

2010

THE 2010 NATIONAL ANTENATAL SENTINEL HIV & SYPHILIS PREVALENCE SURVEY IN SOUTH AFRICA



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The HIV epidemic in South Africa has a profound impact on society, the economy, as well as the health sector. It contributes to a decline in life expectancy, increased infant and child mortality and maternal deaths as well as a negative impact on socio-economic development.

In 2010, the South African Government adopted an outcome-based approach to service delivery and performance management, using 12 key outcomes. The public health sector has been mandated to play a pivotal role in leading the country in its efforts to ensure: *“A long and healthy life for all South Africans”*. The findings presented in this report contribute directly to the Negotiated Service Delivery Agreement's (NSDA) objectives of *“Increasing Life Expectancy; Decreasing maternal and child mortality; Combating HIV, AIDS and Tuberculosis”* and *“Strengthening of the Health System Effectiveness”*.

The National Department of Health in South Africa has been conducting the Antenatal Sentinel HIV and Syphilis Prevalence Survey annually, for the past 21 years. This survey has been used as an instrument to monitor the HIV prevalence trends since 1990. HIV prevalence is currently the only parameter that is measured accurately, whilst the country depends on the use of mathematical modeling to estimate HIV incidence and HIV related mortality. The UNAIDS spectrum and EPP and ASSA mathematical models were used respectively to project new HIV infections (incidence), HIV-associated morbidity and mortality and number of people eligible for antiretroviral treatment (ART).

The objectives of the 2010 Antenatal Sentinel HIV & Syphilis prevalence survey are:

- To determine the HIV sero-prevalence amongst first time antenatal clinic attendees (seen as a particularly suitable “sentinel” group to represent most closely the HIV prevalence of the general adult sexually active part of the population);
- To provide baseline information for national, provincial estimates and future projections of HIV infection.

The specific objectives are:

- To estimate the national prevalence of HIV and syphilis infection among pregnant women then establish HIV prevalence estimate among the adult population of 15-49 year olds; those aged under 15 years and those above 49 years in the country, using pregnant women attending antenatal clinics in public health institutions as a proxy;
- To determine the geographical distribution pattern of HIV and syphilis infection among pregnant women attending antenatal clinics at national and provincial level, by district and age groups;

- To monitor trends for both HIV and syphilis prevalence in the country;
- To estimate HIV prevalence in the general population, in children, men and those who need treatment;
- To provide scientific evidence to measure progress towards meeting the Millennium Development Goal 6, Target 7, indicator 18, which is HIV prevalence amongst 15 – 24 year old pregnant women.

By the end of 2010/2011, 11.4 million South Africans had responded to the President call, by undergoing HIV counselling, with 9.7 million people agreeing to be tested for HIV.

Through epidemiological surveillance, the HIV epidemic in South Africa has in the last 5 years shown stabilization, particularly among antenatal care first time bookers, in the public health sector clinics. For the first time this report will present, the HIV prevalence of young adolescents i.e. 10-14 year old survey participants in the past three years. The sample in this age group is small, nevertheless it provides insights such as HIV incidence rate, the impact of PMTCT, determinants of HIV epidemic in young adolescent.

In 2010, a total of 32 225 first time antenatal care attendees participated in the survey, the target was 36 000. This was a representative sample to make conclusive inferences on the HIV and syphilis occurrence at National, Provincial and district level. Intravenous blood samples were collected from the surveyed pregnant women in 1 424 public sector antenatal clinics during the month of October 2010. These biological specimens were collected and sent to central laboratories in the various provinces for HIV and syphilis analysis. The blood test used was the Enzyme Linked Immuno Sorbent Assay (ELISA) for HIV antigen testing and the Rapid Plasma Reagin (RPR) card test for active syphilis.

Given that the sentinel sites were chosen on a probability proportional to size basis by district, the sampling period was fixed and the districts samples were self-weighting. The provincial HIV prevalence estimates were calculated as the total of the results from the districts in the provinces. The national prevalence was weighted according to the total number of women aged 15 - 49 years including non pregnant women and those who use the private health sector in each province.

The sample realization rate has decreased over the last 3 years of testing, with 33 927 in 2008, 32 861 in 2009 and 32 225 in 2010 of the targeted 36 000 pregnant women attending antenatal care. The sample population realization rate in 2010 was 90.0% and exceeds 70% compliance as outlined in the survey protocol.

The National HIV prevalence

The national HIV prevalence estimate among antenatal women in 2010 was 30.2% (95%CI of 29.39 - 30.91), the increase of 0.8% from 2009 HIV prevalence is not statistically significant as indicated in the 95%CI (Confidence Intervals) of the years 2007 to 2009 below. The HIV prevalence remains stable.

The 2009 antenatal HIV prevalence estimate of: 29.4% (95%CI of 28.5 – 30.2)

The 2008 antenatal HIV prevalence estimate of: 29.3% (95%CI of 28.5 – 30.1)

The 2007 antenatal HIV prevalence estimate of: 29.4% (95%CI of 28.5 – 30.1)

The WHO/UNAIDS model estimates that in the general population the overall HIV prevalence to be at 17.9% and the number of people living with HIV in South Africa for 2010 at 5.575 million. Of these, and estimated 518 000 were children under 15 years and 2.95 million were adult females over 15years. The UNAIDS model also estimates that there were 332 512 new infections for adults above 15years.

Indicator	UNAIDS ¹ 2008	UNAIDS ² 2009	UNAIDS 2010
Total HIV population (Adults & children)	5 570 000	5 630 000	5 575 096
HIV+ Adults(15+)	5 240 000	5 300 000	5 056 294
Adult (15 - 49) prevalence(%)	17.9	17.8	17.9
Adult HIV+female population(15+)	3 230 000	3 270 000	2 945 686
HIV population (children <15)	325 000	334 000	518 802
Total annual AIDS deaths	330 000	314 000	282 578
AIDS orphans	1 850 000	1 950 900	2 138 909
Adult AIDS deaths (15+)	297 000	284 000	252 348
Adult New HIV infections (15+)	352 000	344 000	332 512
New infections (children<15)	49 800	42 700	48 088
Need for ART among adults (15+)	1 475 000	1 584 000	1 407 026
Need for ART(children)	156 800	158 600	304 535
Infected mothers needing PMTCT	218 700	213 800	260 280

HIV prevalence by province

The highest provincial HIV prevalence was recorded in KwaZulu-Natal which increased from 38.7% in 2008 to 39.5% in 2009 and stabilised at 39.5% in 2010. Provinces with 'higher' HIV prevalence estimates compared with 2009 are: Eastern Cape (29.9%), Gauteng (30.4%), Limpopo (21.9%), Mpumalanga (35.1%), Northern Cape (18.4%), and Western Cape (18.5%). These small increases fell within the expected sampling variability. The provinces with 'lower' HIV prevalence estimates were: North West (29.6%) and Free State (30.6%). Their estimates were also within the expected sampling variability, which means that the HIV prevalence is stabilizing, but there are statistical differences in HIV prevalences between provinces from a low of 18.4% in the Northern Cape to a high of 39.5% in Kwazulu-Natal.

HIV prevalence by district

In 2010 there were five(5) districts recording HIV prevalence above 40% namely: Umkhanyakude (41.9%), eThekweni (41.1%), uMgungundlovu (42.3%), iLembe (42.3%) and Ugu (41.1%). All these are located in KZN. The district level HIV epidemic is significantly heterogeneous, with prevalences ranging from a low of 8.5% in Central Karoo in the Western Cape to a high of 42.3% in uMgungundlovu and iLembe. When data are pooled over the four years, this heterogeneity has persists. **The number of districts recording prevalences between 30% and 40 % has increased from 14 out of 52 in 2009 to 21 out of the 52 districts in 2010.**

HIV incidence estimates projected in the general population 2010

In 2010 UNAIDS EPP & Spectrum model estimated that the National HIV prevalence in the general was 17.9% compared with 17.8% in 2009. The estimated provincial HIV prevalence in the general population for 2010 compared to (2009 estimates) were as follows: Eastern Cape (18.5%) (18.5%); Free State (19.7%) (19.5%); Gauteng (16.9%) (16.6%); KwaZulu-Natal = (24.9%) (25.9%); Limpopo (14.0%) (13.8%); Mpumalanga (21.7%) (21.8%); North West (19.1%) (19.2%); Northern Cape (8.9%) (9.3%) and Western Cape (6.2%) (6.2%).

HIV prevalence estimate by age

From 2007 to 2010, the peak in HIV prevalence now occurs in the age category 30 - 34 years. The HIV prevalence in this age group increased from 41.5% in 2009 to 42.6% in 2010. When comparing the HIV prevalence in the different age categories with previous years it has gone up slightly in all age groups. The higher prevalence in older age groups could be partly explained by ART use but it is very worrying that the trend in young people (15-24yrs) is not showing a decline (this age group should not be much affected by ART). The baseline HIV prevalence in the 15-24 pregnant MDG group in 2001 was 23.1% and it is expected to be reduced by 75% in 2015, which translate to 5.3%. The 2010 HIV prevalence among the 15-24yrs pregnant women is 21.8%.

The Department of Basic Education survey of teenage pregnancy among school going learners (2004 - 2008) in South Africa findings showed that teenage pregnancy was more prevalent in KZN (15 027), EC (11 852) and LP (12 848). There is no published data on HIV prevalence of teenage pregnancy among non-school going young adolescent in South Africa. The findings of this Department of Health antenatal HIV and syphilis survey has shown that some of the survey participants were young adolescents who are HIV infected. Of these 121 (10-14 year olds) that participated in the 2010 antenatal HIV survey, 11 of them (9.4%) were HIV positive, which has increased from 7.3 % in 2008. The majority of the 121 came from KZN, LP, FS, EC and WC. The trends in numbers of the 10-14 years pregnant women and their HIV status in the past 3 years are presented in this report. The realized sample size for the under 15 years was statistically significant hence the findings of their HIV outcome in this age group is significant. The sample size of the 10-14 years age group was more than the 45 – 49 years in 2008, 2009 and 2010, hence their HIV status outcome on this age group is now documented and can no longer be ignored.

Regression analysis of determinants of HIV infection

The tree model identified age, population group and marital status as the top three determinants of the HIV outcome in the 2008 survey. The first split was on age of the women at 22 years: The model shows that women younger than 22 years had a prevalence of 17.2% compared to 35.9% in the older women. None of the risk factors available were important enough to split the younger sub group further. In 2010, the older subgroup was split on population group: non-African women had a prevalence of 7.8% compared with African women with a prevalence of 39.0%. No further splits were made in the non-African women. In the sub group of older African women marital status was the most important determinant: married women had a prevalence of 29.4% compared to 42.2% in unmarried women. In these unmarried African women those older than 27 years constituted a total of 7 722 women (24% of the total survey). In this sub group the HIV prevalence was 48.7%. This sub group as identified by the tree regression had the highest HIV prevalence within the model. The model identified that unmarried African women older than 27 years have the highest HIV prevalence. This indicates a significant shift in HIV risk exposure towards women of older age groups than what was observed in 2008.

National syphilis prevalence trends

The 2010 estimated syphilis prevalence has decreased by 0.4% from 1.9% (1.7 - 2.1) in 2009 to 1.5% (1.4 - 1.7) in 2010.

The Northern Cape remained the only province that still had the highest syphilis prevalence of 5.6% whilst the lowest syphilis prevalence was recorded in Limpopo at 0.3%. HIV prevalence trends were inversely proportional to the syphilis prevalence: some of those districts with very high HIV prevalence had no women infected with syphilis, especially in KwaZulu-Natal.

The department will look at more literature to determine which sexually transmitted disease such as Human Papilloma Virus, Hepatitis C and *Herpes simplex* etc, could have more significant correlations as potential HIV co-factors than syphilis.

This is further illustrated where for example zero per cent (0.0%) or no syphilis infection was recorded in Amajuba (HIV prevalence = 35.9%), Ugu (HIV prevalence = 41.1%); Umkhanyakude (HIV prevalence = 41.9%); UMzinyathi (HIV prevalence = 31.1%); uThukela (HIV prevalence = 36.7 %), Zululand (HIV prevalence = 39.8%), eThekweni (HIV prevalence = 41.1%), iLembe (HIV prevalence = 42.3%), uMgungundlovu (HIV prevalence = 42.3%). The detailed description of syphilis vs. HIV prevalence trends for all the 52 health districts are presented in the section describing syphilis trends in this report.

The findings of this survey in the past 14 years show that there is an inverse correlation between HIV and Syphilis and since 1997, there is scientific evidence that Syphilis is not a cofactor for onset of HIV infection.

Conclusion

The 2010 national HIV prevalence estimate indicates a slight increase by 0.8% in the prevalence of antenatal women between 2009 and 2010. Prevalence usually reflects the burden of HIV on the health care system and changes (increases) may be the cumulative effect of many factors that may work individually or collectively to drive the epidemic. The prevalence might increase under circumstances where new infections (incidence) are declining, for example where large number of people are receiving ART and surviving for longer periods. There is still heterogeneity (great variation in HIV infection rate) among provincial HIV prevalence estimates.

It is essential to ensure that all pregnant women, including 10-14 year-old young adolescents, are included in strategic HIV prevention and care programmes aimed at reducing HIV incidence, morbidity and mortality.

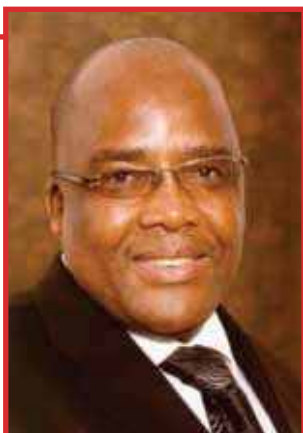
A comprehensive strategy focusing on this age group should be incorporated into the programmes of the Department of Health, Department of Basic Education, Department of Social Development and the Ministry of Women, Child and Persons with Disabilities, in order to formulate a more coordinated and integrated response to this problem. HIV prevention must remain the mainstay of our efforts to combating HIV and AIDS.

The 2010 findings produced by the tree model reflect that the significant contributor to the high HIV prevalence is a small group less than 8 000 pregnant and unmarried African women aged 27 years and over, where the HIV prevalence is 48.7%.

The 2011 report will include findings of triangulation of other HIV and AIDs related data, to understand the age distribution of the HIV infected persons receiving ART treatment, and to monitor pregnant women and 15-24 year old MDG group enrolled in the ART in order to monitor the impact of HIV and AIDS interventions on the prevalence and incidence rate.

In steering the country's efforts towards the NSDA 2010-2014, the common theme that will be sustained by the Health sector is to continue with the advocacy and community mobilizations through campaigns aimed at ensuring that more PLWHA have access to treatment. The common trend amongst South Africans in the past has seen two million people on average voluntarily testing for HIV annually. The HCT campaign was launched by the Honourable President of South Africa in April 2010. By the end of 2010/11 financial year, a total of 9.7 million people had agreed to be tested. This marked a three fold increase from the previous annual trends. By the end of March 2011, the anti-retroviral programme had enrolled 1.4 million HIV infected people since its inception.

FOREWORD



The HIV epidemic is one of the most significant public health challenges South Africa is facing with impacts of the epidemic clearly visible at all levels of our society. At the macro level, the HIV epidemic is threatening achievement of the Millennium Development Goals through reversal of post apartheid developmental gains. Communities have not been spared either as the traditional social safety mechanisms are overstretched and at the brink of collapse.

For an effective response to the HIV epidemic, South Africa requires robust data to inform policy formulation, programme planning and implementation. The antenatal sentinel surveillance survey contributes to this intelligence, by providing data on trends of the HIV epidemic and anticipated burden of HIV disease. The 2010 surveillance results reaffirm stabilization of HIV prevalence among antenatal clinic attendees since 2007 albeit at unacceptably higher levels. Results from the 2010 survey will guide the development of the new National Strategic Plan 2012-2016.

Government is committed to respond to the HIV epidemic effectively. In April 2010, the President of South Africa, His Excellency Mr. Jacob. G. Zuma, launched the national HIV Counselling and Testing campaign, targeting 15 million South Africans by June 2011. In August 2011, the Deputy President of South Africa announced changes in the eligibility criteria for ART, with all HIV positive people with a CD4 count of ≤ 350 being eligible for treatment.

I have also directed that TB and HIV and AIDS services be integrated. This move will go a long way towards improving efficiencies as the two epidemics of HIV and TB will be managed under one roof. One of the key deliverables in the Health Sector Negotiated Service Delivery Agreement (NSDA) which I have signed with the other Ministers and Health MECs is to combat HIV and AIDS and the burden of TB, with the aim of improving the lives of all South Africans.

I am fully aware that HIV prevalence cannot be used singularly and is not the only useful measure of success, particularly in South Africa, a country with the largest ART programme in the world. We must not forget that we have a generalized epidemic with between 5.4 to 5.6 million persons already HIV infected.

While there is no globally agreed method to measure HIV incidence, the Department of Health is actively collaborating with partners to come up with a consensus position for the estimation of HIV incidence and how best we can measure HIV related mortality trends.

In 2010 the sample size of the survey was increased to come up with more precise HIV prevalence estimates at district level. However, I strongly recommend that in the years ahead, the Department should isolate the effect of the ART programme on the observed HIV prevalence and mortality rates.

In conclusion, the findings presented in this report contribute directly to the Negotiated Service Agreement's (NSDA) objectives of *Increasing Life Expectancy; Combating HIV, AIDS and Tuberculosis; Decreasing maternal and child mortality; and Strengthening of the Health System Effectiveness*. These results will strengthen our ability to plan interventions to reduce morbidity and mortality from HIV and AIDS.



DR. P. A. MOTSOLEDI (MP)

MINISTER OF HEALTH

DATE: 8/11/2011

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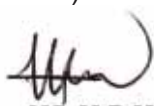
I would like to extend my appreciation to all nurses in the public sector for their continued dedication and support over the past 21 years in the implementation of this survey and their professionalism in adherence to the survey protocol for the collection, handling and transportation of blood specimens to laboratories.

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ACRONYMS

AIDS	Acquired Immuno Deficiency Syndrome
ANC	Antenatal Care
ART	Anti-retroviral Therapy
BCC	Behavior Change Communication
BoD	Burden of Disease
BSS	Behavioural Surveillance Survey
CCMT	Comprehensive Care Management and Treatment
CI	95% Confidence Interval
DHIS	District Health Information System
DoH	Department of Health
EC	Eastern Cape Province
ELISA	Enzyme Linked Immuno Sorbet Assay
EPP	Estimation and Projection Package
FS	Free State Province
GA	Gauteng Province
HCW	Health Care Worker
HCT	HIV Counseling and Testing
HIV	Human Immunodeficiency Virus
HSRC	Human Science Research Council
HST	Health Systems Trust
KZN	KwaZulu-Natal Province
LP	Limpopo Province
MDG	Millennium Development Goals
MEDUNSA	Medical University of South Africa
MP	Mpumalanga Province
MRC	Medical Research Council
NC	Northern Cape Province
NDoH	National Department of Health
NHC	National Health Council
NHLS	National Health Laboratory Service
NICD	National Institute for Communicable Diseases
NTP	National Tuberculosis Programme
NSP	National Strategic Plan for HIV, AIDS and STI
NW	North West Province
PCR	Polymerase Chain Reaction
PAC	Provincial AIDS Councils
PHC	Primary Health Care

ACRONYMS

PMTCT	Prevention of Mother-to-Child Transmission
PPS	Probability Proportional to Size
PSU	Primary Sampling Unit
Prya	Persons per year per annum
QA	Quality Assurance
RPR	Rapid Plasma Reagin (A screening test for syphilis)
SA	South Africa
SACEMA	South African Centre of Excellence in Epidemiological Modelling & Analysis
SANAC	South Africa National AIDS Council
StatsSA	Statistics South Africa
STI	Sexually Transmitted Infection
TB	Tuberculosis
UCT	University of Cape Town
UKZN	University of KwaZulu-Natal
UNAIDS	United Nations Joint Program on HIV & AIDS
UNGASS	United Nations General Assembly Special Session on HIV & AIDS
UNICEF	United Nations Children's Fund
UNISA	University of South Africa
USAID	United States Agency for International Development
WC	Western Cape Province
WHO	World Health Organisation

1. INTRODUCTION

The history of the annual HIV antenatal sentinel prevalence survey in South Africa dates back to 1990 when the department realized that the epidemic was increasing exponentially in the general population and an instrument had to be developed to monitor trends for strategic response and policy planning. Since 1990, women attending antenatal care (ANC) for their first time in their current pregnancy were requested to participate in the survey in selected public health clinic across the country to assess their HIV and syphilis status. Initially these sentinel surveys only allowed for national and provincial level estimates. Due to the differences among districts within provinces, with regard to population distribution, poverty levels, access to services etc; the need was identified to have information on the HIV prevalence at district level. The survey sites have increased from 461 sites in (1990) to 1 424 sites from (2006). The target sample was 36 000 pregnant women presenting for ANC health services for their first time on the current pregnancy, during the month of October each year. These antenatal sites are located in both urban and rural areas and provide health services to urban, rural, semi-rural, township, and informal settlement communities.

The HIV epidemic in South Africa is unfolding at different paces in different provinces and districts. There was a considerable variation in HIV prevalence among the 52 health districts observed over the four year period 2006 to 2010. The HIV prevalence ranged from a high of over 46.4% in uThukela (KwaZulu-Natal) to a low of 0.0% in Namaqua (Northern Cape) in 2009. When data are pooled over the four years this heterogeneity persists. Since 2003, the national syphilis prevalence estimate has been fluctuating between a prevalence of 1.5% and 2.8%. There was a significant increase in syphilis prevalence in the Western Cape from 1.9% in 2006 to 5.6 % in 2007, but it decreased to 3.8% in 2008 and Northern Cape from 6.8% in 2008 to 3.6% in 2010. Western Cape, Gauteng, Mpumalanga, Eastern Cape, North West and Limpopo all experienced an increase in syphilis prevalence between 2006 and 2007. Mpumalanga syphilis prevalence has more than halved from 1.8 % in 2007 to 0.7% in 2008 (NDoH, Antenatal sentinel HIV Survey, 2009).

Limpopo, Western Cape and Northern Cape have consistently recorded lower HIV prevalence levels compared with other provinces. In contrast, Northern Cape has the highest syphilis prevalence while KwaZulu-Natal has shown the lowest syphilis prevalence trends in the past 4 years. KwaZulu-Natal province and districts have consistently reported the highest HIV prevalence's in the country since 1990. There is still significant variation in HIV and syphilis prevalence between the 9 provinces (NDoH, Antenatal sentinel HIV Survey, 2009).

1.1 The purpose of the survey

The purpose of undertaking an annual sentinel antenatal point prevalence survey is to assess the HIV sero-prevalence amongst first time antenatal clinic attendees (seen as a particularly suitable “sentinel” group to represent most closely the HIV prevalence of the generally sexually active part of the population) and to assess trends in HIV prevalence over time.

1.2 The general objective

The general objective is to determine the distribution of HIV and syphilis infection among pregnant women attending public health antenatal clinics at National, Province and District Level and disaggregated by age.

1.3 The primary objectives are:

- To assess HIV and syphilis sero-prevalence among women attending public sector antenatal clinics;
- To monitor HIV and syphilis trends over time among women attending public antenatal clinics and;
- To use this data for estimation and projection of HIV sero-prevalence trends and the burden of AIDS in the general population.

1.4 The secondary objectives are:

- To estimate the national prevalence of HIV and syphilis infection among pregnant women then establish HIV prevalence estimate among the adult population of 15-49 year olds; those aged under 15 years and those above 49 years in the country, using pregnant women attending antenatal clinics in public health institutions as a proxy;
- To determine the geographical distribution pattern of HIV and syphilis infection among pregnant women attending antenatal clinics at national and provincial level, by district and age groups;
- To monitor trends for both HIV and syphilis prevalence in the country;
- To estimate HIV prevalence in the general population, in children, men and those who need treatment;
- To provide scientific evidence to measure progress towards meeting the Millennium Development Goal 6, Target 7, indicator 18, which is HIV prevalence amongst 15 – 24 year old pregnant women.

The HIV prevalence results remain as one of the most important sources of robust surveillance data to provide a basis for the projection and estimation of the epidemic and measurement of HIV and AIDS impact in the general population.

For the first time the 2010 survey will report on the following:

1. Description of the demographic characteristics of the survey participants and provide insight into the description of the 10-14 year old pregnant women who participated in the survey.
2. The HIV prevalence trends (2001 – 2010) among the pregnant 15-24 year old pregnant women, which is the MDG 6, Target 7, Indicator 18.
3. Map the distribution of HIV prevalence by individual province from 2007 to 2010.
4. The syphilis trends by province and district from 2007 to 2010.
5. The association between HIV and syphilis prevalence by province and by districts
6. A comparison of the HIV prevalence distribution among 15-49 year old women with the number of PTB cases at district level.
7. The ecological association between HIV outcomes of antenatal women and TB Burden and syphilis in South Africa

In the discussion section, we attempt to triangulate findings of published data on HIV mortality among 15-49 year-olds by district (StatsSA 2008 Death Notification Report) and the Department of Basic Education report on “Teenage pregnancy in South Africa (2009) with specific focus on school going learners” and provide evidence supporting the findings of teenage sexual and reproductive health in the two reports.

2. METHODOLOGY

During the month of October 2010 the 21st National Antenatal Sentinel HIV Prevalence Survey was conducted in South Africa, across the nine provinces and 52 health districts using the standard unlinked and anonymous methodology (WHO/UNAIDS). The survey is used as a proxy to estimate the trend in the prevalence of HIV and syphilis among pregnant first bookers aged 15 - 49 years presenting to a public sector ANC facility for the first time. A total of 36 000 pregnant women were targeted to participate in 2010. The number of Primary Sampling Units (PSU) were 1 424, selected from all 52 health districts in South Africa.

Health Care Service-based HIV surveillance is recommended by WHO as an entry point, because PMTCT services are available in all sites to provide women an option of HIV Counselling and Testing and further care. The survey design is an unlinked anonymous testing method using blood samples collected for other purposes in selected sentinel primary health care facilities. This sampling approach is convenient because, as part of the antenatal care services it is mandatory to routinely draw blood from the first bookers, and this minimises participation bias and reduces costs. In addition, pregnant women are universally the most common Sentinel Population for HIV and in South Africa the most common mode of transmission is the heterogeneous sexual route. It is not perfectly representative of all women and even less of men, children and non-pregnant women, but it is an important means of coverage for countries that have a generalized HIV epidemic (i.e. where HIV prevalence among pregnant women is >1%) and it also has a wide geographic coverage (urban; informal settlements and rural communities).

2.1 Survey design

The national antenatal HIV and syphilis prevalence survey is an anonymous, unlinked, cross-sectional survey targeting pregnant women attending antenatal clinics in the public health sector. Only first-time attendees are recruited, to minimize the chance of any woman being included more than once. Since 2006, this survey has expanded its sample population to target 36 000 pregnant women recruited from 1 424 PSU compared with 16 000 women recruited from 461 clinics in 2005. This has expanded geographic coverage considerably to include a representative sample from all 52 health districts in all the nine provinces and includes urban and rural comparison.

2.2 Sampling

2.2.1 Sentinel population

This survey was conducted as an unlinked anonymous survey amongst women who attended public health antenatal clinic services for the first time during their current pregnancy. Pregnant women

attending ANC services at public health facilities were used as the target population as they are sexually active; constitute an easily accessible and stable population, and are more likely than other groups to be representative of the general population. In addition, they obtain antenatal care at facilities that draw blood as part of routine medical services offered to this group.

2.2.2 Selection of survey population

Inclusion criteria

All pregnant women attending antenatal clinics for the first time during their current pregnancy were eligible for inclusion.

Exclusion criteria

Pregnant women who had previously visited the ANC clinic during their current pregnancy during the survey period were excluded (to avoid duplicate sampling during the same month). No pregnant women were excluded from participation on the basis of their known HIV status.

2.2.3 Selection of sentinel surveillance sites

The basic goal was to select sentinel surveillance sites representative of the population size estimate of the area to be surveyed. Sentinel sites were selected using the 'Probability Proportional to Size' (PPS) method as this combines a random approach with a bias towards the larger clinics. By using this approach, it made the analysis easier as it introduced a "natural weighting" process. The geographic distribution of sentinel sites is shown in Figure 1.

2.2.4 Selection of Primary Sampling Units (PSU)

The following are the criteria that were applied in selecting sentinel surveillance sites to be eligible for inclusion in the sample:

- Any randomly selected health establishment in the public health sector, providing antenatal care services and routinely drawing blood from attendees on the first visit of the current pregnancy with facilities to store sera at 4°C;
- The sentinel site should provide ANC services to sufficient first time antenatal clinic attendees to ensure that a minimum of 20 first time bookers be recruited over one month;
- Availability of transport arrangements in place that will allow for biological specimens to be taken to a reference laboratory within 24 hours or if the blood samples are centrifuged then transferred to referral laboratory within 72 hours.
- The clinic staff must be willing to cooperate and have the capacity to conduct the survey.

It should be noted that no other criteria were applied in selecting sites. In particular, sites were not selected specifically to monitor either high risk or low risk sub-populations, nor with the aim of monitoring interventions. These criteria are strictly adhered to in order to limit bias and promote comparability.

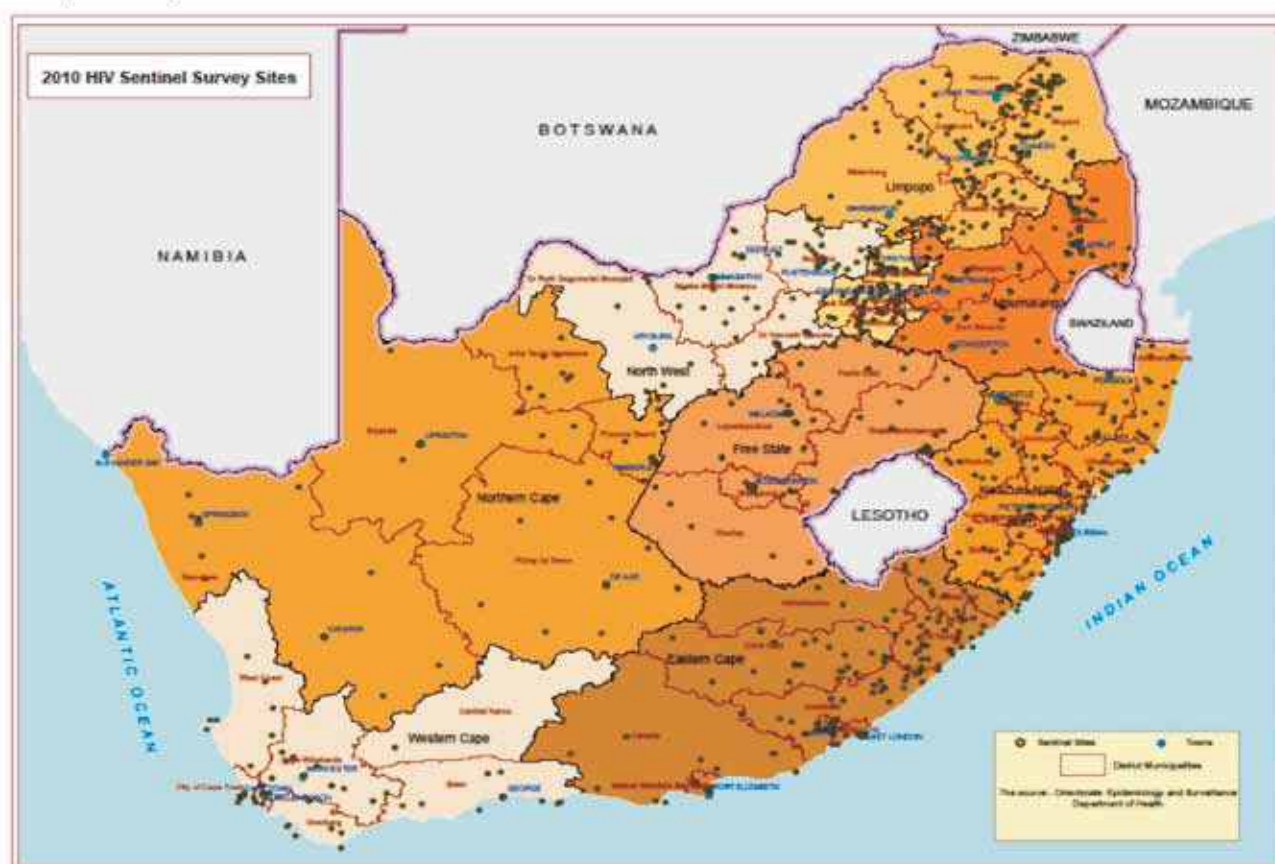


Figure 1: Geographical location of sentinel sites for the 2010 National Antenatal HIV and Syphilis survey.

2.3 Sample Collection

Full blood analysis for pregnant first bookers at the ANC clinic was used as an entry point for HIV testing using anonymous unlinked procedures. One blood sample was taken by veni-puncture and labeled with the bar code number of the individual pregnant woman and stored at 4°C. The demographic details of the participants, with the exclusion of any particulars from which it may be possible to ascertain the identity of a patient, were collected using a standardized collection form (Appendix A). The data collection form with the woman's demographic details was labeled with the same bar code number. At the close of each day the supervisors checked the forms against the blood samples for any mistakes and for completeness. The samples, together with the forms, were transported in a cooler box to the participating provincial laboratory where HIV and syphilis testing was done.

2.4 Laboratory Methods

2.4.1 Laboratory techniques

In accordance with the recommendations of the WHO on HIV screening for surveillance purposes, blood samples were tested with one ELISA (Abbott Axysm System for HIV-1 HIV-2) assay. The samples were also screened for active syphilis using the RPR test. Participating laboratories included the National Health Laboratory Services (NHLS) laboratories in Bloemfontein, Johannesburg, Kimberley, Middleburg, Port Elizabeth and Stellenbosch, MEDUNSA, and the Virology laboratory of the University of KwaZulu-Natal.

2.4.2 Laboratory quality assurance

Internal quality assurance was the responsibility of the individual laboratories. While most laboratories participate in external quality assurance programmes, for the purposes of this study the NICD was responsible for overall external quality assurance. The National Institute for Communicable Diseases (NICD) compiled a battery of 20 HIV positive and negative sera which was sent to each participating lab to test. Results were sent back to the NICD. In addition, each lab compiled a batch of 20 sera comprising HIV positive and negative sera, including some “borderline” cases. These were forwarded to the NICD for confirmatory testing.

After completion of the survey the NICD produced a quality assurance report on the performance of the laboratories for HIV testing and University of Limpopo (Medunsa Campus) Microbiology Department for RPR testing.

2.5 Quality Control of Fieldwork

District level monitoring of the sentinel sites was done weekly by a team from the district health office. Provincial coordinators also undertook provincial level monitoring and visited the sites in their province. The national team conducted supervisory visits to at least two districts per province. The main purpose of the visits, was to monitor that the protocol was being adhered to by observing practices and reconciling the number of submitted specimens to the calculated expected number which was derived from the routine data collection. A monitoring checklist (Appendix B) was used to ensure that monitoring and supervision was standard for all sites.

2.6 Data Management

Raw data was captured at provincial level, using the Antenatal HIV and Syphilis Prevalence Survey DHIS 1.4 Patient Module. This database is designed with range restrictions to ensure that data captured are not out of range. Additionally extensive internal data consistency checks against the original data capture form were done by each provincial coordinator to ensure the data were accurate. After data were entered, frequency tables were produced for each data element to identify missing or inconsistent values that may have originated from incorrect entry of data into the computer. Further data cleaning and validation and quality assessment was done at the national office.

Data analysis was carried out by independent statisticians, actuarial scientists and epidemiologists from the NDoH and various other institutions. The analysis was mainly descriptive and focused on determining national, provincial, district and age group specific prevalence rates of HIV and syphilis.

2.6.1 Exclusions from analysis

The following entries were excluded from the analysis:

- Those which had no HIV status result was not indicated.
- Those with no age of the survey participant

2.6.2 Calculation of confidence intervals

For the 95% confidence intervals, the normal approximation to the binomial distribution was used. In a few cases where the sample size or prevalence was small, the exact binomial calculation was used and adjusted for the design effect of the domain.

2.6.3 Weighting

The national estimate was weighted according to the total number of women aged 15 - 49 years in the different provinces using the StatsSA mid-year population estimates current at the time of the survey. Given that the sentinel sites were chosen on a probability proportional to size basis by district, the sampling period is fixed and the districts are self-weighting, the provincial prevalence estimates were simply calculated as the total of the results from the districts in the provinces.

2.6.4 Biases with Antenatal data

- Only pregnant women and not all reproductive age women were tested
- Only pregnant women who attend public sector antenatal clinics are tested
- Clinics selected may not be representative
- In general terms, ANC data:
 - underestimate prevalence in the general female population
 - overestimate prevalence in the rural population

2.7 National population based HIV surveys vs. sentinel antenatal HIV surveillance

Sentinel surveillance and population-based surveys each have strengths and weaknesses but taken together provide complementary information and can provide a clear picture of both overall trends and geographic distribution of HIV in South Africa.

2.7.1 Sentinel Series Antenatal HIV Surveys

Strengths

- Easy access to a cross-section of sexually active women from the general population.
- Testing among pregnant women is a good proxy for prevalence in the general population.
- Provides data on trends in the HIV epidemic over time.
- Biases are recognized and can be corrected.
- Geographical coverage can be expanded.

Weaknesses

- Women attending ANC may not be representative of all pregnant women
- ANC does not provide data on the prevalence among men. Estimates for men are based on assumptions about the ratio of male to female prevalence derived from community based studies (HSRC).

2.7.2 National Population based HIV Surveys

Strengths

- Can provide representative estimates of prevalence in the general population (for generalized epidemics) as well as for different subgroups.
- Results can be used to adjust estimates from sentinel surveillance (ANC).
- Provides an opportunity to link HIV status with social, behavioural and other biomedical information.

Weaknesses

- Sampling from households may not adequately represent high risk and mobile populations.
- Non-response can bias population-based estimates.
- Population based surveys are expensive and logistically difficult to carry out.

2.8 Extrapolation of HIV Infection to the General Population

2.8.1 WHO/UNAIDS estimation process

The Estimation and Projection Package (EPP) recommended by UNAIDS was used to estimate and project adult HIV prevalence from surveillance data and to estimate HIV incidence from prevalence and ART coverage data. After surveillance data from various sites and years showing HIV prevalence among pregnant women were included in the model, the package fitted the best epidemic curve, scaled to be consistent with estimates of the general population prevalence. Separate estimates and time trends were developed for each of the provinces, and combined within EPP to produce a national estimate for HIV prevalence and its trends over time. The resulting national estimated adult HIV prevalence was transferred to a demographic package (Spectrum: a computer modelling for demographic projections) to calculate the number of people infected and other variables, such as the number of adults and children who need to be receiving ART, and the estimated number of AIDS deaths and other information.

Adjusting HIV prevalence curve using EPP

For South Africa:

1. Adjusting for race-based relative attendance rates at ANC:
 - Based on race-standardized prevalence.
2. Adjusting for the use of HIV prevalence among pregnant women:
 - Based on ratio of prevalence among adults in the general population, using data from the National population based HIV survey and prevalence among pregnant women.

Required inputs in Spectrum are: Country data on

- Demographic data projected by age and sex over the time period of interest
- Adult prevalence / Incidence curve
- MTCT program description
- PMTCT coverage
- Adult ART coverage
- Child treatment coverage

Epidemiologic assumptions

- Effect of HIV on fertility
- Progression from infection to need for treatment and AIDS death
- Age distribution of infections
- Sex ratio of incidence
- Mother-to-child transmission rates by regimen and feeding options
- Effect of child treatment

2.8.2 The ASSA 2008 estimation process

The ASSA model can be described as a behavioral cohort component projection model. It comprises two aspects, the first being, a standard demographic cohort projection model that projects the population at a point of time from the population a year earlier taking into account births, deaths and migration. The second is a 'behavioral' component that projects the numbers of people by age and sex newly infected with HIV, and thereby, the impact of HIV on mortality and to a lesser extent fertility.

The number of new infections is estimated by assuming:

1. That the population is comprised of four risk groups
 - a small, high-risk group representing commercial sex workers and their regular clients
 - a larger high-risk group, not part of the above, who are regularly infected with STDs and often have unprotected sexual intercourse
 - a larger group who are at risk of getting infected by sometimes having unprotected sexual intercourse and assumed to average one new partner per year
 - the balance, assumed not to be much at risk of getting infected.
2. That the amount of sexual activity and whether or not a condom is used differs by risk group.
3. That the proportion of all sex that occurs at a particular age follows a uni-modal curve, which in the case of females is similar to the fertility curve with a peak in the young, high-fertility, ages.
4. Risk-group dependent probabilities of transmission from a person in one risk group to his or her partner, which are dependent on how long the person has been infected.
5. Probabilities of transmission from infected mother to child.
6. That ART impacts on the probability of transmission of the virus and the amount of sex.
7. That the prevalence of pregnant women attending public antenatal clinics is higher than that of women attending private antenatal clinics. Following this, the model assumes certain proportions of those infected survive each year after infection. The survival is a function of age at infection and duration of infection. From this, the number of deaths due to HIV are estimated.

The proportion surviving increases for those receiving ART.

In addition, the model allows for the following interventions:

- Information and education campaigns (via impact on condom use)
- Syndromic management of STIs (via reduction in probability of transmission)
- PMTCT (via the probability of transmission from mother to child)
- ART (via reduced HIV mortality and a reduction in the probability of transmission)

Calibration

In order to ensure that the output from the model tracks reality, the model is calibrated to empirical evidence of the epidemic. This means that certain parameters (the percentage in the risk group and possibly the amount sexual activity and the ages at which it occurs) are altered to ensure that the output from the model (in particular the number of deaths by age and sex, and the prevalence by age and sex) match independent estimates of these output.

The ASSA model has been calibrated to fit data for each of the provinces and the country as a whole.

2.9 Ethical considerations

Participation in the survey was voluntary, with informed consent for answering the questions on the forms and for collecting the blood samples. For reasons of confidentiality, testing was done on anonymous unlinked samples. A unique bar code was allocated to each of the participants and it is this number that was recorded on the form and also used for labelling the blood samples and linking laboratory results with demographic data. The bar code was used to link the demographic information with the laboratory results while maintaining anonymity of the survey participant. For future surveys, a revised proposal will be submitted to the MRC Ethics Committee to request that the results of all HIV positive women be communicated to the clinic to ensure that each woman is aware of her status and is provided with a choice to participate in the PMTCT programme, without the survey investigators knowledge of her identity.

2.10 Reliability of this report results

To ensure that we publish a robust report which provides reliable scientific evidence the National DoH does the following:

1. Continuously liaises with the scientific HIV Surveillance Task Team
2. Uses a reliable DHIS data, capturing and verification management tool to ensure data validity and plausibility.
3. Revises the protocol with the provincial survey coordinators and laboratory technicians annually before the implementation of the next survey
4. Receives critical technical inputs from experts in different fields of Public Health
5. The report goes through a thorough scientific peer-review process
6. Data is subjected to internal and external independent scientific analysis including 4 internationally renowned Epidemiologists, Bio-Statisticians, DoH directorate technical staff, WHO HIV Specialists, UNAIDS HIV M&E Specialists and Statisticians, MRC and UCT.

3. 1. RESULTS – HIV PREVALENCE

3.1 Characteristics of Survey Population

This section of the report will firstly present the characteristics of the survey population, and secondly the association between HIV prevalence in relation to demographic factors collected when the women were interviewed by nurses before collecting the biological specimens. Third, this section will present the descriptive summary of HIV prevalence at national and provincial level, by district and by age distribution.

3.1.1 Participation

Facility and individual level

A total of 32 225 out of the targeted 36 000 pregnant women attending antenatal care sentinel clinics, at selected public health facilities in the nine provinces (Table 1), representing the 52 health districts in South Africa participated in the survey during October 2010. The sample population realization rate was 90.0% with women recruited from 1 424 sentinel clinics. The number of pregnant women who participated in the survey by district in 2010 ranged from 76 in Namaqua district to 2 656 in the Cape Metropole, as shown in Annexure 1.

Table 1: Sampled population distribution at national and provincial level, 2008 to 2010.

Province	2008		2009		2010	
	N	%	N	%	N	%
Eastern Cape	4 220	12.4	4 225	12.9	3 994	12.4
Free State	2 016	5.9	2 336	7.1	2 223	6.9
Gauteng	7 500	22.1	7 187	21.9	6 714	20.8
Kwa-Zulu Natal	6 985	20.5	6 744	20.5	6 887	21.4
Limpopo	3 908	11.5	3 412	10.4	3 117	9.7
Mpumalanga	2 224	6.5	2 049	6.2	2 202	6.8
North West	2 113	6.2	2 227	6.8	1 963	6.1
Northern Cape	1 113	3.2	1 002	3.0	1 144	3.6
Western Cape	3 848	11.3	3 679	11.2	3 981	12.4
National	33 927	100.0	32 861	100.0	32 225	100.0

N = Realized sample size.

3.1.2 The demographics characteristics of the sample population

3.1.2.1 National participation rate by age

Age is an important risk factor and is central to monitoring the epidemic among the highly sexually active group. The HIV prevalence in the 15 - 24 year age group is crucial when reporting the outcome of the MDG 6, Target 7, indicator 18. The age pattern of the women recruited in the survey was similar to the previous three surveys (Table 2) as described later in the results section.

The age distribution of pregnant women who participated ranged from girls aged 10 years to women aged over 50 years as shown below in Table 2 and Figure 2 below. The antenatal distribution in the past 4 surveys, was concentrated in the 20-24 year old age group, which was more than 30% of the survey population. Antenatal women older than 39 years and younger than 15 years were under-represented in the survey compared to the 15 to 39 year old. Seven (7) pregnant women were more than 50 years old. Pregnant women above 40 years and under 15 years are classified as the high risk pregnancy group.

Table 2: National participation by age group, 2008 to 2010.

Age group	2008		2009		2010	
	N	%	N	%	N	%
<15	138	0.4	114	0.3	121	0.4
15- 19	6 589	19.4	6 143	18.7	6 171	19.2
20 – 24	10 539	31.1	10 224	31.1	9 723	30.2
25 – 29	8 082	23.8	7 864	23.9	7 939	24.6
30 – 34	4 966	14.6	4 776	14.5	4 690	14.6
35 – 39	2 717	8.0	2 650	8.1	2 498	7.8
40 – 44	707	2.1	732	2.2	703	2.2
45 – 49	82	0.2	82	0.2	58	0.2
>49	5	0.0001	6	0.00	7	0.02
Not specified	102	0.3	270	0.8	315	1.0
Total	33 927	100.0	32 861	100.0	32 225	100

N = Realized sample size.

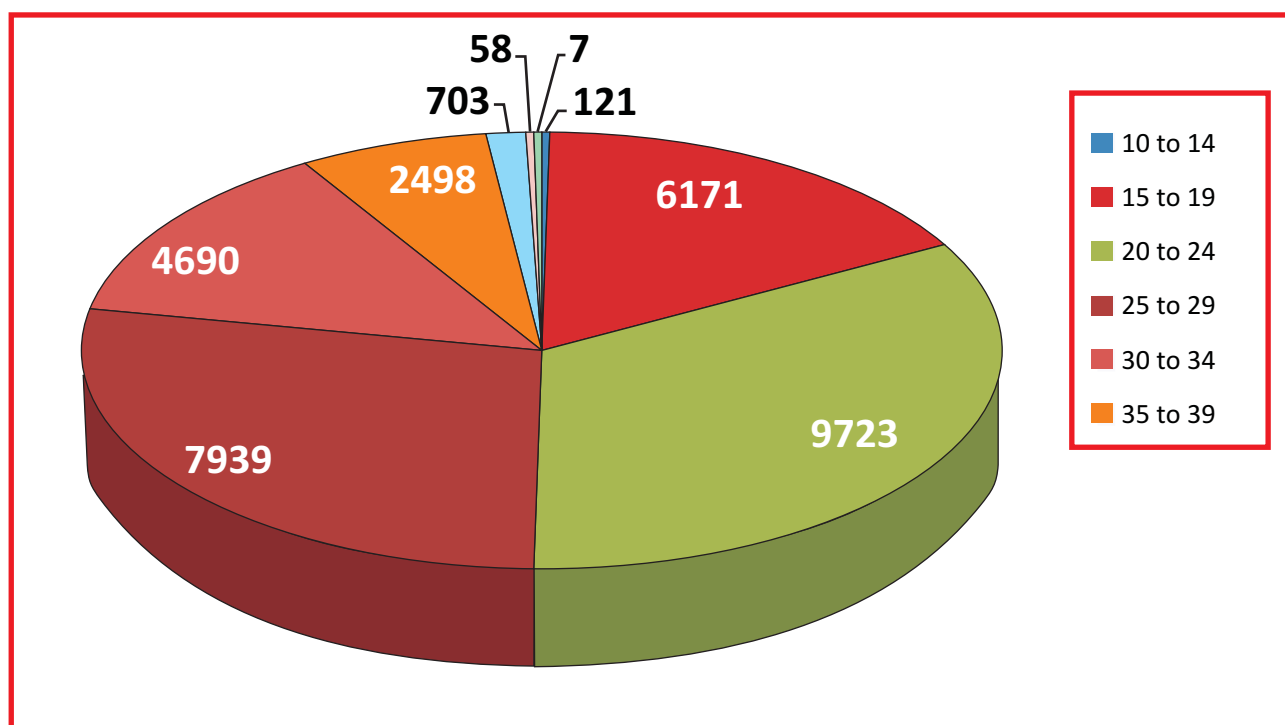


Figure 2: National distribution of survey participants by age group, 2010

3.1.2.2 National participation by population group

The distribution by race of the women recruited in the 2010 survey was similar to the previous three surveys as shown in Table 3. Eighty eight percent (88.5%) of the survey participants were African women, while 9.1% were Coloured. Asians and Whites together accounted for less than 1% of the total tested, and 1.4% were not specified. The number of Asians and Whites who participated was too small to provide reliable estimates for these two population groups.

Table 3: National participation by population group from 2008 to 2010.

Population Group	2008		2009		2010	
	N	%	N	%	N	%
African	30 502	89.9	29 062	88.4	28 533	88.5
Asian	149	0.4	185	0.6	144	0.5
Coloured	2 930	8.6	2 783	8.5	2 930	9.1
White	140	0.4	176	0.5	166	0.5
Not specified	206	0.7	655	2.0	452	1.4
Total	33 927	100	32 861	100.0	32 225	100.0

N = Realized sample.

3.1.3 HIV prevalence in relation to various demographic and background characteristics of the survey participants

There are a number of variables that either alone or in combination promote or prevent the risk of acquiring HIV infection. The precise linkages between these different risk factors for the disease are difficult to ascertain and to separate from the effects of other variables. The antenatal survey is not designed to collect comprehensive data on potential risk factors. However, it does include the collection of a number of discrete demographic variables.

3.1.3.1. Participants knowledge of their own HIV status

Analysis of Table 4 indicates that a high percentage (58.1%) of the survey participants knew their HIV status, of these 65.0% were HIV infected. The 35% did not know their HIV status, of these, 26.9% were found to be HIV positive. There were significant differences between provinces regarding the percentage of women who said they knew their HIV status, with women from Gauteng having the lowest percentage of 57% compared with 77% of women from KwaZulu-Natal.

3.1.3.2. HIV prevalence and marital status

More than 75% of the survey participants were single women, of which 31.2% were HIV infected, only 19.6% of the 32 225 pregnant women were married and 25.1% of these were HIV infected. Furthermore, thirty nine per cent (39%) of the 105 divorced women who participated in the survey were also HIV infected (Table 4).

3.1.3.3. HIV prevalence by level of education

The majority (76.4%) of the survey participants had secondary school qualifications with 30.2% of them being HIV positive. These findings showed that most women had the same HIV risk exposure, irrespective of their level of education (Table 4).

3.1.3.4. HIV prevalence and parity

HIV prevalence was higher (37%) among women who had two children before this pregnancy than women who had more, particularly those who had more than 6 children (Table 4).

Table 4. Association between the demographic and background characteristics and HIV outcome status of survey participants, 2010.

Variable	Level	N	% HIV Prev.
Population group	African	28 533	32.5
	Asian	144	7.1
	Coloured	2 930	7.0
	White	166	3.0
Level of Education	None	562	33.5
	Primary	3 786	33.3
	Secondary	24 627	30.2
	Tertiary	2 576	22.7
Marital Status	Single	24 802	31.2
	Married	6 317	25.1
	Widowed	72	41.7
	Divorced	105	39.0
Parity Number of Live born children	none	12 805	20.7
	1	10 531	35.9
	2	5 324	37.7
	3	2 146	34.9
	4	763	33.4
	5	301	26.9
	6	110	28.2
	More than 6	71	21.4
Age of Partner	<15	2	50
	15 - 19	280	23.4
	20 - 24	1 745	34.2
	25 - 29	3	38.9
	30 - 34	301	42.2
	35 - 39	1 037	40.2
	40 - 44	66	25.8
	>45	2	1.0
Aware of their HIV status	Yes	20 943	65.0
	No	10 173	35.0

3.1.3.5. HIV prevalence by partner's age

We assessed HIV prevalence by report of current partner's age (Table 4). The age of partners for the survey participants ranged from 14 years to 75 years. The greatest likelihood of being HIV infected was in women who had partners aged 22 years to 49 years.

3.2 National HIV prevalence trends (1990 – 2010)

In 2010, the overall HIV prevalence amongst antenatal women who presented for their first antenatal care visit in October in public health clinics was 30.2% (95% CI: 29.4 – 30.9). The estimated national HIV prevalence amongst the women surveyed has remained stable over the past four years: 29.1% in 2006; 29.4% in 2007, 29.3% in 2008 and 29.4% in 2009 and has increased by 0.8% to 30.2% in 2010. The HIV prevalence trends from 1990 to 2010, show that the Error Bars between 2007 to 2010 overlap, which indicates that there is no statistical difference in the HIV estimates in the past 3 years as shown in Figure 3.

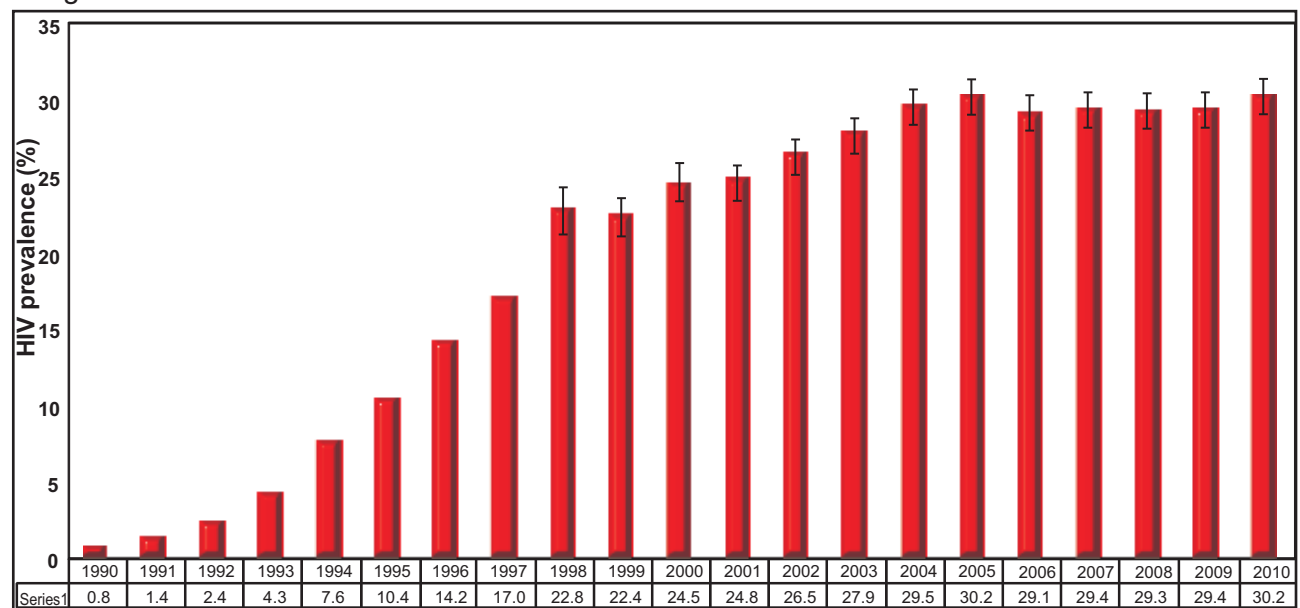


Figure 3: HIV prevalence trends among antenatal women, South Africa 1990 to 2010. The estimates from 2006 are based on a different sample to the previous years.

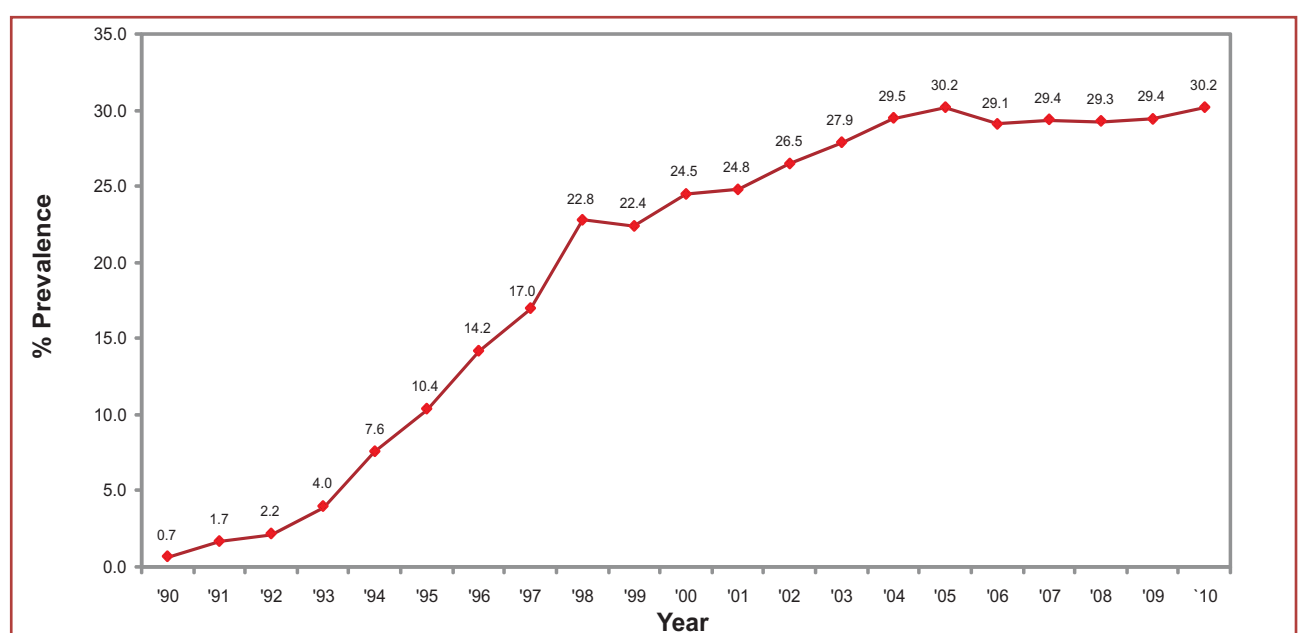


Figure 4: HIV prevalence epidemic curve among antenatal women, South Africa, 1990 -2010

3.3 HIV prevalence by province, 2008 to 2010

The results of this survey are used to estimate the HIV prevalence in the entire population based on assumptions. The provincial HIV prevalence estimate have remained largely unchanged when compared to 2009. However, these changes are not statistically significant and form part of the unusual variance with sampling variability. The point prevalence estimate may be “higher” and “lower” in some cases relative to 2009. In the past twenty years the highest HIV prevalence among the 15-49 year olds has been recorded in KZN which remained stable at 39.5% in 2009 and 2010. Provinces with 'higher' HIV prevalence estimates in 2010 compared with 2009 were: EC, LP, MP, NC, GA, FS and WC. Their estimates were also within the expected sampling variability (Figure 5). These small increases fell within the expected sampling variability. The only province with 'lower' HIV prevalence estimate was North West and Free State. The HIV prevalence in the Western Cape has increased significantly (because of the large sample size) from 16.9% in 2009 to 18.5% in 2010 .

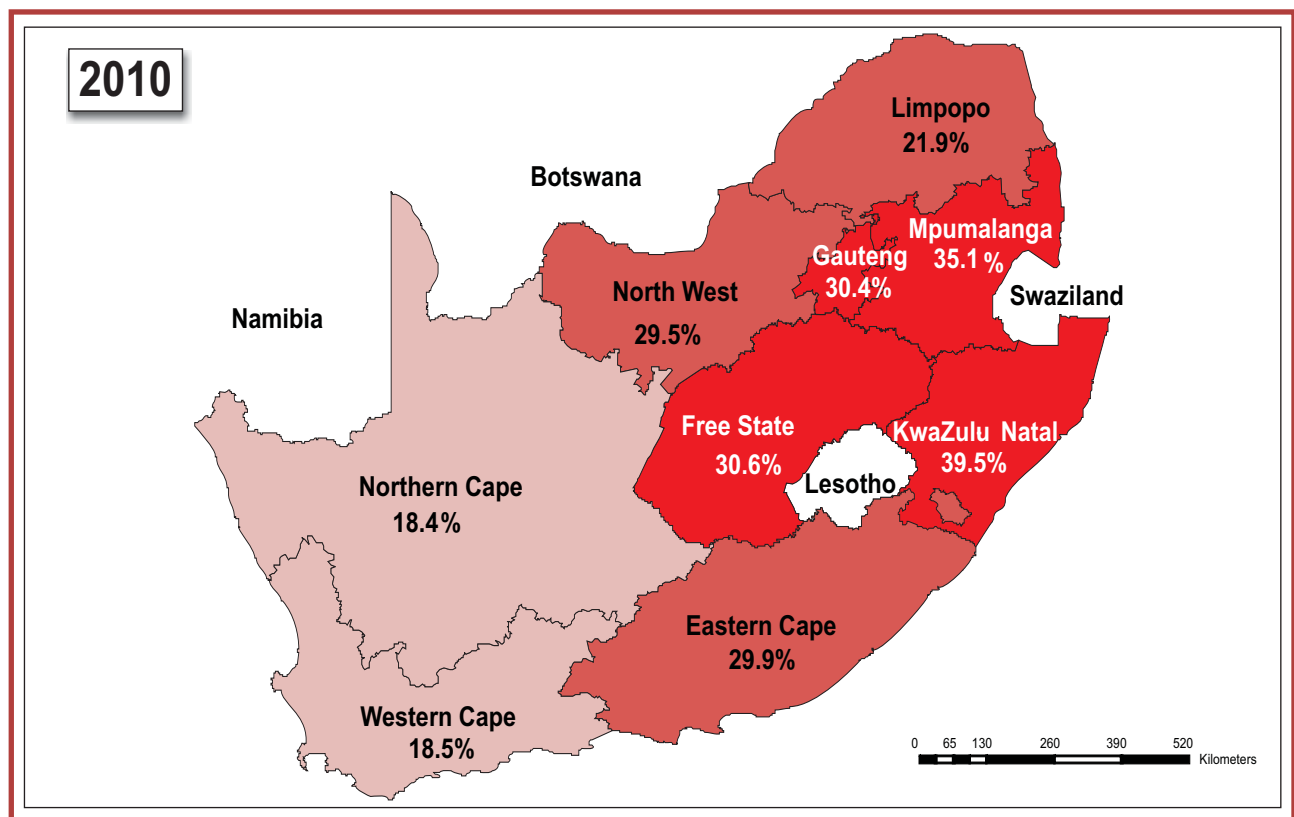


Figure 5: HIV prevalence distribution by province, South Africa, 2010

The results still show that the highest HIV prevalence rates are located in the Central and Eastern parts of the country, and the lowest prevalences in the Western Cape, Northern Cape and Limpopo.

KwaZulu-Natal has the highest HIV prevalence followed by Mpumalanga and Free State and Gauteng with overall prevalences greater than 30.0%. North West, Limpopo, the Eastern Cape recorded prevalences between 20.0% and 30.0% and Northern Cape and Western Cape are the only provinces that have HIV prevalences below 20.0% (Table 5 and Figure 5).

Table 5: The HIV prevalence (%) among antenatal women by province, 2008 to 2010. N = total

Province	2008			2009			2010		
	N	% HIV+	95% CI	N	% HIV+	95% CI	N	% HIV+	95% CI
Eastern Cape	4 216	27.6	25.6 – 29.6	4 225	28.1	26.1 – 30.1	3 994	29.9	28.2 – 31.7
Free State	2 016	32.9	30.5 – 35.3	2 336	30.1	28.1 – 32.1	2 223	30.6	28.3 – 33.0
Gauteng	7 498	29.9	28.4 – 31.2	7 187	29.8	28.6 – 31.1	6 714	30.4	29.1 – 31.8
KwaZulu-natal	6 963	38.7	37.2 – 40.1	6 744	39.5	38.1 – 41.0	6 887	39.5	38.0 – 41.0
Limpopo	3 835	20.7	19.1 – 22.4	3 412	21.4	19.7 – 23.1	3 117	21.9	20.3 – 23.6
Mpumalanga	2 224	35.5	33.1 – 37.8	2 049	34.7	32.5 – 36.9	2 202	35.1	32.6 – 37.7
North West	2 112	31.0	28.8 – 33.3	2 227	30.0	27.5 – 32.6	1 963	29.6	27.3 – 31.9
Northern Cape	1 111	16.2	13.7 – 18.9	1 002	17.2	14.3 – 20.5	1 144	18.4	16.1 – 21.1
Western Cape	3 828	16.1	12.6 – 20.2	3 679	16.9	13.8 – 20.5	3 981	18.5	15.1 – 22.5
South Africa	33 803	29.3	28.5 – 30.1	32 861	29.4	28.7 – 30.2	32 225	30.2	29.4 – 30.9

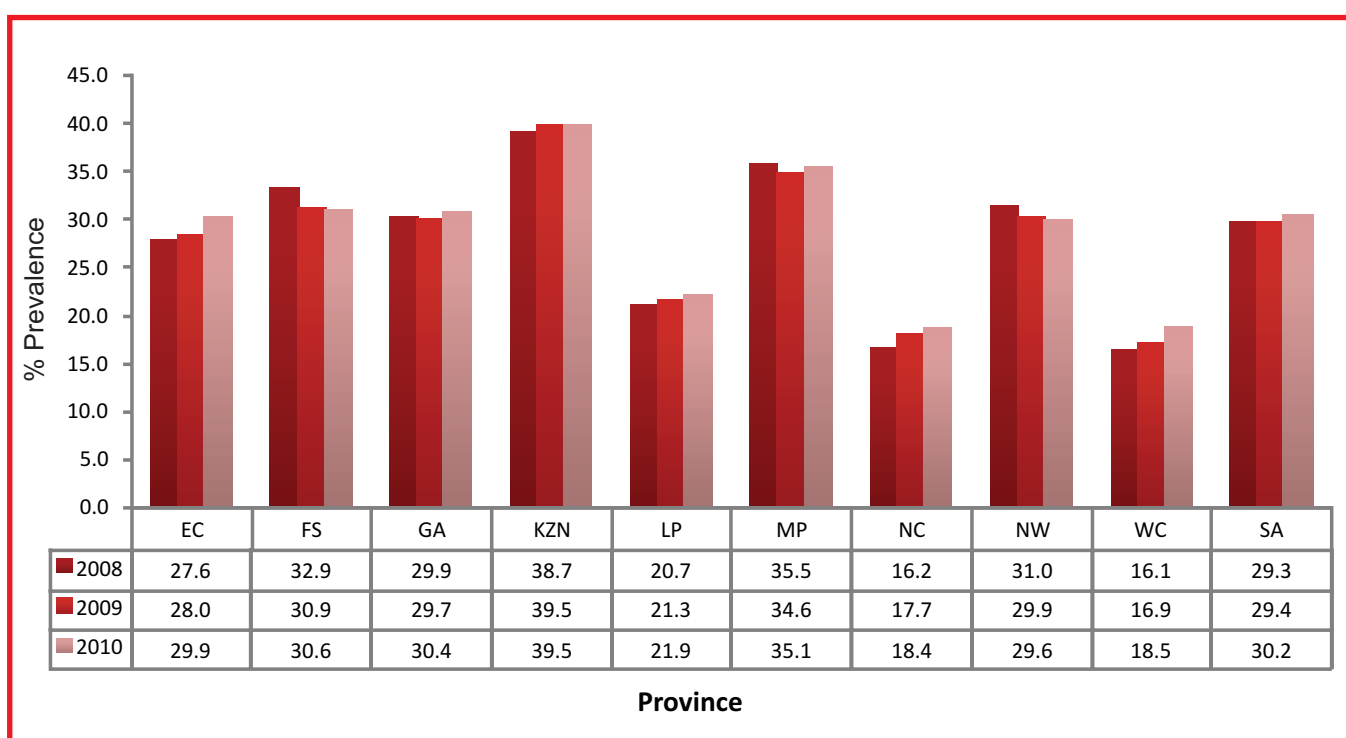


Figure 6: HIV prevalence trends among antenatal women by province, South Africa, 2008 - 2010.

3.4 HIV prevalence by district, 2008 to 2010

The WHO/UNAIDS HIV Reference group has recommended categorization of the HIV epidemic (for the purpose of targeting surveillance efforts) as follows:

1. Concentrated epidemic, with HIV concentrated in high risk populations;
2. Low-level epidemic where HIV prevalence is less than 1.0% in the general population and less than 5% in high risk populations.
3. Generalized epidemic where the prevalence in the general population is above 1%.

In 2010 there was no single district that recorded prevalence below 8%. Five districts located in KwaZulu-Natal recorded HIV prevalence above 40%. **The number of districts recording prevalences between 30% and 40 % has increased from 14 out of 52 in 2009 to 21 out of the 52 districts in 2010** (Figure 7 and 8).

In 2009, twenty one (21) districts, recorded HIV prevalences **above the national average** compared to 23 out of the 52 districts in 2010. There were 31 out of 52 districts that recorded HIV prevalences **below the national average** of 29.4% in 2009 compare to 28 out of 52 districts in 2010 (Figure 8).

The HIV prevalence distribution among antenatal women by district, from 2007 to 2010 is shown in Figure 9 a-d. There was considerable variation in HIV prevalences between the 52 health districts observed over this four year period, particularly where the sample size in a district was small, making it difficult to interpret any trends.

The districts are clearly heterogeneous with respect to the epidemic, with prevalences ranging from a high of 42.3% in uMgungundlovu and iLembe in KZN to a low of around 8.5% in Central Karoo in the Western Cape. When data are pooled over the four years this heterogeneity persists.

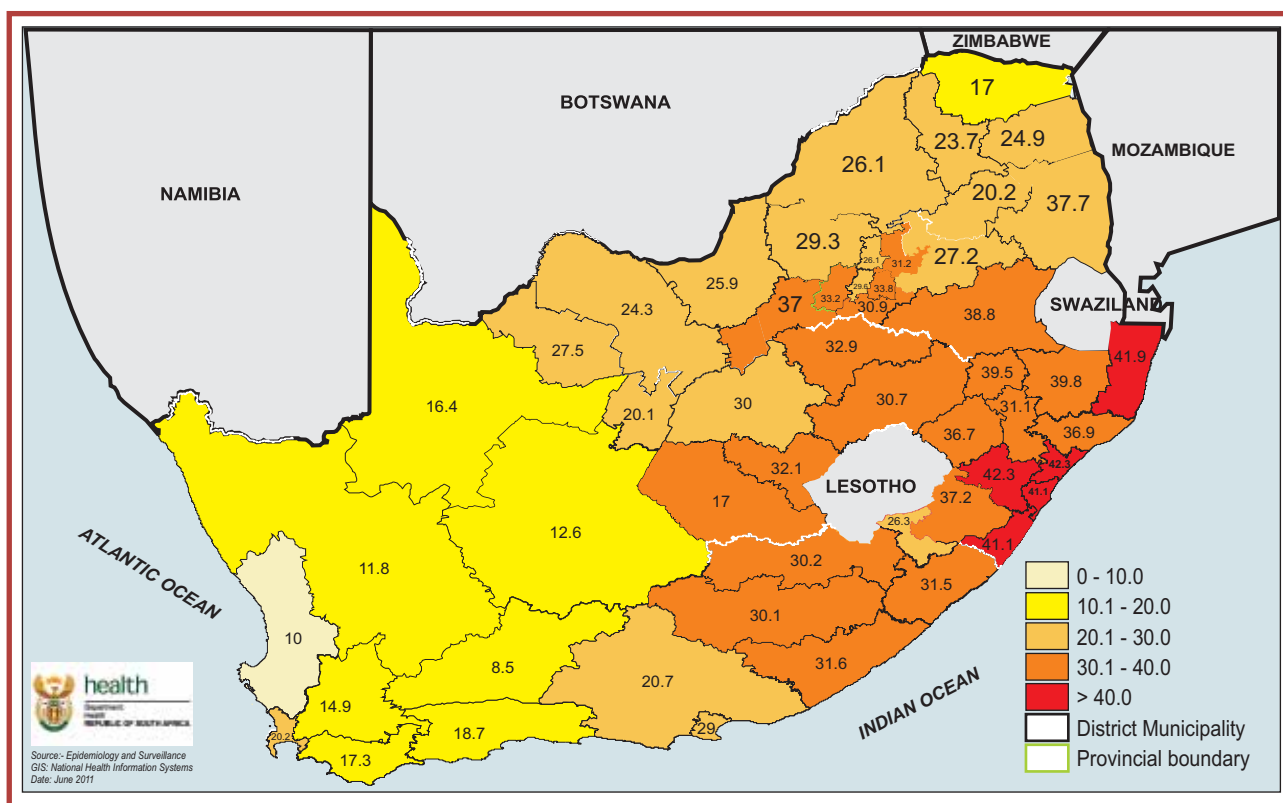


Figure 7: Map of the HIV prevalence distribution pattern among antenatal women in the 52 Health districts in South Africa, 2010.

In 2010, four health districts, all located in KwaZulu-Natal recorded the highest HIV prevalence ranging between 41.1% and 42.3%. Two out of three districts in Mpumalanga recorded high prevalence levels of 37.7% in Ehlanzeni and 38.8% in Gert Sibande.

Dr. Kenneth Kaunda is the only district among the four in North West that recorded an HIV prevalence of 37.7% and the other three recorded prevalence rate of between 24.3% in Dr. Ruth S. Mompoti and 29.3% in Bojanala.

The Western Cape has, for the first time (in 2010), recorded district prevalences of above 20% (Figure 7).

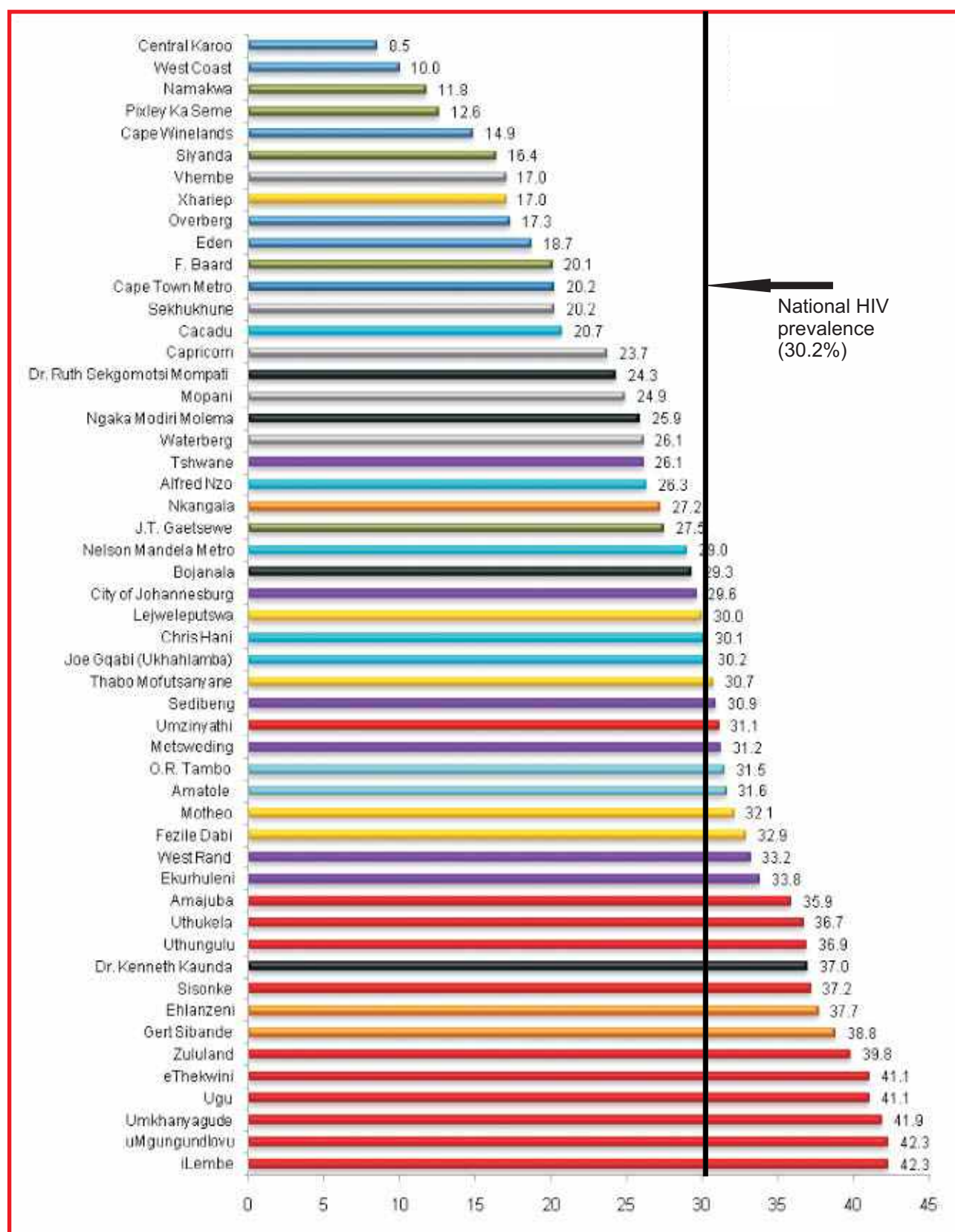


Figure 8: HIV prevalence among antenatal women by district, South Africa, 2010.

3.5 HIV prevalence by age

The age group 15-24 years is the most important indicator to use for providing evidence when monitoring HIV incidence (new infections). HIV prevalence in this age group has been suggested as a proxy measure for incidence because of sexual onset and hence prevalent infections are assumed to be recent while this age group is less likely to be affected by AIDS mortality. The HIV prevalence among the 15 - 24 year old pregnant women was 21.7% in 2008 compared with 22.1 % in 2007, a decline of 0.4%. In 2010, the South African MDG (15-24 year old pregnant women) baseline HIV prevalence was 21.8%. This MDG group constituted almost 50% (N = 16 367) of the survey population. The specific MDG target is that by 2015 the expected HIV prevalence reduction (by two thirds) should be 75% (to two-thirds) less than the baseline prevalence in of 23.1% in 2001, to an expected MDG target of 5.3% in 2015. The findings of monitoring trends in this age group in South Africa show that efforts to achieve the MDG target must be significantly strengthened (Figure 10).

There was a slight increase in HIV prevalence rates in the age group 15 -19 years, from 13.1% in 2007 to 14.1% in 2008. There was a slight decrease in HIV prevalence among young women in the age group 15 - 19 years from 14.1% in 2008 to 13.7% in 2009, an increase of 0.3% to 14.0% in 2010 however these increases were not statistically significant (Figure 11 and Table 6).

The higher prevalence in older age groups could partly be explained by ART use but it is very worrying that the trend in young people (15-24 years) has not shown a significant decline (the HIV prevalence in this age group should not be much affected by ART). This age group will be used as proxy to monitor new infections in a parallel survey targeting the pregnant women under fifteen years old. It becomes more important, that triangulation of the ART data be included in future surveys and reports, in order to understand the age patterns of HIV infected patients receiving ART.

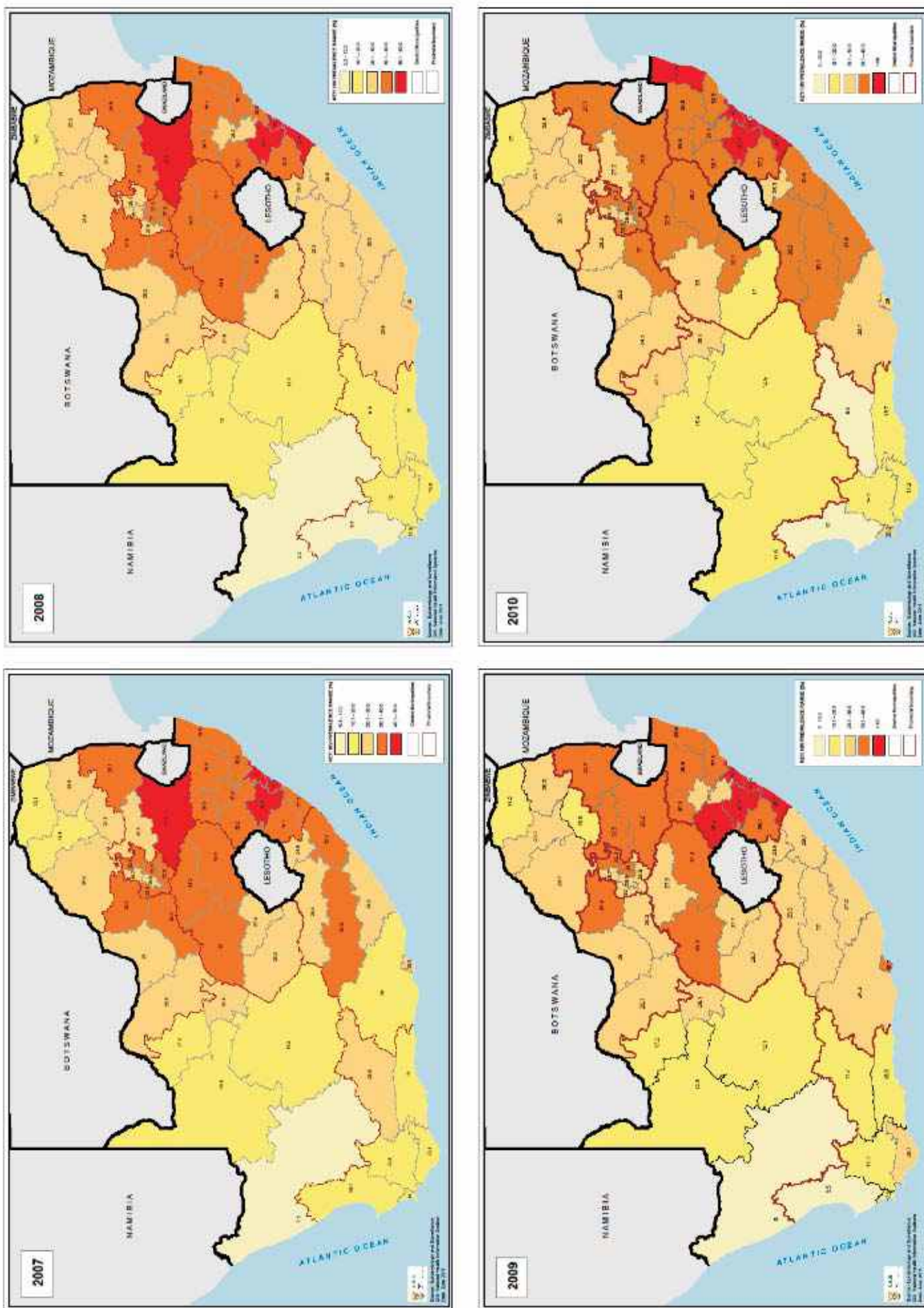


Figure 9 a-d HIV prevalence by district among 15-49 years antenatal women in 2007, 2008, 2009 and 2010.

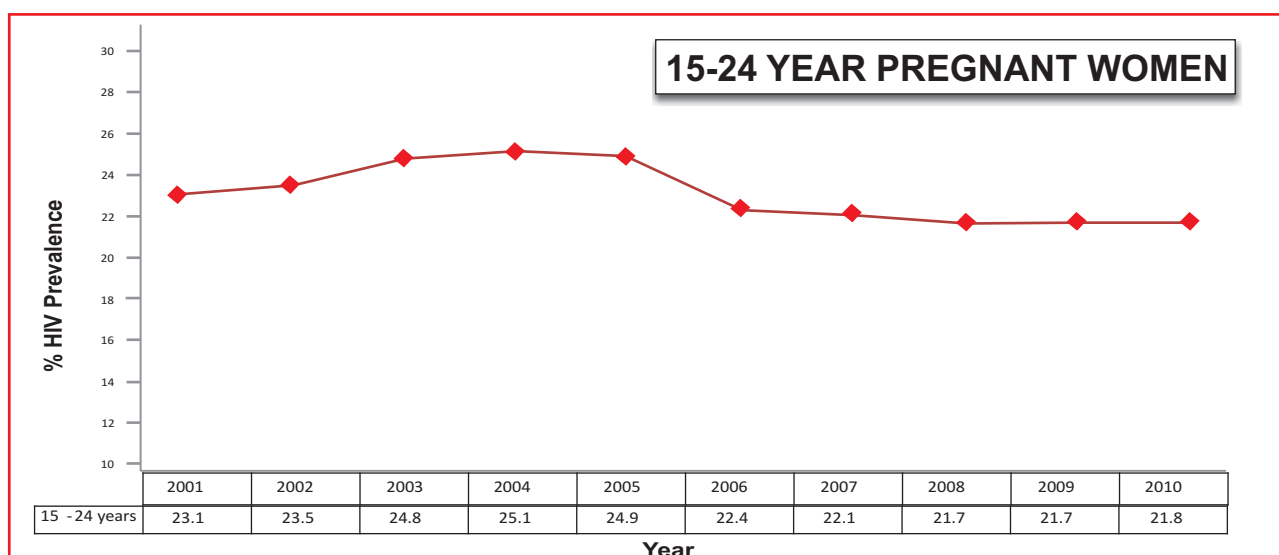


Figure 10: The 15-24 year old antenatal women HIV prevalence (MDG 6, Target 7, indicator 18) from 2001 to 2010. The MDG Target for 2015, is to reduce the HIV prevalence amongst this age group by 75% which is equivalent to 5.3%.

Table 6: The HIV prevalence trend among antenatal women in South Africa, 2008- 2010.
N= Sampled population; CI= 95% Confidence Interval.

Age group	2008			2009			2010		
	N	% HIV +	95% CI	N	% HIV +	95% CI	N	% HIV +	95% CI
10 - 14	138	7.3	3.6 - 13.0	114	7.9	3.7-14.6	121	9.1	5.12– 15.8
*15 - 24	17 065	21.7	21.0 – 22.3	16	21.7	20.9 - 22.5	15 894	21.8	21.0– 22.6
15 -19	6 563	14.1	13.1 – 15.0	6 143	13.7	12.9 -14.7	6 171	14.0	13.1– 14.9
20 – 24	10 502	26.9	25.9 – 27.9	10	26.6	25.6 - 27.6	9 723	26.7	25.7– 27.8
25 – 29	8 051	37.9	36.4 – 39.3	7 864	37.1	35.8 - 38.4	7 939	37.3	36.0– 38.7
30 – 34	4 465	40.4	38.7– 42.0	4 776	41.5	39.9 - 43.1	4 690	42.6	40.9– 44.2
35 – 39	2 712	32.4	30.5 – 34.3	2 650	35.4	33.5 - 37.3	2 498	38.4	36.3– 40.5
40 – 44	702	23.3	20.3 – 26.6	732	25.6	22.5 - 29.0	703	30.9	27.5– 34.5
45 – 49	82	17.6	10.7 – 27.7	82	23.9	15.8 - 34.6	58	28.2	18.1– 41.2

* Prevalence among the age group 15 – 24 years used as an indicator for goal 6 of the MDG
Source: Antenatal Sentinel HIV Survey, National Department of Health

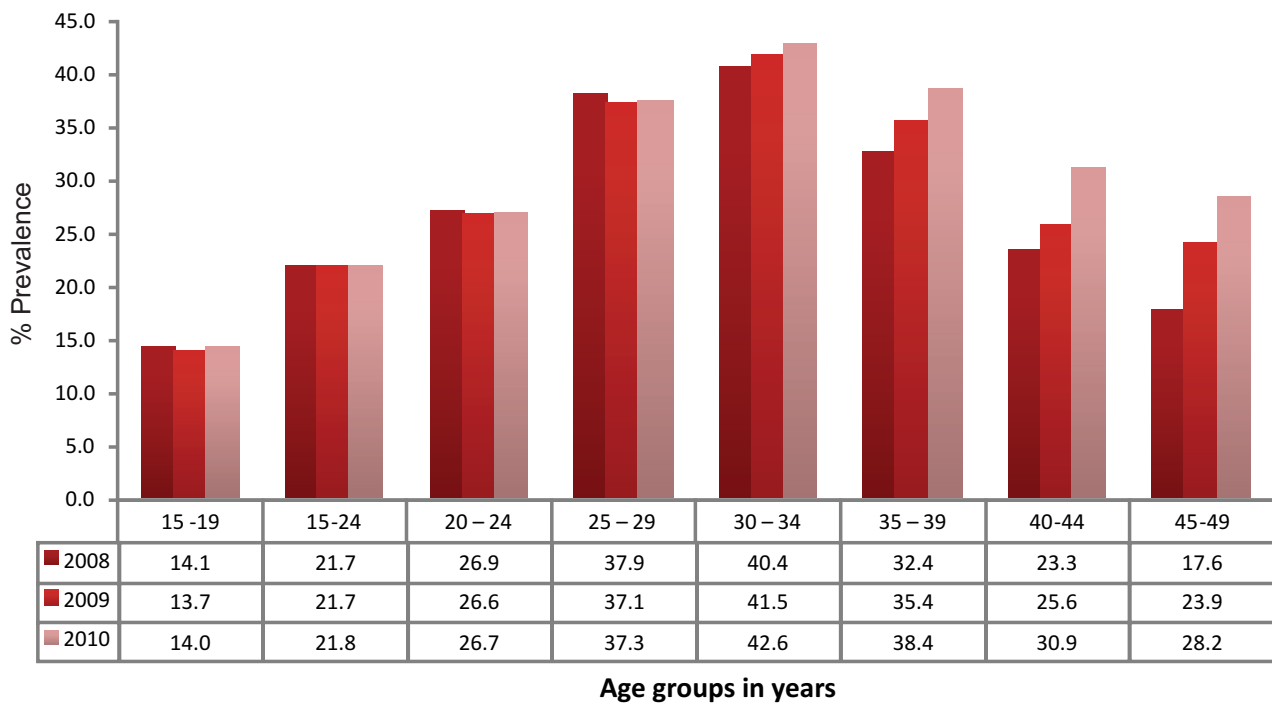


Figure 11: HIV prevalence trends among antenatal women by age group, South Africa, 2008 to 2010.

Nationally, the HIV prevalence among women in the age group 30 - 34 years remains the highest from 40.4% in 2008 to 42.6% in 2010. This age group constituted 14.6% of the sampled survey population.

The age groups 15 – 19yrs, 20 – 24yrs and 25 – 29yrs show a small increase in HIV prevalence whereas the older age groups show significant increase. The HIV prevalence in the age group 35 - 39 years has increased significantly by 9.1% in the last four years from 29.3% in 2006 to 32.4% in 2008 and 38.4% in 2010 (Figure 11).

The HIV prevalence among women under 30 years has stabilized in the four age-specific intervals since 2006 while the prevalence in the women above 30 years continues to increase significantly (Table 6).

3.6 HIV prevalence trends by individual province

For each province, comparison of the provincial, district level and age distribution HIV prevalences are reported from 2008 to 2010. **Due to the smaller sample size in some districts, the sampling error is much larger than at the provincial level. Therefore changes of 4% in either direction between the years within a district can be expected due to chance, if the sample size was less than 500, and even greater for smaller sample sizes.**

3.6.1 THE EASTERN CAPE PROVINCE

In 2010, the Eastern Cape provincial HIV prevalence amongst antenatal women was 29.9% (95% CI: 28.2 – 31.7). The estimated overall HIV provincial prevalence in this province has increased by 2.3% from 27.6% in 2008 to 29.9% in 2010, as shown by the epidemic curve (Figure 12). The trends in district prevalence rates from 2008 to 2010 are presented in Table 7.

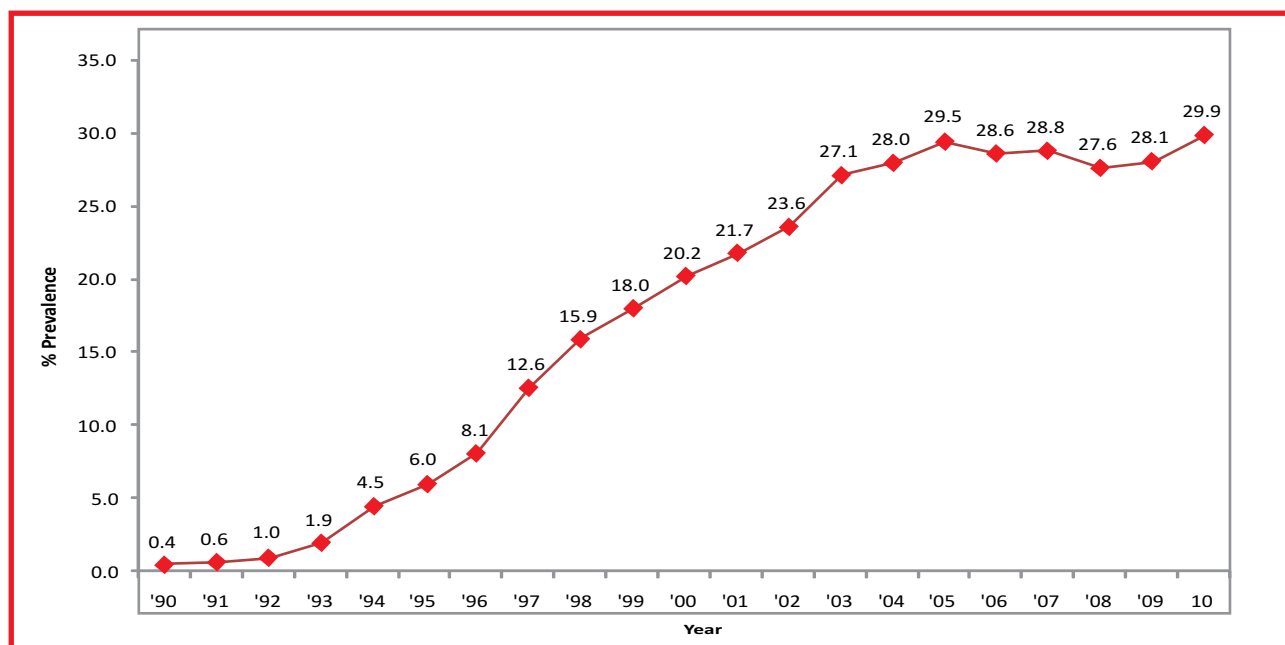


Figure 12: HIV prevalence epidemic curve among antenatal women, Eastern Cape from 1990 to 2010

Table 7 HIV prevalence among antenatal women by district in the Eastern Cape, 2008 - 2010.

YEAR	2008			2009			2010		
	N	%HIV+	95% CI	N	%HIV+	95% CI	N	%HIV+	95% CI
Provincial	4 216	27.6	25.9 – 29.6	4 225	28.1	26.1 – 30.1	3 994	29.9	28.2 – 31.7
Alfred Nzo	201	29.8	22.3 – 38.6	186	23.7	16.3 – 33.0	133	26.3	21.5 – 31.8
Amatole	1 128	26.5	23.0 – 30.3	1 116	27.2	24.5 – 30.2	1 029	31.6	28.7 – 34.6
Cacadu	281	23.8	17.7 – 31.2	255	24.3	16.4 – 34.5	275	20.7	14.8 – 28.2
Chris Hani	529	27.0	22.9 – 31.5	491	27.1	23.1 – 31.4	548	30.1	26.5 – 34.0
N.M.M.	795	29.0	23.4 – 35.4	785	30.7	24.0 – 38.4	677	29.0	23.6 – 35.0
O.R. Tambo	1 063	29.6	26.2 – 33.2	1 192	29.8	27.1 – 32.6	1 097	31.5	28.5 – 34.7
Joe Gqabi (Ukhahlamba)	219	21.9	15.2 – 30.5	200	23.5	16.0 – 33.2	235	30.2	23.4 – 38.0

N = Realized sample; CI= Confidence Interval.

Source: Antenatal Sentinel HIV Survey, National Department of Health

In 2010 there were four districts in the Eastern Cape that recorded HIV prevalence above 30%. Only one district i.e. Cacadu where the HIV prevalence decreased from 24.3% in 2009 to 20.7% in 2010. The decrease HIV prevalence in Cacadu district is encouraging, however the sample size is too small to draw any statistical conclusions in the trends recorded (Figure 13 and Table 7).

As might be expected, significant year on year changes were observed in the districts with smaller sample sizes). The HIV prevalence in Joe Gqabi district (formerly known UKhahlamba significantly increased by 8.3%, from 21.9% in 2008 to 30.2% in 2010.

The O.R. Tambo and Chris Hani district HIV prevalence rate have slightly increased from 29.6% in 2008 to 31.5% in 2010 and 27.0% in 2008 to 30.1% in 2010 respectively, which is nearly equal to the national overall prevalence of 30.2%. Alfred Nzo, Amatole and Nelson Mandela Metro have recorded increased HIV prevalences in 2010 than 2009 (Table 7).

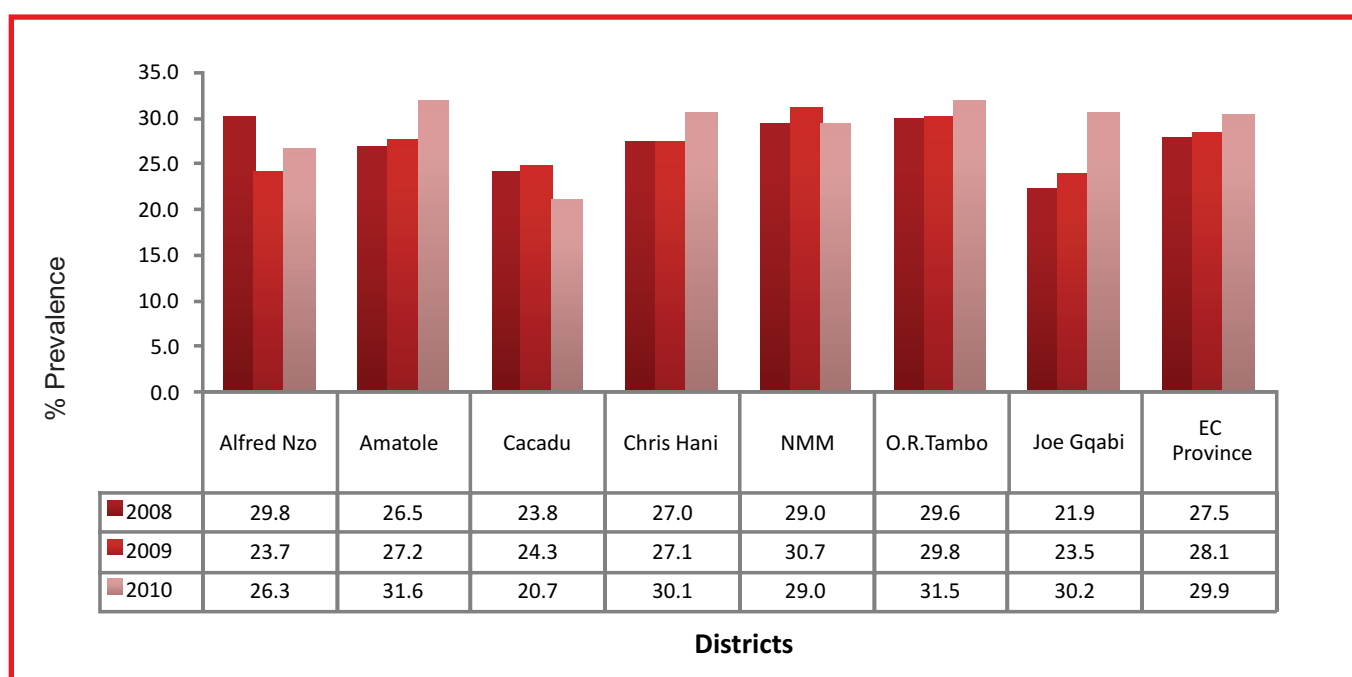


Figure 13: HIV prevalence trends among antenatal women by district, Eastern Cape, 2008, 2009, 2010

Table 8: HIV prevalence among antenatal women by age group, Eastern Cape, 2008 to 2010.

YEAR Age group	2008		2009		2010	
	N	%HIV+	N	% HIV+	N	%HIV+
*15 - 24	2 196	22.8	2 158	20.7	2 097	21.8
10-14	23	4.3	16	20.0	19	0.0
15 -19	930	12.6	964	12.1	907	12.0
20 – 24	1 266	30.3	1 194	27.6	1 190	29.3
25 – 29	914	36.7	908	38.2	868	39.7
30 – 34	607	35.3	624	37.0	504	44.4
35 – 39	326	25.5	341	33.7	324	34.6
40 – 44	109	16.5	109	25.7	112	28.6
45 – 49	10	0.0	15	20.0	14	21.4
>49	1	100	3	0.0	1	0.0

* Prevalence among the age group 15 – 24 years used as is an Indicator for goal 6 of the MDG.
N = Realised sample size.

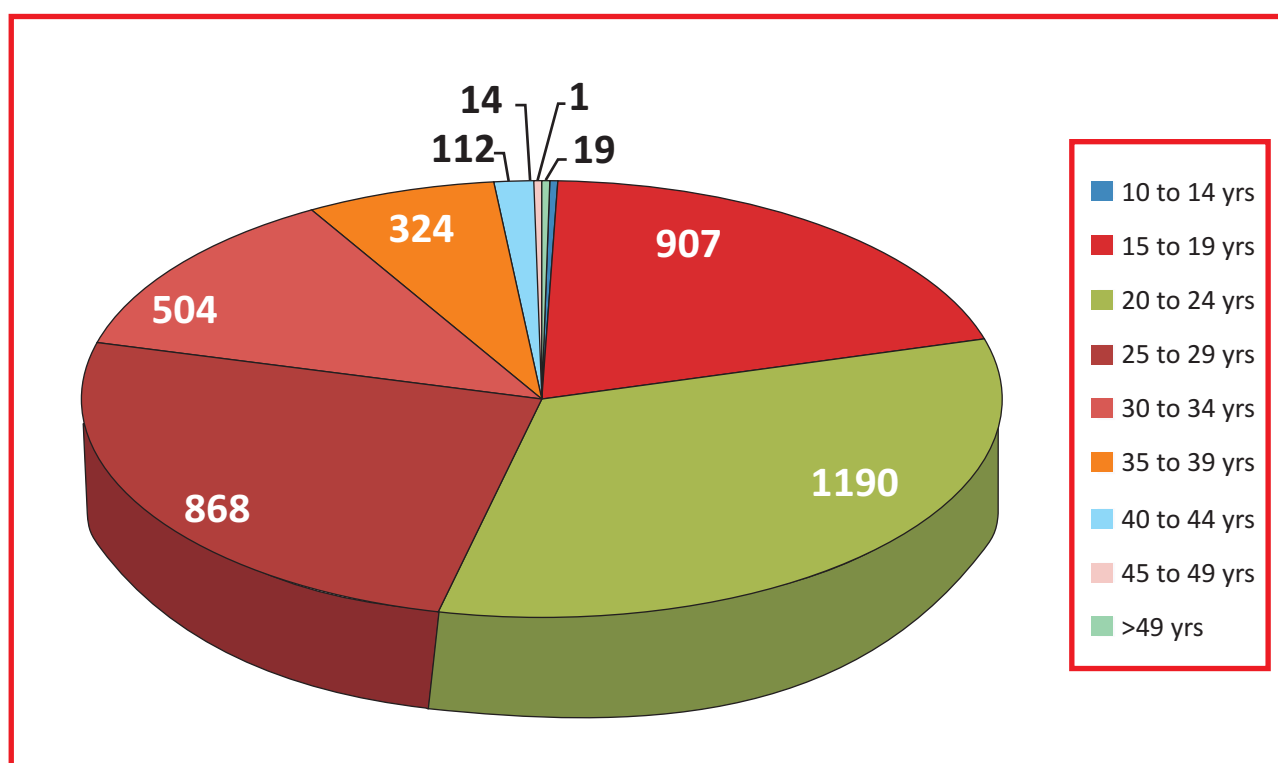


Figure 14: Sampled population distribution by age group, Eastern Cape, 2010.

The age distribution of pregnant women who participated ranged from nineteen 10 to 40 year olds. Women in these 2 extreme age categories are classified as high risk in pregnancy. The majority of the survey participants from this province were in the age group (15 – 24 years old women (Figure 14).

The HIV prevalence among the 15 - 24 year olds (which is the Millennium Development Goal 6, Target 7 indicator 18 group) remained stable at around 21%, with prevalence ranging from 22.8% in 2008, to 20.7% in 2009 and to 21.8% in 2010. There was stabilization in the HIV prevalence among young women in the age group 15 - 19 years from 12.6% in 2008 to 12.1% in 2009 and 12.0% in 2010. All other age group categories in this province have shown an increase in HIV prevalence between 2009 and 2010.

The changes in HIV prevalence distribution by district in the Eastern Cape between 2008 and 2010 is shown in Figure 15.

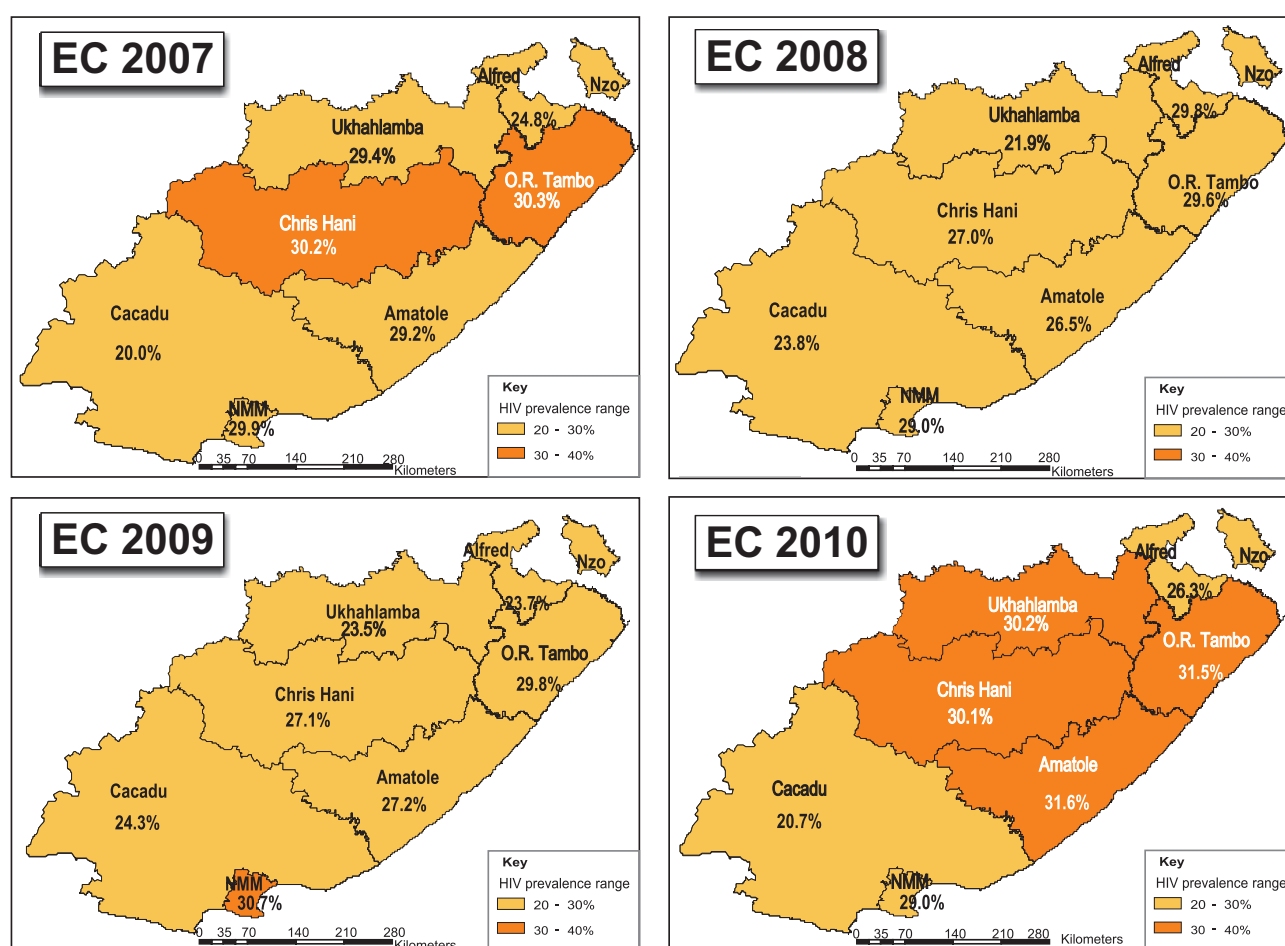


Figure 15: HIV prevalence distribution among antenatal women by district, Eastern Cape, 2007 - 2010

3.6.2 FREE STATE PROVINCE

In 2010, the Free State provincial HIV prevalence amongst antenatal women was 30.6% (95% CI: 28.3 – 33.0). This shows a slight increase of 0.5% from 30.1% recorded in 2009 (Figure 16).

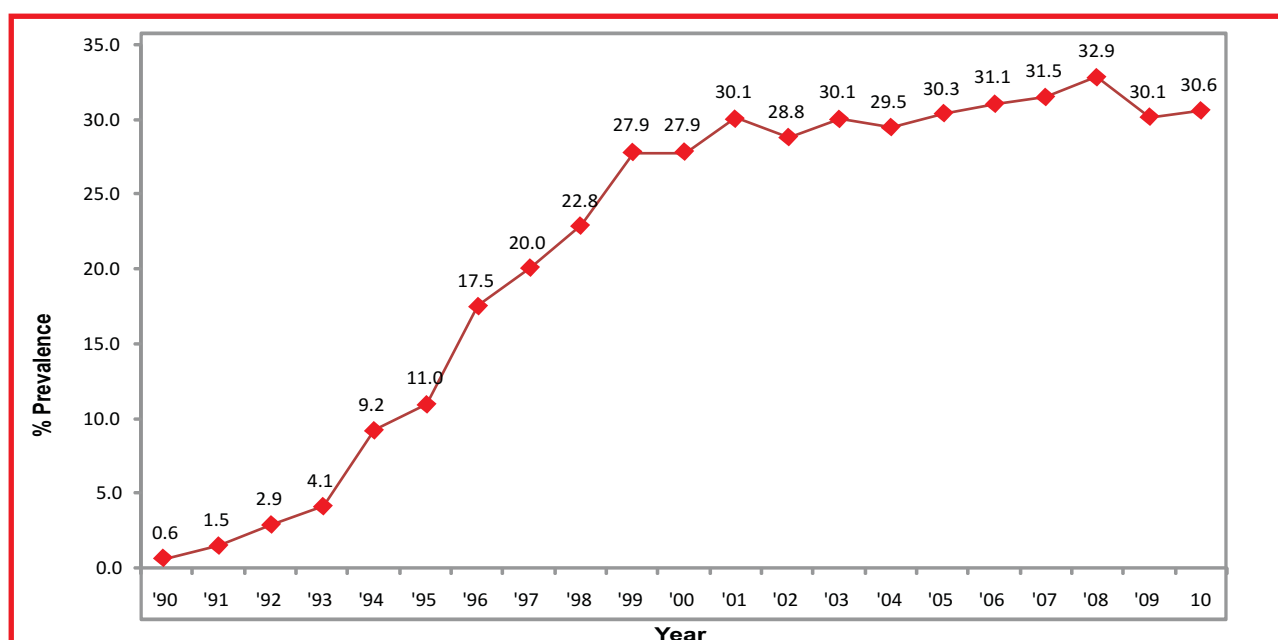


Figure 16: HIV prevalence epidemic curve among antenatal women, Free State, 1990 to 2010

Table 9: HIV prevalence among antenatal women by district, in the Free State, 2008 to 2010.

YEAR	2008			2009			2010		
	N	% HIV+	95% CI	N	% HIV+	95% CI	N	% HIV+	95% CI
Provincial	2 016	32.9	30.5 – 35.4	336	30.1	28.1 – 32.1	2 223	30.6	28.3 – 33.0
Fezile Dabi	336	34.5	29.7 – 39.6	416	27.9	24.5 – 31.5	413	32.9	28.0 – 38.3
Lejweleputswa	571	33.8	29.2 – 38.6	611	33.4	29.3 – 37.87	601	30.0	26.1 – 34.2
Motheo	486	31.6	26.6 – 37.1	601	27.8	23.7 – 32.2	545	32.1	27.2 – 37.4
Thabo Mofutsanyana	519	33.1	28.9 – 37.6	603	31.3	27.9 – 35.1	558	30.7	26.0 – 35.8
Xhariep	104	26.9	16.8 – 40.0	105	25.7	16.4 – 37.9	106	17.0	10.4 – 26.5

Source: Epidemiology & Surveillance National Department of Health

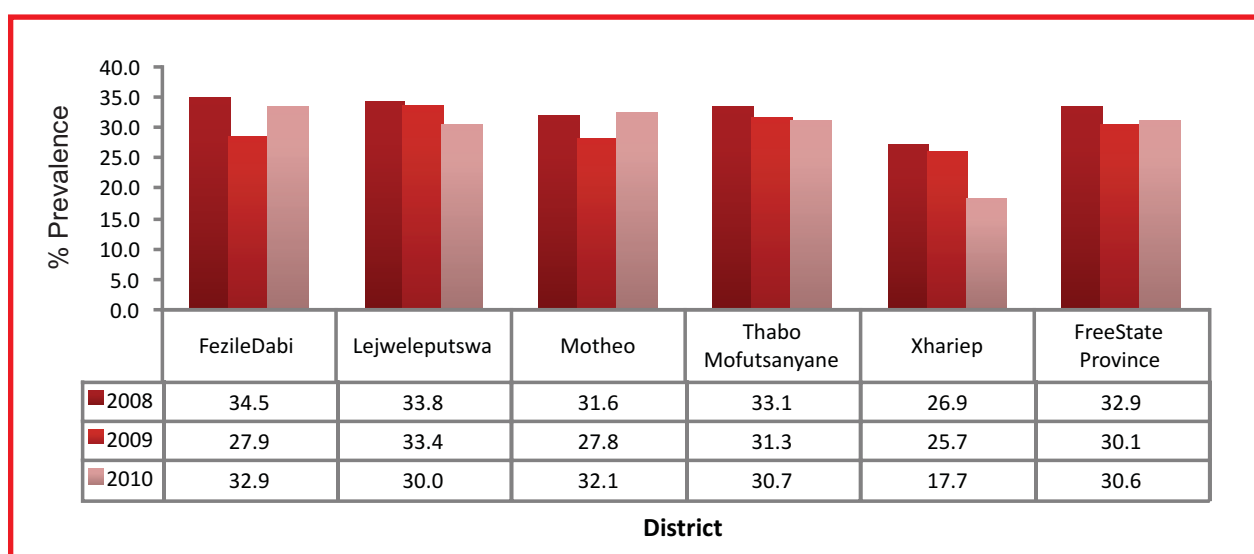


Figure 17: HIV prevalence trends among antenatal women by district, Free State, 2008 to 2010.

The Xhariep district's HIV prevalence decreased significantly by 9.9%, from 26.9% in 2008 to 17.0% in 2010. Four districts of the Free State in 2010, compared with two districts in 2009, recorded prevalence above 30%. The interpretation of HIV prevalence in districts with sample size less than 400, should be interpreted with caution.

However, Lejweleputswa and Thabo Mofutsanyane have shown slight decreases, from 33.4% in 2009 to 30.0% in 2010 and from 31.3% to 30.7% in 2010 respectively. Table 9 and Figure 17).

Fezile Dabi recorded an increase of 5.0% from 27.9% in 2009 to 32.9% in 2010, followed by Motheo with an increase of 4.3%, from 27.8% in 2009 to 32.1% in 2010.

Table 10: HIV prevalence among antenatal women by age group, Free State, 2008 to 2010.

Age group	2008		2009		2010	
	N	% HIV+	N	% HIV+	N	% HIV+
*15 - 24	1 038	22.0	1 144	21.8	1 118	21.0
10-14	8	28.0	16	0.0	14	0.0
15 -19	395	12.7	426	15.0	443	14.0
20 – 24	643	27.7	718	25.8	675	25.6
25 – 29	468	42.1	567	36.7	554	36.8
30 – 34	301	50.5	350	42.9	324	46.9
35 – 39	168	42.9	194	39.7	172	44.2
40 – 44	26	34.6	57	26.3	38	34.2
45 – 49	4	0.0	4	75.0	3	0.0
>49	**	**	**	**	**	**

* Prevalence among the age group 15 – 24 years used as is an Indicator for goal 6 of the MDG; N= Realised sample size.

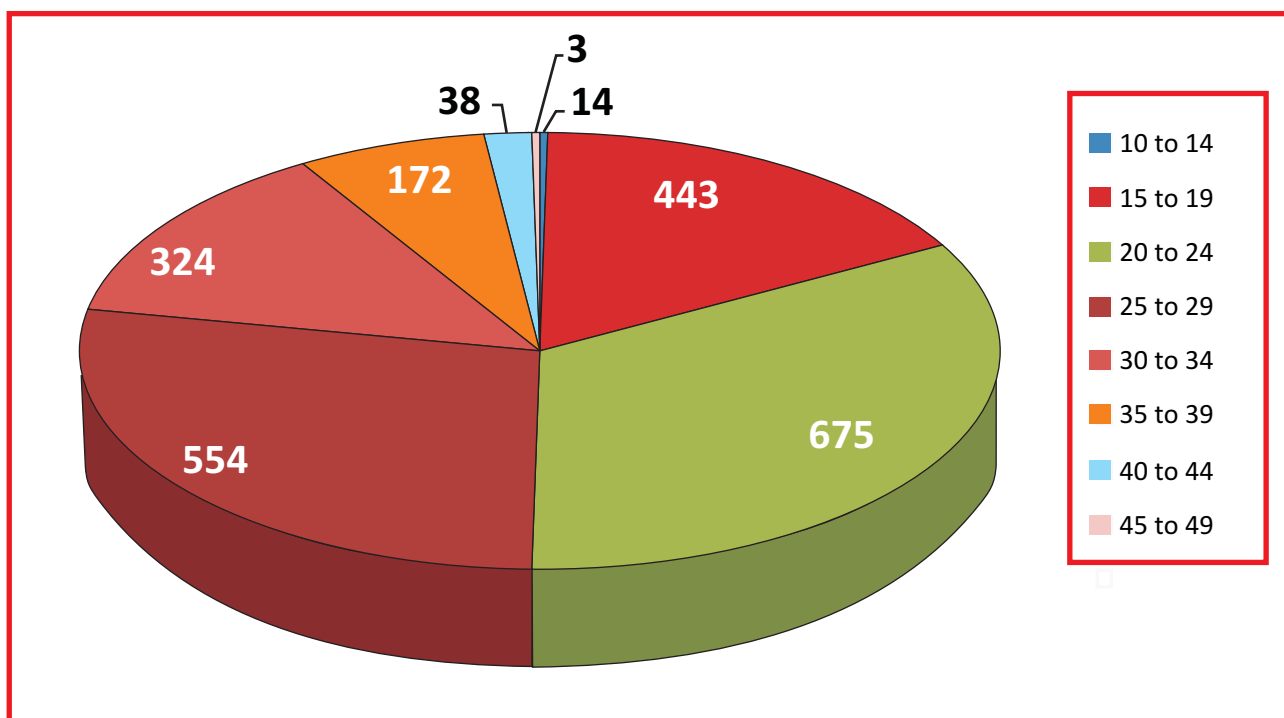


Figure 18: Sampled population distribution by age group, Free State, 2010

The age distribution of pregnant women who participated in the 2010 survey ranged from 10-14 years old to above 40 years of age. The majority of the participants in the Free State survey were women aged 20 – 24 years (Figure 18).

The HIV prevalence rates among the 15 - 24 year olds (which is the Millennium Development Goal 6, Target 7 indicator 18) in this province was 22.0% in 2008, 21.8% in 2009 and 21.0% in 2010. This group constituted almost 55% of the survey population. There was a slight decrease in HIV prevalence among young women in the age group 15 - 19 years, from 15.0% in 2009 to 14.0% in 2010, a decline of 1.0% (Table 10).

The HIV prevalence among women in the age group 30 - 34 years remains the highest, with a 4.0% increase in prevalence, from 42.9% in 2009 to 46.9% in 2010. This age group constituted 14.0% of the sampled survey population. In 2008 the HIV prevalence among the 30-34 year old age group was 50.5% in the Free State province (Figure 17 and Table 9).

The HIV prevalence in the age group 35 - 39 years has increased by 5.0% from 39.7% in 2009 to 44.2% in 2010. When comparing the HIV prevalence in the different age categories with previous years, it has gone up slightly in all age groups.

The change in HIV infection and distribution in the Free State from 2008 to 2010 is shown in Figure 19.

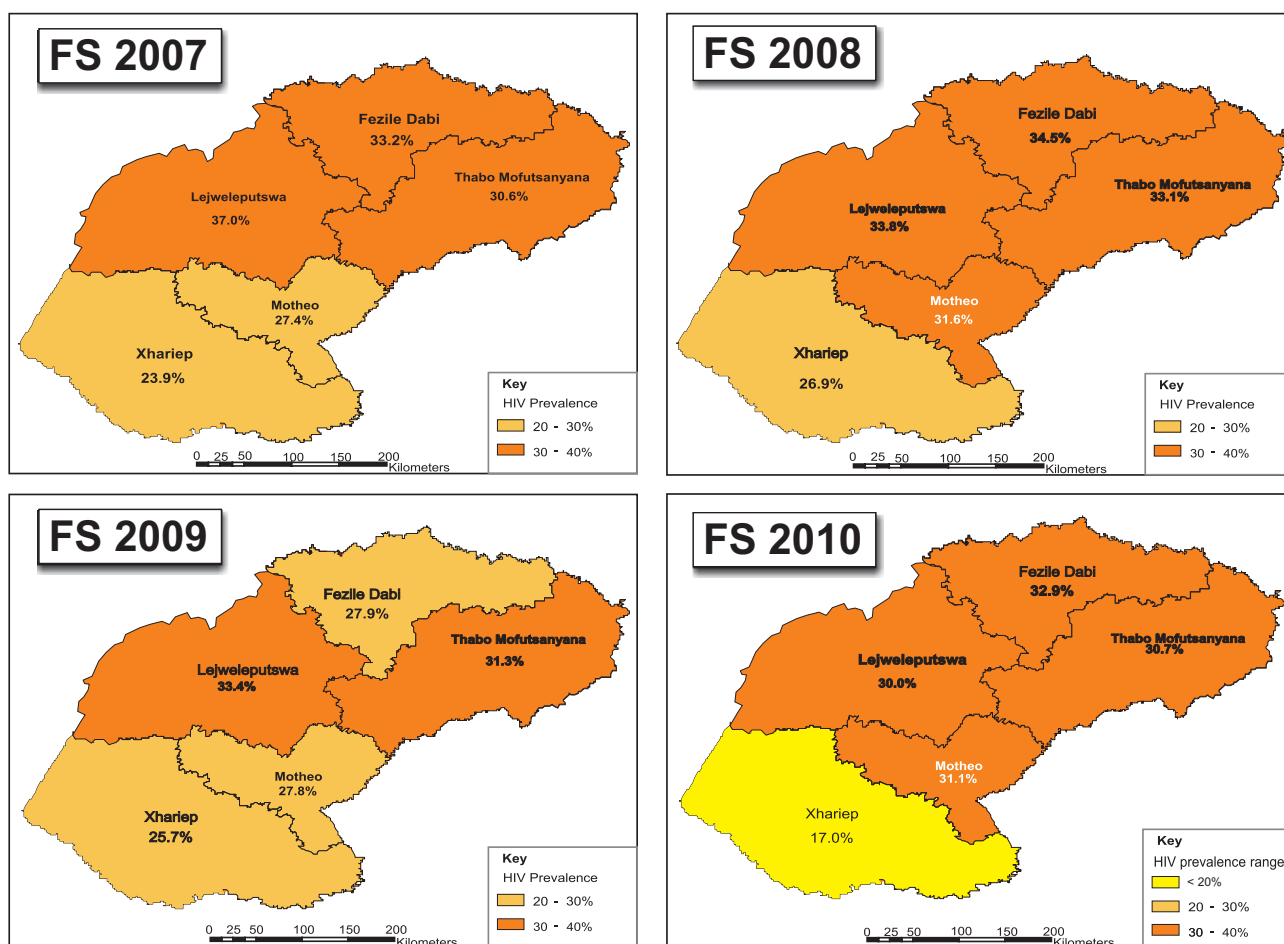


Figure 19: HIV prevalence distribution among antenatal women by district, Free State, 2007 - 2010.

3.6.3 GAUTENG PROVINCE

In 2010, the Gauteng provincial HIV prevalence amongst antenatal women was 30.4% (95% CI: 29.1 – 31.8). The overall prevalence in Gauteng has increased from 29.9% in 2008 to 30.4% in 2010 (Figure 20).

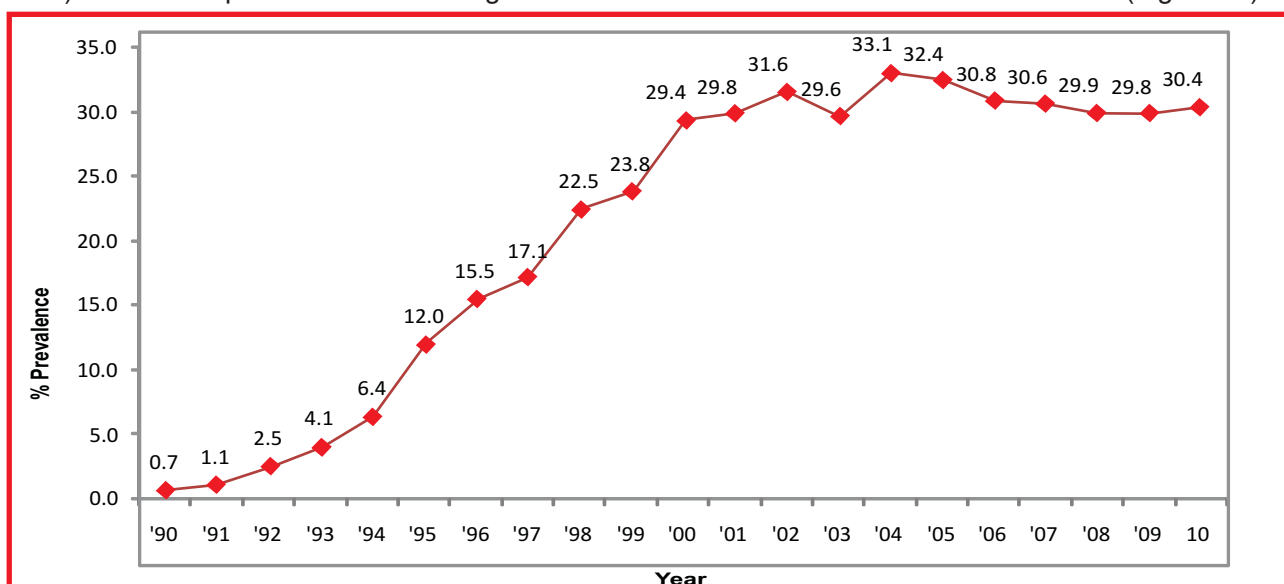


Figure 20: HIV prevalence epidemic curve among antenatal women, Gauteng, 1990 to 2010.

The results of this survey suggest that the overall HIV prevalence in the City of Johannesburg, Ekurhuleni and Tshwane has remained stable from 2007 to 2010. The highest HIV prevalence of 33.8% was again recorded in Ekurhuleni in 2010, followed by West Rand with a prevalence of 33.2%. Sedibeng and West Rand districts have shown an HIV prevalence increase of 2.0% and 3.1% respectively (Table 11 and Figure 21). All the health districts in Gauteng recorded HIV prevalences above 25.7% among 15-49 year old pregnant women.

Table 11: HIV prevalence among antenatal women by district in the Gauteng, 2008 to 2010.

YEAR	2008			2009			2010		
	N	% HIV+	95% CI	N	% HIV+	95% CI	N	% HIV+	95% CI
Provincial	7 497	29.9	28.5 – 31.2	7 187	29.8	28.6 – 31.1	6 714	30.4	29.1 – 31.8
City of JHB	2425	31.0	28.7 – 33.4	2 489	29.0	27.0 – 31.0	2 000	29.6	27.4 – 32.0
Ekurhuleni	2006	31.5	28.7 – 34.7	1 896	34.0	31.5 – 36.7	1 959	33.8	31.7 – 35.9
Metsweding	131	25.1	16.9 – 35.6	120	33.3	24.9 – 43.0	125	31.2	26.2 – 36.7
Sedibeng	740	31.8	28.7 – 35.1	667	28.9	25.9 – 32.2	499	30.9	26.5 – 35.6
Tshwane	1639	26.1	23.2 – 29.2	1 466	25.7	23.1 – 28.6	1 583	26.1	22.9 – 29.6
West Rand	556	27.8	23.7 – 32.4	549	30.1	26.2 – 34.3	584	33.2	29.7 – 37.0

Source: Epidemiology & Surveillance National Department of Health

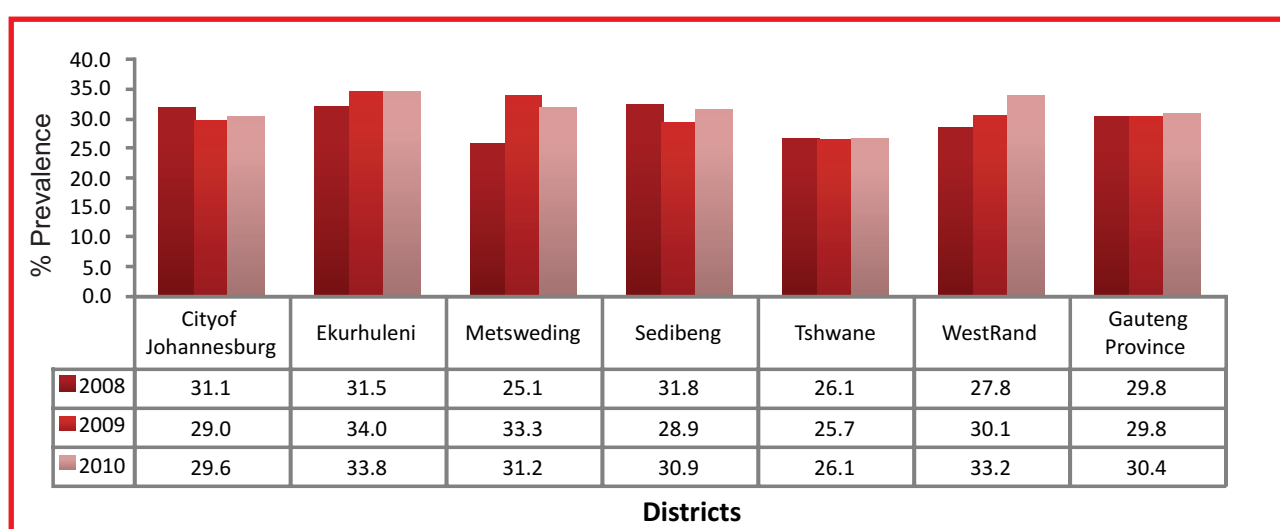


Figure 21: HIV prevalence trends among antenatal women by district, Gauteng, 2008, 2009 and 2010.

Table 12: HIV prevalence among antenatal women by age group, Gauteng, 2008 to 2010.

YEAR	2008		2009		2010	
Age group	N	%HIV+	N	% HIV+	N	% HIV+
*15 - 24	3 330	21.1	3 221	20.7	2 927	20.8
10-14	23	13.0	16	6.3	12	8.3
15 -19	1 038	14.4	943	12.1	887	12.6
20 – 24	2 292	24.2	2 278	24.2	2 040	24.4
25 – 29	2 046	36.7	1 956	35.1	1 928	36.3
30 – 34	1 262	40.6	1 154	43.6	1 068	40.5
35 – 39	696	34.6	575	38.3	545	42.2
40 – 44	157	25.5	157	23.6	138	31.2
45 – 49	15	33.3	14	42.9	8	25.0

* Prevalence among the age group 15 – 24 years used as is an Indicator for goal 6 of the Millennium Development Goals

** No participants in this age group

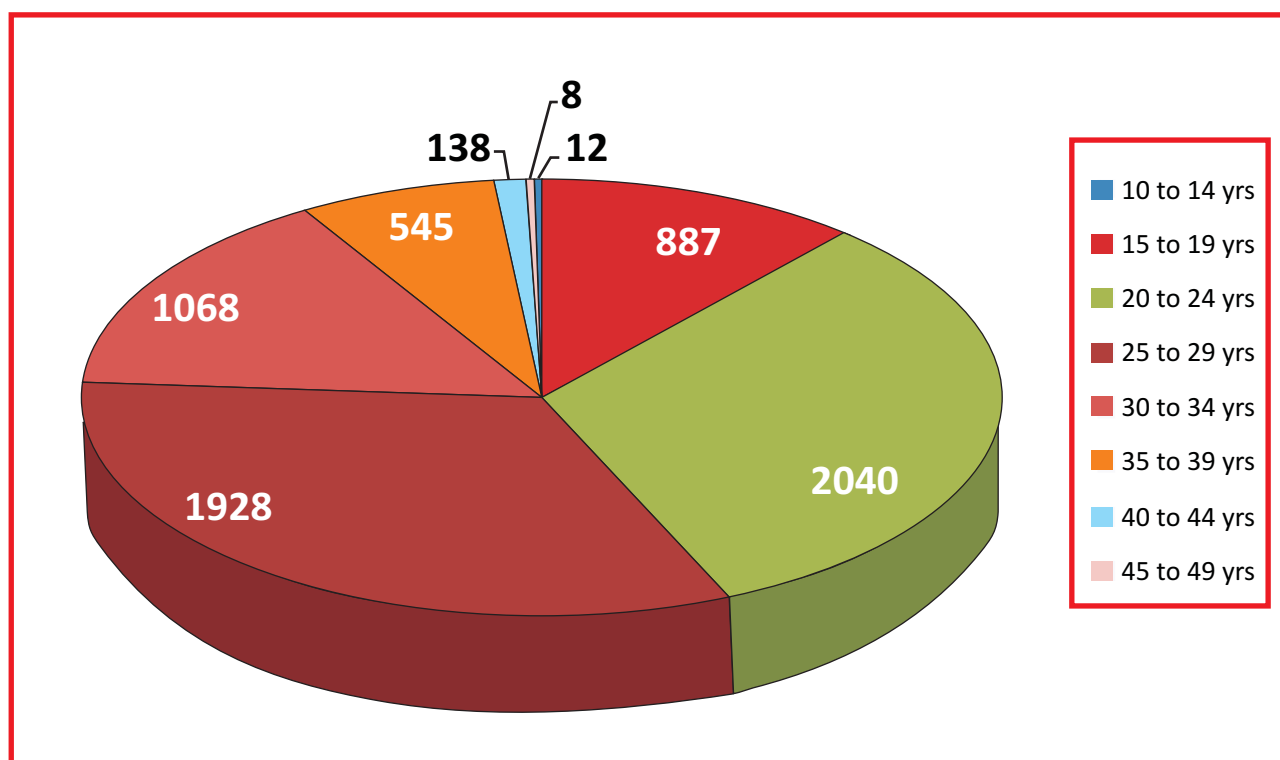


Figure 22: Sampled population distribution by age group, Gauteng, 2010.

In Gauteng province, the age distribution of pregnant women who participated ranged from 10 years to 49 years in the past 3 years. The majority of the survey participants were young women (20 - 24 years). Twelve women who participated in the survey were less than 14 years of age, of which 8.3% of them were HIV infected (Figure 22).

The trends in this age group in Gauteng require that additional efforts must be made to reduce HIV prevalence rate. In 2008 the 15 - 24 year old pregnant women's HIV prevalence was 21.1% compared with 20.7% in 2009, and 20.8% in 2010 which does not indicate a decline in HIV prevalence in this group (unless ART is factored in). This MDG group constituted almost 50% (N = 2 927) of the survey population.

There was a slight decrease in HIV prevalence among young women in the age group 15 - 19 years from 14.4% in 2008 to 12.6% in 2010, a decline of 2.0%. The HIV prevalence among women in the age group 30 - 34 years, remains high, with 40.6% in 2008 to 43.6% in 2009 and 40.5% in 2010. The HIV prevalence among the 30 – 39 years in Gauteng has been increasing from 34.6% in 2008 to 38.3% in 2009 and 42.2% in 2010, in each age group respectively.

The changes in HIV prevalence distribution by district from 2008 to 2010 of HIV prevalence by district in Gauteng province are shown in Figure 23.

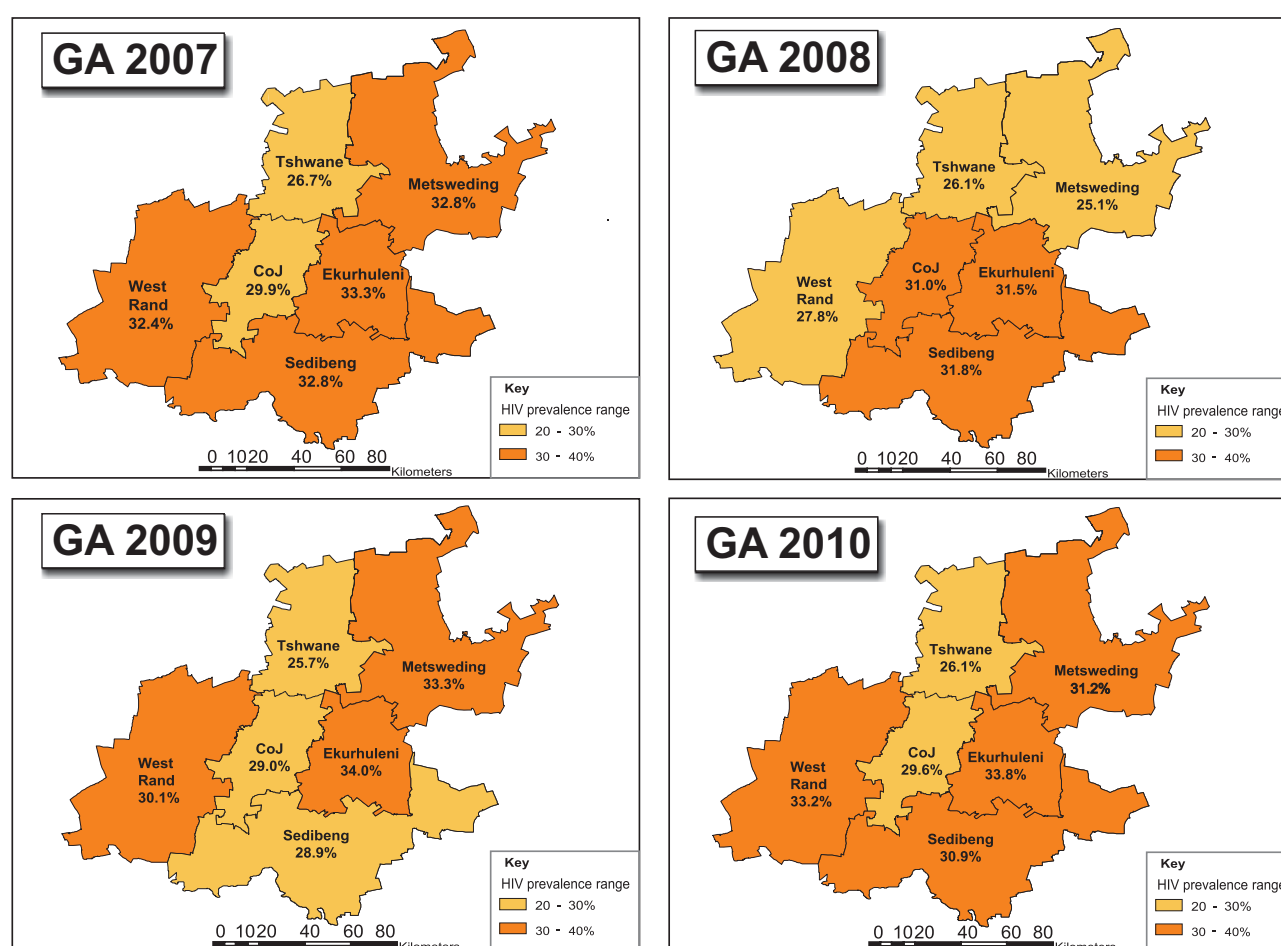


Figure 23: HIV prevalence distribution among antenatal women by district, Gauteng, 2007 – 2010.