrant women and 34% of non-resident, migrant men tested HIV positive. Among resident women aged 25 – 29 years, 51% were HIV infected, while in men aged 30 – 34 years, HIV peaked at 44% infection.

While people living in urban informal settlements are known to have the highest rates of HIV infection, this study suggests that the burden of HIV infection in rural areas may in fact be higher than previously estimated. The authors argue that accurate and detailed information on prevalence in rural areas has been scarce, where non-resident or 'migrant' household members are often not accounted for, and little is known about those who actively evade participation in surveys. "Almost all the socio-demographic characteristics associated with an increased risk of HIV occurred significantly more frequently among non-participants, suggesting that refusal to test and absence are likely to have resulted in an underestimate of HIV prevalence in this study".

(Welz, Hosegood, Jaffar, Batzing-Feigenbaum, Herbst and Newell, 2007)

HIV prevalence, by province

Figure 22. HIV prevalence among people 2 years and older, by province 2008

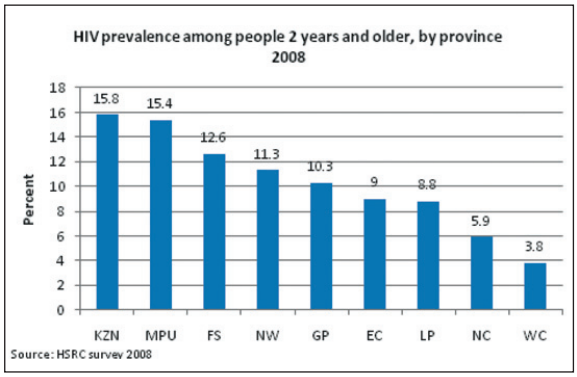
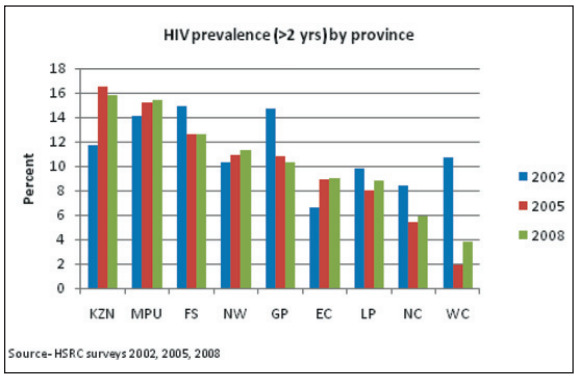


Figure 23. Trends in HIV prevalence among people 2 years and older, by province



Trends: KwaZulu-Natal and Mpumalanga have the highest prevalence of HIV, exceeding 15% in people older than 2 years of age. The three provinces with large farming and mining communities (Free State, North West and Gauteng) have an HIV prevalence between 10 and 15%, while the three provinces with larger rural populations (Eastern Cape, Limpopo and Northern Cape) have a prevalence between 5 and 10%. The Western Cape is the only province where the prevalence is below 5% – as it has a relatively small black African population – the group most heavily affected by HIV [Figure 22]. The prevalence in the Free State, Gauteng and Northern Cape has decreased significantly since 2002, while it has increased in KwaZulu-Natal, North West, Limpopo and the Eastern Cape. There has been an increase in HIV infection in the Western Cape since 2005 [Figure 23].

Data validity and reliability: Relatively wide confidence intervals limit the certainty of changes over time and the ability to compare across provinces. Subtle upward changes that may possibly be occurring in provinces like Limpopo and the Eastern Cape are difficult to detect.
Given the results of the 2005 and 2008, the point estimate for the Western Cape in 2002 (10.7; 95% CI 6.4-15.0) is likely to have been spurious, for reasons possibly related to test reliability and/or sampling bias.

Implications for policy and planning: Provinces seem to have stabilised in three prevalence ranges, name extremely high (>15%), very high (10-15%) and high (5-10%). Although the Eastern Cape, Limpopo and Northern Cape seem to have stabilised at lower levels than all other provinces, except the Western Cape, new economic developments in these provinces could increase rates of infection over the next five years. In particular, the effects of the N2 highway construction through the Eastern Cape and mining expansion in Limpopo need to be proactively mitigated. Without intensive HIV prevention, these developments could create new hot spots that tip provinces such as the Eastern Cape and Limpopo into higher prevalence levels.

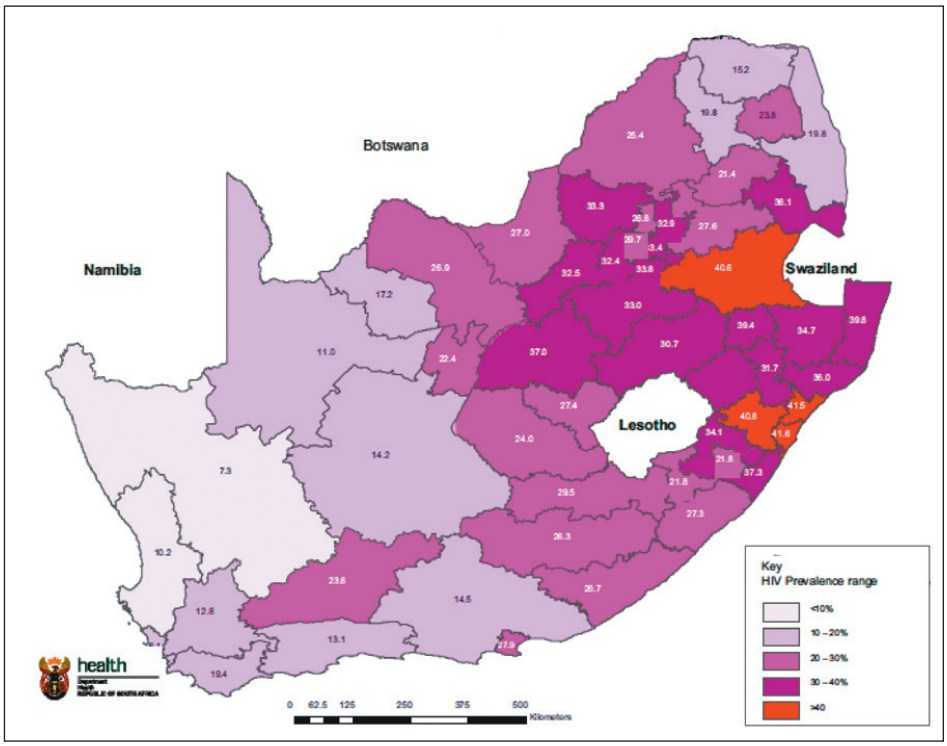
Table 6. Changes in prevalence in provinces, 2002 – 2008

Province	2002		2005		2008		Trends (2008 w.r.t.)	
	PE (%)	95%CI	PE (%)	95%CI	PE (%)	95%CI	2002	2005
KwaZulu-Natal	11.7	8.5-15.2	16.5	14.0-19.3	15.8	13.4-18.6		
Mpumalanga	14.1	9.7-18.5	15.2	12.3-18.5	15.4	11.9-19.7		
Free State	14.9	9.5-20.3	12.6	9.5-16.7	12.6	10.5-15.1		
North West	10.3	6.8-13.8	10.9	8.4-14.0	11.3	9.1-14.0		
Gauteng	14.7	11.3-18.1	10.8	8.9-12.9	10.3	8.3-12.7		
Eastern Cape	6.6	4.5-8.7	8.9	7.0-11.4	9.0	7.2-11.2		
Limpopo	9.8	5.9-13.7	8.0	6.0-10.6	8.8	6.5-11.9		
Northern Cape	8.4	5.0-11.7	5.4	4.0-7.2	5.9	4.5-7.8		
Western Cape	10.7	6.4-15.0	1.9	1.2-3.0	3.8	2.7-5.3	Artefact	

** PE = point estimate*

HIV prevalence (antenatal) by district

Figure 24. HIV prevalence estimates by district among antenatal clinic attendees, 2007



Trends: Data from the annual antenatal surveys has been disaggregated by district. The districts with the highest antenatal prevalence (>40%) are those around Durban in KwaZulu-Natal and Gert Sibande district in Mpumalanga adjacent to Swaziland [Figure 24].

Data validity and reliability: The increase in sample size of both primary sampling units (1,415 clinics) and individuals (36,000) provides a useful spatial mapping and district management tool. However, confidence intervals are generally too wide to compare neighbouring districts. This survey data may be compared with the routine clinic data collected as part of the district health information system, which is still regarded as less reliable than survey data.

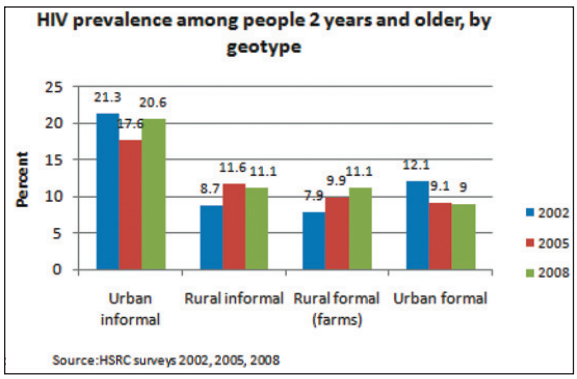
Implications for policy and planning: Spatial mapping illustrates the concentration of the epidemic in KwaZulu-Natal, Mpumalanga, Gauteng, North West and the Free State. However, the prevalence is generally high across the board, such that districts may not constitute the best differentiator for national programme targeting (see below). Nevertheless, this data will provide useful information for district managers in tracking progress over time, gauging the reliability of routine data and assessing the adequacy of coverage of programmes like PMTCT.

Box 3 HIV loves moving around

A study in the predominantly rural districts of Hlabisa and Nongoma (1998-2000) compared HIV infection in migrant men and their rural partners in comparison to non-migrant men (n = 488). No statistically significant difference was found between men and women (22% versus 19.1% respectively; p=0.34). However, the prevalence in migrants and their partners was significantly higher than among non-migrant couples (24.0% versus 15% respectively; p=0.02; OR 1.8; 95% CI 1.1-3.0). Among migrant men, HIV prevalence was significantly higher than among non-migrant men (25.9% versus 12.7%; p=0.03; OR 2.4, 95% CI 1.1-5.3). For women, higher HIV infection was found in partners of migrants than partners of non-migrants. However, the difference was not statistically significant (21.1% and 16.5% respectively; p=0.39). (Lurie, Williams, Zuma, Mkaya-Mwamburi, Garnett, Sturm, Sweta, Gittelsohn & Abdool Karim, 2003)

HIV prevalence by geotype

Figure 25. Trends in HIV prevalence, by geotype



Trends: The effects of urbanisation and migration are seen in the differences in HIV prevalence by geotype, where HIV transmission risk is strongly associated with the poverty and inequality-stressors of unemployment, crime, violence and discrimination that are concentrated in communities in transition (Kalichman et al 2006). The HIV prevalence in informal settlements is almost double that in all other areas [Figure 25]. High incidence nodes are also found in high-transition points in rural areas, either as concentrated informal settlements on the outskirts of small towns or as high-density areas associated with cross-border migration or mining.

Data validity and reliability: The three HSRC surveys, as well as the RHRU survey of 2003 generally found similar patterns, with the prevalence in urban informal areas 1.8-2 times as high as in urban formal settings.

Implications for policy and planning:

- These findings imply that HIV prevention strategies should seek to identify and address those factors predisposing to high risk sexual behaviour in marginalised communities. These include lack of social cohesion and sense of individual and group isolation; limited perceptions of opportunity for personal growth and development; and limited access to information and other social connections.

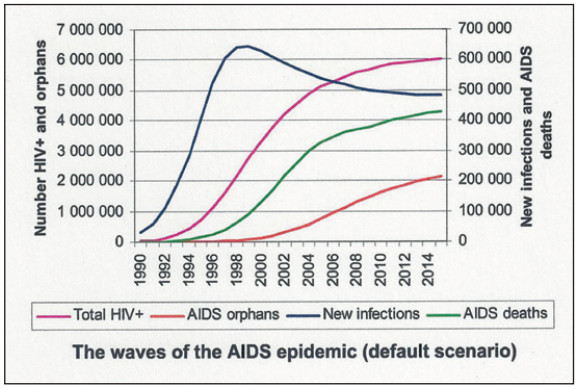
- It should also be noted that there are very few traditional rural areas not affected by migration and pockets of population density. These findings suggest that the classification of districts into rural and urban is not particularly helpful in identifying areas of highest incidence and point to the need for targeting within sub-districts

HIV prevalence in most-at-risk groups

The generalised nature of the epidemic requires a country-wide response at scale, with concentrated efforts in nodes of highest incidence. These nodes may be defined geographically (as above), or in terms of age (life transitions) or specific sub-populations defined by circumstances of risk. Following is an assessment of HIV prevalence among key high risk groups.

Orphans and vulnerable children and teenagers

Figure 26. Projections of HIV infection, mortality and orphan hood, 1990 – 2015



Source: R E Dorrington, D Bradshaw, L Johnson, D Budlender, The Demographic Impact of HIV AND AIDS in South Africa. National Indicators for 2004. Centre for Actuarial Research, South African Medical Research Council and Actuarial Society of South Africa, Cape Town, 2004.

Trends: The emergence of a generation of orphans in South Africa poses new challenges to the containment of the epidemic – as these young people are more likely to be at risk for HIV infection themselves. The 2002 HSRC survey found a prevalence of 12.7% (95% CI 4.8-29.7)

Box 4 Rural and remote may confer some protection

Serum samples from 2013 pregnant women attending public antenatal clinics in the Hlabisa health district were tested for HIV in 1997. A quarter (26%, 95CI 24% – 28%) tested positive and prevalence was highest for women in the 20 – 24 age group. A still high prevalence of 25% was found in the 15 – 19 age band. Women seen at clinics in smaller more remote parts of the district had a lower prevalence (21%) than those seen in the more developed or large areas of Hlabisa (29%, p=0.001). No significant difference in HIV prevalence was found between women with migrant partners as opposed to those with resident partners. (Wilkinson, Abdool Karim, Williams & Gouws, 2000)

among 2 – 18 year olds who had lost both parents, compared to 5.4% (95% CI 4.1-7.1) overall and 6.4% (95% CI 3.7-10.7) among those living in informal settlements.

Young people aged 15 – 24 years of age who have lost one or more parents through death are also at higher risk for HIV infection (AOR 1.19 95% CI 1.05 – 1.36) (Operario et al, 2007). Among 15 – 24 year old women who had lost one or more parent (51.8%), the adjusted odds ratio for having HIV infection was 1.25 (95% CI 1.08 – 1.44) compared with those whose parents are still living.

Data validity and reliability: The above findings are derived from nationally representative sample surveys (HSRC and RHRU respectively). These surveys have high external validity. Data reliability with respect to paternal orphanhood is complicated by the high proportion of absent fathers in households, and respondents may not necessarily know whether their fathers are alive or not. For example, the 2003 RHRU survey found that 22.4% of 15 – 24 year olds said that their fathers had died, compared to 7.9% of mothers. Reported maternal orphanhood is likely to be a more reliable measure.

Implications for policy and planning:

- In practice, any absentee parent – whether deceased or not – increases the vulnerability to HIV infection and high risk behaviour. A study in Kenya found that the presence of a father significantly reduced the likelihood of early sexual activity or unwanted pregnancy (Ngam 2003). Similarly, a study on Uganda found that paternal indifference (or absence) was associated with earlier sexual debut (AOR 1.21, p=0.04) (Wolff et al 2009).

- The protective effect of parents extends beyond material provision and security. A longitudinal survey conducted in the Umkhanyakude district in rural KwaZulu-Natal found that, controlling for socio-economic variables, orphaned teenagers are 1.4 times more likely to have sex by the age of 13 (1.38 95%CI 1.09-1.75) (McGrath et al 2009).

Box 5 ***Most-at-risk: Commercial sex workers***

Data collected in 1996 and 1998, showed a 45% prevalence of HIV among 278 commercial sex workers (all female) in the Hillbrow area of Johannesburg. Prevalence was highest in the 20-25 year age group (51%) but closely followed by 26 to 30 year olds (50%). Time spent in the sex work industry was not significantly correlated with HIV. (Rees, Beksinksa, Dickson-Tetteh, Ballard & Htun, 2000)

- Many orphan-focused interventions have concentrated on the subsistence needs of younger orphans, while few have addressed the concerns of adolescents, which include vulnerability to socio-economic marginalisation, school dropout, physical and sexual abuse and transactional sex for money or food. Those that have focused on teenagers have yet to be adequately assessed.

- Modelling by the Actuarial Society of Southern Africa (ASSA) predicts that there will be 2 million maternal orphans by 2012 (Dorrington et al, 2007) [Figure 26]. They represent a significant high risk group requiring intensive focused interventions. Primary support should be at community-level, through networks of caregivers (such as grandmothers) – supported by State interventions such as social security.

Commercial sex workers

Trends: There is little recent data on the prevalence of HIV among commercial sex workers country-wide, but the prevalence is likely to be higher than the general population.

The three city study of commercial sex workers (n=348) conducted in Johannesburg, Durban and Cape Town in 2008 found that, while poorer, black African women report fewer acts of vaginal sex a week, they are far more likely to be HIV positive. (Leggett 2008). These findings probably indicate that some poorer black women supplement household income by part-time sex work, tend to operate in high prevalence communities on the margins of cities, and are less able to negotiate safe sex.

Data validity and reliability: The secretive nature of sex work precludes representative surveys, which tend to rely on snowball methods of sampling. The lack of random sampling limits external validity.

Implications for policy and planning:

- There is an urgent need for a national HIV prevention initiative for sex workers. They represent a group at high risk with frequent sexual contact with a large number of men. The primary focus should be condom promotion and availability, supported by HIV testing. Strategies focused on sex workers also need to reach those who are not full-time.

- Sex work should be decriminalised to increase protection for sex workers, who are often abused and unable to negotiate safe sex.

Men who have sex with men

Trends: There are no reliable estimates of the number of men who have sex with men (MSM) in South Africa. Assuming that 5 percent of men aged 15 to 60 years have sex with other men, there are approximately 680,000 MSM in South Africa. The results of three recent studies conducted in Johannesburg and Durban (Rispel et al 2009), Soweto (Dladla et al 2009), and Cape Town (Burrell et al 2009) found that MSM are represented in all race groups in South Africa.

The prevalence of HIV among MSM in South Africa is also unknown. Compared to the estimated proportion of MSM in the general population, very few self-identified in the 2008 HSRC survey (n=88, 1% of males >15years). The point estimate is thus unlikely to be accurate (9.9%, 95%CI 4.6-20.2).

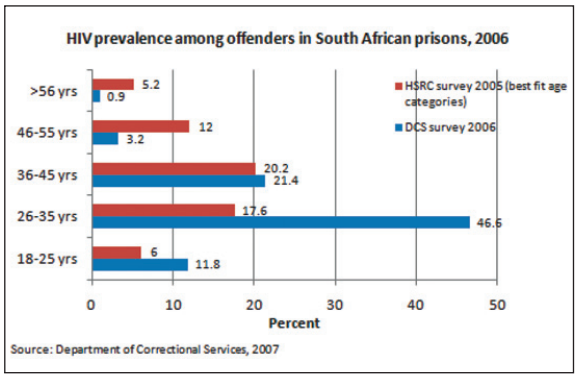
Recent surveys have used snowballing sampling techniques to better identify MSM, and the three recent surveys cited above found that the prevalence of HIV among MSM is considerably higher than in the general population. HIV testing of 266 MSM from Durban (KwaZulu-Natal) and Johannesburg (Gauteng), of whom 67 percent were under 25 years of age, found an HIV prevalence of 44 percent. Two of the three studies found that the prevalence of HIV was significantly higher among gay-identified MSM than among those who identified as bisexual or heterosexual. HIV testing of approximately 300 MSM from Soweto (Gauteng), of whom less than 40 percent were gay-identified, found an HIV prevalence of 21 percent overall and 43 percent among gay-identified MSM. The Cape Town study found that HIV prevalence was significantly higher among 82 black (African) MSM (35.4%) than among 87 coloured (mixed race) MSM (12.6%). (The other two studies did not make any racial comparisons because the participants were predominantly black.) (Reddy et al 2009)

Data validity and reliability: Social stigmatisation means that most MSM do not self-identify to outside observers; thus in gauging frequencies of HIV and high risk behaviour, neither numerators nor the denominator are known.

Implications for policy and planning: There is an urgent need for a national programme focused on MSM. A national network of organisations promotes the interests and health of men who have sex with men, and it should be used to implement a country-wide programme promoting safer sexual behaviour and distributing condoms.

Offenders in correctional services

Figure 27. HIV prevalence among offenders in prisons (2006), compared with national male prevalence 2005



Trends: A survey of a random sample of 10% of offenders conducted in 2006 (with opt-out) found a national prevalence of 19.6% among people incarcerated in correctional facilities [Figure 27]. This compares with 11.7% among males aged

Box 6 Florid, but undiagnosed infections in sex workers

A study in Hlabisa (KwaZulu-Natal) in 1997 found that, among sex workers:

- *77% had at least one STI and 33% had multiple infections (compared to 52% and 18% respectively among pregnant women)*
- *the prevalence of HIV infection was 50% (compared to 24% of women attending family planning clinics*
- *sex workers reported an average of 20 clients each week and only 10% reported using a condom in more than half of all episodes of intercourse*
- *symptoms and signs associated with STIs (lower abdominal pain, burning urine, vaginal discharge, genital itch, genital ulceration) were frequently not recognised or not acted upon*
- *infection was frequently asymptomatic or unrecognised: 60% of infected women in the family planning clinic were asymptomatic and 14% of sex workers had unrecognised genital ulcers (Wilkinson et al 1997)*

Box 7 Truck drivers and sex workers

The HIV prevalence among sex workers and truck drivers visiting sex workers in KwaZulu-Natal was surveyed in 2001. The mean age of truck drivers was 37 (range, 18-71 years) and the female sex workers were on average 25 years old (range, 15 – 49 years). Over half (56%, 95% CI 51-62) of the truck drivers were HIV positive, and no significant association between race and HIV status was found. The overall prevalence for the sex workers (all female) was also 56% (95% CI 49-63). HIV prevalence for the women peaked at 61% (95% CI 53-69) in the age band 20 to 24 years, while prevalence among the male truck drivers increased significantly with age (p=0.006). The highest prevalence of 69% was found among truck drivers between the ages of 55 and 59 years. (Ramjee and Gouws, 2001)

15 – 49 years of age in the general population in 2005 (97.8% of sentenced offenders are male). HIV prevalence among younger male offenders was found to be far higher than in the general male population – close to half (46.6%) of 2,635 year old offenders are HIV positive compared with 17.6% of men aged 25 – 34 years surveyed in the HSRC survey in 2005. Conversely, the prevalence of HIV among older offenders (> 45 years of age) was found to be lower than the general population.

Data validity and reliability: The high non-response rate (refusal to test) among offenders compromises data validity and could explain the substantially lower prevalence found in older offenders. The Department of Correctional Services (DCS) study obtained a response (testing) rate of 46.6% among offenders, lower than the overall testing rate of 65.4% obtained by the 2005 HSRC survey.

Implications for policy and planning:

- Over two-fifths of people incarcerated in South African prisons serve less than 1 year, and 25,000 prisoners are released annually (Goyer 2003). Given the circumstances of prison, HIV transmission is likely to be higher than in the general population – and newly released (and often newly infected) individuals represent a high-risk group in their communities.

- The most critical intervention is to improve male condom availability in prisons. Current policy is that condoms may be made available following proper counselling regarding safe sexual behaviour. This condition should be lifted and condom distribution significantly increased.

- HIV testing should be extended to ensure earlier access to a package of medical prevention and treatment (including regular TB screening and access to ART). In addition, life navigation programmes should be extended nationally, starting in juvenile detention centres.

Box 8 Growing up – a dangerous mine field

An HIV prevalence survey was conducted in an informal settlement outside the gold mining district of Carletonville in Gauteng in 1999. Data from a random sample of male and female residents aged 14-24 years was analysed (n = 1507), yielding high prevalence estimations, typical of urban informal settlements: 22.4% of the overall sample were HIV positive. 9.4% of men and 34.4% of women were infected at the time of the study. Prevalence rapidly increased with age, especially among women: 6.1% (95% CI, 1.2-11.0) of females aged 14 and 15 were HIV positive, whereas an extremely high prevalence of 67.7% (95% CI 54.6-77.3) was estimated for 24 year old women. Prevalence for men peaked at 32.9% between the ages of 22 and 24. (Auvert, Ballard, Campbell, Carael, Carton, Fehler, Gouws, MacPhail, Taljaard, van Dam & Williams, 2001)
In a sample including 862 mineworkers residing in hostels, 95 sex workers, 415 male, and 731 female residents from a nearby township (n = 2103), sera was obtained and tested for HIV. Participants were between the ages of 16 and 63 years. Sex workers showed the highest prevalence rate (76.8%) followed by female township residents (48.3%). Of the mineworkers, 36.5% were HIV infected, and the lowest prevalence was found among the male township residents (22.2%). Overall prevalence of HIV in the sample was 39.6%. (Malope, MacPhail, Mbisa, MacPhail, Stein, Ratshikhopha, Ndhlovu, Sitas, Whitby, 2008)

Intravenous drug users

Trends: The incidence of HIV transmission through intravenous drug use is not known, although the prevalence of HIV among drug users may be higher than the general population (5 – 20%) (Parry & Pithey 2008). The HSRC survey 2008 found a prevalence of 10.8% (95% CI 7.2 -15.8) among the 490 people who self-identified as using drugs for recreational purposes [Shisana et al, 2008]. This estimate is identical to the national average, but may be biased by under-reporting of illegal practices. Nevertheless, intravenous drug use is thought to be quite low in South Africa, with a strong stigma against it in the drug-using community (Leggett 2008), and its contribution to total incidence is likely to very small relative to other modes of transmission.

Data validity and reliability: The illicit nature of intravenous drug use precludes representative national surveys.

Implications for policy and planning: Needle exchange programmes should be implemented as part of all rehabilitation programmes for intravenous drug users. However, this is not a priority in terms of national incidence reduction.

High-risk drinkers

Trends: High risk drinkers were identified through a validated ten-item scale related to alcohol use called the Alcohol Use Disorder Identification Test (AUDIT) (Babor et al 2001). The HSRC 2008 survey estimated an HIV prevalence of 13.9% (95% CI 10.4-18.2) among high risk drinkers (n=490/15,845 people >15 years: 3% of total sample). This approximates the national prevalence among people >15 years.

Data validity and reliability: Self-reported questionnaires may under-estimate the frequency of heavy drinkers and skew the findings.

Implications for policy and planning: In a study of three communities in Cape Town, substance abuse was associated with higher risk of HIV transmission, but did not reduce the independent effects of poverty-related stressors (Kalichman 2006). This suggests that HIV prevention efforts in marginalised communities cannot focus only on HIV and substance abuse prevention communication, but must address the poverty-related stressors at the same time.

People with disabilities

Trends: People with disabilities are often at risk for physical and sexual abuse. They are often neglected in HIV prevention programmes. The HSRC 2008 survey found a prevalence of 14.1% (95% CI 9.9-19.6) among people with disability (n=458/21,654 people > 2 years: 2% of total sample). This is higher than the national average of 10.9%.

Data validity and reliability: The relatively small sub-sample of disabled people reduces the certainty of the point estimate, with 95% confidence limits between 9.9% and 19.6%.

Implications for policy and planning: The lack of protection of people with disability is of real concern, and support programmes for people with disability should specifically address issues of physical and sexual abuse and HIV prevention. Similarly, the Department of Justice should be alert to the heightened vulnerability of disabled people to sexual abuse.

Incidence of HIV

TRENDS AT A GLANCE

Table 7. Trends in age-specific HIV incidence

Age group	Trends	
	Male	Female
<2 years		
2-14 years		
15 – 19		
20 – 24		
25 – 29		
30 – 34		
35 – 39		
40 – 44		
45 – 49		
50 – 54		
55 – 59		
60+		

Colour	Incidence trend
	Improvement
	Equivocal (+-)
	Worsening
	Insufficient data

KEY

Table 8. Trends in age-specific HIV incidence among women attending public antenatal clinics

Age group	Trends
	Pregnant women
15 – 19	
20 – 24	
25 – 29	
30 – 34	
35 – 39	
40+	

Colour	Incidence trend
	Improvement
	Equivocal (+-)
	Worsening
	Insufficient data

KEY

Estimated overall trends in HIV incidence in South Africa, 2008

The accuracy of measurement of incidence is still debatable and we do not have baseline data. Hence, the following are informed guesses:

- Overall incidence of HIV is about 1.2% per annum
- Incidence among newborns has been halved, but there are still at least 28,000 unnecessary infections through vertical transmission a year
- Rate of new HIV infection among young people (15 – 24 years) has decreased by about 50% since 2002
- Spike of new infection occurs in 18 – 21 year old women (>2% p.a.) and men in their early twenties (>1.5% p.a.)
- High rates of new infection (>1.5% p.a.) are sustained beyond the age of thirty

Data validity and reliability: The incidence of HIV is the rate of new infection in the uninfected population per year. In local studies, it is often measured by tracking cohorts over time, but national longitudinal studies are very expensive and would require massive sample sizes. For that reason, estimations of incidence are either extrapolated from prevalence data or, more recently, the use of BED antibody (IgG) assay which measures recent infection.

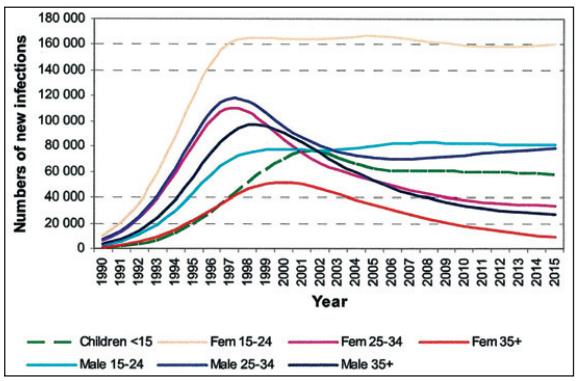
Prevalence is a measure of the proportion of the population who have HIV. Changes in prevalence are determined by three factors, namely the number of new infections each year, the number of people with HIV who die each year and the number of people born each year. A high rate of new infections will push the prevalence up and a high death rate from HIV will push the prevalence down. Changes in fertility rates will alter the denominator of uninfected persons, but typically does not change much over a five-year period.

Among teenagers – an age group with very low mortality – year-on-year changes in prevalence approximate incidence fairly well. However, the validity of calculations in single-year age bands is constrained by relatively small sample sizes and consequent wide confidence intervals. For example, the confidence intervals associated with the point estimates for 15 – 19 year old males and females were 1.2-7.7 and 4.9-8.5 respectively. Nevertheless, mathematical estimates are a useful and fairly accurate measure among teenagers.

But in older age groups, increasing mortality complicates interpretation of prevalence changes. Hence the development of biomedical measures to gauge new infection. The BED immunoassay HIV-1 incidence test was developed to measure recent infection with sub-types B, E and D. In southern Africa, the dominant sub-type is C, and correction factor (McDougal Correction) has been developed to adjust for the different sub-types. However, the accuracy of the 'correction factor' where sub-type C is dominant, is still open to debate, with one study finding a specificity[1] of 71% (95% CI 54-84) and validation studies of the McDougal correction finding a specificity of 94% (Westreich et al 2007). It is also possible that the specificity varies over time-from-infection (Hallet et al 2009).

A third point of triangulation is modelling projections, where changes in incidence are modelled by varying determinants of HIV infection, such as the prevalence of condom use and extent of treatment of curable sexually transmitted infections. Together, these three methods (mathematical calculation, incidence testing by immunoassay and modelling projections) provide some degree of confidence in estimating the incidence of HIV.

Figure 28. Projected number of new infections (based on ASSA lite 2003 model)



Dorrington R, Johnson L, Bradshaw D, Daniel T-J (2006). The Demographic Impact of HIV AND AIDS in South Africa. National and Provincial Indicators for 2006. Centre for Actuarial Research (UCT), South African Medical Research Council and Actuarial Society of South Africa, Cape Town, 2006.

Overall incidence

Trends: In 2005, the HSRC survey found an incidence of 1.4%, (95%CI 1.0-1.8) based on BED-immunoassay. This figure was comparable to the projections for 2006 of 1.3%, based on the Actuarial Society of South Africa model for HIV/AIDS (ASSA lite 2003) [Figure 28] (Dorrington et al 2006). That model predicted a decline in incidence to 1.2% by 2008, based on a number of assumptions[2]. The incidence findings of the HSRC survey 2008 were not released in time for publication in this Prevention Gauge. Given the similarity between empirical and modelled findings for 2005/6, we can say with reasonable confidence that the total incidence in 2008 was about 1.2%.

1 Specificity is the accuracy of detection – the percentage of positive findings that prove to be true. Sensitivity is the ability to detect – the percentage of true cases that are able to be picked up.

2 The ASSA model varies a number of factors, including coverage of information and education campaigns, improved treatment of STIs, expanded voluntary counselling and testing, mother-to-child prevention and antiretroviral treatment.

Age-specific incidence:

Infants

The incidence of vertical transmission in South Africa is estimated at 3% of live births, calculated as follows:

- The average number of live births recorded in South Africa over the past five years is 940,000 (Statistics South Africa, 2008a).
- Using this figure as the minimum (assuming that there are some unregistered births) and assuming an overall antenatal prevalence of 25% (29.4% in public sector and 2% in private sector), about 250,000 babies are exposed to HIV in utero, at birth or through breastfeeding.
- Without any intervention, and with vertical transmission rates estimated at about 30% (UNAIDS 1998), approximately 75,000 babies will become infected each year. At current levels of PMTCT coverage and programme efficacy (see Programmes section), it is likely that fewer than 60% of these infections are averted, and at least 28,125 infants are still infected.

Box 10 HIV incidence during pregnancy

A prospective randomised control study conducted in Rakai, Uganda, found an increased risk of incident HIV during pregnancy. Adjusted odds ratios of HIV transmission – relative to non-pregnancy – were 2.16 [95% CI 1.39-3.37] for pregnancy and 1.16 [95% CI 0.82-1.63] for lactation. These findings could not be explained away by changes in sexual behaviour during pregnancy and implied that physiological changes of pregnancy may heighten HIV transmission (Gray 2005).

In South African primary healthcare facilities, HIV testing is offered to most (80%) pregnant women at their first antenatal visit. However, retesting of HIV negative women at subsequent antenatal visits is seldom done or reported on. A study linked to a PMTCT programme (2006/07) sought to gauge HIV incidence during pregnancy. In urban and rural clinics in Mpumalanga, Eastern Cape and Free State, pregnant women who had tested negative at baseline were retested for HIV between 36 and 40 weeks of gestation. Repeat tests were done on 1,278 women in rural clinics and 1,099 women in urban health facilities who were initially HIV negative.

3% of the 2,377 pregnant women tested positive for HIV on repeat testing, yielding an HIV incidence of 10.7 per 100 pregnant-woman-years (95% CI 8.2-13.1). The incidence risk ratio of urban versus rural infection was 1.37, but not statistically significant for this sample size (95% CI 0.86-2.17, p=0.182).

The authors note that HIV incidence for the pregnant women in the study was about 4 times higher than in the general female population. These findings emphasise the importance of sustained condom use throughout pregnancy.

(Moodley, Esterhuizen, Pather, Chetty & Ngaleka, 2009)

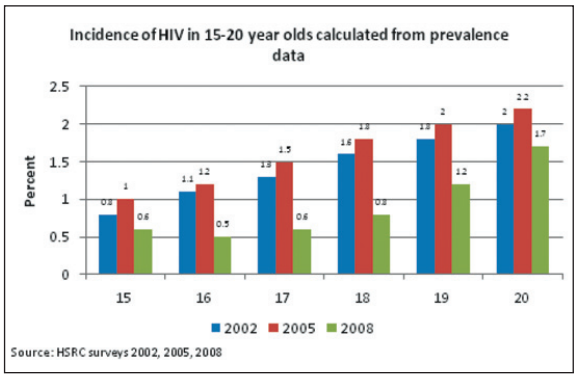
2 – 14 year olds

The 2005 HSRC survey estimated the incidence of HIV among 2 – 14 year olds at 0.5% (95%CI 0.0-1.2). If the 2008 HSRC survey provides further substantiation, this represents a high rate of infections in this age group.

15 – 19 years

The incidence of HIV among 15 – 19 year olds seems to have declined sharply since 2005. Figure 29 shows the incidence calculation for the single-year age bands 15 – 20. It shows that incidence is relatively low until 18 years, whereafter it still climbs steeply.

Figure 29. Trends in incidence of HIV among15 – 20 year olds, calculated from prevalence data



20 – 24 years

The fact that the prevalence of HIV among 20 – 24 year olds is still extremely high (21.1% and 5.1% in women and men respectively) implies that the incidence is still significant, even if it has declined somewhat. Using prevalence data to extrapolate the incidence among those older than twenty is complicated by increasing mortality of people living with Aids (which could lead to incidence being underestimated) and increasing longevity of people on antiretrovirals (which could lead to incidence being overestimated).

Based on mathematical calculations, the HSRC survey 2008 found an overall incidence of 1.7% among 20 year olds, while a similar figure for the entire 20 – 24 year age group may be derived from the difference in prevalence between 15 – 19 year olds and 20 – 24 year olds. Analysis of data from the annual antenatal surveys has led Rob Dorrington of the Centre for Actuarial Research (University of Cape Town) to conclude that the incidence among women under 30 years of age appears to have peaked around 2003/04 at 2.8% (95% CI: 0.8-4.8%) and has fallen since then to 0.5% in 2006/07

(0-2.5%). However, wide confidence intervals limit the certainty of these findings, and greater certainty will only be achieved by increasing the survey sample sizes substantially or through large-scale cohort studies (Dorrington 2009). The HSRC incidence data will assist in confirming or revising current estimations.

>25 years of age

Prevalence data from the HSRC survey 2008 shows that the steep trajectory continues throughout the twenties, with prevalence among 25 – 29 year old women peaking at 32.1% (95% CI 27.5 – 38.0). Male prevalence peaks at 25.8% (95% 19.8 – 33.9) among 30 – 34 year olds. The prevalence remains high (>7%) until 60 years of age. The proportion of people older than 24 years of age infected with HIV has increased since 2005 from 15.6% (95% CI 14.2-17.1) to 16.8% (95% CI 15.3-18.4). This may be explained by increasing access to ARVs, coupled with the maturing nature of the epidemic as the most infected cohorts get older.

But it also clear that the incidence of HIV remains high among older adults. Dorrington et al project an incidence of 1.5% for women and 1.9% for men (Dorrington et al 2007). This figure is the same as that obtained from BED immunoassay tests in the HSRC survey in 2005 (Rehle et al 2007). For planning purposes and in the absence of other data, a reasonable estimate of current incidence among people 25 – 64 years of age is roughly 1.7%.

Implications for policy and planning:

- In terms of reducing national incidence, the immediate priority is the near-elimination of all vertical transmission from mother-to-baby. An optimally functioning PMTCT programme – using a dual therapy regimen for women with CD4 count >350 and prompt initiation of HAART for those ≤ 350 – would reduce the transmission in HIV exposed babies to less than 5% (Lallemant 2004). This will reduce the number of babies infected to below 3,750 in each year.

- The apparent high incidence of HIV infection among 2-14 year olds (high for this age group) needs further verification and investigation. The high rates of physical and sexual assault in South Africa may be a contributing factor. A further concern is the sub-group of young people who have penetrative sex before the age of 15 years. Although they constitute a relatively low percentage (8.5%), they represent a group at high risk through transactional sex and lower condom use.

- The declining incidence among teenagers is encouraging and suggests that behavioural change programmes have had particular effect in this age group. However, the incidence spike in late adolescence contributes significantly to the lifetime probability of HIV infection.

- The risk of HIV infection among people in their twenties – already affected by higher risk tolerance – is further heightened by the desire for reproduction. These factors necessitate a concentrated initiative to prevent HIV among 18 – 25 year olds, including parenting counselling, HIV testing, counselling of discordant couples, and initiation of ART prior to pregnancy in HIV-positive women to reduce the risk of vertical transmission to virtually zero.

- The persistence of high rates of infection in people thirty years and older needs to be better understood and addressed. To date, this group has not been the focus of major behaviour change efforts in South Africa and there may be new gains in ensuring better access to information. The greatest gain probably rests in improving consistency of

Box 11 Incidence in rural KwaZulu-Natal

In the district of Umkhanyakude in KwaZulu-Natal, incidence was calculated from data from a prospective population-based HIV survey conducted between 2003 and 2005. Women aged 15 – 49 and men 15 – 54 who tested HIV negative at baseline, with an either negative or positive result in the second round of the survey, were eligible for inclusion.

During 5,253 person-years at risk (n = 4,046), 170 participants sero-converted, yielding a crude HIV incidence rate of 3.8 new infections (95% CI, 3.2-4.6) per 100 person-years for women and 2.3 new infections per 100 person-years (95% CI, 1.8-3.1) for men. Multiple imputations (MI) were used to adjust for possible non-response bias, yielding an estimate of 7.9 per 100 person-years (95% CI 7.4-8.4) for women and 5.1 per 100 person-years (95% CI 4.1-6.2) for men.

HIV incidence for women peaked among 25 – 29 year olds (with and without MI), while for men MI changed the highest HIV incidence from the age group 25 – 29 years to 30 – 34 years.

HIV incidence was 53% higher in women than in men ($p<0.001$), almost twice as high in unmarried individuals with a partner compared to those who were married ($p<0.001$) and higher among those reporting that they were 'extremely poor' as opposed to 'just getting by' ($p<0.022$). Increased distances between the participant's house and government clinic increased the risk of infection (adjusted hazard ratio 1.174, $p=0.051$), while it decreased with increasing distance from a public road (adjusted hazard ratio, 0.856; $p=0.002$). (Barnighausen, Tanser, Gqwede, Mbizana, Herbst & Newell, 2008)

condom use among sexual partners – even those in long-term relationships – and reducing partner concurrency. At the margin, there may also be some gain in improving syndromic management of STIs, particularly among men who attend private general practitioners. Almost half of all curable STI cases are treated by private GPs, and only about 10% of these are fully treated (Schneider et al 2005). Although treatment of curable STIs is thought to have limited impact on incidence in a mature epidemic, it is still a cost effective intervention (taking into account its marginal effects on HIV and the value of treating the STI epidemic in South Africa) (see White et al 2008).

Box 12 New infection rates in Limpopo

In rural Limpopo, HIV incidence was measured among 14-35 year olds between 2001 and 2004 (n=1,286). A total of 34 sero-conversions among men and 108 among women were recorded. For men, HIV incidence was calculated at 2.2 per 100 person-years (95% CI 1.5-3.0). Among women, incidence was 4.9 per 100 person-years (95% CI 4.0-5.9) and in all age groups, incidence among women exceeded rates among men. Sero-conversion was significantly less common in women with higher levels of education (AOR 0.49, 95% CI 0.28-0.85). For both sexes, incidence was lowest in the youngest age groups.

Contrary to the authors' expectations, no association was found between migrancy and the risk of seroconversion. However, it was suggested that relatively low rates of new infections among men and limited migration rates among women may have reduced the power to predict such an association. There was similarly limited evidence for variation in HIV incidence by household wealth or marital status. Overall, women, particularly those with a measure of socioeconomic deprivation, remained the most vulnerable to HIV infection in rural Limpopo.
(Hargreaves, Bonell, Morison, Kim, Phetla, Porter, Watts & Pronyk, 2007)

Mortality

TRENDS AT A GLANCE

Table 9. Trends in mortality rates (1997 – 2004)

Age group	Trends	
	Male	Female
2-14		
15 – 19		
20 – 24		
25 – 29		
30 – 34		
35 – 39		
40 – 44		
45 – 49		
50 – 54		
55 – 59		
60+		

Colour	Mortality trend
	Improvement
	Equivocal (<10% change)
	1.1 – 1.49 times worse
	1.5 – 1.99 times worse
	2.0 – 2.99 times worse
	3.0 – 3.99 times worse
	> 4 times worse
	Insufficient data

KEY

Table 10. Trends in mortality rates (2004 – 2006)

Age group	Trends	
	Male	Female
2-14		
15 – 19		
20 – 24		
25 – 29		
30 – 34		
35 – 39		
40 – 44		
45 – 49		
50 – 54		
55 – 59		
60+		

Colour	Mortality trend
	1.5-1.99 times better
	1.1-1.49 times better
	Equivocal (<10% change)
	1.1 – 1.49 times worse
	1.5 – 1.99 times worse
	Insufficient data

KEY

Figure 30. Survival rates of people alive on their 15th birthday 2004, compared to 1997

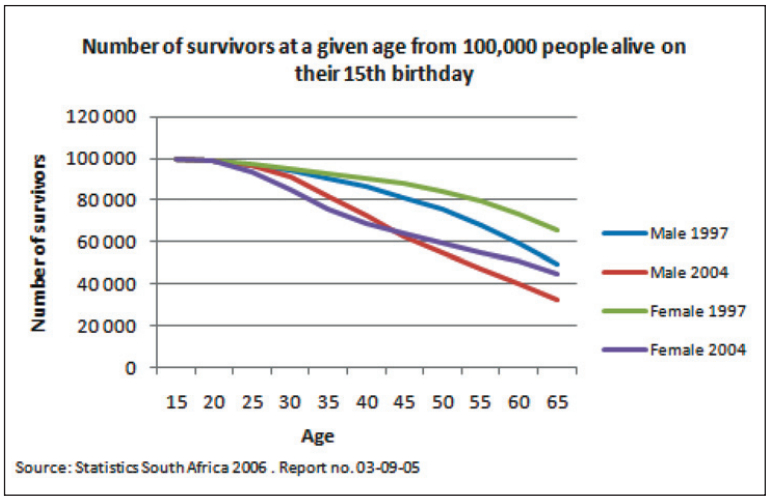


Figure 31. Trends in age-specific mortality 1997 – 2006 (adjusted for incomplete reporting)

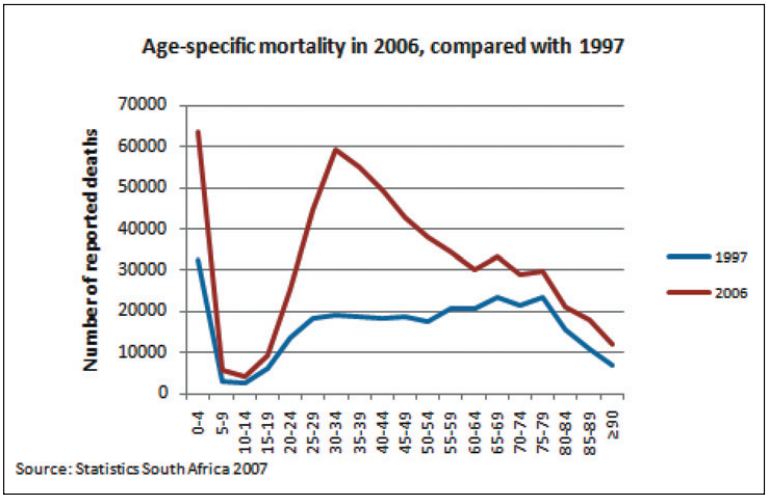


Figure 32. Trends in age-specific mortality among males 1997 – 2006 (adjusted for incomplete reporting)

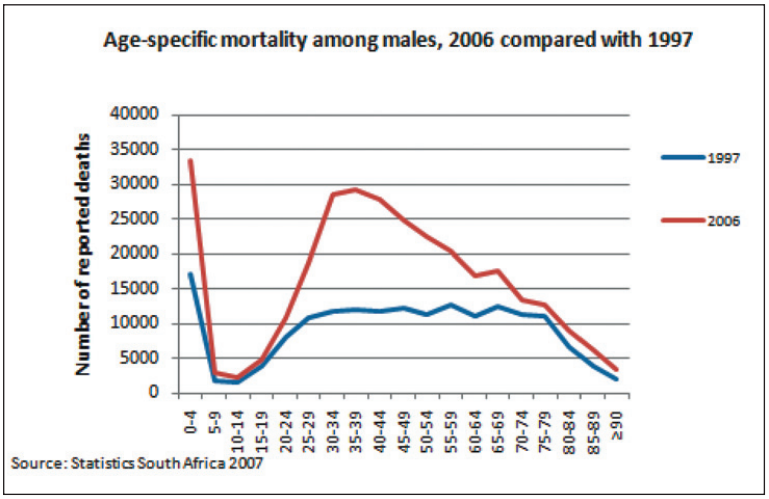


Figure 33. Trends in age-specific mortality among women 1997 – 2006 (adjusted for incomplete reporting)

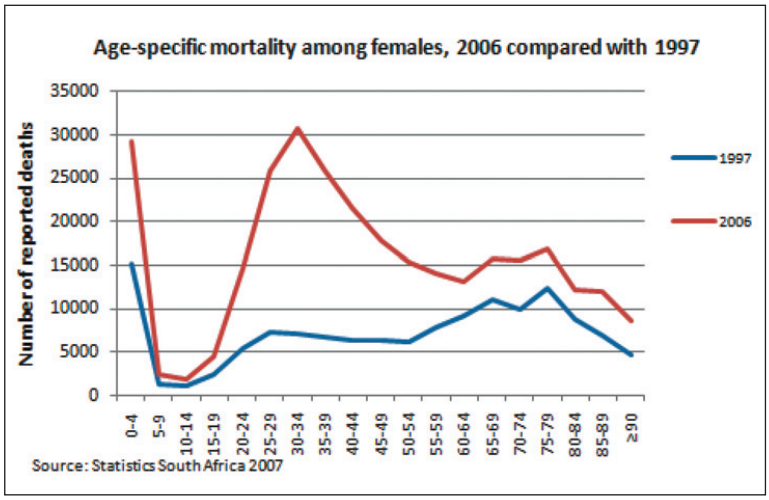


Figure 34. Trends in age-specific mortality rates among men 1998 – 2006 (adjusted for incomplete reporting)

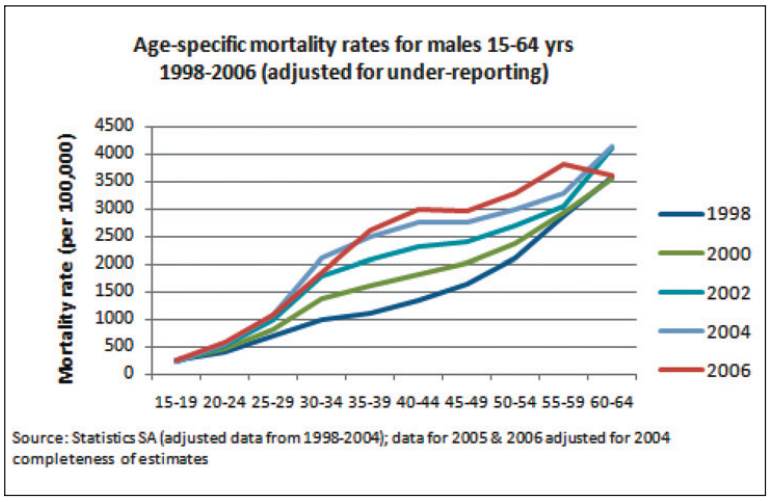
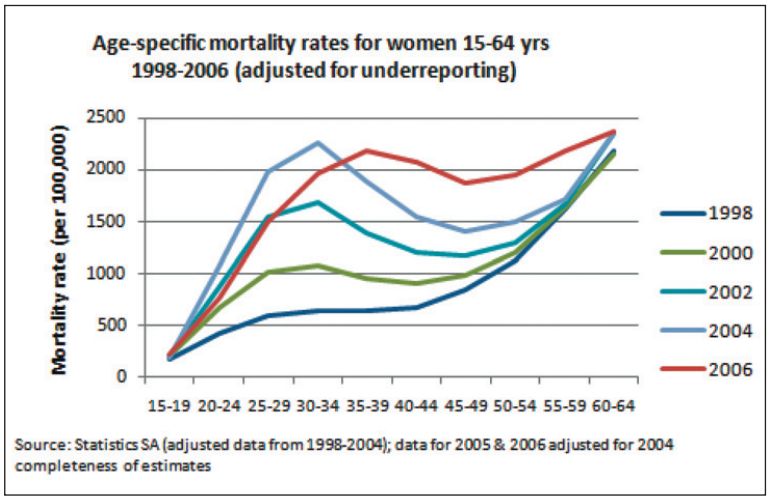


Figure 35. Trends in age-specific mortality rates among women 1998 – 2006 (adjusted for incomplete reporting)



Trends:

Among children: Notification of deaths among children (<15 years) is still regarded as too incomplete to analyse accurately, although the sharp increase in notifications probably reflects both improved vital registration and significant increases in AIDS-related mortality.

Among men: Mortality rates among 30 – 34 year old men increased by over 2½ times (259%) between 1997 and 2004. This increase is evident from age 20 and sustained to 55 years of age.
Since 2004, there appears to be a moderate decline in mortality rates (13%) among 30 – 34 year old men, with a slight increase among 50 – 54 year old (10.5%) and 55 – 59 year old (16.4%) men. Among those older than 60 years of age, there has been a relative decrease in mortality rates (although notification rates in people over 60 years of age are unreliable). In all other age groups, there has been no marked change in mortality.

In 2004, the probability of the national cohort of 15 year-old male South Africans dying before the age of 60 years (45q15) was 67% [Figure 30].

Among women: Mortality rates among women aged 25 – 29 years of age more than quadrupled (439%) between 1997 and 2004, with dramatic increases from aged 20 – 49 years of age. In 2005 and 2006, there appears to be a significant decline in mortality rates among young women aged 20 – 34 years in particular (24%) – albeit from extremely high levels of mortality (1,985 per 100,000). These declines are evident from 20 – 34 years of age, while there is still a rise in mortality in older age groups.

In 2004, the probability of the national cohort of 15 year-old female South Africans dying before the age of 60 years (45q15) was 55% [Figure 30].

Among prisoners in correctional facilities: Prison statistics are a complete source of mortality data for a most-at-risk group. The numbers of natural deaths of prisoners and medical releases (implying terminal illness) are described in Table 11.

Table 11. Natural deaths and medical releases of prisoners, 1996 – 2007

Year	Natural deaths	Medical releases
1996	211	49
1997	327	47
1998	534	47
1999	737	59
2000	1 087	60
2001	1 169	51
2002	1 389	88
2003	1 683	117
2004	1 689	76
2005	1 507	64
2006	1 249	70
2007	1 056	58
Percentage increase 1997 – peak	**800%**	**238.0%**
Percentage increase 1997 – 2007	**500%**	**18.3%**

Mortality data from prisons indicates that AIDS is taking a heavy toll on prisoners. For example, there were 6.38 natural deaths per 1,000 prisoners during 2000 – an increase of 584% from 1995 (1.65 deaths per 1,000), while the prisoner population increased by 38% over that same period (Goyer 2003).

The number of natural deaths peaked in 2004, and has decreased by 60% since then. This is most likely due to expanded antiretroviral provision to prisoners, with 2,718 prisoners on ARVs by the end of 2007 and an estimated 4,800 by the end of 2008 (Dept of Correctional Services, 2008). This represents about 3% of the total prison population. Assuming one in five people living with HIV in South Africa currently need ARVs, the prevalence among prisoners would be at least 15%.

Data validity and reliability: Vital registration for all people in South Africa was only established in 1994, and data prior to 1997 is regarded as unreliable. The registration of deaths among 15-64 year olds was estimated in 2004 at 80.2% for males and 81.8% for

Box 13 Young, beautiful and dead

Umkhanyakude, a rural district in the north of KwaZulu-Natal, was the site of a study that calculated and described age specific mortality in the area for the year 2000. There were 1,021 deaths recorded for adults 15 years and older. Mortality rose sharply with age for young adults. Between the ages 15 – 19 and 20 – 24, men's mortality rates increased four-fold and female rates increased five-fold. Overall, men had significantly higher mortality than women. However, 20 – 29 women may have had higher mortality than men (RR 1.13; 95%CI 0.86-1.48).
The probability of dying between ages 15 and 60 (45q15) was 58% for women and 75% for men. Among 15-44 year olds, AIDS caused 73% of female deaths and 61% of male deaths. Among these deaths, TB co-mortality was 48%.
While AIDS mortality is higher among women than men before 30 years of age, rates were higher among men for people older than 30. Risk of AIDS mortality peaked for men between ages 30 and 44. Homicide and injury-related deaths also accounted for a substantial proportion of young male mortality. (Hosegood, Vanneste & Timaeus, 2004)

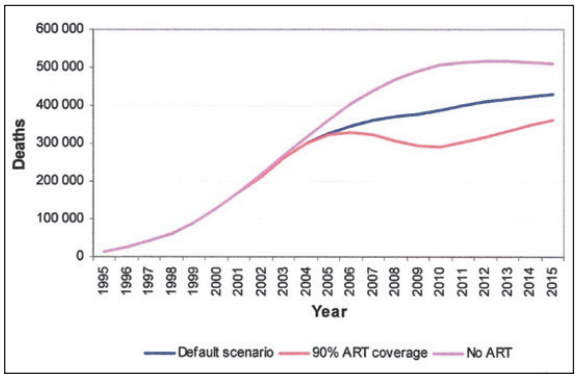
females (Statistics South Africa 2006a).

Figures 31, 32 and 33 present unadjusted mortality figures based on actual registrations, while Figures 34 and 35 show mortality rates, adjusting for the estimated completeness of mortality data. Crude mortality data was derived from death notification (Statistics South Africa 2008b), while adjusted data for 1997 – 2004 was derived from Statistics South Africa's report of age-specific mortality (Statistics South Africa 2006). Data for 2005 and 2006 was adjusted from death notification, using estimates of completeness for 2004.

Changes between 2004 and 2006 should be interpreted with caution as weighting for completeness is based on 2004 calculations. Estimates for 2005 and 2006 are not available.

Implications for policy and planning: There is some indication that mortality rates peaked in 2004 and are starting to decline – probably as a result of the expansion of antiretroviral treatment programme. However, the moderate effect of ARVs on overall AIDS-related mortality needs to be understood: Figure 36 (below) illustrates that, at 50% programme coverage for those eligible for ARVs, annual mortality will only be reduced by 25%. Even at 90% coverage, mortality will be less than halved, and there will still be over 200,000 AIDS-related deaths a year. Systems failures that result in poor adherence and higher drug resistance will worsen outcomes, and it imperative that the antiretroviral treatment programmes is optimally implemented.

Figure 36. Projected mortality associated with varying levels of ARV coverage



Source: R E Dorrington, D Bradshaw, L Johnson, D Budlender, The Demographic Impact of HIV AND AIDS in South Africa. National Indicators for 2004. Centre for Actuarial Research, South African Medical Research Council and Actuarial Society of South Africa, Cape Town, 2004.

Box 14 Untested and untreated at death

In Umkhanyakude, longitudinal household surveillance (The Africa Centre Demographic Information System) as well as three annual prospective population-based HIV surveys between 2003 and 2006 were used to examine mortality differentials in individuals who were HIV positive, HIV negative and those who refused to test (survey round 1, n = 12,653, survey round 2, n = 21,901; survey round 3, n = 21,214). Resident household members in the surveillance area were visited at home.

The sample included women 15 – 49 years and men 15 – 54 years. In every observation, mortality was highest among HIV infected people, and higher in men than women, irrespective of HIV and testing status. HIV positive individuals were 11 – 19 times more likely to die than HIV negative individuals. Age and sex were significantly associated with higher mortality rates and a peak was seen in the 45-54 year age group, regardless of HIV status.

After adjusting for age, sex and socioeconomic status, HIV positive individuals were nearly 9 times more likely to die than HIV negative individuals. In the group with unknown HIV status, mortality rates were 4 – 7 times higher than in uninfected people. In this unknown status group, individuals under 35 resembled more closely the rates for the HIV infected group. However, the rates for those older than 35 years are closer to the rates of the uninfected sample. This may indicate a reluctance to test among youth who are at higher risk.

There was a decline in mortality in 2005/2006 compared to 2004, especially among HIV positive individuals. Overall mortality decreased from 71 to 48 deaths per 1000 person-years from 2005 – 2006. According to the authors, this is likely due to the district ART programme which commenced in late 2004. Notably, more men than women were receiving ART treatment in the area at the time.
(Nyirenda, Hosegood, Barnighausen & Newell, 2007)

Predictors of HIV infection

AT A GLANCE

Table 12. Predictors of HIV infection among 15 – 24 year olds

Predictor	Effect size	
	Male	Female
Demographic		
Gender: Women vs men		
Race: Black African		
Age: 20 – 24 vs 15 – 19 years		
Socio-economic		
Geography: Urban vs rural		
Education: Did not complete high school		
Marital status: Married vs single		
Circumcised (vs not)		
Sexual behaviour		
Sexually active for >12 mo.		
Does not always use a condom		
Number of lifetime partners (per add. partner)		
Age difference of partner ≥5 years for 15 – 19 year olds		
Unusual genital discharge		
Genital ulcers in past 12 months		
HIV prevention interventions		

Colour		Adjusted odds ratio ($p \leq 0.05$)
	LOW	0.4 – 0.59
		0.6 – 0.79
		0.8 – 0.99
		Equal odds
	RISK	1.01-1.19
		1.2 – 1.49
		1.5 – 1.99
	HIGH	2.0 – 2.99
		≥3.0
		Not significant at $p \leq 0.05$

KEY

Predictors of HIV

It is useful to consider four main categories in classifying the predictors of HIV infection, namely:

- Demographic factors
- Social and economic factors
- Individual factors related to sexual behaviour and self-efficacy; and associations with HIV
- Exposure to HIV prevention programmes (either media exposure or participation in interpersonal programmes).

Multiple regression analysis on nationally representative sample survey data may identify significant predictors of HIV infection, and Pettifor et al (2005) have published findings for 15 – 24 year old men and women [Table 13]. Similar regression analysis for older age groups based on national population data is not yet available. However, it is likely that many of the associations, though not all, hold true for older people too.

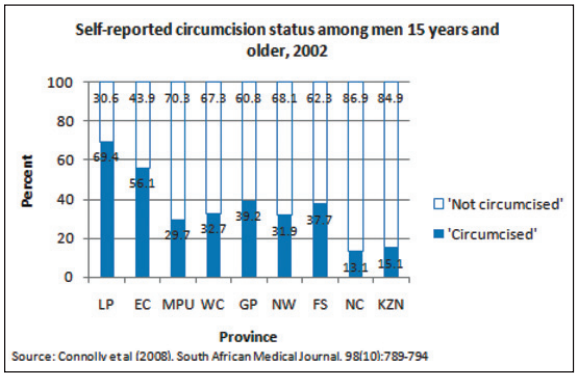
Decreased risk

- Among 15 – 24 year old women, marriage was found to be protective. However, multiple regression on the 2002 HSRC data (n=6,095) found that the risk of HIV among people older than 15 years was significantly higher among unmarried people when only self-reported sexual behaviour was controlled for (OR 0.55 95%CI 0.47-0.66), but was not significant when age, socio-economic status and race (among others) were included in the model (OR 0.85 95% CI 0.71-1.02) (Shisana et al 2004). Simply put – and no surprise – marriage protects only when the commitment to fidelity is honoured, but is not protective when it is not – and factors other than marital status have more bearing on HIV status.

- Young men who report having being circumcised have less risk of HIV infection. Regression analysis on data from 3,810 15 – 24 year old men who said they had had penetrative sex showed that those who reported being circumcised had lower odds of HIV infection (0.62 95% CI 0.32-1.00). However, the relationship between self-reported circumcision status and HIV prevalence in South Africa is not straightforward, as in Box 15.

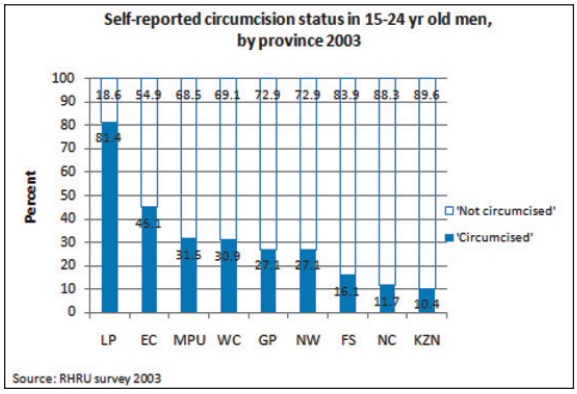
Given the protective effective of medical circumcision, one would expect a strong inverse relationship between self-reported circumcision and HIV prevalence. Figure 37 shows the self-reported circumcision status among men 15 years and older in 2002.

Figure 37. Self-reported circumcision status among men 15 years and older, 2002



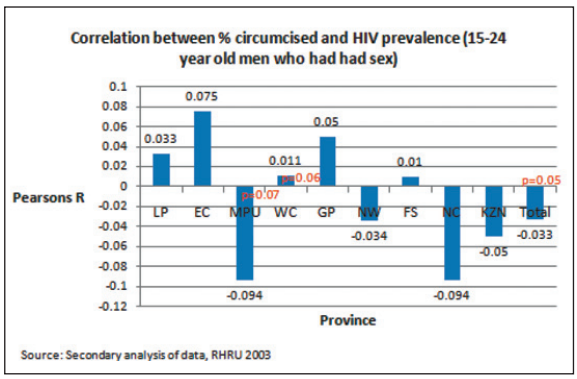
There is big variation across provinces, from Limpopo and the Eastern Cape where the practice of ritual circumcision is widespread, to KwaZulu-Natal where only 15% of men say they are circumcised (Connolly et al 2008). The proportion of 15 – 24 year olds who say they are circumcised shows similar variation, although this survey (RHRU 2003) found much a lower prevalence of circumcision in the Free State [Figure 38]. Whether this reflects changes in circumcision practice between older and younger men in the Free State, or represents sampling aberrations between the two surveys, is not known.

Figure 38. Self-reported circumcision status among 15 – 24 year olds, 2003



The correlations between provincial HIV prevalence and self-reported circumcision in 15 – 24 year old men are not strong – and in the Eastern Cape, there is a significant positive association between self-reported circumcision and HIV prevalence [Figure 39].

Figure 39. Correlation between prevalence of self-reported circumcision and HIV prevalence, by province



These findings are supported by the 2002 HSRC survey, which found no significant association between self-reported circumcision status and lower odds of HIV infection among sexually active men (Connolly 2008).

- Participation in interpersonal programmes is protective against HIV. In this analysis, participation in loveLife's face-to-face programmes was associated with lower odds of HIV. This finding was statistically robust and exhibited a dose-dependent effect (See Programmes section). While exposure to media programmes only was associated with changes in self-reported sexual behaviour, the odds of HIV infection were not significantly different compared to those without media exposure.

Box 15 Circumcision: Cutting edge findings from Orange Farm

Between July 2002 and February 2004, research was conducted to test the association between male circumcision and HIV infection. The sample consisted of males aged 18 – 24 living in Orange Farm and surrounding areas near Johannesburg.

Male circumcision was offered to a randomised intervention group immediately; and to the control group after the last of 3 follow-up visits, 21 months later. The study demonstrated a causal association between male circumcision and HIV infection.

Results indicated 20 HIV infections in the intervention group, (incidence rate 0.85 per 100 person years) and 49 in the control group (2.1 per 100 person years). The corresponding risk ratio (RR) was 0.40 (95% CI 0.24-0.68; p<0.001). After controlling for behavioural factors, including condom use, sexual behaviour (marginally increased in the intervention group) and health seeking behaviour, the increase in protection was 61% (95% CI 34%-77%). (Auvert, Taljaard, Lagarde, Sobngwi-Tambeko, Sitta & Puren, 2005)

Increased risk

- This regression analysis shows that being black African is the strongest predictor of HIV infection among women. The reasons for this strong association are not clear, but may include social, economic and cultural variables not included in the analysis.

- Among 15 – 24 year olds, gender is also a strong predictor of HIV infection, with women being 3.2 times more likely to have HIV than men. That differential declines steadily until about forty years of age, when the HIV prevalence of men and women is roughly equal. It is interesting to note that the independent effects of socio-economic factors are worse among women – even controlling for gender. This supports the view that there are missing variables related to social and economic marginalisation.

- Not surprisingly, 20 – 24 year olds have a higher risk of HIV infection than 15 – 19 year olds. For women, the odds of HIV are 4.26 times higher, while the odds for men are 2.56 times higher.

- Significant socio-economic variables that increase risk of HIV include urban transition, and failure to complete high school.

- Among the behavioural predictors, regular condom use emerges as a significant protective factor for women, while each additional lifetime partner increases the risk of HIV infection by 3% in men and 9% in women.

- An age differential of 5 years or more is a substantive and significant predictor of HIV risk among 15 – 19 year olds. Among 20 – 24 year old women, having a partner 1 – 4 years older increases the risk of infection. An age differential of 5 years or more is associated with a higher odds of infection (1.4 95% CI 0.94-2.08) but is not significant at p=0.05. This apparent anomaly may simply reflect a lack of statistical power in comparing this sub-sample.

- Genital pathology (discharge among women and ulceration among men) is a significant predictor of HIV infection.

- In a study of three communities in Cape Town, substance abuse was associated higher risk of HIV transmission, but did not reduce the independent effects of poverty-related stressors (Kalichman 2006). This suggests that HIV prevention efforts in marginalised communities cannot focus only on HIV and substance abuse prevention communication, but must address the poverty-related stressors at the same time.

Box 16 Male rape may matter more than we think

A 2002/3 study of 1, 277 sexually experienced Xhosa youth from the Eastern Cape found that HIV infection was associated with having impregnated a woman (OR 2.93, 95%CI 1.28-6.68, p=0.011). Although high risk heterosexual behaviour was common among the men, it was not a significant predictor of HIV status.

Circumcision significantly decreased the likelihood of being positive (OR 0.40, 95%CI 0.16-0.98, p=0.046), and this protective effect was stronger among those circumcised before sexual debut (HIV+ve 0.72% vs 2.2% respectively).

3.6% of the sample reported having had sex with a man, the majority of whom reported that it was a coerced sexual encounter that had only happened once. Men who had sex with men were 3.61 (95%CI 1.0-13.0) times more likely to be HIV positive, suggesting that this risk for young men in South Africa deserves more attention. (Jewkes, Dunkle, Nduna, Levin, Jama, Khuzwayo, Koss, Puren & Duvvury, 2006)

Box 17 Some money matters

Data from a longitudinal HIV surveillance study in KwaZulu-Natal (2003-2005) was used to investigate the effects of socioeconomic status on HIV incidence. The measures of socioeconomic status included: level of education, per capita household expenditure, and household wealth categories (an asset index scale).
The sample comprised of 3,325 individuals who tested HIV negative at baseline. Results suggested that – net of sex, age, wealth, household expenditure, migration status, partnership status and rural versus urban residence – one additional year of education reduced HIV risk by 7% (p=0.017). But respondents who fell into the middle 40% of household wealth had a 72% higher risk of HIV infection as compared with members from the poorest 40% of households (p = 0.012).
Given the polarised distribution of income in South Africa, it should be noted that the middle quintiles do not represent a 'middle class', but the 'working poor', who may be at highest risk for HIV infection.
(Barnighausen, Hosegood, Timaeus & Newell, 2007)

Table 13. Predictors of HIV infection in 15 – 24 year olds

Predictor	Men		Women	
	AOR (95% CI)	p-value	AOR (95% CI)	p-value
Demographic				
Women (vs men)	-	-	3.22	P<0.01
Black African (vs other)	2.61 (1.25-5.47)	0.01	8.33 (4.15-16.7)	<0.01
Age 20 – 24 (vs 15 – 19)	2.56 (1.69-3.88)	<0.01	4.26 (1.43-12.7)	<0.01
Socio-economic				
Urban (vs rural)	1.96 (1.21-3.19)	0.01	2.16 (1.44-3.24)	0.01
Did not complete high school (vs completed)	1.93 (1.22-3.06)	<0.01	2.34 (1.71-3.21)	<0.01
Married (vs single)	Not significant at 0.05		0.56 (0.32-0.96)	0.04
Circumcised (vs not, self-reported)	0.62 (0.39-1.00)	0.05	-	-
Sexual behaviour				
Sexually active for >12 mo. (vs ≤ 12 mo)	Not significant at 0.05		2.37 (1.65-3.39)	<0.01
Did not always use a condom with most recent sexual partner (vs always used a condom)	Not significant at 0.05		1.54 (1.05-2.26)	<0.03
Number of lifetime sexual partners (per additional partner)	1.03 (1.01-1.06)	0.02	1.09 (1.02-1.17)	0.01
Age difference with most recent partner: 15 – 19 years old: ≥ 5 years older (vs ≤ same age) 20 – 24 years old: 1-4 years older (vs ≤ same age)	 - -	 - -	 3.22 (1.25-8.33) 2.28 (1.45-3.59)	 0.02 <0.01
Genital pathology				
Unusual genital discharge in past 12 mo. (vs none)	Not significant at 0.05		1.75 (1.26-2.44)	<0.01
Genital ulcers in past 12 mo.	1.91 (1.04-3.49)	0.04	Not significant at 0.05	
HIV prevention interventions & knowledge of HIV*				
Participated in face-to-face programmes (loveLife vs no interpersonal)	0.60 (0.40-0.89)	0.01	0.61 (0.43-0.85)	<0.01

Key to colouring	Increased risk		Decreased risk	

*Adjusted for completed high school or not, race, age, urban/rural; residence, marriage, electricity in home, awareness of two different national HIV prevention campaigns (Soul City and Khomanani)

Data validity and reliability: The findings in Table 13 are based on a large random probability household survey of 11,904 15 – 24 year olds, and have a degree of external validity. There are, however, a large number of factors that are not captured in the regression models that must explain the large socio-economic and demographic differentials. In particular, the social cognitive dimensions of social and economic exclusion are difficult to define quantitatively. Yet these may be key determinants of risk tolerance and consequent HIV infection.

The differential response rates between black Africans (82.7%) and whites (37.7%) may also introduce significant bias in the data, especially if HIV positive whites were less likely to complete the interview and accept the anonymous testing.

Implications for policy and planning:

- Why the risk of HIV among black Africans is so high has yet to be fully explained. Although the regressions include some measures of socio-economic

Box 18 Intimate partner violence has a hand in HIV

1,395 pregnant women receiving VCT at public antenatal clinics in Soweto were interviewed in 2001/2002. After adjusting for risk behaviour and demographic characteristics, intimate partner violence was significantly associated with HIV infection (OR 1.54, 95% CI 1.19-1.99).

Furthermore, report of high male control in a woman's most recent relationship was a predictor for HIV seropositivity (OR 1.56; 95% CI 1.15-2.11). Adult assault by non-partners, childhood sexual assault and forced first sex were not significantly associated with HIV. However, forced first intercourse and a history of childhood sexual assault may impact women's risk for HIV through increasing the risk of intimate partner violence.

This study finds that women who are involved with men they perceive as controlling, or men who are violent, are at an increased risk of contracting HIV. It is possible that abusive men impose higher risk sexual practices on female intimate partners, and are also more likely to be HIV positive themselves. (Dunkle, Jewkes, Brown, McIntyeare, Gray & Harlow, 2003)

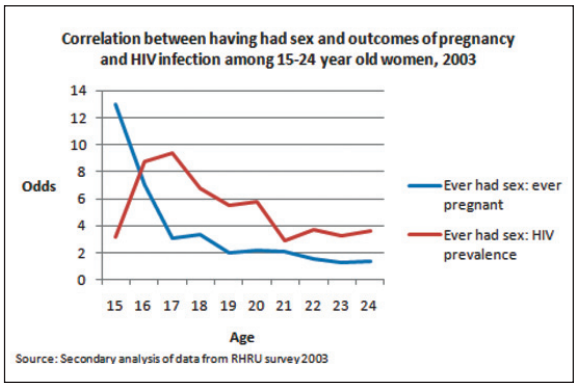
marginalisation, it is likely that there are other omitted variables that would further explain the difference between African and other race categories. There may also be factors regarded as cultural – such as the position of women in African society – that may help explain higher rates of HIV infection but are also difficult, or uncomfortable, to measure.

The effect of these factors on HIV incidence are probably mediated through sub-conscious processes of decision-making, where future health benefits are discounted in the face of economic pressure and social expectations. Social discount rates may in turn be determined by the presence or absence of choice or imminent possibility and the degree of social inclusion (see Douglas & Wildavsky 1993 and Lowenstein & Prelec 1992). These factors are very difficult to capture as predictive psychometric measures, but this is an area of research and evaluation in HIV prevention that requires more attention.

- There are a number of possible explanations for the weak associations between apparent circumcision status and HIV infection in South Africa:
  - First, a proportion of men may think they are circumcised when they are not. For example, a study in Orange Farm found that 45% of men who declared themselves 'circumcised' had intact foreskins (Taljaard et al 2008).
  - Second, a proportion of men may not be circumcised enough to be protective, in that traditional circumcision practice encompasses a range of practice from cicatrisation to full foreskin removal.
  - Third, a proportion of men may be circumcised too late to be protective (in that infection may have already occurred), with 40% of men reporting circumcision after sexual debut (Connolly et al 2008).
  - Fourth, traditional ritual of circumcision may in fact heighten the risk of HIV transmission through the use of contaminated scalpels or sexual intercourse while the wound is still raw.
  - As a large-scale programme for medical circumcision is contemplated, these factors should be considered to ensure that it has the anticipated effects.

- The sharp rise in incidence among young women needs fuller explanation. Figure 40 shows that potential outcomes of sexual activity, pregnancy and HIV prevalence vary by age. The ratio of young women that report having had sex to those that report being pregnant declines sharply from 15 to 17 years of age (see Pettifor 2004). At age 15, there is one pregnancy for every 13 girls who report having had sex. At age 16, the ratio is one pregnancy for every 7 sexually active girls, while from age 17, the ratio drops below 3:1. In other words, the chance of becoming pregnant from each act of sex increases with age – with sexually active 15- and 16-year-olds relatively protected. Beyond that age, the upward trend is incremental, as would be expected from a cumulative biological probability of pregnancy.

Figure 40. Outcomes of sexual activity among young women vary by age



Source: Calculated from Pettifor et al, HIV and Sexual Behaviour Among Young South Africans: A National Survey of 15 – 24 Year Olds 2003. Reproductive Health Research Unit, University of the Witwatersrand, Johannesburg, 2004

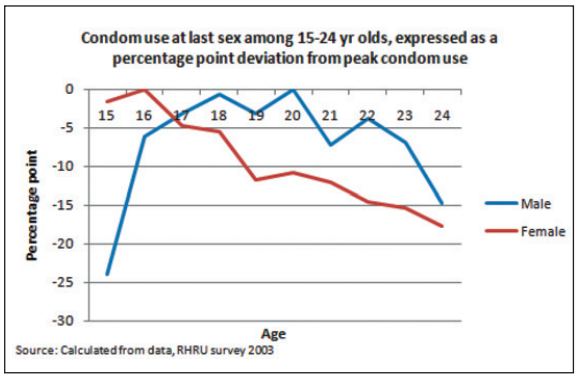
Ratios of sexual activity to HIV infection also vary by age, with 16- and 17-year-olds appearing to be relatively protected. The strong correlation between reported sexual activity and HIV prevalence among 15-year-old girls is indicative of the fact that sexual activity in the 12-15 year age group is strongly associated with coercion and transactional sex. This vulnerable sub-population may use injectable contraceptives, enabling them to prevent pregnancy, but not HIV infection (Pettifor et al 2004b). In contrast, most sexually active 16- and 17-years-old are more likely to have sex with partners who also want to avoid pregnancy and thus may be more amenable to condom use.

The findings are not explained by substantive differences between younger and older women in the frequency of sexual activity. The proportion of 15 – 19-year-olds reporting sex 1-5 times a month is not substantially different from 20 – 24 year olds (46% vs 52%). The implication is that sexually active young women may initially protect themselves from pregnancy, but they

subsequently experience life changes that put them at risk.

The life event that precipitates such marked changes in sexual outcomes appears to be school-leaving – either through dropout or completion of schooling. The direct reason for the spike in pregnancy and HIV infection is lower contraceptive use among school leavers – in particular lower rates of condom use. Sexually active school-going women are 1.7 (95% CI 1.05-2.65) times more likely to use a contraceptive than their same-aged peers (Rees et al 2004). Further, there is a sharp decline in self-reported condom use among women of school-leaving age (18 – 21 years). Until 21 years of age, trends in condom use by single year age-bands track the odds of having HIV among women who have had sex [Figure 41]. The divergence of trends after 21 years of age probably reflects relative saturation of the high risk pool.

Figure 41. Condom use at last sex, expressed as a percentage point deviation from peak condom use, 2003



- Despite the unacceptably high rate of teen pregnancy in South Africa, school attendance is still protective against HIV infection (Hargreaves et al 2007 & 2008), and school retention remains one of the most effective strategies for HIV prevention among adolescents. In addition, there must intensification of effort directed at 18 – 25 year olds aimed at increasing condom use (of both men and women) and reducing the number of sexual partners (of men in particular). Strategies should focus on anticipating and safely navigating the life changes associated with school leaving, connecting young people to information and opportunity and improving institutional responsiveness (such as tollfree helplines, and youth friendly sexual and reproductive health services).

- In this regard, the protective effect of participation in interpersonal programmes is instructive. It points to the need for sustained and intensive community-level engagement, to capitalise on the normative changes which mass communication can achieve. Specifically, social networking strategies need to be developed that straddle the school and post-school periods.

- Multiple concurrent partnerships have been described as the primary driver of HIV infection in sub-Saharan Africa (Halperin and Epstein 2004). However, this conclusion is based mainly on mathematical modelling and scant empirical evidence, and in fact studies that have sought to relate concurrency with HIV prevalence in Africa have found very little association (Lurie and Rosenthal 2009). Nevertheless, a number of studies have described high levels of concurrency, and the theoretical impact of concurrent sexual networking is significant (Mah & Halperin 2009). This warrants emphasis on concurrency as part of partner-reduction communication. But it is increasingly clear that it should not be emphasised to the exclusion of other parts of a comprehensive communication strategy

Box 19 Leaving school is risky for learners, leaving home is risky for educators

Among public sector educators (20,626), prevalence is significantly higher in African educators than those of other race groups ($p<0.01$). However, controlling for race, the sex of respondents is not a significant predictor of HIV. Educators who began their careers married, (HIV 14.3%, 95%CI 12.2-16.8) showed lower HIV prevalence than single educators (23.3%, 95%CI 21.7-24.9). A significant difference in infection levels was seen in women who relocated to their teaching location, away from their families (HIV 23.5% 95%CI 21.4-25.8) compared to those who remained in the same area as before (18.9%, 95%CI 17.3–20.6). This difference however was not found for males. An inverse, statistically significant ($p<0.0001$) relationship was found between annual income and HIV status. For both men and women, higher levels of education were associated with lower HIV prevalence. (Zungu-Dirwayi, Shisana, Louw & Dana, 2007)

Box 20 HSV-2 as a co-factor in HIV transmission

In a 1999 study among men and women living in a township in the Carletonville district, strong independent associations between HIV and HSV-2 were found. HSV-2 serology was found in 17% of the men and 53.3% of women. The odds of men with HSV-2 being HIV positive were 5.3 (95% CI 2.7-10.3) and for women the odds ratio was 8.4 (95% CI 4.9-14.2). No other sexually transmitted infections were independently associated with HIV status in this population. (Auvert, Ballard, Campbell, Carael, Carton, Fehler, Gouws, MacPhail, Taljaard, Van Dam & Williams, 2001)

Self-reported sexual behaviour

TRENDS AT A GLANCE

Table 14. Trends in self-reported sexual behaviour in the general population

	Trends 2008 vs 2005	
Age group	**Male**	**Female**
Condom use at last sex:		
15 – 24		
25 – 49		
50+		
>1 sexual partner in past year		
15 – 24		
25 – 49		
50+		
Partners ≥5 years older		
15 – 24		
Sexual debut < 15 years		

Colour	Prevalence trend
	Improvement
	Equivocal (+-)
	Worsening

KEY

Table 15. Trends in self-reported sexual behaviour among most-at-risk groups

	Trends
Most-at-risk groups	
Condom use at last sex:	
Commercial sex workers	
Men who have sex with men	
Offenders in prison	
High risk drinkers or drug users	

Colour	Prevalence trend
	Improvement
	Equivocal (+-)
	Worsening
	Insufficient information

KEY

General trends in self-reported sexual behaviour by 2008

- Sustained increase in condom use among all age groups, but most marked among young people
- No change in patterns of age of sexual debut
- No change in the frequency of partner change
- No change in age differentials between male and female sexual partners

Box 21 Giving some, getting some

A (2001/2002) cross sectional study of women receiving antenatal services in Soweto (n=1,395), found that transactional sex was associated with increased risk of HIV infection (OR 1.54; 95% CI 1.07-2.21), while having non-primary partners without transactional sex was not. 21.1% of the participants reported ever exchanging sex for money or goods with a non-primary partner.

Increased education, marriage and delayed sexual debut was associated with less transactional sex, while substance abuse, urban residence, intimate partner violence and substandard living conditions increased the risk of transactional sex.
(Dunkle, Jewkes, Brown, Gray, McIntyeare & Harlow, 2004)

Condom use

Figure 42. Proportion of people 15 years and older who say they used a condom at last sex

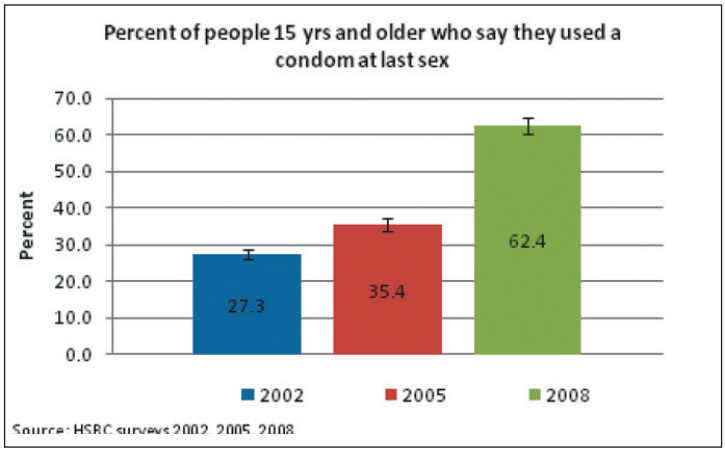
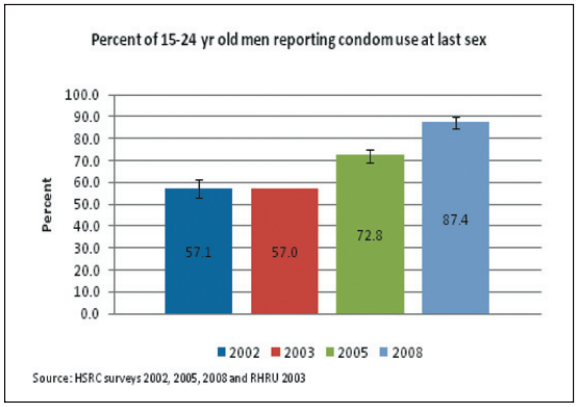


Figure 43. Proportion of sexually active 15 – 24 year olds say they used a condom at last sex



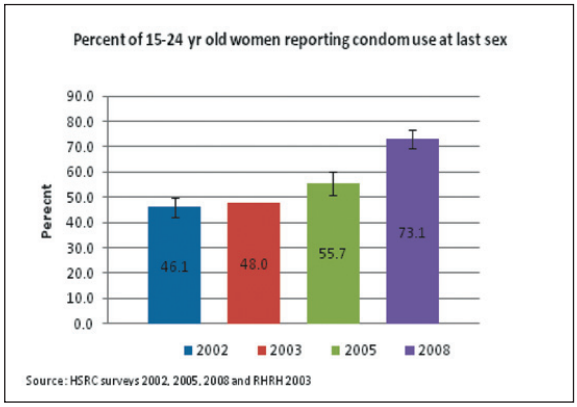
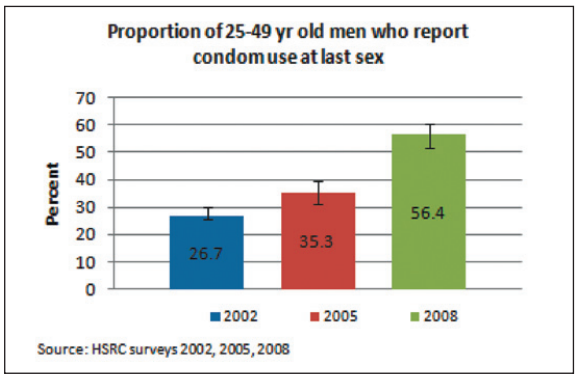


Figure 44. Proportion of 25 – 49 year olds who report condom use at last sex



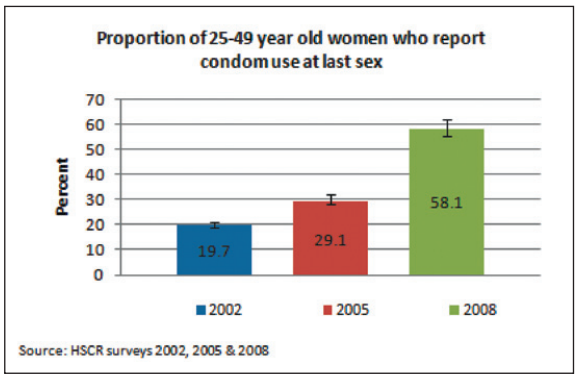


Figure 45. Proportion of people aged 50 years and older who report condom use at last sex

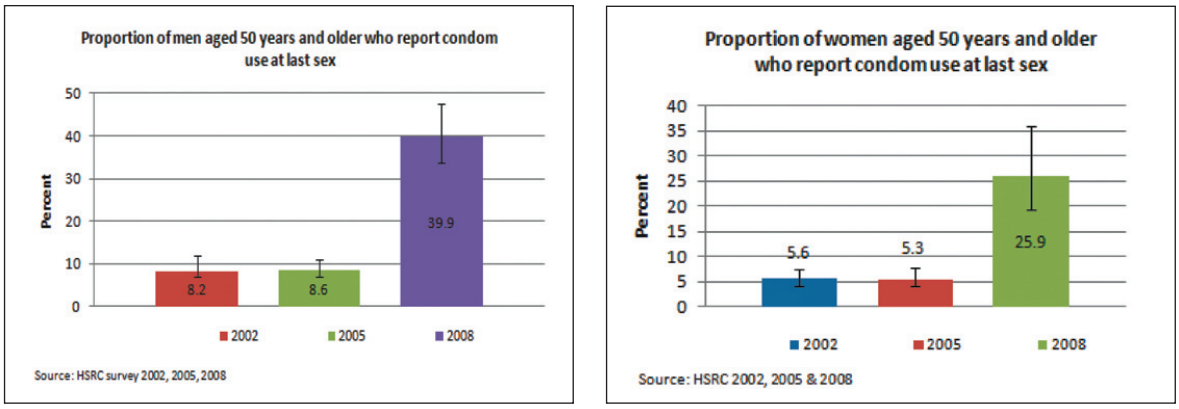
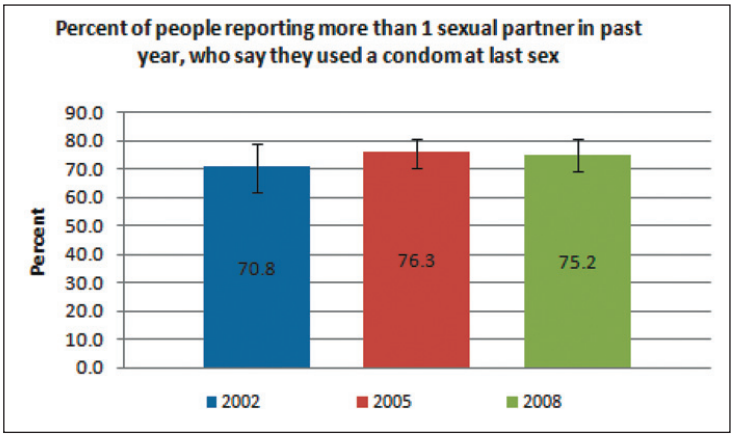


Figure 46. Percent of people reporting >1 sexual partner in the past year who say they used a condom the last time they had sex



Overall condom use

Self-reported condom use at last sex has increased steadily over the past decade – and sharply in the past three years [Figure 42].

Box 22 Sex, life and latex in the Eastern Cape

In the rural Eastern Cape in 2003/2004, sexually active women (n=1,296) and men (n=1,288) aged 15-26 were asked about their attitudes about condoms as well as their self-reported sexual behaviour.

60% of women, compared to 37% of men ($p<0.001$) reported finding condom use embarrassing. While there was no significant difference in reported condom use between men and women, significantly more women (30%) reported preferring flesh to flesh sex than men (24%, $p<0.001$). 20-26 year olds were more likely to use condoms than 15 – 19 year olds. However, of the youth reporting condom use, only 43-46% of them reported condom use at last sex. 23-26% of those reporting condom use used condoms consistently with their main partner, and condom use was reported more often with a casual partner than a main partner.
Jama (Unpublished Master's thesis, undated)

Age specific condom use

15 – 24 year olds: The proportion of 15 – 24 year old men who say they used a condom at last sexual intercourse is now close to 90%, and is the most likely explanation for the drop in incidence over the past five years. Among 15 – 24 year old women, there has been a steady increase as well, although a quarter of women in this age still did not use a condom at last sex [Figure 43].

25 – 49 years: The proportion of 25 – 49 year olds who report condom use at last sex has almost doubled since 2005 [Figure 44]. Interestingly, the proportion of women who report condom use in this age group is almost identical to that of men.

50 years +: The proportion of men and women aged 50 years and older who report condom use at last sex has increased five-fold in just three years [Figure 45]. These trends are encouraging, but must be sustained if condom use is to have a significant impact on incidence rates in older people.

Condom use among high risk groups

- Multiple partners in past year: Condom use at last sex is high among people reporting more than one sexual partner in the past year (75%), relative to the general population (62%) [Figure 46]. This is consistent with the fact that men tend to use condoms more with non-regular partners, with those reporting more partners also reporting higher condom use at last sex (Shisana et al 2005).

- Men who have sex with men: A study of 266 men who have sex with men (MSM) found that 46% of respondents reported unprotected anal intercourse (56% of those HIV positive and 39% of those HIV negative) and many use unsafe lubricants like petroleum-based jellies (Metcalf 2009). The HSRC survey 2008 found that 41.3% (95% CI 42.6-72.5) of self-identified MSM did not use a condom the last time they had sex. These findings point to a group still at high risk for HIV infection.

- Commercial sex workers: National data is not available, and it is likely that self-identified sex workers would be reluctant to report unsafe sexual activity. A three-city study of HIV and sexual practice among sex workers (n=349, Johannesburg, Durban, Cape Town) found that only 8% reported condom-free sex on occasions (either penetrative or oral sex) (Leggett 2008). However, 70% of these sex workers said they did not always use condoms with their non-client partners.

- People in prisons: The use of condoms in prisons is unknown. Although the policy of the Department of Correctional Services is that condoms should be provided to prisoners "on the same basis as condoms are provided in the community", this is qualified by a requirement that prisoners should undergo education and counselling regarding AIDS prior to receiving condoms (Goyer 2003). While education and counselling is desirable, this requirement may be an obstacle to the free distribution of condoms in prisons.

- High risk drinkers: Of the 490 respondents who reported high-risk drinking, 63.8% (95% CI 60-69.0) reported condom use at last sex, similar to the national average (62.4%).

- People who use drugs for recreational purposes: Of the 490 respondents in the HSRC survey 2008 who self-identified as using drugs for recreational purposes, 67.4% (95%CI 63.2-77.1) reported condom use at last sex – almost double that reported in 2005 (35.8% 95%CI 28.3-44.1).

- People with disability: Of the 458 people with disabilities surveyed in the HSRC survey 2008, 62.7% (95%CI 52.0-72.4) of those sexually active reported condom use at last sex. This is the same as the national average (62.4%).

Data validity and reliability: Self-reported behavioural change is vulnerable to systematic bias, particularly over-reporting of positive behaviour change in interviewer-administered questionnaires. Nevertheless these biases should remain relatively constant over time so that trends may be gauged with a fairly high degree of certainty.
Data for high risk groups is less valid, as sample sizes in the groups are relatively small, there may be under-reporting of socially discouraged behaviour, and representative sampling of groups such as commercial sex workers is not possible.

Implications for policy and planning: Targeted condom distribution is one of the most cost-effective strategies for HIV prevention (Creese et al 2002), and the most likely reason for the decline in incidence of HIV among young people is a remarkable increase in the use of condoms since 2002.

One of the most contentious issues is whether condoms should be distributed in schools. There is no evidence that shows that condom distribution in schools increases sexual activity,

Box 23 Sexual risk and mild mental retardation: Knowledge matters

A study (published in 2006) in KwaZulu-Natal assessed the knowledge and reported sexual behaviours of adolescents (14-16 years) diagnosed with mild mental retardation. At the time of the study, the 90 respondents were engaged in full-time study at a school for learners with intellectual disabilities and had IQ scores ranging from 55 to 70.

Many of the adolescents held erroneous beliefs about the transmission of HIV and 57% of the sample did not believe that HIV caused AIDS. 14% of the sample reported a history of at least one experience of sexual intercourse, and only 1 in 3 learners believed that condoms should be used with main partners. Moreover, 1 in 3 respondents reported that condoms should only be used with promiscuous women. 33% of the group reported 'difficulty' using condoms and 20% reported feeling embarrassed at the idea of negotiating condom use.

Of interest, on a number of different indicators, safer sexual practice was positively correlated with knowledge, while critical gaps in knowledge were predictors of higher risk sexual practice in this group. The authors make useful recommendations with regards to intervention strategies for adolescents with intellectual disability.
(Dawood, Bhagwanjee, Govender & Chohan, 2006)

and studies from the United States have found an increase in protective behaviour where condom distribution is part of a school-based health sexuality programme (Schuster et al 1998). However, some of these studies have been based on pre- and post-intervention questionnaires and should be interpreted with caution, as the introduction of programmes may have introduced other systematic biases. Others have relied on matched sampling, comparing schools with condom availability programmes with similar schools without the programme (Blake et al 2003). This methodology may also not adequately account for systematic variation between schools. No study has demonstrated a harmful effect from condom availability programmes, and the deciding factors for South Africa should be whether there is significant added benefit to be derived from condom availability programmes in schools. Given the high levels of reported condom use among sexually active teenagers – and those in school in particular – there may be relatively little to be gained from making condoms freely available in schools and our view is that this issue should not detract from the far more pressing need to ensure condom availability in prisons and among commercial sex workers.

Box 24 Got knowledge, got condoms. Got protection?

A study (published in 2004) conducted in the Midlands district of KwaZulu-Natal, explored the HIV prevention knowledge, attitudes and reported condom use among secondary school learners. 1,113 students in grade 11 were interviewed and the results confirmed that accurate knowledge is not necessarily a predictor of safer sexual behaviour. 86.4% of the learners understood that condoms were protective against HIV and other sexually transmitted infections. Furthermore, 87% of the students could list at least one way through which they would be able to protect themselves from an STI, including condom use, abstinence or remaining faithful to one partner combined with consistent condom use.

Attitudes towards condom use were however not overwhelmingly positive. 30% of males and 17.8% of females reported that condoms 'took the fun out of sex'. 16.7% of males and 13.2% of females believed that condoms were embarrassing to use. 28.4% of males and 23.9% of females believed that using a condom indicated mistrust of a partner and 23.3% of males and 36.2% of females were unsure as to whether a condom could cause harm to their body. Encouragingly, 82% of males and 88.1% of females believed that it was important to use condoms in all sexual encounters, and 90.6% of males and 88.4% of females believed that using a condom showed care about their own health and the health of their partner.

Less encouraging was the reported condom use among students who were sexually active: 33.3% reported never having used a condom. 18.2% of females reported that their partners refused to use a condom. Of those who reported using a condom, 41.8% reported consistent condom use. 73.7% of males and 56.7% of females reported that using the condom was their idea. (James, Reddy, Taylor & Jinabhai, 2004)

Multiple sexual partnerships and/ or frequent partner change

Figure 47. Proportion of 15 – 24 year olds who report >1 sexual partner in the past year

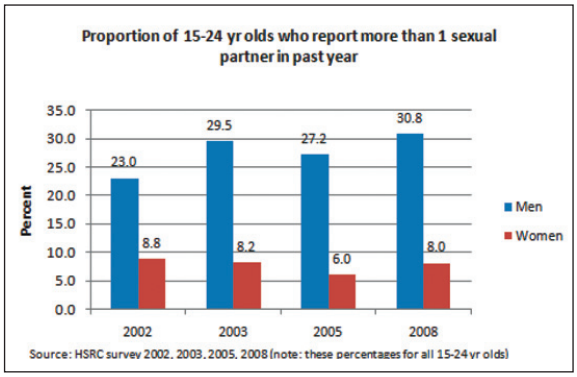


Figure 48. Proportion of 25 – 49 year olds who report >1 sexual partner in the past year

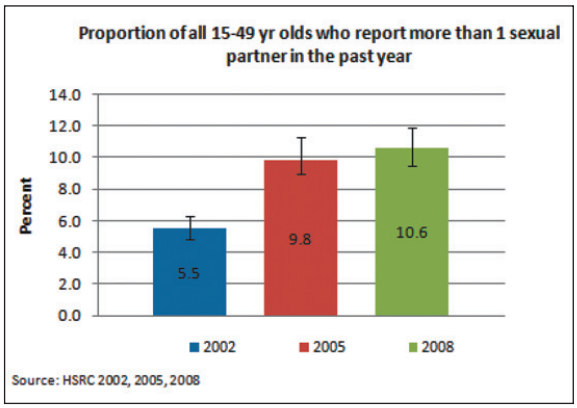
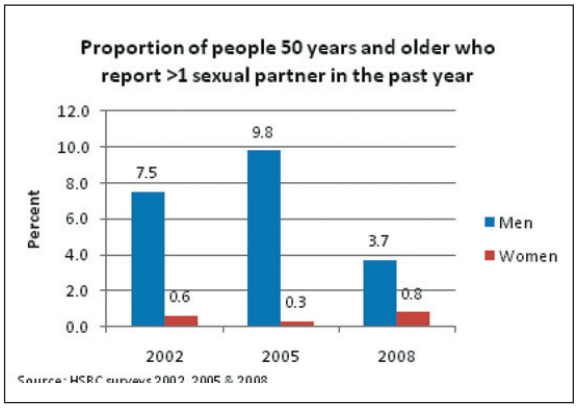


Figure 49. Proportion of people 50 years and older who say they had >1 sexual partner in the past year



Overall patterns of sexual partnerships

There is no evidence of change in patterns of sexual partnerships in South Africa. A much higher proportion of men report more than one sexual partner in the past year than women. A higher proportion of 15 – 24 year olds report more than one sexual partner in the past year than older people. At present, there is no national data reliably describing the frequency of concurrent partners.

Age-specific trends

15 – 24 year olds: The proportion of 15 – 24 year olds who report more than 1 sexual partner in the past year has remained relatively constant, with no statistically significant variation since 2002. In 2008, five times as many 15 – 24 year men reported more than one sexual partner in the past year (30.8%) than women of the same age (6.0%) [Figure 47]. This indicator of multiple partnerships under-represents its full extent among 15 – 24 year olds, in that only a third of 15 – 19 year olds is sexually active. Among sexually active 15 – 24 year olds, the RHRU survey in 2003 found that 44% of men and 12% of women had more than one sexual partner in the past year. Given that overall trends have remained constant, current estimates are likely to be similar.

25 – 49 year olds: The proportion of 25 – 49 year olds who report more than one sexual partner in the past year has remained constant, with no statistically significant variation [Figure 48].

50+ years: Between 2002 and 2008, there was a substantive, but statistically insignificant, decline in the proportion of men aged 50 years and older who reported more than one sexual partner in the past year. However, the variation between 2005 and 2008 estimates is statistically significant and it would appear that there is a real decline in the proportion of men older than 50 years who report more than one sexual partner in the past year. A very small proportion of women older than 50 years of age (<1%) say they had more than one partner in the past year [Figure 49].

Box 25 What knowledge matters?

203 grade 11 and 12 adolescents from Venda were the participants in a 2002 study that aimed to understand condom use behaviour in African youth. 63% of the adolescents were sexually active. Of those, 33% always used a condom, 10% mostly used condoms, 29% occasionally used a condom and 28% had never used a condom.

An assessment on HIV knowledge revealed inadequate and inaccurate information about the transmission of HIV, especially for the younger respondents. However, knowledge did not significantly predict the respondent's intention to use condoms nor did it directly affect their reported sexual behaviour.

Furthermore, results suggested that both the theory of planned behaviour (TPB) and the protection motivation theory (PMT) could significantly predict intended condom use among the adolescents. The TPB found that the social environment is an important factor contributing to condom attitude and use. Shared norms, beliefs and attitudes towards condoms in the respondent's community are likely to affect that person's sexual behaviours. The PMT results indicated that adolescents need to believe in the efficacy of condoms in order to use, or intend to use condoms.

The authors argue that it is not primarily a sense of invulnerability that perpetuates risk behaviour, but a deeply embedded, perhaps cultural, dissatisfaction with the notion and use of condoms, coupled with a lack of belief in the effectiveness of condoms preventing HIV infection. (Boer & Mashamba, 2005)

Box 26 Rendezvous risks

In order to understand sexual networking and South African sexual norms, a study was conducted at public meeting sites in Cape Town, East London and Port Elizabeth. In 1999/2000 the study identified and visited over 200 township sites, as well as 64 sites in a business district of Port Elizabeth where people reported meeting new sexual partners. Patrons of the meeting places were interviewed about their sexual behaviour and HIV prevention coverage onsite was assessed.

Sexual networks in these areas were found to be "extensive, diffuse, and characterised by high rates of new partner formation and concurrency" (p.895). Almost half of the men and women interviewed reported a new sexual partner in the previous four weeks. 57% of women in the business district and between 22 and 40% of men and women in the townships reported personally having met a new sexual partner at the site of the interview. Furthermore, most patrons reported being regular visitors, visiting a mean of 2.5 different sites per day.

Less than 15% of township sites and 20% of the business district sites had condoms available, and less than 25% of respondents had condoms with them at the time of the interview. Men from township sites in Cape Town and Port Elizabeth reported a mean of just over 2 partners in the four weeks prior to the study. A mean of 1.3 was found for men in East London townships. Depending on site, 19 to 46% of women patrons in township sites reported more than 2 partners in the past four weeks, while 39% of women (but only 14% of men) in the business district sites reported more than 4 partners within the same timeframe. High partner acquisition and low condom use suggests that these social spaces are key areas requiring attention and HIV prevention coverage.

Multiple sexual partnerships among high risk groups

The proportion of selected high risk groups who report more than one sexual partner in the past year is similar to patterns among younger people in general:

- *Men who have sex with men:* Of the 86 men in the HSRC survey 2008 who self-identified as having sex with other men, 17.5% (95% CI 8.8-31.6) said they had had more than one sexual partner in the past year.

- *Commercial sex workers:* The three city study (n=348) conducted in Johannesburg, Durban and Cape Town in 2008 found that, overall, 20% of commercial sex workers reported 15 acts of vaginal sex per week (Leggett 2008). However, this data is heavily skewed by the proportion of poorer, black African women, among whom 31% report 1-5 acts of vaginal sex a week. At the other extreme, over 30 acts of vaginal sex a week are reported by 16% of white, 15% of coloured and 13% of black women. However, HIV infection was found to be strongly associated with race, rather than the number of sexual partners. These findings probably indicate that some poorer black women supplement household income by part-time sex work, tend to operate in high prevalence communities on the margins of cities, and are less able to negotiate safe sex. This implies that strategies focused on sex workers also need to reach those who are not full-time.

- *High risk drinkers:* Of the 490 respondents who reported high-risk drinking, 26.2% (21.4-33.) reported more than one sexual partner in the past year.

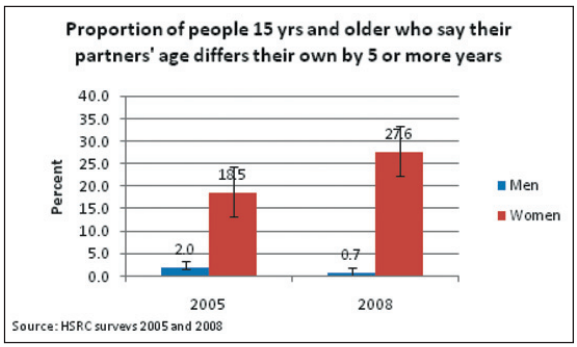
- *People who use drugs for recreational purposes:* Of the 490 respondents in the HSRC survey 2008 who self-identified as using drugs for recreational purposes, 24.1% (95% CI 19.0-31.1) reported more than one sexual partner in the past year.

Data validity and reliability: Self-reported data is subjected to the systematic biases described above. The measure graphed above (namely >1 partner in past year versus one or less) is a categorical variable which is fairly blunt to subtle changes in partner numbers. A more useful measure is the median number of sexual partners (and inter-quartile range).

Implications for policy and planning: A large proportion of men report more than one sexual partner a year. This is probably one of the reasons for the relative intractability of the epidemic, and persistently high incidence among older men and women. A key strategy for HIV prevention is to change the social acceptability of frequent sexual partner change and concurrent partnerships.

Age-disparate sex

Figure 50. Proportion of people 15 years and older who say their partner's age differs from their own by five or more years

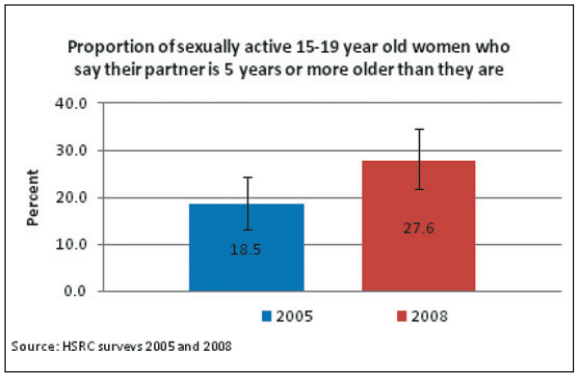


Box 27 When sex and blood go together

Data on sexual exposure to blood was provided by 149 men and 78 women receiving treatment for sexually transmitted infections in Cape Town. 12% of the men and 46% of the women reported a lifetime prevalence of engaging in sexual intercourse in the presence of their own genital bleeding (including menstruation). 7% of women and 40% of men reported engaging in sexual intercourse with a partner whose genitals were bleeding.

For 27% of the men and 22% of the women, there had been blood present during a sexual act in the past month. There was no difference in HIV/AIDS knowledge between those engaging in sex during genital bleeding compared to those who did not report sex in the presence of blood. After controlling for age, sex, marital status, employment and level of education, those reporting sexual intercourse in the presence of blood had significantly more frequent unprotected anal and vaginal sex, had more sexual partners and had a higher rate of reported condom breakage. There was no correlation between intercourse during genital bleeding and commercial or transactional sex. (Kalichman & Simbayi, 2004)

Figure 51. Proportion of sexually active 15 – 19 year old women who say their partners are at least five years older



Trends: As in most societies, men in South Africa typically have partners 1-5 years younger than themselves. However, a significant proportion of young women have sexual partners five years or more, older than themselves – a factor contributing to the spike of HIV infection in 18-24 year old women [Figure 50].

The HSRC survey 2005 found that 18.5% of sexually active 15 – 19 year old women had sexual partners at least five years or more older than they were (95% CI 13.7-24.4). This proportion appears to have increased substantively in 2008 (27.6% 95% CI 21.7-34.5) [Figure 51]. However, the change is not statistically significant at the p=0.05 level and such significant variation in true values is unlikely – unless able to be explained by major changes in economic reliance on men. It is likely that the true value lies somewhere between the point estimates from 2005 and 2008.

Data validity and reliability: Self-reported behaviour is subjected to systematic bias, and changes in social acceptability may affect both the true and reported frequencies of specific behaviours and practices.

Implications for policy and planning: Although an age-differential between men and women is fairly typical of relationships, it is often exaggerated by economic stress. Prevention strategies should address both the underlying vulnerabilities and seek to reduce the social acceptability of age-disparate sex.

Age of sexual debut

Figure 52. Proportion of 15 – 24 year olds who say they have had penetrative sex

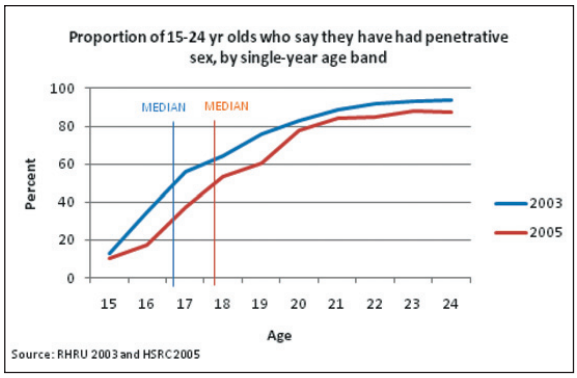


Figure 53. Proportion of 15 – 24 year olds who say they have had sex, by gender

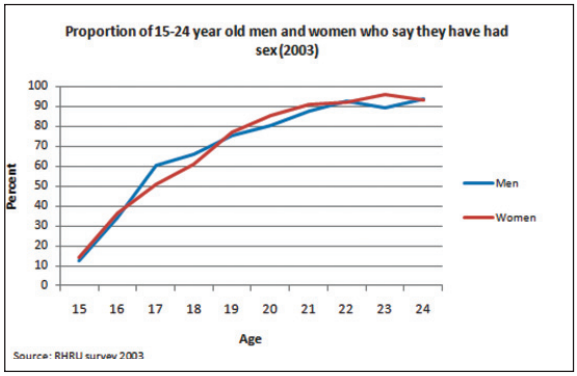


Figure 54. Proportion of 15 – 24 year old men who report sexual debut younger than 15 years of age

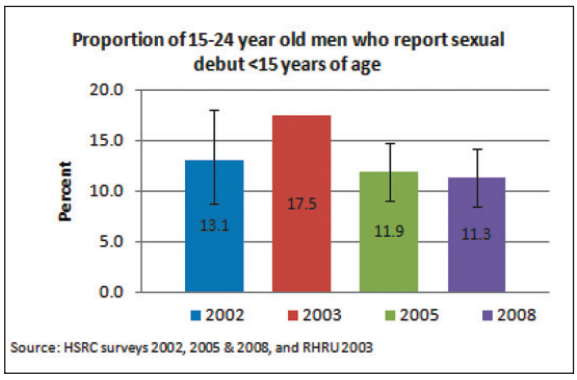
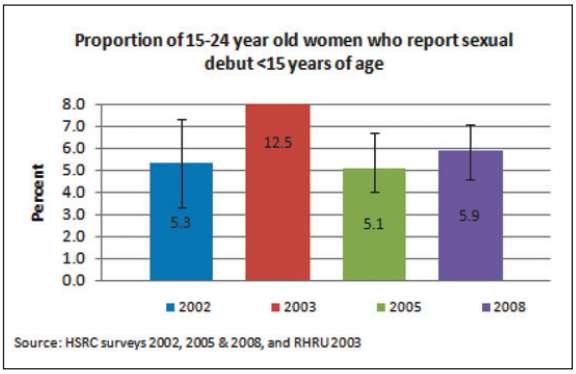


Figure 55. Proportion of 15 – 24 year old women who report sexual debut younger than 15 years of age.



Trends: The median age of (reported) sexual debut in South Africa is between 17 and 18 years, similar to that in many developed countries. Figure 52 shows the cumulative proportion of young people, in single-year age bands, who say they have had penetrative sex. The difference between the 2003 curve (RHRU 2004) and that of 2005 (HSRC 2005) probably reflects a systematic bias in sampling, rather than a significant shift in age of sexual debut.

Box 28 Gender and the risk of glib assumptions

A cross sectional survey (published in 2003) was conducted in Mpumalanga, Limpopo and the Eastern Cape to better understand how gender inequity affects women's ability to negotiate condom use and discuss HIV/AIDS with their partners (n=1,164).

Women were more likely to discuss HIV with their partners if they we : were younger age, close in age to their partner, unmarried, had a higher level of education (OR 3.8, 95%CI 2.0-7.1), a more highly educated partner (OR 2.6, 95%CI 1.6-4.4), a partner being a migrant worker (OR 1.45, 95%CI 1.1-1.9), resident in Mpumalanga (OR 1.6, CI 1.1-2.3), had more than one partner in the past year (OR 2.4, CI 1.2-4.5) and were less likely to have been financially or physically abused in the past year.

Women were significantly more likely to suggest condom use if they had a post-matric education (OR 3.5, 95%CI 2.1-5.9), had more than one partner in the previous year (OR 3.05, 95%CI 1.7-5.6), had been financially abused by a man (OR 1.95, 95%CI 1.2-3.1), and had experienced physical abuse prior to the past year (OR 1.5, 95%CI 1.04-2.17). Women who felt their relationship was not good were also less likely to suggest condom use (OR: 0.59, CI 0.38-0.92).

Gender inequalities operate in conflicting, even paradoxical ways. The authors caution against reductionist statements that gender inequality alone reduces women's ability to negotiate safer sexual behaviour. "The complexity of the relationship between gender and HIV indicated here highlights the need for gender issues as a whole to be integrated into HIV prevention programmes and not approached piecemeal" (p. 133).
(Jewkes, Levin, Loveday & Penn-Kekana, 2003)

Although a significantly higher proportion of 15 – 24 year old men report sexual debut younger than 15 years (11.3%) compared to women (5.9%), the proportion of men and women who have had penetrative sex follows a similar trajectory from 15 years of age [Figure 53].

Data validity and reliability: As with all other self-reports of sexual behaviour, reported age of sexual debut may be subject to systematic biases such as social desirability bias.

Implications for planning and policy: Age of sexual debut is determined by many socio-economic factors and – outside of good parenting – has not been shown to be amenable to significant change.
These findings suggest that, in general, abstinence-focused HIV prevention among young people may not have a significant impact on HIV infection in this age group – and that condom use and partner reduction may be protective behaviours both more amenable to intervention and more effective in reducing the incidence of HIV. On the other hand, reducing the social and economic vulnerability of high-risk adolescents aged 12 – 15 years, particularly those who have dropped out of school or are orphaned, may be a critical strategy for further reductions in the incidence of HIV among teenagers.

But this is a tough group to change: there has been no change in the proportion of 15 – 24 year old men and women who say their age of sexual debut was younger than 15 years of age [Figures 54 and 55] – probably reflecting the limited ability of communications campaigns to effect normative change in the face of significant socio-economic stressors working in the opposite direction. It suggests that this sub-group requires a more comprehensive safety net to ensure they remain in school, access social grants, avoid sexual abuse and have sufficient food to avoid transactional sex.

Predictors of high risk behaviour

AT A GLANCE

Table 16. Predictors of self-reported condom use (15 – 24 year olds)

Predictor of condom use at last sexual intercourse	Effect size	
RHRU survey 2003 (n=11,903)	Male	Female
Behaviour in sexual relationships		
Used a condom at sexual debut		
Talked to first sexual partner about using condoms		
Length of relationship with most recent partner longer than 6 mo.		
Social		
Married (vs single)		
Cognitive		
Personally know someone who has died of AIDS		
Reported behavioural change attributed to knowledge of HIV/AIDS		
Condom use self-efficacy		
Personal optimism		

Colour		Adjusted odds ratio ($p \leq 0.05$)
	LOWER	>3.0
		2.0 – 2.99
		1.5 – 1.99
	RISK	1.2 – 1.49
		1.01 – 1.19
		Equal odds
	HIGHER	0.8 – 0.99
		0.6 – 0.79
		0.4 – 0.59
		Not significant at $p \leq 0.05$

KEY

Table 17. Predictors of one or zero sexual partners in the past year (>15 year olds)

Predictor of 1 or 0 sexual partners in past year	Effect size
Soul City evaluation 2007 (n=1,520)	
Demographic	
Age: Older vs younger (16-24, 25-34, 35-49, 50+)	
Gender: Women vs men	
Race: Other vs Black African	
Socio-economic	
Geotype: informal settlement/ rural versus formal	
Cognitive	
Perception of high risk	
Exposure to media	
People watching television more frequently	
Exposure to Soul City multi-media	

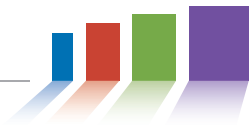
Colour		Adjusted odds ratio ($p \leq 0.05$)
	LOWER	>3.0
		2.0 – 2.99
		1.5 – 1.99
	RISK	1.2 – 1.49
		1.01 – 1.19
		Equal odds
	HIGHER	0.8 – 0.99
		0.6 – 0.79
		0.4 – 0.59
		Not significant at $p \leq 0.05$

KEY

Predictors of condom use

Decreased risk

- Among 15 – 24 year olds, the strongest predictor of condom use at most recent sexual intercourse is whether a condom was used at sexual debut [Table 13]. However, it should be noted that 35% of sexual active respondents had only ever had one sexual partner, and longitudinal studies would be required to establish whether this protective behaviour is carried through to other partnerships (Hendriksen et al 2007).
- Open communication about condom use between sexual partners is significantly associated with higher condom use.
- Knowledge of someone who has died of AIDS is associated with higher condom use among men, but is insignificant among women.
- Not surprisingly, those who say they are able to negotiate condom use with their partners report higher rates of condom use at last sex – and those women who report sexual coercion have higher rates of inconsistent



condom use (AOR 5.8 95% CI 1.9-17.9) (Pettifor et al 2004).
For men, self-reported optimism is a significant, though small, predictor of condom use at last sex In this survey, optimism was gauged through four questions, namely: 'I have long-range goals for myself'; 'I think I'll have many opportunities in life'; 'I know what I want out of life'; and 'I have a good idea of where I am headed in the future'. However, the combined 'explanatory value' (adjusted R^2) of the study' four 'optimism' variables in predicting HIV is only 0.015. This suggests that, while personal aspiration may be an important incentive for safer sexual behaviour, it is difficult to measure and consequently not very helpful in predicting sexual behaviour.

Increased risk

- Longer relationships (>6 mo.) and marriage are associated with lower condom use. Paradoxically, marriage is protective against HIV infection in this age group (see Table 13). This is probably due to higher rates of fidelity among the sub-group of 20 – 24 year olds who do get married (9% of total), while protracted engagements are more likely associated with multiple partnerships (Bongaarts 2006). Fifty-five percent of people under the age of 35 describe themselves as single and not cohabiting (Parker & Kincaid 2008) – and in fact this pattern persists throughout life, with less than half of 40 – 49 year olds ever being married (Statistics South Africa 2009). Part of this reflects the lobola system associated with marriage in black African culture, where nuptials require a significant contribution in cash or kind from the husband-to-be. This commitment, yet deferred marriage, may be a predisposing factor for multiple and concurrent partnerships.

Box 29 Poverty a risk?

Although the HIV burden is intensified in the poorest regions of the world, it is not always the poorest populations in these areas that are the hardest hit. Using data from the Cape Area Panel studies of 2002 and 2005, Dinkelman et al (2007) investigated the effects of household and community poverty on adolescent sexual behaviour.
Matched survey data (n = 2993) from coloured (1583) and African (1410) 17-22 year olds were analysed for information on sexual debut, multiple partnerships and condom use at last sex. The subsample of African youth lived in significantly poorer households and communities than the coloured subsample.

For all sexual behaviour outcomes in 2005, except for male sexual debut, African and coloured behaviour was significantly different. African women were more likely to have had sex (OR 1.37) and had more than one sexual partner (OR 1.08), but were much more likely to have used a condom at last sex (OR 1.52).
African men were more likely to have had sex (OR1.33) and to have more than one partner (OR1.49 than coloured men, but were also more likely to report condom use at last sex (OR 1.3).

The independent effect of poverty (measured in terms of household income) on self-reported behaviour was marginal, with very small negative changes associated with declining income. This may in part reflect the difficulty of measuring social exclusion and economic marginalisation and the relative insensitivity of household income as a proxy. Community factors – degree of cohesion and mutual support among others – may be as important as individual household income. It may also suggest that, where income levels are not orders of magnitude apart, other social factors more strongly determine risk. (Dinkelman, Lam & Leibbrandt, 2007)

Equivocal findings

- In the above multiple regression analysis, neither 'awareness of HIV status' nor 'having tested for HIV' emerge as independent predictors of condom use. Even bivariate analysis for men 15 – 24 years of age found there was no significant association between 'knowing your status' and condom use. For women, knowledge of status was associated with higher condom use (OR 1.39, p=0.02).

- Bivariate analysis showed that men who had been tested were more likely to use a condom (OR 1.56, p = 0.001), while women who had been tested were less likely to use a condom (OR 0.81, p = 0.012). This could be explained by the fact that more women are routinely tested in public clinics, while men who test may be those motivated to go for voluntary counselling and testing. Pre-existing personal motivation, rather than knowledge of status, may drive safer sexual behaviour.

- Although there is considerable international evidence showing the relationship between individual alcohol use and riskier sexual behaviour, findings from national studies in South Africa are not that strong. For example, failure to use a condom at last sex is independently but weakly associated with heavy drinking (OR 0.91 for those drinking 4-5 drinks a day, 95% CI 0.83-1.00, p<0.01) (Kincaid & Parker 2008). The 2008 HSRC study found similar rates of self-reported condom use among heavy drinkers when compared to the general population. However, local studies have demonstrated the link between alcohol use and individual sexual behaviour, including lower condom use (Kalichman et al 2008).

Table 18. Predictors of self-reported condom use (15 – 24 year olds)

Predictor	Men		Women	
	AOR (95% CI)	p-value	AOR (95% CI)	p-value
Sexual behaviour				
Used a condom at sexual debut	5.92 (4.02-8.72)	<0.001	3.35 (2.50 – 4.50)	<0.001
Talked to first sexual partner about using condoms	1.56 (1.19-2.03)	0.001	2.64 (1.75-3.99)	<0.001
Length of relationship with most recent partner longer than 6 mo.	0.53 (0.38-0.75)	<0.001	0.44 (0.32-0.62)	<0.001
Social				
Married (vs single)	0.42 (0.18-0.98)	0.046	0.40 (0.23-0.72)	0.002
Cognitive				
Personally know someone who has died of AIDS	1.58 (1.15-2.19)	0.005	Not significant at 0.05	
Reported behavioural change attributable to knowledge of HIV/AIDS	2.45 (1.53 -3.92)	<0.001	1.79 (1.38-2.31)	<0.001
Condom use self-efficacy score	1.64 (1.46-1.84)	<0.001	1.60 (1.43-1.79)	<0.001
Optimism score	1.13 (1.04-1.24)	0.004	Not significant at 0.05	

KEY	Increased risk		Decreased risk	

**Adjusted for primary sampling units, strata and weights*

Predictors of multiple sexual partnerships

There is surprisingly little work in establishing independent associations with multiple sexual partners, and this is an area that requires more attention by researchers. Qualitative research has found that people engage in multiple and concurrent partnerships for the following reasons:

- The exchange of sex for material goods or for survival purposes
- Loneliness and avoiding the lack of loneliness
- Lack of sexual fulfilment within existing relationship
- Peer pressure to prove oneself to one's peers.
- Low self-esteem
- False sense of confidence and an inadequate emotional framework
- Population mobility – migrant labour or truck drivers (Parker et al 2007)

Backwards stepwise regression analysis on the results of a cross-sectional household survey of 1520 participants (16 – 65 years) – which was originally designed to evaluate Soul City – found significant associations between sexual partner numbers (≤ 1 versus >1) and a number of demographic and programme-related factors [Table 19] (Goldstein et al 2009).

Decreased risk

- Older women, who are not Black African, are less likely to have had more than 1 sexual partner in the past month and past year.
- Exposure to Soul City programmeming was associated with fewer sexual partners

Increased risk

- Increased risk of multiple partnerships is associated with being male, African, and living in informal settlements or rural areas.

Equivocal findings

- Associations with specific HIV prevention programmeming were paradoxical: a positive association with fewer partners was found with respect to exposure to Soul City multi-media, while exposure to Tsha Tsha had a negative association. Exposure to Khomanani was associated with a higher likelihood of having only one partner in the past month.

Box 30 Multiple partners and substance abuse are regular bedfellows

A study (published in 2006) of 630 sexually active teenagers and young adults in rural Limpopo, analysed the correlates of multiple sexual partnerships. 'Multiple sexual partners' was defined as having several sexual partners either concurrently or sequentially. Participants provided self reports on how many different partners they had sexual intercourse with in the previous 12 months and more than a single sexual partner was classified as 'multiple partnerships'. A history of substance use (tobacco, OR 1.97 and alcohol, OR 1.75) almost doubled the chances of having multiple partners, Those with later sexual debut were less likely to have multiple sexual partners than those with an earlier onset (OR 0.83, 95% CI, 0.74-0.93). After controlling for substance use, gender became a significant predictor of sexual partnerships, with females more likely to have multiple partners than males. This finding contradicts those in national studies.
(Mpofu, Flisher, Bility, Onya & Lombard, 2006)

The other side of intimate partner violence and HIV risk

The link between intimate partner violence and HIV risk behaviour has been a focus of research. However, most often the participants have been the victims of such violence. Between 2002 and 2003 men recruited for a randomized controlled trial of the Stepping Stones intervention were analysed at baseline. 1,275 men were asked about perpetration of physical violence on their female partners, and data was compared to their self reported sexual behaviour. Nearly a third (31.8%) of men admitted having been physically or sexually violent with their main female partner. 11.3% reported sexual violence, 71.9% reported physical violence, and 16.7% reported both physical and sexual violence. 73.5% of the men reporting perpetration of both kinds of violence had engaged in violence both within and prior to the last 12 months.

Men who reported physical violence, or physical and sexual violence, reported more recent intercourse and more lifetime and past-year partners than non-perpetrators.

Men who perpetrated both sexual and physical violence were more likely than non-perpetrators to report a casual partner in the past year (OR 10.6, CI 3.1-36.1), to have engaged in transactional sex (OR 9.8, 95%CI 5.65-17.1), to have an alcohol problem (OR 4.05, 95%CI 2.5-6.6), report a lifetime use of illegal substances (OR 2.2, 95%CI 1.2-3.8) and to have perpetrated violence on someone other than an intimate partner (OR 10.8, 95% CI 6.2-18.8).

Across the varying forms of violence, more severe violence was associated with greater sexual risk taking, including more partners, more recent sex and transactional sex.
(Dunkle, Jewkes, Nduna, Levin, Jama, Khuzwayo, Koss & Duvvury, 2006)

Table 19. Predictors of number of sexual partners in past year among 16 – 64 year olds

Predictor	≤ 1 versus >1 sexual partner in past year	
	OR (95% CI)	P
Demographic factors		
Age: Older vs younger (16-24, 25-34, 35-49, 50+)	1.43 (1.19-1.70)	<0.01
Gender: Women vs men	3.63 (2.47-5.35)	<0.01
Race: Other vs Black African	1.52 (1.14-2.03)	<0.05
Geotype (formal): Informal settlement Rural area	0.51 (0.28-0.94) 0.45 (0.29-0.69)	<0.01 <0.01
Programmematic factors		
People watching television more frequently	0.57 (0.38-0.87)	<0.05
Exposure to Soul City multi-media	1.23 (1.04-1.45)	<0.05
Exposure to Tsha Tsha TV programme	0.58 (0.37-0.92)	<0.05
Perception of high risk	0.46 (0.31-0.68)	<0.01

KEY	
Increased risk	
Decreased risk	

Table 20. Predictors of number of current sexual partners among 16 – 64 year olds

Predictor	≤ 1 sexual partner in past month vs > 1	
	OR (95% CI)	P
Demographic factors		
Gender: Women vs men	4.63 (2.38-9.01)	<0.01
Race: Other vs Black African	3.74 (1.57-8.87)	<0.05
Interpersonal factors		
Talked to partner about HIV	2.26 (1.16-4.43)	<0.05
Programmematic factors		
Exposure to Khomanani	2.62 (1.14-5.98)	<0.05

KEY	Increased risk	
	Decreased risk	

Predictors of age-disparate sex

The high frequency of age-disparate sex in South Africa is probably related to, among others, the economic disadvantage of women and the lack of social taboo against much older partners (LeClerc-Madlala 2008). However, regression analysis on national data is not available.

Predictors of age of first sex

Similarly, the predictors of age of sexual debut are strongly linked to socio-economic circumstance. For example, young people who have left school prior to completion are more likely to have had sex. Fifty-eight percent of young people in school or who had completed high school reported ever having had sex compared to 88% of young people who were not in school or who had not completed high school (p<0.01) (Pettifor et al 2005). Gender-based violence contributes to earlier sexual debut among girls, with significant associations with self-reported threats of (11% vs 7%, p=0.026) or use of physical force (20% vs 9%, p<0.001) (Pettifor et al 2004).

The importance of parents in ensuring older sexual debut and safer sexual behaviour is demonstrated by regression models comparing 14-18 year old orphans with other young adolescents. Controlling for the socio-economic variables described above, orphaned teenagers are 1.4 times more likely to have sex by the age of 13 (1.38 95%CI 1.09-1.75).

Box 31 Treatment of risk by people with HIV

A 2005 study in KwaZulu-Natal aimed to investigate the incidence and predictors of unprotected vaginal and anal sex among a sample of HIV positive individuals receiving clinical care (n = 152). Almost half (47%) of the sample reported anal or vaginal sex in the past 3 months and 30% of this sexually active subsample said that one or more of those sex acts was unprotected. 39.2% of the unprotected sex acts were with partners who were thought to be HIV negative or with an unknown status.

Unprotected sexual events were associated with alcohol use during sex (event ratio [ER] 3.08, 95% CI 1.8-5.35), forced sex (ER 3.37, 95%CI 1.6-7.8), having a casual partner (ER 3.48, 95%CI 1.56 – 7.78) and having an HIV positive partner (ER 2.3, 95%CI 1.05-5.2).

Participants who had disclosed their HIV status to someone outside the clinic were less likely to have had unprotected sex (ER 0.24, 95%CI 0.15-0.39). Patients who reported taking antiretroviral drugs were no more likely than those not on treatment to have had unprotected sex. Other variables not found significant for risk behaviour were: sex, age, length of time since diagnosis, marital status, ethnicity, socio-economic status, STI diagnosis in past three months, education level, employment, or disclosure of HV status to partner.

The authors suggest that linking HIV/AIDS treatment with prevention should be a high priority on South African public health agendas. Providing clinical care without adequate counselling on condom use and alcohol abuse is a missed opportunity. (Kiene, Christie, Cornman, Fisher, Shuper, Pillay, Friedland, & Fisher, 2006

Data validity and reliability: Causal conclusions cannot be drawn from cross-sectional studies, and odds ratios and p-values only indicate the strength of association between the variables and level of statistical significance (a measure of the likelihood that the finding was not due to chance). Regression analysis is always vulnerable to missing variable bias, i.e. other factors that could explain sexual behaviour that is not included in the model. The analysis may also be biased by self-reports, which may over- or underreport specific behaviours. Differential participation by different race groups may also introduce significant bias.

Regressions on the Soul City evaluation data should also be interpreted with caution, as stepwise ('best fit') regression analysis may introduce significant systematic biases and produce spurious results. For example, collinearity between frequent TV exposure and exposure to Tsha Tsha (a programme less well known than Soul City) may account for the apparent adverse association between Tsha Tsha and multiple sexual partners.

Implications for policy and planning:

- Condom use is amenable to behaviour change communication – at least to the extent that patterns in condom use can be explained. Norms and attitudes associated with relationships are influential in predicting condom use – and people who have made 'pre-commitments' to condom use, within a communicative and open relationship, are more likely to use condoms. The ability to influence condom use – at least to some degree – may be the reason why condom use in South Africa has increased so sharply among younger people, with attendant declines in HIV prevalence.

- However, the structural underpinnings of high risk behaviour are still significant. Hyperbolic models of inter-temporal choice suggest that young people may the see the long-term utility of protecting themselves, but their sexual decisions may be shaped by more immediate economic and social pressures and expectations (Prelec and Lowenstein 1992). These factors are poorly captured in self-reported sexual behavioural surveys and future risk-assessment surveys should focus more on social cognitive measures related to personal resilience, sense of inclusion, sense of internal control and ability to deal with day-to-day circumstances.

- The dominance of socio-economic factors in predicting age of first sex and (probably) age-disparate sex also demonstrates the limitations of message-driven (and particularly abstinence message-driven) approaches to HIV prevention communication. The approach should rather focus on building skills which help young people anticipate and cope with life transitions, and remodel social expectations that lead to tolerance of gender violence and submissiveness. It should aim to create new pathways for personal affirmation, growth and development for young people, while reinforcing public intolerance of age-disparate relationships that are underpinned by economic want or need.

Box 32 Body bartering

In the rural Eastern Cape (2002/2003), 1,288 men were asked about their experiences of transactional sex, both giving and receiving material resources for sex with casual and main partners. Participants between 15 and 26 years (n = 1288) were interviewed face to face.

Transactional sex with casual partners:

6.6% of the participants reported having received material goods or money from a casual partner and 17.7% reported giving resources to a casual partner for sex. Earning money (OR 1.6), higher exposure to media (OR 1.3) and problematic alcohol use (OR 1.6) were all significantly associated with transactional sex that involved giving to a casual partner, while lifetime number of sexual partners was strongly associated with both giving (OR 1.25) and receiving (OR 1.26) material goods or money for sex. Perpetrators of both sexual and physical violence were 5.6 times more likely to give goods in exchange for sex and 2.8 times more likely to get goods when compared with men who did not report gender based violence. Self-reported resistance to peer pressure was found to protect against transactional sex involving both giving (OR 0.8) and getting (0.7).

Transactional sex with main partners

Transactional encounters with main partners were surprisingly balanced between giving (14.9%) and receiving (14.3%). Associations with respect to main partners were similar to that of casual partners. Men who reported equitable attitudes towards relationship control and gender equality were less likely than other men to engage in giving (OR 0.55) or getting (OR 0.43) material exchanges for sex. Ten or more years of education was negatively associated with giving (OR 0.57) for sex while men with higher socio-economic status were more likely to give (OR 1.21) resources in return for sex. Reported problems with alcohol were associated with both giving (OR 1.92) and getting (OR 1.82) as was number of lifetime sexual partners (giving, OR 1.25; getting, OR 1.19). Receiving resources for sex was strongly associated with the perpetration of physical violence (OR 1.50), sexual violence (OR 2.25) and both physical and sexual violence (OR 4.08). Giving material goods or money for sex was also significantly and strongly associated with perpetrating physical (OR 1.59), sexual (OR 2.50) and both physical and sexual (OR 4.97) violence.
(Dunkle, Jewkes, Nduna, Jama, Levin, Sikweyiya & Koss, 2007)

Box 33 School attendance – the best social vaccine?

In 2001, a study was conducted to assess the influence of school attendance on HIV risk behaviour and HIV serostatus among unmarried 14 – 25 year olds in Limpopo (n=1,919).

Male students were significantly less likely than their non-student counterparts to report more than one sexual partner in the previous 12 months (OR 0.60, 95%CI 0.38-0.95) or more than 3 lifetime partners (OR 0.60, 95%CI 0.44-1.00). Male students were significantly less likely to be HIV positive than male non-students (OR 0.21, 95%CI 0.06-0.71).

Female students were less likely to report more than 2 sexual partners during their lifetime (17.7%) than female non-students (51.8%), and were less likely to report age differentials greater than three years (OR 0.52, 95%CI 0.34-0.80). They were also significantly less likely to report a high frequency of sexual activity (OR 0.57, 95%CI 0.37-0.87) or never using a condom (OR 0.60, 95%CI 0.40-0.91) in the past year. Adjusted for age, there was no significant difference in HIV among women students and non-students.

School attendance was found to be protective for men against HIV infection and was protective against high risk sexual behaviour for women. The authors suggest that sexual networking structures imposed by regular school attendance may partly explain the reduction in HIV risk and risk behaviour.
(Hargreaves, Morison, Kim, Bonell, Porter, Watts, Busza, Pronyk & Phetla, 2007)

Box 34 Parents matter

Data collected in 2001 was used to test the hypothesis that orphan status is associated with high risk sexual behaviour. The participants were 1,694 black African youth between the ages of 14 and 18 years. 31% of the sample was classified as either maternal paternal orphan. 8% were double orphans.

Both male and female orphans reported earlier sexual debut than the non-orphan sample. 49.4% of the orphans had ever had sex compared to 39.2% ($p<0.05$) of same-aged non-orphans; and 22.6% of the sexually active orphans as opposed to 15.4% of non-orphans reported having had sex by age 13 or younger ($p<0.05$). 75.2% of non-orphans compared with 70.2% of orphans ($p<0.01$) reported that they were willing the first time they had sex. Transactional sex was reported by 7.8% of the orphan sample and only 3.3% of the non-orphans ($p<0.01$).

After controlling for socio-demographic factors, including school attendance, socio-economic status and genotype, orphan youth were still nearly one and a half times more likely to have ever had sex when compared with non-orphan youth (OR: 1.38, CI 1.09 – 1.75).
(Thurman, Brown, Richter, Maharaj & Magnani, 2006)

Box 35 Sexual risks of rich and poor are poles apart

Using household survey data from 2001, Hallman (2005) measured the effects of household wealth on a variety of sexual behaviours among 14 – 44 year olds in KwaZulu-Natal (n = 4,000).

Among females, high household wealth was associated with significantly lower rates of ever having had sex (hazard ratio 0.06) and, after controlling for other factors, there was a significant and large effect of household wealth status on delaying sexual debut.

Fewer women in the lowest wealth quintiles reported a willing first sex compared to women in the highest quintile (48% vs 72%, $p<0.001$). Compared to women in low wealth households, women in high wealth households were significantly less likely to have ever been forced to have sex (OR 0.20) or to have traded sex for goods, money or favours (OR 0.06). For both men and women, greater household wealth was significantly associated with lower odds of having multiple sexual partners (OR 0.76 and 0.10 respectively) and men in the upper quintiles (high 73%; high-mid 71%; mid 72%) reported increased condom use when compared with those in the lower quintiles (low 58%; low mid 57%, $p<0.001$).

Interestingly, for both males and females, wealth did not affect the age difference between sexual partners. The relationship between poverty and HIV is not linear, but this study shows how wealth polarisation may the influence sexual risk of young South Africans.

Box 36 Poverty and risk: Take 3

In Cape Town, the associations of poverty and substance abuse with sexual risk behaviour was analysed in an African township, a racially integrated township and an urban neighbourhood. The African township (n = 499), with predominantly Xhosa residents, was the most impoverished, followed by the racially integrated township (n= 995, 73% coloured) that had similarly low income levels but was supported by better infrastructure and service delivery. The urban residential neighbourhood (n=678) was predominantly coloured, was characterised by higher standards of living and had greater economic resources than the township sites.

Sexual risk correlated well with these socio-economic differentials, at both a community and individual level. Overall, 70% of the African township participants indicated at least one HIV risk factor, in comparison to 55% of the racially integrated township and 28% of the urban residential population. Alcohol use was reported most often by residents of the racially integrated township (53%), with the urban neighbourhood reporting the least alcohol use (22%). Cannabis was reported most often in the African township (19%).

People who experienced stressors, including unemployment, discrimination, inadequate education, crime, violence and AIDS, reported a greater number of behavioural risk factors for HIV infection. Furthermore, substance use was associated with HIV risk behaviours, and poverty related stressors contributed to alcohol and drug use. Substance use however did not moderate the effects of poverty on HIV risk behaviour, and poverty was found to be an independent predictor of risk.
(Kalichman, Simbayi, Kagee, Toefy, Jooste, Cain & Cherry, 2005)

HIV counselling and testing

Table 21. Trends in HIV testing and knowledge of status, based on cross-sectional surveys in 2002, 2005 and 2008

	Trends 2008 vs 2005	
	Male	Female
People ≥ 15 years who say they have had an HIV test		
People ≥ 15 years who say they have had an HIV test & know status		

Colour	Prevalence trend
	Improvement
	Equivocal (+-)
	Worsening

KEY

Figure 56. Proportion of people ≥15 years of age who say they have ever been tested for HIV

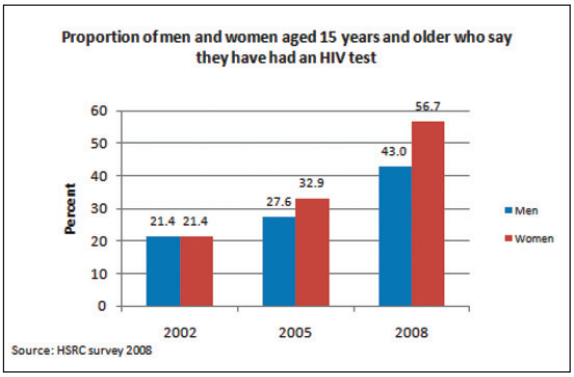
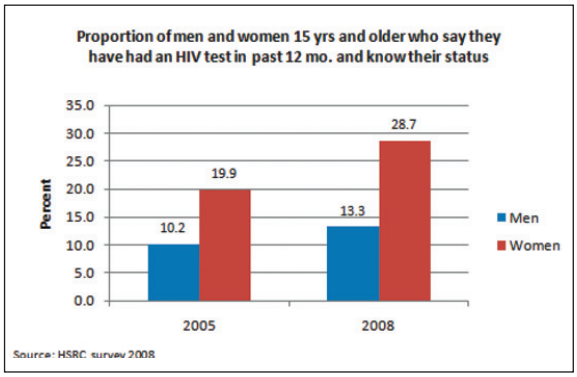


Figure 57. Proportion of people who have tested in the past year and know their status



Box 37 HIV testing attitudes and AIDS stigma

A study (published in 2003) in a township in Cape Town examined the associations between HIV testing history, attitudes towards HIV testing and AIDS stigmas. The participants were 224 men and 276 women 35 years or younger (n = 500), the majority (98%) of whom were black Africans. Participants who had previously been tested for HIV (44%) were compared with those who had not, and those who had been tested but did not know their results.

No significant demographic variations were found between those who had been tested for HIV, those who had not tested and those who were unaware of their status.

There was no significant difference in reported HIV risk behaviours or HIV prevention knowledge between individuals tested and those who had not tested.

Controlling for age, sex, education and survey venue, respondents who had not been tested were significantly more likely to endorse test avoidance, more likely to perceive adverse testing outcomes and were less likely to perceive testing as beneficial. Similarly, among those tested, participants who did not know there results were more likely to have negative beliefs about testing outcomes and were less likely to view testing as potentially beneficial.

AIDS stigmatising beliefs were not significantly different among those who tested and knew their results in comparison to those tested who did not know their results. However, those who had not tested held significantly more AIDS-stigmatising views than those who had tested.
(Kalichman & Simbayi, 2003)

Overall trends

Ever been tested: There has been a marked increase in the proportion of people 15 years and older who have tested for HIV and who know their status.

Half the adult population has now tested for HIV, compared with less than a third in 2005. Men still lag behind women – probably reflecting the higher attendance in public facilities among women especially of reproductive age [Figure 56].

Tested in the past year: Over a quarter of women (28.7%) say they have been tested in the past year and know their status, although only 13% of men report the same [Figure 57].

Data validity and reliability: Self-reports of HIV testing may be biased upwards, especially as national communication about HIV testing has increased since 2005 and respondents may be inclined to be part of a growing social norm. Nevertheless, the trends are so marked that they are likely to reflect real changes in population behaviour.

Implications for policy and planning: The fact that men are less likely to have been tested points to the need to increase voluntary counselling and testing (VCT) outside of health facilities and to extend testing in private healthcare – particularly in cash practices which serve a high proportion of men presenting with sexually transmitted infections.

However, a key breakthrough strategy may be the introduction of provider-initiated 'routine' HIV testing (with op out) in all public facilities. Routine testing has been shown to be the most-effective form of HIV counselling and testing (Menzies et al 2009) and has been successfully implemented in a number of African countries (World Health Organisation 2007).

Box 38 VCT in the Eastern Cape

A 2002/3 study in the Eastern Cape (n = 3,520) investigated uptake of voluntary counselling and testing (VCT), attitudes towards VCT and how both AIDS stigma and VCT service availability may affect the utilisation of testing services. Close to 75% of adults knew where they could get an HIV test. However, just 17% of the men and 14% of women reported a history of ever testing for HIV. For both males and females, the probability of being tested was positively associated with age, education, socio-economic status, availability of rapid tests, closer proximity of clinics, and absence of stigma. While women were more affected by AIDS stigma, men were more strongly influenced by the characteristics of the VCT clinics and services available. (Hutchinson & Mahlalela, 2006)

Behaviour change programmes

Behaviour change programmes (General population)

Figure 58. Estimated coverage gaps for HIV prevention media against National Operational Plan targets, 2008

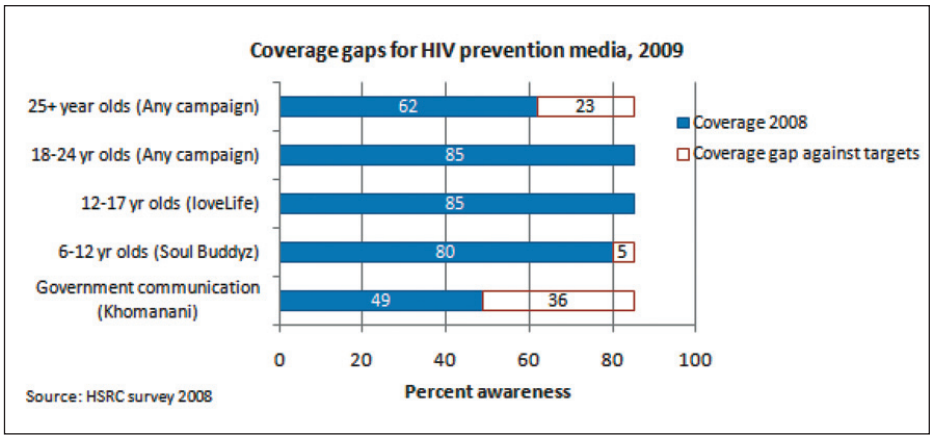
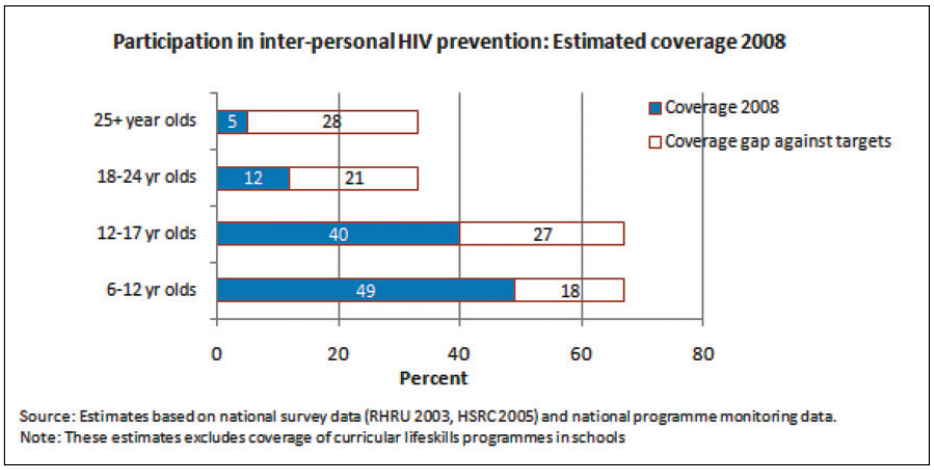


Figure 59. Estimated participation in interpersonal HIV prevention, against National Operational Plan targets, 2008



Description of programmes

There are currently four main national initiatives focused on behaviour change:

- Khomanani is the official Government communications campaign dealing with all aspects of a comprehensive national response to HIV/AIDS, and including prevention, treatment, care and support. It operates through a consortium of implementing partners, who are commissioned through a tender process every two years.

- loveLife is a national prevention programme focused specifically on young people aged 12 – 17 years of age (although it has a significant shoulder target audience). It has a significant community footprint, operating in 5,200 secondary schools (47% of total), 500 public clinics (14% of total) and in partnership with 180 community-based organisations. Its community programmes are supported by a large multi-media component including radio programmes on 10 regional radio stations. loveLife has operated as a non-profit organisation for the past ten years, funded by the Department of Health, Social Development, Sports and Recreation and other donors, including the Kaiser Family Foundation and Bill & Melinda Gates Foundation.

- Soul City is a national programme committed to HIV prevention through edutainment. Its flagship is the television drama series *Soul City*, but it has developed an extensive radio component across Southern Africa and a TV series focused on 6 – 12 year olds (*Soul Buddyz*). The latter has a strong

interpersonal programme element in Soul Buddyz Clubs in schools and libraries. At the end of May 2009, there were 5,572 clubs (36% of total primary schools) with 108,530 registered participants. Soul City is funded by the Department of Health, several bilateral agencies and the Global Fund to fight HIV, TB and Malaria.

- The Department of Education's lifeskills programme introduces issues of healthy sexuality and HIV/AIDS from Grade 4, and has a comprehensive curriculum through to Grade 12.
  HIV prevention activities in schools include curriculum-based lifeskills (life orientation), supplemented by peer motivation programmes. The educator-led life orientation curricular content is of high quality, but implementation across the country is of varying standard. Problems include the lack of trained life orientation teachers in some schools, and educators' own discomfort or inability to deal with complex and personal behavioural issues. There are a number of peer education initiatives in schools (led by both educators and/or non-government organisations, which seem to be of benefit to programme participants, although their wider impact on their peers is not clear (Flisher et al 2009).

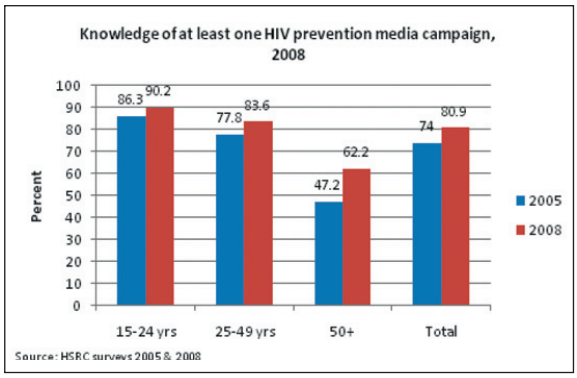
In addition, there are a number of other media initiatives, including local productions such as Siyanqoba Beat it!, 46664 (Nelson Mandela Foundation) and those of the non-profit agency Johns Hopkins University Health and Education South Africa (Tsha Tsha and Scrutinise).
These national initiatives complement the work of thousands of small community- and faith-based based organisations working locally across South Africa. Their impact is likely to be significant but cannot be independently measured or assessed nationally.

Programme coverage

National surveys have largely measured exposure to media communications, and have paid insufficient attention to coverage of interpersonal programmes. The exceptions are the RHRU survey of 15 – 24 year olds in 2003 (which specifically measured participation in loveLife's community programmes) and the 2005 HSRC survey which gauged participation in community-level HIV prevention activities.

Media exposure: Overall, exposure to HIV prevention communication through the media is high (80.9%) [Figure 60]. Not surprisingly, it is highest among 15 – 24 year olds who are most tuned into media and have been intensively targeted by HIV prevention programmes. Knowledge of HIV prevention programmes among those over 50 is still too low (62.2%).

Figure 60. Exposure to at least one HIV prevention media campaign, 2008



In terms of exposure to the four major communications campaigns, loveLife and Soul City have the greatest reach among 15 – 49 year olds, while Khomanani is less well known [Figure 61]. Exposure among those 50 years and older is equally low. Inevitably, the focus of Soul Buddyz on children means that it is less well known in older age groups. However, it is still significant that almost half of all respondents know of Soul Buddyz, which may be an important point of leverage in expanded parenting campaigns.

Figure 61. Exposure to specific HIV prevention media campaigns, by age group

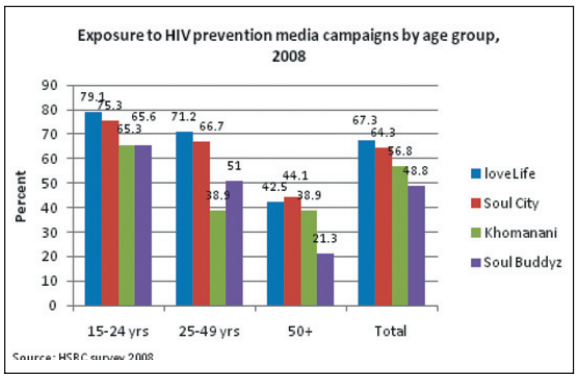


Figure 62 shows that loveLife and Soul City have good media coverage among sectors of the general population at higher risk, namely 20-34 year old women and 25 – 49 year old men. Given that these age groups are not the primary focus of loveLife, it implies a high and positive spill-over effect into the general population – critical in helping to shape broader social norms. Interestingly, loveLife also has highest reach among men who have sex with men, heavy drinkers and people who use recreational drugs, while Soul City has highest reach among

people with disability [Figure 63]. This may reflect loveLife's larger community footprint.

Figure 62. Proportion of high risk groups (defined by age) exposed to HIV prevention media campaigns, 2008

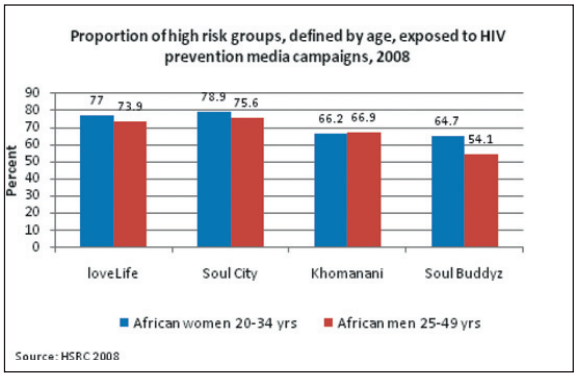
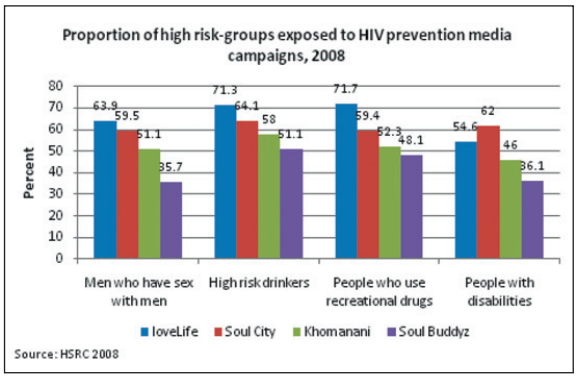
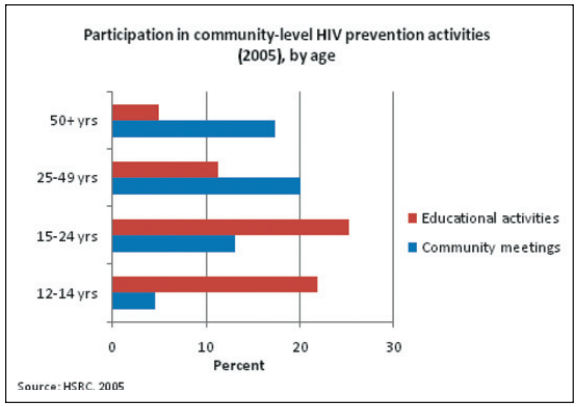


Figure 63. Proportion of high risk groups exposed to HIV prevention media campaigns, 2008



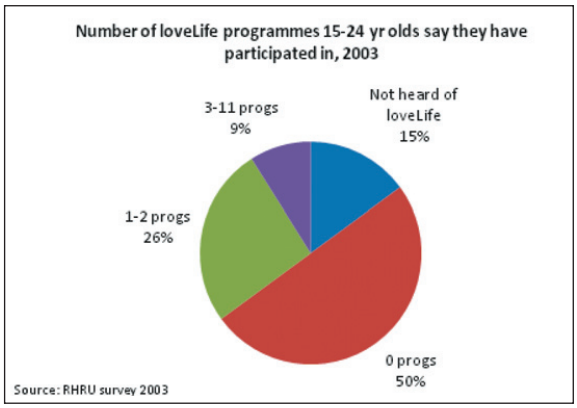
Interpersonal programme exposure: Although the full extent of local HIV prevention initiatives cannot be properly gauged, coverage of community-level programmes is clearly insufficient. The HSRC survey 2005 found that fewer than 30% of 15 – 24 year old participate in community-based educational activities, and the proportions in older age groups are even lower [Figure 64].

Figure 64. Participation in community-level HIV prevention activities, 2005



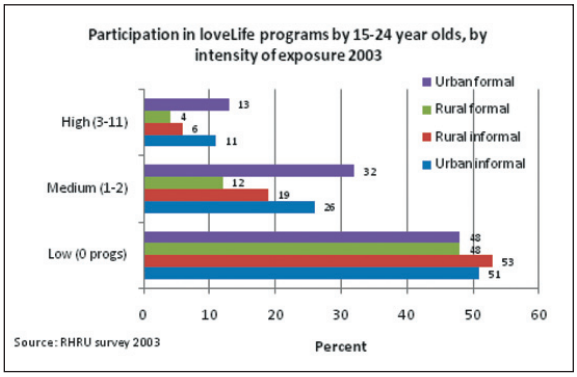
The RHRU survey 2003 assessed participation in loveLife's programmes specifically, and found that one third (34%) of 15 – 24 year olds had participated in its interpersonal programmes [Figure 65].

Figure 65. Number of loveLife programmes 15 – 24 years olds say they participated in, 2003



The intensity of loveLife exposure was assessed, disaggregated by geotype [Figure 66]. It shows highest levels of participation in areas regarded as urban formal, followed by urban informal and rural informal. Most young people who had participated in loveLife had participated in 1 or 2 programmes. While the proportion of young people who have participated in loveLife programmes is now likely to be higher – as an entire of cohort of 15 – 24 year olds have now been exposed to loveLife – high coverage is likely to be confined to the national footprint established by 2003 as loveLife's budget has not increased in real terms.

Figure 66. Participation in loveLife programmes among 15-25 year olds, by intensity of exposure



Schools-based programmes: Although all schools are meant to provide the lifeskills content as part of the life orientation curriculum, the adequacy of coverage of the HIV/AIDS lifeskills programme is difficult to assess.

A 2006 evaluation of the HIV & AIDS lifeskills programme noted:

- Reports of educator discomfort with content related to sex and sexuality, which may

undermine the efficacy of the programme
- Overstretched schools may be diverting training life orientation educators to other subjects
- Increasing pressure as the numbers of orphaned and vulnerable children and teenagers mount
- A range of activities implemented in concert with a variety of organisations, which may be responsive to local needs but should be better standardised to ensure uniform high-quality
- Lack of uniform monitoring, so that it is difficult to assess adequacy and progress over time (Centre for Education Policy Development 2007)

A further concern is that, despite an excellent and appropriate curriculum, key content for school leavers provided in Grade 10 may be too late for those most at risk that drop out earlier.

Programme impact

Impact of programmes on HIV outcome: To date, only one study has tried to establish the protective effect of national HIV prevention interventions on HIV outcomes, namely the RHRU study of 2003 relating specifically to loveLife's effect on 15 – 24 year olds. It found a significant association between participation in loveLife programmes and lower odds of HIV infection [Table 22]. The association was stronger with higher levels of participation in interpersonal programmes. Although cross-sectional survey analysis does not permit attribution, the association between HIV infection and intense participation in face-to-face programmes has important implications for scaling up behavioural interventions in South Africa.

Box 39 Media shapes attitudes, but interpersonal programmes may trigger behaviour change

Data from a 2002/3 household survey in the Eastern Cape (n=1,085) sought to gauge the role of mass media, social networks and community-level factors in increasing knowledge and safer sexual practices.

For women, talking to someone about HIV/AIDS and HIV/AIDS knowledge were increased with exposure to mass media, but no direct effect was found for stigma reduction, likelihood of disclosing test results, nor condom use at last sex. For men, only HIV/AIDS knowledge appeared to be influenced by mass media.

For women, participation in social networks was related to increased condom use at last sex. For both men and women, social networking was connected to increased knowledge and reduced stigma, but no effect on likelihood of disclosure was found.

Significant differences were found in relation to the proximity of the local clinic where greater distance decreased the likelihood of condom use. Moreover, increased condom availability at the nearest clinic improved the rate of reported condom use among women. Overall however, community-level effects were small relative to individual level effects.

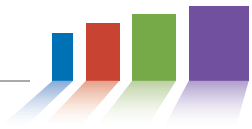
These findings suggest that mass media is effective in transmitting information. However, it appeared to have limited influence on the likelihood of status disclosure or condom use at last sex.
(Hutchinson, Mahlalela & Yukich, 2007)

Table 22. Adjusted Odds Ratios (AOR), 95% Confidence Intervals (CI) and associated p-values for HIV infection associated with participation in loveLife programmes vs not having participated

Any participation in interpersonal programmes	**Males 15 – 24 years** **AOR** (95% CI)* p-value	**Females 15 – 24 years** **AOR** (95% CI)* p-value
Participated in loveLife programmes (vs not)	**0.6** (0.40-0.89) 0.01	**0.61** (0.43-0.85) <0.01
Intensity of participation in programmes	**1 prog vs not** **AOR** (95% CI)* p-value	**2 prog vs not** **AOR** (95% CI)* p-value
Level of programme participation	**0.68** (0.54-0.85) <0.01	**0.44** (0.33-0.58) <0.01

Adjusted for completed high school or not, race, age, urban/rural residence, marriage, electricity in the home, awareness of two different national HIV prevention campaigns, participation in youth groups in past month, knowing someone who died of AIDS, and testing for HIV

Source: Pettifor et al AIDS 2005 19:1525-1534 & Pettifor et al 2006



Impact of programmes on self-reported sexual behaviour: Measuring the impact of specific national media programmes is difficult, given the confounding effects of other programmes. In 2006, a study attempted to gauge the cumulative effect of exposure to multiple media programme elements on self-reported sexual behaviour. These are summarised in Table 23, showing the odds of reporting behaviour change associated with exposure to each additional communication programme. The range of impact shows the difference between those exposed to no programmes (reporting behaviour change) and those exposed to 15 or more programmes.

Although self-reported behaviour change is not the same as demonstrating reductions in incidence, the cumulative effect of multiple media interventions is important, and emphasises the need to sustain a diversity of media programmes at high levels of coverage.

Table 23: Cumulative odds of reporting behaviour change with exposure to an increasing number of communications campaigns

Reported behaviour change	Odds ratio	% range of impact
Used condom to prevent HIV	1.05	38-56
Self efficacy of condom use	1.07	42-55
Talked to friend about HIV test	1.09	23-79
Talked to partner about HIV test	1.07	50-73
HIV test within last 6 months	1.06	15-30
Ever had an HIV test	1.06	36-57
Helped someone sick with AIDS	1.10	6-21
Helped a child affected by Aids	1.12	2-11
Positive attitude to Aids	1.03	37-47
Participated in meeting in which Aids discussed	1.11	35-72
Knows Aids telephone helpline	1.12	15-50
Faithful to partner	1.06	1-3
Abstains	Ns	
One versus multiple partners	Ns	
Condom with non-regular partner	Ns	

Source: Kincaid et al 2008

Modeling of impact

Modeling based on the above empirical data demonstrates the cost-effectiveness of programme scale-up. Kahn, Marseille and Kramer (2006) modelled the effect of scale up of loveLife from 34% face-to-face coverage measured in the 2003 RHRU survey to 50% face-to-face coverage (based on ASSA Lite). They found that participation in loveLife's community programmes by half the target group of 12-17 year olds would avert 316,000 infections by 2015 in this cohort (269,000 – 363, 000) – not taking into account any reductions in incidence in older age groups [Table 24]. Increasing coverage to 70% would avert almost half a million infections – an impact similar in size to a full-scale circumcision programme.

Implications for policy and planning:

Despite the severity of the epidemic, South Africa continues to miss opportunities for HIV prevention through behaviour change programmes. The national strategy should be a portfolio of behaviour change programmes, implemented at scale, and differentiated by age and group most-at-risk. Increasingly, schools will have to respond to the growing challenge of HIV prevention, care & support of orphans and vulnerable children – and develop strategies to help bridge the transition of school leaving.

- *Age group differentiation*

  The starting place is to better understand the trajectory of life of young people – because that helps explains the trajectory of HIV infection. As each age cohort grows up, they need to know about HIV and how to avoid it. But by their mid-teens, they should be anticipating the imminent transitions in their lives, and strategies may need to focus more on life navigation, building resilience and personal initiative. By late adolescence, young people should be linked into social networks that create systems of support through times of transition – and the best peer motivators should be nurtured as the agents of change even as they reach adulthood.

  Based on the trajectory-of-life approach, it makes sense to define four main age groups, namely:
  - 6 – 11 year olds
  - 12 – 17 year olds
  - 18 – 29 year olds
  - 30 years and older

  Programme content should be structured around the key drivers of HIV, which differ in different age groups:
  - 6 – 11 year old is primary prevention aimed at basic healthy living/ healthy sexuality information and education and shaping norms
  - 12 – 17 year old should focus on: i) increasing knowledge and risk perception; ii) normative and attitudinal strategies, and reinforcement of healthy lifestyle/healthy sexuality (12-14 years); iii) anticipating life transitions and development of ability to navigate day-to-day pressures and expectations; iv)

Table 24. Sensitivity analysis of cost-effectiveness of loveLife intervention (2005-2015)

Scenario	HIV infections averted	$ per HIV infection averted (net)	Total net cost
Base case - midpoint impact	**316,250**	**($8,093)**	**($2,559,399,603)**
Variation from Base case			
Effectiveness in risk reduction among program participants			
25% of base case	79,063	($4,773)	($377,349,901)
50%	158,125	($6,986)	($1,104,699,802)
75%	237,188	($7,724)	($1,832,049,702)
125%	395,313	($8,314)	($3,286,749,504)
Program participation (base case = 50%)			
34%	215,050	($7,572)	($1,628,391,730)
66%	417,450	($8,361)	($3,490,407,476)
Program cost with donated value			
150% of base case	316,250	($7,540)	($2,384,399,603)
200%	316,250	($6,986)	($2,209,399,603)
Effectiveness; Program cost			
50%; 200%	158,125	($4,773)	($754,699,802)
25%; 150%	79,063	($2,559)	($202,349,901)
25%; 200%	79,063	($346)	($27,349,901)
Lifetime medical cost of HIV/AIDS			
$6,100	316,250	($5,026)	($1,589,599,735)
$13,134 (85% ART)	316,250	($12,027)	($3,803,484,173)
exchange rate of 8.4 (2002)	316,250	($5,793)	($1,832,049,702)
Worst combination: Effectiveness, Program cost, Medical cost			
25%, 200%; $6,100	79,063	$2,721	$215,100,066

Source: Kahn J, Marseille E, Kramer S (2005). Assessment of the potential economic impact of South Africa's loveLife national HIV prevention programme. Unpublished

encouraging health-seeking behaviour (eg. appropriate and timely use of healthcare)

- 18 – 29 year olds must focus on changing perception of opportunity by strengthening social networks and access to information, ensuring safest sexual practice and reproduction, 'positive prevention' and parenting (especially father identity and responsibilities)
- >30 year should focus on parenting and 'positive prevention', as well as risk reduction in long-term relationships.

Box 41 Failed peer education in the workplace

In 1997, an HIV/AIDS peer-education programme was set up in a South African national retail group. At the time, the group was employing approximately 18,761 people. The programme was broadly education based and free condoms were distributed. In 2001, a study aimed to measure the effects of the programme on HIV/AIDS knowledge, self-perceived risk of infection, condom use and attitudes towards people living with HIV/AIDS. 778 employees who had access to the programme (intervention group) and 122 who did not (control) were administered an anonymous questionnaire (n = 900).
No significant associations between the peer-education programme and outcome variables were found.
(Sloan & Myers, 2005)

Box 40 Working against the wind

Mothusimpilo is a community-based programme to reduce the spread of HIV and other STIs in the mining community of Carletonville. It started in February 1998 and included condom distribution, peer education in schools, work and youth hangouts, monthly presumptive treatment of curable STI among 1,200 sex workers and training in syndromic management of STI for 100 healthcare providers.

Cross-sectional surveys done in 1998 (baseline) and in 2000 aimed to assess the impact of the intervention on self reported sexual behaviour and STI prevalence. Little positive change was noted:
Overall, knowledge, already high in 1998, improved in the subsequent 2 years. However, HIV testing and status awareness remained extremely low among sex workers, miners and residents of Khutsong.
Mineworkers reported an overall improvement in HIV related risk behaviours. Condom use increased, alcohol consumption decreased and fewer men reported ongoing casual sex or more than 6 lifetime partners.
Discouragingly, there was an increase in prevalence for all 3 curable STI measured (Chlamydia, gonorrhoea and syphilis).
Among young people in Khutsong, all STIs increased – Chlamydia significantly, as had alcohol consumption and sexual activity among men. The only recorded improvement was in condom use and fewer casual partners Among young men.
Among sex workers, alcohol consumption increased dramatically and though it was not statistically significant, infection rates of the 3 measured STI increased.

Why so little change for the better? Insufficient programme scope or scale? Positive intentions offset by negative socio-economic changes? A bad political time for Khutsong, involved in provincial boundary disputes?

(Williams, Taljaard, Campbell, Gouws, Ndhlovu, van Dam, Carael & Auvert, 2003)

- *School-based programmes*
  The optimal school intervention would include:
  - Educators responsible for life orientation learning outcomes; supported by
  - Peer motivators who have recently completed school; supported by
  - Learners in school who are recognised as potential leaders provide further peer support; together with
  - School-based support teams to identify and assist learners at risk; linked to
  - Health, Social development, Home Affairs, Police and other local Government Departments and NGOs.

  A fundamental requirement is a trained life orientation educator in every school, and the post provisioning system should make provision for a dedicated individual who will not be redeployed to deal with other subjects.
  Training of life orientation educators should focus more on personal motivation and clarification of values and attitudes of educators; the ability to tackle issues of HIV, sex and sexuality frankly; and a focus on school leaving, enabling them to deal explicitly with the sexual pressures post-school.
  The excellent lifeskills curriculum of Grades 10 – 12 develops anticipatory skills for life transitions. However, young people most in need of this curriculum are most likely to have dropped out at the end of Grade 9 or 10. The curriculum should be reviewed with a view to including the well-defined Grade 10 curriculum in Grade 8.
  Social support clubs play an important role in shaping 'pre-commitments' to positive behaviour and developing networks of support that reduce risk tolerance. In primary schools, activities such as Soul Buddyz clubs should be supported. In secondary and high schools, peer motivators should offer structured, modular programmes to learners – complementing (but not replacing) the lifeskills curriculum. This programme would be offered during break times and after school and linked to promotion of physical fitness and exercise.

  Parents should be supported as the central pillar for protecting and nurturing their children. Each school should run a series of workshop seminars for parents and caregivers of learners, dealing specifically with HIV/AIDS and how children and teenagers can protect themselves, and talking more openly about HIV, sex and sexuality. Parents should be provided with information and referred to toll free helplines such as Child Line, loveLife's parent line (0800 121 100) and other local parenting support organisations.

  A school-based support team for learners should be in place in every school, tasked with identifying and supporting children and teenagers at risk. This team, convened by the life orientation educator, should:
  - identify learners at risk
  - Ensure follow-up of every school drop-out and facilitate return to school (through active case management by schools and involvement by social workers and community-based organisations)
  - Assure both learners at risk and their caregivers that they will not be prejudiced if school fees are not paid or

Box 42 Lessons learnt at school

In KwaZulu-Natal, an HIV/AIDS and lifeskills programme was initiated by the provincial department of education in 2000. Educators facilitated a programme designed to address factors at the individual, school and community level. A study aimed to evaluate its impact on prevention knowledge, self reported sexual behaviour, attitudes towards sexual behaviour and attitudes towards people living with HIV/AIDS.

The sample of grade 9 learners (n = 1,141) was largely Zulu speaking and came from both rural and urban residence. Questionnaires were filled out at baseline, after the 6 month intervention and again 4 months later. While the experimental group received the intervention programme, the control group continued with non-structured lifeskills, including sporadic input around HIV and AIDS.

Immediately after the intervention and again at 4 months follow-up, the only significant intervention effect was for knowledge of HIV/AIDS (short term, $p<0.05$; long term, $p<0.01$). The programme appeared to have little impact on condom use, attitudes towards condom use, reported sexual behaviour, perceived social support, attitude towards people living with HIV/AIDS, confidence to assert oneself, perception of sexual behaviour, communication about HIV and future intentions for safer sex.

On further analysis, it emerged that teachers implemented the programme to different degrees in terms of the time spent on lessons and content covered. Learners facilitated by teachers who delivered the full (versus partial) implementation showed an increase in perceptions of social support, a reduction in negative perceptions about sexual behaviour, an increase in reported condom use and a decrease in reported sexual activity. Notably, responses from learners who received partial implementation of the programme were not significantly different from those of students in the control group.

This study illustrates that a common weakness of impact evaluations is the failure to assess and adequacy and quality of interventions. Through poor implementation, good interventions may be written off as bad.
(James, Reddy, Ruiter, McCauley & van den Borne, 2006

uniforms are not worn
- Seek to procure uniforms for learners from indigent families[3]
- Engage with the Department of Home Affairs, Social Development and Health to ensure access to social security and healthcare, and address physical and sexual abuse, and strengthen household food security

- Peer motivation programmes should be structured to create a pipeline of youth leadership for health and social change. Often the best and brightest young people – who have shown a commitment to public service and voluntarism – are trained as peer educators, then dropped for the next crop of bright-eyed youngsters. Yet they could be the future leaders – innovative, risk-averse and networked for the public good. The core of the programme should consist of post-school peer motivators (18-25 year olds) who would be intensively trained to facilitate the structured modular programmes. An example of such a programme is loveLife's groundBREAKER initiative. Post-school motivators would be selected from the best in-school peer motivators (who were otherwise unemployed and available). The Department of Education should work with the Expanded Public Works Programme and the National Youth Service Programme to ensure their formal recognition and payment of stipends.
  Non-government organisations should be contracted to provide modular and on-going training to, and monitoring of peer motivators. As part of their support, NGOS should seek to identify exit opportunities for the peer motivators and, in time, facilitate their involvement in ongoing leadership development and support for post-school social networks (see below).

- A bridging network for school leavers should be developed to enable school-leavers to better navigate post-school transition, and maximise access to further education and training opportunities. Key strategies should include:
  - Initiation of a national branded social network, that permits membership in high school and for at least five years beyond;
  - Use of mobile cellular technology to expand access to information about educational and financing opportunities; and
  - Links to tollfree helplines for young people (eg. National Youth Commission line, loveLife's tollfree helplines, AIDS helplines etc).

  The success of the branded social 'club' for high school learners and alumni will depend on its ability to create real value for participants. Corporate partners should be included to incentivise participation, and could include:
  - A 'starter pack' of resources for school leavers (ID registration, learner drivers' information, bank card etc), as envisaged by the Human Sciences research Council
  - A smart card (maintained by a willing corporate partner) to accrue and use accumulated points
  - Discounts at major participating retailers

Box 43 Choice in our time

A school-based behaviour change intervention based on prevention curricula from the United States was adapted for use in South Africa in (2002). The adapted intervention 'Our Times, Our Choices' was offered in 2002 to 661 Zulu speaking Grade 9 students (median age of 16) from 5 township schools in KwaZulu-Natal.

Monologues from 4 fictional teenage township characters were presented as case studies to provoke discussions and group assignments centred on alcohol use and sex.

Ten half hour sessions were presented over 8 weeks concentrating on HIV and alcohol related facts, the consequences of alcohol and unprotected sex, techniques to avoid peer pressure and positive alternatives to alcohol and sex. Learners were given the opportunity to role play newly learnt techniques. 325 learners from 3 schools received the intervention, while 336 learners from 2 schools continued with regular life orientation classes.

On alcohol related variables, no significant intervention effects emerged. That is there was no change in frequency of alcohol use, alcohol related problems, alcohol use self efficacy and attitudes about alcohol.
Learners in the intervention condition were less likely to report alcohol concurrent with sex than their peers in the control group ($p<0.05$). Females reported increased sex-refusal self-efficacy after the intervention ($p<0.05$) and among the sexually active sample at baseline, those in the intervention were more likely to report intention to use a condom at every sex in the following 3 months ($p<0.01$). No intervention effects were reported for knowledge of HIV prevention, attitudes toward condom use, condom use self-efficacy or perceived social norms for sexual activity.

The authors conclude that the modest HIV related behaviour changes demonstrated in the study suggest that prevention programmes developed in the West may be adapted and used in other cultural settings with potentially positive results.
(Karnell, Cupp, Zimmerman, Feist-Price and Bennie, 2006)

3 An analysis of orphaned and vulnerable children supported through loveLife's goGogetters programme shows that the lack of school uniform is a major disincentive to school attendance. Ref: loveLife Trust (2009). goGogetters programme review and strategy 2009. Internal document

- Mobile social networks can be used to facilitate access to information and promote social networking and support. Examples in South Africa include MXit (which is principally for chatting) and MYMsta (which is run by loveLife and provides packaged information for young people about HIV, sexuality and opportunities). The use of mobile technology is at low cost. Although access to information requires a WAP enabled phone, cellular technology is evolving so fast that WAP technology will be universally available in a couple of years. Over 75% of all South African youth own mobile phones (71% of youth in informal settlements and 67% in rural areas) (SABC/ Kaiser Foundation 2006).

Box 44 Student/sex/ life

At the Westville campus of the University of KwaZulu-Natal, a pilot study (published in 2004) of the 'Sex and Risk' (S&R) HIV reduction programme was conducted Among 196 first year psychology students. All students were exposed to 8 standard lectures on the topic of HIV/AIDS. Lectures were knowledge focused and learners were passive recipients of the information taught. Thereafter, the experimental condition (n = 151) received the S&R programme which was less didactic and included material addressing high risk sexual situations, self efficacy with regards to communication and condom usage, as well as the gendered social influences involved in negotiating safer sexual behaviour. Pre and post-test questionnaires were administered to both the control (n = 91) and experimental groups.

Intention to resist negative social influences significantly improved in men receiving S&R ($t = 3.708$, $p<0.01$) relative to the men in the control group ($t = 0.481$, $p>0.05$). Women, already more aware at baseline of risky social situations, did not improve significantly on this scale. Both the control and experimental conditions improved significantly with regard to HIV/AIDS general knowledge, suggesting that S&R added little in this regard and that the didactic lecture style was sufficient for the transfer of factual information. Students' reported self efficacy in condom use and self efficacy in communication were not significantly influenced in either the control or S&R condition

For men, the S&R programme was significantly more effective than the standard lectures in increasing awareness of the social forces involved in high-risk sexual behaviour. Smaller groups and participatory learning may be an important method for developing gender equality in tertiary institutions. (Petersen, Bhagwanjee, Bhana & Mahintsho, 2004)

Coverage thresholds required

Stover's modelling of the effectiveness of interventions assumes the following coverage in a generalised epidemic:

- AIDS education for primary and secondary students – 100%
- Programmes focused on out-of-school youth (6 – 15 years) – 50%
- Programmes focused on most-at-risk populations – 80%
- Prevention for people living with HIV – 80%
- Percent of adults reached through community mobilisation – 70% (Stover 2002)

This modelling is generic, but provides some idea of the scale of programmes required. Together with the modelling based on empirical findings and current media footprints in South Africa, it provides a basis for setting coverage targets for media and face-to-face programmes in the National Operational Plan for HIV Prevention [Table 25].

Behaviour change programmes

(Most at risk groups)

People living with HIV and AIDS

The cause of people living with HIV and AIDS has been championed most notably by the Treatment Action Campaign, which has combined national advocacy for ARV treatment with community-level mobilisation in all nine provinces. Increasingly, TAC has taken a more active role in terms of prevention for positives. The National Association of People living with HIV and AIDS (NAPWA) has provided an alternative mouthpiece and source of support to people living with HIV and AIDS, but has not been active in primary HIV prevention.

Commercial sex workers

The NGO SWEAT focuses specifically on sex workers. It has three programmes, namely (a) outreach and development, (b) advocacy and networking, and (c) research and information management. SWEAT's Outreach and Development uses peer-motivation for outreach. It is currently based in the Western Cape, and it partners with the Reproductive Health Research Unit of the University of the Witwatersrand to do outreach in Gauteng.

SWEAT is supported in the execution of its programmes by the Department of Health, which funds part of its sexual health activities and also provides condoms for distribution. SWEAT is also one of a handful of sites for distribution of the female condom. SWEAT is supported by the

Table 25. Coverage targets for behavioural interventions for the general population, 2009-2013

Age group	Activity	Coverage target (2011)
6-11 years	Media School-based programmes Social clubs at school/ out-of-school activities	67% coverage 100% 67% of all 6-11 year olds
12 – 17 year olds	Mass media School-based programmes Participation in youth leader-led social networks & other interpersonal interaction Use of toll free helplines	85% (implies almost 100% coverage of households with radio or TV) 100% 67% 5% of 12-17 year olds p.a
18-29 year olds	Mass media Participation in social networks Participation in community dialogues and conversations (or through clinic-based activities	85% coverage 33% (starting from zero) 50%
30 years +	Mass media Participation in community dialogues and conversations (or through clinic-based activities) Workplace programmes	85% 33% (starting off low base) 50%

Women's Legal Centre which continues to assist women with access to justice through the provision of legal advice and pro bono representation by lawyers and advocates when needed. It also works with the Legal Resource Centre which represented it in litigation against the police for harassment and abuse of sex workers.

Men who have sex with men

There is a well-organised national network of 26 LGBT NGOs co-ordinated by an umbrella body known as the Joint Working Group (JWG). Several of the NGOs provide psychosocial services including youth programmes, risk-reduction counselling, and support groups for people who are HIV positive. Several of the NGOs also distribute condoms and lubricant and distribute printed IEC materials. The three dominant LGBT NGOs are the Triangle Project (in Cape Town, Western Cape), OUT LGBT Well-being (in Tshwane, Gauteng), and Durban Lesbian and Gay Community and Health Centre (in Durban, KwaZulu-Natal). These NGOs currently receive funding from HIVOS, Atlantic Philanthropies, and the Netherlands Schörer Foundation. The funding is generally short-term and insufficient to provide large-scale sustained services. In 2008 Health4Men, a stand-alone health service targeting MSM, was established in Cape Town (Western Cape) with PEPFAR funding and support from the Western Cape DOH and NDOH. Health4Men currently operates from two centres in Cape Town, and there are plans to expand to Soweto (Gauteng). Services provided include VCT, STI treatment, ART, and general healthcare (Personal communication Dr Carol Metcalf).

Prisoners in correctional facilities

The Department of Correctional Services is responsible for health and HIV prevention in prisons, with the Department of Health providing condoms. Specific health interests of prisoners have been championed by the Police and Prisons Civil Rights Unions and the Treatment Action Campaign, but there is a need for a far more concerted programme of HIV prevention in prisons. The existing policy to permit condom provision following counselling is restrictive and should be replaced by a directive to ensure maximum and unfettered condom availability in prisons.

Orphans and vulnerable children

The National Action Committee for Children affected by HIV/AIDS, spearheaded by the Department of Social Development, combines the efforts of a range of key Government and non-government agencies. Its role is to implement the dual policy of extending Government social safety nets, while expanding community-level systems of support.

Focused national initiatives include ACESS (improving access to social security), loveLife goGogetters (a network of 500 grandmothers), and Khomanani Circles of Support in communities. There are also thousands of local initiatives spearheaded by faith-based organisations, schools, social development offices and civil society, often with the support of donors.

Implications for policy and planning: The generalised nature of the epidemic requires a country-wide response at scale, with concentrated efforts in nodes of highest incidence. These nodes may be defined geographically, or in terms of age (life transitions) or specific sub-populations defined by circumstances of risk. Programmes should focus both on established high risk groups (such as people living with HIV and AIDS, men who have sex with men, commercial sex workers, people presenting to health services with STIs and prisoners in correctional services) as well emerging high risk groups (such as orphaned teenagers and people living in new mining areas and transport corridors.

The aim of programmes aimed at the former should be to reduce the high HIV incidence, while the aim of the latter should be to prevent new hot spots of HIV infection. The main strategy for the former should be to increase condom use, while the latter requires a more multi-faceted response.

Box 45 Stepping Stones

Stepping Stones, an HIV intervention programme originally developed for use in Uganda, has been adapted for use in over 40 countries. The intervention aims to improve sexual health through participatory methods including role play, drama and critical reflection. The 50 hour 6 to 8 week programme is delivered to males and females separately with the aim of encouraging more gender equitable relationships in the context of HIV/AIDS. In 2003 and 2004 the version adapted for South Africa was assessed in the Eastern Cape among 1,360 men and 1,416 women (n = 2,776) between 15-26 years. The impact of the programme was measured against the incidence of HIV and HSV-2 as well as self reported sexual and risk behaviour.

Stepping Stones had little effect on the incidence of HIV. However, the incidence of HSV-2 was reduced significantly (incidence risk ratio 0.67, 95% CI 0.46-0.97, p=0.036). The HSV-2 effect was similar for men and women in the sample.
There was no evidence of any behaviour change in women receiving the intervention other than an increase in transactional sex at 12 months (insignificant at 24 months) and a slight, yet insignificant, increase in unwanted pregnancy at 24 months.
Significant intervention effects for men included less transactional sex at 12 months (disappearing at 24 months), less perpetration of physical or sexual intimate partner violence at 24 months and less problem drinking at 12 months or drug initiation at 24 months.

Given that, at the time of the study Stepping Stones was asserted to be the most "widely used intervention of its kind in the world", the lack of impact found on the primary outcome measure, HIV incidence, is of concern. However, reductions in HSV-2 incidence and some evidence of sexual behaviour change among men suggest that Stepping Stones can affect some HIV risk factors in South African youth.
(Jewkes, Nduna, Levin, Jama, Dunkle, Puren & Duvvury, 2008)

- Interventions targeting commercial sex workers and men who have sex with men are best done through established social networks by organisations that have pre-existing legitimacy (Beyearer 2008).
- Prisoners are a captive audience at considerable risk, yet they do not have unfettered access to condoms. While it is true that condom availability in prisons will not necessarily translate into universal use, it will undoubtedly have some effect on the extremely high rates of infection (47% prevalence among 26-34 year olds).
- Behavioural initiatives and school-based initiatives aimed at 6-11 years and 12-17 years should include specific programmematic components for orphans and vulnerable children and teenagers. These should address their HIV prevention needs by:
  - Ensuring they are included in society
  - Keeping them at school
  - Helping access social grants
  - Seeking to prevent physical and sexual abuse
  - Strengthening food and economic security
- Development-specific initiatives should be established to ensure intensive HIV prevention in new areas of development among others, the:
  - N2 highway project through the Eastern Cape
  - The trans-Kalahari highway project
  - Mining expansion in Limpopo and other provinces
  - All new major developments should be required to submit AIDS impact assessment and HIV prevention plans, and should be held to account for their implementation

Condom provision

Figure 67. Average number of male condoms distributed (per male 15 years and older), 2004 – 2008

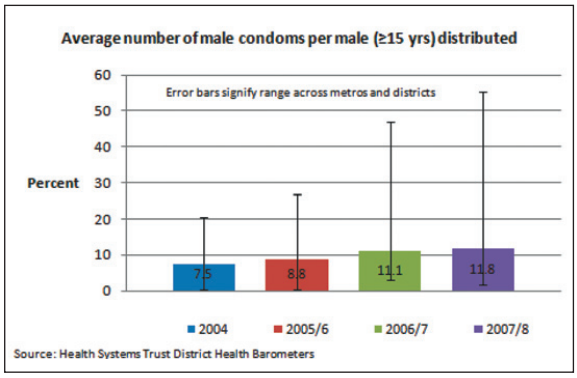
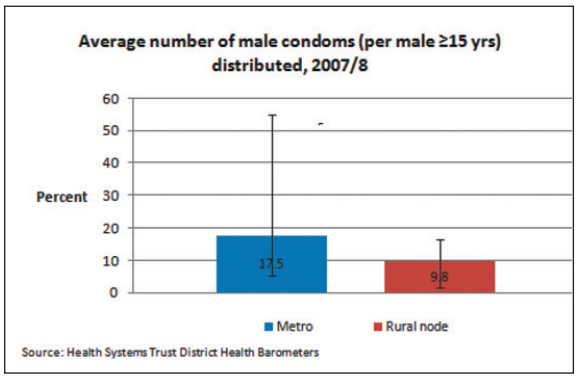


Figure 68. Average number of male condoms (per male 15 years and older), 2007/8



Condom availability

In general, male condoms are widely accessible, although they are not available enough to a number of high risk groups – ironically the groups that need them most. Female condoms are expensive and made available primarily in family planning settings. The 2003 RHRU survey of 15-14 year olds found that 87% of young people said that it was easy to get condoms if they wanted or needed them; a further 6% said it was somewhat easy; while 6% said it was difficult or somewhat difficult (Pettifor et al 2004).

The 2005 HSRC survey found that the 'overwhelming majority of South Africans believe that condoms are easily accessible', and 70% report using free Government-provided condoms (Shisana et al 2005). However, among high risk groups and in certain parts of the country, the situation is different:

- Local studies among men who have sex with men report that condom availability is inadequate (Rispel and Metcalf 2009).
- Condom distribution in prisons has been limited. Although the policy of the Department of Correctional Services is that condoms should be provided to prisoners "on the same basis as condoms are provided in the community", this is qualified by a requirement that prisoners should undergo education and counselling regarding AIDS prior to receiving condoms (Goyer 2003). While education and counselling is desirable, this requirement is an obstacle to the free distribution of condoms in prisons.
- Female condoms are very limited. As part of its Expanding Dual Protection Strategies Programme, the Department of Health now distributes over 3 million free female condoms a year.

Condom supply

Data from the male condom logistics management information system (LMIS) shows that an average of 33 million condoms is distributed per month (Kumire 2009). Demographic forecasts, based on self-reported sexual frequency, use of Government condoms, and condom use at last sex are that 43 million free condoms are required per month. This translates into an annual demand of 33 Government condoms per male ≥15 years per annum. Given that these forecasts are adjusted for 10% wastage and 5% cross-border attrition, the projected demand and reported availability (90%) tally fairly well.

Data from the District Health Information System (DHIS) shows a steady increase in the average number of male condoms distributed to men aged 15 years and older through the district health system [Figure 67] (Health Systems Trust 2009b). However, there is still significant variation across districts, with the metropolitan area of Greater Cape Town consistently distributing the highest average number of condoms (>50 per male ≥15 years), and some rural districts averaging only 3 [Figure 68].

Box 46 There's a market for female condoms

A female condom pilot programme conducted by the Reproductive Health Research Unit in 2001/2 found that about three out of four female condom acceptors were also using either injectables or oral contraceptives, indicating a desire for dual protection from pregnancy and STIs. Most acceptors of female condoms said they used it to protect themselves from STIs. About half of the female acceptors reported current male condom use. About 60% of acceptors were aged 20 to 29 years (Nutley et al 2002).

There have been recent reports of stock-outs of government-supplied condoms, and a review of the condom distribution system identified a number of shortcomings that need to be addressed (Kumire 2009). These include:

- Delays in tender processes for procurement, which are the prime cause of the current near depletion of the condom pipeline
- Supplies exhausted at supplier and many primary distribution sites (compensated for by sharing with other sites and across provinces)
- Cumbersome logistics management information system, with multiple data entries for a single consignment – resulting in inaccuracies
- Lack of staff designated specifically to condom distribution programme at central level
- Absence of standardised staff functions and responsibilities at provincial, district and sub-district levels
- Need for clerical support in the condom supply chain within provinces

Implications for policy and planning

The national strategy should be to:

- Achieve uniformly high coverage across the country (>45 condoms distributed per male older than 15 years according to the LMIS and >25 condoms distributed per male older than 15, according to the DHIS. Condoms are a commodity where supply can drive demand, and for such a cost-effective strategy, the Government should err on the side of over-supply.
- Saturate high-group groups with condoms – including in prisons, MSM, commercial sex workers.
- Expand female condom distribution. The costs of female condoms are about thirty times higher than male condoms which will inevitably limit the extent of general distribution. But still, women who need condoms most are typically those who don't get to use them: often because their partners, who have other sexual partnerships, refuse to use condoms in their regular relationships. Providing female condoms to women attending clinics for family planning and STI treatment may be a breakthrough strategy for HIV prevention, particularly in reducing the incidence of HIV in people >30 years.

With almost 80% of people using Government-issue condoms, the possibility of an interrupted supply of male condoms represents a significant threat to HIV prevention in South Africa and must be addressed as a matter of urgency.

Box 47 Social marketing and good supply increase condom use

A random sample of 446 Grade 10 secondary school learners in the Northern Province filled out a questionnaire regarding their sexual health behaviour. The 200 males and 246 females were between the ages 10 and 30 years with a mean age of 16.6 years. The majority of participants (84%) came from rural backgrounds. 70 females and 79 males reported being sexually active. The mean age of sexual debut was 14.9 years for males and 15.6 years for females. At 16.6 years of age, 23.9% of the women and 40.2% of the men had engaged in sexual intercourse with more than one partner. Of the sexually active sample, 18.6% of the females and 56% of the males reported never having used a condom. Males were more likely to have sex under the influence of alcohol than females.

Having read a social health magazine as well as having been given free condoms was significantly associated with condom use at last sex. When students felt susceptible to HIV/AIDS they were more likely to report lifetime condom use and high condom use self efficacy. Women reported significantly less condom use self efficacy than males, yet had used condoms more.(Peltzer, 2000)

Box 48 Where did all the rubber go?

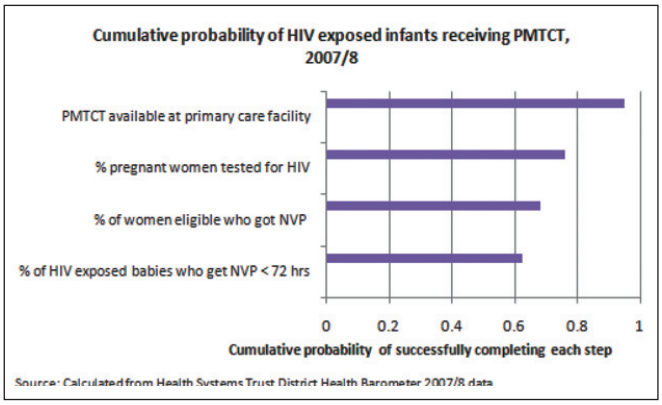
People who procured condoms in 12 different public health clinics were recruited and followed up for five weeks between (1998 and 1999) to determine their use and wastage of the freely distributed condoms. Across all the clinics, 384 participants who had acquired 5,528 condoms were successfully tracked and interviewed. Results indicated that 43.7% (2,418) of the condoms were used in sex, 21.7% (1,202) were given away, 8.6% (473) were wasted or lost and 26% (1,435) had not been used and were still available to the participants.

Participants who asked for, or actively took condoms, used them at a rate of 5.5 per 30 days, whereas those who were given condoms, used them at a rate of 4.4 per 30 days. Furthermore, multivariate analysis showed that public sector condom use is higher among those who reported more than one sexual partner when compared with participants who reported only one sexual partner during the study period. Condom use was also higher among those reporting concern around pregnancy as opposed to those who were not. (Myer, Mathews, Little & Abdool Karim, 2001)

Health service interventions

Prevention of mother-to-child transmission

Figure 69. Cumulative probability of HIV exposed infants receiving PMTCT, 2007/8



South Africa first introduced its PMTCT programme in 2000. Until 2008, the South African PMTCT regimen consisted of single-dose Nevirapine for the mother during labour and for the newborn within 72 hours of delivery. In 2008, short-course AZT starting at 28 weeks of gestation was added to the PMTCT regimen. Women who have an indication for HAART (At present, CD4+ T-cell count <200 or Stage IV disease) and who present before 34 weeks gestation are started on HAART, but those who present after 34 weeks gestation are given the PMTCT regimen, and HAART is deferred until after delivery. However, access of eligible HIV-infected pregnant women to HAART for their own health in the context of PMTCT has remained limited.

Coverage of PMTCT

Over 95% of primary care facilities now provide PMTCT. There is no up-to-date data on the uptake and successful completion of the PMTCT regimen, and that which is available may be incomplete – dependent on the quality of data from the District Health Information System (DHIS). Nevertheless, analysis of 2007/8 data provides a useful assessment of missed opportunities, which may be summarised as follows:

- Not all women access antenatal services.
- Less than one third have their first antenatal clinic (ANC) appointment before 20 weeks, limiting timely access to PMTCT services, yet social mobilisation campaigns have not focused on encouraging pregnant women to report early for ANC.
- Not all primary healthcare facilities offer PMTCT programmes – although the proportion that don't is now less than 5%.
- Not all pregnant women are tested for HIV. An estimated 20% are still not tested.
- Not all HIV-infected pregnant women receive antiretrovirals and access to maternal HAART is very limited.
- Not all infants born to HIV-infected women receive antiretrovirals.
- The community health worker and clinic-based peer education programmes have not been adequately utilised to promote early ANC booking and testing.
- Despite counseling on infant feeding, mixed feeding rates remain high.
- There is poor uptake of HIV PCR testing for HIV exposed infants and thus delays in diagnosis and appropriate management.

Taking into account the missed opportunities prior to entering the health service, and attrition through the system, a little over three quarters of women (76%) tested for HIV and eligible for PMTCT currently receive it. Although data from the district health information system suggests that 100% of HIV-exposed babies receive Nevirapine within 72 hours after birth, the real figure is probably lower, as the denominator (number of live births in facilities to HIV positive women) does not take into account failure to test for HIV and home births (8% of births, Health Systems Trust 2008). Assuming that the same proportion of women not tested are HIV positive as those tested (28.4% HIV+ in 2008), and similar assumptions hold true for those giving birth at home, the true proportion of infants of HIV+ mothers who receive Nevirapine within 72 hours is 92%. This means that still over a third of babies born to HIV positive women are put at risk through health systems failures. Assuming a vertical transmission rate of 30%, this translates into about 30,000 infections annually as a result of health system failure. This is illustrated in Table 26.

Table 26. Progression and failure through the PMTCT system, 2007/8

Steps in PMTCT programme	% of each step successfully completed	Cumulative % of steps so far successfully completed	% of each step failed to complete	Cumulative failure rate (HIV exposed babies put at risk)
PMTCT available at primary care facility	95%	95.0%	5%	5%
Proportion of pregnant women tested for HIV	80%	76%	20%	10.7%*
Proportion of women eligible for PMTCT who receive it	76%	68%	24%	32.0%
Proportion of HIV-exposed babies who receive NVP within 72 hrs after birth, out of the number of live births in facilities to HIV positive women	92%**	62.5%	8%	37.5%

* Assumes that HIV prevalence among those not tested is the same as among those tested

** Adjusted for under-estimate of the denominator, as only 80% of pregnant women were tested for HIV and 8% deliver at home

Source of first data column: Health Systems Trust District Health Barometer 2009

Figure 70 shows the proportion of women attending public antenatal clinics who were tested for HIV for the years 2004 – 2007/8. As with general patterns of HIV testing, it shows a steady increase since 2005. However, there are still some districts where records provide evidence of only half of all pregnant women being tested for HIV (the fact that the inter-district range exceeds 100% probably implies repeat testing of individuals, or unreliable data).
Interestingly, clinics in the six metropolitan areas lag behind clinics in rural nodes in terms of routine testing in antenatal clinics (73% vs 85% respectively) [Figure 71]. This has been a consistent pattern since 2004.
There have been significant gains in PMTCT uptake and service efficiency over the past two years, with the cumulative failure rate (based on records and as determined in Table 26 above) dropping from 68% in 2006/7 to 37.5% in 2007/8.

Figure 70. Proportion of women attending public antenatal clinics who are tested for HIV

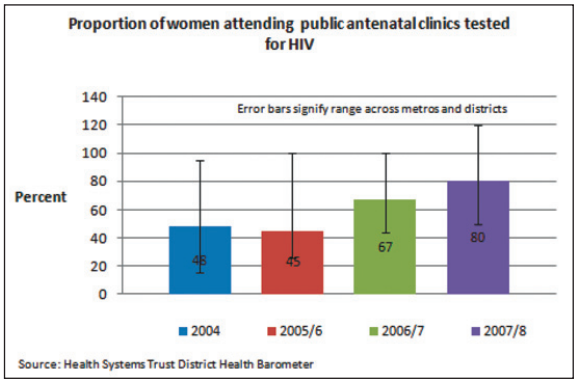
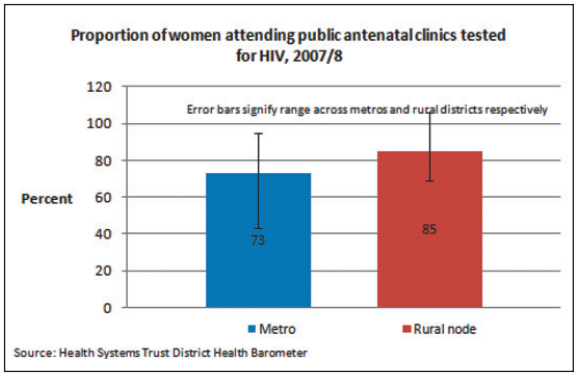
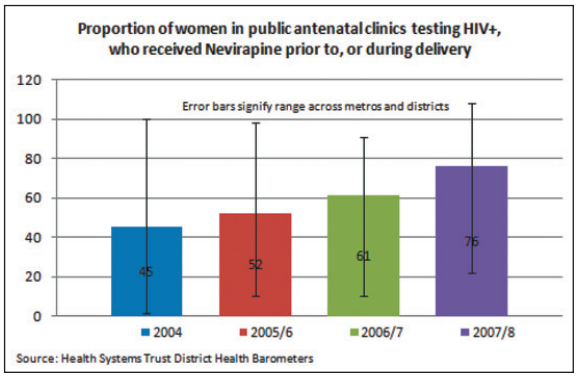


Figure 71. Proportion of women attending public antenatal clinics tested for HIV, metro vs rural node, 2007/8



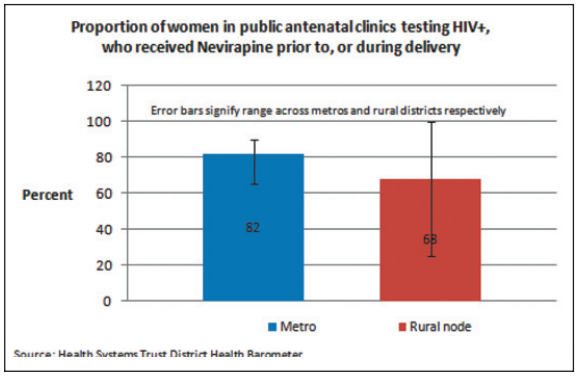
The proportion of pregnant women who received antiretroviral prophylaxis increased from 45% in 2004 to an average of 76% in 2007/8. However, there is still huge variation across provinces and districts [Figure 72].

Figure 72. Proportion of pregnant women eligible for ART prophylaxis who received it



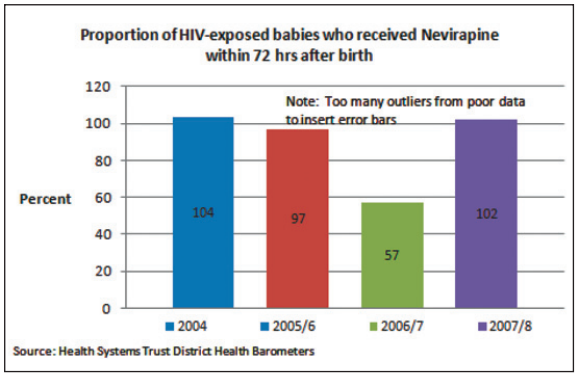
In terms of provision of Antiretroviral prophylaxis to eligible mothers, clinics in rural nodes (68%) continue to lag far behind metropolitan ones (82%), although there has been a substantial improvement since 2006/7 (49% vs 73% respectively [Figure 73]. There remains wide variation in provision in rural districts, from below 30% to close to 100%.

Figure 73. Proportion of pregnant women eligible for Nevirapine who received it, metro vs rural nodes



According to the District Health Information System, 100% of infants born to HIV-infected women received Nevirapine within 72 hours of birth in 2007/08. However, as described above, this figure under-estimates the number of live births (which is the denominator), and actual average uptake is probably closer to 90% [Figure 74].

Figure 74. Proportion of babies of HIV + mothers who received Nevirapine ≤ 72 hrs of birth



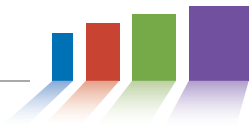
Effectiveness of PMTCT programme

Successful PMTCT reduces the rate of vertical transmission to less than 5%, and early provision of HAART for women with a CD4 count ≤350 reduces transmission to virtually zero (Mofenson 2009). Data from the Western Cape (where dual therapy has been in place since May 2004) shows that over 95% of pregnant women are tested for HIV, and almost 95% of HIV positive mothers and their babies receive the prescribed prophylaxis. The result has been a reduction in the transmission rate from 22% in 2003 to 5% in 2007 (Uys 2008). The performance in some other provinces may have been less successful.

An earlier study of PMTCT in KwaZulu-Natal (2001-2004) found that 21.6% of infants of HIV + mothers taken to immunisation clinics were already infected (Rollins 2006). In Gauteng, the overall transmission rate dropped from 17.1% among babies of HIV positive mothers in January 2008 to 13.1% in September 2008. Transmission rates within the first three months dropped from 11.7% to 8.2% over the same period (Coovadia 2008). These improvements in transmission rates over a short time period reflect the successful implementation of dual therapy prophylaxis in some provinces, while in others the roll-out of dual prophylaxis has yet to be completed.

While dual therapy will increase the efficacy of antiretroviral intervention, the overall programme effectiveness also depends on the efficiency of the health system. A recent analysis of bottlenecks in the PMTCT system identified the following:

- PMTCT is not viewed as a priority intervention. This is borne out by the inadequate outcomes and monitoring of the interventions.
- There is a lack of integration of the various components of the PMTCT programme, including maternity care, child health, nutrition and HIV treatment at care starting in the national DOH and percolating down through provinces, districts, sub-districts to facility level.
- There is inadequate integration of PMTCT interventions by non-public sector health organisations with the public sector.
- There is inadequate monitoring of the PMTCT system at all levels. The indicators for measurement of the system need revision as the record keeping system for basic data collection is non-standardised, outdated, and not in line with the indicators required to monitor treatment (e.g. dual therapy; HIV-positive pregnant women placed on HAART).
- There is inadequate supervision of facility (including district hospital) staff including those responsible for the implementation. (Dept of Health 2009).



These, coupled with rigorous application of HIV testing and PMTCT protocols, are critical in meeting the target of near zero incidence (<5% of births to HIV positive women) by 2011.

Implications for policy and planning

- Eliminating missed service opportunities for PMTCT would avert 7.5% of total national incidence. This requires early antenatal booking (6 wks), 100% HIV testing and follow-through for HIV+ mothers and exposed babies. It is not unusual for pregnant mothers who try to book early to be turned away – and this practice should stop.

- If mothers-to-be are kept healthy, the risk of HIV transmission will be greatly reduced. The CD4 threshold for initiation of HAART should be increased to 350 to minimise transmission risk and ensure that mothers are well during the formative phase of their children's lives. Antenatal attendance provides the opportunity for PAP smear, early TB detection, STI treatment, counselling on the importance of condoms during pregnancy and other family planning. These opportunities cannot be missed.

Box 49 HIV training for traditional healers

In 2004/2005, 233 traditional healers in KwaZulu-Natal were randomly allocated to a control or intervention group. The intervention consisted of 3½ days training in HIV/AIDS, STI and TB prevention. Semi structured baseline questionnaires included STI/HIV/AIDS and TB knowledge, HIV and STI management, HIV risk practices as well as referral patterns and attitudes towards the biomedical field. 155 (67%) of the traditional healers completed the follow up interview 7 – 9 months later.

A significant intervention effect was found for HIV knowledge ($p<0.01$) but not for TB knowledge. A significant intervention effect was also found for HIV/STI management practices ($p<0.001$) where significant improvements were found for integrating partner referrals in their STI management, conducting HIV/STI risk reduction counselling and distribution of condoms to their patients. Furthermore, healers in the intervention group reported giving more HIV/AIDS and STI education in their communities and keeping records of their patients.

There was no significant effect for HIV risk practices, including the re-use of blades and enema equipment. Participants complained that local clinics could not provide them with gloves or blades due to stock shortages.
Both the control and experimental group reported that they were prepared to and were confident about working with biomedical health practitioners and were likely to refer patients to clinics or hospitals. (Pelzer, Mngqundaniso & Petros, 2006)

HIV testing

Programme status: HIV counselling and testing (HCT) is provided in all public primary healthcare facilities in South Africa, as well as by many non-government agencies funded by donors.
To date, a policy of voluntary counselling and testing (VCT) has been pursued, with the exception of antenatal care where routine testing has effectively been instituted for about 80% of attendees. In clinics, the policy of provider-initiated voluntary counselling and testing (opt-in) has resulted in missed opportunities for detection of HIV infection, which may lead to late presentation and clinical complications. A study in KwaZulu-Natal in 2007 found that routine HIV testing in a public hospital identified 39 cases per week compared to 8 cases per week referred by a physician to a VCT site ($P<0.001$) (Basset et al 2007). The experience of Botswana is that routine testing was well received by the population (Weiser 2006), although there were some initial fears that it might deter some people from clinic attendance.

Implications for policy and planning: Provider-initiated testing with opt-out (routine testing) in South Africa would add new impetus to the PMTCT, ART and TB testing programmes in South Africa It may help overcome some of the social barriers to uptake of PMTCT and ART. It may also assist in earlier TB detection if positive HIV results are followed up by active screening for TB.

In Uganda, routine testing was found to be two-fifths of the cost of stand-alone VCT (per HIV positive identified (Menzies et al 2009).

Circumcision

Programme status: The coverage of medical circumcision in South Africa is not known. (See section on Predictors of HIV infection for a discussion of the extent of self-reported circumcision).

Implications for policy and planning:
Circumcision should be viewed as an effective component of a multi-faceted and comprehensive HIV prevention strategy in South Africa. It provides partial protection, which together with behaviour change and other strategies, will reduce the incidence of HIV infection.

Male circumcision provides an opportunity to reach men who typically don't use health services frequently, and should be provided as part of a package of healthcare for men – including basic vital signs, clinical screening for STIs and treatment, condom provision, counselling on contraception, and counselling on alcohol use and abuse.

Knowledge of the full effects of male circumcision is still evolving. There are very real concerns that male circumcision may have a negative effect on women if sexual intercourse is initiated within six weeks of circumcision, or if circumcised men feel that they can engage in riskier sexual practice (Waver et al 2009). In the short-term, key messages regarding the partial protective effect of circumcision should be integrated into national communication provided by Khomanani.

Early diagnosis of tuberculosis

Programme status: TB and HIV go together. More than half of people with TB in South Africa have HIV. The risk of contracting TB in the first year after HIV infection is twice that of other people (Sonnenberg 2001). Among HIV positive infants, the risk of contracting TB is 24 times higher ((Hesseling et al 2005). It also appears that TB accelerates the rate of HIV progression (Perneger et al 1995) and early case detection and treatment is critical in reducing morbidity and its associated healthcare costs. Our goal should be to reduce the burden of disease and death from HIV and TB, saving considerable healthcare costs at the same time. This requires better integration of prevention, treatment, care and support.

The costs of TB-HIV coinfection in South Africa are high: Apart from the exponential growth in expenditure on standard treatment, multi-drug resistant TB (MDR-TB) has increased sharply and extensively drug resistant TB (XDR-TB) has emerged over the past five years. The costs of treatment are at least 100 times higher than standard treatment (Fourie 2006).

The World Health Organisation recommends a smear test for people initiating HAART if they have had a cough for two weeks or more. However, a study in Durban found that cough symptoms were an insensitive and non-specific form of triage for testing (52% sensitivity, 63% specificity) (Bassett et al 2009). Furthermore, the smear test was found to be highly insensitive: Of 824 patients, 159 (19%) had a positive TB sputum culture, only 14 (9%) had a positive AFB smear. The authors found that, for people ready to start ART based on clinical symptoms or CD4 counts, a full diagnostic workup of AFB culture and chest x-ray costs $360 per case identified. This compares to $240 per case identified through an AFB smear, but only half the cases were identified through the smear. This calculation does not take into account the costs of treating an undiagnosed case of TB.

Implications for policy and planning:

- The above points to the need for a high-vigilance protocol for people testing positive for HIV: sputum culture for AFBs in all newly diagnosed HIV positive people who are smear negative – and chest x-ray among those symptomatic for TB if the culture is negative.

- Infant and child morbidity related to TB could be significantly reduced through heightened vigilance – active exclusion of TB in mothers-to-be, 6 monthly chest x-rays for HIV-exposed infants, and immediate chest x-rays for HIV-exposed infants and infants in high risk areas who fail to thrive.

STI management

Programme status: The incidence of sexually transmitted infections among adults 15 years and above (as calculated from district health information system statistics) is 5% per annum (Health Systems Trust 2007b).

Given the magnitude of the problem – high prevalence of mixed infections and limited diagnostic resources – South Africa has adopted the syndromic management approach to treatment. This approach should work well among symptomatic patients, but there is evidence of significant health systems failures in this regard:

- A study of the implementation of syndromic management in rural KwaZulu-Natal (1995-2004) found a median overall effectiveness of 13.1% (95% CI 8.9-13.1) (measured as the proportion of symptomatic curable episodes of STI, cured by syndromic treatment (White el al 2008). The authors conclude that effectiveness could be improved by increased rates of treatment-seeking and provision of treatment according to protocol.
- Treatment of STIs in the private sector is inadequate, particularly within cash practices that treat many men who cannot afford medical aid but choose to go to public clinics (Schneider et al 2005). Appropriate drug treatment in the private sector is significantly associated with the client having medical aid (AOR 2.64 95% CI 1.95-3.58) and more recent medical graduation of the practitioner (after 1993 vs before AOR 3.47 95% CI 2.39-5.01). It is estimated that about half of all STI episodes in South Africa are treated by private general practitioners (Schneider et al 2001). This means that private GPs treat about 4 million episodes a year.

These findings point to the need to intensify training and in-service support for syndromic management in the public sector, and among older medical practitioners and those in cash practice. However, the problem is not only a lack of training but perverse incentive among cash practitioners who include the cost of medications in a standard

client's fee and are reluctant to provide the full range of medications. A cluster randomised trial of 37 Durban primary care clinics found that the use of syndromic packages (containing antibiotics, condoms, partner notification cards, and written information) improved STI management and was cost-effective. Simulated patients in intervention clinics were more likely to receive appropriate syndromic STI management (correct treatment plus condoms offered plus partner notification cards offered; prevalence rate ratio 2.3; 95% CI 1.6 – 3.0) and to receive more STI advice and information (odds ratio 1.5; 95% CI 1.01 – 2.1). The additional cost per extra patient appropriately managed was $1.51 (Colvin et al 2006).

Both HIV testing and treatment of STIs provide an opportunity for prevention of other reproductive health problems, notably cervical cancer. Pre-cancerous cervical cells are five times more likely among women presenting with sexually transmitted infections than among other women (Kamb 2005), and the development of cervical cancer among human papilloma virus (HPV) infected women is accelerated among women with HIV (Bourke 2008). In 1999, the Department of Health introduced a policy to provide three PAP smears, free of charge, at ten year intervals to women over thirty years of age. But by 2006, fewer than 20% of eligible women had been screened (Health Systems Trust 2006). Currently, 7,000 women are diagnosed annually in South Africa with cervical cancer and 3,000 die of it (Denny 2006). As more women receive HAART, it is likely that the incidence of, and mortality from, cervical cancer will increase.

Implications for policy and planning:

- Provision of STI medications for treatment in private cash practice, as part of a 'package deal' may improve the quality of STI management considerably. Unfortunately, this strategy may be difficult to implement on a large-scale as private practitioners may use the subsidised medications for other purposes, and feasibility and monitoring will need to be carefully assessed (Personal communication, Dr David Coetzee).

- A prevention and treatment package for people presenting to health services with STI should include:
  - Full syndromic treatment according to protocol
  - HIV counselling and testing
  - If female, PAP smear, family planning counselling & dual contraception (including offer of female condoms)
  - If male, family planning counselling, alcohol counselling and provision of condoms (male & female offered)
  - Request for partner to attend for physical exam and HIV testing
  - Provision of printed material about HIV, STIs and high risk sexual behaviour

Box 50 The 10 Standards for Youth Friendly Clinics

1. Management systems are in place for effective provision of adolescent-friendly health services.
2. The clinic has policies and processes that support the rights of adolescents.
3. Appropriate adolescent health services are available and accessible.
4. The clinic has a physical environment conducive to the provision of adolescent-friendly health services.
5. The clinic has the drugs, supplies and equipment necessary to provide the essential service package for adolescent-friendly healthcare.
6. Information, education, and communication (IEC) consistent with the essential service package is provided.
7. Systems are in place to train staff to provide effective adolescent-friendly health services.
8. Adolescents receive an adequate psychosocial and physical assessment.
9. Adolescents receive individualised care based on standard management guidelines/protocols.
10. The clinic provides continuity of care for adolescents.

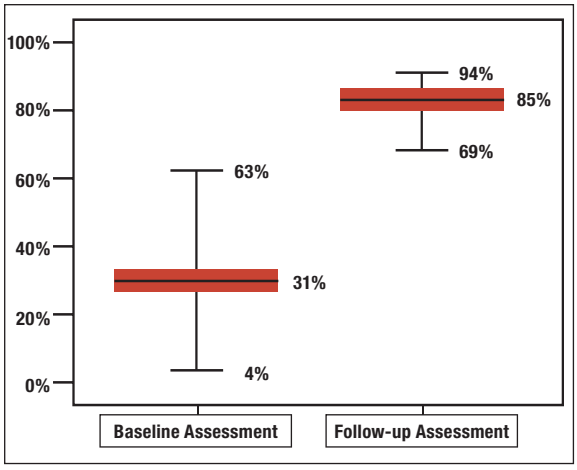
Increasing access to healthcare for young people, men and high risk groups

Programme status: Youth friendly health services improve access and effectiveness of healthcare to young people (Ross et al 2006). Similar approaches should be adopted to increase service utilisation by men and high-risk groups.

The Department of Health has adopted a programme developed by the Reproductive Health and HIV Research Unit (University of Witwatersrand) and loveLife aimed at strengthening ten standards of care for young people [Box 50] . This programme combines a quality assessment element aimed at health workers with expanded youth outreach services. Currently about 500 public clinics (14%) have actively participated in the programme.

Post-programme assessment of clinics shows a significant increase in the quality of care, measured against 41 criteria related to the ten standards described above. [Figure 75].

Figure 75. Inter-quartile distribution of quality scores (pre- and post assessment)



Source: loveLife monitoring data, 2005

Similarly, the utilisation of public clinics by teenagers shows an increase in clinics where the programme has been in place for longer than six months. These findings, based on monitoring, are supported by an intervention study comparing 11 intervention sites with a similar number of controls. This study found improvements across virtually all measures, with youth friendly clinics scoring higher overall (79.9%) than the clinics with routine standards of care (Dickson 2007).

Implications for policy and planning:

- The successes of this programme will only be sustained if there is continuing in-service support. This is especially important where clinics experience a rapid turnover of staff. Further, the youth friendly service programme needs to be rapidly expanded to address the backlog and meet the NSP target of 100% coverage by 2011.
- The youth friendly service programme can be easily adapted to other groups, such as men in general, men who have sex with men and commercial sex workers. In this regard, a module should be developed to improve the quality of care for men, with a specific focus on sexual and reproductive health. This module, provided as part of the quality improvement component of youth friendly services will help facilitate the uptake of the national male circumcision programme, and ensure its integration into routine healthcare for men.

Safe blood supplies

Programme status: Responsibility for safe blood supply in South Africa is delegated to the non-profit and autonomous South African National Blood Services which serves all provinces except for the Western Cape. The latter is served by the Western Province Blood Transfusion Service.

Screening is done both through behavioural questionnaires and immunoassays. Nucleic acid amplification (NAT) tests are done on all donated blood to detect HIV, Hepatitis B and C and syphilis. It can detect the presence of HIV from 11 days after infection (i.e window period of 11 days). These tests, the most sensitive available, have virtually eliminated HIV transmission through blood – reducing transmission from an average of 2 per year to zero since NAT was introduced in 2005 (SA National Blood Transfusion Service, 2009).

Implications for policy and planning: The Department of Health should continue to ensure that, through the South African National Blood Service and the Western Province Blood Transfusion Service, we continue to adhere to the highest international standards for safe blood.

Post-exposure prophylaxis

Programme status: The Department of Health has established clinical guidelines for post-HIV exposure through occupational hazard or sexual assault.

For occupational injury: Low risk exposure (mucous membrane, non-intact skin, solid needle puncture or superficial scratch) is treated with a combination of zidovudine and lamivudine), while high risk exposure (deep puncture, puncture with hollow needle) is treated with the basic regimen together

with a protease inhibitor (Department of Health 2008).

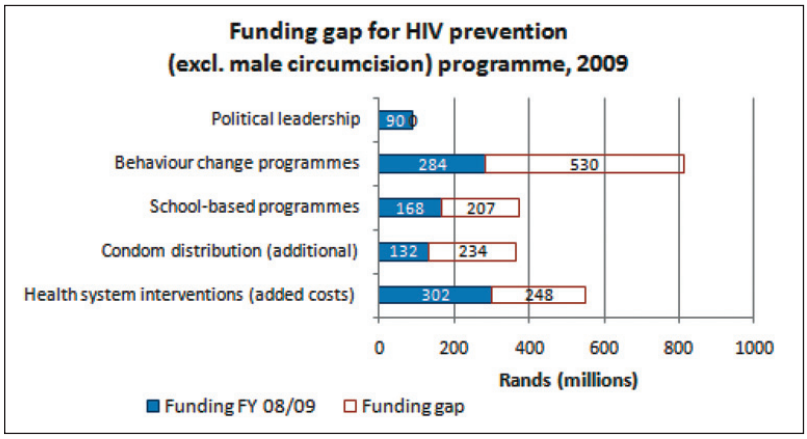
For sexual assault: Either the basic or extended regimen is used, based on clinical assessment of risk. However, the low percentage of rapes reported means that most women exposed through sexual assault do not receive prophylaxis. For example, the Victims of Crime survey conducted by Statistics SA in 1997 found an incidence of rape of 134/100,000, compared with reported statistics of 68/100,000. Based on these figures (which may be an underestimate), there are about 60,000 rapes (by penetration) per year in South Africa (StatsSA 2000).

Implications for policy and planning:

- In the case of sexual assault, current guidelines are the use of the basic regimen of zidovudine and lamivudine. However, the extended regimen (zidovudine and lamivudine and a protease inhibitor) should be used where there is vaginal or anal penetration or injury, or other clinical indications.
- In the case of discordant couples reporting accidental exposure through condom slippage or failure, the couple should be offered the basic or extended regimen (depending on circumstances and likely exposure).

Financing and expenditure

Figure 76. Funding gap for HIV prevention FY 09/10 (based on estimates to achieve required programme scale)

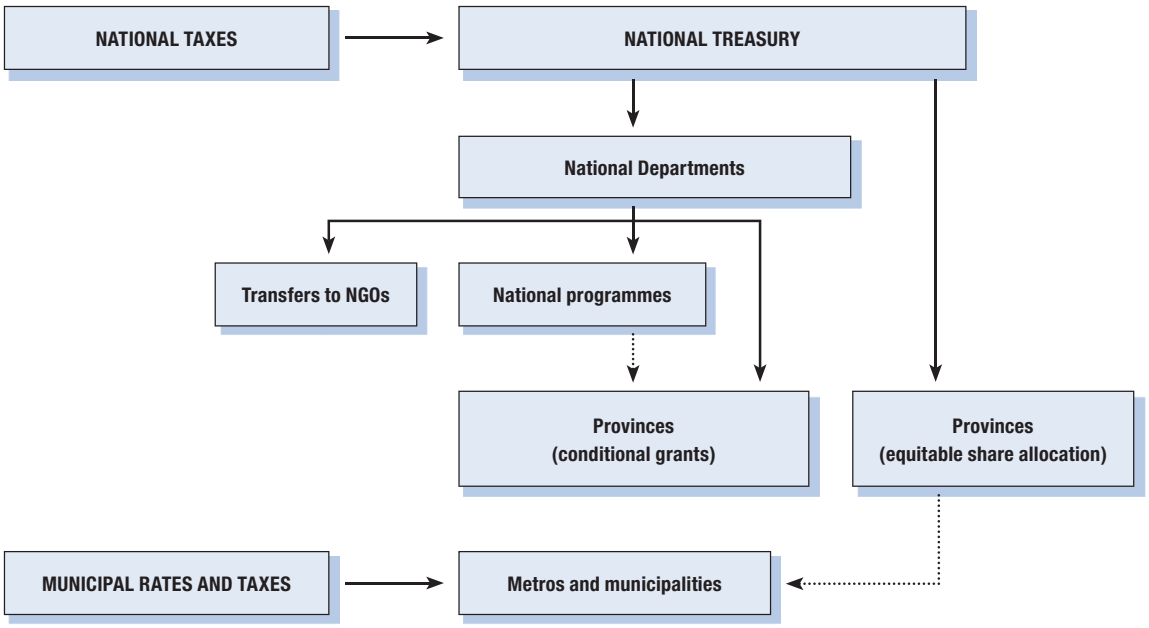


The full extent of public expenditure HIV programmes is difficult to ascertain, given multiple channels of funding through different levels of Government. In addition, the contribution of bilateral investors and other donors has yet to be quantified.

Public financing

The main public funding flows for HIV prevention are illustrated schematically in Figure 77 below. For the purposes of this analysis, programme funding from municipal rates and taxes has been excluded. It probably represents a small percentage of total funding (<5%).

Figure 77. Flow of public funding for HIV/AIDS programmes in South Africa



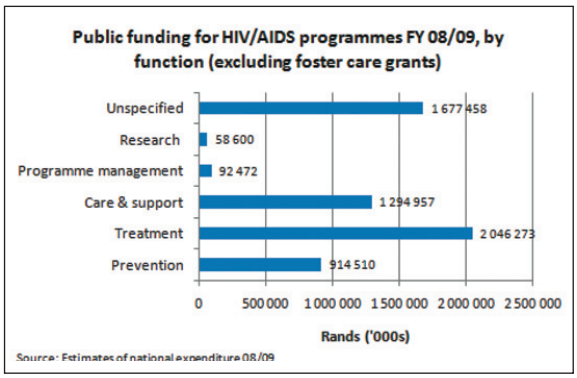
Total public expenditure on HIV/AIDS programmes

Following is an analysis of public expenditure for HIV prevention for the financial year 2008/09, based on estimates of national expenditure and provincial reporting of funding for HIV/AIDS programmes through equitable share allocations.

Given the multi-faceted response to HIV/AIDS, the parameters of HIV-related programme funding are difficult to define. For the purposes of this analysis, total funding for HIV-related programmes excludes amounts spent on foster care grants. The number of children in legal foster care increased by 22% per year from 2002 to 2008 and is now close to 500,000. Much of this increase in need for foster care may be ascribed to AIDS-related illness and mortality, and foster care may be an important strategy for HIV prevention in the next decade.

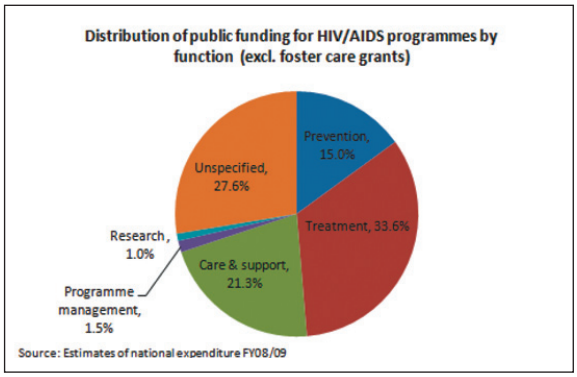
The estimated total public expenditure on HIV/AIDS programmes (excluding foster care grants) in FY 2008/9 was R6.084 billion (USD 760.5 million) [Figure 78][4].

Figure 78. Public funding for HIV/AIDS programmes FY 08/09 (by function), excluding foster care grants



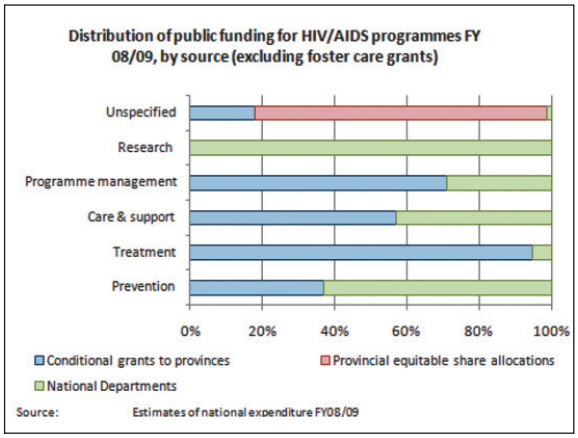
The proportion of total expenditure allocated to HIV prevention is 15% [Figure 79].

Figure 79. Distribution of public funding for HIV/AIDS programmes FY 08/09, by function



The unspecified allocations mainly relate to provincial contributions to HIV programmes from equitable share programmes. This expenditure is currently being analysed, but it is likely that the vast majority of unspecified funds relate to costs associated with ARV treatment [Figure 80]. In terms of prevention, provinces receive conditional grants mainly for health service-related interventions (PMTCT and HIV testing). The national Department funds major HIV prevention communication and behavioural programmes.

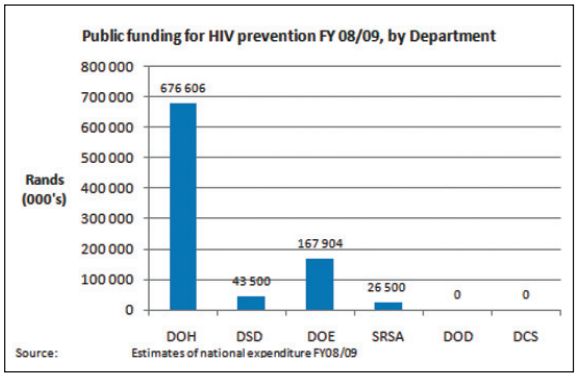
Figure 80. Distribution of public funding for HIV/AIDS programmes FY 08/09, by revenue source (excluding foster care grants)



4 Analysis of expenditure includes the following assumptions: 20% of the Medical Research Council allocation from DOH allocated to HIV/AIDS programme; full transfer to National Health Labouratory Service allocated to HIV/AIDS programme (split 72% allocated to ARV monitoring and 28% to TB detection), most costs for NHLS recouped from provincial allocations; national DOH allocation from programme management = total allocation minus all other allocations; total allocation for medical supplies in national DOH spilt between condom provision and HIV tests (R100m and R40 m respectively in FY08/09)

Figure 81 shows the total public funding for HIV/AIDS programmes, divided by Government Department.

Figure 81. Public funding for HIV/AIDS programmes FY 08/09, by Department



Total expenditure on HIV prevention

Total public expenditure on HIV prevention in 2008/9 was R914.5 million (USD 114.3 million) [Figure 82].

Figure 82. Allocation of public funding for HIV prevention FY 08/09, by activity

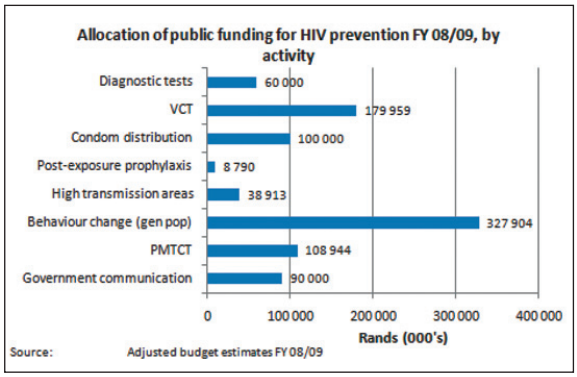


Figure 83 depicts the public investment portfolio for HIV prevention in FY 08/09. In general, it appears to be a balanced portfolio, cognizant of the respective potential gains from different activities of HIV prevention. However, as will be shown, the total pie is still inadequate, and over half (52%) of behaviour change programme expenditure is the allocation to intra-curricular programme in schools. This is an appropriate investment, but additional funding is required to fill gaps in other aspects of behaviour change programmes.

Figure 83. HIV prevention public investment portfolio, FY 08/09

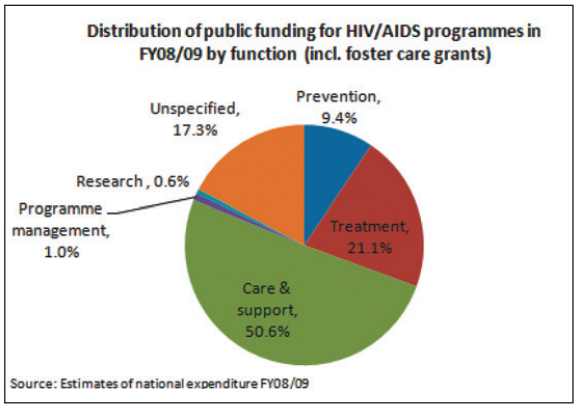


Figure 84 shows the allocation of public funds specifically earmarked for HIV prevention, across Government departments.

Figure 84. Public funding for HIV prevention FY 08/09, by Department

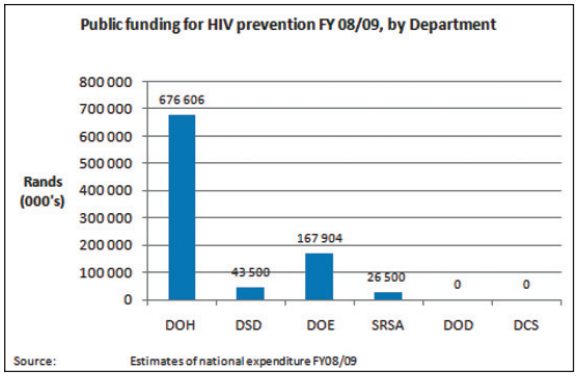
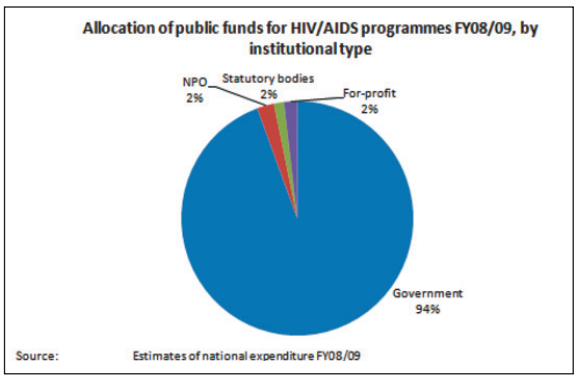


Figure 85 shows the allocation of funds for HIV/AIDS programmes in FY 08/09 by institutional type of implementing agency. Seventy percent of funds are used by Government agencies (for PMTCT, VCT etc). Not-for-profit entities receive 18%. Of this, 80% is a gazetted allocation by three Government departments to youth-focused prevention through loveLife, and Soul Buddyz receives 10% of the total gazetted NGO allocation. Much of donor funding for HIV prevention is channelled directly to smaller NGOs, so that this represents only a small part of the total national expenditure on behaviour change programmes. For profit entities account for 10% of public funds through competive tender for the Khomanani campaign.

Figure 85. Allocation of public funds for HIV prevention FY 08/09, by type of implementing agency



DOH allocations for HIV prevention

In FY 2008/9, an amount of R676.6 million was allocated for HIV prevention through the Health budget vote [Figure 86]. This allocation is roughly evenly divided between biomedical prevention programmes (53%) and behavioural change and communications programmes (47%) [Figure 87].

Figure 86. DOH allocations for HIV prevention FY 08/09, by activity

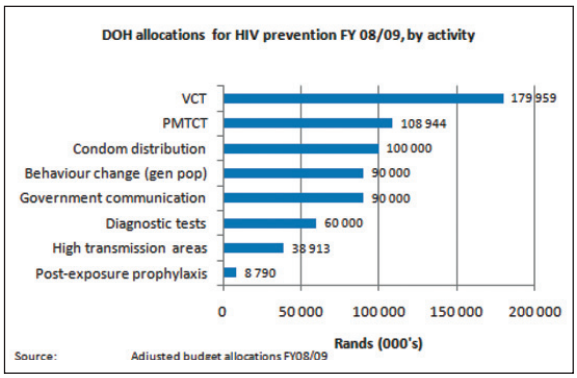
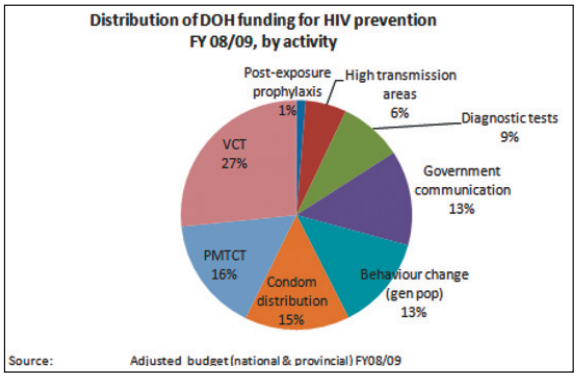
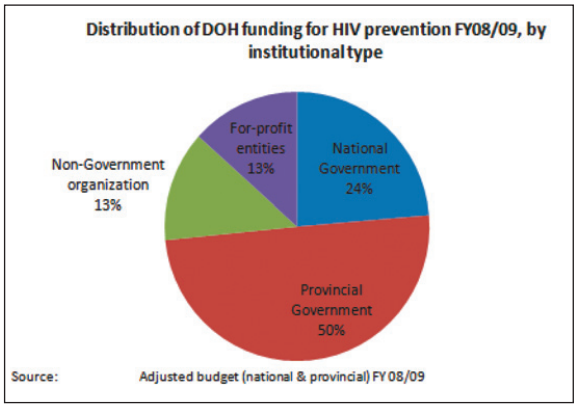


Figure 87. Distribution of DOH funding for HIV prevention FY 08/09, by activity



The allocation of DOH funding by institutional type mirrors the functional distribution, with half allocated to provincial departments for health service interventions, a quarter (24%) administered by the national Department for procurement of condoms and other supplies, and the balance distributed evenly to non-government agencies and for-profit suppliers tendering for the Khomanani communications contract [Figure 88]

Figure 88. Distribution of DOH funding for HIV prevention FY 08/09, by institutional type



Implications for policy and planning:
Comprehensive HIV prevention is cost-effective and is the only way in which South Africa will be able to afford the costs of treatment in the long-term. Sensitivity analysis by Stover (2006) shows that, even if a low range of impact effectiveness is used to calculate the cost-effectiveness of comprehensive prevention (compared to the treatment, and care costs) of infection, HIV prevention saves money (US$657 per infection averted). When probable impact of HIV prevention is compared to the costs of treatment and care for 5 years, the savings are US$551. When compared with 10 years' prevention and treatment, the cost savings increases to US$2080 per infection averted.

Table 27 compares the intervention coverage used in Stover's modelling to gauge cost-effectiveness with the targets set in the national operational plan for HIV prevention. It shows that, taking into account the specific realities of South Africa, most of the targets of the operational plan approximate those predicted by Stover to be effective and to save substantial costs of treatment and care.

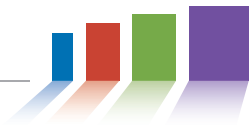
Table 27. Comparison between intervention coverage predicted to be cost-effective, and targets set in this operational plan

Target group/ activity	Targets by 2010 (Stover et al 2006)	Targets of operational plan (by 2011)
Vulnerable populations		
AIDS education for primary and secondary students	100%	100%
Programmes focused on out-of-school youth	50%	67%
Programmes focused on sex workers and clients	80%	Unknown (~50%)
Programmes focused on MSM	80%	67%
Prevention for people living with HIV	80%	85% media coverage
		33% interpersonal
Workplace programmes	50%	50%
General population		
Percent of population reached through community mobilisation	70%	6-11 year olds 67%
		12-17 year olds 67%
		18-24 year olds 85% media & 33% interpersonal
		25+ years 85% media & 33% interpersonal
Number of mass media campaigns per year	5	85% coverage with sustained media campaigns
Percent of adult population accessing HCT per year	5%	25%
Percent of casual sex acts covered with condoms	80%	80%
Percent of married people with casual partners using condoms in marital sex	30%	50%
Medical services		
Percent of need for post-exposure prophylaxis that is met	100%	75%
Safe blood (proportion of units screened for HIV)	100%	100%
Safe medical injections	99%	99%
Universal precautions	99%	99%
STI treatment	100%	90%
PMTCT (coverage among women attending antenatal care)	80%	99%

Based on these targets and marginal costs of scale-up, we estimate that a fully funded HIV prevention programme would cost in the order of R2 billion (USD 250 million).

The above indicative costs and funding gaps are presented graphically below. DoH allocations for HIV prevention in FY 08/09 totalled R676 million. Based on these allocations, the total funding gap for HIV prevention (FY 09/10) spearheaded by the Department of Health is estimated at R1.012bn, or 60% of required allocation to meet prevention targets by 2013. The lifeskills programme in schools should be expanded to ensure 100% coverage and to provide greater support to school-leavers and orphaned and vulnerable learners. Provisional costing of scale-up suggests that the conditional grant should be increased from R178m in FY 09/10 to R375 million. The total additional requirement is thus about R1.2 billion, excluding the costs of a national male circumcision programme [Figure 75].

These estimates are motivated more fully in Appendix 2. Although it will be difficult to find an additional R1 billion in the current financial context, the costs of not finding the money are much higher. Already, well over R4 billion is spent each year on treatment, care and support. Inevitably, there will be some programme failures – in the same way that there is a significant mortality associated with the Antiretroviral treatment programme. But there is now enough evidence both in South Africa and internationally to show that HIV infection can be significantly reduced when countries are committed enough to achieving this goal.



Appendix 1

SENSITIVITY ANALYSIS FOR PREVALENCE, VARYING INCIDENCE AND ART COVERAGE

This analysis is intended to provide an indication of the range in prevalence that may occur under different conditions, varying the projected incidence and ART coverage respectively.
The four variable conditions considered are:

- No change: current estimated incidence and 50% ART coverage
- 50% reduction in incidence (holding ART coverage constant at 50%)
- 90% ART coverage (holding incidence constant at current estimates
- 50% reduction in incidence and 90% ART coverage.

Calculations with respect to mortality under variable ART coverage are based on modelling by Dorrington, Johnson, Bradshaw and Daniel (2007).

1. Projections of total prevalence

1.1 Effect on total prevalence of 50% incidence reduction (with 90% ART coverage)

Assumptions	Basis for assumption	2008 baseline	2009	2010	2011	2012	2013
Overall incidence	Dorrington et al 2007	1.2	1.08	0.96	0.84	0.72	0.6
ARV coverage	Department of Health 2008	50%	50%	50%	50%	50%	50%
Estimated population	ASSA (approximates StatsSA)	48 545 698	48 855 213	49 147 177	49 418 610	49 670 161	49 904 215
Number of new infections	Calculated from Dorrington et al 2007		527 636	471 813	415 116	357 625	299 425
Number of deaths from HIV	Calculated from Dorrington et al 2007		374 655	382 521	393 778	404 587	413 635
Total SA population living with HIV		5 160 822	5 313 803	5 403 095	5 424 434	5 377 472	5 263 262
Projected prevalence of HIV		10.6%	10.9%	11.0%	11.0%	10.8%	10.5%

1.2 Effect on total prevalence (with 90% ART coverage, holding incidence constant)

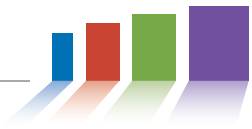
Assumptions	Basis for assumption	2008 baseline	2009	2010	2011	2012	2013
Overall incidence	Dorrington et al 2007	1.0	1.0	1.0	1.0	1.0	1.0
ARV coverage	Department of Health 2008	50%	60%	70%	80%	90%	90%
Estimated population	ASSA (approximates StatsSA)	48 545 698	48 855 213	49 147 177	49 418 610	49 670 161	49 904 215
Number of new infections	Calculated from Dorrington et al 2007		488 552	491 472	494 186	496 702	499 042
Number of deaths from HIV	Calculated from Dorrington et al 2007		363 750	339 500	315 250	291 000	291 000
Total SA pop. living with HIV		5 160 822	5 285 624	5 437 596	5 616 532	5 822 234	6 030 276
Projected prevalence of HIV		10.6%	10.8%	11.1%	11.4%	11.7%	12.1%

1.3 Effect on total prevalence with 50% incidence reduction, holding ART coverage constant at 50%

Assumptions	Basis for assumption	2008 baseline	2009	2010	2011	2012	2013
Overall incidence	Dorrington et al 2007	1	0.9	0.8	0.7	0.6	0.5
ARV coverage	Department of Health 2008	50%	50%	50%	50%	50%	50%
Estimated population	ASSA (approximates StatsSA)	48 545 698	48 855 213	49 147 177	49 418 610	49 670 161	49 904 215
Number of new infections	Calculated from Dorrington et al 2007		439 697	393 177	345 930	298 021	249 521
Number of deaths from HIV	Calculated from Dorrington et al 2007		374 655	382 521	393 778	404 587	413 635
Total SA pop. living with HIV		5 160 822	5 225 864	5 236 520	5 188 673	5 082 107	4 917 993
Projected prevalence of HIV		10.6%	10.7%	10.7%	10.5%	10.2%	9.9%

1.4 Effect on total prevalence (holding incidence and ART coverage constant)

Assumptions	Basis for assumption	2008 baseline	2009	2010	2011	2012	2013
Overall incidence	Dorrington et al 2007	1.0	1.0	1.0	1.0	1.0	1.0
ARV coverage	Department of Health 2008	50%	50%	50%	50%	50%	50%
Estimated population	ASSA (approximates StatsSA)	48 545 698	48 855 213	49 147 177	49 418 610	49 670 161	49 904 215
Number of new infections	Calculated from Dorrington et al 2007		488 552	491 472	494 186	496 702	499 042
Number of deaths from HIV	Calculated from Dorrington et al 2007		374 655	382 521	393 778	404 587	413 635
Total SA pop. living with HIV		5 160 822	5 274 719	5 383 670	5 484 078	5 576 193	5 661 600
Projected prevalence of HIV		10.6%	10.8%	11.0%	11.1%	11.2%	11.3%



2. Prevalence among 15 – 19 year olds

2.1. Effect on prevalence among 15 – 19 year olds (assuming no change in incidence)

			2009	2010	2011	2012	2013	
Age	Prevalence 2008	Calculated incidence	100% of baseline incidence					Projected prevalence
14	2.4							2.4
15	3	0.6	0.6	0.6	0.6	0.6	0.6	3
16	3.5	0.5	0.5	0.5	0.5	0.5	0.5	3.5
17	4	0.6	0.6	0.6	0.6	0.6	0.6	4.1
18	4.8	0.8	0.8	0.8	0.8	0.8	0.8	4.9
19	6	1.2	1.2	1.2	1.2	1.2	1.2	6.1
20	7.6	1.7	1.7	1.7	1.7	1.7	1.7	7.8
TOTAL 15 – 19 years								**4.32**

2.2. Effect on prevalence among 15 – 19 year olds with a 50% reduction in incidence

			2009	2010	2011	2012	2013	
Age	Prevalence 2008	Calculated incidence	90% of incidence	80%	70%	60%	50%	Projected prevalence
14	2.4							2.4
15	3	0.6	0.54	0.48	0.42	0.36	0.3	2.7
16	3.5	0.5	0.45	0.4	0.36	0.3	0.25	2.95
17	4	0.6	0.54	0.48	0.432	0.36	0.3	3.25
18	4.8	0.8	0.72	0.64	0.576	0.48	0.4	3.65
19	6	1.2	1.08	0.96	0.864	0.72	0.6	4.25
20	7.6	1.7	1.53	1.36	1.224	1.02	0.85	5.1
TOTAL 15 – 19 years								**3.36**

These calculations assume AIDS-related morbidity among 15 – 19 year olds is negligible.

3. Prevalence among 20 – 24 year olds

3.1 Effect on prevalence over 5 years (holding incidence and mortality constant)

	2009	2010	2011	2012	2013
	100% of baseline incidence				
20 year old cohort					
2009	7.7	8.5	9.2	10.0	10.7
2010	6.4	7.2	7.9	8.7	9.4
2011	5.8	6.6	7.3	8.1	8.8
2012	5.5	6.3	7.0	7.8	8.5
2013	6.0	6.8	7.5	8.3	9.0
Prevalence	**holding incidence and mortality constant**				**9.3**

3.2. Effect on prevalence of 50% incidence reduction (holding mortality constant)

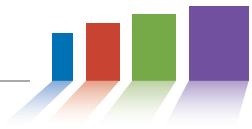
	2009	2010	2011	2012	2013
	90% of baseline incidence	**80% of baseline incidence**	**70% of baseline incidence**	**60% of baseline incidence**	**50% of baseline incidence**
20 year old cohort					
2009	7.5	8.3	9.0	9.8	10.5
2010	6.2	6.9	7.7	8.4	9.2
2011	5.5	6.2	7.0	7.7	8.5
2012	5.0	5.8	6.5	7.3	8.0
2013	5.1	5.9	6.6	7.4	8.1
Prevalence	**holding mortality constant**				**8.9**

3.3. Effect on prevalence by 2013 (with 90% ART coverage holding incidence constant)

Number of 20 – 24 year olds	4 900 000
Prevalence 2013 holding mortality constant	9.3
Number of infections	455 700
Reduction in deaths due to HIV	20 000
Prevalence	**9.7%**

3.4. Effect on prevalence by 2013 (with 90% ART coverage and 50% incidence reduction)

Number of 20 – 24 year olds	4 900 000
Prevalence 2013 holding mortality constant	8.7
Number of infections	426 300
Reduction in deaths due to HIV	20 000
Prevalence	**9.1%**



4. Prevalence among 25 – 64 year olds

4.1. Effect on mortality of 50% ART coverage

	2008	2009	2010	2011	2012	2013
Projected no. of AIDS-related deaths (unchanged ARV coverage)		374 655	382 521	393 778	404 587	413 635
No. of AIDS-related deaths in children < 5years		35 000	30 000	25 000	20 000	15 000
No. of AIDS-related deaths in 5 – 24 year olds		60 000	55 000	50 000	45 000	40 000
No. of AIDS related deaths in 25 – 64 year olds		**279 655**	**297 521**	**318 778**	**339 587**	**358 635**

4.2. Effect on mortality of 90% ART coverage

	2008	2009	2010	2011	2012	2013
Projected no. of AIDS-related deaths (increasing ARV coverage)		363 750	339 500	315 250	291 000	291 000
No. of AIDS-related deaths in children < 5years		35 000	30 000	25 000	20 000	15 000
No. of AIDS-related deaths in 5 – 24 year olds		60 000	55 000	50 000	45 000	40 000
No. of AIDS related deaths in 25 – 64 year olds		**268 750**	**254 500**	**240 250**	**226 000**	**236 000**

4.3. Effect on prevalence holding incidence and ART coverage at 50% constant

Total population aged 25 – 64 years	20 818 000	20 951 000	21 035 000	21 151 000	21 260 000	21 360 000
Assumptions of incidence	1.70%	1.70%	1.70%	1.70%	1.70%	1.70%
No. of new infections in 25 – 64 year olds	353 906	356 167	357 595	359 567	361 420	363 120
No. of people 25 – 64 years living with HIV	3 500 000	3 576 512	3 636 586	3 677 375	3 699 208	3 703 693
Prevalence of HIV among 25 – 64 year olds	16.8%	17.1%	17.3%	17.4%	17.4%	17.3%

4.4. Effect on prevalence of 50% reduction in incidence (holding ART coverage at 50%)

Total population aged 25 – 64 years	20 818 000	20 951 000	21 035 000	21 151 000	21 260 000	21 360 000
Assumptions of incidence	1.70%	1.53%	1.36%	1.19%	1.02%	0.85%
No. of new infections in 25 – 64 year olds	353 906	320 550	286 076	251 697	216 852	181 560
No. of people 25 – 64 years living with HIV	3 500 000	3 540 895	3 529 450	3 462 369	3 339 634	3 162 559
Prevalence of HIV among 25 – 64 year olds	16.8%	16.9%	16.8%	16.4%	15.7%	14.8%

4.5. Effect on prevalence of 90% ART coverage (holding incidence constant)

Total population aged 25 – 64 years	20 818 000	20 951 000	21 035 000	21 151 000	21 260 000	21 360 000
Assumptions of incidence	1.70%	1.70%	1.70%	1.70%	1.70%	1.70%
No. of new infections in 25 – 64 year olds	353 906	356 167	357 595	359 567	361 420	363 120
No. of people 25 – 64 years living with HIV	3 500 000	3 587 417	3 690 512	3 809 829	3 945 249	4 072 369
Prevalence of HIV among 25 – 64 year olds	**16.8%**	**17.1%**	**17.5%**	**18.0%**	**18.6%**	**19.1%**

4.6. Effect on prevalence with 50% incidence reduction and 90% ART coverage

Total population aged 25 – 64 years	20 818 000	20 951 000	21 035 000	21 151 000	21 260 000	21 360 000
Assumptions of incidence	1.70%	1.53%	1.36%	1.19%	1.02%	0.85%
No. of new infections in 25 – 64 year olds	353 906	320 550	286 076	251 697	216 852	181 560
No. of people 25 – 64 years living with HIV	3 500 000	3 551 800	3 583 376	3 594 823	3 585 675	3 531 235
Prevalence of HIV among 25 – 64 year olds	**16.8%**	**17.0%**	**17.0%**	**17.0%**	**16.9%**	**16.5%**

Appendix 2

BASIS FOR ESTIMATING FUNDING GAP FOR HIV PREVENTION

The estimated funding gap for HIV prevention 2010/11 is summarised below:

Summary of estimated funding gap for HIV prevention 2010/11

HIV prevention strategy	Funding gap
Political leadership and general communication	R 0
Behaviour change programmes	
General population	R375 m
Most-at-risk groups	R155 m
Condom distribution	R234 m
Health systems interventions	R248 m
TOTAL	**R1,012 billion**

1. Political leadership

Programme budget estimates suggest that the current annual allocation for Government communication through Khomanani should be adequate, provided that the terms of reference of Khomanani are defined as Government communication for key programmes related to HIV, TB and STIs.

PREVENTION TOOL	ACTIVITY	MAIN COST DRIVER	ESTIMATED REQUIREMENT for 2010/11*	EXISTING AMOUNT	FUNDING GAP
Political leadership			R90 m	R90m	0
	Visible communications campaign on key aspects of Government's response to HIV/AIDS	Media costs	R90 m	R90 m (Khomanani allocation)	

2. Behaviour change programmes

PREVENTION TOOL	ACTIVITY	MAIN COST DRIVER	ESTIMATED REQUIREMENT for 2010/11*	EXISTING AMOUNT	FUNDING GAP	
Behaviour change programmes			R781 m	R251 m	R530 m	
General population			R582 m	R207 m	R375 m	
	6-11 year olds	TV production costs Programmes in 11,400 schools to reach 4 million intensively by 2011	R177 m	R27 m	R150 m	
	12-17 year olds	Multi-media production costs Programmes in 7,400 schools, and activities with 400 CBO, youth leadership sports programme and tollfree helplines to reach 4 million intensively by 2011	R290 m	R180 m	R110 m	
	18-24 year olds	Media production costs Tollfree helpline Community activities to reach 2 million intensively by 2011	R55 m	-	R55 m	
	25+ year olds	Community activities to achieve 6 million face-to-face exposures by 2011	R60 m	-	R60 m	
Most-at-risk groups			R199 m	R44 m	R155 m	
	PLWHA	Community-level activities to reach 1.75 million PLWHA by 2011	R60 m	R39 m (allocated to provinces for 'high transmission areas') + R5 m allocations to NGOs	R55 m	Funding gaps less existing allocations for high transition areas totalling R39 m
	Orphans & vulnerable teenagers	Support to networks of grandmothers and other caregivers responsible for HIV prevention to reach 200,000 orphaned teenagers (10,000 grandmothers by 2013)	R87 m		R48 m	
	MSM	Support to networks of MSM to reach 400,000 MSM face-to-face by 2011	R15 m		R15 m	
	Commercial sex workers	Support to networks of CSW to reach 10,000 CSW face-to-face by 2011	R10 m		R10 m	
	Prisoners	Programme for juveniles and awaiting trial prisoners to reach 30,000 p.a	R15 m		R15 m	
	High risk clients of cash practice GPs	Information resources for 4 million attendees for STI treatment (printing costs factored in above)	R2 m		R2 m	
	Development-project specific initiatives to mitigate risks	Project-specific costs associated with new developments (assumes co-funding by private sector)	R10 m		R10 m	

**Based on the coverage targets for behavioural interventions described above, there is a funding gap of 67% for age-targeted interventions for the general population, and 77% for behavioural interventions focused on high risk groups.*

3. Condom distribution

The costs of condom scale-up are summarised below:

Further expansion targeted at particularly high risk groups	Number of additional condoms	Cost	Percent of increase
Increased distribution of female condoms through public sector	15 million	R120m	51%
Expanded provision to community outlets in high risk and underserved areas	142 million male condoms	R35.5 m	15.2%
People living with HIV and AIDS	13 million male and 300,000 female condoms	R5.65 m	2.4%
Men who have sex with men	8 million male condoms	R2 m	0.8%
Commercial sex workers	2 million male and 200,000 female condoms	R1.3 m	0.5%
Male prisoners	3.2 million male condoms	R0.8 m	0.4%
Clients of private practitioners (cash practice)	80 million male condoms and 6 million female condoms	R68 m	29.0%
TOTAL	**248.2 million male condoms 24 million female condoms**	**R233.25m**	**100%**

4. Health service interventions

The estimated marginal costs of scale-up of health services for HIV prevention (2010/11) are summarised below:

Health service	Basis for calculation	Total required	Allocation FY 08/09	Funding gap
PMTCT	Proportional to shortfall in current complete coverage	R162 m	R109 m	R53 m
Routine HIV testing	6 million test kits (test consumables @R20 per kit)	R260 m	R180 m	R80 m
Male circumcision	Still to be determined based on plan	Modeling suggests unit cost of USD 50-60		
Earlier TB diagnosis:	Number of cultures (Assumes additional 300,000 in general clinics and 300,000 in antenatal clinics @ R13 per culture + R7 support costs)	R12.0 m	-	R12 m
Youth friendly service programme	Technical support, training and facilitation in all districts	R30m	R4m	R26 m
Syndromic mx drugs in private sector (excl. Acyclovir)	Syndromic management drug supply to cash practice GPs (assumes 90% discharge and 10% ulcerative)	R70m	-	R70 m
Post-exposure prophylaxis	Extended ART regimen for estimated 90,000 rape cases p.a and 3,000 needlestick injuries	R16 m	R9 m	R7 m
TOTAL		**R550 m**	**R342 m**	**R248 m**

Reference Tables

1. HIV prevalence

Category	Sub-Category	Year	Point Estimate	CL (-)	CL (+)
Population					
	Total				
		2008	10.6		
Population>2					
	Total				
		2008	10.9	10	11.9
		2005	10.8	9.9	11.5
		2002	11.4	10	12.7
Totals					
	Female				
		2005	13.3	12.1	14.6
		2002	12.8	10.9	14.6
	Male				
		2005	8.2	7.1	9.6
		2002	9.5	8	11.1
Age group (total)					
	2 – 4				
		2005	5.1	2.8	9.1
	2 – 14				
		2008	2.5	0.6	6
	5 – 9				
		2005	4.4	3	6.6
	10 – 14				
		2005	1.7	1	2.8
		2002	4.7	2.2	13.4
	15 – 19				
		2005	5.9	4.4	8
	15 – 24				
		2008	8.7	1.5	19.1
	20 – 24				
		2005	15.2	12.5	18.2
	>=25				
		2008	16.8	1.5	35.2
	25 – 29				
		2005	23.2	19	28
	30 – 34				
		2005	24.9	21.1	29.2
	35 – 39				
		2005	20.8	17.3	24.9
	40 – 44				
		2005	14.8	11.4	19
	45 – 49				
		2005	9.4	6.9	12.6

Category	Sub-Category	Year	Point Estimate	CL (-)	CL (+)
	50 – 54				
		2005	10.8	7.5	15.2
	55 – 59				
		2005	4.5	2	10
	60+				
		2005	3.9	2.5	5.9
Age group (female)					
	2 – 4				
		2005	5.3	3.1	9
	2 – 14				
		2008	2		
	5 – 9				
		2005	4.8	2.8	8
	10 – 14				
		2005	1.8	0.9	2.6
		2002	5.9	2.3	14.2
	15 – 19				
		2008	6.7	4.9	8.5
		2005	9.4	7.1	12.4
		2002	7.3	4.7	11.3
	15 – 24				
		2008	13.6		
	20 – 24				
		2008	21.1	17.9	24.8
		2005	23.9	19.8	28.4
		2002	17.1	12.9	22.3
	25 – 29				
		2008	32.7	27.6	38
		2005	33.3	27.6	39.4
		2002	32	24.4	40.1
	30 – 34				
		2008	29.1	24.5	36.2
		2005	26	21.5	30.9
		2002	24.1	17.3	32.5
	35 – 39				
		2008	24.8	21.4	30.4
		2005	19.3	14.9	24.6
		2002	13.8	8.7	21.1
	40 – 44				
		2008	16.3	7.6	21.1
		2005	12.4	9.4	16.2
		2002	19	12.8	27.2
	45 – 49				
		2008	14.1	10	17.6
		2005	8.7	6	12.6
		2002	11.2	6.5	18.7
	50 – 54				
		2008	10.2	7.1	15.4

Category	Sub-Category	Year	Point Estimate	CL (-)	CL (+)
		2005	7.5	4.9	11.2
		2002	8.1	5.7	14.6
	55 – 59				
		2008	7.7	4.9	12.8
		2005	3	1.6	5.6
		2002	7	4	10.4
	60+				
		2008	1.8	1.1	2.4
		2005	3.7	2.2	6.3
Age group (male)					
	2 – 4				
		2005	4.9	1.8	12.8
	2 – 14				
		2008	3		
	5 – 9				
		2005	4.2	2.2	8
	10 – 14				
		2005	1.6	0.8	3.4
		2002	3.5	1.6	9.9
	15 – 19				
		2008	2.5	1.2	7.7
		2005	3.2	1.4	8.1
		2002	3.8	2.4	7.5
	15 – 24				
		2008	3.8		
	20 – 24				
		2008	5.1	3.8	7.7
		2005	6	2.1	7.7
		2002	7.7	4.9	13.2
	25 – 29				
		2008	15.7	11.4	20
		2005	12.1	8	17.9
		2002	21.9	14.9	32.2
	30 – 34				
		2008	25.8	19	33.9
		2005	23.2	17.2	30.7
		2002	24	16.9	32.5
	35 – 39				
		2008	18.5	13.8	27.7
		2005	23.3	16.8	29.8
		2002	17.8	11.8	27.8
	40 – 44				
		2008	19.2	14	29
		2005	17.5	12	24.7
		2002	11.9	7.4	19.5
	45 – 49				
		2008	8.4	4.9	13.8
		2005	10.3	6.5	16

Category	Sub-Category	Year	Point Estimate	CL (-)	CL (+)
		2002	11.7	7.4	19.5
	50 – 54				
		2008	10.4	7.1	17.7
		2005	14.2	8.5	22.7
		2002	5	2.5	10.2
	55 – 59				
		2008	6.2	3	11
		2005	6.4	1.9	19.9
		2002	7	2.8	15.5
	60+				
		2008	3.5	2.9	5.1
		2005	4	1.9	8.2
Geotype					
	Rural formal (farms)				
		2008	11.1	8.6	14.2
		2005	9.9	6.9	13.8
		2002	7.9	4.8	11.1
	Rural informal				
		2008	11.1	9.6	12.9
		2005	11.6	10	13.4
		2002	8.7	6.5	10.9
	Urban formal				
		2008	9	7.5	10.8
		2005	9.1	1.3	19.6
		2002	12.1	10.3	14
	Urban informal				
		2008	20.6	18	23.6
		2005	17.6	15.3	20.2
		2002	21.3	16.2	26.5
Province					
	EC				
		2008	9	7.2	11.2
		2005	8.9	12.4	18.5
		2002	6.6	4.5	8.7
	FS				
		2008	12.6	10.5	15.1
		2005	12.6	8.9	17.1
		2002	14.9	9.5	20.3
	GP				
		2008	10.3	8.3	12.7
		2005	10.8	4.8	21.4
		2002	14.7	11.3	18.1
	KZN				
		2008	15.8	13.4	18.6
		2005	16.5	7	21.6
		2002	11.7	7.2	20.4
	LP				
		2008	8.8	6.5	10.9

Category	Sub-Category	Year	Point Estimate	CL (-)	CL (+)
		2005	8	4	11.2
		2002	9.8	6.7	14.2
	MPU				
		2008	15.4	11.9	1.7
		2005	15.2	10.5	16.7
		2002	14.1	9.7	18.5
	NC				
		2008	5.9	4.5	7.8
		2005	5.4	2.4	14
		2002	8.4	5	11.7
	NW				
		2008	11.3	9.1	14
		2005	10.9	7.8	16.6
		2002	10.3	6.8	13.8
	WC				
		2008	3.8	2.7	5.3
		2005	1.9	1.2	3
		2002	10.7	6.4	15
Race					
	African				
		2005	13.3	12.2	14.5
		2002	12.9	11.2	14.5
	Coloured				
		2005	1.9	1.4	2.7
		2002	6.1	4.5	7.8
	Indian				
		2005	1.6	0.8	3.4
		2002	1.6	0	3.4
	White				
		2005	0.6	0.3	1
		2002	6.2	3.1	9.2

2. Antenatal HIV prevalence disaggregated by age (Department of Health, South Africa)

Year	Age	Point Estimate
2007	15 – 19	12.9
2007	20 – 24	28.1
2007	25 – 29	37.9
2007	30 – 34	40.2
2007	35 – 39	33.2
2007	40 and above	21.5
2006	15 – 19	13.7
2006	20 – 24	28
2006	25 – 29	38.7
2006	30 – 34	37
2006	35 – 39	29.3
2006	40 and above	21.3
2005	15 – 19	15.9
2005	20 – 24	30.6
2005	25 – 29	39.5
2005	30 – 34	36.4
2005	35 – 39	28
2005	40 and above	19.8
2004	15 – 19	16.1
2004	20 – 24	30.8
2004	25 – 29	38.5
2004	30 – 34	34.4
2004	35 – 39	29.5
2004	40 and above	17.5
2003	15 – 19	15.8
2003	20 – 24	30.3
2003	25 – 29	35.4
2003	30 – 34	30.9
2003	35 – 39	23.4
2003	40 and above	15.8
2002	15 – 19	14.8
2002	20 – 24	29.1
2002	25 – 29	34.5
2002	30 – 34	29.5
2002	35 – 39	19.8
2002	40 and above	17.2
2001	15 – 19	15.4
2001	20 – 24	28.4
2001	25 – 29	31.4
2001	30 – 34	25.6
2001	35 – 39	19.3
2001	40 and above	9.8
2001	40 – 44	9.1

Year	Age	Point Estimate
2001	45 – 49	17.8
2000	15 – 19	16.1
2000	20 – 24	29.1
2000	25 – 29	30.6
2000	30 – 34	23.2
2000	35 – 39	15.8
2000	40 – 44	10.2
2000	45 – 49	13.1
1999	15 – 19	16.5
1999	20 – 24	25.6
1999	25 – 29	26.4
1999	30 – 34	21.7
1999	35 – 39	16.2
1999	40 – 44	12
1999	45 – 49	7.5
1998	15 – 19	21
1998	20 – 24	26.1
1998	25 – 29	26.9
1998	30 – 34	19.1
1998	35 – 39	13.4
1998	40 – 44	10.5
1998	45 – 49	10.2

3. Antenatal HIV prevalence disaggregated by province (Department of Health, South Africa)

Year	Province	Point Estimate
2007	EC	29.4
2007	FS	31.6
2007	GP	30.6
2007	KZN	38.7
2007	LP	20.4
2007	MPU	34.6
2007	NC	16.6
2007	NW	30.7
2007	WC	15.3
2006	EC	28.6
2006	FS	31.1
2006	GP	30.8
2006	KZN	39.1
2006	LP	20.6
2006	MPU	32.1
2006	NC	15.6
2006	NW	29
2006	WC	15.1
2005	EC	29.5
2005	FS	30.3
2005	GP	32.4
2005	KZN	39.1
2005	LP	21.5
2005	MPU	34.8
2005	NC	18.5
2005	NW	31.8
2005	WC	15.7
2004	EC	28
2004	FS	29.5
2004	GP	33.1
2004	KZN	40.7
2004	LP	19.3
2004	MPU	30.8
2004	NC	17.6
2004	NW	26.7
2004	WC	15.4
2003	EC	27.1
2003	FS	30.1
2003	GP	29.6
2003	KZN	37.5
2003	LP	17.5
2003	MPU	32.6
2003	NC	16.7
2003	NW	29.9
2003	WC	13.1

Year	Province	Point Estimate
2002	EC	23.6
2002	FS	28.2
2002	GP	31.6
2002	KZN	36.5
2002	LP	15.6
2002	MPU	28.6
2002	NC	15.1
2002	NW	26.2
2002	WC	12.4
2001	EC	21.7
2001	FS	30.1
2001	GP	29.8
2001	KZN	33.5
2001	LP	14.5
2001	MPU	29.2
2001	NC	15.9
2001	NW	25.2
2001	WC	8.6
2000	EC	20.2
2000	FS	27.9
2000	GP	29.4
2000	KZN	36.2
2000	LP	13.2
2000	MPU	29.7
2000	NC	11.2
2000	NW	22.9
2000	WC	8.7
1999	EC	18
1999	FS	27.9
1999	GP	23.9
1999	KZN	32.5
1999	LP	11.4
1999	MPU	27.3
1999	NC	10.1
1999	NW	23
1999	WC	7.1
1998	EC	15.9
1998	FS	22.8
1998	GP	22.5
1998	KZN	32.5
1998	LP	11.5
1998	MPU	30
1998	NC	9.9
1998	NW	21.3
1998	WC	5.2

4. Antenatal Syphilis prevalence disaggregated by age (Department of Health, South Africa)

Year	Age	Point Estimate
2007	15 – 19	1.9
2007	20 – 24	2.7
2007	25 – 29	3.1
2007	30 – 34	3.1
2007	35 – 39	3.5
2007	40 and above	3.9
2006	15 – 19	1.5
2006	20 – 24	1.9
2006	25 – 29	2
2006	30 – 34	1.8
2006	35 – 39	1.6
2006	40 and above	2.3
2005	15 – 19	2.1
2005	20 – 24	2.5
2005	25 – 29	3.2
2005	30 – 34	3
2005	35 – 39	3.6
2005	40 and above	3
2004	15 – 19	1.7
2004	20 – 24	1.8
2004	25 – 29	1.3
2004	30 – 34	1.5
2004	35 – 39	1.5
2004	40 and above	.7
2004	40 – 44	
2004	45 – 49	
2003	15 – 19	2.6
2003	20 – 24	2.8
2003	25 – 29	3
2003	30 – 34	2.8
2003	35 – 39	2.1
2003	40 and above	1.6
2002	15 – 19	2.4
2002	20 – 24	3.5
2002	25 – 29	3.7
2002	30 – 34	3.2
2002	35 – 39	2.8
2002	40 and above	1.3
2001	15 – 19	2.3
2001	20 – 24	3.1
2001	25 – 29	3
2001	30 – 34	3.1
2001	35 – 39	2.3
2001	40 and above	1.8
2001	40 – 44	2

Year	Age	Point Estimate
2000	15 – 19	3.9
2000	20 – 24	4.9
2000	25 – 29	5.4
2000	30 – 34	4.5
2000	35 – 39	4.4
2000	40 and above	4.9
2000	40 – 44	3.7
2000	45 – 49	1.7
1999	15 – 19	5.4
1999	20 – 24	9.5
1999	25 – 29	8.9
1999	30 – 34	10.2
1999	35 – 39	7.9
1999	40 – 44	5.5
1999	45 – 49	2.8
1998	15 – 19	7.9
1998	20 – 24	11.4
1998	25 – 29	13.1
1998	30 – 34	9.9
1998	35 – 39	9.7
1998	40 – 44	10.8
1998	45 – 49	10.5

5. Antenatal Syphilis prevalence disaggregated by province (Department of Health, South Africa)

Year	Province	Point Estimate
2007	EC	2.6
2007	FS	2.2
2007	GP	5.6
2007	KZN	.6
2007	LP	1.2
2007	MPU	1.4
2007	NC	5.6
2007	NW	2.7
2007	WC	5.7
2006	EC	2.6
2006	FS	2.5
2006	GP	2.3
2006	KZN	1
2006	LP	.6
2006	MPU	1.1
2006	NC	6.9
2006	NW	1.8
2006	WC	1.9
2005	EC	2.5
2005	FS	3
2005	GP	4.3
2005	KZN	1.2
2005	LP	1.1
2005	MPU	2.9
2005	NC	8.5
2005	NW	1.9
2005	WC	4
2004	EC	2.4
2004	FS	3.8
2004	GP	.9
2004	KZN	.8
2004	LP	.9
2004	MPU	1.3
2004	NC	7
2004	NW	2.1
2004	WC	1.6
2003	EC	3.8
2003	FS	3.8
2003	GP	2.1
2003	KZN	1.4
2003	LP	1.7
2003	MPU	1.8
2003	NC	8.6
2003	NW	2
2003	WC	5.5

Year	Province	Point Estimate
2002	EC	3.1
2002	FS	5
2002	GP	6
2002	KZN	1.5
2002	LP	1.9
2002	MPU	2.5
2002	NC	5.2
2002	NW	3.2
2002	WC	2
2001	EC	3.3
2001	FS	2.
2001	GP	2.7
2001	KZN	1.3
2001	LP	4.9
2001	MPU	2
2001	NC	6.2
2001	NW	4
2001	WC	2.9
2000	EC	3.3
2000	FS	4.8
2000	GP	9.6
2000	KZN	2.6
2000	LP	4.2
2000	MPU	3.7
2000	NC	5.1
2000	NW	3.6
2000	WC	5.2
1999	EC	4.4
1999	FS	15.8
1999	GP	9.6
1999	KZN	3.8
1999	LP	8.6
1999	MPU	9.7
1999	NC	3.8
1999	NW	5.6
1999	WC	4.4

6. Incidence calculated (RHRU, HSRC)

Year	Age	Point Estimate	Source
2008	15	0.6	HSRC 2008
2008	16	0.5	HSRC 2008
2008	17	0.6	HSRC 2008
2008	18	0.8	HSRC 2008
2008	19	1.2	HSRC 2008
2008	20	1.7	HSRC 2008
2008	average	0.9	HSRC 2008
2005	15	1	HSRC 2008
2005	16	1.2	HSRC 2008
2005	17	1.5	HSRC 2008
2005	18	1.8	HSRC 2008
2005	19	2	HSRC 2008
2005	20	2.2	HSRC 2008
2005	average	1.61	HSRC 2008
2003	16	0.58	RHRU
2003	17	0.24	RHRU
2003	18	1.58	RHRU
2003	19	2.35	RHRU
2003	20	0.96	RHRU
2003	average	1.14	RHRU
2002	15	0.8	HSRC 2008
2002	16	1.1	HSRC 2008
2002	17	1.3	HSRC 2008
2002	18	1.6	HSRC 2008
2002	19	1.8	HSRC 2008
2002	20	2	HSRC 2008
2002	average	1.43	HSRC 2008

7. Mortality rate

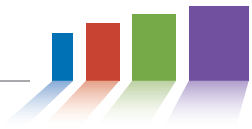
Year	Gender	Age	Point Estimate
2006	Female	15 – 19	226
2006	Female	20 – 24	770
2006	Female	25 – 29	1502
2006	Female	30 – 34	1965
2006	Female	35 – 39	2180
2006	Female	40 – 44	2084
2006	Female	45 – 49	1871
2006	Female	50 – 54	1958
2006	Female	55 – 59	2190
2006	Female	60 – 64	2368
2006	Male	15 – 19	242
2006	Male	20 – 24	575
2006	Male	25 – 29	1083
2006	Male	30 – 34	1844
2006	Male	35 – 39	2611
2006	Male	40 – 44	2993
2006	Male	45 – 49	2947
2006	Male	50 – 54	3290
2006	Male	55 – 59	3806
2006	Male	60 – 64	3595
2005	Female	15 – 19	225
2005	Female	20 – 24	784
2005	Female	25 – 29	1595
2005	Female	30 – 34	2016
2005	Female	35 – 39	2241
2005	Female	40 – 44	2008
2005	Female	45 – 49	1816
2005	Female	50 – 54	1936
2005	Female	55 – 59	2095
2005	Female	60 – 64	2406
2005	Male	15 – 19	240
2005	Male	20 – 24	554
2005	Male	25 – 29	1110
2005	Male	30 – 34	1885
2005	Male	35 – 39	2664
2005	Male	40 – 44	2851
2005	Male	45 – 49	2933
2005	Male	50 – 54	3241
2005	Male	55 – 59	3737
2005	Male	60 – 64	3619
2005	Total	0 – 4	1256
2005	Total	5 – 9	110
2005	Total	10 – 14	84
2005	Total	15 – 19	192
2005	Total	20 – 24	551
2005	Total	25 – 29	1063
2005	Total	30 – 34	1577

Year	Gender	Age	Point Estimate
2005	Total	35 – 39	1981
2005	Total	40 – 44	1994
2005	Total	45 – 49	1953
2005	Total	50 – 54	2167
2005	Total	55 – 59	2430
2005	Total	60 – 64	2425
2005	Total	65 – 69	3490
2005	Total	70 – 74	4432
2005	Total	75 – 79	7538
2005	Total	80 – 84	6522
2004	Female	15 – 19	187
2004	Female	20 – 24	1085
2004	Female	25 – 29	1985
2004	Female	30 – 34	2267
2004	Female	35 – 39	1890
2004	Female	40 – 44	1548
2004	Female	45 – 49	1400
2004	Female	50 – 54	1506
2004	Female	55 – 59	1717
2004	Female	60 – 64	2360
2004	Male	15 – 19	216
2004	Male	20 – 24	555
2004	Male	25 – 29	1081
2004	Male	30 – 34	2118
2004	Male	35 – 39	2498
2004	Male	40 – 44	2765
2004	Male	45 – 49	2744
2004	Male	50 – 54	2979
2004	Male	55 – 59	3270
2004	Male	60 – 64	4146
2004	Total	0 – 4	1042
2004	Total	5 – 9	113
2004	Total	10 – 14	77
2004	Total	15 – 19	188
2004	Total	20 – 24	532
2004	Total	25 – 29	1049
2004	Total	30 – 34	1479
2004	Total	35 – 39	1716
2004	Total	40 – 44	1710
2004	Total	45 – 49	1665
2004	Total	50 – 54	1901
2004	Total	55 – 59	2122
2004	Total	60 – 64	2833
2004	Total	65 – 69	3733
2004	Total	70 – 74	5568
2004	Total	75 – 79	8239
2004	Total	80 – 84	7653

Year	Gender	Age	Point Estimate
2003	Female	15 – 19	187
2003	Female	20 – 24	1026
2003	Female	25 – 29	1789
2003	Female	30 – 34	1997
2003	Female	35 – 39	1642
2003	Female	40 – 44	1404
2003	Female	45 – 49	1291
2003	Female	50 – 54	1423
2003	Female	55 – 59	1695
2003	Female	60 – 64	2363
2003	Male	15 – 19	218
2003	Male	20 – 24	542
2003	Male	25 – 29	1043
2003	Male	30 – 34	2007
2003	Male	35 – 39	2343
2003	Male	40 – 44	2607
2003	Male	45 – 49	2620
2003	Male	50 – 54	2877
2003	Male	55 – 59	3177
2003	Male	60 – 64	4148
2002	Female	15 – 19	203
2002	Female	20 – 24	870
2002	Female	25 – 29	1547
2002	Female	30 – 34	1680
2002	Female	35 – 39	1396
2002	Female	40 – 44	1210
2002	Female	45 – 49	1173
2002	Female	50 – 54	1297
2002	Female	55 – 59	1668
2002	Female	60 – 64	2352
2002	Male	15 – 19	234
2002	Male	20 – 24	527
2002	Male	25 – 29	977
2002	Male	30 – 34	1792
2002	Male	35 – 39	2083
2002	Male	40 – 44	2323
2002	Male	45 – 49	2395
2002	Male	50 – 54	2684
2002	Male	55 – 59	3059
2002	Male	60 – 64	4122
2001	Female	15 – 19	206
2001	Female	20 – 24	728
2001	Female	25 – 29	1254
2001	Female	30 – 34	1336
2001	Female	35 – 39	1143
2001	Female	40 – 44	1032
2001	Female	45 – 49	1059
2001	Female	50 – 54	1231

Year	Gender	Age	Point Estimate
2001	Female	55 – 59	1642
2001	Female	60 – 64	2348
2001	Male	15 – 19	238
2001	Male	20 – 24	502
2001	Male	25 – 29	903
2001	Male	30 – 34	1592
2001	Male	35 – 39	1859
2001	Male	40 – 44	2077
2001	Male	45 – 49	2207
2001	Male	50 – 54	2519
2001	Male	55 – 59	2978
2001	Male	60 – 64	4104
2000	Female	15 – 19	206
2000	Female	20 – 24	670
2000	Female	25 – 29	1011
2000	Female	30 – 34	1073
2000	Female	35 – 39	960
2000	Female	40 – 44	902
2000	Female	45 – 49	981
2000	Female	50 – 54	1199
2000	Female	55 – 59	1642
2000	Female	60 – 64	2155
2000	Male	15 – 19	244
2000	Male	20 – 24	471
2000	Male	25 – 29	808
2000	Male	30 – 34	1359
2000	Male	35 – 39	1604
2000	Male	40 – 44	1811
2000	Male	45 – 49	2010
2000	Male	50 – 54	2373
2000	Male	55 – 59	2944
2000	Male	60 – 64	3548
1999	Female	15 – 19	185
1999	Female	20 – 24	521
1999	Female	25 – 29	756
1999	Female	30 – 34	803
1999	Female	35 – 39	773
1999	Female	40 – 44	767
1999	Female	45 – 49	895
1999	Female	50 – 54	1154
1999	Female	55 – 59	1626
1999	Female	60 – 64	2163
1999	Male	15 – 19	239
1999	Male	20 – 24	421
1999	Male	25 – 29	712
1999	Male	30 – 34	1097
1999	Male	35 – 39	1315
1999	Male	40 – 44	1527

Year	Gender	Age	Point Estimate
1999	Male	45 – 49	1789
1999	Male	50 – 54	2217
1999	Male	55 – 59	2895
1999	Male	60 – 64	3560
1998	Female	15 – 19	176
1998	Female	20 – 24	420
1998	Female	25 – 29	589
1998	Female	30 – 34	648
1998	Female	35 – 39	648
1998	Female	40 – 44	681
1998	Female	45 – 49	841
1998	Female	50 – 54	1130
1998	Female	55 – 59	1624
1998	Female	60 – 64	2179
1998	Male	15 – 19	238
1998	Male	20 – 24	408
1998	Male	25 – 29	703
1998	Male	30 – 34	985
1998	Male	35 – 39	1104
1998	Male	40 – 44	1327
1998	Male	45 – 49	1634
1998	Male	50 – 54	2113
1998	Male	55 – 59	2862
1998	Male	60 – 64	3584
1997	Female	15 – 19	165
1997	Female	20 – 24	331
1997	Female	25 – 29	452
1997	Female	30 – 34	489
1997	Female	35 – 39	526
1997	Female	40 – 44	615
1997	Female	45 – 49	800
1997	Female	50 – 54	1116
1997	Female	55 – 59	1626
1997	Female	60 – 64	2201
1997	Male	15 – 19	235
1997	Male	20 – 24	381
1997	Male	25 – 29	625
1997	Male	30 – 34	817
1997	Male	35 – 39	916
1997	Male	40 – 44	1136
1997	Male	45 – 49	1486
1997	Male	50 – 54	2016
1997	Male	55 – 59	2838
1997	Male	60 – 64	3614



8. Survival chances

(Number of survivors to a given age from 100, 000 people alive on their 15th birthday)

Cohort	Gender	Age	Survivors	Source
2004	female	15	100000	Stats SA 2006
2004	female	20	99070	Stats SA 2006
2004	female	25	98836	Stats SA 2006
2004	female	30	84963	Stats SA 2006
2004	female	35	75848	Stats SA 2006
2004	female	40	69002	Stats SA 2006
2004	female	45	63861	Stats SA 2006
2004	female	50	59542	Stats SA 2006
2004	female	55	55221	Stats SA 2006
2004	female	60	50676	Stats SA 2006
2004	female	65	45028	Stats SA 2006
2004	male	15	100000	Stats SA 2006
2004	male	20	98924	Stats SA 2006
2004	male	25	96218	Stats SA 2006
2004	male	30	91152	Stats SA 2006
2004	male	35	81984	Stats SA 2006
2004	male	40	72347	Stats SA 2006
2004	male	45	62991	Stats SA 2006
2004	male	50	54904	Stats SA 2006
2004	male	55	47293	Stats SA 2006
2004	male	60	40145	Stats SA 2006
2004	male	65	32604	Stats SA 2006
1997	female	15	100000	Stats SA 2006
1997	female	20	99176	Stats SA 2006
1997	female	25	97546	Stats SA 2006
1997	female	30	95368	Stats SA 2006
1997	female	35	93064	Stats SA 2006
1997	female	40	90647	Stats SA 2006
1997	female	45	87901	Stats SA 2006
1997	female	50	84453	Stats SA 2006
1997	female	55	79869	Stats SA 2006
1997	female	60	73630	Stats SA 2006
1997	female	65	65951	Stats SA 2006
1997	male	15	100000	Stats SA 2006
1997	male	20	98830	Stats SA 2006
1997	male	25	96967	Stats SA 2006
1997	male	30	93981	Stats SA 2006
1997	male	35	90220	Stats SA 2006
1997	male	40	86179	Stats SA 2006
1997	male	45	81420	Stats SA 2006
1997	male	50	75589	Stats SA 2006
1997	male	55	68336	Stats SA 2006
1997	male	60	59282	Stats SA 2006
1997	male	65	49458	Stats SA 2006

9. Predictors of HIV infection

Category	Age	Year	Gender	AOR	CL (-)	CL (+)	Source
20 – 24 (vs 15 – 19)	15 – 24	2003	Female	4.26	1.43	12.7	Pettifor et al., 2005
20 – 24 (vs 15 – 19)	15 – 24	2003	Male	2.56	1.69	3.88	
Black (vs non-black)	15 – 24	2003	Female	8.33	4.15	16.71	
Black (vs non-black)	15 – 24	2003	Male	2.61	1.25	5.47	
Circumcised (vs not)	15 – 24	2003	Male	0.62	0.39	1	
Completed high school (vs not)	15 – 24	2003	Female	2.34	1.71	3.21	
Completed high school (vs not)	15 – 24	2003	Male	1.93	1.22	3.06	
Did not always use condom with most recent partner	15 – 24	2003	Female	1.54	1.05	2.26	
Did not always use condom with most recent partner	15 – 24	2003	Male	1.4	0.88	2.23	
Diff in partner age: >= 5 years older (vs same or less)	15 – 19	2003	Female	3.22	1.25	8.33	
Diff in partner age: >= 5 years older (vs same or less)	20 – 24	2003	Female	1.4	0.94		
Diff in partner age:1-4 years older (vs same or less)	15 – 19	2003	Female	1.89	0.66	5.47	
Diff in partner age:1-4 years older (vs same or less)	15 – 19	2003	Male				
Diff in partner age:1-4 years older (vs same or less)	20 – 24	2003	Female	2.28	1.45	3.59	
Diff in partner age:1-4 years older (vs same or less)	20 – 24	2003	Male				
Genital ulcer in past 12 months (vs none)	15 – 24	2003	Female	0.67	0.39	1.15	
Genital ulcer in past 12 months (vs none)	15 – 24	2003	Male	1.91	1.04	3.49	
Had sex > 5 times in past month (vs < 5 times)	15 – 24	2003	Female	1.03	0.69	1.54	
Had sex > 5 times in past month (vs < 5 times)	15 – 24	2003	Male	1.69	0.93	3.07	
Length of most recent relationship <1 month (vs >1 month)	15 – 24	2003	Female	1.16	0.8	1.69	
Length of most recent relationship <1 month (vs >1 month)	15 – 24	2003	Male	0.59	0.33	1.06	
Married (vs single)	15 – 24	2003	Female	0.56	0.32	0.96	
Married (vs single)	15 – 24	2003	Male	2.09	0.63	6.95	
No. of partners in lifetime (per added partner)	15 – 24	2003	Female	1.09	1.02	1.17	
No. of partners in lifetime (per added partner)	15 – 24	2003	Male	1.03	1.01	1.06	
Sexually active >12months (vs <=12 months)	15 – 24	2003	Female	2.37	1.65	3.39	
Sexually active >12months (vs <=12 months)	15 – 24	2003	Male	0.95	0.54	1.69	
Unusual genital discharge in past 12 months (vs no discharge)	15 – 24	2003	Female	1.75	1.26	2.44	
Unusual genital discharge in past 12 months (vs no discharge)	15 – 24	2003	Male	1.61	0.9	2.88	
Urban (vs rural)	15 – 24	2003	Female	2.16	1.44	3.24	
Urban (vs rural)	15 – 24	2003	Male	1.96	1.21	3.19	

10. Circumcision

(Percentage of men who say they have been circumcised)

Province	Age	Point Estimate	Source
EC	>15	56.1	Connolly et al, 2002
EC	15 – 24	45.1	RHRU, 2003
FS	>15	37.7	Connolly et al, 2002
FS	15 – 24	16.1	RHRU, 2003
GP	>15	39.2	Connolly et al, 2002
GP	15-25	27.1	RHRU, 2003
KZN	>15	15.1	Connolly et al, 2002
KZN	15 – 24	10.4	RHRU, 2003
LP	>15	69.4	Connolly et al, 2002
LP	15 – 24	81.4	RHRU, 2003
MPU	>15	29.7	Connolly et al, 2002
MPU	15 – 24	31.5	RHRU, 2003
NC	>15	13.1	Connolly et al, 2002
NC	15 – 24	11.7	RHRU, 2003
NW	>15	31.9	Connolly et al, 2002
NW	15 – 24	27.1	RHRU, 2003
WC	>15	32.7	Connolly et al, 2002
WC	15 – 24	30.9	RHRU, 2003

11. Self reported sexual behaviour

Category	Sub-Category	Gender	Age	Year	Point Estimate	CL-Lower	CL-Upper
Sexual Debut	Percent reporting sexual debut < 15 years	Total	15 – 24	2002	8.9	5.9	11.5
Sexual Debut	Percent reporting sexual debut < 15 years	Total	15 – 24	2003	8		
Sexual Debut	Percent reporting sexual debut < 15 years	Total	15 – 24	2005	8.4	7.3	9.3
Sexual Debut	Percent reporting sexual debut < 15 years	Total	15 – 24	2008	8.5	7	9.5
Sexual Debut	Percent reporting sexual debut < 15 years	Male	15 – 24	2002	13.1	8.8	18
Sexual Debut	Percent reporting sexual debut < 15 years	Male	15 – 24	2003	17.5	12	24.8
Sexual Debut	Percent reporting sexual debut < 15 years	Male	15 – 24	2005	11.9	9.1	14.8
Sexual Debut	Percent reporting sexual debut < 15 years	Male	15 – 24	2008	11.3	8.5	14.2
Sexual Debut	Percent reporting sexual debut < 15 years	Female	15 – 24	2002	5.3	3.3	7.3
Sexual Debut	Percent reporting sexual debut < 15 years	Female	15 – 24	2003	12.5	5.8	21.5
Sexual Debut	Percent reporting sexual debut < 15 years	Female	15 – 24	2005	5.1	4	6.7
Sexual Debut	Percent reporting sexual debut < 15 years	Female	15 – 24	2008	5.9	4.6	7.1
Sexual Debut	Ever had oral sex	Total	15 – 24	2006	18		
Sexual Debut	Ever had anal sex	Total	15 – 24	2006	5		
Sexual Debut	Ever had either vaginal or anal sex	Total	15 – 24	2006	67		
Condom use	Proportion of people who say they used a condom the last time they had sex	Total	>=15	2002	27.3	26	28.6
Condom use	Proportion of people who say they used a condom the last time they had sex	Total	>=15	2005	35.4	33.4	37.3
Condom use	Proportion of people who say they used a condom the last time they had sex	Total	>=15	2008	62.4	60.2	64.4
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	>=15	2002	30.3	28.4	32.3
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	>=15	2005	38.1	35.3	40.9
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	>=15	2008	64.6	61.6	67.4
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	>=15	2002	24.7	23	25
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	>=15	2005	32.8	30.5	35.1
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	>=15	2008	60.4	57.6	63.2
Condom use	Proportion of people who say they used a condom the last time they had sex	Total	15 – 24	2002	51.6		
Condom use	Proportion of people who say they used a condom the last time they had sex	Total	15 – 24	2003	52		
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	15 – 24	2002	57.1	52.8	61.2
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	15 – 24	2003	57		
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	15 – 24	2005	72.8	69	75.3
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	15 – 24	2008	87.4	84.8	90
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	15 – 24	2002	46.1	42.2	50
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	15 – 24	2003	48		
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	15 – 24	2005	55.7	51.1	60

Category	Sub-Category	Gender	Age	Year	Point Estimate	CL-Lower	CL-Upper
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	15 – 24	2008	73.1	69.6	76.8
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	25 – 49	2002	26.7	25.8	29.9
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	25 – 49	2005	35.3	31.2	39.5
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	25 – 49	2008	56.4	52	60.5
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	25 – 49	2002	19.7	18.7	21.3
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	25 – 49	2005	29.1	28.1	32
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	25 – 49	2008	58.1	55.6	61.8
Condom use	Proportion of people who say they used a condom the last time they had sex	Total	15 – 49	2002	31.3	29.8	32.8
Condom use	Proportion of people who say they used a condom the last time they had sex	Total	15 – 49	2005	40.3	38	42.6
Condom use	Proportion of people who say they used a condom the last time they had sex	Total	15 – 49	2008	64.8	62.6	66.9
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	15 – 49	2002	36.1	33.8	38.6
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	15 – 49	2005	45.4	42.9	48.9
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	15 – 49	2008	67.4	64.4	70.3
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	15 – 49	2002	27.6	25.7	29.6
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	15 – 49	2005	35.9	33.4	38.5
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	15 – 49	2008	62.5	59.7	65.3
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	>=50	2002	8.2	7.1	12
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	>=50	2005	8.6	6.9	11
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	>=50	2008	39.9	33.6	47.5
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	>=50	2002	5.6	4	7.6
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	>=50	2005	5.3	4.1	7.8
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	>=50	2008	25.9	19.3	35.9
Condom use	Among people with multiple partners	Total	Total	2002	70.8	61.9	78.9
Condom use	Among people with multiple partners	Total	Total	2005	76.3	70.6	80.9
Condom use	Among people with multiple partners	Total	Total	2008	75.2	69.2	80.4
Condom use	Among people with multiple partners	Male	Total	2002	71	59.8	79.4
Condom use	Among people with multiple partners	Male	Total	2005	81.1	75.5	85.6
Condom use	Among people with multiple partners	Male	Total	2008	77.1	70.4	82.6
Condom use	Among people with multiple partners	Female	Total	2002	71.6	54.3	84.3
Condom use	Among people with multiple partners	Female	Total	2005	52.5	39.4	65.2
Condom use	Among people with multiple partners	Female	Total	2008	67.5	52.5	79.6

Category	Sub-Category	Gender	Age	Year	Point Estimate	CL-Lower	CL-Upper
Condom use	Proportion of people who say they used a condom the last time they had sex	Total	15	2002	42.3	36	48.6
Condom use	Proportion of people who say they used a condom the last time they had sex	Total	16	2002	47.2	41	53.5
Condom use	Proportion of people who say they used a condom the last time they had sex	Total	17	2002	51.5	45.5	57.4
Condom use	Proportion of people who say they used a condom the last time they had sex	Total	18	2002	42.3	33.1	51.4
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	15	2002	45.3	37.7	52.9
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	16	2002	48.3	39.7	57
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	17	2002	52.6	45.6	59.6
Condom use	Proportion of people who say they used a condom the last time they had sex	Male	18	2002	52.5	46	58.9
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	15	2002	38.7	30.4	47
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	16	2002	45.9	38.6	53.1
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	17	2002	49.9	41.4	58.5
Condom use	Proportion of people who say they used a condom the last time they had sex	Female	18	2002	31.7	16.3	47.1
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Total	Total	2002	9.4	8.5	10.4
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Total	Total	2005	9.8	8.6	11.3
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Total	Total	2008	10.6	9.5	11.9
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Total	15 – 24	2002	15.9		
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Total	15 – 24	2003	27		
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Total	15 – 24	2005	16.6		
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Total	15 – 24	2006	37		
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Total	15 – 24	2008	18		
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Male	15 – 24	2002	23		
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Male	15 – 24	2003	29.5		
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Male	15 – 24	2005	27.2		
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Male	15 – 24	2008	30.8		
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Female	15 – 24	2002	8.8		
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Female	15 – 24	2003	8.2		
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Female	15 – 24	2005	6		

Category	Sub-Category	Gender	Age	Year	Point Estimate	CL-Lower	CL-Upper
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Female	15 – 24	2008	6		
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Total	25 – 49	2002	7		
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Total	25 – 49	2005	8.1		
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Male	25 – 49	2002	11.5	9.5	13
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Male	25 – 49	2005	14.4	11.4	15.8
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Male	25 – 49	2008	14.8	11.8	16.3
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Female	25 – 49	2002	2.5	1.6	2.8
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Female	25 – 49	2005	1.8	0.9	2.4
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Female	25 – 49	2008	3	2	4.6
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Total	>=15	2002	8.7	7.9	9.6
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Total	>=15	2005	9.3	8.2	10.6
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Total	>=15	2008	9.3	8.3	10.3
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Male	>=15	2002	13.5	12.1	15.1
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Male	>=15	2005	16.3	14.3	18.6
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Male	>=15	2008	16.2	14.5	18.1
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Female	>=15	2002	3.9	3.2	4.8
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Female	>=15	2005	2.6	2.1	3.3
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Female	>=15	2008	3.3	2.6	4.3
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Male	>50	2002	7.5	5.3	10.5
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Male	>50	2005	9.8	6.5	15
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Male	>50	2008	3.7	2.8	6.5
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Female	>50	2002	0.6	0	1
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Female	>50	2005	0.3	0.1	0.6
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Female	>50	2008	0.8	0	2.5
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Total	15 – 49	2002	5.5	4.8	6.3
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Total	15 – 49	2005	9.8	9	11.3
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Total	15 – 49	2008	10.6	9.5	11.9

Category	Sub-Category	Gender	Age	Year	Point Estimate	CL-Lower	CL-Upper
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Male	15 – 49	2002	9.4	8.1	10.9
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Male	15 – 49	2005	17.9	15.5	20.6
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Male	15 – 49	2008	19.3	17.3	21.6
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Female	15 – 49	2002	1.6	1.1	2.3
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Female	15 – 49	2005	2.9	2.3	3.7
Multiple partnerships	Proportion of people reporting more than one sexual partner in the past year	Female	15 – 19	2008	3.7	2.9	4.8
Age Disparate Sex	Proportion of people reporting a sexual partner 5 or more years older	Total	15 – 19	2005	9.6	7.2	12.5
Age Disparate Sex	Proportion of people reporting a sexual partner 5 or more years older	Total	15 – 19	2008	14.5	11.2	18.6
Age Disparate Sex	Proportion of people reporting a sexual partner 5 or more years older	Male	15 – 19	2005	2	1	2.2
Age Disparate Sex	Proportion of people reporting a sexual partner 5 or more years older	Male	15 – 19	2008	0.7	0.5	1.3
Age Disparate Sex	Proportion of people reporting a sexual partner 5 or more years older	Female	15 – 19	2005	18.5	13.3	24.4
Age Disparate Sex	Proportion of people reporting a sexual partner 5 or more years older	Female	15 – 19	2008	27.6	21.7	34.5

12. Age of first sex

(Percentage of each single age band that reports having ever had sex)

Gender	Age	Year	Source	Point Estimate	CL (-)	CL (+)
total	15	2003	RHRU	13		
	16	2003	RHRU	35		
	17	2003	RHRU	56		
	18	2003	RHRU	64		
	19	2003	RHRU	76		
	20	2003	RHRU	83		
	21	2003	RHRU	89		
	22	2003	RHRU	92		
	23	2003	RHRU	93		
	24	2003	RHRU	94		
	15	2005	HSRC	10.1		
	16	2005	HSRC	17.2		
	17	2005	HSRC	37		
	18	2005	HSRC	53.4		
	19	2005	HSRC	60.6		
	20	2005	HSRC	77.6		
	21	2005	HSRC	84		
	22	2005	HSRC	85		
	23	2005	HSRC	87.9		
	24	2005	HSRC	87.6		
male	15	2003	RHRU	12.4	7.9	18.9
	16	2003	RHRU	34.1	29.4	39.1
	17	2003	RHRU	60.4	46.6	72.7
	18	2003	RHRU	66	60.7	70.1
	19	2003	RHRU	75.3	65.9	82.7
	20	2003	RHRU	80.4	74.2	85.4
	21	2003	RHRU	87.5	83.4	90.8
	22	2003	RHRU	92.9	89.1	95.4
	23	2003	RHRU	89.1	82.3	93.6
	24	2003	RHRU	93.8	89	96.6
female	15	2003	RHRU	14.4	11.3	18.2
	16	2003	RHRU	36.5	19.4	57.9
	17	2003	RHRU	50.9	42.1	59.6
	18	2003	RHRU	61	54	67.5
	19	2003	RHRU	77	71.5	81.6
	20	2003	RHRU	85.2	81.1	88.6
	21	2003	RHRU	90.8	85.8	94.2
	22	2003	RHRU	91.9	88.5	94.4
	23	2003	RHRU	96	91.4	98.1
	24	2003	RHRU	93.5	88.9	96.3

13. Most at risk populations (MARP)

Category	Sub-Category	Year	Point Estimate	CL-Lower	CL-Upper	Source
Men who have sex with men	HIV prevalence	2008	9.9	4.6	20.2	HSRC 2008
	More than one sexual partner in past year	2008	17.5	8.8	31.6	HSRC 2008
	Condom use at last sex	2008	58.3	42.6	72.5	HSRC 2008
Prisoners in correctional facilities	HIV prevalence	2006	19.8			DCS, 2006
	Syphilis present	2006	5.6			DCS, 2006
High risk drinkers	HIV prevalence	2008	13.9	10.4	18.2	HSRC 2008
	More than one sexual partner in past year	2005	27.9	22.1	34.9	HSRC 2008
	More than one sexual partner in past year	2008	26.2	21.4	33	HSRC 2008
	Condom use at last sex	2005	36.3	30	42.1	HSRC 2008
	Condom use at last sex	2008	63.8	60	69.3	HSRC 2008
People who use drugs for recreational purposes	HIV prevalence	2008	10.8	7.2	15.8	HSRC 2008
	More than one sexual partner in past year	2002	19.3	14	29.1	HSRC 2008
	More than one sexual partner in past year	2005	20.3	15	29.6	HSRC 2008
	More than one sexual partner in past year	2008	24.1	19	31.1	HSRC 2008
	Condom use at last sex	2002	31.5	23.1	40	HSRC 2008
	Condom use at last sex	2005	35.8	28.3	44.1	HSRC 2008
	Condom use at last sex	2008	67.4	63.2	77.1	HSRC 2008
People with disabilities	HIV prevalence	2008	14.1	9.9	19.6	HSRC 2008
	Condom use at last sex	2008	62.7	52	72.4	HSRC 2008
Maternal orphans	HIV prevalence	2008	6.3	2.5	15.4	HSRC 2008
Paternal orphans	HIV prevalence	2008	4.5	2.1	9.2	HSRC 2008
Double orphans	HIV prevalence	2008	12.7	4.8	29.7	HSRC 2008

14. Predictors of self reported sexual behaviour

Category	Sub-Category	Age	Gender	AOR	CL (-)	CL (+)	Source
Used alcohol or drugs before sex		>=19	Female	7.9	4.1	11.7	YearBS, 2002
Used alcohol or drugs before sex		>=19	Male	17.9	11.4	24.4	YearBS, 2002
Used alcohol or drugs before sex		>=19	Total	13.2	9.3	17.1	YearBS, 2002
Used alcohol or drugs before sex		13	Female	17.5	1.9	33.2	YearBS, 2002
Used alcohol or drugs before sex		13	Male	17.5	9.2	25.8	YearBS, 2002
Used alcohol or drugs before sex		13	Total	17.5	8.7	26.3	YearBS, 2002
Used alcohol or drugs before sex		14	Female	9.6	4.7	14.6	YearBS, 2002
Used alcohol or drugs before sex		14	Male	14.1	6.9	21.4	YearBS, 2002
Used alcohol or drugs before sex		14	Total	12.5	7.2	17.7	YearBS, 2002
Used alcohol or drugs before sex		15	Female	9.7	5.8	13.7	YearBS, 2002
Used alcohol or drugs before sex		15	Male	14.3	7.5	21	YearBS, 2002
Used alcohol or drugs before sex		15	Total	12.3	8.4	16.2	YearBS, 2002
Used alcohol or drugs before sex		16	Female	13.7	8.8	18.6	YearBS, 2002
Used alcohol or drugs before sex		16	Male	17.2	12.3	22.1	YearBS, 2002
Used alcohol or drugs before sex		16	Total	15.6	11.6	19.5	YearBS, 2002
Used alcohol or drugs before sex		17	Female	8.8	4.6	13	YearBS, 2002
Used alcohol or drugs before sex		17	Male	17.3	13.3	21.3	YearBS, 2002
Used alcohol or drugs before sex		17	Total	13.6	10.2	17	YearBS, 2002
Used alcohol or drugs before sex		18	Female	2.5	0.6	4.3	YearBS, 2002
Used alcohol or drugs before sex		18	Male	26.9	19.7	34	YearBS, 2002
Used alcohol or drugs before sex		18	Total	14.6	10	19.1	YearBS, 2002
Condom use	Been in a relationship > 6 months	15 – 24	Female	0.44	0.32	0.62	Hendriksen et al, 2006
Condom use	Been in a relationship > 6 months	15 – 24	male	0.53	0.38	0.75	Hendriksen et al, 2006
Condom use self efficacy	Belief that condom use implies distrust	15 – 24	Male	0.63	0.46	0.87	Sayles et al, 2020
Condom use self efficacy	Belief that condom use implies distrust	15 – 24	Female	0.57	0.43	0.75	Sayles et al, 2011
Condom use self efficacy	Believe they are not as risk	15 – 24	Male	1.38	1.12	1.7	Sayles et al, 2014
2 or more current sexual partners	Black versus non-black	16 – 65	Total	3.74	1.57	8.87	Soul City
Number of sexual partners in the past 12 months 1 or less	Black versus non-black	16 – 65	Total	1.52	1.14	2.03	Soul City
Condom use at last sex	Black versus non-black	16 – 65	Total	0.56	0.44	0.71	Soul City
Condom use	Condom use at sexual debut	15 – 24	Female	3.35	2.5	4.5	Hendriksen et al, 2006
Condom use	Condom use at sexual debut	15 – 24	Male	5.92	4.02	8.72	Hendriksen et al, 2006
Always use a condom with regular partner	Condom use self efficacy	16 – 65	Total	4.59	4.25	5.53	Soul City
Condom use at last sex	Condom use self efficacy	16 – 65	Total	5.49	3.87	7.81	Soul City
Condom use self efficacy	Did not use condoms at sexual debut	15 – 24	Female	0.61	0.5	0.76	Sayles et al, 2009
Condom use self efficacy	Did not use condoms at sexual debut	15 – 24	Male	0.51	0.39	0.67	Sayles et al, 2018
Always use a condom with regular partner	Female versus male	16 – 65	Total	0.59	0.41	0.83	Soul City
Condom use self efficacy	Have life goals	15 – 24	Male	1.3	1.1	1.54	Sayles et al, 2016

Category	Sub-Category	Age	Gender	AOR	CL (-)	CL (+)	Source
Condom use self efficacy	Have life goals	15 – 24	Female	1.28	1.1	1.48	Sayles et al, 2008
Condom use	High condom use self-efficacy	15 – 24	Female	1.6	1.43	1.79	Hendriksen et al, 2006
Condom use	High condom use self-efficacy	15 – 24	Male	1.64	1.46	1.84	Hendriksen et al, 2006
Condom use at last sex	Higher levels of education	16 – 65	Total	1.44	1.2	1.73	Soul City
Condom use self efficacy	History of unwanted sex	15 – 24	Female	0.66	0.51	0.86	Sayles et al, 2010
Condom use self efficacy	History of unwanted sex	15 – 24	Male	0.47	0.34	0.64	Sayles et al, 2019
Condom use self efficacy	Knowledge of HIV avoidance	15 – 24	Female	2.3	1.05	5	Sayles et al, 2006
Number of sexual partners in the past 12 months 1 or less	Male versus female	16 – 65	Total	3.63	2.47	5.35	Soul City
2 or more current sexual partners	Male versus female	16 – 65	Total	4.63	2.38	9.01	Soul City
Condom use at last sex	Male versus female	16 – 65	Total	0.58	0.42	0.81	Soul City
Condom use	Married	15 – 24	Female	0.4	0.23	0.72	Hendriksen et al, 2006
Condom use	Married	15 – 24	Male	0.42	0.18	0.98	Hendriksen et al, 2006
Always use a condom with regular partner	More versus less educated	16 – 65	Total	1.33	1.08	1.63	Soul City
Always use a condom with regular partner	Non-black versus black	16 – 65	Total	0.58	0.45	0.76	Soul City
Always use a condom with regular partner	Old versus young	16 – 65	Total	0.67	0.57	0.79	Soul City
Condom use	Optimism about the future	15 – 24	Female	1.07	0.96	1.19	Hendriksen et al, 2006
Condom use	Optimism about the future	15 – 24	Male	1.13	1.04	1.24	Hendriksen et al, 2006
Condom use at last sex	Positive subjective norms	16 – 65	Total	2.26	1.45	3.54	Soul City
Condom use self efficacy	Refusing to be friends with person with HIV	15 – 24	Male	0.52	0.32	0.85	Sayles et al, 2021
Condom use self efficacy	Report ease of access to condoms	15 – 24	Male	1.85	1.23	2.77	Sayles et al, 2015
Condom use	Reported behaviour change attributable to HIV/AIDS knowledge	15 – 24	Female	1.79	1.38	2.31	Hendriksen et al, 2006
Condom use	Reported behaviour change attributable to HIV/AIDS knowledge	15 – 24	Male	2.45	1.53	3.92	Hendriksen et al, 2006
Number of sexual partners in the past 12 months 1 or less	Rural	16 – 65	Total	0.45	0.29	0.69	Soul City
2 or more current sexual partners	Sometimes or often discuss HIV with partner versus never	16 – 65	Total	2.26	1.16	4.43	Soul City
Condom use self efficacy	Spoken with some one other than parent or guardian about HIV	15 – 24	Female	1.46	1.01	2.1	Sayles et al, 2007
Condom use self efficacy	Take HIV seriously	15 – 24	Male	4.03	1.55	10.52	Sayles et al, 2013
Condom use	Talking with one's first partners about condom use	15 – 24	Female	2.64	1.75	3.99	Hendriksen et al, 2006
Condom use	Talking with one's first partners about condom use	15 – 24	Male	1.56	1.19	2.03	Hendriksen et al, 2006

Category	Sub-Category	Age	Gender	AOR	CL (-)	CL (+)	Source
Condom use	Tested for HIV	15 – 24	Female	1.02	0.8	1.3	Sayles et al, 2006
Condom use	Tested for HIV	15 – 24	Male	1.2	0.93	1.56	Sayles et al, 2006
Condom use at last sex	Urban formal	16 – 65	Total	0.55	0.33	0.91	Soul City
Number of sexual partners in the past 12 months 1 or less	Urban informal	16 – 65	Total	0.51	0.28	0.94	Soul City
Number of sexual partners in the past 12 months 1 or less	Young versus old	16 – 65	Total	1.43	1.19	1.7	Soul City
Condom use at last sex	Young versus old	16 – 65	Total	0.64	0.55	0.75	Soul City

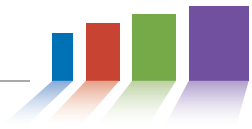
15. Voluntary counselling and testing

Category	Age	Gender	Year	Point-Estimate	CL (-)	CL (+)
Proportion of people who say they have been tested for HIV	>=15	total	2008	50.8	49.3	52.2
Proportion of people who say they have been tested for HIV	>=15	female	2008	56.7	55	58.2
Proportion of people who say they have been tested for HIV	>=15	female	2005	32.9	31.3	34.7
Proportion of people who say they have been tested for HIV	>=15	female	2002	21.4	19.2	23.9
Proportion of people who say they have been tested for HIV	>=15	male	2008	43	40.9	45.2
Proportion of people who say they have been tested for HIV	>=15	male	2005	27.6	25.5	29.8
Proportion of people who say they have been tested for HIV	>=15	male	2002	21.4	18.9	24.1
Proportion of people who say they have been tested for HIV in the past 12 months and know their status	>=15	female	2008	28.7	26.8	31
Proportion of people who say they have been tested for HIV in the past 12 months and know their status	>=15	female	2005	13.3	12.3	14.5
Proportion of people who say they have been tested for HIV in the past 12 months and know their status	>=15	male	2008	19.9	18	22.2
Proportion of people who say they have been tested for HIV in the past 12 months and know their status	>=15	male	2005	10.2	9	11.2
Proportion of people who say they have been tested for HIV in the past 12 months and know their status	>=15	total	2008	24.7		

16. Exposure to media

Category	Sub-Category	Age	Year	Point Estimate	CL (-)	CL (+)
General Exposure	KHOMANANI	>=50	2008	38.9		
	KHOMANANI	15 – 24	2008	65.3		
	KHOMANANI	25 – 49	2008	38.9		
	KHOMANANI	Total	2008	56.8		
	LOVELIFE	>=50	2008	42.5		
	LOVELIFE	15 – 24	2008	79.1		
	LOVELIFE	25 – 49	2008	71.2		
	LOVELIFE	Total	2008	67.3		
	SOUL BUDDYZ	>=50	2008	21.3		
	SOUL BUDDYZ	15 – 24	2008	65.6		
	SOUL BUDDYZ	25 – 49	2008	51		
	SOUL BUDDYZ	Total	2008	48.8		
	SOUL CITY	>=50	2008	44.1		
	SOUL CITY	15 – 24	2008	75.3		
	SOUL CITY	25 – 49	2008	66.7		
	SOUL CITY	Total	2008	64.3		
Heard or seen at least one programme	ANY	>=50	2008	62.2	59.3	65.0
	ANY	>=50	2005	47.2	43.5	50.9
	ANY	15 – 24	2008	90.2	88.5	91.6
	ANY	15 – 24	2005	86.3	83.9	88.4
	ANY	25 – 49	2008	83.6	81.9	85.2
	ANY	25 – 49	2005	77.8	75.4	80.0
	ANY	Total	2008	80.9	79.4	82.3
	ANY	Total	2005	74	71.9	76.1
	KHOMANANI	>=50	2008	38.9	35.9	41.9
	KHOMANANI	>=50	2005	24.4	21.5	27.6
	KHOMANANI	15 – 24	2008	65.3	62.6	67.9
	KHOMANANI	15 – 24	2005	44.9	42.0	48.1
	KHOMANANI	25 – 49	2008	59.7	57.4	61.9
	KHOMANANI	25 – 49	2005	40.5	38.0	43.1
	KHOMANANI	Total	2008	56.8	54.8	58.8
	KHOMANANI	Total	2005	38.4	36.2	40.6
	LOVELIFE	>=50	2008	42.5	39.8	45.3
	LOVELIFE	>=50	2005	20.9	17.9	24.2
	LOVELIFE	15 – 24	2008	79.1	76.8	81.3
	LOVELIFE	15 – 24	2005	67.7	64.7	70.5
	LOVELIFE	25 – 49	2008	71.2	69.3	73.3
	LOVELIFE	25 – 49	2005	48.7	45.9	51.5
	LOVELIFE	Total	2008	67.3	65.6	69.0
	LOVELIFE	Total	2005	48.3	45.9	50.7
	SOUL BUDDYZ	>=50	2008	21.3	18.9	23.9
	SOUL BUDDYZ	>=50	2005	22.6	19.7	25.8
	SOUL BUDDYZ	15 – 24	2008	65.6	62.8	68.4
	SOUL BUDDYZ	15 – 24	2005	67.6	64.3	70.8
	SOUL BUDDYZ	25 – 49	2008	51	48.3	53.6
	SOUL BUDDYZ	25 – 49	2005	49.1	46.1	52.1

Category	Sub-Category	Age	Year	Point Estimate	CL (-)	CL (+)
	SOUL BUDDYZ	Total	2008	48.8	46.7	50.9
	SOUL BUDDYZ	Total	2005	49	46.4	51.5
	SOUL CITY	>=50	2008	44.1	41.0	47.3
	SOUL CITY	>=50	2005	37.9	34.4	41.4
	SOUL CITY	15 – 24	2008	75.3	73.0	77.5
	SOUL CITY	15 – 24	2005	79.9	77.4	82.3
	SOUL CITY	25 – 49	2008	66.7	64.3	69.0
	SOUL CITY	25 – 49	2005	71.3	68.9	73.7
	SOUL CITY	Total	2008	64.3	62.3	66.3
	SOUL CITY	Total	2005	67	64.7	69.1
High risk drinkers	KHOMANANI	Total	2008	58		
	LOVELIFE	Total	2008	71.3		
	SOUL BUDDYZ	Total	2008	51.1		
	SOUL CITY	Total	2008	64.1		
Men who have sex with men	KHOMANANI	Total	2008	51.1		
	LOVELIFE	Total	2008	63.9		
	SOUL BUDDYZ	Total	2008	35.7		
	SOUL CITY	Total	2008	59.5		
People who use drugs for recreational purposes	KHOMANANI	Total	2008	52.3		
	LOVELIFE	Total	2008	71.7		
	SOUL BUDDYZ	Total	2008	48.1		
	SOUL CITY	Total	2008	59.4		
People with disabilities	KHOMANANI	Total	2008	46		
	LOVELIFE	Total	2008	54.6		
	SOUL BUDDYZ	Total	2008	36.1		
	SOUL CITY	Total	2008	62		
African men	KHOMANANI	25 – 49	2008	66.9		
	LOVELIFE	25 – 49	2008	73.9		
	SOUL BUDDYZ	25 – 49	2008	54.1		
	SOUL CITY	25 – 49	2008	75.6		
African women	KHOMANANI	20 – 34	2008	66.2		
	LOVELIFE	20 – 34	2008	73.9		
	SOUL BUDDYZ	20 – 34	2008	64.7		
	SOUL CITY	20 – 34	2008	78.9		



17. Face to face programmes

Category	Sub-Category	Geotype	Age	Year	Point Estimate
Knowledge of loveLife	Not heard of loveLife	Total	15 – 24	2003	15
	1-3 programmes	Total	15 – 24	2003	20
	4-9 programmes	Total	15 – 24	2003	49
	10-16 programmes	Total	15 – 24	2003	16
Participation in specific loveLife programmes	Not heard of loveLife	Total	15 – 24	2003	15
	0 programmes	Total	15 – 24	2003	50
	1-2 programmes	Total	15 – 24	2003	26
	3-11 programmes	Total	15 – 24	2003	9
	0 programmes	Urban informal	15 – 24	2003	51
	0 programmes	Rural informal	15 – 24	2003	53
	0 programmes	Rural formal	15 – 24	2003	48
	0 programmes	Urban formal	15 – 24	2003	48
	1-2 programmes	Urban informal	15 – 24	2003	26
	1-2 programmes	Rural informal	15 – 24	2003	19
	1-2 programmes	Rural formal	15 – 24	2003	12
	1-2 programmes	Urban formal	15 – 24	2003	32
	3-11 programmes	Urban informal	15 – 24	2003	11
	3-11 programmes	Rural informal	15 – 24	2003	6
	3-11 programmes	Rural formal	15 – 24	2003	4
	3-11 programmes	Urban formal	15 – 24	2003	13
	Not heard of loveLife	Urban informal	15 – 24	2003	12
	Not heard of loveLife	Rural informal	15 – 24	2003	23
	Not heard of loveLife	Rural formal	15 – 24	2003	35
Participation in community prevention activities	Community meetings	Total	12 – 14	2005	4.5
	Community meetings	Total	15 – 24	2005	13.1
	Community meetings	Total	20 – 49	2005	20.1
	Community meetings	Total	>=50	2005	17.3
	Educational activities	Total	12 – 14	2005	21.9
	Educational activities	Total	15 – 24	2005	25.2
	Educational activities	Total	24 – 49	2005	11.3
	Educational activities	Total	>=50	2005	5

18. Condom distribution

(distribution of public sector male condoms)

Measure	Indicator	Metro/Rural	Year	Average	CL (-)	CL (+)
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Metro	2007/2008	17.5	4.8	55
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Metro	2006/2007	15.5	6.5	47
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Metro	2005/2006	10.1	7.6	28.8
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Metro	2004	8.5	6.3	20.3
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Rural	2007/2008	9.8	1.7	16.5
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Rural	2006/2007	9.4	5.8	13.2
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Rural	2005/2006	10.1	5.1	16
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Rural	2004	8.7	2.2	14
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Total	2007/2008	11.8	1.7	55.2
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Total	2006/2007	11.1	3	47
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Total	2005/2006	8.8	8.3	26.8
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Total	2004	7.5	7	20.3

18. Condom distribution

(distribution of public sector male condoms)

Measure	Indicator	Metro/Rural	Year	Average	CL (-)	CL (+)
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Metro	2007/2008	17.5	4.8	55
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Metro	2006/2007	15.5	6.5	47
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Metro	2005/2006	10.1	7.6	28.8
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Metro	2004	8.5	6.3	20.3
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Rural	2007/2008	9.8	1.7	16.5
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Rural	2006/2007	9.4	5.8	13.2
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Rural	2005/2006	10.1	5.1	16
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Rural	2004	8.7	2.2	14
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Total	2007/2008	11.8	1.7	55.2
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Total	2006/2007	11.1	3	47
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Total	2005/2006	8.8	8.3	26.8
Condoms distributed (public sector)	Male condom distribution rate (# of condoms per man > 15 years)	Total	2004	7.5	7	20.3

19. Prevention of mother-to-child transmission programmes

Category	Sub-Category	Geotype	Year	Average	Range (-)	Range (+)	Source
HIV testing	Percent of HIV tests performed in antenatal clinics	metro	2007/2008	73	43	95	District health barometers
	Percent of HIV tests performed in antenatal clinics	metro	2006/2007	61	missing data	missing data	District health barometers
	Percent of HIV tests performed in antenatal clinics	metro	2005/2006	missing data	30	100	District health barometers
	Percent of HIV tests performed in antenatal clinics	metro	2004	55	15	100	District health barometers
	Percent of HIV tests performed in antenatal clinics	rural	2007/2008	85	69	106	District health barometers
	Percent of HIV tests performed in antenatal clinics	rural	2006/2007	73	58	100	District health barometers
	Percent of HIV tests performed in antenatal clinics	rural	2005/2006	missing data	missing data	missing data	District health barometers
	Percent of HIV tests performed in antenatal clinics	rural	2004	missing data	missing data	missing data	District health barometers
	Percent of HIV tests performed in antenatal clinics	total	2007/2008	80	50	120	District health barometers
	Percent of HIV tests performed in antenatal clinics	total	2006/2007	67	44	100	District health barometers
	Percent of HIV tests performed in antenatal clinics	total	2005/2006	45	26	100	District health barometers
	Percent of HIV tests performed in antenatal clinics	total	2004	48	15	95	District health barometers
Treatment	Percent mothers given NVP (and AZT) prior to birth	metro	2007/2008	82	65	90	District health barometers
	Percent mothers given NVP (and AZT) prior to birth	metro	2006/2007	73	56	87	District health barometers
	Percent mothers given NVP (and AZT) prior to birth	metro	2005/2006	54	10	72	District health barometers
	Percent mothers given NVP (and AZT) prior to birth	metro	2004	37	2	74	District health barometers
	Percent mothers given NVP (and AZT) prior to birth	rural	2007/2008	68	25	100	District health barometers
	Percent mothers given NVP (and AZT) prior to birth	rural	2006/2007	49	10	84	District health barometers
	Percent mothers given NVP (and AZT) prior to birth	rural	2005/2006	48	17	68	District health barometers
	Percent mothers given NVP (and AZT) prior to birth	rural	2004	40	12	63	District health barometers
	Percent mothers given NVP (and AZT) prior to birth	total	2007/2008	76	22	108	District health barometers
	Percent mothers given NVP (and AZT) prior to birth	total	2006/2007	61	10	91	District health barometers
	Percent mothers given NVP (and AZT) prior to birth	total	2005/2006	52	10	98	District health barometers
	Percent mothers given NVP (and AZT) prior to birth	total	2004	45	1.5	100	District health barometers
Treatment	Percent babies given NVP at birth	metro	2007/2008	105	95	140	District health barometers
	Percent babies given NVP at birth	metro	2006/2007	46	24	81	District health barometers

Category	Sub-Category	Geotype	Year	Average	Range (-)	Range (+)	Source
	Percent babies given NVP at birth	metro	2005/2006	Not given	100	76	District health barometers
	Percent babies given NVP at birth	metro	2004	93	86	100	District health barometers
	Percent babies given NVP at birth	rural	2007/2008	95	80	110	District health barometers
	Percent babies given NVP at birth	rural	2006/2007	42	16	75	District health barometers
	Percent babies given NVP at birth	rural	2005/2006	Not given	100	76	District health barometers
	Percent babies given NVP at birth	rural	2004	87	44	100	District health barometers
	Percent babies given NVP at birth	total	2007/2008	102	79	140	District health barometers
	Percent babies given NVP at birth	total	2006/2007	57	19	97	District health barometers
	Percent babies given NVP at birth	total	2005/2006	97	21	97	District health barometers
	Percent babies given NVP at birth	total	2004	104	53	115	District health barometers

20. Allocation of government funds for HIV prevention

Category	Sub-Category	Group	Amount	Percentage
Care and Support	conditional grants	conditional grants to provinces (DOH)	243144	
	conditional grants	conditional grants to provinces (DSD)	495000	
	conditional grants	conditional grants to provinces total	738144	
	DCS	total	0	
	DOD	total	0	
	DOE	total	0	
	DOH	total	303244	
	DSD	total	991713	
	equitable share allocations	provincial equitable share allocation (DOE+DSD	0	
	equitable share allocations	provincial equitable share allocation (DOH)	0	
	equitable share allocations	provincial equitable share allocations total	0	
	national departments	national DCS	0	
	national departments	national departments total	556813	
	national departments	national DOD	0	
	national departments	national DOE	0	
	national departments	national DOH	60100	
	national departments	national DSD	496713	
	national departments	national SRSA	0	
	SRSA	total	0	
	total	total	1294597	21.3
Prevention	conditional grants	conditional grants to provinces (DOH)	336606	
	conditional grants	conditional grants to provinces (DSD)	0	
	conditional grants	conditional grants to provinces total	336606	
	DCS	total	0	
	DOD	total	0	
	DOE	total	167904	
	DOH	total	676606	
	DSD	total	43500	
	equitable share allocations	provincial equitable share allocation (DOE+DSD)	0	
	equitable share allocations	provincial equitable share allocation (DOH)	0	
	equitable share allocations	provincial equitable share allocations total	0	
	national departments	national DCS	0	
	national departments	national departments total	577904	
	national departments	national DOD	0	
	national departments	national DOE	167904	
	national departments	national DOH	340000	
	national departments	national DSD	43500	
	national departments	national SRSA	26500	
	SRSA	total	26500	
	total	total	914510	15
Programme management	conditional grants	conditional grants to provinces (DOH)	65601	
	conditional grants	conditional grants to provinces (DSD)	0	
	conditional grants	conditional grants to provinces total	65601	
	DCS	total	0	
	DOD	total	0	
	DOE	total	0	

Category	Sub-Category	Group	Amount	Percentage
	DOH	total	70301	
	DSD	total	22171	
	equitable share allocations	provincial equitable share allocation (DOE+DSD)	0	
	equitable share allocations	provincial equitable share allocation (DOH)	0	
	equitable share allocations	provincial equitable share allocations total	0	
	national departments	national DCS	0	
	national departments	national departments total	26871	
	national departments	national DOD	0	
	national departments	national DOE	0	
	national departments	national DOH	4700	
	national departments	national DSD	22171	
	national departments	national SRSA	0	
	SRSA	total	0	
	total	total	92472	1.5
Research	conditional grants	conditional grants to provinces (DOH)	0	
	conditional grants	conditional grants to provinces (DSD)	0	
	conditional grants	conditional grants to provinces total	0	
	DCS	total	0	
	DOD	total	0	
	DOE	total	0	
	DOH	total	58600	
	DSD	total	0	
	equitable share allocations	provincial equitable share allocation (DOE+DSD)	0	
	equitable share allocations	provincial equitable share allocation (DOH)	0	
	equitable share allocations	provincial equitable share allocations total	0	
	national departments	national DCS	0	
	national departments	national departments total	58600	
	national departments	national DOD	0	
	national departments	national DOE	0	
	national departments	national DOH	58600	
	national departments	national DSD	0	
	national departments	national SRSA	0	
	SRSA	total	0	
	total	total	58600	1
Treatment	conditional grants	conditional grants to provinces (DOH)	1940073	
	conditional grants	conditional grants to provinces (DSD)	0	
	conditional grants	conditional grants to provinces total	1940073	
	DCS	total	0	
	DOD	total	56000	
	DOE	total	0	
	DOH	total	1990273	
	DSD	total	0	
	equitable share allocations	provincial equitable share allocation (DOE+DSD)	0	
	equitable share allocations	provincial equitable share allocation (DOH)	0	
	equitable share allocations	provincial equitable share allocations total	0	
	national departments	national DCS	0	
	national departments	national departments total	106200	
	national departments	national DOD	56000	

Category	Sub-Category	Group	Amount	Percentage
	national departments	national DOE	0	
	national departments	national DOH	50200	
	national departments	national DSD	0	
	national departments	national SRSA	0	
	SRSA	total	0	
	total	total	2046273	33.6
Unspecified	conditional grants	conditional grants to provinces (DOH)	301000	
	conditional grants	conditional grants to provinces (DSD)	0	
	conditional grants	conditional grants to provinces total	301000	
	DCS	total	0	
	DOD	total	0	
	DOE	total	0	
	DOH	total	1293000	
	DSD	total	384458	
	equitable share allocations	provincial equitable share allocation (DOE+DSD)	365652	
	equitable share allocations	provincial equitable share allocation (DOH)	992000	
	equitable share allocations	provincial equitable share allocations total	1357652	
	national departments	national DCS	0	
	national departments	national departments total	18806	
	national departments	national DOD	0	
	national departments	national DOE	0	
	national departments	national DOH	0	
	national departments	national DSD	18806	
	national departments	national SRSA	0	
	SRSA	total	0	
	total	total	1667458	27.6
Total government allocation HIV/AIDS programmes	conditional grants to provinces	total	3381424	
	DCS	total	0	
	DOD	total	56000	
	DOE	total	167904	
	DOH	total	4392024	
	DSD	total	1441842	
	national departments	total	1345194	
	provincial equitable share allocations	total	1357652	
	SRSA	total	26500	
	Total	total	6084270	

References

Auvert B, Ballard R, Campbell C, Carael M, Carton M, Fehler G, Gouws E, MacPhail C, Taljaard D, van Dam J & Williams B (2001). HIV infection among youth in a South African mining town is associated with Herpes Simplex Virus-2 seropositivity and sexual behaviour. AIDS 15: 885-898.

Auvert B, Taljaard D, Lagaarde E, Sobngwi-Tambekou J, Sitta R & Puren A (2005). Randomised controlled intervention of male circumcision for reduction of HIV infection risk: the ANRS 1265 trial. PLoS Med 2(11): e298.

Babor T, Higgins-Biddle J, Saunders J & Monteiro M (2001). AUDIT, The Alcohol Use Disorders Identification Test: Guidelines for use in primary care. World Health Organisation, Department of Mental Health and Substance Dependence, Geneva.

Bärnighausen T, Tanser F, Gqwede Z, Mbizana C, Herbst K & Newell M (2008). High HIV incidence in a community with high HIV prevalence in rural South Africa: Findings from a prospective population based study. AIDS 22(1): 139-144.

Bärnighausen T, Hosegood V, Timaeus I & Newell M (2007). The socioeconomic determinants of HIV incidence: Evidence from a longitudinal, population-based study in rural South Africa. AIDS 21(suppl 7): S29-S38.

Bassett I, Giddy J, Nkera J, Wang B, Losina E, Lu Z, Freedberg K & Walensky R (2007). Routine voluntary HIV testing in Durban, South Africa: the experience from an outpatient department. *Journal of Acquired Immune Deficiency Syndrome* 46(2): 181-186.

Bassett I, Chetty S, Wang B, Giddy J, Losina E, Mazibuko M, Allen J, Walensky R & Freedberg K (2009). Intensive TB Screening for HIV-infected Patients Ready to Start ART in Durban, South Africa: Limitations of WHO Guidelines. Poster at the 16th Conference on Retroviruses and Opportunistic Infections. http://www.retroconference.org/2009/Abstracts/34392.htm

Beyearer C (2008). Hidden yet happening: the epidemics of sexually transmitted infections and HIV among men who have sex with men in developing countries. *Sexually Transmitted Infections* 84:410 – 412.

Blake S, Ledsky R, Goodenow R, Sawyer R, Lohrmann D & Windsor, R (2003). Condom Availability Programmes in Massachusetts High Schools: Relationships with condom use and sexual behaviour. *American Journal of Public Health* 93(6): 955 – 962

Boer H & Mashamba M (2005). Psychosocial correlates of HIV protection motivation among black adolescents in Venda, South Africa. *AIDS Education and prevention* 17(6): 590-602.

Bongaarts J (2006). Late marriage and the HIV epidemic in sub-Saharan Africa. Population Council Working paper #216. www.popcouncil.org/wp/216.pdf

Brookes H, Shisana O & Richter L (2004). *The National Household HIV Prevalence and Risk Survey of South African Children.* Human Sciences Research Council, Pretoria.

Bourke D (2008). Women with AIDS face cervical cancer threat: Largest cervical cancer screening programme in developing world finds new risk for women living with AIDS. Email article CIDRZ Cervical Cancer Prevention Programme, Zambia. http://www.eurekalert.org/pub_releases/2007-11/cf-wwa113007.php

Burrell E, Baral S, Beyearer C, Wood R & Bekker L-G (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.* Oral presentation at the 4th South African AIDS Conference, Durban, 2 April 2009. (Abstract 516)

Centre for Education Policy Development and the Education Foundation Trust (2007). National Evaluation of the Impact of the DOE HIV & AIDS Lifeskills Programme on the Behaviour of Learners. National Report, Dept of Education.

Colvin M, Bachmann M, Homan R, Nsibande D, Nkwanyana N, Connolly C, Reuben E (2006). Effectiveness and cost effectiveness of syndromic sexually transmitted infection packages in South African primary care: cluster randomised trial. Sexually Transmitted Infections 82: 290-294. doi:10.1136/sti.2005.019240.

Colvin M, Connolly C & Madurai L (2007). The epidemiology of HIV in South African workplaces. AIDS 21 (suppl 3): S13-S19.

Connolly C, Simbayi L.C, Shanmugam R & Nqeketo A (2008). Male circumcision and its relationship to HIV infection in South Africa: results of a national survey in 2002. *South African Medical Journal*. 98(10): 789-794.

Coovadia A (2008). Progress with PMTCT: Gauteng and National. Department of Paediatrics and Child Health, University of Witwatersrand. Presentation http://www.web.wits.ac.za/NR/rdonlyeares/49F51B36-88C6-45CA-93C7-F6089DC7927F/31827/1.pdf

Creese A, Floyd K, Alban A & Guinness L (2002). Cost effectiveness of HIV/AIDS interventions in Africa: A systematic review of evidence. The Lancet 359(9318): 1635-1643.

Dawood N, Bhagwanjee A, Govender K & Chohan E (2006). Knowledeg, attitudes and sexual practices of adolescents with mild mental retardation, in relation to HIV/AIDS. *African Journal of AIDS Research* 5(1): 1-10.

Denny L (2006). Cervical cancer: The South African perspective. International Journal of Gynaecology and Obstetrics 95: 211-214.

Department of Correctional Services (2008). Briefing to the National Portfolio Committee on Correctional Services by Deputy Commissioner: Development and Care, Ms Subashini Moodley. 28 July 2008.

Department of Correctional Services (2006). DCS HIV prevalence survey 2006. Lim'uvune consulting.

Department of Health (2009). Addendum to the national HIV and syphilis prevalence survey report. Pretoria. http://www.doh.gov.za

Department of Health (2009a). Operational plan for HIV Prevention 2009 – 2013.

Department of Health (2009b). Operational plan for accelerating scale-up and improvement of the quality of services for prevention of mother to child transmission (PMTCT) in the context of integrated maternal and child healthcare in South Africa. http://www.doh.gov/za

Department of Health (2008). Policy and guidelines for the implementation of the PMTCT Programme. Pretoria. http://www.doh.gov/za

Department of Health (2008). Post-exposure prophylaxis. http://www.doh.gov.za/docs/misc/hiv/presentation/pep.pdf

Department of Health (2008). *The national HIV and syphilis prevalence survey report.* Pretoria. http://www.doh.gov.za

Department of Health (2008a). *Progress Report on Declaration of Commitment on HIV and AIDS: Republic of South Africa. Reporting Period: January 2006 – December 2007.* Pretoria: DOH.

Department of Health (2007). *National Strategic Plan on HIV & AIDS and STIs*: 2007-2011. Pretoria: DOH.

Dickson K, Ashton, J & Smith, JM (2007). Does setting adolescent-friendly standards improve the quality of care in clinics? Evidence from South Africa. International Journal for Quality in Health Care. doi:10.1093/intqhc/mzl070.

Dinkelman T, Lam D & Leibbrandt 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 21(7): S49-S56.

Dladla S, Rasethe J, Struthers H, McIntyeare J, Lane T (2009). *HIV testing behaviour of men who have sex with men in Soweto.* Oral presentation at the 4th South African AIDS Conference, Durban, 2 April 2009. (Abstract 376)

Dorrington R (2009). *Estimating incidence from antenatal data in South Africa*. Presentation at the 4th Southern African AIDS Conference, 31 Mar-3 April, 2009. (Abstract 611).

Dorrington R & Bourne D (2008). Re-estimated provincial HIV antenatal survey prevalence and a reinterpretation of the national trend. *South African Medical Journal* 98(12).

Dorrington R, Johnson L, Bradshaw D & Daniel T (2007). T*he Demographic Impact of HIV/AIDS in South Africa: National and Provincial Indicators for 2006*. Cape Town: Centre for Actuarial Research, University of Cape Town, Medical Research Council and Actuarial Society of SA.

Dorrington R, Johnson L, Bradshaw D, Laubscher, R & Timaeus (2001). *The impact of HIV/AIDS on adult mortality in South Africa.* Technical report: Burden of Disease Unit, Medical Research Council. http://www.mrc.ac.za/bod/publications.pdf

Douglas M & Wildavsky A. *Risk and Culture: an Essay on the Selection of Technical and Environmental Dangers*. Berkeley and Los Angeles: University of California Press, 1983.

Dunkle K, Jewkes R, Brown H, McIntyeare J, Gray G & Harlow S (2003). *Gender-based violence and HIV infection among pregnant women in Soweto.* A technical report to the Australian Agency for International Development.

Dunkle K, Jewkes R, Brown H, McIntyeare J, Gray G & Harlow S (2004). Transactional sex Among women in Soweto, South Africa: Prevalence, risk factors and association with HIV infection. *Social Science and Medicine* 59: 1581-1592.

Dunkle K, Jewkes R, Nduna M, Levin J, Jama N, Khuzwayo N, Koss M & Duvvury N (2006). Perpetration of partner violence and HIV risk behaviour among men in the rural Eastern Cape, South Africa. *AIDS* 20: 2107-2114.

Dunkle K, Jewkes R, Nduna M, Jama N, Levin J, Sikweyiya Y & Koss M (2007). Transactional sex with casual and main partners Among young South African men in the rural Eastern Cape: prevalence, predictors, and associations with gender based violence. *Social Science and Medicine* 65: 1235-1248.

Flisher A, Matthews C, Dewing S, Mtshizana Y & de Jager S (2009). P*rocess evaluation of a peer education HIV prevention programme in high schools in the Western Cape, RSA*. Adolescent Health Research Unit and School of Public Health, University of Cape Town and Health Systems Research Unit, Medical Research Council. (Unpublished)

Fourie B (2006). The burden of tuberculosis in South Africa. Medical Research Council. http://www.sahealthinfo.org/tb/tbburden.htm

Goldstein S, Scheepers E & Kimme Z (2009). Predictors of key sexual behaviours amongst youth and adults in South Africa. Poster presentation at the 4th South African AIDS Conference, Durban, April 2009.

Goyer K (2003). HIV/AIDS in Prison: Problems, Policies and Potential (Monograph 79). Institute for Security Studies, Johannesburg. www.iss.co.za/publications/monographindex.html (Accessed June 2009)

Gray R, Kigozi G, Serwadda D, Makumbi F, Watya S, Nalugoda F, Kiwanuka N, Moulton L, Chaudhary M, Chen M, Sewankambo N, Wabwire-Mangen F, Bacon M, Williams C, Opendi P, Reynolds S, Laeyendecker O, Quinn T & Wawer M (2007). Male circumcision for HIV prevention in men in Rakai, Uganda: a randomised controlled trial. *The Lancet* 369(9562):657-666.

Gray R, Xianbin L, Kigozi G & Serwadda D (2005). Increased risk of incident HIV during pregnancy in Rakai, Uganda: a prospective study. The Lancet 366: 1182-1188. DOI:10.1016/S0140-6736(05)67481-8

Hallet T, Ghys P, Bärnighausen T, Yan P & Garnett G (2009). Errors in 'BED'-derived estimates of HIV incidence will vary by place, time and age. PLoS ONE 4(5): e5720. doi:10.1371/journal.pone.0005720

Hallman K (2005). Gendered socioeconomic conditions and HIV risk behaviours among young people in South Africa. *African Journal of AIDS Research* 4(1): 37-50.

Halperin D & Epstein H (2004). Concurrent sexual partnerships help to explain Africa's high prevalence: Implications for prevention. *Lancet* 364(9428): 4-6. doi: 10.1016/S0140-6736(04) 16606-3

Hargreaves J, Morison L, Kim J, Bonell C, Porter J, Watts C, Busza J, Pronyk P & Phetla G (2007). The association between school attendance, HIV infection and sexual behaviour in rural South Africa. *Journal of Epidemiological Community Health*; 000;1-8;doi.10.1136/jech.2006.053827

Hargreaves J, Bonell C, Morison L, Kim J, Phetla G, Porter J, Watts C & Pronyk P (2007). Explaining continued high HIV prevalence in South Africa: socioeconomic factors, HIV incidence and sexual behaviour change among a rural cohort, 2001-2004. AIDS 21(suppl 7): S39-S48.

Hargreaves J, Bonell C, Boler T, Boccia D, Birdthistle I, Fletcher A, Pronyk P & Glynn J (2008). Systematic review exploring time trends in association between educational attainment and the risk of HIV infection in southern Africa, AIDS 22: 403-414.

Health Systems Trust (2009). Cervical cancer and HIV: The intimate connection. Policy brief # 2 (March 2009.)

Health Systems Trust (2007). District Health Barometer 2006/7, Durban, 2007.

Health Systems Trust (2007b). South African Health Review. Durban, 2007.

Health Systems Trust (2006). South African Health Review. Durban, 2006.

Hendriksen E, Pettifor A, Sung-Jae Lee, Coates T, Rees H (2007). Predictors of condom use among young adults in South Africa: the Reproductive Health and HIV Research Unit National Youth Survey. *American Journal of Public Health* 97(7): 1241-1248.

Henry J Kaiser Family Foundation and the South African Broadcasting Corporation (2007). *Young South Africans, Broadcast Media and HIV Awareness: results of a national survey.*

Hesseling A, Westra A, Werschkull H, Donald P, Beyers N, Hussey G, El-Sadr W, Simon Schaaf H (2005). Outcome of HIV infected children with culture confirmed tuberculosis. *Archives of Disease in Childhood* 90: 1171-1174.

Hosegood V, Vanneste A & Timaeus I (2004). Levels and causes of adult mortality in rural South Africa: The impact of AIDS. AIDS 18: 663-671.

'HSRC 2008': Shisana O, Rehle T, Simbayi L C, Zuma K, Jooste S, Pillay-van-Wyk V, Mbelle N, Van Zyl J, Parker W, Zungu, N P, Pezi S, Nwanyanwu O, and SABSSM III Implementation Team. *Third South African national HIV, behaviour and health survey 2008: Outcome Indicators for assessing mid-term progress on the NSP 2007-2011. Report 1: A turning tide among teenagers?* Cape Town: HSRC Press.

'HSRC 2005': Shisana O, Rehle T, Simbayi LC, et al (2005). *South African National HIV Prevalence, HIV Incidence, Behaviour and Communication Survey, 2005.* Cape Town: HSRC Press.

'HSRC 2002': Shisana O & Simbayi LC (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.

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

Hutchinson P, Mahlalela X & Yukich J (2007). Mass media, stigma and disclosure of HIV test results: Multilevel analysis in the Eastern Cape, South Africa. *AIDS Education and Prevention* 19(6): 489-510.

James S, Reddy S, Taylor M, & Jinabhai, C (2004). Young people, HIV/AIDS/STIs and sexuality in South Africa: The gap between awareness and behaviour. *Acta Paediatr* 93: 264-269.

James S, Reddy P, Ruiter R, McCauley A & van den Borne B (2006). The impact of an HIV and AIDS lifeskills programme on secondary school students in KwaZulu-Natal, South Africa. *AIDS Education and Prevention* 18(4): 281-294.

Jewkes R, Levin J, Penn Kekana L (2003). Gender inequalities, intimate partner violence and HIV preventive practices: Findings of a South African cross-sectional study. *Social Science and Medicine* 56: 125-134.

Jewkes R, Dunkle K, Nduna M, Levin J, Jama N, Khuzwayo N, Koss M, Puren A & Duvvury N (2006). Factors associated with HIV sero-positivity in young, rural South African men. *International Journal of Epidemiology* 35: 1455-1460.

Jewkes R, Nduna M, Levin J, Jama N, Dunkle K, Puren A, Duvvury N (2008). Impact of Stepping Stones on incidence of HIV and HSV-2 and sexual behaviour in rural South Africa: cluster randomised controlled trial. Medical Research Council. http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2505093

Kahn J, Marseille E & Kramer S (2005). Assessment of the potential economic impact of South Africa's loveLife national HIV prevention programme. Submitted to the Global Fund to fight HIV, TB and Malaria as part of the proposal for second phase funding, 2005. (Unpublished)

Kalichman S C, Simbayi L, Jooste S, Vermaak R & Cain D. (2008). Sensation seeking and alcohol use predict HIV transmission risks: prospective study of sexually transmitted infection clinic patients, Cape Town, South Africa. *Addictive Behaviours.* 33: 1630-1633.

Kalichman S, Simbayi L, Kagee A, Toefie Y, Jooste S, Cain D & Cherry C (2005). Associations of poverty, substance abuse, and HIV transmission risk behaviours in three South African communities. *Social Science & Medicine*; 62(7): 1641-1649.

Kalichman S & Simbayi L (2004). Sex during genital bleeding and risks for HIV infection: Preliminary study of sexually transmitted infection clinic patients in Cape Town, South Africa. *African Journal of AIDS Research* 3(1): 51-55

Kalichman S & Simbayi L (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.

Kamb M (1995). *Cervical cancer screening of women attending sexually transmitted disease clinics. Clinical Infectious Diseases* 20 (Suppl 1): S98–S103.

Karnell A, Cupp P, Zimmerman R, Feist-Price S & Thola B (2006). Efficacy of an American alcohol and HIV prevention curriculum adapted for use in South Africa: Results of a pilot study in five township schools. *AIDS Education and Prevention* 18(4): 295-310.

Kiene S, Christie S, Cornman D, Fisher W, Shuper P, Pillay S, Friedland G & Fisher J (2006). Sexual risk behaviour among HIV positive individuals in clinical care in urban kwaZulu-Natal, South Africa. AIDS 20(13): 1781-1784.

Kincaid DL, Parker W, Johnson S, Schierhout G, Connolly C & Pham V (2008). AIDS Communication Programmes, HIV prevention, and living with HIV/AIDS in South Africa 2006. Paper presented at the 58th Annual Conference of the International Communication Association, Montreal, Canada. May 2008. http://www.allacademic.com/meta/p_mla_apa_research_citation/2/3/1/3/6/p231365_index.html, accessed March 2009).

Kumire C (2009). Rapid assessment and quantification of the male condom supply chain in South Africa. Presentation by the JSI Senior Technical Adviser to the South African National AIDS Council, 24 June 2009.

Lallemant M, Jourdain G, LeCouer S, Mary J, Ngo-Giang-Huong N & Koetsawang (2004). Single dose perinatal Nevirapine plus standard zidovudine to prevent mother-to-child transmission of HIV-1 in Thailand. *The New England Journal of Medicine* 351(3): 217-228.

LeClerc- Madlala S (2008). Intergenerational/ age-disparate sex and young women's vulnerability in Southern Africa. Presentation at the Technical Meeting on young women in HIV hyper-endemic countries of southern Africa. Muldersdrift, 18-19 June 2008. http://www.hsrc.ac.za/research/output/outputDocuments/5427_Leclerc-Madlala_Intergenerationalagedisparatesex.pdf

Leggett T (2001). Drugs, sex work and HIV in three South African cities. http://www.sahealthinfo.org.za/admodule/drugs.htm

loveLife (2008). HIV prevention for young people: Moving from what-to-change to want-to-change strategies. Report of a conference held 6-8 November 2008, Johannesburg. http://www.lovelife.org.za/corporate/wanttochangestrategies/

Lowenstein G & Prelec D (1992). Anomalies in Intertemporal Choice: Evidence and an Interpretation, *The Quarterly Journal of Economics* 107: 573-597.

Lurie M, Williams B, Zuma K, Mkaya-Mwamburi D, Garnett G, Sturm A, Sweta M, Gittelsohn J & Abdool Karim S (2003). The impact of migration on HIV-1 transmission in South Africa: A study of migrant and non-migrant men and their partners. *Sexually transmitted Diseases* 30(2): 149-156.

Lurie M & Rosenthal S (2009). Concurrent partnerships as a driver of the HIV epidemic in sub-Saharan Africa? The evidence is limited. AIDS Behaviour (EPub ahead of print). Doi: 10.1007/s10461-009-9583-5

Mah T & Halperin D (submitted for publication Aids & Behaviour 2009).

Malope B, MacPhail P, Mbisa G, MacPhail C, Stein L, Ratshikhopha E, Ndhlovu L, Sitas F & Whitby D (2008). No evidence of sexual transmission of Kaposi's sarcoma herpes virus in a heterosexual South African population. AIDS 22: 519-526.

McGrath N, Nyirenda M, Hosegood V, Newell M-L (2009). Age at first sex in rural South Africa. *Sexually Transmitted Infections* 85(Suppl I): i49-i55. Doi: 10.1136/sti.2008.033324

Metcalf C, Rispel L, Townsend L, Cloete A, Reddy V & Zembe Y (2009). *To what extent does the HIV epidemic among men who have sex with men (MSM) overlap with the generalised HIV epidemic in South Africa? Preliminary findings from the Johannesburg/ eThekwini Men's Study (JEMS).* Oral presentation at the 4th South African AIDS Conference, Durban, 2 April 2009. (Abstract 597)

Menzies N, Abang B, Wanyenze R, Nuwaha F, Mugisha B, Coutinho A, Bunnell R, Mermin J & Blandford J (2009). The costs and effectiveness of four HIV counselling and testing strategies in Uganda. AIDS 2009. 23: 395-401.

Mofenson L (2009). Update on the Science of Prevention of Mother to Child HIV Transmission. National Institutes of Child Health and Human Development. http://www.pepfar.gov/documents/organisation/117839.pdf

Moodley D, Esterhuizen T, Pather T, Chetty V & Ngaleka L (2009). High HIV incidence during pregnancy: compelling reason for repeat HIV testing. *AIDS* 23: 1255-1259.

Mpofu E, Flisher A, Bility K, Onya H & Lombard C (2006). Sexual partners in a rural South African setting. *AIDS and Behaviour* 10(4): 399-404.

Myer L, Mathews C, Little F & Abdool Karim S (2001). The fate of free male condoms distributed to the public in South Africa. *AIDS* 15: 789-793.

Ngam P, Magadi M & Owuor T (2003). Parental presence and adolescent reproductive health among the Niaorbi urban poor. *Journal of Adolescent Health* 33 (Suppl. 5): 369-377.

Nutley T, Mqhayi M, Hatzell T, Rees H & Delaney S (2002). National Public Sector introduction of the female condom in South Africa. *Int Conf AIDS.* 2002 Jul 7-12; 14: abstract no. MoPeF3858.

Nwabisa Jama, P (undated). *Gender differences in condom use patterns among youth in the Eatern Cape, South Africa: A descriptive and analytical study.* Unpublished thesis: University of the Western Cape.

Nyirenda M, Hosegood V, Barnighausen T & Newell M (2007). Mortality levels and trends by HIV serostatus in rural South Africa. *AIDS* 21(suppl 6): S73-S79.

Operario D, Pettifor A, Cluver L, MacPhail C & Rees H (2007). Prevalence of parental death among young people in South Africa and risk for HIV infection. *Journal of Acquired Immune Deficiency Syndrome* 44(1): 93-98.

Parry C & Pithey A (2008). Drug abuse and HIV risk behaviour. *African Journal of Drug and Alcohol Studies.* 5(2): 140-157.

Perneger T, Sudra P, Lundgren J & Hirschel B (1995). Does the onset of tuberculosis in AIDS predict shorter survival? Results of a cohort study in 17 European countries over 13 years. *British Medical Journal* 311: 1468-1472.

Peltzer K (2000). Factors affecting condom use among junior secondary school pupils in South Africa. *Health South Africa* 5(2): 37-44.

Pelzer K, Mngqundaniso N & Petros G (2006). HIV/AIDS/STI/TB knowledge, beliefs and practices of traditional healers in KwaZulu-Natal, South Africa. *AIDS Care* 18(6): 608-613.

Petersen I, Bhagwanjee A, Bhana A & Mahintsho Z (2004). The development and evaluation of a manualised participatory HIV/AIDS risk reduction programme (Sex and Risk) for tertiary level learners: A pilot study. *African Journal of AIDS Research* 3(1): 93-100.

Pettifor A, MacPhail C, Bertozzi S & Rees H (2006). The challenges of evaluating a national HIV prevention programme: the case of loveLife, South Africa. STI Online, *British Medical Journal* (http://sti.bmj.com/cgi/contact/abstract/sti-2006.023689v1, accessed 1 March 2007)

Pettifor A, Rees H, Steffenson A, Hlongwa-Madikizela L, MacPhail C, Vermaak K & Kleinschmidt I (2004). *HIV and sexual behaviour among young South Africans: a national survey of 15 – 24 year olds.* Johannesburg: Reproductive Health Research Unit, University of the Witwatersrand.

Pettifor A, Measham D, Rees H & Padian N (2004b). Sexual Power and HIV Risk, South Africa. *Emerging Infectious Diseases* 10(11): 1996-2004.

Pettifor A, Rees H, Madikizela L, MacPhail C, Vermaak K, Kleinschmidt I & Levine J (2004c). The prevalence of HIV, gonorrhea and chlamydia and risk factors for HIV infection among 15 – 24 year olds in South Africa: Data from a community based survey. International Conference on AIDS (15th : 2004 : Bangkok, Thailand). *Int Conf AIDS.* 2004 Jul 11-16; 15: abstract no. TuPeC4823.

Pettifor A, Rees H, Kleinschmidt I, Steffenson A, MacPhail C, Hlongwa-Madikizela L, Vermaak & Padian N (2005). Young people's sexual health in South Africa: HIV prevalence and sexual behaviours from a nationally representative household survey. *AIDS 2005*, 19:1525-1534.

Ramjee G & Gouws E (2002). Prevalence of HIV among truck drivers visiting sex workers in KwaZulu-Natal, South Africa. *Sexually Transmitted Diseases* 29(1): 40 – 49.

Reddy V, Sandfort T, Rispel L (eds) (2009). *From Social Silence to Social Science: Same sex sexuality, HIV & AIDS and Gender in South Africa.* Human Sciences Research Council.

Rees H, MacPhail C & Pettifor, A (2004). HIV, contraceptive use and pregnancy among 15 – 24 year old South African women: The Need for Greater Synergy, XV International AIDS Conference, 11-162004 July 2004, 15, abstract no. TuPeC4870.

Rees H, Beksinska M, Dickson-Tetteh K, Ballard R & Htun Y (2000) Commercial sex workers in Johannesburg: Risk behaviour and HIV status. South African Journal of Science 96: 283-284.

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.

Rispel LC & Metcalf CA (2009). Breaking the silence: South African HIV policies and the needs of men who have sex with men. *Reproductive Health Matters* 17(33): 133-142.

'RHRU 2003': Pettifor A, Rees H, Steffenson A, Hlongwa-Madikizela L, MacPhail C, Vermaak K, Kleinschmidt I (2004). *HIV and sexual behaviour among young South Africans: a national survey of 15 – 24 year olds.* Johannesburg: Reproductive Health Research Unit, University of the Witwatersrand.

Rollins N (2006). HIV transmission and mortality associated with exclusive breastfeeding. Paper presented at the XVI International AIDS Conference, Toronto, Canada. 13-18 August 2006. (Abstract CDC0540).

Ross D, Dick B, Ferguson B eds. (2006). *Preventing HIV/AIDS in young people: A systematic review of developing countries.* World Health Organisation Technical Report Series 938, Geneva.

Schneider H, Chabikuli N, Blaauw D, Funani I & Brugha R (2005). Sexually transmitted infections – factors associated with quality of care among general practitioners. *South African Medical Journal* 95 (10): 782-785.

Schneider H, Blaauw D & Dartnall E (2001). STD in the South Africa private health sector. *South African Medical Journal* 91: 151-156.

Schuster M, Bell R, Berry S & Kanouse D (1998). Impact of a High School Condom Availability Programme on Sexual Attitudes and Behaviours. *Family Planning Perspectives* 30(2).

Shisana O, Rehle T, Simbayi L C, Zuma K, Jooste S, Pillay-van-Wyk V, Mbelle N, Van Zyl J, Parker W, Zungu N P, Pezi S, Nwanyanwu O and SABSSM III Implementation Team (2009). *Third South African national HIV, behaviour and health survey 2008: Outcome Indicators for assessing mid-term progress on the NSP 2007-2011. Report 1: A turning tide among teenagers?* Cape Town: HSRC Press.

Shisana O & Simbayi LC (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.

Shisana O, Rehle T, Simbayi LC, et al (2005). *South African National HIV Prevalence, HIV Incidence, Behaviour and Communication Survey, 2005.* Cape Town: HSRC Press.

Shisana O, Rehle T, Simbayi L, 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, Zungu-Dirwayi N, Toefy Y, Simbayi L, Malik S, Zuma K (2004). Marital status and risk of HIV infection in South Africa. *South African Medical Journal* 94(7): 537-543.

Sloan N & Myers J (2005). Evaluation of an HIV/AIDS peer education programme in a South African workplace. *SAMJ* 95(4): 261-265.

Sonnenberg P, Murray J, Glynn J, Shearer S, Kambashi B & Godfrey-Faussett P (2001). HIV-1 and recurrence, relapse, and reinfection of tuberculosis after cure: a cohort study in South African mineworkers. *The Lancet*, 358 (9294): 1687-1693.

Soul City Institute (2008). Soul Buddyz Evaluation Report 2008. http://www.soulcity.org.za/programmes/research/evaluations/

Statistics South Africa (2008a). Recorded live births 2007. Statistical release P0305, Pretoria.

Statistics South Africa (2008b). Mortality and causes of death in South Africa 2006. Findings from death notification. Statistical release P0309.3, Pretoria.

Statistics South Africa (2006). Adult mortality based on death notification data 1997 – 2004. Report No. 03-09-05, Pretoria.

Statistics South Africa (2005). Census 2001: *Stages in the Life Cycle of South Africans,* Pretoria: Statistics South Africa.

Statistics South Africa (2000). Quantitative research findings on rape in South Africa. http://www.statssa.gov.za/publications/Rape/Rape.pdf

Stover J, Bertozzi S, Gutierrez J-P, Walker N, Stanecki R, Greener R, Gouws E, Hankins C, Garnett G, Salmon J, Boerma J, De Lay P & Ghys P (2006). Supporting online material for The Global Impact of Scaling Up HIV/AIDS Prevention Programmes in Low- and Middle-Income Countries. Science Express 2 February 2006 Doi: 10.1126/science.1121176. http://sciencemag.org/cgi/content/full/1121176/DCI

Stover J. N, Walker G.P, Garnett J.A, Salomon K.A, Stanecki P, Ghys N.C, Grassly R.M, Anderson & Schwartländer, B (2002). Can we reverse the HIV AND AIDS pandemic with an expanded response? Lancet 360(9326): 73.

Taljaard D, Rech D, Doyle S, Lewis C, Lissouba P, Lert F & Auvert B (2008). Estimating the uptake of safe and free male circumcision in a South African community. Presented at the XVIIth International AIDS Conference, Mexico City 3-8 August 2008. (Abstract TUAC 0306)

Thurman T, Brown L, Richter L, Maharaj P & Mangani R (2006). Sexual risk behaviour among South African adolescents: Is orphan status a factor? *AIDS Behaviour.*

UNAIDS (1998). Mother-to-child transmission of HIV: UNAIDS technical update. Geneva.

Uys P (2008). Presentation by the MEC for Health of the Western Cape Health Budget 2008/9. 16 May 2008. http://www.search.gov.za/info/previewDocument.jsp

Waver M, Makumbi F, Kigozi G, Serwadda D & Watya S (2009). Circumcision in HIV-infected men and its effect on HIV transmission to female partners in Rakai, Uganda: a randomised controlled trial. *The Lancet* 374: 229-237.

Weir S, Pailman C, Mahlalela X, Coetzee N, Meidany F & Boerma, T (2006). From people to places: Focussing AIDS prevention efforts where it matters most. *AIDS* 17: 895 – 903.

Weiser S, Heisler M, Leiter K, Percy-de Korte F, Tlou S, DeMonner S, Phaladze N, Bangsberg D & Lacopino V (2006). Routine HIV testing in Botswana: A population-based study on attitudes, practices, and human-rights concerns. PLoS Medicine 3(7): e261: 1013-1022. http://www.plosmedicine.org/article/info:doi/10.1371/journal.pmed.0030261 (accessed June 2009)

Welz, T, Hosegood V, Jaffar S, Batzing-Feigenbaum J, Herbst K & Newell M (2007). Continued very high prevalence of HIV infection in rural KwaZulu-Natal, South Africa: A population based longitudinal study. *AIDS* 21: 1467-1472.

Westreich D, Pettifor A, Karita E, Price M & Fiamma A (2007). Overestimation of the South African HIV incidence using the BED IgG assay. *South African Medical Journal* 97(7): 477-478.

White R, Moodley P, McGrath N, Hosegood V, Zaba B, Herbst K, Newell M-L, Sturm A & Hayes R (2008). Low effectiveness of syndromic treatment services for curable sexually transmitted infections in rural South Africa. Sexually Transmitted Infections published online 15 Aug 2008. Doi: 10.1136/sti.2008.032011

White R, Orroth K, Glynn J, Freeman E, Bakker R, Habbema J, Terris-Prestholt F, Kumaranayake L, Buvé A & Hayes R (2008). Treating curable sexually transmitted infections to prevent HIV in Africa: Still an effective control strategy? *Journal of Acquired Immune Deficiency Syndrome* 47(3): 346-353.

Wilkinson D, Abdool Karim S, Williams B & Gouws E (2000). High HIV incidence and prevalence among young women in rural South Africa: Developing a cohort for intervention trials. *Journal of Acquired Immune Deficiency Syndromes* 23: 405-409.

Wilkinson D, Ramjee G, Sturm A & Abdool-Karim S (1997). Reducing South Africa's hidden epidemic of sexually transmitted infections. Medical Research Council. www.mrc.ac.za/genital/1polbrief1997.htm (accessed 25 September 2008)

Williams B, Taljaard D, Campbell C, Gouws E, Ndhlovu L, van Dam J, Carael M & Auvert, B (2003). Changing patterns of knowledge, reported behaviour and sexually transmitted infections in a South African gold mining community. AIDS 17: 2099-2107.

Wolff B, Wight D, Kasamba I, Bukenya D & Grosskurth H (2009). The role of parental environment on age of sexual debut and risk profile of first sexual relationships in rural southwestern Uganda. Research update. Accessed June 2009. http://iussp2009.princeton.edu/download.aspx?submissionId=93101

World Health Organisation (2007). Guidelines on provider-initiated HIV testing and counselling in health facilities. Geneva. http://whqlibdoc.who.int/publications/2007/9789241595568_eng.pdf

World Health Organisation (2007). WHO Report 2007: Global Tuberculosis Control. http://www.doh.gov.za/docs/reports/2007/tb/who_tb-report.pdf

World Health Organisation (2007b). Helping parents in developing countries improve adolescents' health. WHO, Geneva.

Zungu-Dirwayi N, Shisana O, Louw J. & Dana P (2007). Social determinants for HIV prevalence among South African educators. *AIDS care* 19(10): 1296-1303.