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The 2019 National Antenatal HIV Sentinel Survey (ANCHSS) Key Findings

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Disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention (CDC).

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Executive Summary

Background: The Antenatal HIV Sentinel Survey (ANCHSS) has been conducted in South Africa since 1990, annually between 1990 and 2015 and biennially since 2015, with the main aim of monitoring HIV epidemic trends among 15–49 year old pregnant women attending antenatal clinics. The 2019 survey was the 28th survey conducted in South Africa.
The objectives of the 2019 survey were:

- to estimate HIV prevalence and the geographic distribution of HIV, knowledge of HIV status, and coverage of antiretroviral therapy (ART) among pregnant women attending antenatal care (ANC) in selected public health facilities from across all districts of South Africa, and
- to estimate the coverage of maternal syphilis screening and treatment, the prevalence of unintended pregnancy, and early attendance of ANC.

Methods: A total of 37 116 pregnant women from 1 589 public health facilities, selected from across the 52 districts of South Africa were included in the 2019 survey conducted between 1 October and 15 November 2019. Sentinel sites were selected using multistage stratified cluster sampling method. From each of the 1 589 public facilities, consenting women aged between 15 and 49 years attending ANC were consecutively enrolled until sample size was achieved or until the end of the study period, whichever came first. The target sample size was to enrol 36 015 eligible pregnant women at national level. The data collection procedures included a brief interview of enrolled women by clinic nurses as they performed their routine tasks, medical record review, and blood specimen collection. Demographic and clinical information collected from interviews and medical record review included: age of the woman, gestational age at first booking, HIV testing history, latest HIV rapid test result, ART initiation, timing of ART initiation, and maternal syphilis screening and treatment. To assess pregnancy intent, participants were asked two questions adopted from the London Measure of Unplanned Pregnancy – these questions assessed the woman's intention to become pregnant before pregnancy, and whether intention to become pregnant was discussed with the partner (i.e. the father of the child) – both questions were answered by the pregnant woman. These two pregnancy intention questions were classified into the following three categories: 1) in both questions the pregnancy was reported as 'unintended' 2) in both questions the pregnancy was reported as 'intended' and 3) 'ambivalent (undecided)' which included responses where one response indicated the pregnancy was intended and the other response did not. A whole blood sample was collected from participants and samples were tested using the routine algorithm for HIV infection on enzyme–linked immunosorbent assay (EIA) 4th generation platforms. All analyses considered the survey design (clustering within facilities and stratification by district) and were weighted for sample size realization (at district level) and for the Statistics South Africa (Stats SA) 2019 mid-year population size of women of reproductive age (15−49 years) at province level. A population finite correction factor was added in all analysis to adjust for the >5% of facilities sampled without replacement from a finite population of about 4 000 public facilities. We reported frequencies and percentages. Ninety-five percent (95%) confidence intervals (CI) or P values from chi-square tests were reported. Data were analysed using STATA 14 (StataCorp. 2015. *Stata Statistical Software: Release 14*. College Station, TX: StataCorp LP).

Results: The national antenatal HIV prevalence was estimated at 30.0% (95% CI: 29.4%–30.6%) −this figure was 0.7% points lower than the prevalence reported in 2017 (30.7%, 95% CI: 30.1%−31.3%). The highest HIV prevalence was in KwaZulu-Natal (40.9%, 95% CI: 39.6%–42.3%) followed by Eastern Cape (36.5%, 95% CI: 35.2%–37.9%). The lowest overall HIV prevalence was in Western Cape at 17.9% (95% CI: 16.2%–19.7%). HIV prevalence among the 15–24 year age group continued to show steady decline – with prevalence declining from 11.2% to 10.3% (P value=0.07) and from 21.8% to 19.4% (P value <0.01) among the 15–19 year and 20–24 year age groups respectively between 2017 and 2019.

Of the 11 321 HIV-positive pregnant women in the survey, 97.6% (11 046) already knew they were HIV-positive at the time of the survey, and of these, 96.0% (10 271) were already on ART at the time of the survey. The coverage of ART in the prevention of mother-to-child transmission (PMTCT) programme was high in all age group.

Among a total of 10 778 EIA positive participants whose timing of HIV diagnosis was reported, 72.7% (7 912) knew their HIV-positive status before pregnancy. Of those who knew their HIV-positive status before pregnancy and whose treatment status was reported (7 735), 93.3% (7 207) were initiated on ART before pregnancy. Knowledge of HIV-positive status before pregnancy significantly improved (by 19.6%) between the 2017 (60.8%, 95% CI: 59.9%−61.7%) and 2019 (72.7% (95% CI: 71.9%–73.4%) surveys. Knowledge of HIV-positive status before pregnancy was significantly lower among younger women (15–19 years and 20–24 years: 47.6% and 59.4% respectively) compared to older women (35–49 years: 85.1%, P value <0.01).

More than half (51.6%) of the pregnancies in this study were unintended. Adolescent girls (15−19 years) (76.3%, 95% CI: 74.9%–77.6%) and young women (20−24 years) (56.5%, 95% CI: 55.4%–57.6%) had higher prevalence of unintended pregnancy compared to older women (35−49 years) (45.2%, 95% CI: 43.9%–46.6%). Participants in a non-cohabiting relationship (64.3%, 95% CI: 63.4%–65.2%) and single women (76.0%, 95% CI: 73.9%–78.0%) had higher prevalence of unintended pregnancy compared to participants who were married (27.0%, 95% CI: 26.0%–28.1%) or cohabiting with their partner (41.4%, 95% CI: 40.3%–42.5%). More than two-thirds (70.1%, 95% CI: 69.5%–70.7%) of participants attended their first-ANC-visit before 20 weeks of pregnancy. Attendance of ANC before 20 weeks of pregnancy was significantly lower among participants whose pregnancy was unintended (66.7%, 95% CI: 66.0%–67.4%) compared to participants whose pregnancy was intended (74.3%, 95% CI: 73.5%–75.2%).

Maternal syphilis screening coverage was 96.4% at national level. All provinces had greater than 90% maternal syphilis screening coverage. Of those who had syphilis screening, 2.1% (95% CI: 2.0%−2.3%) were positive for syphilis, 79.4% were negative, 17.3% were awaiting results and 1.2% of results were not in the patient file. After excluding the pending results and the results not in the file, the prevalence of syphilis (per medical record review data) among those who had a syphilis test result, was 2.6% (95% CI: 2.4%−2.9%) (793) at national level. Compared to the prevalence of syphilis in 2015 (which was 2.0% based on laboratory testing), the current syphilis prevalence represents a 30% increase in prevalence between 2015 and 2019. The highest syphilis prevalence was in Eastern Cape at 3.8% (95% CI: 2.6%−5.4%) and the lowest was in Limpopo at 1.4% (95% CI: 1.0%−1.8%). Of 729 participants who were syphilis positive and whose syphilis treatment status was reported, 92.3% (671) received treatment for syphilis. Most (93.1%, 553) of those treated for syphilis with treatment data available (599) were treated with Benzathine Penicillin G.

Conclusion: HIV prevalence among pregnant women has remained largely unchanged at around 30% since 2004. The consistent decline in HIV prevalence among young women (15–24 years) is encouraging as this age group experiences a high rate of HIV incidence (1.5%) compared to their male counterparts (0.5%). The high PMTCT ART coverage regardless of age group shows the success of the PMTCT programme. Promising progress has been observed in the number of HIV-positive women initiating ART before pregnancy, although young women (15–24 years) were still less likely to know their HIV-positive status before pregnancy compared to older women (>35 years).

Despite free contraceptive services provided in public health facilities in South Africa, the prevalence of unintended pregnancy was very high. Innovative strategies need to be deployed in order to increase uptake of contraceptives and dual protection, particularly amongst young women, for instance by expanding the available channels for accessing contraception through private-sector partnerships and the chronic medicines

dispensing and distribution (CCMDD) programme. Providing information (through national educational media campaigns) on available contraceptive choices could enable women and couples to find an option that suits their individual needs. In collaboration with the Departments of Basic Education, Higher Education and Social Development, strategies to strengthen school based sexual and reproductive health education could be developed to address the dual burden of HIV/sexually transmitted diseases and unplanned pregnancy among adolescent girls and young women. Additional research could be done into Adolescent and Youth Zones at facilities to identify specific strategies that have been successful and could be scaled-up nationally.

According to these data, syphilis prevalence increased from 2.0% in 2015 to 2.6% in 2019 − this finding is concerning, particularly in the context of the severe adverse pregnancy and neonatal outcomes associated with maternal syphilis. Increasing testing coverage and improving turnaround time of results, through the launch of the dual HIV/Syphilis rapid test, and improved treatment rates, through ensuring the availability of Benzathine Penicillin are key strategies for the eradication of congenital syphilis. Broader screening could also be undertaken to determine if the observed pattern of increasing syphilis prevalence is found in other populations, and suitable strategies should subsequently be implemented based on these findings. This could, in particular, be considered amongst key populations and contraceptives service clients.

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Acronyms

AIDS	Acquired Immunodeficiency Syndrome
ANC	Antenatal care
ANCHSS	Antenatal HIV sentinel survey
ART	Antiretroviral therapy
BPG	Benzathine penicillin G
CCMDD	Chronic medicines dispensing and distribution
CDC	Centers for Disease Control and Prevention
CI	Confidence interval
DHIS	District Health Information System
EC	Eastern Cape province
eMTCT	Elimination of mother-to-child transmission
EIA	Enzyme-linked immunosorbent assay
FS	Free State province
GP	Gauteng province
HIV	Human Immunodeficiency Virus
HSRC	Human Sciences Research Council
IQR	Interquartile range
KZN	KwaZulu-Natal province
LP	Limpopo province
MMC	Male medical circumcision
MP	Mpumalanga province
MTCT	Mother-to-child transmission
NC	Northern Cape province
NDoH	National Department of Health
NHLS	National Health Laboratory Service
NICD	National Institute for Communicable Diseases
NMC	Notifiable Medical Condition
NSP	National strategic plan
NW	North West province
PLHIV	People living with HIV
PMTCT	Prevention of mother-to-child HIV transmission
PPS	Probability proportional to size
PSU	Primary sampling unit
RPR	Rapid Plasma Regain
SAHPRA	South African Health Products Regulatory Authority
SAMRC	South African Medical Research Council
SANAS	South African National Accreditation System
Stats SA	Statistics South Africa
STI	Sexually transmitted infections
UNAIDS	The Joint United Nations Programme on HIV/AIDS
WC	Western Cape province
WHO	World Health Organization

Chapter 1: Introduction

1.1. Background

South Africa remains the global epicentre of the HIV epidemic, accounting for more than a quarter of new HIV infections in East and Southern African countries and had an estimated 7.5 million people living with HIV (PLHIV) in 2019[1]. Despite having the largest HIV epidemic, the country has made significant progress in reducing new HIV infections and AIDS related deaths by 39% and 50% respectively between 2010 and 2018[2]. Access to HIV testing and effective antiretroviral therapy (ART) has also improved substantially with the implementation of the test and treat initiative, and increased availability of affordable drugs with fewer side effects. The country remains committed to the Joint United Nations Programme on HIV/AIDS (UNAIDS) 90-90-90 targets which aim to ensure 90% of PLHIV know their HIV status, 90% of people diagnosed with HIV receive sustained ART and 90% of people on ART have viral suppression by 2020, with these targets increasing to 95% by 2030[3].

Available evidence shows that South Africa has met the first 90 of the UNAIDS 90-90-90 targets at national level[2]. In 2019, at national level, 92% of PLHIV knew their HIV status although there was substantial sub-population level variation (e.g. by age) in the achievement of this target[2, 4, 5]. For the second 90/ART coverage target, as of September 2019, 70% of HIV-positive people who knew their HIV status nationally were receiving ART, which is far below the 90% ART coverage target for 2020[6]. Challenges to reaching the second 90 target include lack of facilitated linkage and loss to follow-up[2, 7-10]. According to the 2017 household survey, South Africa has also been progressing well towards the third 90 target, with 87.5% of PLHIV on ART being virally suppressed[11]. However, viral load monitoring, which plays a crucial role in the progress towards the 3rd 90 target, remains low (<75%) in South Africa[6].

The South African National Strategic Plan (NSP) for 2017−2022 highlights the need to focus HIV responses on areas and populations that have been disproportionately affected by the disease[12]. One of the target populations identified in the NSP as a disproportionately affected group are women of child-bearing age, and particularly adolescent girls and young women due to the extremely high rate of HIV infection in this population. In the 2017 household survey, women between the ages of 15–49 years and adolescent girls and young women (15–24years) respectively accounted for 46.3% and 28.5% of new HIV infections in the country, which highlights the need to monitor HIV prevention services targeting this population[11].

The Antenatal HIV Sentinel Survey (ANCHSS) is a survey conducted every two years in South Africa to monitor the HIV epidemic and the progress towards the 90-90-90 targets among pregnant women attending public health facilities. A significant proportion of pregnant women (about 40%) in South Africa are adolescent girls and young women[13]. The survey addresses a number of important public health questions relevant for programme and policy evaluation. The last (2017) antenatal survey which estimated HIV prevalence, HIV incidence, and progress towards the 90-90-90 targets at national and sub-national level highlighted the low viral suppression rate (<70%) among pregnant women despite the high coverage of antenatal care (ANC) testing and ART initiation in this population[13]. The 2017 survey also highlighted the need to improve implementation of preconception care including HIV testing prior to conception and early ANC attendance so that treatment for HIV-positive women can be initiated as early as possible.

This report presents the findings of the 2019 antenatal survey. The 2019 survey assessed the HIV status of pregnant women (i.e. HIV prevalence), knowledge of HIV status, and coverage of ART among pregnant women attending ANC services in selected sentinel sites from across all districts of South Africa. The

coverage of maternal syphilis screening and treatment, the prevalence of intended and unintended pregnancy, and early attendance of ANC were also estimated in the 2019 antenatal survey as these elements are crucial for improving pregnancy outcomes of both HIV-negative and HIV-positive women. These factors also serve as key indicators for measuring progress towards the joint elimination of HIV and syphilis.

1.2. Aim

To monitor trends in HIV prevalence and the progress towards the UNAIDS first and second 90 targets among pregnant women between 15 to 49 years old attending public ANC clinics in South Africa at the national, provincial, and district levels.

1.2.1. Primary objectives

- To determine the geographical distribution and pattern of HIV sero-prevalence among pregnant women between the ages of 15 and 49 years who attend public ANC clinics in South Africa, at national, provincial and district levels.
- To monitor HIV prevalence trends over time among pregnant women attending public ANC clinics in the following two domains:
    (a) 15–49 years old, at national and provincial level
    (b) 15–24 years old, at national level.

1.2.2. Secondary objectives

- To determine what proportion of HIV-positive pregnant women 15–49 years old, attending ANC clinics, know their HIV status (1st 90: knowledge of HIV status).
- To determine what proportion of known HIV-positive pregnant women 15–49 years old are receiving ART (second 90: ART coverage).
- To determine the prevalence of unintended pregnancy among pregnant women 15–49 years old attending ANC clinics.
- To determine the prevalence of early (≤12 weeks) ANC initiation among (15–49 years old) pregnant women attending ANC clinics.
- To determine the coverage of maternal syphilis screening and treatment among (15–49 years old) pregnant women attending ANC clinics.

Chapter 2: Methodology

2.1. Study design

The South African antenatal survey is a cross-sectional survey conducted every two years to monitor trends in HIV prevalence among pregnant women attending ANC in public health facilities. Multistage stratified cluster sampling design was used to select sentinel sites.

2.2. Sample size

The 2019 survey envisaged enrolling 36 015 pregnant women attending ANC service from 1 589 public health facilities. As in the previous surveys, the sample size determination was guided by the following two main objectives of the survey: (1) to estimate HIV prevalence within an acceptable level of precision, and (2) to measure change in HIV prevalence over time. For the first objective, the calculation was performed to estimate HIV prevalence at district level with a precision level of 3–5%, with 95% confidence interval (CI), design effect of 1.5, and 10% error rate (for loss of specimens and data collection forms, incomplete reporting, etc.).

For the second objective, with the calculated sample size for the first objective, it was possible to detect the following prevalence trends over time at 5% significance level, 80% power on a two–sided test, design effect of 1.5, and 10% error rate:
(i) A 1.3% HIV prevalence change over time at the national level,
(ii) A minimum expected 3–5% change in HIV prevalence over time at the provincial level, and
(iii) A 1.6% HIV prevalence change over time among the 15–24-year age group at the national level.

2.3. Sampling of sites

The 2019 survey included all sites (except closed clinics) which were sampled and visited in the previous antenatal surveys. Sites were sampled based on geographical distribution, covering all nine provinces and 52 districts. Sample size (of pregnant women) calculated at district level was allocated proportionally to the following six strata: urban, semi-urban, and rural clinics and small, medium, and large facilities. The rural, urban, and semi-urban categories were determined by geo-coordinates and information on ward-level geographical type classification from the 2011 census conducted by Statistics South Africa (Stats SA)[14]. Facilities were classified as small, medium, and large by using quantile values of the district antenatal visit volume data (from 2016 annual report) as proxy measure for size. Eligible sentinel sites within each stratum were selected according to the probability proportional to size (PPS) sampling method (using antenatal visit volume as a proxy for size of facility). Since the sampling period was the same for each facility, this produced a self-weighting sample for each district. A fixed (equal) sample size was allocated for each clinic within a stratum.

2.3.1. Inclusion and exclusion criteria for sites

Eligible facilities that took part in the 2017 survey were included in 2019. Sites were sampled in 1990 and 2006. In the 2006 sampling, to be included as a sentinel surveillance site, the public clinic had to[1]:

- provide pregnancy testing and ANC services;
- have a minimum of 20 first-ANC-visit attendees per month;
- routinely draw blood from ANC-clients, with facilities to store sera at 4 degrees Celsius (°C);
- be able to transport biological specimens to the nearest regional laboratory within 24 hours.

[1] Site were selected in 2006 during which time the inclusion/exclusion criteria for site selection was applied. In the surveys after 2006, all sites selected in 2006 were included unless they were closed or non-functional. Closed/non-functional sites were replaced by new clinics.

In addition, the facility staff had to be willing and able to conduct the survey. Only public facilities were included.

No other criteria were applied when 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.

2.4. Sampling of women

During the designated enrolment period, consenting pregnant women attending ANC at the survey sentinel sites were consecutively enrolled into the survey.

Inclusion criteria

- Consenting pregnant women aged 15–49 years, attending the antenatal clinic either for the first time or for follow-up visits during their current pregnancy in the survey period were eligible for inclusion, regardless of their HIV status or previous (or current) history of routine HIV test.

Exclusion criteria

- Pregnant women who previously visited the clinic during this survey period were excluded to avoid duplicate sampling. Survey barcodes were put on the medical record of survey participants to indicate their participation in the survey. This was used to identify and exclude women who already participated in the 2019 survey from being sampled twice.
- Pregnant women aged <15 years or ≥50 years.
- Women who refused to participate in the survey.

2.5. Data collection

The survey was conducted between 1 October to 15 November 2019. In most provinces due to delay in distribution of survey materials, the survey started in the 2nd week of October 2019. To compensate for this delay, for those facilities that were affected by the delay, the survey was extended by 1–2 weeks. The data collection procedures included written informed consent, a brief interview, medical record review, and blood specimen collection. Women were offered enrolment into the survey during their ANC visit. The ANC nurse, after providing routine services, assessed the eligibility of subjects to participate in the survey. Baseline data on four demographic indicators were collected from each eligible woman, using the data collection form (Annexure 1): age, relationship with the father of the child, race, and type of antenatal visit – first or follow-up visit. Following this, the information sheet (Annexure 2), adapted with permission from the South African Medical Research Council's prevention of mother-to-child HIV transmission (PMTCT) survey consent form[15], was given to the participant to read; if necessary, the nurse would read the information sheet to the participant. The information sheet described the objectives of the study, the potential benefit and harm of participating in the study, participants' privacy, participants' right to refuse to participate in the study without any penalty and returning of HIV test results. Nurses were trained to explain the information sheet in the language used for communication during consultation.

After giving written consent, participants were interviewed briefly, and a blood specimen was taken. For first-ANC-visit attendees, the blood sample for the antenatal survey was collected at the same time as the routine blood specimen for syphilis testing. For follow-up ANC attendees, a blood sample was collected for the antenatal survey only.

2.5.1. Collection and transfer of demographic information

The attending health worker completed the form (Annexure 1) used to collect the demographic and clinical information listed in Table 1. Data were extracted from medical records where available and documented on the form. New questions added in the 2019 survey and the method of collection for each demographic and clinical information is described in Table 1. In 2019, three new questions were added as follows: gestational age at first ANC booking, syphilis treatment, and pregnancy intention. In addition, the options for the 'marital status' question were amended as illustrated in Table 1, giving separate options for those who were single (with no relationship) and those in a relationship but living apart. The martial status question was also rephrased to ask of "relationship with the father of the child" instead of marital status in general, in order to avoid ambiguity in the case of participants with multiple partners.

Table 1: Data collected in the 2019 Antenatal HIV Sentinel Survey, South Africa

Data source	**Variables**
Medical record review	• Province, district, health facility • Date of specimen collection • Age of the woman • Visit type, and gestational age • **Gestational age at first booking** • Routine HIV testing uptake, routine HIV test result • ART initiation, timing of ART initiation (if available from medical record, otherwise self-reported) • Maternal syphilis screening and **syphilis treatment**
Self–reported	• Race of the woman, level of education, **relationship with the father of the child (with options: married, living together, in a relationship but not living together, no relationship).** • Gravidity, parity, age of the father of the child **Pregnancy intention using 2 questions adopted from the London Measure of Unplanned Pregnancy (LMUP).** The questions included were: LMUP item 3: "Just before I became pregnant…"with response options: • I intended to get pregnant, • My intentions kept changing, • I did not intend to get pregnant LMUP item 5 "Before I became pregnant..." with response options: • The father of the child and I had agreed that we would like me to be pregnant, • The father of the child and I had discussed having children together, but hadn't agreed for me to get pregnant, • We never discussed having children together. **(see also Annexure 1)** Both LMUP questions were answered by the pregnant women.

New questions added or amended question in the 2019 survey are highlighted in bold

The completed data collection form was sent to the regional serology laboratory (with the blood specimen) where HIV test was done. After the HIV tests were performed, the data collection forms, and the leftover specimens were sent to the reference laboratory at National Institute for Communicable Diseases (NICD) for viral load and incidence tests to be performed.

2.5.2. Collection and transport of blood

The clinic nurses collected 8.5 ml of whole blood into the Ethylenediaminetetraacetic acid (EDTA) tubes supplied. Each tube was labelled with a barcode, and stored at 4 °C. At the close of each day, supervisors (clinic managers) checked the forms against the blood samples for completeness and possible mismatches. The NICD and National Health Laboratory Service (NHLS) were responsible for coordinating and facilitating the transport of specimens by routine courier from the sentinel sites to the designated survey laboratories. The samples were transported in cooler boxes maintained at 4°–8°C, with the temperature continuously monitored by trackers.

2.6. Laboratory methods

2.6.1. Specimen testing for HIV

Standardized HIV testing strategies, as outlined in the national HIV testing guideline (2016), were used[16]. Two fourth-generation HIV-1 enzyme immunoassays were used to test for HIV infection, following the manufacturer's instructions, including appropriate quality control specimens (see annexure 3 for full details of tests used). All plasma samples were tested at the regional laboratories, using the first enzyme-linked immunosorbent assay (EIA 1). Specimens that tested negative on first EIA were classified as negative. All samples that tested reactive using EIA 1 were re-tested using a second and different EIA (EIA 2). If EIA 1 and EIA 2 were in agreement the result was classified "HIV-positive". If EIA 1 and EIA 2 were not in agreement the result was recorded as "discrepant". The specimen information, including EIA 1 and EIA 2 results, were captured in an electronic lab information system called TrakCare. Further confirmatory testing (such as Western blot) could not be done as part of this survey on all positive specimens as it was not feasible based on cost and time. However, a proportion of the specimens (i.e. specimens with normalized optical density (ODn) of ≤ 0.4 in a Limiting Antigen Avidity Enzyme Immunosorbent Assay test) were tested using Western blot (Bio Rad GS HIV-1 Western Blot; Bio-Rad Laboratories, Redmond, WA 98052, USA) to identify false positive results and ensure accuracy of test results returned to participants – testing using Western blot has not been finalized at the time of this report writing therefore the Western blot results could not be included in the current report.

The final HIV test results were returned to participants if they were unaware of their HIV status or if there was a discrepancy between the results of the survey-provided laboratory test and the routine clinic test. During data collection, the name of the participant, cell phone number and the barcode was collected in a separate confidential register that stayed at the antenatal clinic. The antenatal nurse used the cell phone number of participants to contact and return results of participants with discordant result and those who missed routine HIV testing. The identifying information documented on the register was used to link HIV test results returned from the laboratory with participants' files. Discordant results were handled per the national guideline.

2.6.2. Laboratory quality assurance

The NICD was responsible for monitoring key laboratory performance indicators against specific targets. All participating testing laboratories were SANAS-accredited (South African National Accreditation System), based on ISO15189-2012, and/or had an NHLS compliance audit score of over 80%.

2.7. Training and survey monitoring

Before the scheduled commencement of the survey, one-day training sessions were held at the national level, in all nine Provincial Health offices and at the district level. The national training was organized by the NICD and the South African HIV Clinicians Society (SAHCS) and was attended by provincial HIV and AIDS coordinators, and laboratory personnel. A train-the-trainers approach was adopted to cascade the training down to provincial, district and facility staff. Provincial and District Department of Health (DOH) offices were responsible for coordinating the provincial and district level training sessions (including funding, logistics and training). Health care providers were responsible for undertaking further orientation upon their return to their respective facilities for midwives, nurses and other staff who were directly involved in the survey. The training covered: criteria for selection of the sites; screening and recruitment of pregnant women; obtaining informed consent, questionnaire administration; blood sample collection; labelling, coding and storage of samples; sample transportation; laboratory testing for HIV; return of results; handling of discordant results; confidentiality and ethical issues; supervision and quality assurance procedures; and standard laboratory operating procedures.

2.7.1. Technical support and quality control visits during survey execution

Provincial and District Department of Health offices organized and managed all survey monitoring activities. Personnel from the district health office conducted site visits. In some provinces, provincial survey teams joined site visits. Weekly clinic level survey progress reports were produced by the NICD team which were used by provincial survey coordinators to monitor and improve survey progress. One data clerk was recruited at each designated laboratory to perform data quality checks on completed data collection forms. Identified data quality gaps were reported to the central data quality manager who provided daily feedback to provincial survey coordinators on the identified data quality gaps. The NICD lab team conducted site visits to the designated labs to discuss and assist in addressing challenges faced during the survey. Personnel from the SAHCS provided telephonic technical support to provincial survey coordinators during survey implementation.

2.8. Data management

Data collected on paper (the data collection forms) were converted into an electronic database by data clerks at NICD using optical mark recognition (OMR) software. The electronic database was uploaded on the NICD server and data was exported directly to STATA14 (StataCorp. 2015. *Stata Statistical Software: Release 14*. College Station, TX: StataCorp LP) [17] for data cleaning and analysis.

All EIA screening and confirmatory test results were exported from TrakCare (the NHLS electronic laboratory information system) to Excel. The laboratory data exported to Excel were then merged with the interview data extracted from the NICD server, using STATA 14. Queries such as missing laboratory data and missing data collection forms were sent to the staff responsible at NICD and National Department of Health (NDoH), i.e. laboratory managers and provincial coordinators respectively, and data were cleaned. The final database excluded observations for participants outside the age range of 15–49 years, those with no interview data, rejected or lost specimens and those with equivocal or unconfirmed HIV test results. Anonymous data were

shared with South African Medical Research Council (SAMRC) and Centers for Disease Control and Prevention (CDC) for parallel data analysis. Data will be stored for future use at NICD on a password-protected computer and will be backed-up onto server with access restricted to those who analyse the data. Paper based data collection forms and consent forms were stored at DOH provincial offices in a secure locked cabinet. The paper-based data collection forms and consent forms will be retained (for audit and inspection) at least for 5 years after data analysis is completed. After 5 years, the consent and data collection form will be shredded.

2.9. Data analysis

Data were analysed using STATA 14 at the NICD office, in collaboration with statisticians from the SAMRC and CDC. A working group composed of NICD and SAMRC reviewed the technical aspects of the data analysis and outputs.

All analysis took into account the survey design (clustering within primary sampling units – PSUs, and stratification by district) and was weighted for sample size realization (at district level) and for the Stats SA 2019 mid-year population size of women of reproductive age (15−49 years) at province level. The surveys prior to 2019 (i.e. 1990–2017) were weighted for the mid–year population size of reproductive age (15–49 years) women in the respective years using Stats SA data. Given that sites were sampled using PPS, and that the sampling period was fixed, this provided a self-weighted sample at district level. A population finite correction factor was added, to adjust for the >5% of PSUs sampled without replacement from a finite population of about 4 000 public facilities.

Descriptive analyses included a summary of sample size realization and data distribution by district, province, nationally, and by age, gravidity, race group, and visit type (first or follow-up ANC visit). Median and interquartile ranges (IQR) were reported for continuous variables, while frequencies and percentages were reported for categorical variables. The primary outcome of the survey was HIV prevalence: defined as the proportion of eligible pregnant women who participated in the survey with positive HIV EIA test. Descriptive analysis provided HIV prevalence at national, provincial and district level, by age group (5-year age bands, and the 15–24 years category), and visit type (first or follow-up ANC visit). HIV prevalence was compared across provinces and districts, and by visit type, with P values from chi-square tests and trend analysis reported for statistically significant differences.

The HIV prevalence trend for 2012–2019 (excluding 2015) was analysed by 5-year age band and by province. This analysis was restricted to first-ANC-visit attendees, because the inclusion of follow-up visit attendees was expected to result in a slight increase in overall HIV prevalence, owing to new HIV infections acquired during pregnancy. The 2015 survey was excluded from this trend analysis, as the data were not identified by visit type.[2] A separate analysis compared HIV prevalence among all pregnant women for the period 2015, 2017 and 2019 by province and district. For all prevalence estimates, 95% CIs are reported.

The PMTCT cascade analysis included: uptake of HIV testing, knowledge of HIV-positive status, and ART coverage (2nd 90). Knowledge of HIV-positive status and ART initiation before pregnancy was estimated, in order to assess the coverage of ART among women of reproductive age in the general population in the test and treat era. The denominator for knowledge of HIV-positive status before pregnancy was the number of

[2] The surveys prior to 2015 enrolled only first-ANC-visit attendees. In the 2015 survey, although both first-ANC-visit attendees and follow-up attendees were included, the data were not identified by visit type (i.e. on which visit each participant was tested was not known). In the 2017 and 2019 survey, the data were identified by visit type (as 1st, 2nd, 3rd and 4+ ANC visits).

EIA positive individuals. Of those who knew their HIV-positive status before pregnancy the proportion who were initiated on ART before pregnancy was reported. The PMTCT cascade analysis was presented in stratified group by age and province. Estimates were reported with 95% CI.

The two pregnancy intention questions were classified into the following three categories: (1) in both questions the pregnancy was reported as 'unintended' 2) in both questions the pregnancy was reported as intended and 3) 'ambivalent (undecided)' which included responses where one response indicated the pregnancy was intended and the other response did not. Table 2 shows the distribution of responses for the two London Measure of Unplanned Pregnancy (LMUP) questions and the classification of responses. The prevalence of unintended pregnancy was presented in stratified group by age and province.

Table 2: London Measure of Unplanned Pregnancy (LMUP) scoring applied in the Antenatal HIV Sentinel Survey pregnancy intention questions, 2019.

Before I became pregnant**	**Just before I (mother) became pregnant***		
	I intended to become pregnant	My intention kept changing	I did not intend to become pregnant
The father of the child and I (mother) had agreed that we would like me to be pregnant	Both responses indicate intended (35.9%)	One response indicated intention undecided (1.1%)	One response indicated not intended (3.7%)
The father of the child and I (mother) had discussed having children together but hadn't agreed for me to be pregnant	One response indicated intended (2.7%)	One response indicated intention undecided (1.8%)	Both responses not intended (16.9%)
We never discussed having child(ren) together	One response indicated intended (2.0%)	One response indicated intention undecided (1.2%)	Both responses indicated not intended (34.7%)

***** The percentages in bracket shows the weighted distribution of participants' response to the two LMUP questions. **Dark grey: intended pregnancy; light grey: ambivalent about pregnancy; white: unintended pregnancy.

Early ANC attendance was defined as attendance of ANC at or before 12 weeks of pregnancy per the World Health Organization (WHO) recommendation. This survey also looked at attendance of ANC before 20 weeks as this definition is still being used in the NDoH annual reports despite the guideline change [18]. For syphilis reporting in this survey, the percentage of women who received maternal syphilis screening during ANC, the proportion who were positive for syphilis (syphilis prevalence), and the proportion positive who received treatment for syphilis were reported.

Each analysis was done using complete observations, excluding individuals with missing values for the relevant variables. The non-response rate was low (≤5%) for majority of the variables. Seven variables had >5% missing values, which were participant age (7.6%), HIV rapid test result (9.7%), pregnancy intention (6.2%), gestational age at booking (6%) visit type (5.5%), syphilis treatment (8.1%), and type of syphilis

treatment received (10.7%). For participant age, a sub-sample of the missing age data was retrieved from patients' files and the retrieved data were found to have the same age distribution as the rest of age data captured from data collection forms, confirming that the exclusion of missing age data from this analysis does not introduce bias. For routine rapid HIV test, EIA test showed participants with missing rapid test data had similar HIV prevalence as those with complete rapid HIV test result. For syphilis screening, syphilis result and treatment, the distribution of the missing data did not vary by province, age group or HIV status, suggesting random distribution of missing data for these variables. The demographic and clinical characteristics of participants whose samples were rejected were compared to those whose samples were processed to assess potential bias introduced due to the exclusion of participants with rejected samples.

2.10. Ethical considerations

Participation in the survey was voluntary, requiring written informed consent. To protect the confidentiality of participants' information, the data collection form and the blood specimens were submitted without patient identifiers. Participants could withdraw from the study at any time and this did not influence their treatment. Participants were not compensated for their participation. Ethical approval was obtained from the University of the Witwatersrand Human Research Ethics Committee (Medical), and the nine provincial health research ethics committees. The study protocol was reviewed in accordance with the CDC human research protection procedures.

2.11. Scope of the report

This report presents data on HIV prevalence, the coverage of the first two UNAIDS 90-90-90 targets among pregnant women during and before pregnancy, the prevalence of unplanned pregnancy, early attendance of ANC, and the coverage of maternal syphilis screening and treatment. The main report presents the data at national and provincial level. The district level data are presented under annexure 4.

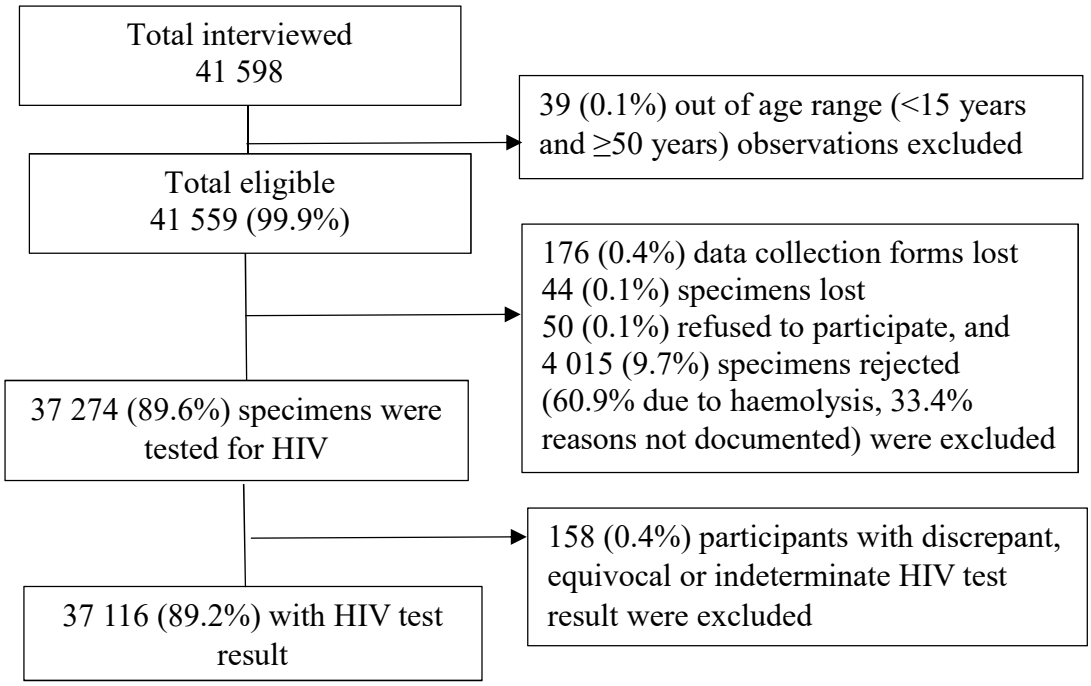
Chapter 3: Results

3.1. Flow chart of participants included in the analysis

In total, 41 598 participants were interviewed (Figure 1). Thirty-nine (0.1%) participants fell out of the age range (15–49 years) for inclusion in the study; 220 (0.5%) participants were missing their HIV test results or interview data, 50 (0.1%) refused to participate in the survey and 4 015 (9.7%) had their blood specimens rejected (60.9% of specimen rejections were due to haemolysis). Of the remaining 37 274 (89.6%) specimens processed, 158 (0.4%) were excluded for discrepant or equivocal results. A total of 37 116 (89.2%) participants were included in the final sample for analysis.

The breakdown of specimen rejections by province was as follows: of the 4 015 specimen rejections, 29.3% of specimen rejections were in KwaZulu-Natal; 18.7% in Gauteng; 13.0% in North West; 11.1% in Mpumalanga; 10.9% in Limpopo; 5.5% in Eastern Cape; 5.3% in Western Cape; 3.5% in Free State; and 2.7% in Northern Cape. The rejected samples did not substantially vary by demographic and clinical characteristics such as age, marital status, visit type and HIV status. Delay in transportation of specimens, breakdown in cold

chain during transportation and high workload at the designated laboratories contributed to the haemolysis of samples.



All percentages are based on the total number of women interviewed; all percentages are unweighted

Figure 1: Flow chart of observations excluded from the analysis, in the 2019 Antenatal HIV Sentinel Survey, South Africa

3.1.1. Sample size realization at national and provincial level

At the national level, 103% of the planned sample size was achieved (Table 3). All provinces achieved at least 95% of their target. Sample size achievement was also high at the district and the clinic levels. All districts and 90% of clinics achieved at least 80% of their sample size. Two clinics – one in Eastern Cape and one in Western Cape – did not participate in the survey due to temporary closure. The sample size for these clinics was collected from the nearest sentinel site where the service is shifted to for the clients of the closed clinics.

Table 3: Sample size realization by province, Antenatal HIV Sentinel Survey, South Africa, 2015–2019

Province	2015 Distribution of sample size achieved by province		2017 Distribution of sample size achieved by province		2019 Distribution of sample size achieved by province		2019 Planned sample size	2019 Sample size realization
	N	%	N	%	N	%	N	%
Eastern Cape	4 168	11.5	4 040	12.3	5 692	15.3	5 306	107
Free State	2 349	6.5	2 734	8.4	2 851	7.7	2 723	105
Gauteng	6 512	18.0	4 844	14.8	5 375	14.5	4 775	113
KwaZulu-Natal	6 819	18.9	8 242	25.2	8 430	22.7	8 761	96
Limpopo	3 482	9.7	2 647	8.1	3 053	8.2	3 187	96
Mpumalanga	2 162	6.0	2 870	8.8	3 186	8.6	2 954	108

North West	1 880	5.2	2 256	6.9	2 901	7.8	3 045	95
Northern Cape	1 238	3.4	1 512	4.6	1 685	4.6	1 650	102
Western Cape	7 517	20.8	3 571	10.9	3 943	10.6	3 614	109
Total	**36 127**	**100**	**32 716**	**100**	**37 116**	**100**	**36 015**	**103**

All percentages are unweighted

3.2. Characteristics of survey participants

The majority of participants were Black African (88.3%) and had attended at least secondary school (88.1%). Just under a fifth (17.4%) of participants were married to the father of the child, 26.4% were living together with the father of the child, 52.9% were in a non-cohabiting relationship with the father of the child and 3.3% had no relationship with the father of child at the time of the survey. Just under one-third of participants (31.7%) reported that the current pregnancy was their first. The median gestational age of participants (at the time of the survey) was 16.0 weeks (IQR: 10.0–21.0 weeks) for first-ANC-visit attendees and 30.0 weeks (IQR: 24.0–34.0 weeks) for follow-up visit attendees. At provincial level, the percentage of women in a non-cohabiting relationship significantly varied ranging between 37.8% in Western Cape to 70.1% in KwaZulu-Natal. KwaZulu-Natal had the lowest percentage of married women at 9.6% while Western Cape had the highest percentage of married women at 25.6%. More than 85.0% of participants were Black African in seven of the nine provinces. In two provinces – Northern Cape and Western Cape – 52.4% and 41.5% respectively were Black African and 46.4% and 55.6% of participants respectively were Coloured. Distribution of other characteristics such as education, age and gravidity did not vary substantially by province. Demographic characteristics also did not vary substantially by visit type.

The median age of participants was 26 years (IQR: 22–31 years). The proportion of adolescent (15–19 years) pregnant women participating in the survey declined by 1.2% points between 2017 and 2019 (Table 4). This declining trend in adolescent women participating in the survey was consistently observed since 2013.

Table 4: Distribution of survey participants by five-year age group, 2013–2019, Antenatal HIV Sentinel Survey, South Africa

Age group (years)	2013		2014		2015		2017*		2019*	
	N	%	N	%	N	%	N	%	N	%
15–19	5 735	17.5	5 400	16.8	5 587	15.5	4 301	14.3	4 482	13.1
20–24	9 901	30.2	9 548	29.6	10 518	29.1	8 666	28.9	9 515	27.8
25–29	8 289	25.3	8 125	25.2	9 416	26.0	8 012	26.7	9 136	26.7
30–34	5 396	16.4	5 469	17.0	6 455	17.9	5 598	18.6	6 772	19.8
35–39	2 662	8.1	2 788	8.6	3 218	8.9	2 750	9.2	3 506	10.2
40–44	768	2.3	830	2.6	871	2.4	672	2.2	801	2.3
45–49	62	0.2	55	0.2	62	0.2	32	0.1	69	0.2
Total	**32 813**	**100**	**32 215**	**100**	**36 127**	**100**	**30 031**	**100**	**34 281**	**100**

**Total excludes missing age data (in 2017 and 2019, age data were missing for 8.2% and 7.6% of participants respectively). All percentages are unweighted*

Between 2017 and 2019, the number of first-ANC-visit attendees participating in the survey declined (37.7% in 2017 vs 30.1% in 2019) whereas the number of follow-up visit attendees (60.8% in 2017 vs 64.4% in 2019) and those whose visit type was not documented (1.5% in 2017 vs 5.5% in 2019) increased

nationally, and across provinces (Table 5). There were more than 1 000 participants whose ANC visit type data did not tally with their response for gestational age at booking and their current gestational age – the visit type of these participants was set to missing which contributed to the increase in the number of participants whose visit type was not documented.

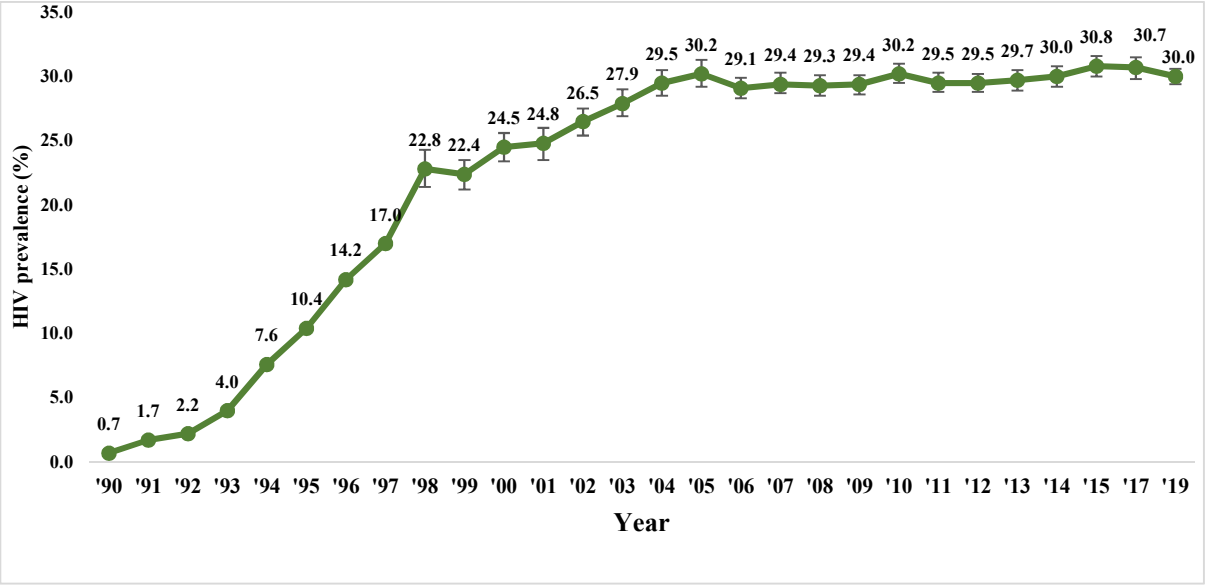
Table 5: sample size distribution by province and visit type, 2019, Antenatal HIV Sentinel Survey, South Africa

Province	First-ANC-visit		Follow-up ANC visit		Visit type not documented		Total	
	N	%	N	%	N	%	N	%
Eastern Cape	1 761	31.0	3 571	62.7	360	6.3	5 692	100
Free State	818	28.7	1 920	67.3	113	4.0	2 851	100
Gauteng	1 963	36.5	3 074	57.2	338	6.3	5 375	100
Kwa-Zulu Natal	1 914	22.7	6 109	72.5	407	4.8	8 430	100
Limpopo	1 061	34.8	1 854	60.7	138	4.5	3 053	100
Mpumalanga	910	28.6	2 091	65.6	185	5.8	3 186	100
North West	944	32.5	1 790	61.7	167	5.8	2 901	100
Northern Cape	446	26.5	1 179	70.0	60	3.5	1 685	100
Western Cape	1 357	34.4	2 321	58.9	265	6.7	3 943	100
Total	**11 174**	**30.1**	**23 909**	**64.4**	**2 033**	**5.5**	**37 116**	**100**

All percentages are unweighted

3.3. National HIV prevalence

The overall HIV prevalence at national level was 30.0% (95% CI: 29.4%–30.6%) (Figure 2). This figure was 0.7% points lower than the prevalence reported in 2017 (30.7%, 95% CI: 30.1%−31.3%), although the difference was not statistically signficant.

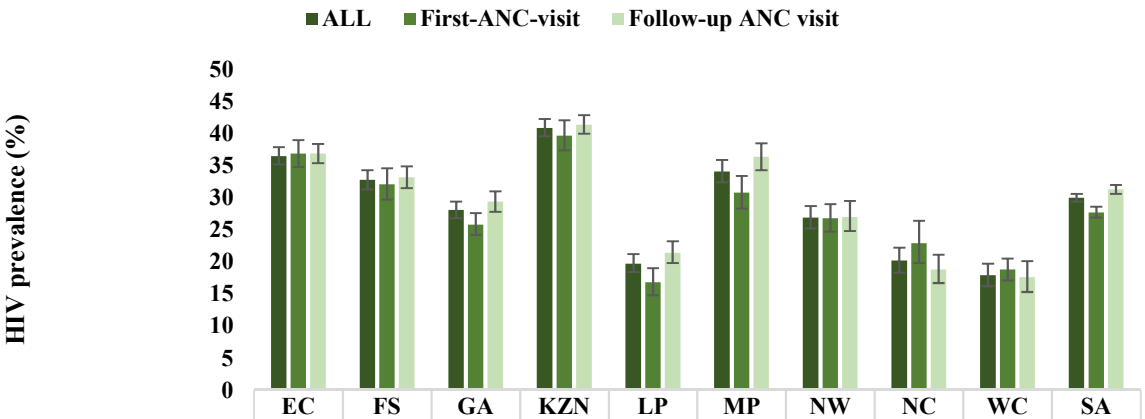


Both first-ANC-visit attendees and follow-up visit attendess were included in 2015, 2017 and 2019 surveys

Figure 2*:* The HIV epidemic curve among antenatal women, South Africa, 1990–2019, Antenatal HIV Sentinel Survey

3.3.1. HIV prevalence by province

The highest overall HIV prevalence was in KwaZulu-Natal (40.9%, 95% CI: 39.6%–42.3%) followed by Eastern Cape (36.5%, 95% CI: 35.2%–37.9%) (Figure 3). KwaZulu-Natal has reported the highest HIV prevalence nationally at least for the last 5 years. The lowest overall HIV prevalence was in Western Cape at 17.9% (95% CI: 16.2%–19.7%). Nationally and in three provinces (Gauteng, Limpopo, Mpumalanga) participants attending follow-up ANC visits had significantly higher HIV prevalence (P value <0.01) compared to participants attending first-ANC-visit. This result was consistent with the 2017 survey result which also showed higher HIV prevalence among follow-up visit attendees compared to first-ANC-visit attendees particularly in Gauteng, Mpumalanga, and KwaZulu-Natal.



	EC	FS	GA	KZN	LP	MP	NW	NC	WC	SA
ALL	36.5	32.8	28.1	40.9	19.7	34.1	26.9	20.2	17.9	30
First-ANC-visit	36.9	32.1	25.8	39.7	16.8	30.8	26.8	22.9	18.8	27.7
Follow-up ANC visit	36.9	33.2	29.4	41.4	21.4	36.4	27	18.8	17.6	31.3

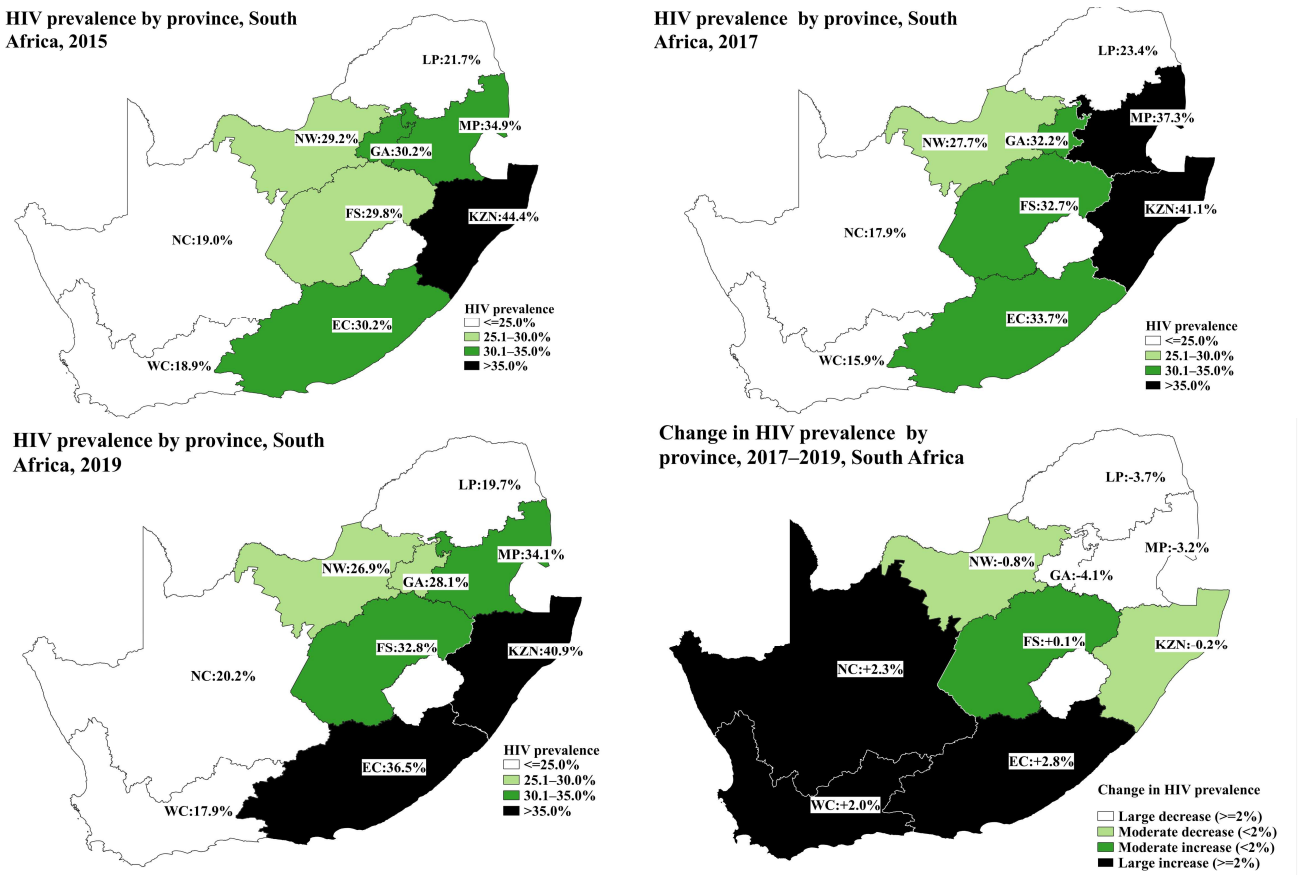
EC: Eastern Cape; FS: Free State; GA: Gauteng; KZN: KwaZulu-Natal; LP: Limpopo; MP: Mpumalanga; NW: North West; NC: Northern Cape; WC: Western Cape; SA: South Africa; ANC: antenatal care
The prevalence in EC is 36.9% for both first-ANC-visit and follow-up ANC visit attendees; those who has not reported their visit type had lower prevalence (31.2%, n=2 033), which is why the overall prevalence is lower than the prevalence among first-ANC-visit and follow-up ANC visit attendees.

Figure 3: HIV prevalence among first-ANC visit attendees, follow-up ANC visit attendees and overall by province, in the 2019 Antenatal HIV Sentinel Survey, South Africa

3.3.1.1. HIV prevalence trends by province

Overall data (among both first antenatal and follow-up antenatal visit attendees)

In the overall data (i.e. data that included both first-ANC and follow-up ANC visit attendees), between 2017 and 2019, the highest decline in HIV prevalence was observed in Gauteng (4.1% points) followed by Limpopo (3.7% points) and Mpumalanga (3.2% points) respectively, but none of these declines were statistically significant (Figure 4). The overall HIV prevalence increased by ≥2% points in Northern Cape, Eastern Cape, and Western Cape – these increases were not statistically significant.

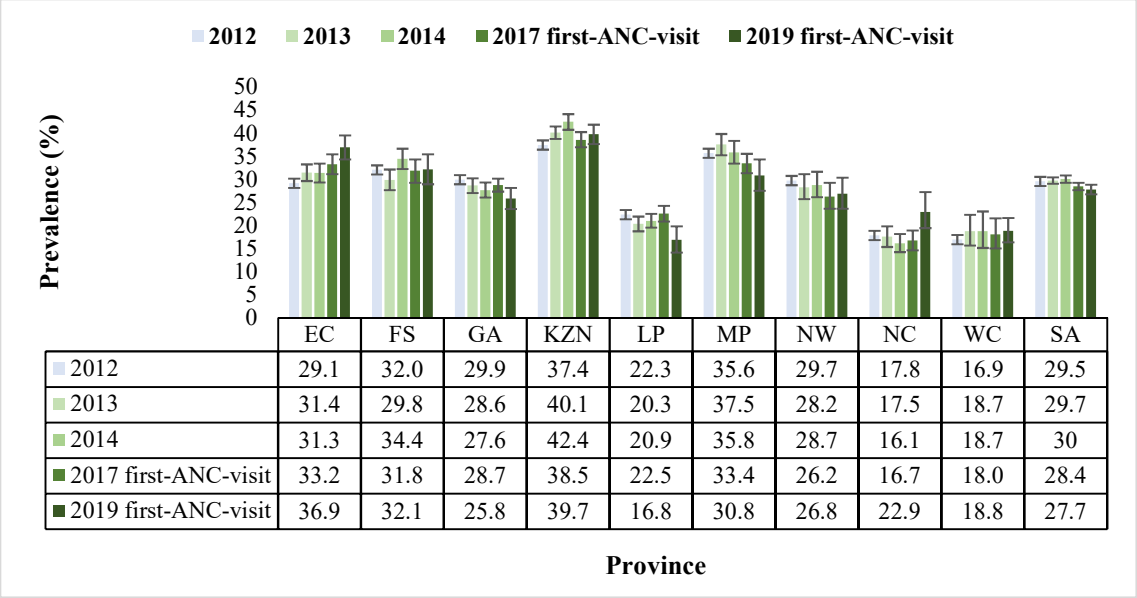


Both first-ANC-visit attendees and follow-up visit attendess were included. HIV prevalence decline (or increase) of >=2%/ <2% refers to a drop (or increase) of HIV prevalence by 2% points.
EC: Eastern Cape; FS: Free State; GA: Gauteng; KZN: KwaZulu-Natal; LP: Limpopo; MP: Mpumalanga; NW: North West; NC: Northern Cape; WC: Western Cape; SA: South Africa
95% CI for the 2019 prevalence: EC: 35.2%−37.9%; FS: 31.3%−34.3%; GA: 26.8%−29.4%; KZN: 39.6%−42.3%; LP: 18.4%−21.2%; MP: 32.4%−35.9%; NC: 18.3%−22.2%; NW: 25.2%−28.7%; WC: 16.2%−19.7%

Figure 4: Overall HIV prevalence (2015–2019) and change in provincial HIV prevalence estimates (2017–2019), Antenatal HIV Sentinel Survey, South Africa

Among first antenatal visit attendees only

Among first-ANC-visit attendees, at the province level, there was no statistically significant trend in HIV prevalence between 2012 and 2019 in seven of the nine provinces (Figure 5). In Eastern Cape, the prevalence increased significantly between 2012 and 2019. Mpumalanga continued to show declining trend in prevalence, but the decline was not statistically significant. In KwaZulu-Natal, in 2017, a significant decline in HIV prevalence was observed, but the prevalence has increased by 1.2% points in 2019.



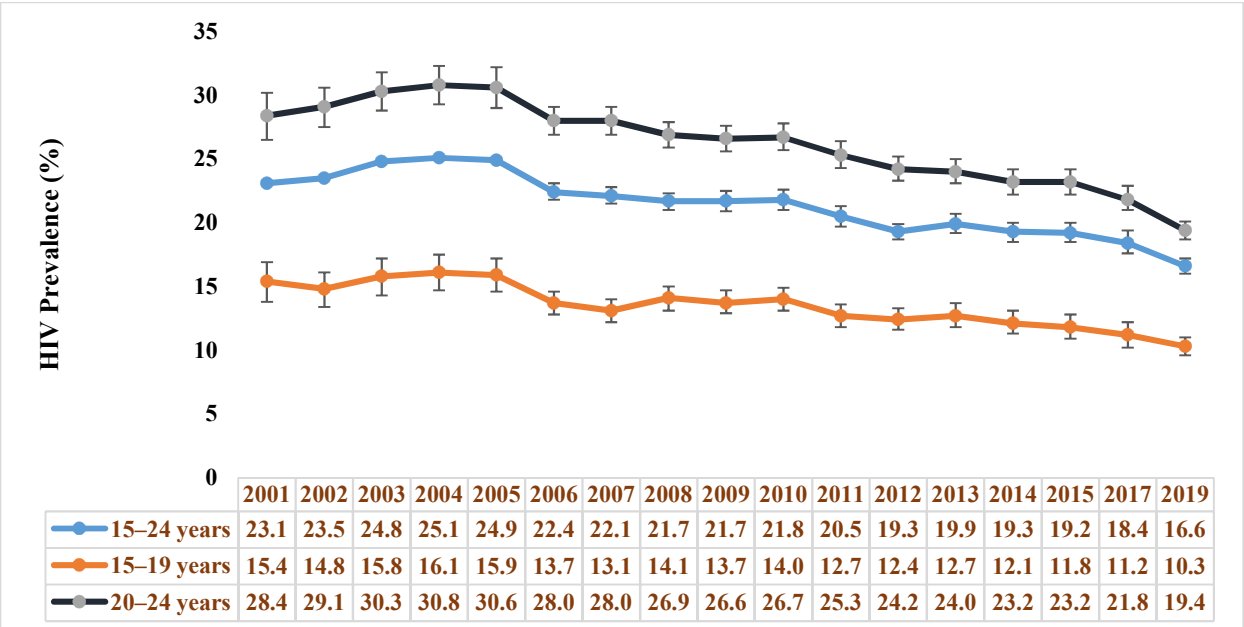
	EC	FS	GA	KZN	LP	MP	NW	NC	WC	SA
2012	29.1	32.0	29.9	37.4	22.3	35.6	29.7	17.8	16.9	29.5
2013	31.4	29.8	28.6	40.1	20.3	37.5	28.2	17.5	18.7	29.7
2014	31.3	34.4	27.6	42.4	20.9	35.8	28.7	16.1	18.7	30
2017 first-ANC-visit	33.2	31.8	28.7	38.5	22.5	33.4	26.2	16.7	18.0	28.4
2019 first-ANC-visit	36.9	32.1	25.8	39.7	16.8	30.8	26.8	22.9	18.8	27.7

EC: Eastern Cape; FS: Free State; GA: Gauteng; KZN: KwaZulu-Natal; LP: Limpopo; MP: Mpumalanga; NW: North West; NC: Northern Cape; WC: Western Cape; SA: South Africa; ANC: antenatal care

Figure 5: HIV prevalence trend among first-ANC-visit attendees by province (2012–2019), Antenatal HIV Sentinel Survey, South Africa

3.3.2. HIV prevalence trend by age

HIV prevalence among the 15–24 years age group continued to show steady decline among both the 15–19 years and the 20–24 years age groups, with prevalence declining from 11.2% to 10.3% (P value = 0.07) and from 21.8% to 19.4% (P value <0.01) among the 15–19 years and 20–24 years age groups respectively between 2017 and 2019 (Figure 6).



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2017	2019
15–24 years	23.1	23.5	24.8	25.1	24.9	22.4	22.1	21.7	21.7	21.8	20.5	19.3	19.9	19.3	19.2	18.4	16.6
15–19 years	15.4	14.8	15.8	16.1	15.9	13.7	13.1	14.1	13.7	14.0	12.7	12.4	12.7	12.1	11.8	11.2	10.3
20–24 years	28.4	29.1	30.3	30.8	30.6	28.0	28.0	26.9	26.6	26.7	25.3	24.2	24.0	23.2	23.2	21.8	19.4

Both first-ANC-visit attendees and follow-up visit attendess were included

Figure 6*:* HIV prevalence trend by age group at national level, 2001–2019, Antenatal HIV Sentinel Survey, South Africa

HIV prevalence among first-ANC-visit attendees in the age groups 15–24 years and 20–24 years also showed consistent but modest statistically significant decline between 2014 and 2019 (Figure 7).

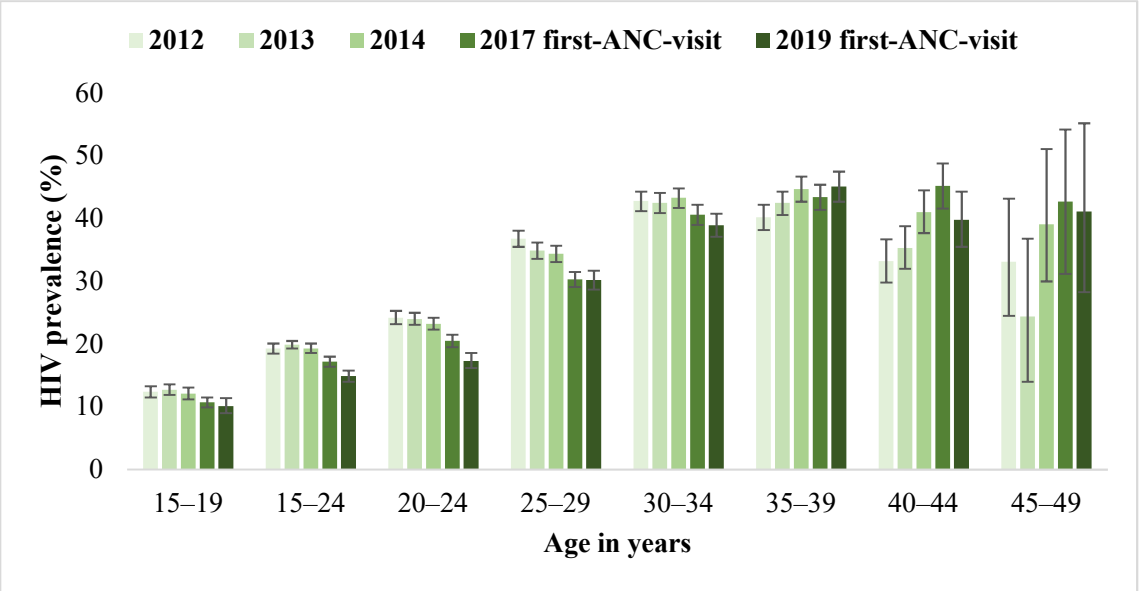
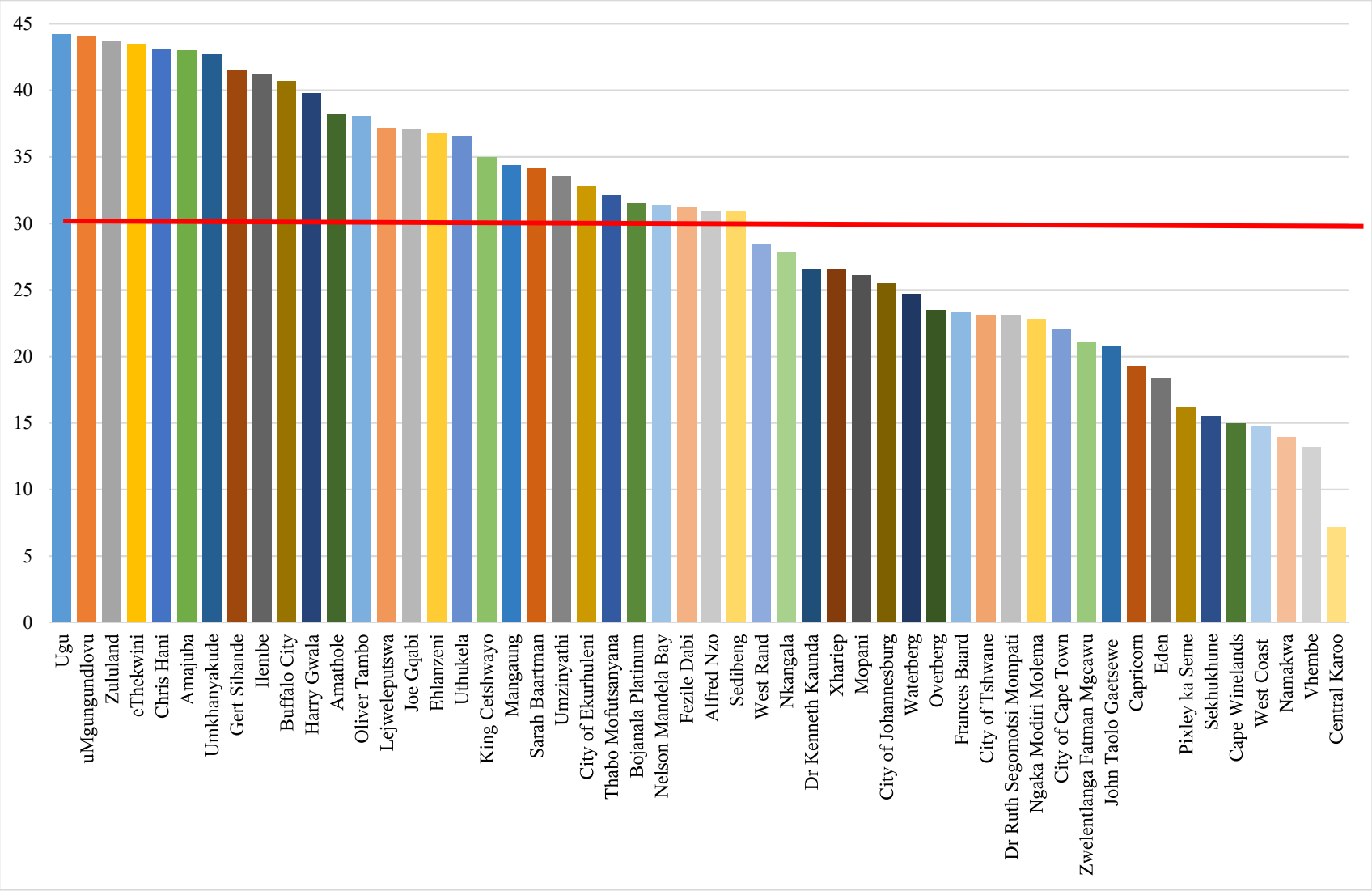


Figure 7*:* National HIV prevalence trend by age group among first-ANC-visit attendees, 2012–2019, Antenatal HIV Sentinel Survey, South Africa

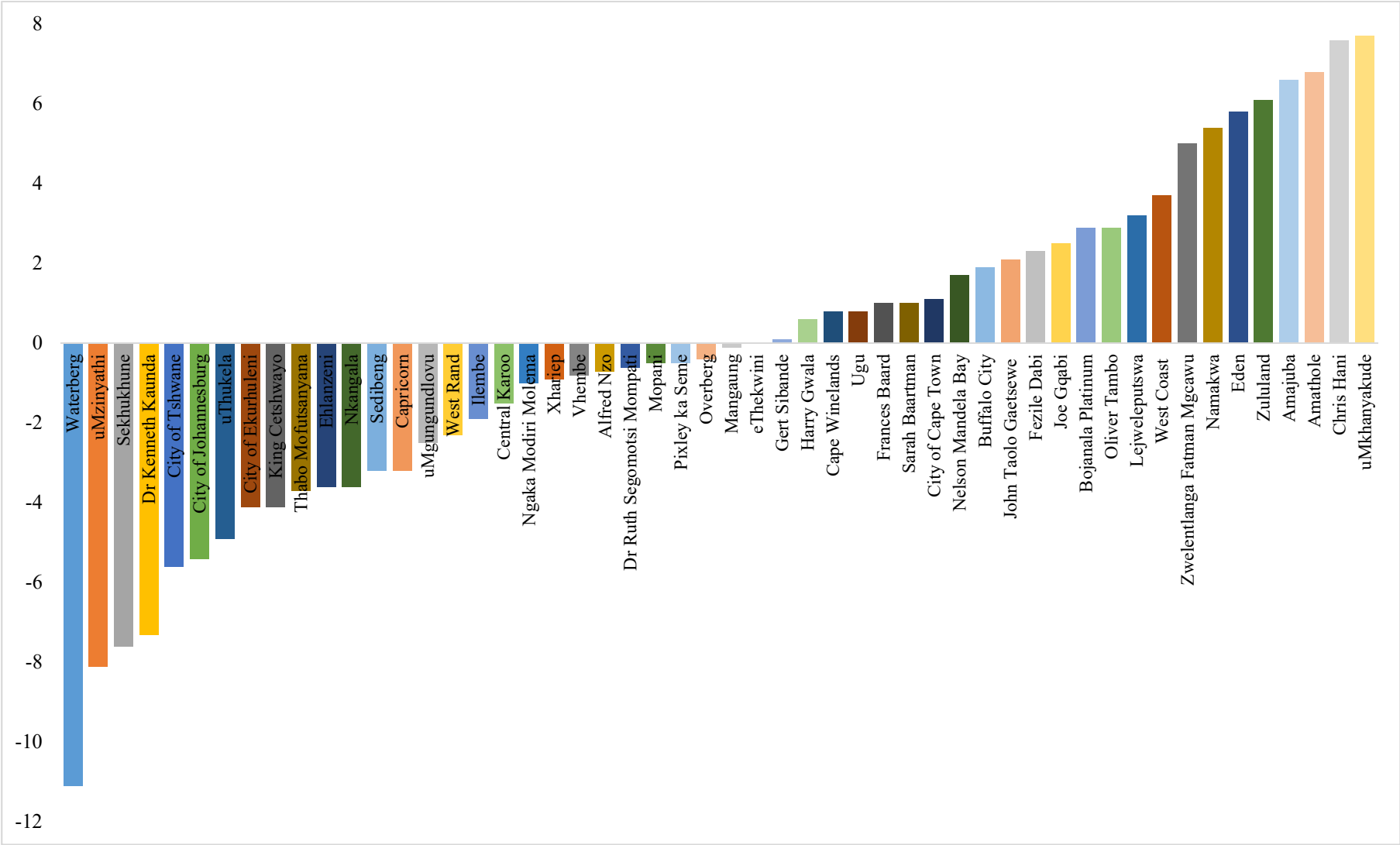
3.3.3. HIV prevalence by district

The highest HIV prevalence was reported in Ugu district at 44.2% (95% CI: 39.0%–49.5%). Seven out of ten districts with the highest prevalence were in KwaZulu-Natal. The other 3 were in Eastern Cape (Chris Hani and Buffalo City) and Mpumalanga (Gert Sebande) (Figure 8). The lowest prevalence was in Central Karoo at 7.2% (95% CI: 4.9%–10.5%). The highest decline in HIV prevalence between 2017 and 2019 was in Waterberg (Limpopo) and uMzinyathi (KwaZulu-Natal) – these changes were both statistically significant. In Waterberg prevalence reduced from 35.8% (95% CI: 33.0%–38.8%) to 24.7% (95% CI: 22.1%–27.5%), while in uMzinyathi prevalence reduced from 41.7% (95% CI: 36.9%–46.6%) to 33.6% (95% CI: 28.8%–38.9%) (P value=0.03) (Figure 9). More detailed analysis of the district data is presented in annexure 4.



Redline shows national prevalence, Both first-ANC-visit attendees and follow-up visit attendess were included.

Figure 8*:* HIV prevalence among pregnant women by district, 2019, Antenatal HIV Sentinel Survey, South Africa

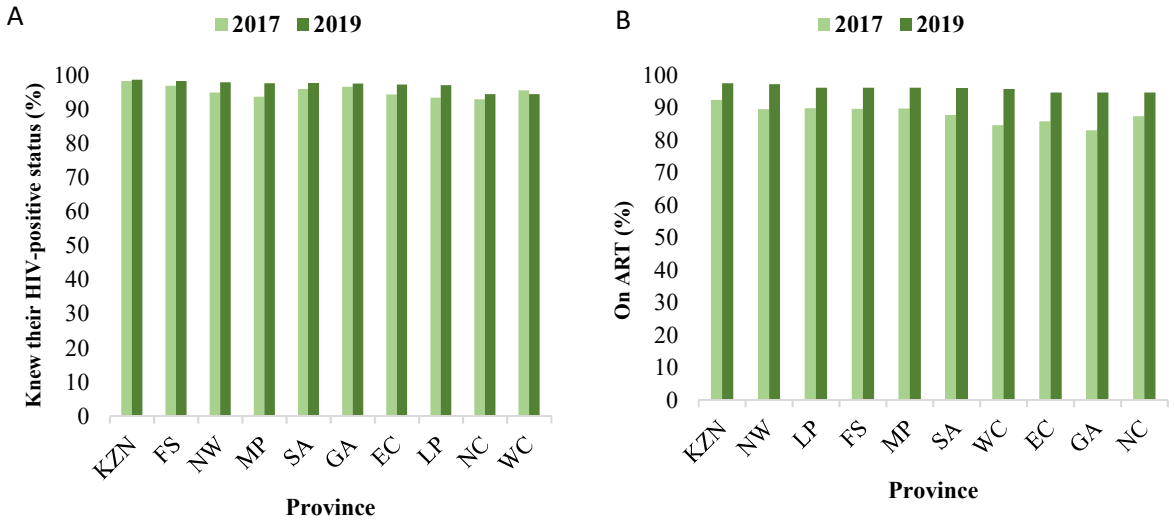


Both first-ANC-visit attendees and follow-up visit attendess were included

Figure 9: Change in HIV prevalence from 2017 to 2019 by district, Antenatal HIV Sentinel Survey, South Africa

3.4. PMTCT cascade – the first and second 90

Based on medical record review data, HIV testing was offered to 99.8%[3] (33 440/33 508) of ANC attendees as part of routine care and almost all (99.9%, 33 427) either accepted the offer or already knew their HIV-positive status. Nationally, of 11 321 participants found to be HIV-positive by EIA test, 97.6% (11 046) already knew their HIV-positive status at the time of the survey (Figure 10). Of those who knew their HIV-positive status, excluding 355 participants whose treatment status was not reported, 96.0% (10 271) were initiated on ART at the time of the survey. Both knowledge of HIV status and ART initiation improved between 2017 and 2019 in most provinces.



The denominator was the total number of women tested positive by EIA test. Missing data excluded
EC: Eastern Cape; FS: Free State; GA: Gauteng; KZN: KwaZulu-Natal; LP: Limpopo;

The denominator was the total number of women who knew their HIV-positive status. Missing data excluded. ART: Antiretroviral therapy.
MP: Mpumalanga; NW: North West; NC: Northern Cape; WC: Western Cape

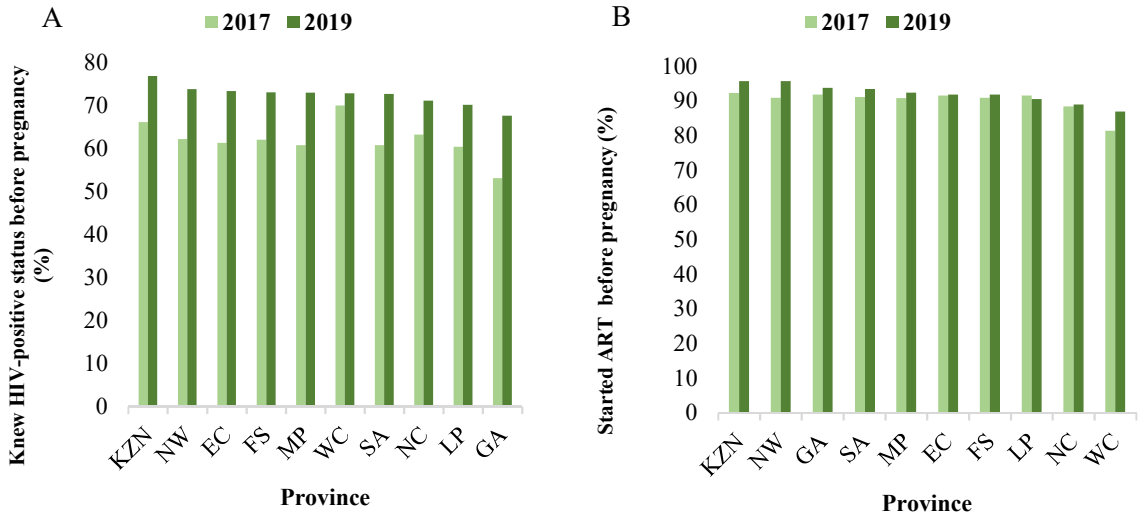
Figure 10*:* Knowledge of HIV-positive status (A) and ART initiation (B) by province, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, South Africa

3.5. Knowledge of HIV-positive status and ART initiation before pregnancy

Nationally, of 10 778 EIA positive participants whose timing of (HIV) diagnosis was reported, 72.7% (7 912) knew their HIV-positive status before pregnancy (Figure 11). Of those who knew their HIV-positive status before pregnancy and whose treatment status was reported (7 735), 93.3%[4] (7 207) were initiated on ART before pregnancy. This translates to 66.2% of all EIA positive participants who had already initiated ART before pregnancy. Knowledge of HIV-positive status before pregnancy significantly improved by 19.6% between 2017 (60.8%, 95% CI: 59.9%–61.7%) and 2019 (72.7%, 95% CI: 71.9%–73.4%).

[3] 3 608 (9.7%) missing responses excluded when calculating percentage

[4] 95% CI: 92.8%–93.7%



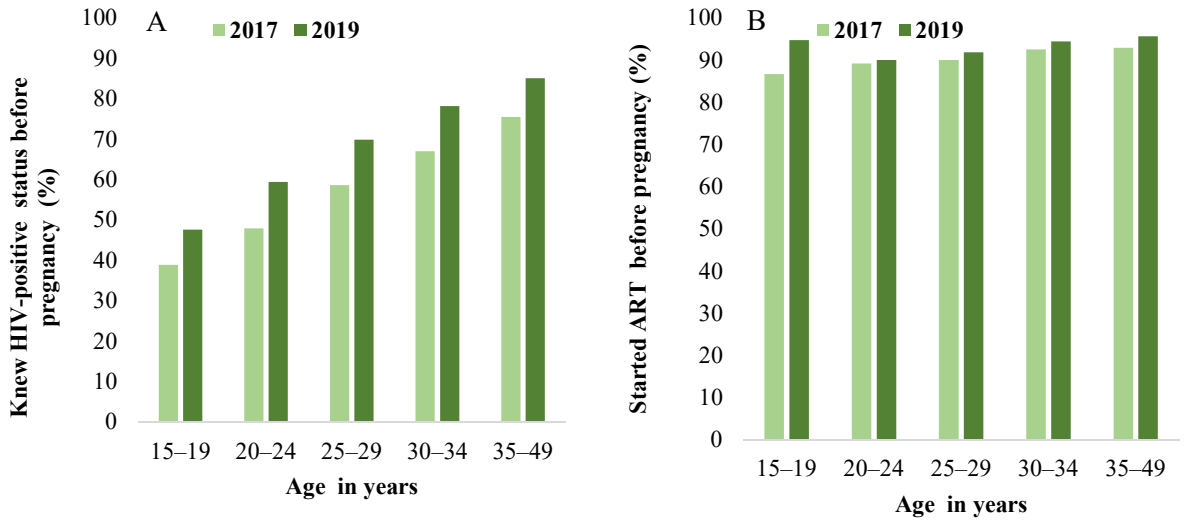
The denominator for knowledge of HIV-positive status before pregnancy was EIA positives. Missing data excluded.

ART: antiretroviral therapy. The denominator for ART initiation before pregnancy was the number of HIV-positive women who were aware of their HIV-positive status before pregnancy. Missing data excluded.

EC: Eastern Cape; FS: Free State; GA: Gauteng; KZN: KwaZulu-Natal; LP: Limpopo; MP: Mpumalanga; NW: North West; NC: Northern Cape; WC: Western Cape; SA: South Africa

Figure 11*:* Knowledge of HIV-positive status (A) and ART initiation (B) before pregnancy by province, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, South Africa

As in the 2017 survey, in 2019, knowledge of HIV status before pregnancy was significantly lower among younger women (15–19 years and 20–24 years: 47.6% and 59.4%, respectively) compared to older women (35–49 years: 85.1%, P value <0.01) (Figure 12). However, there was an overall improvement across all age groups, in knowledge of HIV-positive status before pregnancy between 2017 and 2019. ART initiation did not significantly vary by age.



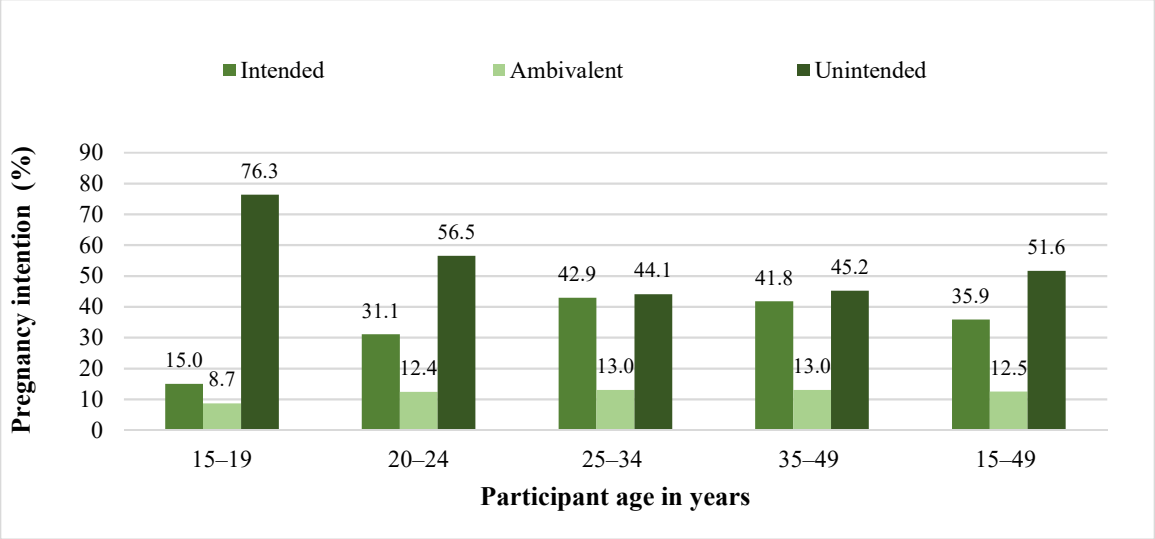
The denominator for knowledge of HIV-positive status before pregnancy was EIA positives. Missing data excluded.

ART: antiretroviral therapy. The denominator for ART initiation before pregnancy was the number of HIV-positive women who were aware of their HIV-positive status before pregnancy. Missing data excluded.

Figure 12*:* Knowledge of HIV-positive status (A) and ART initiation (B) before pregnancy by age group, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, South Africa

3.6. Pregnancy intention

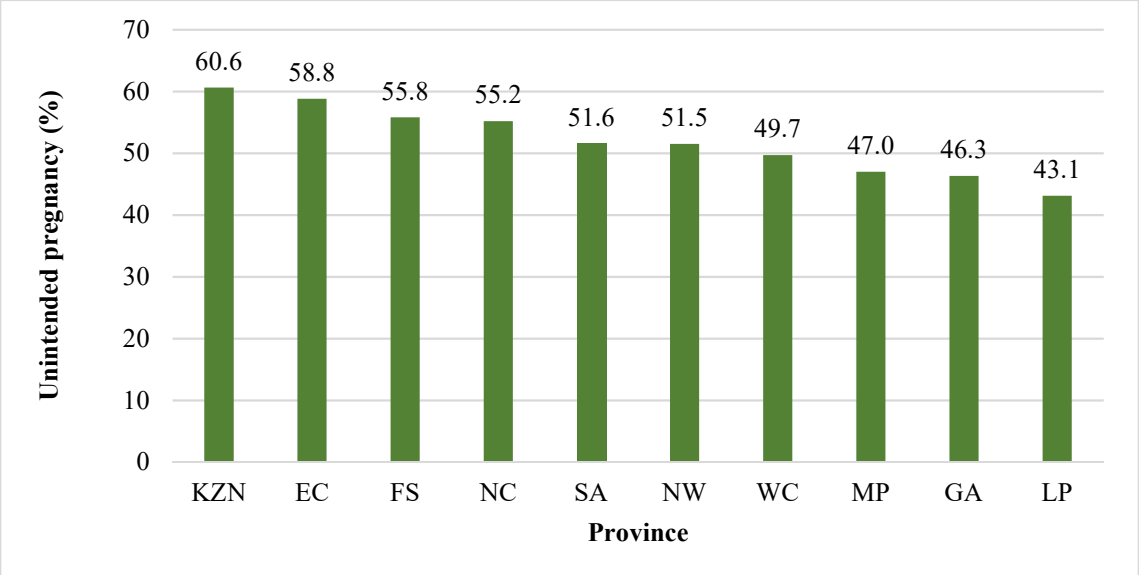
More than half (51.6%) of the pregnancies in this study were unintended (i.e. in both LMUP questions the pregnancy was reported as unintended) (Figure 13). Just above a third (35.9%) of the pregnancies were intended (i.e. in both LMUP questions the pregnancy was reported as intended); while 12.5% of the pregnancies were either reported as intended in one LMUP question only or at least one response (to the LMUP questions) indicated the woman was undecided about having a baby prior to the current pregnancy. Adolescent girls (15−19 years) (76.3%, 95% CI: 74.9%–77.6%) and young women (20−24 years) (56.5%, 95% CI: 55.4%–57.6%) had higher prevalence of unintended pregnancy compared to older women (35−49 years) (45.2%, 95% CI: 43.9%–46.6%). Participants in a non-cohabiting relationship (64.3%, 95% CI: 63.4%–65.2%) and single women (76.0%, 95% CI: 73.9%–78.0%) had significantly higher prevalence of unintended pregnancy compared to participants who were married (27.0%, 95% CI: 26.0%–28.1%) or cohabiting with their partner (41.4%, 95% CI: 40.3%–42.5%).



The categories were defined as follows: Intended: response to both LMUP questions indicated pregnancy was intended; Unintended: response to both questions indicated pregnancy was unintended; Ambivalent: intended by only one response or at least one response indicated the woman was undecided about having a baby.

Figure 13: Pregnancy intention by age group in the 2019 Antenatal HIV Sentinel Survey, South Africa

KwaZulu-Natal had the highest prevalence of unintended pregnancy at 60.6% (95% CI: 58.6%–62.5%). The lowest prevalence of unintended pregnancy was in Limpopo (43.1%) (Figure 14). There was no statistically significant difference in the prevalence of unintended pregnancy between HIV-negative (51.4%) and HIV-positive (52%) participants.

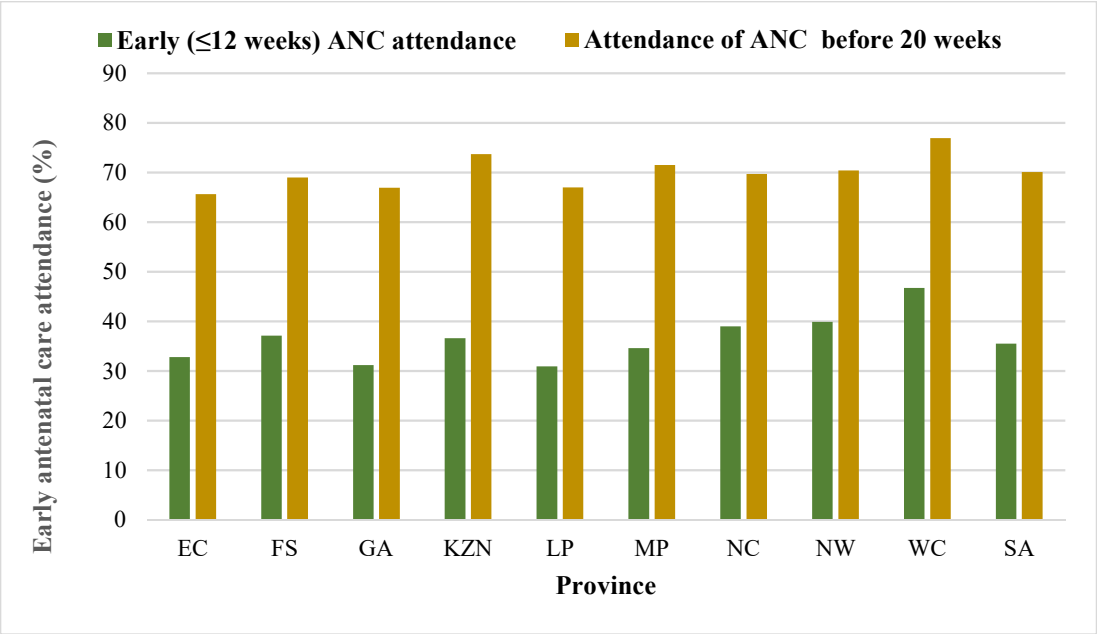


EC: Eastern Cape; FS: Free State; GA: Gauteng; KZN: KwaZulu-Natal; LP: Limpopo; MP: Mpumalanga; NW: North West; NC: Northern Cape; WC: Western Cape; SA: South Africa

Figure 14: Unintended pregnancy by province, in the 2019 Antenatal HIV Sentinel Survey, South Africa

3.7. Early ANC attendance

Only just above a third (35.5%) of participants attended their first-ANC-visit before or at 12 weeks of pregnancy as per the WHO recommendation (Figure 15). Majority of participants (58.9%) attended their first-ANC-visit in their second trimester, while a small percentage (5.6%) of participants attended their first-ANC-visit during the third trimester of their pregnancy.



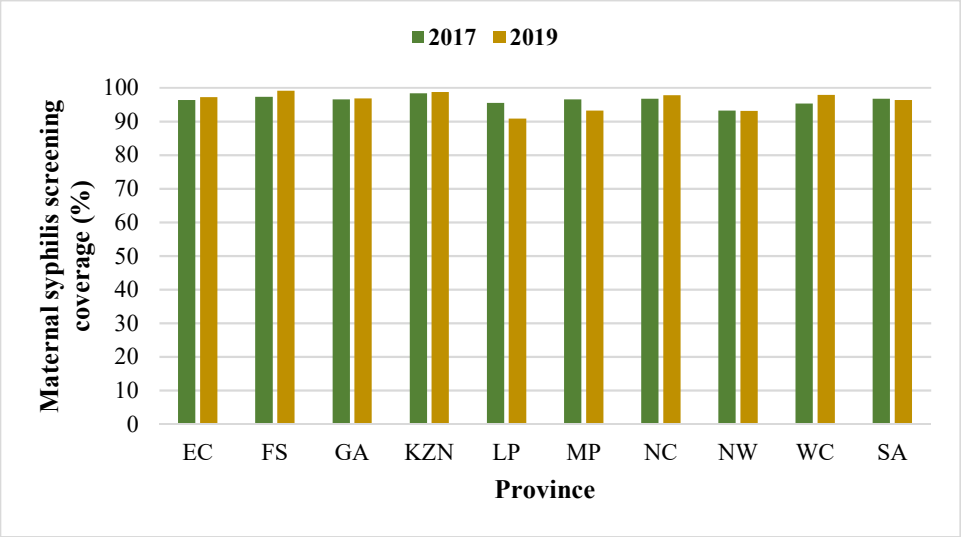
EC: Eastern Cape; FS: Free State; GA: Gauteng; KZN: KwaZulu-Natal; LP: Limpopo; MP: Mpumalanga; NW: North West; NC: Northern Cape; WC: Western Cape; SA: South Africa; ANC: antenatal care

Figure 15*:* Early attendance of antenatal care by province in the 2019 Antenatal HIV Sentinel Survey, South Africa

More than two-thirds (70.1%, 95% CI: 69.5%–70.7%) of participants attended their first-ANC-visit before 20 weeks of pregnancy. The highest attendance of ANC before 20 weeks of pregnancy was in Western Cape at 76.9% and the lowest was in Eastern Cape at 65.6%. Attendance of ANC before 20 weeks was lower than the national average (70.1%) among women with high (≥4) gravidity (64.2%), single women (61.1%), participants with no education (60.6%) or primary education (66.2%), adolescent girls (63.8%) and women older than 40 years (63.3%). Attendance of ANC before 20 weeks of pregnancy was significantly lower among participants whose pregnancy was unintended (66.7%, 95% CI: 66.0%–67.4%) compared to participants whose pregnancy was intended (74.3%, 95% CI: 73.5%–75.2%). Attendance of ANC before 20 weeks was higher among those who knew their HIV-positive status before pregnancy (73.6%, 95% CI: 72.7%–74.6%) compared to participants newly diagnosed with HIV during pregnancy (69.7%, 95% CI: 68.4%–71.0%) and HIV-negative women (69.1%, 95% CI: 68.5%–69.8%).

3.8. Maternal syphilis screening and treatment coverage

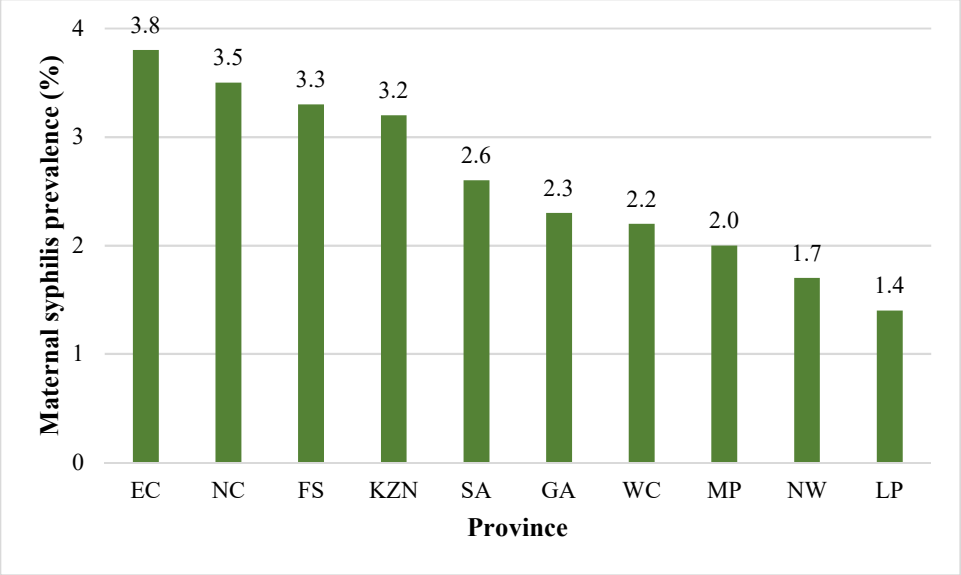
Maternal syphilis screening coverage was 96.4% at national level, representing a decline of 0.3% points in syphilis screening coverage from the level in 2017 (96.7%) (Figure 16). All provinces had greater than 90% syphilis screening coverage. Of those who had syphilis screening, 2.1% (95% CI: 2.0%–2.3%) were positive for syphilis, 79.4% were negative, 17.3% were awaiting result and 1.2% results were not in file. Syphilis screening coverage data were missing for 3.3% of participants. If we assumed that all missing responses indicated that the subjects did not receive the screening test, and include them as such in the denominator, the national coverage for syphilis screening drops to 93.1%.



EC: Eastern Cape; FS: Free State; GA: Gauteng; KZN: KwaZulu-Natal; LP: Limpopo; MP: Mpumalanga; NW: North West; NC: Northern Cape; WC: Western Cape; SA: South Africa

Figure 16*:* Maternal syphilis screening coverage among antenatal women, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, South Africa

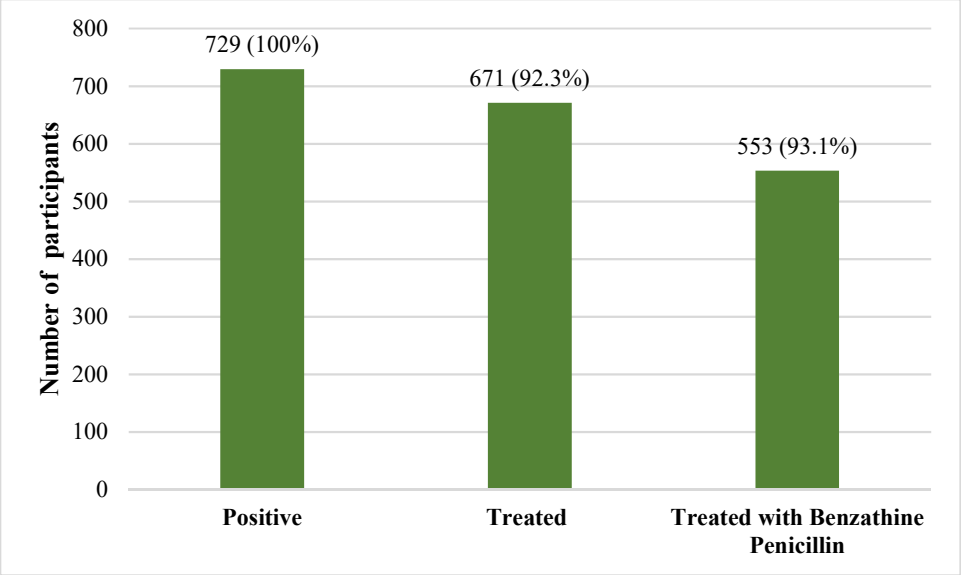
After excluding the pending results and the results not in file, the prevalence of syphilis (per medical record review data) among those who had syphilis test result, was 2.6% (95% CI: 2.4%–2.9%) (793) at national level (Figure 17). Compared to the prevalence of syphilis in 2015 (which was 2.0% based on laboratory testing), the current syphilis prevalence represents a 30% increase in prevalence between 2015 and 2019. The highest syphilis prevalence was in Eastern Cape at 3.8% (95% CI: 2.6%–5.4%) and the lowest was in Limpopo at 1.4% (95% CI: 1.0%–1.8%).



EC: Eastern Cape; FS: Free State; GA: Gauteng; KZN: KwaZulu-Natal; LP: Limpopo; MP: Mpumalanga; NW: North West; NC: Northern Cape; WC: Western Cape; SA: South Africa

Figure 17*:* Syphilis prevalence among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, South Africa

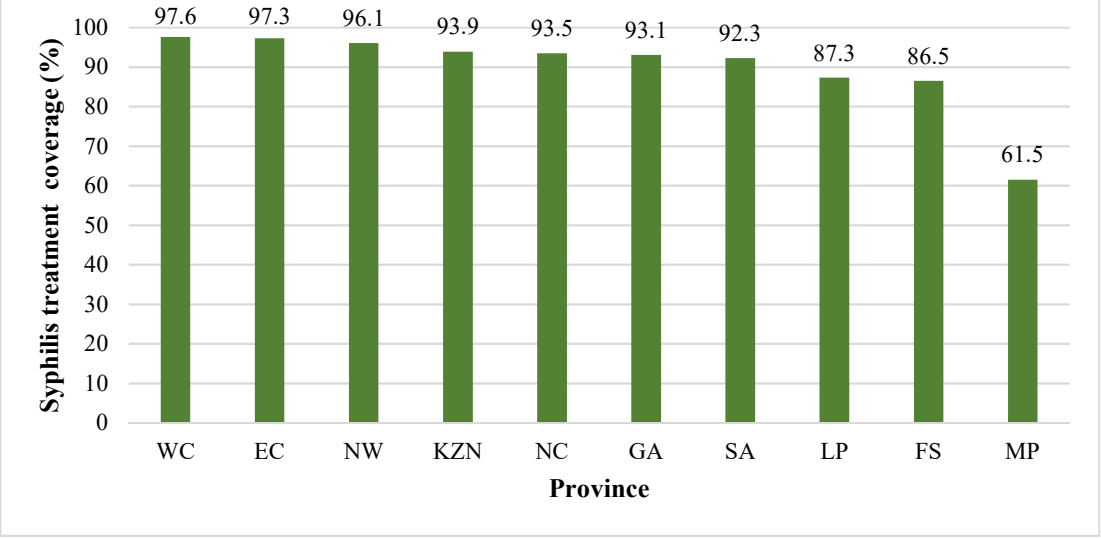
Of 729 participants who were syphilis positive and whose syphilis treatment status was reported, 92.3% (671) received at least one dose of treatment for syphilis (Figure 18). Of those treated for syphilis and had type of treatment reported (599), 93.1% (553) were treated with at least one dose of Benzathine penicillin G (BPG) – these translates to 85.1% of all syphilis positive participants treated with one dose of BPG. Syphilis treatment data was missing for 8.1% of syphilis positive participants, and type of treatment data was missing for 10.7% of participants treated for syphilis; these missing data were excluded from the above analysis (i.e. given that there was no substantial difference in the distribution of missing data by province, HIV status and participants age, it was assumed that the data was missing at random). If it is assumed that all missing responses mean that the subjects did not receive treatment for syphilis, and as such include them in the denominator, the coverage of syphilis treatment and treatment with BPG drops from 92.3% to 85% and from 93.1% to 83.0% respectively.



The graph represents 'number of participants'. The percentages are calculated using the number in the previous bar as the denominator (i.e. of 729 syphilis positive participants, 92.3% were treated for syphilis, and of 671 participants treated for syphilis, 93.1% were treated with Benzathine Penicillin);8.1% (64) of syphilis positive participants and 10.7% (72) participants treated for syphilis had not responded for the questions syphilis treatment and type of treatment (Benzathine Penicillin) respectively – these were excluded from the denominators for syphilis treatment and treatment with Benzathine Penicillin respectively. All percentages are weighted.

Figure 18: Syphilis treatment cascade among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, South Africa

Syphilis treatment coverage varied by province from a low of 61.5% (24/40) in Mpumalanga to a high of 97.6% (73/75) in Western Cape (*missing data were excluded from the denominator*s of these estimates) (Figure 19).



EC: Eastern Cape; FS: Free State; GA: Gauteng; KZN: KwaZulu-Natal; LP: Limpopo; MP: Mpumalanga; NW: North West; NC: Northern Cape; WC: Western Cape; SA: South Africa

Figure 19: Syphilis treatment coverage by province among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, South Africa

Chapter 4: Conclusions and Recommendations

In this national survey, HIV prevalence among pregnant women has remained largely unchanged at around 30% since 2004. Encouraging progress has been observed in the number of HIV-positive women initiating ART before pregnancy, with two-thirds of HIV-positive women initiating treatment prior to their first-ANC-visit. Early ANC initiation was low across provinces with just above a third of women initiating ANC during their first trimester. Despite improved availability and access to modern methods of contraceptives in South Africa, the prevalence of unintended pregnancy was high. At the national level, the prevalence of syphilis (estimated using medical record review data) showed a 30% rise in the prevalence of syphilis from the level reported in 2015 (2% in 2015 vs 2.6% in current survey) – in the later (i.e. in 2015) syphilis status was ascertained using rapid plasma reagin (RPR) test performed on left over blood specimens collected from participants for the survey while in 2019, syphilis status was ascertained using data extracted from participants' medical record.

The consistent declining trend in HIV prevalence among young women (15–24 years) is encouraging as incidence in this age group is traditionally high. However, given the large gender difference in HIV incidence and prevalence in this age group, solutions that extend beyond clinical health interventions are needed in order to address the additional gender-specific challenges [11, 12, 19]. Efforts to provide youth-friendly services may be compromised by low uptake of these services. A holistic approach to services provided, in addition to healthcare services, may reduce fear of stigmatization and increase demand and utilization of these services, thereby providing a platform for high-impact youth interventions that particularly promote testing. A positive healthcare experience during the vulnerable youthful period will additionally provide a positive frame of reference regarding healthcare services.

The interpretation of the provincial and national prevalence data is more complex as changes in HIV prevalence could be attributed to a combination of the following factors: HIV incidence, mortality, mobility between and within provinces, declining (or increasing) fertility among PLHIV, increasing coverage of ART (which reduces mortality among PLHIV), and the higher HIV prevalence among women ageing out of the 15–49 years age group which are replaced by younger women with much lower HIV prevalence ageing into the 15–49 year age group. Hence it is difficult to show direct correlation between HIV prevalence and new HIV infection.

The high prevalence of unintended pregnancy despite free access to contraceptive services in public health care facilities in South Africa is a great concern. This finding highlights the need to address key challenges and gaps that contribute to low uptake and ineffective use of contraceptives. Studies which assessed the level of knowledge on contraceptive methods show, most sexually active women in South Africa have knowledge of at least one contraceptive method [20, 21]. Despite the high knowledge of contraceptives, in 2016, 18% of sexually active women wanting to avoid pregnancy were not using any contraceptive method [22]. Low uptake of contraceptives is the most common cause of unintended pregnancy in up to 75% of unintended pregnancies in South Africa [20, 23]. Reasons cited for not using contraceptive methods included fear of side effects, fear of social disapproval, fear of infertility, believe that

occasional sex doesn't lead to pregnancy, and lack of preparation in unintended sex [24-26]. In other African countries, community-based services are increasingly being used to address misconceptions and concerns about contraceptives within the community, along with provision of commonly used contraceptive methods (e.g. injectables, pills and condoms) at community level, which have been shown to significantly improve uptake of contraceptives [27, 28]. Health service related factors such as quality of care, staff capacity to provide adequate counselling, healthcare providers attitude towards HIV-positive and younger clients, limited contraceptive options, disruptions in contraceptive supplies (stock outs), and long waiting hours have also been reported as contributing factors for low uptake of contraceptives [21]. In addition, discontinuation, and incorrect and irregular use of contraceptives contribute to unintended pregnancy [21, 29-31].

Our finding of approximately half of the pregnancies being unintended was consistent with other studies [20, 32]. Data from the South African demographic and health survey (SADHS) reported 54% of all births between 2012 and 2016 were unintended [22, 32].The high unintended pregnancy among adolescent girls (15–19 years) in this study could be attributable to both low knowledge of contraceptives and fear of using contraceptive methods due to parental disapproval, and male partners influence [21, 22, 33]. Among single women and women in a non-living together relationship, lack of inter-partner communication has been reported as one of the contributing factor for low contraceptive use [21, 29].

In this study, although there was no difference in the prevalence of unintended pregnancy between HIV-positive and HIV-negative women, about half of HIV-positive women who had been receiving ART before pregnancy from adult clinics reported their pregnancy was unintended. In South Africa, although contraceptive services are integrated with HIV services, the models of integration differ, with some healthcare providers providing both HIV and contraceptive services in one location while others provide referral based services [30, 34]. Provision of both HIV and contraceptive services by one healthcare provider could promote contraceptive use among PLHIV [30, 34].

Although the recommendation by WHO [35] and the NDoH [36] is for women to initiate ANC as soon as they suspect pregnancy or the latest by 12 weeks of their pregnancy, about two-thirds of participants in this study had not initiated ANC by 12 weeks of their pregnancy. Attendance of ANC in the first trimester of pregnancy has a vital role for early detection and treatment of HIV infection and other maternal conditions whose management improves maternal and neonatal outcomes[35]. Pregnant women who delay ART initiation due to late ANC attendance are likely to be virally unsuppressed at delivery which increases the risk of mother-to-child transmission (MTCT) [37]. It is also crucial for women to attend ANC in the first trimester of their pregnancy as various critical screenings tests (e.g. tests for iron deficiency, lifestyle diseases, sexually transmitted diseases and genetic and congenital diseases) are performed in the early stage (first trimester) of pregnancy to identify and appropriately manage risk factors that lead to poor maternal and child health outcomes [36].

In the literature, both client-related and health systems-related factors have been reported as barriers for early ANC initiation. In most African countries, women tend to delay ANC visit due to fear of miscarriage, contemplation of termination of pregnancy, fear of ANC HIV test

outcome, and due to financial reasons (e.g. transportation cost) [38, 39]. Some women also underestimate the importance of early ANC attendance due to lack of knowledge [38]. Health systems-related barriers to early ANC initiation include long waiting hours, overcrowding of public health facilities, and healthcare provider-client relationship [38, 40]. In our survey, even though attendance of ANC before 12 weeks was low, majority (more than two-thirds) of women attended their first-ANC-visit before the 5th month of their pregnancy, highlighting women's preference (for cultural and other reasons) to attend ANC after the first trimester. In this survey, women who had 4 or more children were less likely to initiate ANC early, which may be due to presumed knowledge/experience about pregnancy and underestimation of the importance of early ANC attendance [41]. In a stratified analysis, we found early ANC initiation to be high among women who were married and women with higher educational level. The literature shows women who are underage or unmarried fear stigma to visit ANC facilities as it is not acceptable in the society to be pregnant at a young age especially without being married [38]. In addition, women who have unintended pregnancy are more likely to delay ANC initiation [42].

Compared to the SADHS and District Health Information System (DHIS) reports, our estimate for early ANC attendance was somewhat lower. In 2016, the SADHS estimated 47% of pregnant women initiated first ANC before 12 weeks of pregnancy which was higher by about 12% from our estimate for early ANC attendance [22]. The difference in the estimate between the two studies could be due to recall bias and social desirability bias in the SADHS survey which used self-reported and historical data to estimate early ANC attendance. Our estimate of 70% ANC attendance before 20 weeks was also lower compared to routine DHIS data which reported 79.8% attendance of ANC before 20 weeks for the 2018/19 financial year [18]. While DHIS reports data from all clinics, the antenatal survey is conducted in selected sentinel sites which are representative of clinics providing ANC services to more than 20 antenatal clients per month. The exclusion of smaller clinics in the antenatal survey could be a possible explanation for the difference in the estimate of early ANC attendance between DHIS and the antenatal survey.

The suggested increase in maternal syphilis sero-prevalence from 2.0% in 2015 to 2.6% in 2019 is concerning, particularly in the context of the severe negative pregnancy and neonatal outcomes associated with maternal syphilis and the significant increase in congenital syphilis cases notified in the same year. South Africa's screening protocol requires syphilis screening at the booking visit to be repeated at 32–36 weeks gestation, if the first test was negative [43]. The current study did not include the rate of coverage for the repeat third trimester screening. Syphilis sero-prevalence in the 2019 survey represents pregnant women majority of whom tested positive (for RPR) at booking. Rapid plasma reagin (RPR) positivity is a marker of active or recent syphilis infection. In the 2015 survey, the prevalence was determined from an RPR test on a blood specimen collected at enrolment among women who were a mix of first visit attendees and follow up visit attendees. Given that some women may acquire syphilis in pregnancy, the estimate at booking would likely have been lower than the 2% reported in the 2015 survey. This means there was likely a greater increase than the 30% increase observed between the two surveys. Currently syphilis screening is primarily laboratory-based. In this study, 17.3% of participants (>80% of which were first-ANC-visit attendees) were awaiting results and an additional 1.2% of participants results were not recorded in their medical records.

This presents a challenge to timely treatment initiation and the failure of patients to return for treatment. Point-of-Care (rapid) tests have demonstrated an increase in screening and treatment coverage in a variety of settings globally, including a study conducted in South Africa, whilst not creating any additional workload for Healthcare Workers [44, 45].

The increase in maternal syphilis is plausible and consistent with other data sources on syphilis in the general population, maternal syphilis and congenital syphilis. A Spectrum modelling exercise conducted for South Africa in 2018 and reporting data up to 2017 showed that although syphilis rates had declined throughout the early 2000s, incidence had plateaued from about 2010 [46]. In 2017–2018, the country experienced shortages in BPG, the drug of choice for treatment of syphilis during pregnancy. Although facilities were instructed to prioritise pregnant women for treatment with BPG, some partners may have gone untreated leading to re-infection later in pregnancy [47]. Lastly since the revitalisation of the Notifiable Medical Conditions (NMC) surveillance programme in July 2017, there has been a steady increase in the number of congenital syphilis notifications. In 2018, South Africa reported 159 cases of congenital syphilis compared to 362 in 2019 (*unpublished report*). While this increase could have been due to increases in notifications, the parallel increases in number of RPR positive tests conducted on infants or children under the age of two years suggest an increase in syphilis exposure and or number of infants being investigated for congenital syphilis in the country. In addition, the provincial distribution of congenital syphilis cases closely matches the maternal sero-prevalence rates reported. From 2017–2019, about 90% of notifications were from KwaZulu-Natal, Gauteng, Western Cape, Eastern Cape, and Free State. While this may be due to better notification in these provinces, it is also a reflection of increased burden *(Congenital syphilis surveillance report April 2020, unpublished)*.

The 95-95-95 target for elimination of MTCT (eMTCT) syphilis requires that 95% of all pregnant women attend ANC, 95% of all pregnant women are tested for syphilis and that 95% of all syphilis positive women be treated with at least one dose of BPG [48]. Although South Africa has met the second eMTCT syphilis 95% target, as per the findings of this survey, additional focus is needed on retesting at 32 weeks for women who were negative at booking. The observed 92% coverage of the first dose of treatment is higher than expected given the reported BPG shortages as well as lower coverage of treatment from DHIS clinical sentinel sites (*DHIS clinical sentinel site report, unpublished report*). Supplies of BPG could have improved towards the end of 2019 when the survey was conducted, or ANC sentinel sites are better performing than the clinical sentinel sites. Also, while this report measured coverage for the first dose of BPG treatment, South African guidelines require that syphilis positive pregnant women be treated with three doses of BPG (each one week apart). Data from DHIS clinical sentinel sites show that coverage for the second and third doses is substantially lower than for the first (*DHIS clinical sentinel site report, unpublished report*). More work is also needed to improve coverage of treatment especially in Mpumalanga, Free State and Limpopo provinces.

The survey had some limitations. Pregnant women younger than 15 years or older than 49 years were not included in the survey. The survey was restricted to public facilities, which

may limit the generalizability of the findings to the overall population, especially to high-income groups. Compared to previous surveys, missing data and inconsistent reporting has increased in the 2019 survey. The antenatal survey is collected by NDoH staff/ nurses providing ANC services. In the 2019 survey several new questions were added, and the layout of the data collection form was designed in a different way from that used in previous surveys in order to provide space for the new questions introduced. Despite these changes, limited supervision and monitoring support was provided at site level for nurses collecting the data. The district team designated to coordinate and supervise survey implementation had other conflicting commitments/ responsibilities, which resulted in inadequate provision of support to the survey. Missing or inconsistent data was higher for the new questions introduced in the 2019 survey. The team has assessed the potential bias missing data may have introduced by triangulating data with specimen data (e.g. for HIV status) and by extracting the sub-sample of missing data (where possible). The result showed for most variables the missing data was missing at random. Unintended pregnancy was determined by using two questions from the LMUP rather than the full validated measure – because our study used only two LMUP questions, our estimates may not be directly comparable with findings from other studies that used all six LMUP questions.

The percentage of specimens rejected was higher in the 2019 survey compared to previous surveys; however, no substantial difference was observed in the demographic characteristics of participants excluded from the analysis due to rejections. Sample size realization in the 2019 survey was higher compared to previous surveys (e.g. in 2017 sample size realization at province level ranged from 74.1% in North West to 100.4% in Free State as compared to >90% sample size realization across all provinces in 2019). The increase in sample size realization in 2019 was because of improved tracking of the study progress at clinic level. Clinics also collected extra samples to compensate for samples that may have haemolysed during transportation and to assist clinics that were remaining behind in sample size realization. To adjust for variability in sample size achievement between districts, in the 2019 survey, all analyses were weighted for sample size realization.

The following recommendations stemmed out of the 2019 survey, though they draw from findings of other studies. These recommendations are intended to give programmatic direction to existing initiatives undertaken by the NDoH, and partner Departments, as well as to guide the design and implementation of new initiatives. In general, the focus is on the provision of high-quality, integrated health services for Sexual and Reproductive Health and Rights (SRHR) and the design of tailored, innovative initiatives designed to achieve a reduction in infections of HIV and syphilis. The recommendations are as follows:

- Despite the promising reduction in prevalence of HIV amongst young women (15–24 years), cognizance of the large gender disparities in incidence and prevalence of HIV against young women reported in the literature, as well as the high rate of unintended pregnancy among the same age group, indicate that this age group continues to need quality SRHR services delivered in a quality and youth friendly manner. This may be

accomplished through both optimizing access and generating demand for appropriate services:

Optimize Access:

- Provision of comprehensive quality and youth-friendly sexual and reproductive health services continues to be a priority. Designated Adolescent and Youth Zones at facilities with welcoming environments served by appropriately trained Healthcare Workers is the gold standard. However, additional research must be done into Adolescent and Youth Zones to identify specific strategies that have been successful and can be scaled to other Youth Zones. Once initiated, the effectiveness of the Adolescent and Youth zones must be monitored to ensure services provided meet the requisite standards and are continually improving to address the changing needs of youth.
- HIV self-testing could be explored as an alternative option to increase uptake of HIV testing among adolescent girls and young women who may not access health facility-based services due to stigma.
- Innovative strategies are needed in order to increase uptake of contraceptives and dual protection, particularly amongst young women and men. This may include the expansion of the provision of oral contraceptives through the chronic medicines dispensing and distribution (CCMDD) service, the development of private-public-partnerships that facilitate the provision of contraceptive services and dual protection through private pharmacies as well as a strong emphasis on providing updated information on available contraceptive choices so women and couples are able to find an option that suits their individual needs.
- In collaboration with the Departments of Basic Education, Higher Education and Social Development, strategies to strengthen school based sexual and reproductive health education could be developed. These strategies could then be implemented through school nurses and clinical services at tertiary institutions, with focus areas including increasing knowledge about contraceptives and dual protection, provision of contraceptive services, and promoting healthy sexual behavioural choices to ultimately reduce unintended pregnancies and sexually transmitted infections (STI) among adolescent girls, young women and men.
- Increasing contraceptive choices available at primary health care facilities, provision of quality counselling regarding the various options, and ensuring continued availability of contraceptives continue to be a priority. Specifically, efforts could be made to increase the contraceptive options included on the Essential Medicines List and thereby increase the options available at facility. Also, fostering continued close engagement with suppliers may allow supply disruptions to be identified and addressed before causing shortages at the facility level.

Generate Demand:

- Implementing a national educational media campaign on contraceptive options including dual protection, availability, and the importance of early initiation of ANC may assist with demand generation. This could include previously used modes such as radio stations, social media, school services, and local television shows but could be deployed consistently in order to maximise the benefits. Establishment of a health-related media team to co-ordinate distribution of accurate health information through various digital platforms may ensure continuity of efforts.

- Education on SRHR should be expanded to actively include men. In order to optimize reach and scale, this could be undertaken in non-healthcare settings, such as adverts at sports and recreational events, seminars offered at places of employment and universities, and religious facilities. A model for expansion of SRHR initiatives would be most effective if developed in collaboration with the Department of Basic Education, Department of Higher Education, and Department for Social Development, Department of Sports, Arts, Culture and Recreation. In addition, a structured intervention made available and focused towards male-friendly health facilities such as medical male circumcision (MMC) facilities could improve demand.

Further Recommendations:

- Strengthening the integration of HIV treatment programmes with contraceptive and STI services is important in order to provide comprehensive services to PLHIV accessing HIV services. Lessons can be learnt from areas where this has been completed successfully already and may be applied nationwide. The planned comprehensive training for the 2019 SRHR policy and guidelines provides a good opportunity to further this objective.
- Combination prevention services could be expanded to simultaneously address socio–economic drivers of the HIV epidemic (such as low education level and inequity in access to schooling) that contribute to low uptake of HIV and reproductive health services.
- District-level analyses are needed to determine the districts with highest incidence of HIV and evaluate the health prevention services available in these districts as well as the factors affecting availability and uptake of the services. Further analyses may determine the operational interventions required in addressing this challenge. Additional monitoring beyond the ANC population, could determine if the observed pattern of increasing syphilis prevalence yet stable or decreasing HIV prevalence exist, particularly amongst key populations and contraceptives service clients. Voluntary MMC services could also be explored as a platform for STI surveillance, especially in areas where the programme targets men at high risk of HIV/STI.
- A shift away from syndromic management and towards alternatives, such as general or key population testing, could be considered as a potential remedy to this pattern.
- The national introduction of Dual HIV/syphilis rapid diagnostic testing for ANC services may assist with clinical level diagnostics and could be expedited. A pilot implementation study is needed to identify and mitigate challenges and inform national roll-out, given quality assurance concerns in the national HIV testing programme, the high proportion of PLHIV already on ART at booking and the variable HIV rapid test performance among people on ART. Given the high HIV prevalence and increasing awareness of HIV status, algorithms directing the correct selection of rapid tests may be developed.
- With regards to treatment, BPG is the only treatment recommended for preventing vertical transmission of syphilis. It is therefore imperative that any challenges delaying/preventing the registration of BPG in South Africa as well as procurement challenges, be resolved in partnership with SAHPRA, the Affordable Medicines Directorate of the NDoH and all other stakeholders.
- Male circumcision and condom use as strategies for primary prevention of maternal and congenital syphilis warrant further focus for inclusion in existing prevention strategies.

- To improve data quality in the antenatal survey, there is a need to have a project management team at province level that oversees and coordinates activities for the survey including provincial and laboratory activities, onsite support visits and supervision.

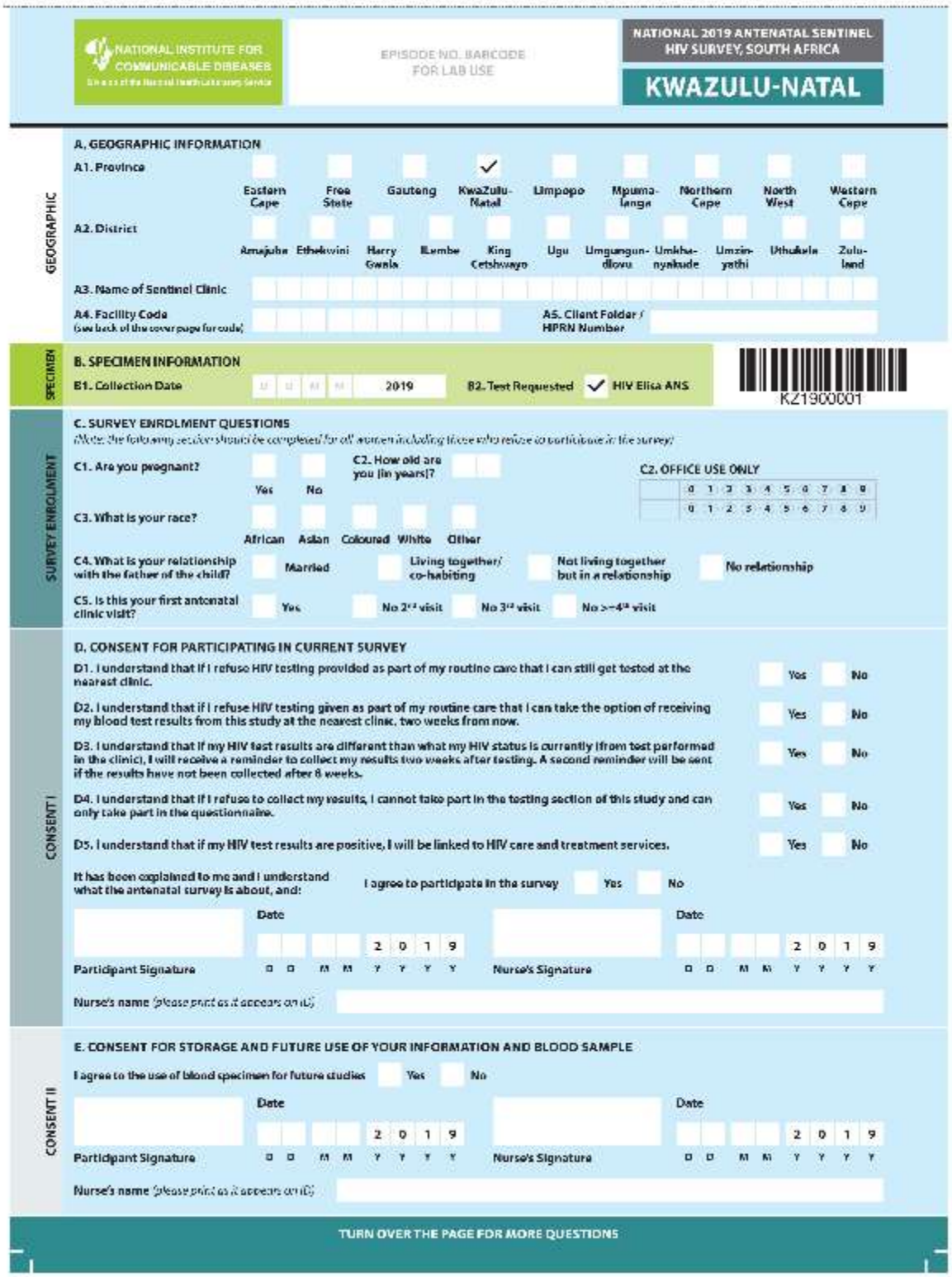
References

1. UNAIDS (2020). UNAIDS data 2020. [cited 26/08/2020]. Available from: https://www.unaids.org/sites/default/files/media_asset/2020_aids-data-book_en.pdf.
2. UNAIDS 'AIDSinfo' [cited 09 /05/2020]. Available from: http://aidsinfo.unaids.org/.
3. UNAIDS. 90-90-90: An ambitious treatment target to help end the AIDS epidemic, 2004 [cited 05/09/2018]. Available from: http://www.unaids.org/sites/default/files/media_asset/90-90-90_en.pdf.
4. Woldesenbet S, Kufa T, Cheyip M, Ayalew K, Lombard C, Manda S, et al. Awareness of HIV-positive status and linkage to treatment prior to pregnancy in the "test and treat" era: A national antenatal sentinel survey, 2017, South Africa. PLoS One. 2020;15(3):e0229874.
5. Kharsany ABM, Cawood C, Lewis L, Puren A, George G, Govender K, Beckett S, Ayalew KA (2019). The HIV Incidence Provincial Surveillance System: Combined report for the 2014 Survey and 2016 Cohort; 2015 Survey and 2017 Cohort, KwaZulu Natal, South Africa [cited: 28/02/20]. Available from: https://epicentre.org.za/wp-content/uploads/2020/02/e-Book-HIPSS-2014-2017-Combined-comparison-report_Final_21Feb2020-3.pdf.
6. Diseko L, Overmeyer R. South African DSD update. 12 November 2019. South Africa National Department of Health. [cited 15/ 4/2020]. Available from: http://www.differentiatedcare.org/Portals/0/adam/Content/LUn23I85V0aDet59YdligA/File/Overmeyer_Final.pdf.
7. Johnson LF, Dorrington RE, Moolla H. Progress towards the 2020 targets for HIV diagnosis and antiretroviral treatment in South Africa. South Afr J HIV Med. 2017;18(1):694.
8. Lilian RR, Rees K, McIntyre JA, Struthers HE, Peters RPH. Same-day antiretroviral therapy initiation for HIV-infected adults in South Africa: Analysis of routine data. PLoS One. 2020;15(1):e0227572.
9. Bor J, Chiu C, Ahmed S, Katz I, Fox MP, Rosen S, et al. Failure to initiate HIV treatment in patients with high CD4 counts: evidence from demographic surveillance in rural South Africa. Trop Med Int Health. 2018;23(2):206-20.
10. Bock P, Fatti G, Ford N, Jennings K, Kruger J, Gunst C, et al. Attrition when providing antiretroviral treatment at CD4 counts >500cells/muL at three government clinics included in the HPTN 071 (PopART) trial in South Africa. PLoS One. 2018;13(4):e0195127.
11. Simbayi LC, Zuma K, Zungu N, Moyo S, Marinda E, Jooste S, et al. (2019). South African national HIV prevalence, incidence, behaviour and communication survey, 2017. Cape Town: HSRC Press [cited: 12/09/19]. Available from: https://www.hsrcpress.ac.za/books/south-african-national-hiv-prevalence-incidence-behaviour-and-communication-survey-2017
12. National Department of Health SA. South Africa's National Strategic Plan for HIV, TB and STI 2017–2022 Department of Health, Pretoria (2007) [cited 15/08/ 2018]. Available from: http://sanac.org.za/wp-content/uploads/2017/05/NSP_FullDocument_FINAL.pdf.
13. Woldesenbet SA, Kufa T, Lombard C, Manda S, Ayalew K, Cheyip M, Puren A,(2018). The 2017 National Antenatal Sentinel HIV Survey, South Africa, National Department of Health [cited: 02/03/19]. Avaialble from: https://www.nicd.ac.za/wp-content/uploads/2019/07/Antenatal_survey-report_24July19.pdf.
14. Census 2011 Statistical release – P0301.4 / Statistics South Africa. Pretoria: Statistics South Africa, 2012 [cited 08/06/2017]. Available from: https://www.statssa.gov.za/publications/P03014/P030142011.pdf.
15. Goga A, Jackson D, Singh M, Lombard C, for the SAPMTCTE study group. Early (4-8 weeks postpartum) Population-level Effectiveness of WHO PMTCT Option A, South Africa, 2012-2013. South African Medical Research Council and National Department of Health of South Africa, 2015 [cited 9/8/ 2018]. Available from: http://www.mrc.ac.za/healthsystems/SAPMTCTEReport2012.pdf.

16. NDOH. National HIV testing services Policy 2016 [cited 8/ 4/2018]. Available from: http://www.hst.org.za/sites/default/files/HTS%20Policy%2028%20July%20final%20copy.pdf
17. StataCorp. 2015. Stata Statistical Software: Release 14. College Station, TX: StataCorp LP.
18. National Department of Health Annual Report 2018/19 [cited 11/05/2020]. Available from: file:///C:/Users/selamawitw/AppData/Local/Microsoft/Windows/INetCache/IE/F6F9ACA3/annual%20report%204web_compressed_1.pdf.
19. UNAIDS – South Africa. [cited 15/05/ 2020]. Available from: https://www.unaids.org/en/regionscountries/countries/southafrica.
20. Chersich MF, Wabiri N, Risher K, Shisana O, Celentano D, Rehle T, et al. Contraception coverage and methods used among women in South Africa: A national household survey. S Afr Med J. 2017;107(4):307-14.
21. Lince-Deroche N, Pleaner M, Harries J, Morroni C, Mullick S, Firnhaber C, Mulongo M, Holele P, Sinanovic E: Achieving universal access to sexual and reproductive health services: the potential and pitfalls for contraceptive services in South Africa. In SA health review. Edited by Padarath A, King J, Mackie E-L, Casciola J. Pretoria: Health Systems Trust; 2016:95-108.
22. National Department of Health (NDOH), Statistics South Africa (Stats SA), South African Medical Research Council (SAMRC) and ICF. 2017. South African demograhic and health survey 2016: key indicators report statistics South Africa. Pretoria, South Africa and Rockville Maryland, USA. [cited 12/08/ 2018]. Available from: https://www.statssa.gov.za/publications/Report%2003-00-09/Report%2003-00-092016.pdf.
23. Oluwole EO, Skaal L. Contraceptive practices among women seeking termination of pregnancy in one public hospital in Eastern Cape, South Africa. Afr J Prim Health Care Fam Med. 2016;8(1):e1-6.
24. Izale K, Govender I, Fina JP, Tumbo J. Factors that influence contraceptive use amongst women in Vanga health district, Democratic Republic of Congo. Afr J Prim Health Care Fam Med. 2014;6(1):E1-7.
25. Hussain R, Loris S, Sedgh G. Unmet Need for Contraception in Developing Countries: Examining Women's Reasons for Not Using a Method, New York: Guttmacher Institute, 2016 [cited 10/05/2020]. Available from: https://www.guttmacher.org/report/unmet-need-for-contraception-in-developing-countries
26. Wang H, Long L, Cai H, Wu Y, Xu J, Shu C, et al. Contraception and Unintended Pregnancy among Unmarried Female University Students: A Cross-sectional Study from China. PLoS One. 2015;10(6):e0130212.
27. Weidert K, Gessessew A, Bell S, Godefay H, Prata N. Community Health Workers as Social Marketers of Injectable Contraceptives: A Case Study from Ethiopia. Glob Health Sci Pract. 2017;5(1):44-56.
28. Okegbe T, Affo J, Djihoun F, Zannou A, Hounyo O, Ahounou G, et al. Introduction of Community-Based Provision of Subcutaneous Depot Medroxyprogesterone Acetate (DMPA-SC) in Benin: Programmatic Results. Glob Health Sci Pract. 2019;7(2):228-39.
29. Hlongwa M, Mashamba-Thompson T, Makhunga S, Hlongwana K. Evidence on factors influencing contraceptive use and sexual behavior among women in South Africa: A scoping review. Medicine (Baltimore). 2020;99(12):e19490.
30. Schwartz SR, Rees H, Mehta S, Venter WD, Taha TE, Black V. High incidence of unplanned pregnancy after antiretroviral therapy initiation: findings from a prospective cohort study in South Africa. PLoS One. 2012;7(4):e36039.
31. Baumgartner JN, Morroni C, Mlobeli RD, Otterness C, Myer L, Janowitz B, et al. Timeliness of contraceptive reinjections in South Africa and its relation to unintentional discontinuation. Int Fam Plan Perspect. 2007;33(2):66-74.
32. Unwanted fertility in South Africa / Statistics South Africa. Pretoria: Statistics South Africa, 2020 [cited 10/05/2020]. Available from: www.statssa.gov.za

33. Ramathuba DU, Khoza LB, Netshikweta ML. Knowledge, attitudes and practice of secondary school girls towards contraception in Limpopo Province. Curationis. 2012;35(1):45.
34. Lince-Deroche N, Hendrickson C, Moolla A, Kgowedi S, Mulongo M. Provider perspectives on contraceptive service delivery: findings from a qualitative study in Johannesburg, South Africa. BMC Health Serv Res. 2020;20(1):128.
35. WHO recommendations on antenatal care for a positive pregnancy experience. World Health Organization [cited 11/05/2020]. Available from: https://apps.who.int/iris/bitstream/handle/10665/250796/9789241549912-eng.pdf;jsessionid=C317513B60CF8026130179C681E1953B?sequence=1.
36. Guidelines for Maternal Care in South Africa: A manual for clinics, community health centres and district hospitals. fourth edition, 2015. Department of Health, Republic of Health South Africa [cited 11/05/2020]. Available from: file:///C:/Users/selamawitw/AppData/Local/Microsoft/Windows/INetCache/IE/PWHFCAP8/maternalcareguidelines2015.pdf.
37. Woldesenbet SA, Kufa T, Barron P, Chirombo BC, Cheyip M, Ayalew K, et al. Viral suppression and factors associated with failure to achieve viral suppression among pregnant women in South Africa. AIDS. 2020;34(4):589-97.
38. Jinga N, Mongwenyana C, Moolla A, Malete G, Onoya D. Reasons for late presentation for antenatal care, healthcare providers' perspective. BMC Health Serv Res. 2019;19(1):1016.
39. Haddad DN, Makin JD, Pattinson RC, Forsyth BW. Barriers to early prenatal care in South Africa. Int J Gynaecol Obstet. 2016;132(1):64-7.
40. Ejeta E, Dabsu R, Zewdie O, Merdassa E. Factors determining late antenatal care booking and the content of care among pregnant mother attending antenatal care services in East Wollega administrative zone, West Ethiopia. Pan Afr Med J. 2017;27:184.
41. Gudayu TW, Woldeyohannes SM, Abdo AA. Timing and factors associated with first antenatal care booking among pregnant mothers in Gondar Town; North West Ethiopia. BMC Pregnancy Childbirth. 2014;14:287.
42. Ebonwu J, Mumbauer A, Uys M, Wainberg ML, Medina-Marino A. Determinants of late antenatal care presentation in rural and peri-urban communities in South Africa: A cross-sectional study. PLoS One. 2018;13(3):e0191903.
43. Guideline for the Prevention of Mother to Child Transmission of Communicable Infections (HIV, Hepatitis, Listeriosis, Malaria, Syphilis and TB) 2019 [cited:12/03/20] . Available from: http://www.nicd.ac.za/wp-content/uploads/2019/11/Guidelines-for-the-Prevention-of-Transmission-of-Communicable-Diseases-from-mother-to-child_28-October.pdf.
44. Mabey DC, Sollis KA, Kelly HA, Benzaken AS, Bitarakwate E, Changalucha J, et al. Point-of-care tests to strengthen health systems and save newborn lives: the case of syphilis. PLoS Med. 2012;9(6):e1001233.
45. Bronzan RN, Mwesigwa-Kayongo DC, Narkunas D, Schmid G, Neilsen G, Ballard R et al. On-site rapid antenatal syphilis screening with an immunochromatographic strip improves case detection and treatment in rural South African clinics. Sex Transm Dis. 2007;34(7 Suppl):S55-S60. .
46. Kularatne RS, Niit R, Rowley J, Kufa-Chakezha T, Peters RPH, Taylor MM, et al. Adult gonorrhea, chlamydia and syphilis prevalence, incidence, treatment and syndromic case reporting in South Africa: Estimates using the Spectrum-STI model, 1990-2017. PLoS One. 2018;13(10):e0205863.
47. Nurse-Findlay S, Taylor MM, Savage M, Mello MB, Saliyou S, Lavayen M, et al. Shortages of benzathine penicillin for prevention of mother-to-child transmission of syphilis: An evaluation from multi-country surveys and stakeholder interviews. PLoS Med. 2017;14(12):e1002473.
48. Global guidance on criteria and processes for validation: elimination of mother-to-child transmission of HIV and syphilis, 2nd edition. Geneva: World Health Organization; 2017.

Annexure 1: Data collection form



NATIONAL INSTITUTE FOR COMMUNICABLE DISEASES
A division of the National Health Laboratory Service

EPISODE NO. BARCODE FOR LAB USE

NATIONAL 2019 ANTENATAL SENTINEL HIV SURVEY, SOUTH AFRICA

KWAZULU-NATAL

GEOGRAPHIC

A. GEOGRAPHIC INFORMATION

A1. Province: Eastern Cape; Free State; Gauteng; KwaZulu-Natal ✓; Limpopo; Mpuma-langa; Northern Cape; North West; Western Cape

A2. District: Amajuba; Ethekwini; Harry Gwala; Ilembe; King Cetshwayo; Ugu; Umgungun-dlovu; Umkha-nyakude; Umzin-yathi; Uthukela; Zulu-land

A3. Name of Sentinel Clinic

A4. Facility Code (see back of the cover page for code)

A5. Client Folder / HPRN Number

SPECIMEN

B. SPECIMEN INFORMATION

B1. Collection Date: D D M M 2019

B2. Test Requested: ✓ HIV Elisa ANS

KZ1900001

SURVEY ENROLMENT

C. SURVEY ENROLMENT QUESTIONS

(Note: the following section should be completed for all women including those who refuse to participate in the survey)

C1. Are you pregnant? Yes / No

C2. How old are you (in years)?

C2. OFFICE USE ONLY

C3. What is your race? African / Asian / Coloured / White / Other

C4. What is your relationship with the father of the child? Married / Living together/ co-habiting / Not living together but in a relationship / No relationship

C5. Is this your first antenatal clinic visit? Yes / No 2nd visit / No 3rd visit / No >=4th visit

CONSENT I

D. CONSENT FOR PARTICIPATING IN CURRENT SURVEY

D1. I understand that if I refuse HIV testing provided as part of my routine care that I can still get tested at the nearest clinic. Yes / No

D2. I understand that if I refuse HIV testing given as part of my routine care that I can take the option of receiving my blood test results from this study at the nearest clinic, two weeks from now. Yes / No

D3. I understand that if my HIV fast results are different than what my HIV status is currently (from test performed in the clinic), I will receive a reminder to collect my results two weeks after testing. A second reminder will be sent if the results have not been collected after 8 weeks. Yes / No

D4. I understand that if I refuse to collect my results, I cannot take part in the testing section of this study and can only take part in the questionnaire. Yes / No

D5. I understand that if my HIV test results are positive, I will be linked to HIV care and treatment services. Yes / No

It has been explained to me and I understand what the antenatal survey is about, and: I agree to participate in the survey Yes / No

Participant Signature — Date D D M M 2019

Nurse's Signature — Date D D M M 2019

Nurse's name (please print as it appears on ID)

CONSENT II

E. CONSENT FOR STORAGE AND FUTURE USE OF YOUR INFORMATION AND BLOOD SAMPLE

I agree to the use of blood specimen for future studies Yes / No

Participant Signature — Date D D M M 2019

Nurse's Signature — Date D D M M 2019

Nurse's name (please print as it appears on ID)

TURN OVER THE PAGE FOR MORE QUESTIONS

F. DEMOGRAPHIC AND CLINICAL INFORMATION

DEMOGRAPHIC AND CLINICAL

F1. How old is the father of this baby? ☐☐

F2. Is the father of this baby 5 years older than you? ☐ Yes ☐ No ☐ Don't know

F1. OFFICE USE ONLY
0 1 2 3 4 5 6 7 8 9
0 1 2 3 4 5 6 7 8 9

F3. What is your highest completed level of education? ☐ None ☐ Primary ☐ Secondary ☐ Tertiary

F4. How many times have you been pregnant including this one? ☐ 1 (one) ☐ 2 (two) ☐ 3 (three) ☐ 4 (four) and above

F5. How many live babies have you delivered? ☐ 0 (zero) ☐ 1 (one) ☐ 2 (two) ☐ 3 (three) ☐ 4 (four) and above

F6. Gestational age at today's visit (in weeks) (review medical record) ☐☐

F7. What trimester is the participant currently (review medical record)? ☐ 1st ☐ 2nd ☐ 3rd

F6. OFFICE USE ONLY
0 1 2 3 4 5 6 7 8 9
0 1 2 3 4 5 6 7 8 9

F8. Gestational age at first antenatal care booking (in weeks) (review medical record ☐☐

F9. What gestational age was the participant at first antenatal care booking (in trimester) (review medical record? ☐ 1st ☐ 2nd ☐ 3rd

F8. OFFICE USE ONLY
0 1 2 3 4 5 6 7 8 9
0 1 2 3 4 5 6 7 8 9

F10. Just before I became pregnant ☐ I intended to get pregnant ☐ My intentions kept changing ☐ I did not intend to get pregnant

F11. Before I became pregnant ☐ The father of the child and I had agreed that we would like me to be pregnant ☐ The father of the child and I had discussed having children together, but hadn't agreed for me to get pregnant ☐ We never discussed having children together

HIV STATUS

G. HIV STATUS

G1. What was the participant's HIV status in the last pregnancy prior to this? ☐ Positive ☐ Negative ☐ Unknown ☐ Not applicable - this is her first pregnancy

G2. What is the participant's latest HIV status (from her medical records)? ☐ No HIV Status recorded ☐ Participant refused testing ☐ Test not offered ☐ Negative from test done in previous ANC visit ☐ Negative from test done today ☐ HIV Positive

G3. If HIV positive, when was she first diagnosed HIV positive? ☐ Positive before this pregnancy ☐ Tested positive during previous antenatal visit ☐ Tested positive today

G4. If reported HIV positive ask this question:

Has the participant ever taken ARVs? If yes when did she start: ☐ Yes, before pregnancy ☐ Yes, initiated today ☐ Yes, initiated in prior ANC visit at 1st trimester ☐ Yes, initiated in prior ANC visit at 2nd trimester ☐ Yes, initiated in prior ANC visit at 3rd trimester ☐ No

HIV VIRAL LOAD

H. VIRAL LOAD TESTING *(If reported HIV positive ask these questions)*

H1. Is there a record showing viral load (VL) test was done for the participant during this pregnancy? ☐ Yes ☐ No ☐ Not due for VL

H2. If VL is done, is the VL test result documented? ☐ Yes ☐ No

H3. If VL is documented, what is the most recent VL result from test done during this pregnancy? ☐ <=49 copies/ml ☐ 50 – 999 copies/ml ☐ >=1000 copies/ml

If HIV positive and no viral load test done during this pregnancy, proceed according to the national viral load testing guideline and place the NHLS barcode here from N1 booklet.

SYPHILIS

I. SYPHILIS TESTING

I1. Is there a record showing syphilis test was done for the participant during this pregnancy? ☐ Yes ☐ No

I2. If syphilis test was done, what is the result? ☐ Positive ☐ Negative ☐ Pending (in lab) ☐ Not in file

I3. If the result was positive, did the patient receive treatment for syphilis? ☐ Yes ☐ No

I4. If she did receive treatment, was this Benzathine Penicillin (Bicillin)? ☐ Yes ☐ No

NATIONAL HIV SURVEILLANCE FOCAL PERSON CONTACT NUMBER: 084 855 7867

Annexure 2: Information sheet

NATIONAL 2019 ANTENATAL SENTINEL HIV SURVEY, SOUTH AFRICA

Information sheet for participating in the current survey

INTHODUCTION

Hello, I am Sr/Ms/Mr ..... a nurse working in the antenatal care unit at this clinic. I would like to find out if you are willing to participate in a study called 'the Antenatal survey'. This study is being supported by the National Institute for Communicable Diseases and the National Department of Health.

WHY AND HOW ARE WE DOING THIS STUDY?

We are asking 39 015 pregnant women to take part in this study. They will come from all 9 provinces of South Africa. We are doing this study to find out how many pregnant women have either HIV or syphilis. Both HIV and syphilis are infections that can lead to serious negative influences on your and your baby's health. The study will help the government to know whether the money spent to prevent HIV and syphilis is having an effect, and what more needs to be done. We are also doing this study to find out what care pregnant women get from the clinic. Did the pregnant women get HIV and syphilis tests during her antenatal visits? Do they get treatment for HIV and syphilis? They also need to know how much medicine is needed to treat pregnant women for HIV and syphilis. We will draw a sample of blood from you for HIV and syphilis tests. We will interview you and collect information from your medical record. Your answers and information from the medical record will be written in a form. We will send the blood and the form to the laboratory for testing.

BEING PART OF THE STUDY AND STOPPING THE STUDY

If you agree to take part in this study, we will first ask you questions. You do not have to answer all the questions. We will then collect 6 drops (2 teaspoons) of blood from you for HIV and syphilis testing. If this is your first antenatal visit, a separate blood sample in addition to the blood collected for routine testing will be collected for the study. At any time during the questions or before the blood specimen collection you can refuse to participate or ask us to stop. We will then stop. Participation in this study is voluntary. If you do not want to take part in this study you will still get the same care in the clinic that you would get if the study was not here. The questions and the blood test will be done today in a separate part of the clinic.

RETURNING OF TEST RESULTS

We will ask you to provide us your full name and mobile phone number to contact you to return to the clinic for your HIV test result. This information will be captured on a paper based register and will be stored in a safe place. Your HIV results will not be given over the phone. The nurse will contact you only if you did not test for HIV during your antenatal visit or the laboratory test result done as part of the survey has a different test result. You will receive two SMS reminders: the first reminder will be sent two weeks after testing and will ask you to come and collect your results. A second reminder will be sent if the results have not been collected after 8 weeks. If the two tests have different results, we will ask you to repeat the test, and the final result will be confirmed 14 days after the second blood draw.

PRIVACY

Your answers to the questions will be marked on a form. Your name will not be written down when you answer the questions. Only a code will be linked to your answers. This code is called a barcode. So all your answers will be kept private. As the study sponsors, the National Department of Health, National Institute for Communicable Diseases and other persons may monitor or audit survey activities in conjunction with the Wits Research Ethics Committee. The reason for this would be to make sure that the survey is being done the way it is supposed to be done. It would also make sure that your rights and health are protected. Your personal medical information will be kept confidential. The blood test results will be kept at the laboratory where they do the test as part of the everyday service. The HIV test results may be shown to the nurse at the clinic who will give you the result but not to other nurses in other clinics.

POTENTIAL BENEFITS

You will know your HIV test result. If you are HIV positive then you can get medicine to treat HIV through the routine health care system immediately. If you are HIV negative then you will get further counselling on HIV prevention methods. Pregnant women are also routinely offered HIV and syphilis testing at the clinic. You can test for HIV and syphilis at the clinic any time you want. Participation in this study is not a requirement for receiving HIV or syphilis testing, or for receiving HIV or syphilis treatment.

POTENTIAL HARM

The questions and the blood sample collection will take about 15 minutes of your time. If we ask questions that are a problem for you, you do not have to answer them. The blood test can cause a little pain. The good thing about the blood test is that you can get to know your HIV result. This means that you can then get the right care for yourself and your baby. As we send your name and answers are kept private. We do not share your individual information with anyone in the clinic. Please ask us if you have any problems with the questions, or with the study.

WILL YOU GET ANY PAYMENT FOR BEING IN THE STUDY?

You will not receive any money or food for being part of the study. You do not have to pay to be in the study.

PEOPLE DOING THE STUDY

If you have any questions or problems about the research study please phone the person in charge of the study. His name and telephone numbers are:
Professor Adrian J Puren (overall investigator)
Head of Department,
Centre for HIV and STI
National Institute for Communicable Disease (NICD)
1 Modderfontein Road, Sandringham, Gauteng, 2031
Tel: +2711 386 8329 Mobile: +27829093919

Or for Ethical or Rights questions contact:
Professor Cas Henry, Chairperson of the Human Research Ethics Committee (Medical) at the University of Witwatersrand, on telephone no: 011 717 3301, or by e-mail at Clement.Henry@wits.ac.za.

Annexure 3: Fourth generation serology platforms

Supplementary Table 1: the 4th generation serology platforms used for HIV testing in the 2019 antenatal survey

Province	HIV Screening Test	HIV Confirmatory Test
Eastern Cape	Abbott Architect HIV Ag/Ab I1000sr	COBAS 6000 c module
Limpopo/ North west	Cobas HIV Combi PT (E 601 Roche)	Architect HIV Ag/Ab combo (Architect Abbott)
Western and Northern Cape	Roche Cobas 6000 e601 HIV Combi PT Elecsys (Ag/Ab)	Abbott Architect HIV Ag/Ab Combo kit
Mpumalanga	HIV Combi PT 4th generation - Roche Cobas 6000	CHIV Siemens Centaur 4th generation
Free State	Roche Cobas 6000 e 601	Minividas HIV quick DUO
KZN	Abbott Architect HIV Antigen/Antibody Combo	Roche HIV Combi PT
	Abbott Architect I1000SR HIV Ag/Ab combo	Diasorin Murex Ag/Ab Combination EIA

Annexure 4: Detailed provincial reports

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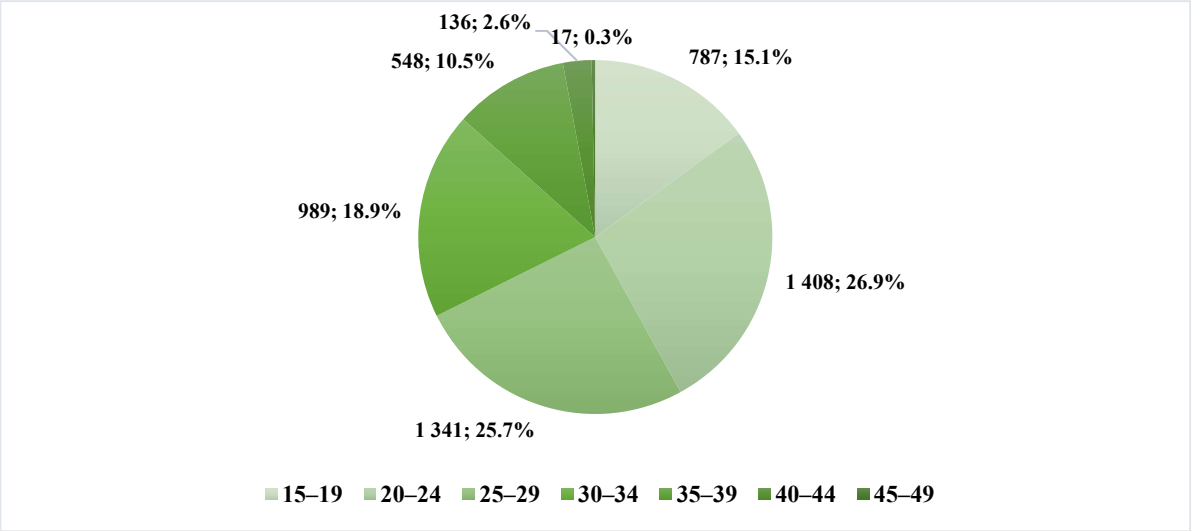
Eastern Cape

Sample size realization and demographic characteristics

The sample size realization in Eastern Cape was 107.0% (5 692). At district level, sample size realization ranged from 99.0% (525) to 116.0% (1 324) for Joe Gqabi and Oliver Tambo districts respectively. Adolescent girls and young women (15–24 years) constituted 42% of participants in the province and only 13.4% were ≥35 years old (Figure 1).

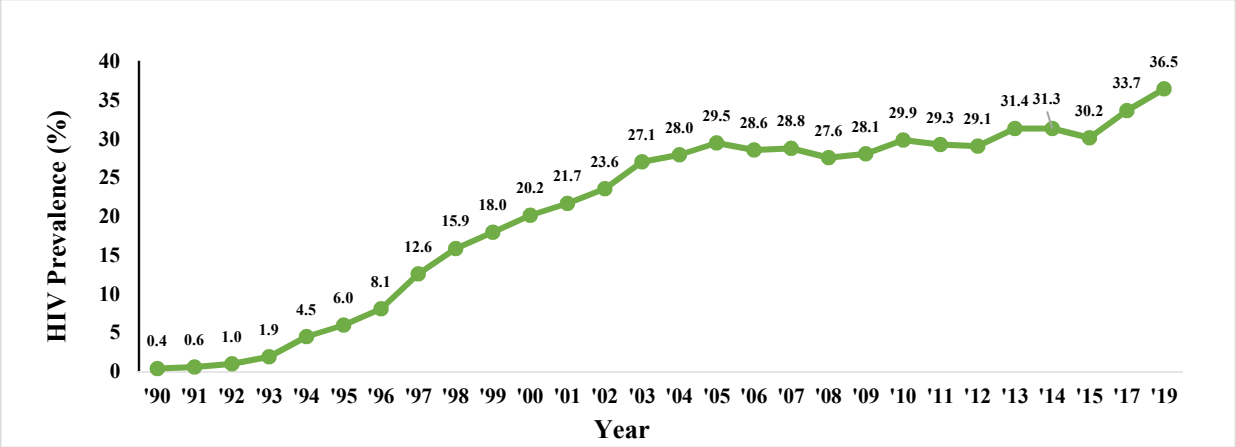


Age group are in years

Figure 1: Distribution of survey participants by five-year age group – Eastern Cape, Antenatal HIV Sentinel Survey, 2019

HIV prevalence

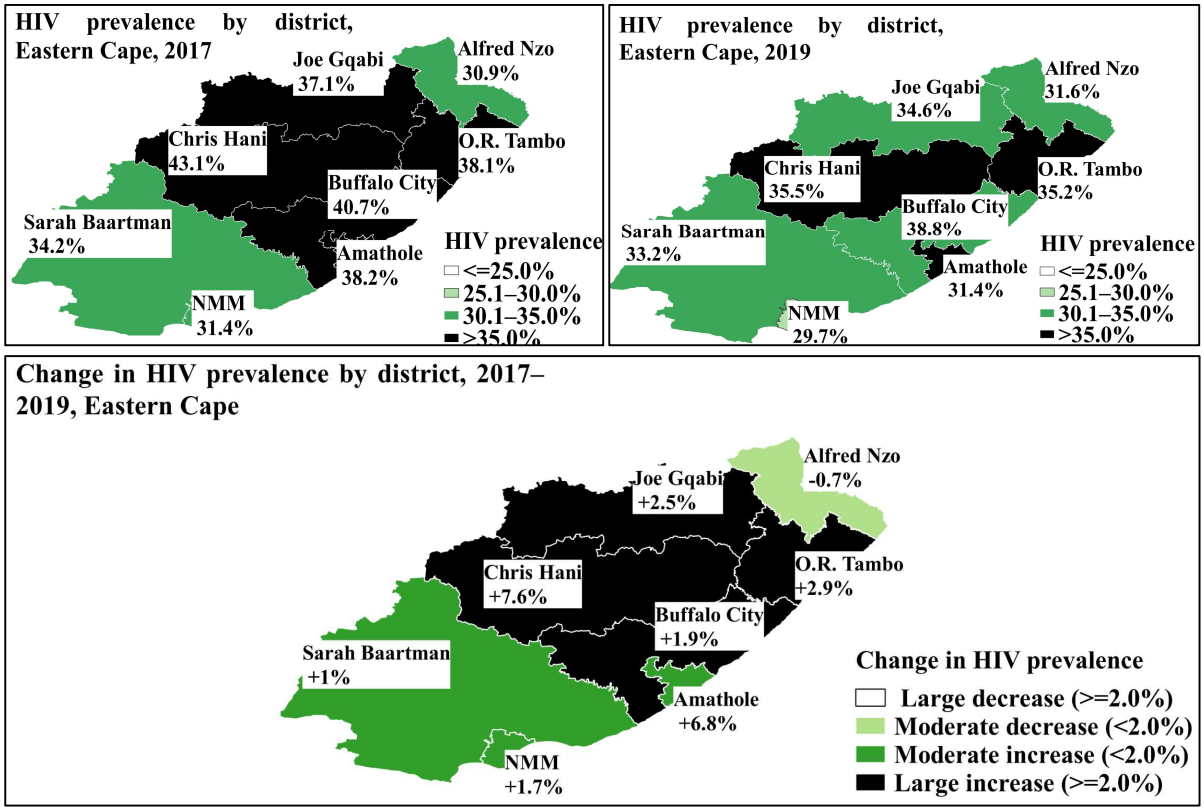
HIV prevalence showed steady increase between 1990 and 2005 in Eastern Cape. Between 2005 and 2012, prevalence stabilized at around 28%–29%, and in 2013 and 2014 prevalence increased slightly to about 31%, which was followed by a sharp increase in prevalence in 2017 and 2019 to 33.7% and 36.5% respectively (Figure 2). Between 2017 and 2019, the prevalence increased in the older age group (i.e. 25–49 years), while in the two youngest age group (i.e. 15–19 years and 20–24 years) prevalence declined by 1.4% and 4% respectively – this is reassuring as increases in HIV prevalence in the two youngest age group are more likely to reflect new HIV infection.



The prevalence reported in 2015, 2017, and 2019 is for both first and follow-up visit attendees

Figure 2: The HIV epidemic curve among antenatal women, Eastern Cape, 1990–2019, Antenatal HIV Sentinel Survey

Chris Hani, Buffalo City, Amatole, O.R. Tambo, and Joe Gqabi districts had the highest prevalence (>35%) in 2019 as shown in Figure 3. Between 2017 and 2019, prevalence increased by at least 2% (2.5%–7.6%) in most districts except in Nelson Mandela Metro (NMM), Sarah Baartman and Buffalo City that had a moderate increase of prevalence by 1.7%, 1.0% and 1.9% respectively, and Alfred Nzo had a moderate decline of prevalence by 0.7%.



The prevalence reported is for both first and follow-up visit attendees; NMM: Nelson Mandela Metro

Figure 3: Change in district HIV prevalence estimates – 2017–2019, Antenatal HIV Sentinel Survey, Eastern Cape

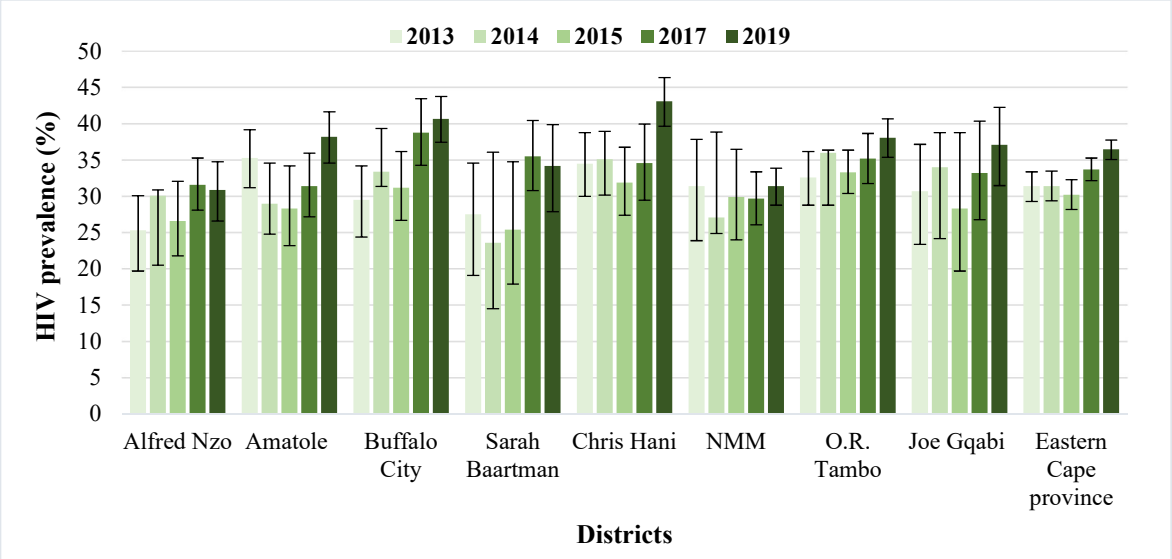
Table 1 and Figure 4 show the prevalence trend from 2013 to 2019. In 2019, district prevalence ranged from 30.9% in Alfred Nzo to 43.1% in Chris Hani. In Eastern Cape, even though there

appear to be year-to-year fluctuation in the prevalence trend, overall, prevalence has increased in almost all districts (except NMM) from the level in 2013.

Table 1: HIV prevalence by district in the Eastern Cape province, Antenatal HIV Sentinel Survey, 2013 to 2019

District	2013		2014		2015		2017		2019	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Alfred Nzo	25.3	20.5 – 30.9	30.1	20.5 – 30.9	26.6	21.8 – 32.1	31.6	28.1–35.3	30.9	27.0– 35.2
Amatole	35.3	31.4 – 39.4	29.0	24.8 – 34.6	28.3	23.2 – 34.2	31.4	27.2–36.0	38.2	34.7– 41.8
Buffalo City	29.5	24.8 – 34.6	33.4	31.4 – 39.4	31.2	26.7 – 36.2	38.8	34.3–43.5	40.7	37.6– 43.9
Chris Hani	34.5	30.2 – 39.0	35.1	30.2 – 39.0	31.9	27.4 – 36.8	35.5	30.8–40.5	43.1	39.8– 46.5
Joe Gqabi	30.7	24.2 – 38.0	34.0	24.2 – 38.8	28.3	19.7 – 38.8	34.6	29.5–40.0	37.1	31.9– 42.7
NMM	31.4	24.9 – 38.9	27.1	24.9 – 38.9	29.9	24.0 – 36.5	29.7	26.1–33.4	31.4	28.9– 34.0
O.R. Tambo	32.6	29.0 – 36.4	36.0	28.8 – 36.4	33.3	30.4 – 36.4	35.2	31.8–38.7	38.1	35.5– 40.8
Sarah Baartman	27.5	20.4 – 35.9	23.6	14.5 – 36.1	25.4	17.9 – 34.8	33.2	26.8–40.4	34.2	28.5– 40.5
Eastern Cape province	**31.4**	**29.4 –33.5**	**31.3**	**29.4 – 33.5**	**30.2**	**28.2 – 32.3**	**33.7**	**32.2–35.3**	**36.5**	**35.2– 37.9**

The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees

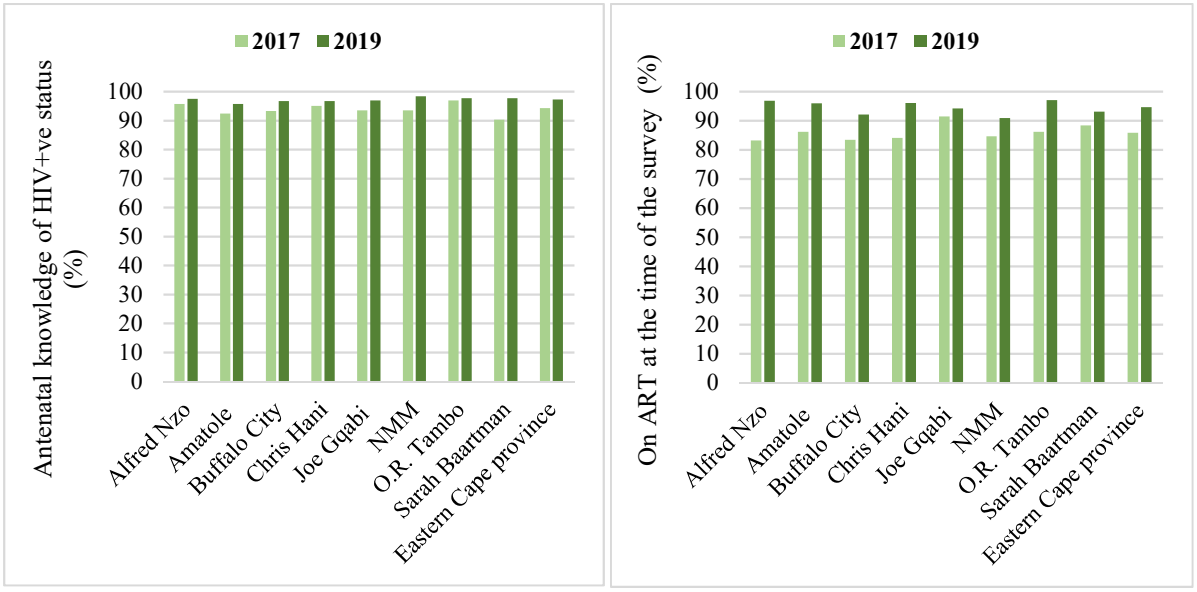


The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees. The confidence intervals are wide due to small sample size at district level

Figure 4: HIV prevalence trend by district, 2013–2019, Antenatal HIV Sentinel Survey, Eastern Cape

PMTCT cascade

In the Eastern Cape sample, 97.2% of HIV-positive women in 2019 were aware of their HIV status, and 94.6% of those who knew their HIV-positive status were on ART at the time of the survey. By district, the lowest knowledge of HIV status was in Amatole at 95.7% and the highest was in NMM at 98.3%. NMM had the lowest ART initiation at 90.9% while O.R. Tambo had the highest ART initiation at 97%. Both knowledge of HIV-positive status and ART initiation increased between 2017 and 2019 in all districts; however, these increases were not statistically significant (Figure 5).

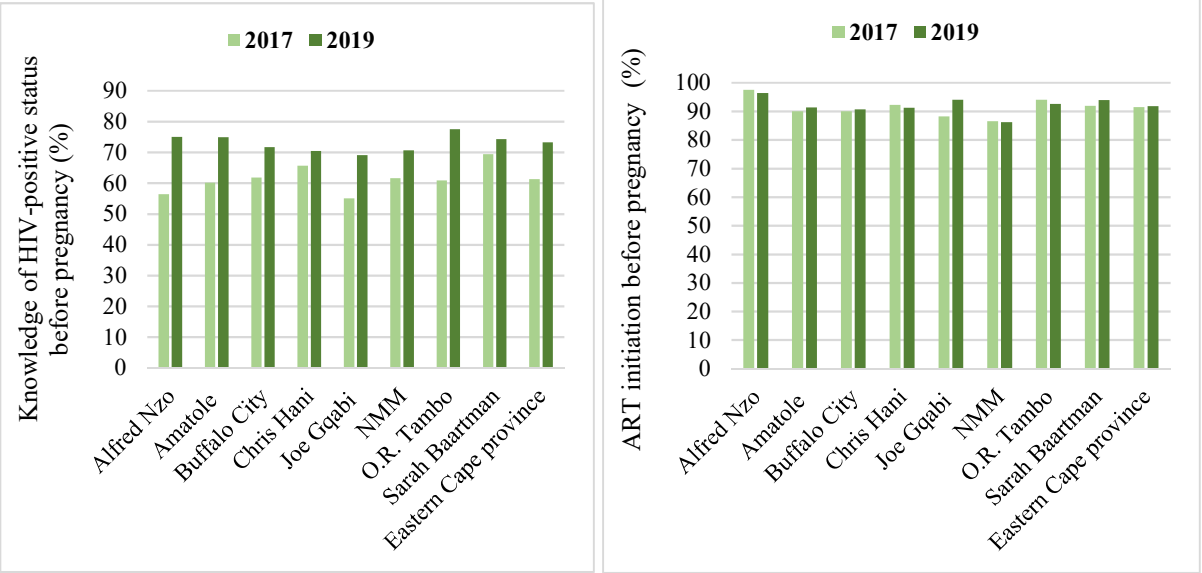


Weighted percentages; HIV+ve: HIV positive; ART – Antiretroviral therapy; NMM: Nelson Mandela Metro

Figure 5: Knowledge of HIV-positive status and ART initiation by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Eastern Cape

Knowledge of HIV-positive status and ART initiation before pregnancy

Knowledge of HIV status before pregnancy in the Eastern Cape was a little above the national average (73.3% compared to 72.7%). Among those who knew their HIV-positive status before pregnancy, 91.8% started ART before pregnancy. By district, knowledge of HIV status before pregnancy ranged from 69.1% in Joe Gqabi to 77.5% in O.R. Tambo districts in 2019. NMM had the lowest ART initiation before pregnancy (at 86.6% and 86.2%) and Alfred Nzo had the highest ART initiation before pregnancy (at 97.5% and 96.4%) in 2017 and 2019 respectively. Between 2017 and 2019, the percentage of women who knew their HIV-positive status before pregnancy improved in all districts. ART initiation before pregnancy improved in all districts except in Alfred Nzo, Chris Hani, NMM, and O.R. Tambo districts where ART initiation before pregnancy slightly declined (Figure 6).

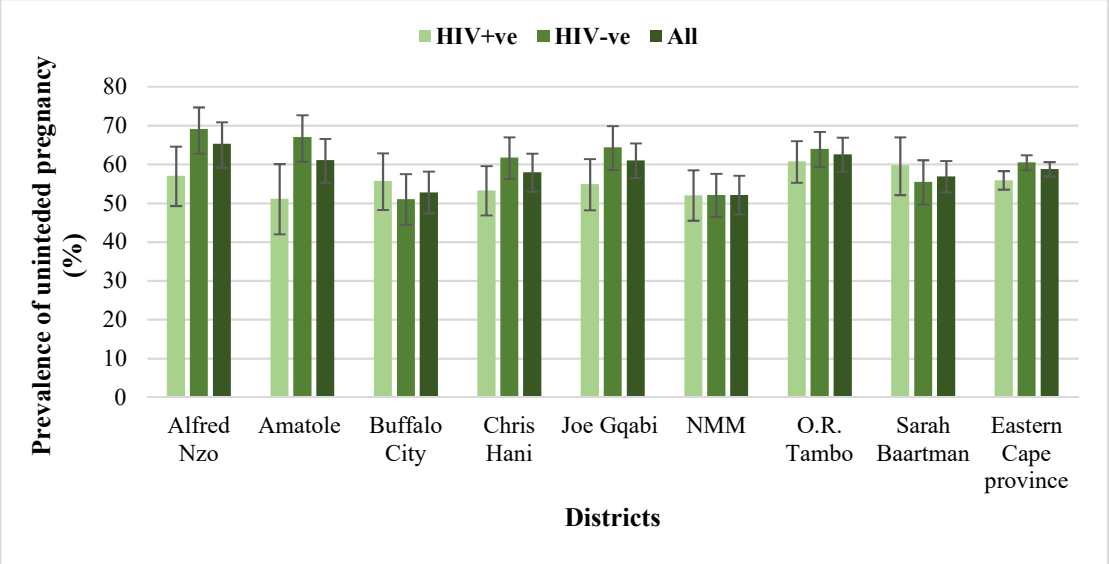


Denominator for knowledge of HIV-positive status before pregnancy was EIA positives.
Denominator for ART initiation before pregnancy was the number of HIV-positive women who were aware of their HIV-positive status before pregnancy

Figure 6: Knowledge of HIV-positive status and ART initiation before pregnancy by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Eastern Cape

Planning of pregnancy

Close to 59% of the pregnancies in Eastern Cape were unintended (Figure 7). All districts had higher unintended pregnancy than the national average (51.6%). One district (Alfred Nzo) had the fifth highest prevalence of unintended pregnancy nationally at 65.3%. The prevalence of unintended pregnancy was higher among HIV-negative women compared to HIV-positive women at province level and in five districts (except NMM, Sarah Baartman and Buffalo city) – this difference was statistically significant at province level and in one district (in Amatole) (Figure 7). Even though HIV-negative women had higher unintended pregnancy in most districts, the prevalence of unintended pregnancy among HIV-positive women was still above 50% in all districts indicating the need to strengthen access to contraceptive services among both HIV-negative and HIV-positive women. In all districts, adolescent girls (15–19 years) had the highest level of unintended pregnancy (unintended pregnancy ranging 71.2%–92.7%) followed by young women (20 to 24 years: unintended pregnancy ranging 56.4%–75.2%) (*data not presented in graph*). Single women and women in a non-cohabiting relationship had the highest level of unintended pregnancy (>65%) while married women had lower unintended pregnancy (< 35%) in all districts in the province (*data not presented in graph*).



Some of the confidence intervals are wide due to small sample size at district level

Figure 7: The prevalence of unintended pregnancy by district, in the 2019 Antenatal HIV Sentinel Survey, Eastern Cape

Early ANC attendance

About two-thirds of participants in Eastern Cape initiated ANC before 20 weeks of gestational age (Figure 8). The lowest attendance of ANC before 20 weeks was in Alfred Nzo district (52.4%) and the highest was in Sarah Baartman district (74.1%). Between 4.6% (in Chris Hani) and 9.4% (in Alfred Nzo) of participants across districts (6.6% at province level) initiated ANC at the third trimester *(data not presented in graph).* In three districts (Buffalo city, NMM, and Amatole) adolescent girls (15–19 years) had significantly lower attendance of ANC before 20 weeks (60.5%, 57.6%, 55.8% respectively) compared to the average for the districts (72.6%, 72.7% and 65.7% respectively). In the other districts, there was no substantial difference in ANC attendance by age group. Women who had unintended pregnancy had lower attendance of ANC before 20 weeks (60.9%) compared to women whose pregnancy was intended (75.6%). Multigravida women had slightly lower (64.8%) attendance of ANC before 20 weeks compared to primigravida women (67.5%).

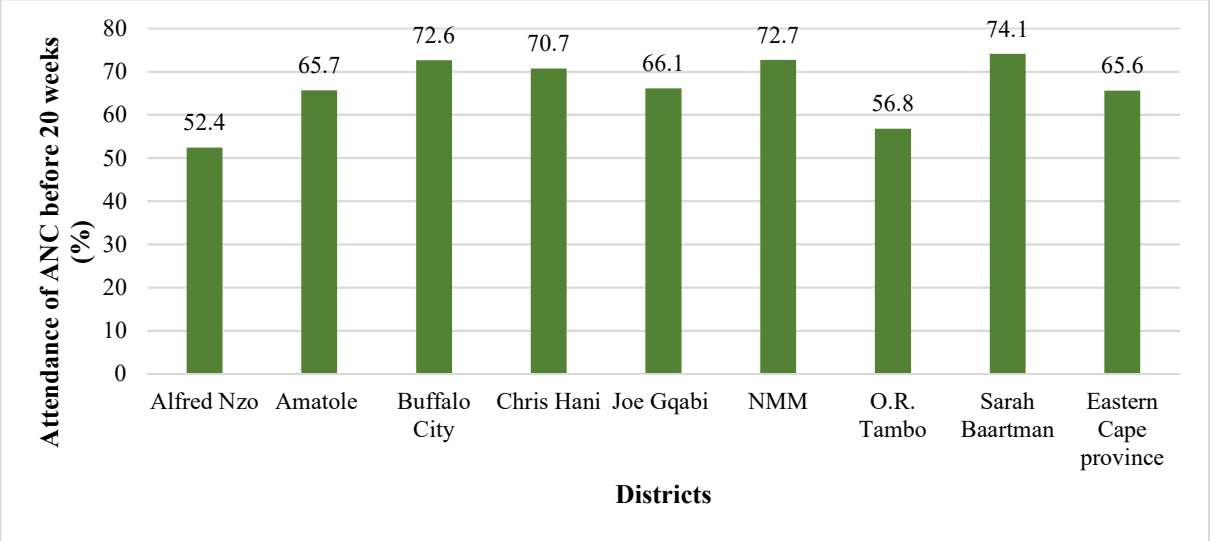


Figure 8: Attendance of antenatal care before 20 weeks of gestational age, in the 2019 Antenatal HIV Sentinel Survey, Eastern Cape

Maternal syphilis screening and treatment coverage

Maternal syphilis screening coverage was 97.2% in Eastern Cape, representing an increase of 0.8% points in syphilis screening coverage from the level in 2017 (96.4%) (Figure 9). All districts except O.R. Tambo district had greater than 95% maternal syphilis screening coverage in both 2017 and 2019.

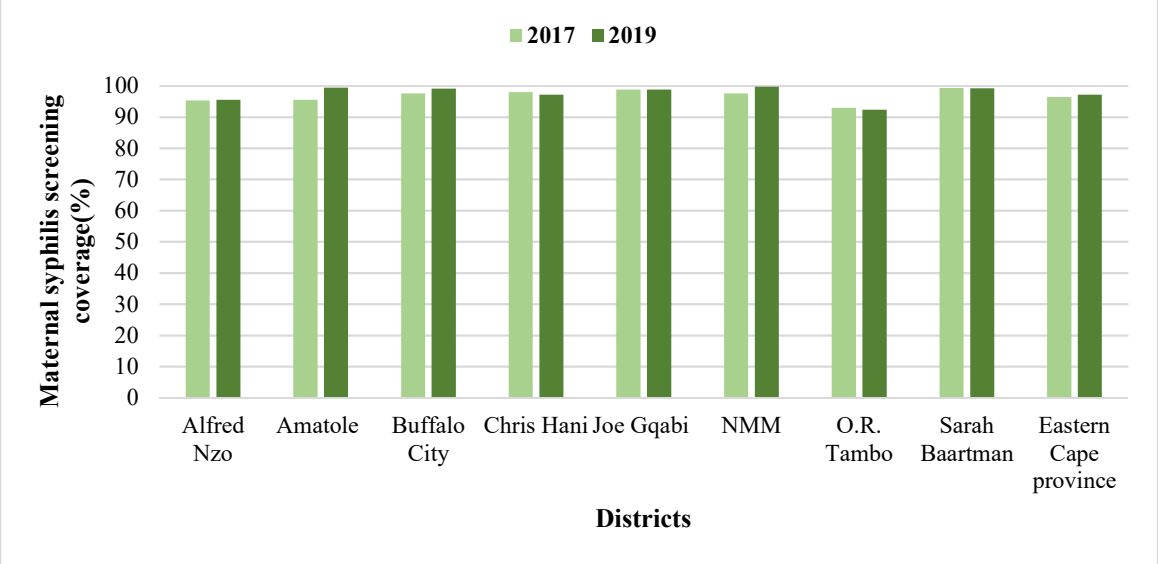


Figure 9: Maternal syphilis screening coverage by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Eastern Cape,

Of those who had syphilis screening, at province level, 3.2% (95% CI: 2.3%–4.6%) were positive for syphilis, 82.8% were negative, 12.8% were awaiting result and 1.2% results were not in file (Figure 10). Alfred Nzo and O.R. Tambo districts had the highest pending results at >25% (13.8% and 12.7% of participants with pending results in the two districts

respectively were follow-up ANC visit attendees), and Sarah Baartman and NMM had the lowest pending results at <5%.

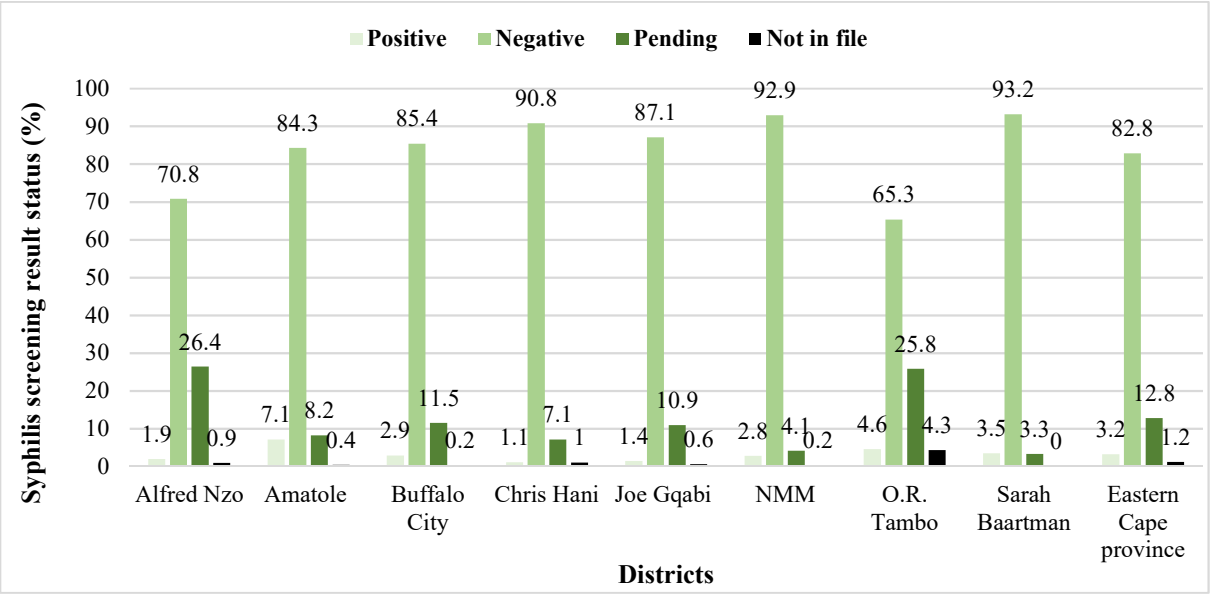
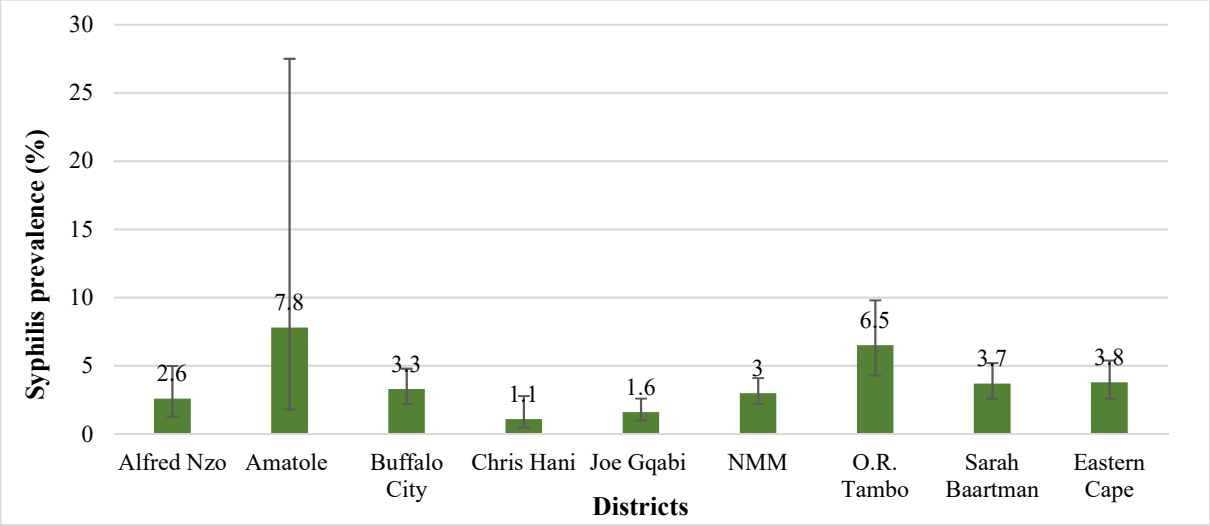


Figure 10: Maternal syphilis screening test result status by district, in the 2019 Antenatal HIV Sentinel Survey, Eastern Cape

After excluding the pending results and the results not in file, the prevalence of syphilis (per medical record review data) in Eastern Cape among those who had syphilis test result was 3.8% (95% CI: 2.6–%5.4%), and this was the highest prevalence nationally (1.2% points higher than the national average – 2.6%). The current prevalence represented a 2% points increase from prevalence in 2015 (which was 1.8%). By district, the prevalence of syphilis ranged from 1.1% in Chris Hani to 7.8% in Amatole districts. The district level prevalence estimates need to be interpreted with caution as the CIs around these estimates are wide due to small sample size (Figure 11).



The confidence intervals are wide due to small sample size at district level

Figure 11: Syphilis prevalence among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, Eastern Cape

Of the 155 participants who were syphilis positive and whose syphilis treatment status was reported in Eastern Cape, 97.3% (151) received at least one dose of treatment for syphilis

(Figure 12). Of those treated for syphilis and had type of treatment data reported (147), 94.7% (139) were treated with at least one dose of BCG (Figure 12). Syphilis treatment data was missing for 8.3% (14) of syphilis positive participants in the province, and type of treatment data was missing for 2.6% (4) of participants treated for syphilis; these missing data were excluded from the above analysis. If we assume that all missing responses mean that the subjects did not receive treatment for syphilis, the coverage of syphilis treatment and treatment with BCG drops from 97.3% to 89.5% and from 94.7% to 92.2% respectively. The syphilis treatment estimates need to be interpreted with caution as the sample size is small.

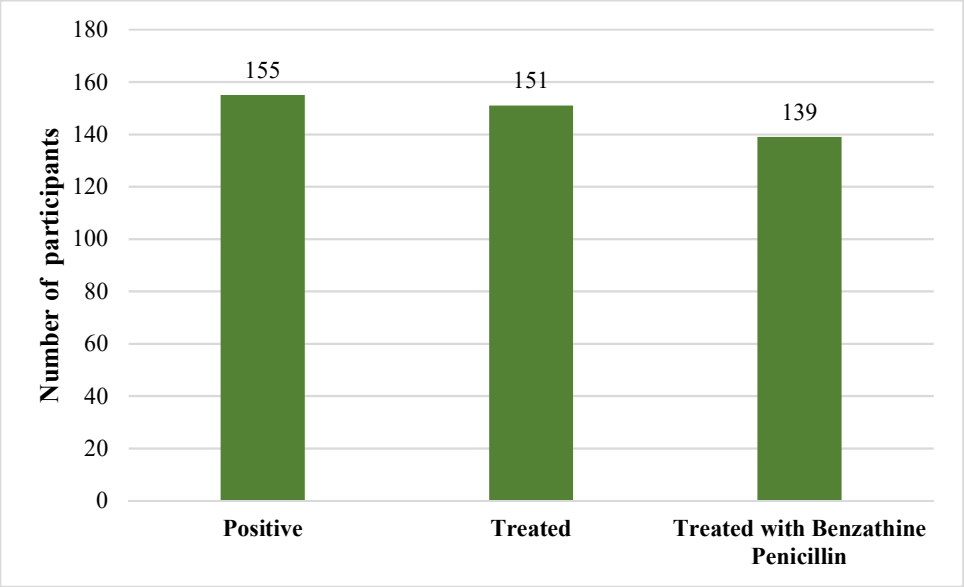
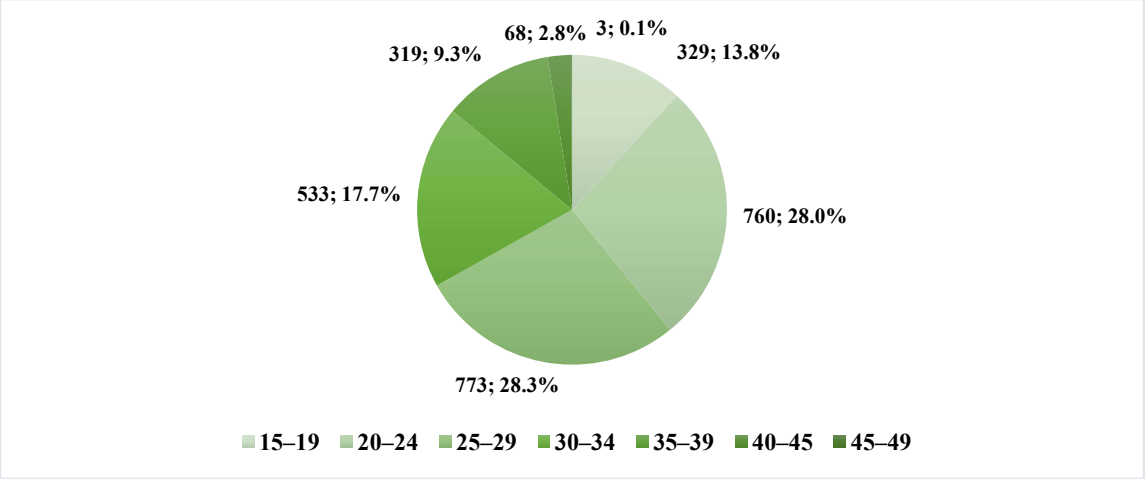


Figure 12: Syphilis treatment cascade among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, Eastern Cape

Free State

Sample size realization and demographic characteristics

The sample size realization in Free State was 105% (2 851). All districts exceeded the planned sample size by 2%–6%. Adolescents and young women (15–24 years) constituted 41.8% of the sample and only 12.2% were ≥35 years old (Figure 13).

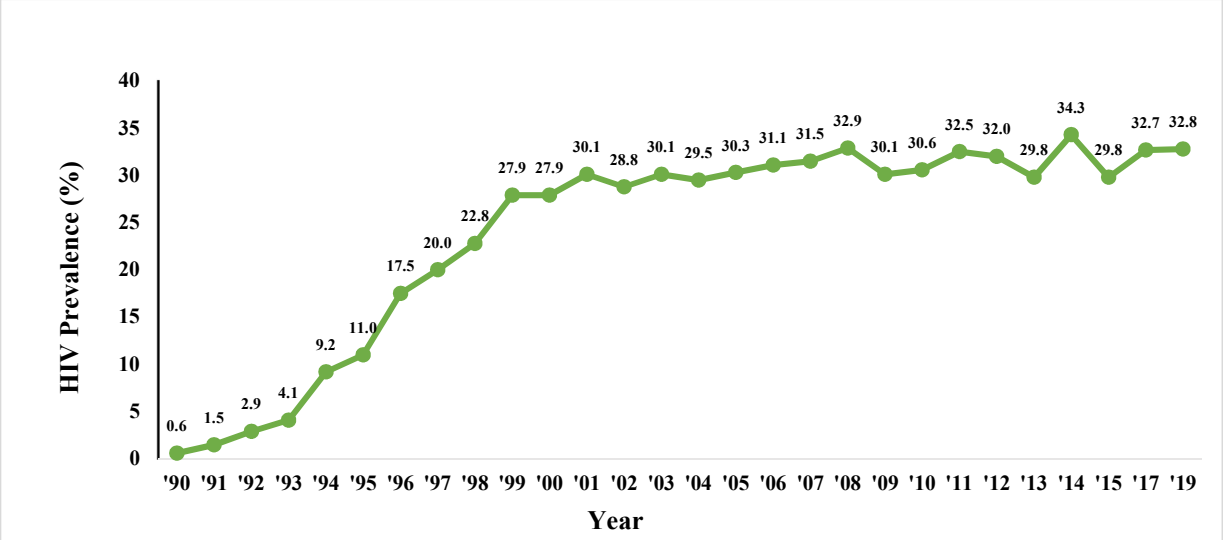


Age group are in years

Figure 13: Distribution of survey participants by five-year age group– Free State, Antenatal HIV Sentinel Survey, 2019

HIV prevalence

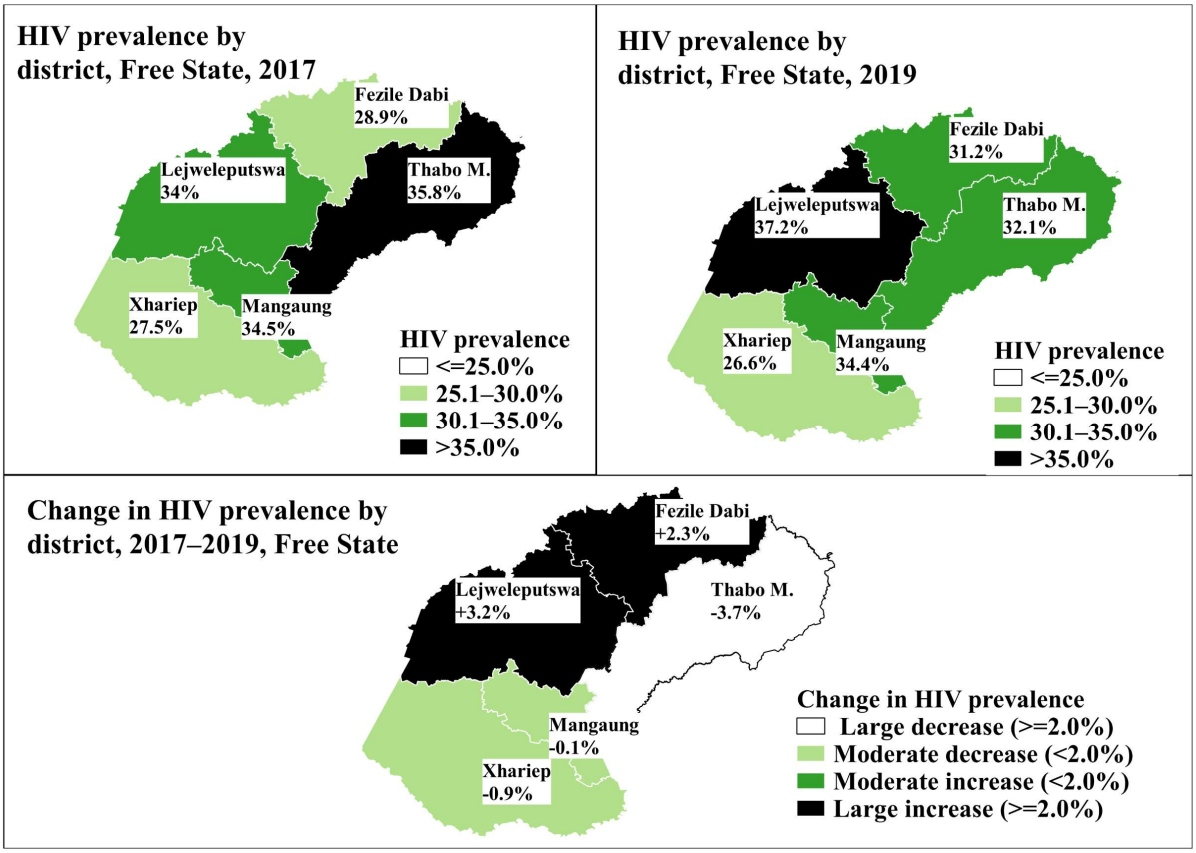
HIV prevalence in Free State increased over the years to 27.9% in 1999; then gradually increased at a slow rate to 32.9% in 2008. Between 2009 and 2019 prevalence fluctuated between 30% to 34%. In 2019 HIV prevalence was 32.8% (Figure 14).



The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees

Figure 14: The HIV epidemic curve among antenatal women, Free State, 1990–2019, Antenatal HIV Sentinel Survey

Between 2017 and 2019, in two districts, namely, Lejweleputswa and Fezile Dabi, prevalence increased by 3.2% and 2.3% respectively (Figure 15). In the other three districts prevalence declined by 3.7% in Thabo Mofutsanyane (Thabo M.), by 0.1% in Mangaung and by 0.9% in Xhariep districts. None of these changes were statistically significant.



The prevalence reported is for both first and follow-up visit attendees. Thabo M.: Thabo Mofutsanyane

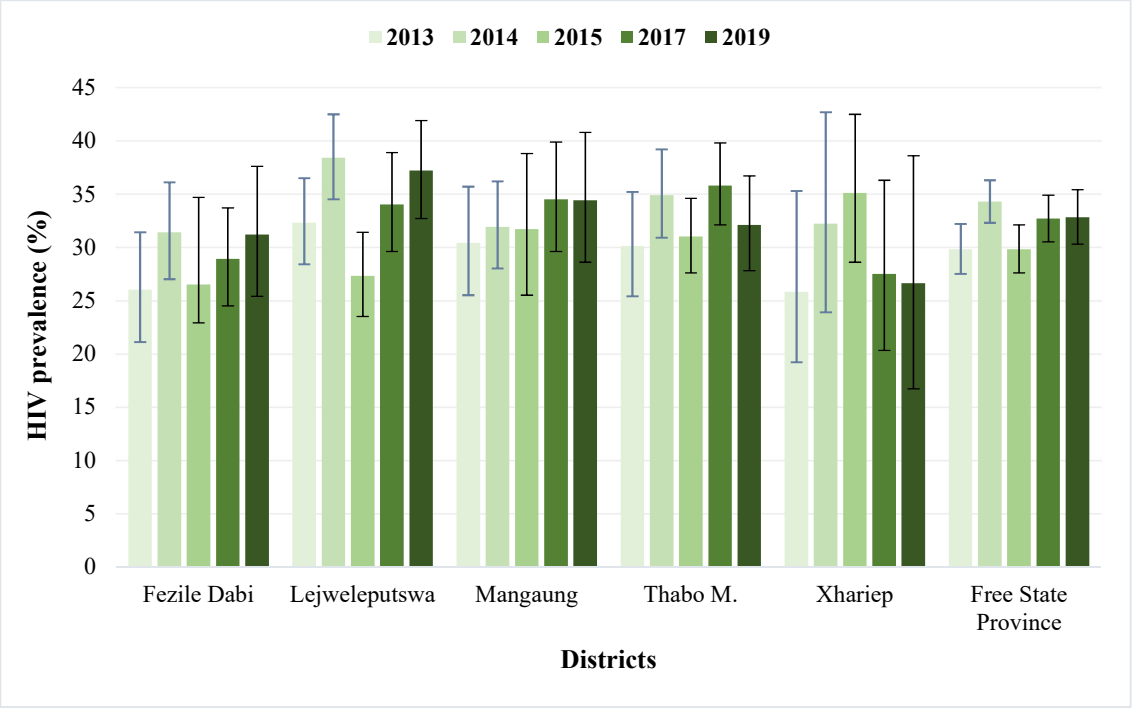
Figure 15: Change in district HIV prevalence estimates – 2017–2019, Antenatal HIV Sentinel Survey, Free State

From 2013 to 2019, Mangaung had a consistent increase in prevalence from 30.4% to 34.4%. In Xhariep prevalence consistently increased between 2013 (25.8%) and 2015 (35.1%), however prevalence dropped from 35.1% in 2015 to 27.5% and 26.6% in 2017 and 2019 respectively. In Fezile Dabi and Lejweleputswa districts, prevalence consistently increased between 2015 and 2019. Prevalence fluctuated between 30% and 36% over the years in Thabo M. district (Table 2 and Figure 16).

Table 2: HIV prevalence by district in the Free State province, Antenatal HIV Sentinel Survey, 2013 to 2019

District	2013		2014		2015		2017		2019	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Fezile Dabi	26.0	21.6 – 30.8	31.4	25.6 – 37.8	26.5	19.4 – 35.1	28.9	25.5– 32.5	31.2	27.4– 35.4
Lejweleputswa	32.3	27.9 – 37.2	38.4	33.9 – 43.1	27.3	23.0 – 32.1	34.0	31.1– 37.1	37.2	33.8– 40.6
Mangaung	30.4	25.5 – 35.8	31.9	26.1 – 38.3	31.7	28.5 – 35.0	34.5	30.5– 38.8	34.4	31.8– 37.2
Thabo M.	30.1	26.4 – 34.1	34.9	30.6 – 39.5	31.0	27.5 – 34.8	35.8	32.4– 39.2	32.1	29.4– 34.8
Xhariep	25.8	18.6 – 34.6	32.2	22.3 – 44.2	35.1	22.7 – 49.8	27.5	23.8– 31.6	26.6	22.1– 31.6
Free State province	**29.8**	**27.6 – 32.0**	**34.3**	**31.8 – 36.9**	**29.8**	**27.5 – 32.3**	**32.7**	**31.1– 34.4**	**32.8**	**31.3– 34.3**

The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees. Thabo M.: Thabo Mofutsanyane

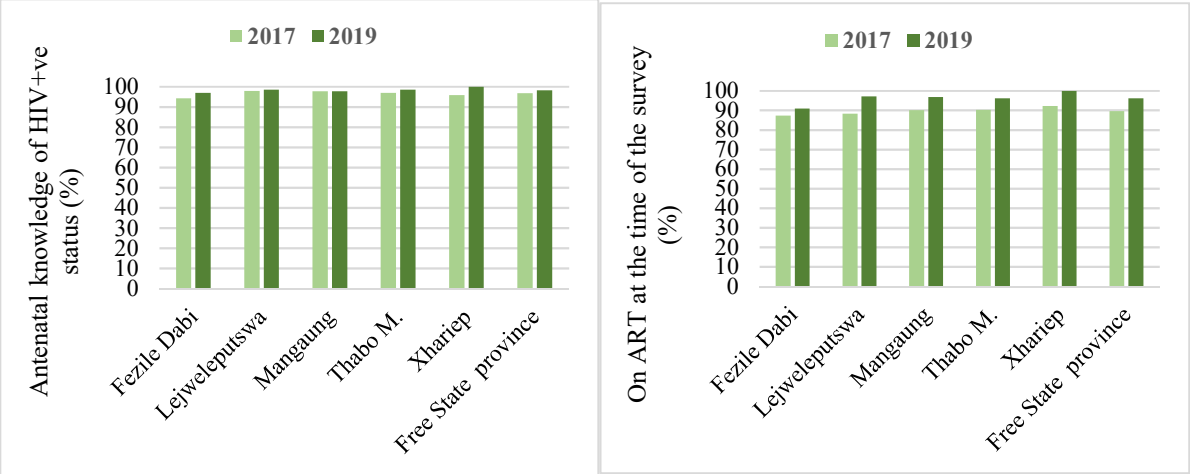


The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees. The confidence intervals are wide due to small sample size at district level

Figure 16: HIV prevalence trend by district, 2013–2019, Antenatal HIV Sentinel Survey, Free State

PMTCT cascade

In the Free State sample, of the women who were positive in 2019, 98.3% were aware of their HIV-positive status at the time of the survey and 96.1% of those who knew their HIV status were on ART. By district, the lowest knowledge of HIV-positive status and ART initiation was in Fezile Dabi at 96.9% and 90.9% respectively and the highest was in Xhariep district at 100% for both knowledge of HIV-positive status and ART initiation. Both knowledge of HIV-positive status and ART initiation increased between 2017 and 2019 in all districts (Figure 17).

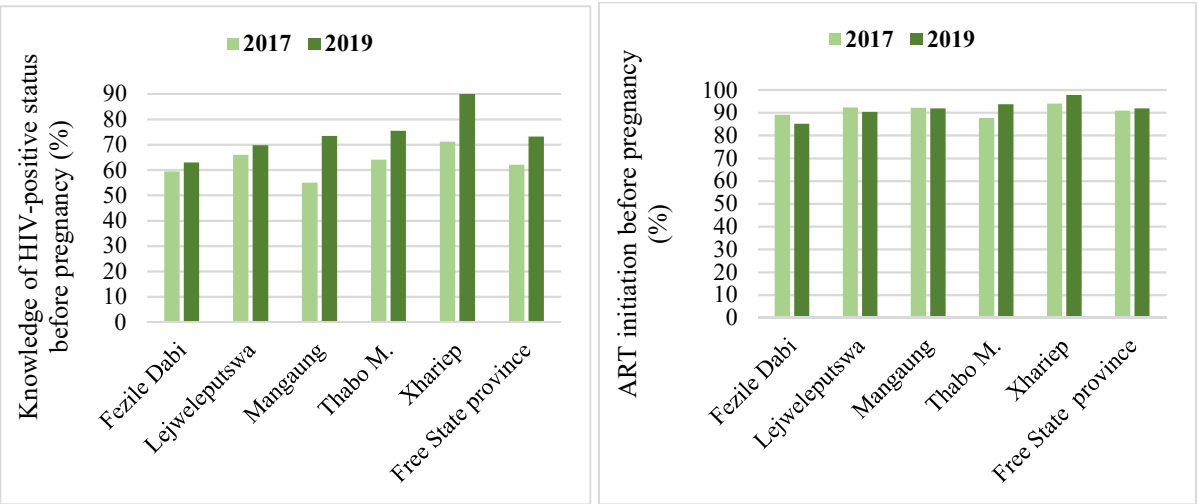


Weighted percentages. HIV+ve: HIV positive; ART – Antiretroviral therapy

Figure 17: Knowledge of HIV-positive status and ART initiation by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Free State

Knowledge of HIV-positive status and ART initiation before pregnancy

Knowledge of HIV-positive status before pregnancy in the Free State in 2019 was slightly higher than the national average (73.1% compared to 72.7%). In the same year, of those who knew their HIV-positive status before pregnancy, 91.8% were initiated on ART before pregnancy. By district, knowledge of status before pregnancy ranged from 62.9% in Fezile Dabi to 90% in Xhariep. Xhariep had the highest ART initiation before pregnancy in the province at 97.8%. Fezile Dabi also had the lowest ART initiation before pregnancy at 85.1%. Between 2017 and 2019, the percentage of women who knew their HIV-positive status before pregnancy increased in all districts in the province, while, ART initiation before pregnancy increased only in two (Thabo M. and Xhariep) districts (Figure 18).

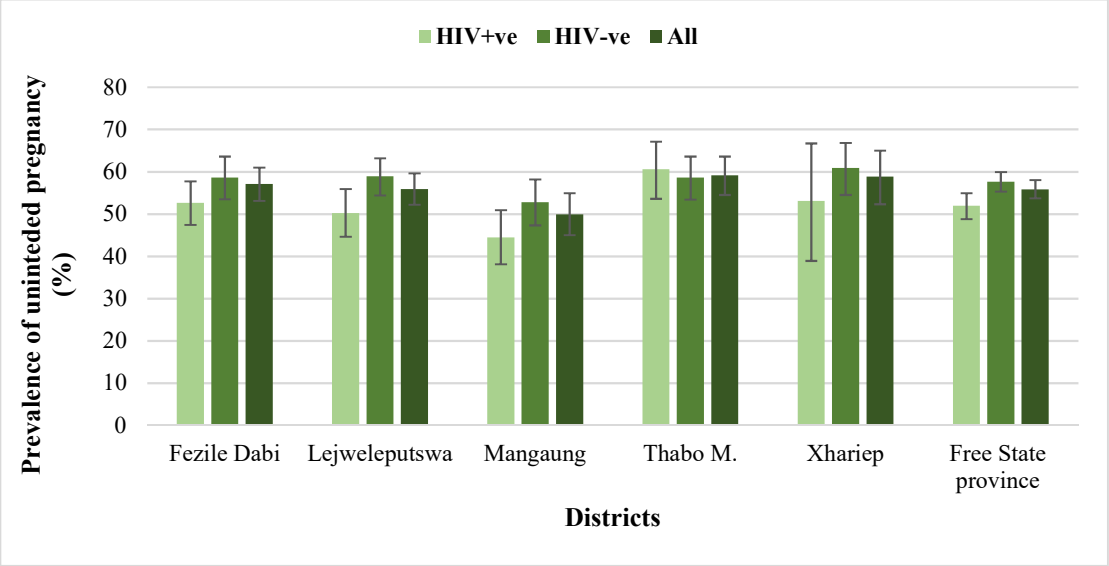


Denominator for knowledge of HIV-positive status before pregnancy was EIA positives.
Denominator for ART initiation before pregnancy was the number of HIV-positive women who were aware of their HIV-positive status before pregnancy

Figure 18: Knowledge of HIV-positive status and ART initiation before pregnancy by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Free State

Planning of pregnancy

Close to 56% of the pregnancies in Free State were unintended (Figure 19). All districts except Mangaung had higher unintended pregnancy than the national average (51.6%). The prevalence of unintended pregnancy was higher among HIV-negative women than HIV-positive women in all districts except Thabo M., and this difference was statistically significant at province level. Even though HIV-negative women had higher unintended pregnancy in most districts, the prevalence of unintended pregnancy among HIV-positive women was ≥50% in all districts, indicating the need to improve access and uptake of contraceptive services among both HIV-positive and HIV-negative women. In all districts, adolescent girls (15–19 years) had the highest level of unintended pregnancy (ranging between 73.5% in Xhariep to 87.1% in Mangaung district) followed by young women (20 to 24 years) ranging between 59.7% in Mangaung to 68.2% in Thabo M. districts (*data not presented in graph*). Single women and women in a non-cohabiting relationship had the highest (>62%) prevalence of unintended pregnancy across all districts in the province. Unintended pregnancy was below 45% among married women in all districts in the province (*data not presented in graph*).



**Due to small sample size at district level, the confidence interval for Xhariep is wide.*

Figure 19: The prevalence of unintended pregnancy by district, in the 2019 Antenatal HIV Sentinel Survey, Free State

Early ANC attendance

More than two-thirds of participants in Free State initiated ANC before 20 weeks of gestational age (Figure 20). Attendance of ANC before 20 weeks was lower than the province average in Thabo M. and Fezile Dabi districts. Between 4.5% (in Xhariep) and 8% (in Thabo M) of participants across districts (6.4% at provincial level) initiated ANC at the third trimester *(data not presented in graph).* In Xhariep and Fezile Dabi districts, the youngest (15–19 years) and the oldest age (35–49 years) groups had lower attendance of ANC before 20 weeks compared to the other age groups. In Mangaung, attendance of ANC before 20 weeks was much lower among adolescent girls (15–19 years) (45.2%) compared to the other age groups (72.8%–74.7%). In the other districts, there was no

substantial difference in ANC attendance by age group. Women who had unintended pregnancy had lower attendance of ANC before 20 weeks (62.2%) compared to women whose pregnancy was intended (78.6%). Multigravida women had slightly lower (68%) attendance of ANC before 20 weeks compared to primigravida women (71%).

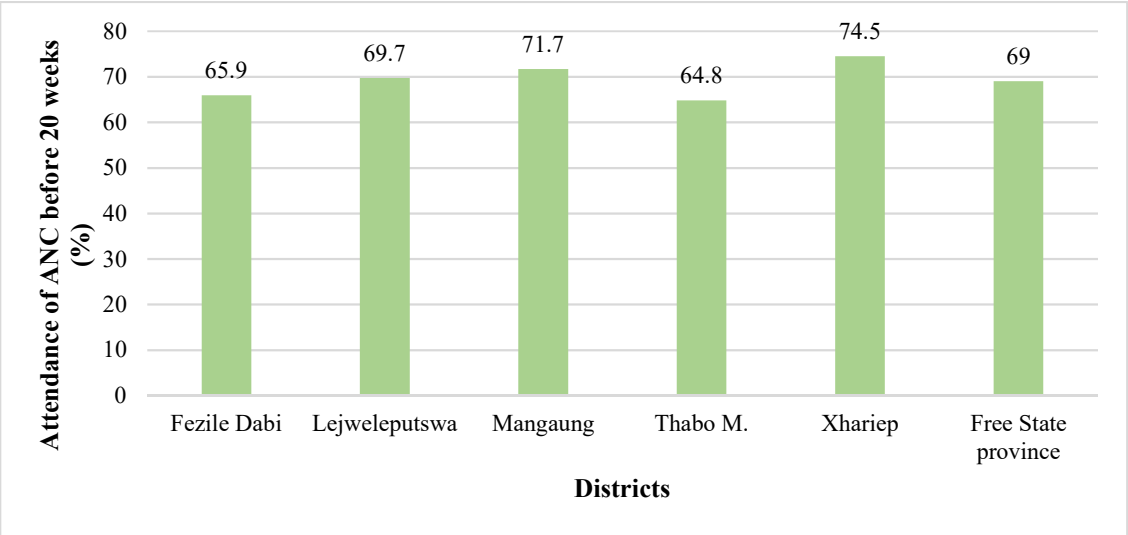


Figure 20: Attendance of antenatal care before 20 weeks of gestational age, in the 2019 Antenatal HIV Sentinel Survey, Free State

Maternal syphilis screening and treatment coverage

Maternal syphilis screening coverage was 99.1% in Free State, representing an increase of 1.8% points in syphilis screening coverage from the level in 2017 (97.3%) (Figure 21). All districts in Free State had greater than 98% maternal syphilis screening coverage in the 2019 survey.

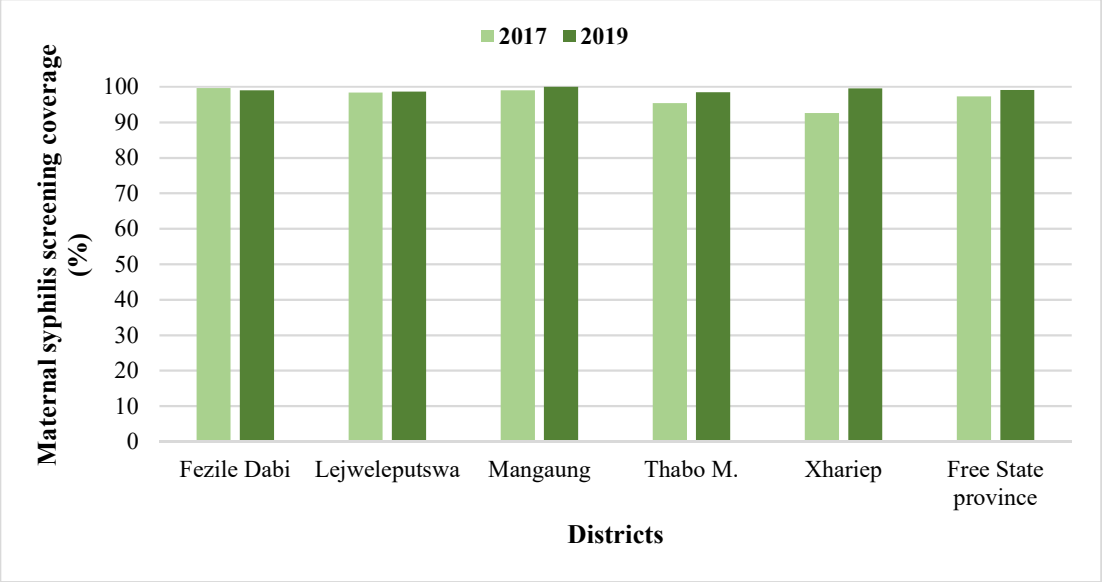


Figure 21: Maternal syphilis screening coverage by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Free State

Of those who had syphilis screening, at province level, 3.2% (95% CI: 2.7%–3.8%) were positive for syphilis, 92.3% were negative, 4% were awaiting result and 0.5% results were not in file (Figure 22). Pending results varied by district ranging from only 0.9% in Mangaung to 10.7% in Fezile Dabi districts (20.8% of participants with the pending results in Fezile Dabi were follow-up visit attendees).

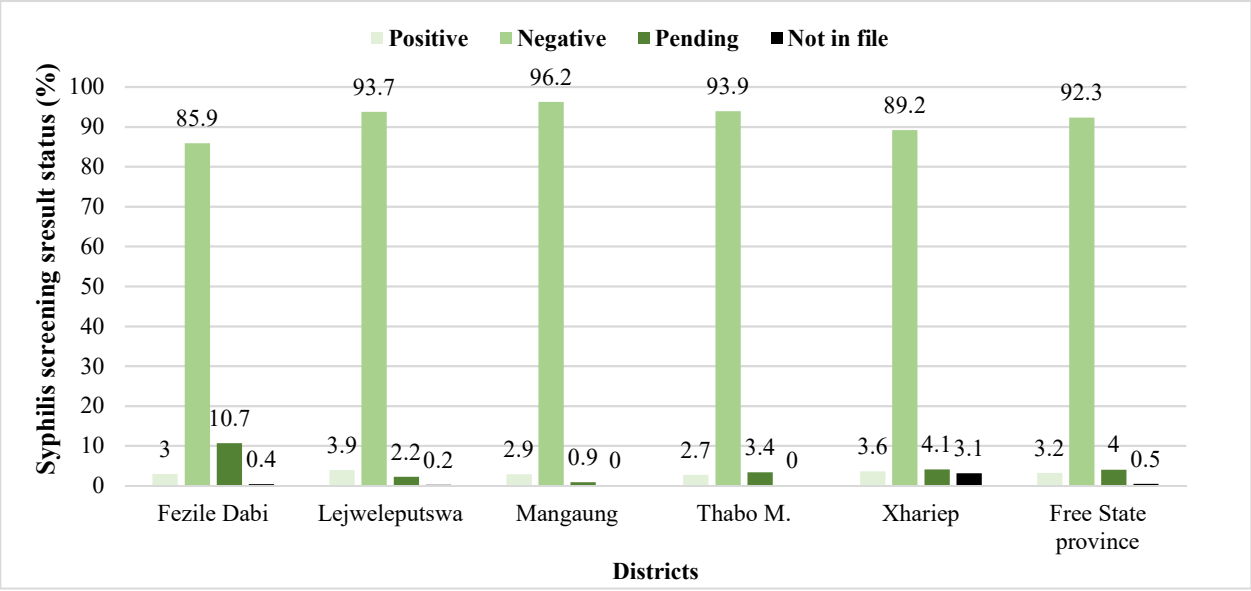
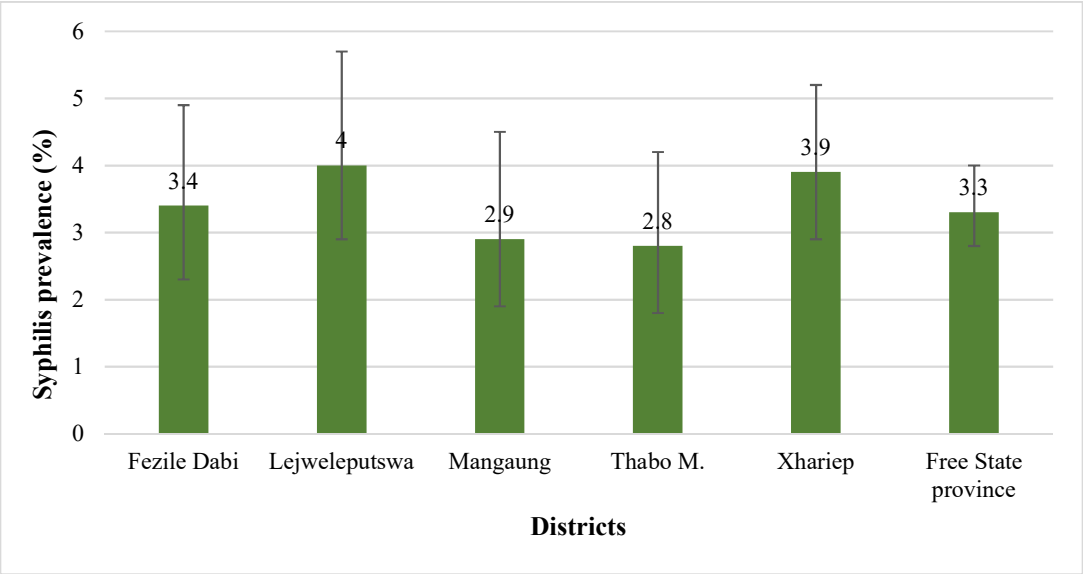


Figure 22: Maternal syphilis screening test result status by district, in the 2019 Antenatal HIV Sentinel Survey, Free State

After excluding the pending results and the results not in file, the prevalence of syphilis (per medical record review data) in Free State among those who had syphilis test result was 3.3% (95% CI: 2.8%–4.0%), and this was 0.7% points higher than the national average (2.6%). However, prevalence reduced by 1.3% points from its level in 2015 (which was 4.6%). By district, the prevalence of syphilis ranged from 2.9% in Mangaung to 4% in Lejweleputswa

districts (Figure 23). The district level prevalence estimates need to be interpreted with caution as the CIs around these estimates are wide due to small sample size.



The confidence intervals are wide due to small sample size at district level

Figure 23: Syphilis prevalence among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, Free State

Of 82 participants who were syphilis positive and whose syphilis treatment status was reported in Free State, 86.5% (71) received at least one dose of treatment for syphilis (Figure 24). Of those treated for syphilis and had type of treatment data reported (65), 89.2% (58) were treated with at least one dose of BCG (Figure 24). Syphilis treatment data was missing for 6.8% (6) of syphilis positive participants in the province, and type of treatment data was missing for 8.5% (6) of participants treated for syphilis; these missing data were excluded from the above analysis. If we assume that all missing responses mean that the subjects did not receive treatment for syphilis, the coverage of syphilis treatment and treatment with BCG drops from 86.5% to 80.6% and from 89.2% to 81.6% respectively. The syphilis treatment estimates need to be interpreted with caution as the sample size is small.

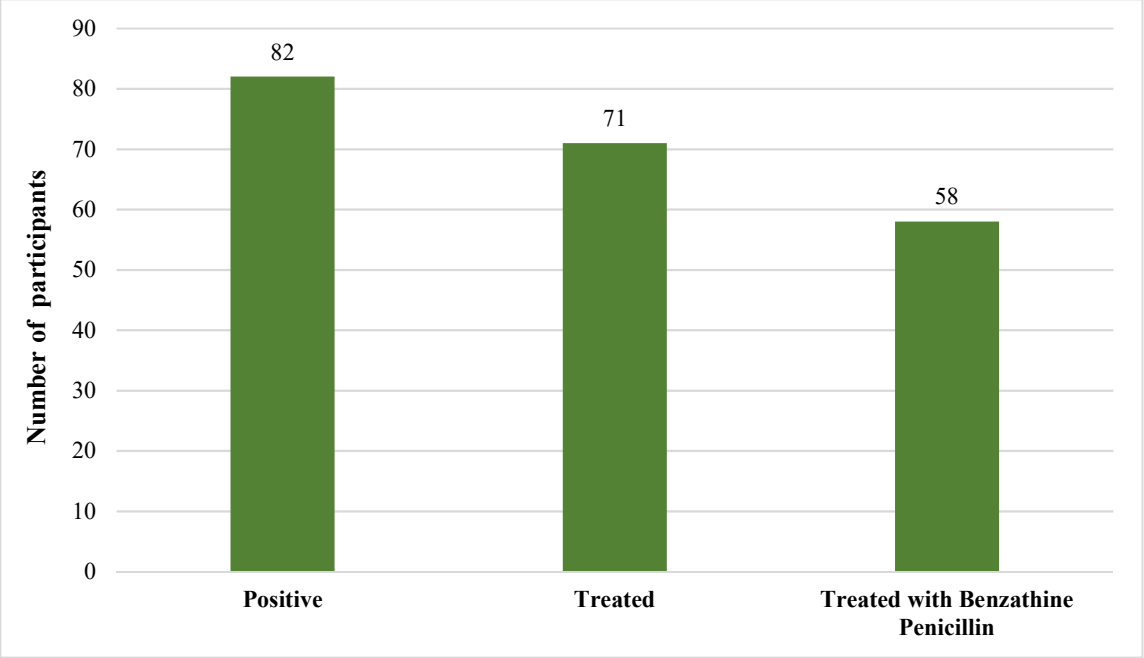
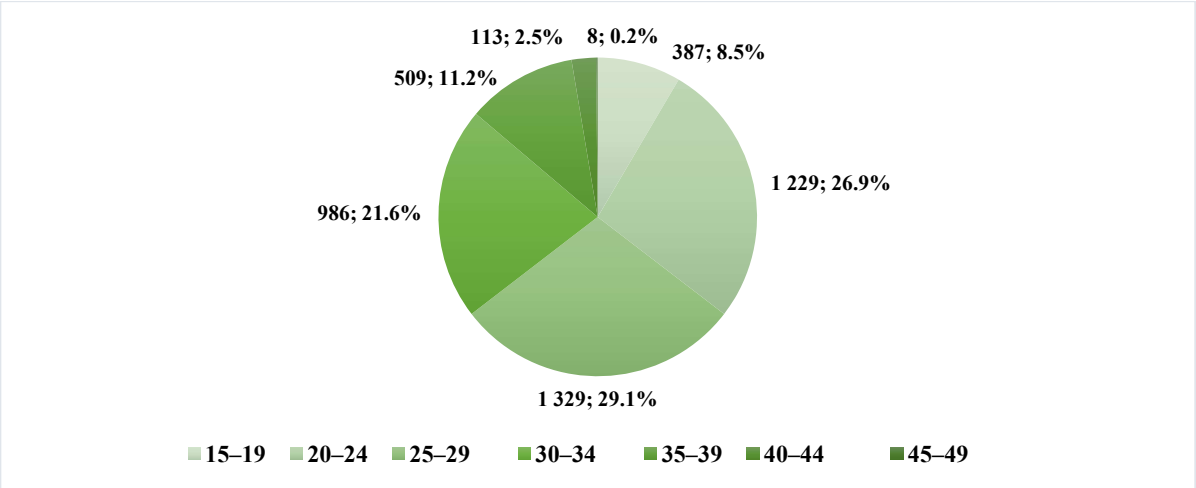


Figure 24: Syphilis treatment cascade among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, Free State

Gauteng

Sample size realization and demographic characteristics

Sample size realization was 113% (5 375) in Gauteng province. At district level, sample size achievement ranged from 104% in West Rand to 125% in Johannesburg Metro districts. More than a third (35.4%) of participants were 15–24 years old and only 13.9% were ≥35 years old (Figure 25). The proportion of 15–24 year old participants in Gauteng province was lower than the national average (40.9%).

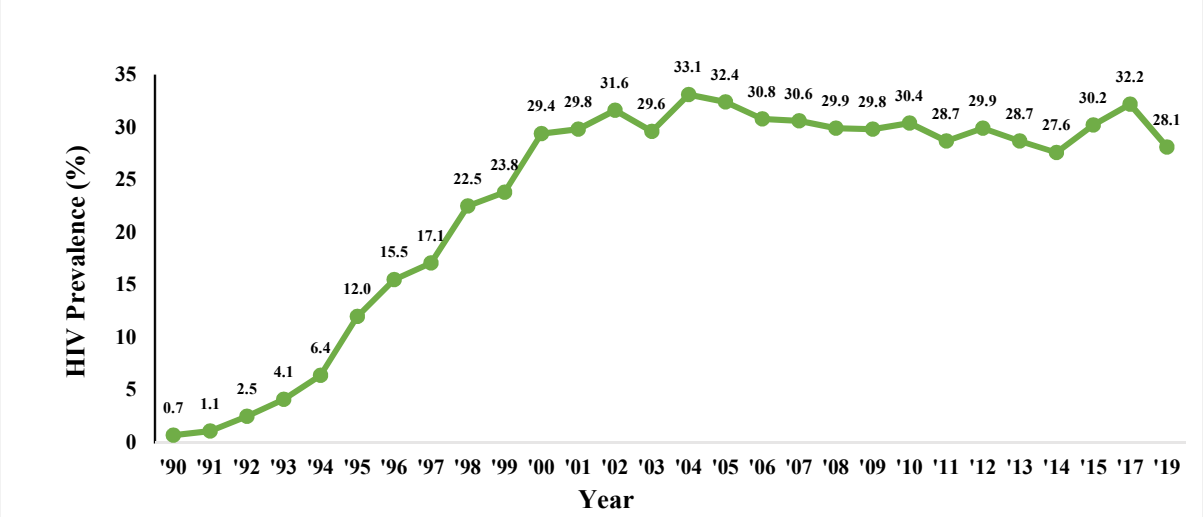


Age groups are in years

Figure 25: Distribution of survey participants by five-year age group – Gauteng, Antenatal HIV Sentinel Survey, 2019

HIV prevalence

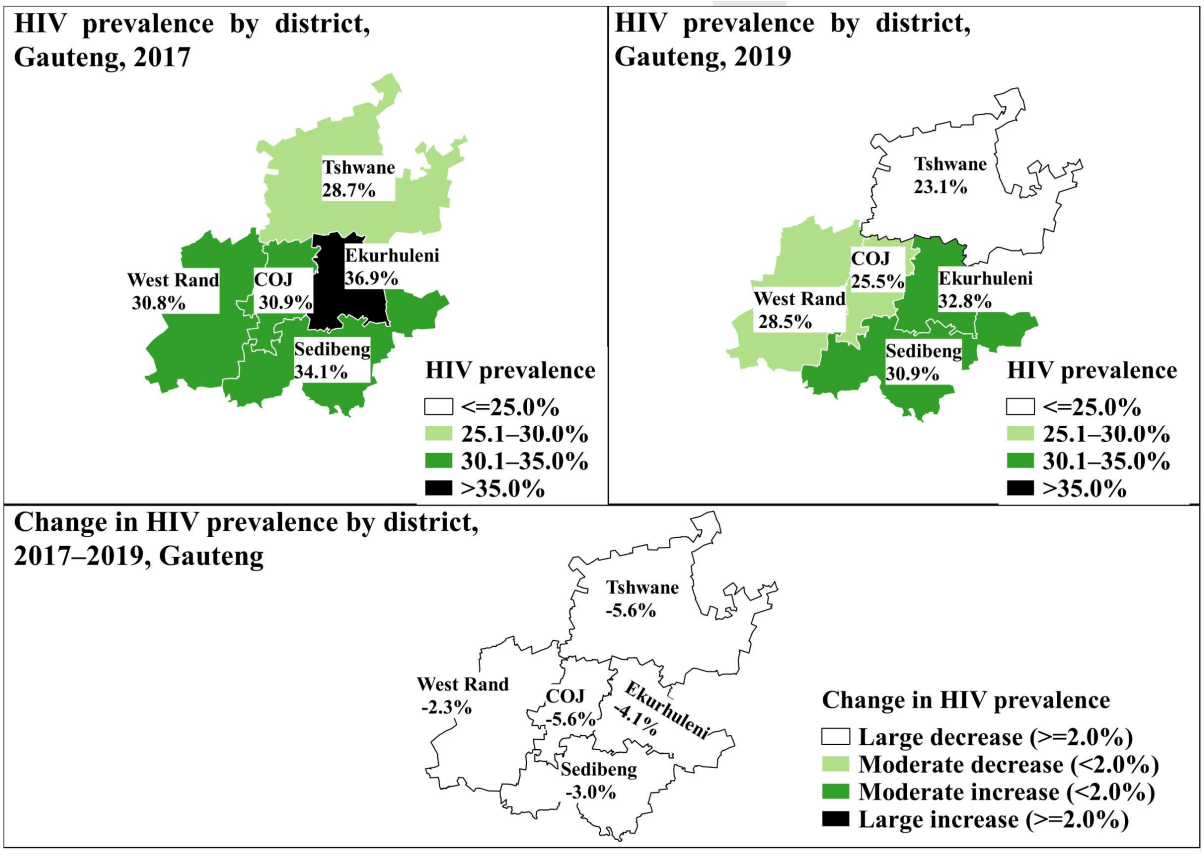
HIV prevalence in Gauteng increased over the years to 33.1% in 2004, then declined gradually to 27.6% in 2014; and increased again to 32.2% in 2017. In 2019, HIV prevalence was 28.1% representing a 4.1% points decline from prevalence in 2017 (Figure 26).



The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees

Figure 26: The HIV epidemic curve among antenatal women, Gauteng, 1990–2019, Antenatal HIV Sentinel Survey

At district level, in 2019 prevalence declined in all districts from its level in 2017. Prevalence declined by >2% in all five districts (Figure 27).



The prevalence reported is for both first and follow-up visit attendees; COJ: City of Johannesburg

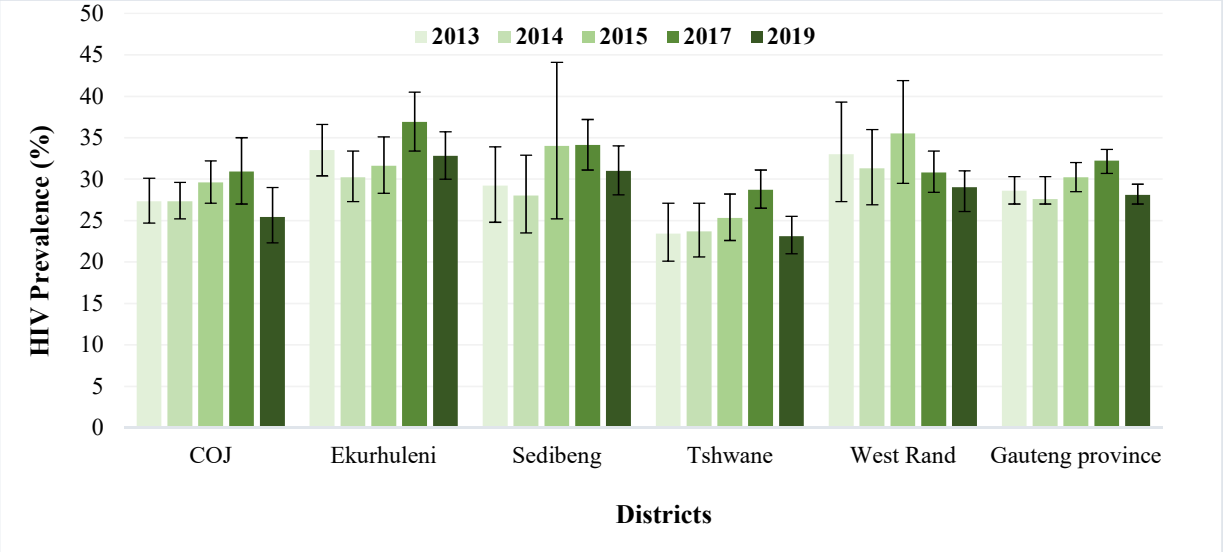
Figure 27: Change in district HIV prevalence estimates – 2017–2019, Antenatal HIV Sentinel Survey, Gauteng

Table 3 and Figure 28 show the prevalence trend from 2013 to 2019. District prevalence ranged from 23.1% in City of Tshwane to 32.8% in Ekurhuleni in 2019. In City of Johannesburg (COJ) and City of Tshwane prevalence increased between 2013 and 2017 and then declined in 2019. In the other three districts prevalence fluctuated over the years.

Table 3: HIV prevalence by district in the Gauteng province, Antenatal HIV Sentinel Survey, 2013 to 2019

District	2013		2014		2015		2017		2019	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
COJ	27.3	24.7 – 30.1	27.3	25.2 – 29.6	29.6	27.1 – 32.2	30.9	27.0– 35.0	25.5	22.3– 28.8
Ekurhuleni	33.5	30.4 – 36.6	30.2	27.3 – 33.4	31.6	28.3 – 35.1	36.9	33.4– 40.5	32.8	30.0– 35.7
Sedibeng	29.2	24.8 – 33.9	28	23.5 – 32.9	34.0	25.2 – 44.1	34.1	31.1– 37.2	30.9	28.1– 33.9
Tshwane	23.4	20.1 – 27.1	23.7	20.6 – 27.1	25.3	22.6 – 28.2	28.7	26.5– 31.1	23.1	21.0– 25.5
West Rand	33	27.3 – 39.3	31.3	26.9 – 36.0	35.5	29.5 – 41.9	30.8	28.4– 33.4	28.5	26.1– 31.0
Gauteng province	**28.6**	**27.0 – 30.3**	**27.6**	**27.0 – 30.3**	**30.2**	**28.5 – 32.0**	**32.2**	**30.7– 33.6**	**28.1**	**26.8– 29.4**

The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees. COJ: City of Johannesburg

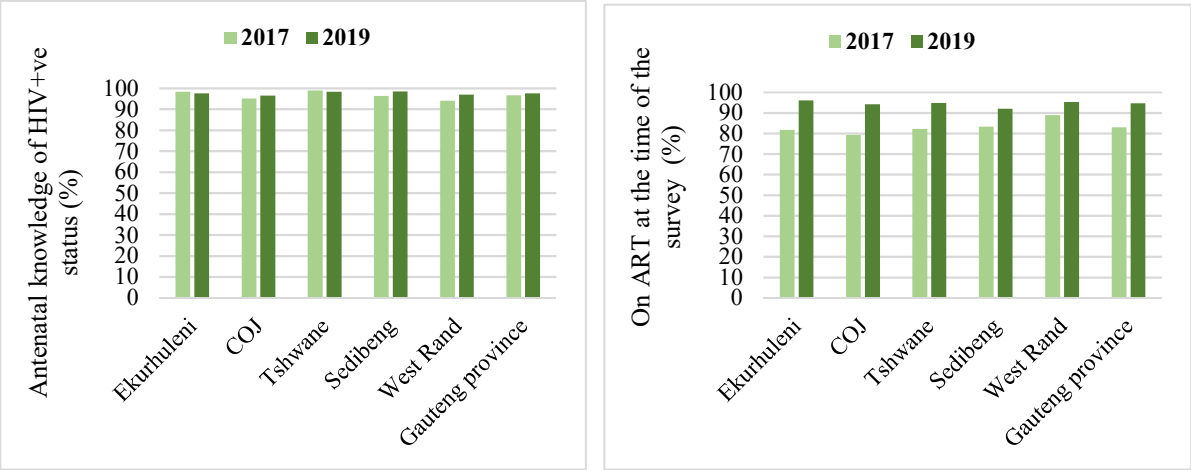


The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees. The confidence intervals are wide due to small sample size at district level. COJ: City of Johannesburg

Figure 28: HIV prevalence trend by district, 2013–2019, Antenatal HIV Sentinel Survey, Gauteng

PMTCT cascade

In the Gauteng sample of HIV-positive women in 2019, 97.5% were aware of their HIV status, and 94.6% of those who knew their status were on ART at the time of this survey. In the same year, knowledge of HIV-positive status was above 95% across all districts in the province. The lowest ART initiation was in Sedibeng district at 92% and the highest was in Ekurhuleni district at 96%. Both knowledge of HIV-positive status and ART initiation increased between 2017 and 2019 in all districts except in Ekurhuleni and Tshwane districts where knowledge of HIV status was slightly lower (by <1%) in 2019 compared to 2017 (Figure 29).

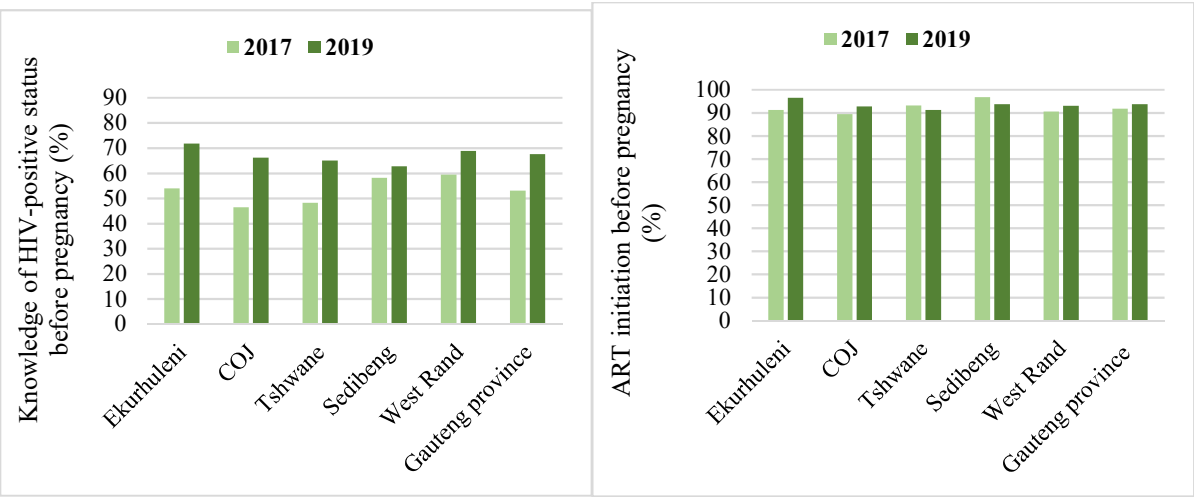


Weighted percentages; HIV+ve: HIV positive; ART – Antiretroviral therapy'; COJ: City of Johannesburg

Figure 29: Knowledge of HIV-positive status and ART initiation by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Gauteng

Knowledge of HIV-positive status and ART initiation before pregnancy

Despite significant progress between 2017 and 2019, knowledge of HIV status before pregnancy in Gauteng province was lower than the national average (67.6% compared to 72.7%) in 2019. Of those who knew their HIV-positive status before pregnancy, 93.8% were initiated on ART before pregnancy in 2019 as compared to 91.8% in 2017 (this difference was not statistically significant). By district, knowledge of HIV status before pregnancy ranged from 62.8% in Tshwane to 71.8% in the Ekurhuleni district. Tshwane also had the lowest ART initiation before pregnancy (91.2%) (Figure 30). Knowledge of HIV status before pregnancy increased between 2017 and 2019 across all districts.

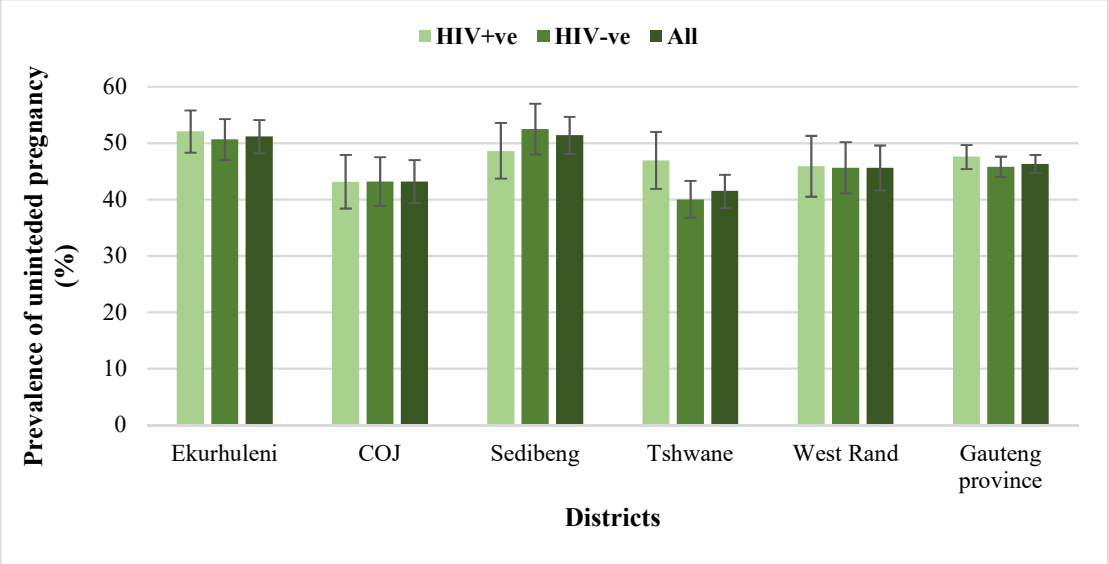


Denominator for knowledge of HIV-positive status before pregnancy was EIA positives. Denominator for ART initiation before pregnancy was the number of HIV-positive women who were aware of their HIV-positive status before pregnancy

Figure 30: Knowledge of HIV-positive status and ART initiation before pregnancy by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Gauteng

Planning of pregnancy

Just below half (46.3%) of the pregnancies in Gauteng were unintended (Figure 31). Unintended pregnancy was lower in all Gauteng districts compared to the national average (51.6%). City of Tshwane had the lowest unintended pregnancy at 41.5% while Ekurhuleni had the highest level of unintended pregnancy at 51.2%. Contrary to the trend observed in other provinces, in Gauteng, the prevalence of unintended pregnancy was higher among HIV-positive women compared to HIV-negative women in three of the five districts (Ekurhuleni, City of Tshwane and West Rand). In the other two districts, the prevalence of unintended pregnancy was almost equal between HIV-negative and HIV-positive women (in COJ) or HIV-negative women had slightly higher unintended pregnancy compared to HIV-positive women (in Sedibeng). All differences observed between HIV-negative and HIV-positive women were not statistically significant. In all districts, adolescent girls (15–19 years) had the highest level of unintended pregnancy (ranging between 61.8% in West Rand district to 72.5% in Ekurhuleni district) followed by young women (20–24 years: ranging between 48.4% in Tshwane district to 59.2% in Sedibeng district) *(data not presented in graph)*. At province level, single women and women in a non-cohabiting relationship had the highest prevalence of unintended pregnancy, but the prevalence of unintended pregnancy in this group substantially varied by district ranging between 59% (in COJ) to 75.6% (in Ekurhuleni) and 56.2% (in Tshwane) to 65.3% (in Ekurhuleni) for single women and women in a non-cohabiting relationship respectively. Unintended pregnancy was below 35% among married women in all districts in the province with the lowest unintended pregnancy among married women reported in COJ at 19.4% (*data not presented in graph*).



Some of the confidence intervals are wide due to small sample size at district level

Figure 31: The prevalence of unintended pregnancy by district, in the 2019 Antenatal HIV Sentinel Survey, Gauteng

Early ANC attendance

Approximately two-thirds of participants in Gauteng province initiated ANC before 20 weeks of gestational age (Figure 32). Attendance of ANC before 20 weeks was >70% in Sedibeng and West Rand districts while Ekurhuleni, COJ and City of Tshwane districts recorded below provincial average attendance of ANC before 20 weeks at 66.4%, 60.6% and 63% respectively. Between 4.6% (in West Rand) and 8.1% (in COJ) of participants across districts (6.2% at provincial level) initiated ANC at the third trimester *(data not presented in graph).* Attendance of ANC before 20 weeks was lower among adolescent girls (15–19 years) compared to the other age groups in COJ, City of Tshwane and Ekurhuleni districts, while in West Rand and Sedibeng districts, both the youngest (15–19 years) and the oldest age (35–49 years) groups had the lowest attendance of ANC at 20 weeks of gestational age. Women who had unintended pregnancy (63.3%) and multigravida women (65.6%) had lower attendance of ANC before 20 weeks compared to women whose pregnancy was intended (70.2%) and primigravida women (70.5%) respectively.

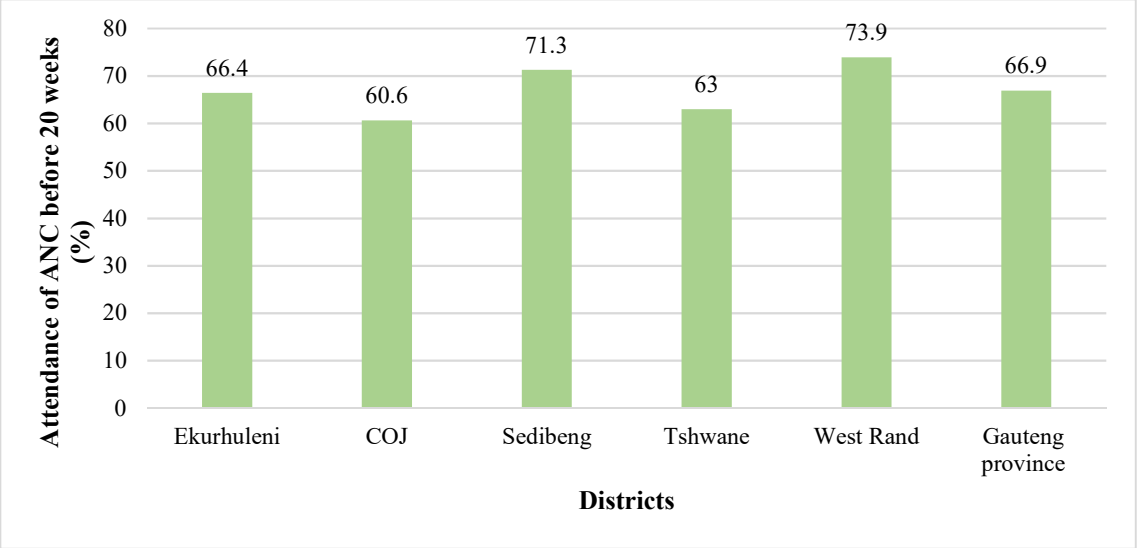


Figure 32: Attendance of antenatal care before 20 weeks of gestational age, in the 2019 Antenatal HIV Sentinel Survey, Gauteng

Maternal syphilis screening and treatment coverage

Maternal syphilis screening coverage was 96.8% in Gauteng, representing an increase of 0.2% points in syphilis screening coverage from the level in 2017 (96.6%) (Figure 33). All districts had greater than 95% maternal syphilis screening coverage in 2019. In three districts (Ekurhuleni, COJ, and Sedibeng) syphilis screening coverage showed modest increase, while in two districts (Tshwane and West Rand) syphilis screening coverage dropped slightly between 2017 and 2019.

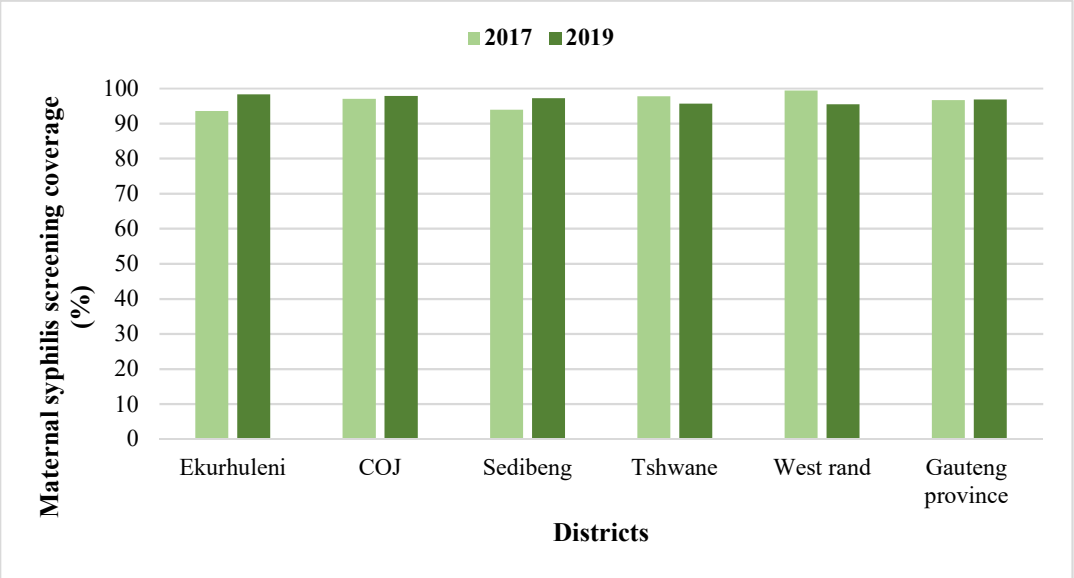


Figure 33: Maternal syphilis screening coverage by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Gauteng

Of those who had syphilis screening, at province level, 1.7% (95% CI: 1.4%–2.0%) were positive for syphilis, 69.6% were negative, 27.7% were awaiting result and 1% results were not in file (Figure 34). Pending results ranged from only 6.1% in Sedibeng to 40.7% in City of Tshwane district. Gauteng had the third highest proportion of pending results nationally next to Limpopo and North West provinces. Between 10.1% and 14.9% of the pending results in Ekurhuleni, COJ, Tshwane and West Rand districts were for follow-up visit attendees.

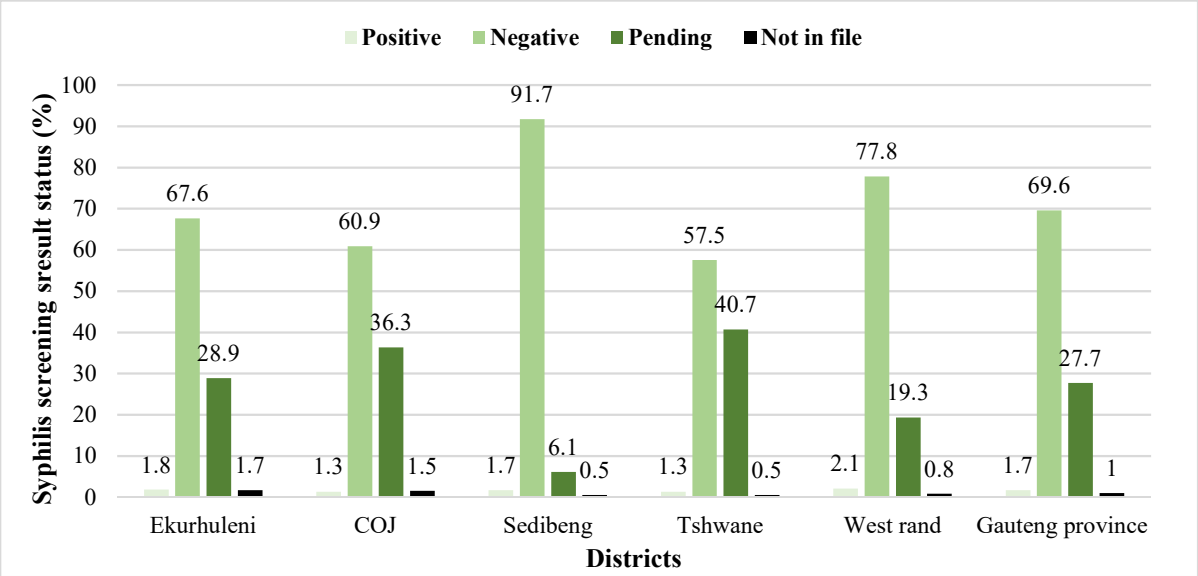
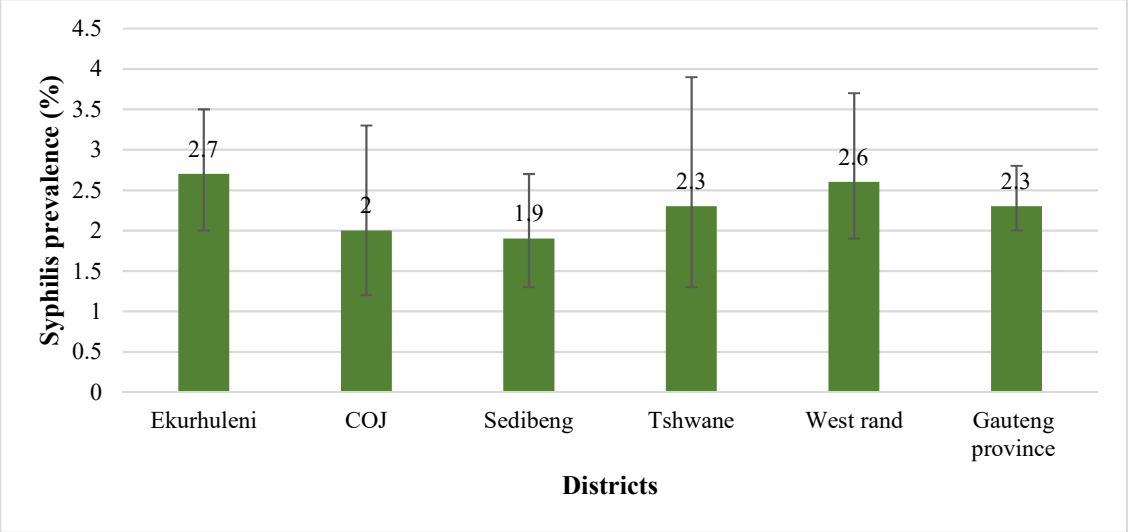


Figure 34: Maternal syphilis screening test result status by district, in the 2019 Antenatal HIV Sentinel Survey, Gauteng

After excluding the pending results and the results not in file, the prevalence of syphilis (per medical record review data) in Gauteng among those who had syphilis test result was 2.3% (95% CI: 2.0%–2.8%), and this was 0.3% points lower than the national average (2.6%). Prevalence increased by 0.6% points from its level in 2015 (1.7%). By district, the prevalence of syphilis ranged from 1.9% in Sedibeng to 2.7% in Ekurhuleni districts (Figure 35). The district level prevalence estimates need to be interpreted with caution as the CIs around these estimates are wide due to small sample size.



The confidence intervals are wide due to small sample size at district level

Figure 35: Syphilis prevalence among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, Gauteng

Of 75 participants who were syphilis positive and whose syphilis treatment status was reported in Gauteng, 93.1% (70) received at least one dose of treatment for syphilis (Figure 36). Of those treated for syphilis and had type of treatment data reported (66), 97.2% (64) were treated with at least one dose of BCG (Figure 36). Syphilis treatment data was missing for 7.4% (6) of syphilis positive participants in the province, and type of treatment data was missing for 5.7% (4) of participants treated for syphilis; these missing data were excluded from the above analysis. If we assume that all missing responses mean that the subjects did not receive treatment for syphilis, the coverage of syphilis treatment and treatment with BCG drops from 93.1% to 86% and from 97.2% to 91.8% respectively. The syphilis treatment estimates need to be interpreted with caution as the sample size is small.

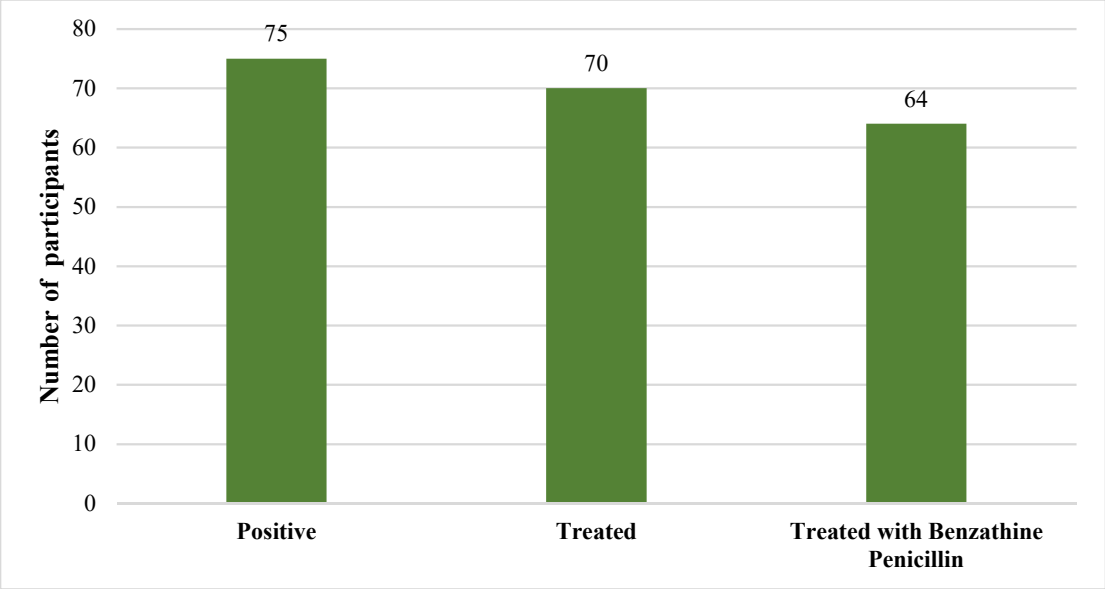
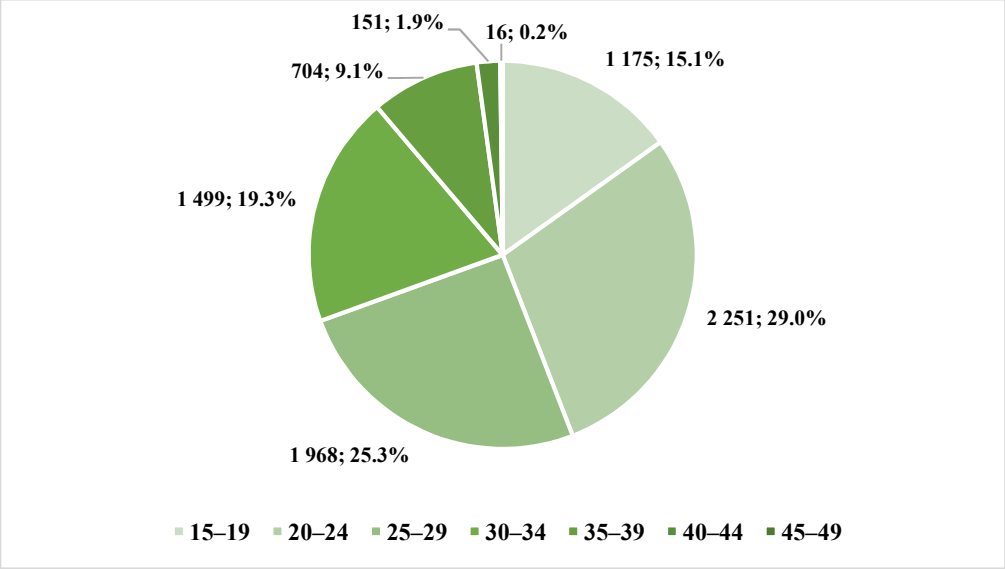


Figure 36: Syphilis treatment cascade among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, Gauteng

KwaZulu-Natal

Sample size realization and demographic characteristics

Sample size realization was 96% (8 430) in KwaZulu-Natal province. The lowest sample size realization was in iLembe and King Cetshwayo districts at 85% and the highest sample size realization was in Zululand, where planned sample size was exceeded by 9% (109%). The proportion of participants in the age group 15–24 years (44.1%) was higher than the national average (40.9%) (Figure 37). The proportion of participants in the age group 35 and above were 11.2%.

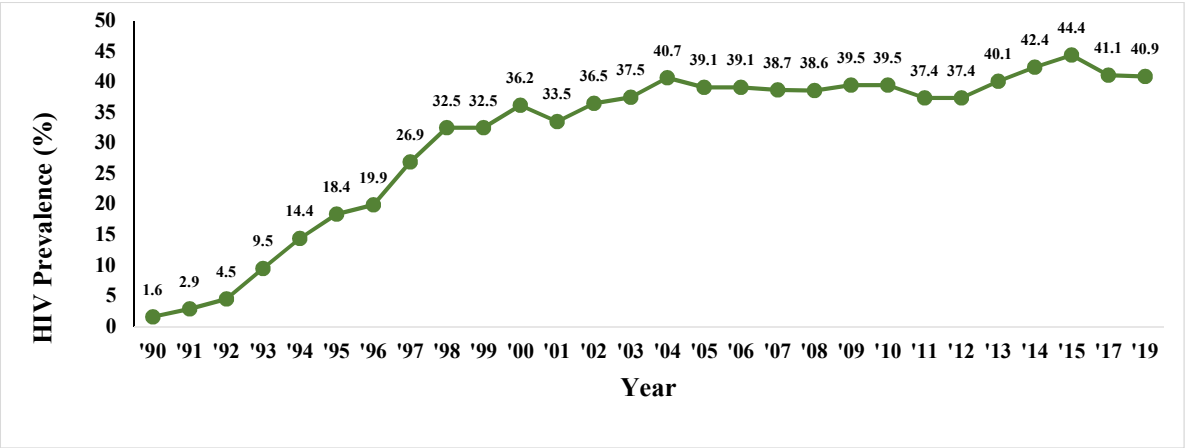


Age groups are in years

Figure 37: Distribution of survey participants by five-year age group – KwaZulu-Natal, Antenatal HIV Sentinel Survey, 2019

HIV prevalence

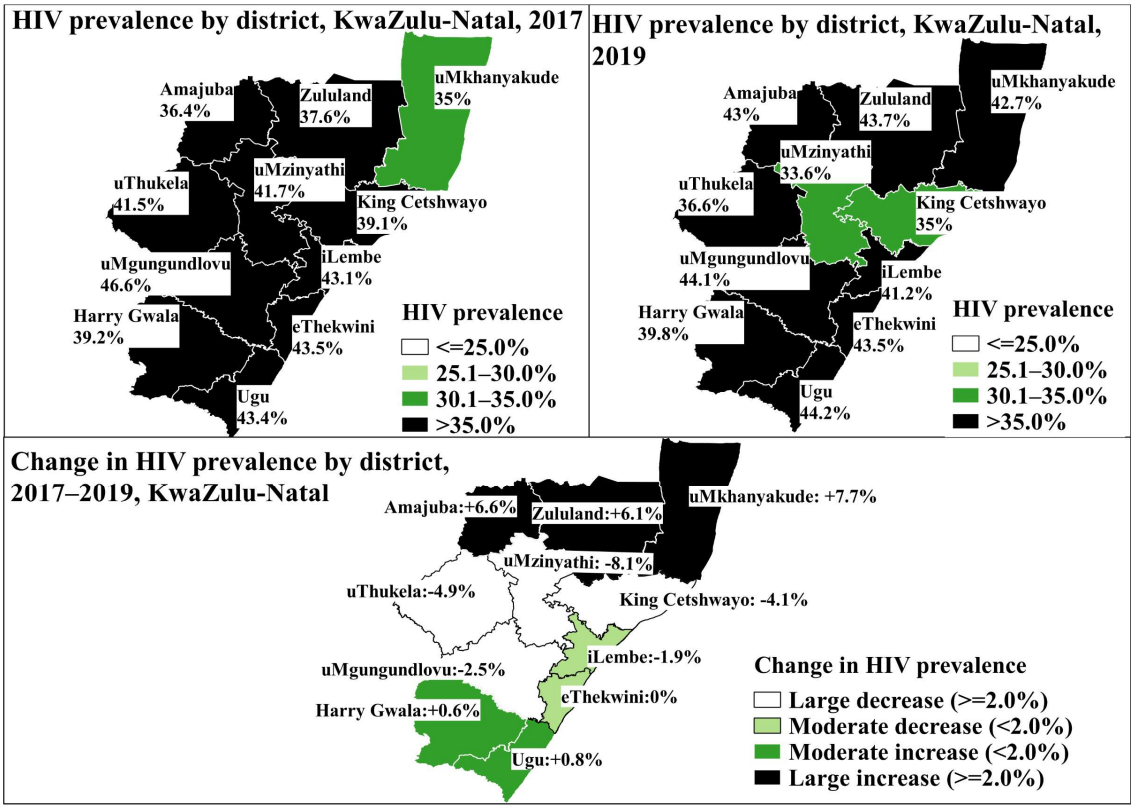
In KwaZulu-Natal, HIV prevalence increased until 2004 followed by plateauing of prevalence at around 39% between 2004 and 2010. HIV prevalence started to show gradual increase between 2013 and 2015 reaching a high of 44.4% in 2015, then prevalence declined to about 41% in 2017 and 2019. Overall, HIV prevalence in KwaZulu-Natal was higher by about 10% from the national average (Figure 38).



The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees.

Figure 38: The HIV epidemic curve among antenatal women, KwaZulu-Natal, 1990–2019, Antenatal HIV Sentinel Survey

Figure 39 provides the prevalence estimates at district level. In 2019, the prevalence of HIV at district level ranged between 33.6% (in uMzinyathi) and 44.2% (in Ugu). Between 2017 and 2019, in three districts, namely, Amajuba, Zululand and uMkhanyakude, there were large (>=2%) increases in prevalence. In other two districts (Ugu and Harry Gwala) prevalence increased by <2%. In five districts prevalence declined by 1.9% in iLembe, by 2.5% in uMgungundlovu, by 4.1% in King Cetshwayo, by 8.1% in uMzinyathi and by 4.9% in uThukela – none of these differences were statistically significant. Prevalence stayed the same in eThekwini district between 2017 and 2019.



The prevalence reported is for both first and follow-up visit attendees

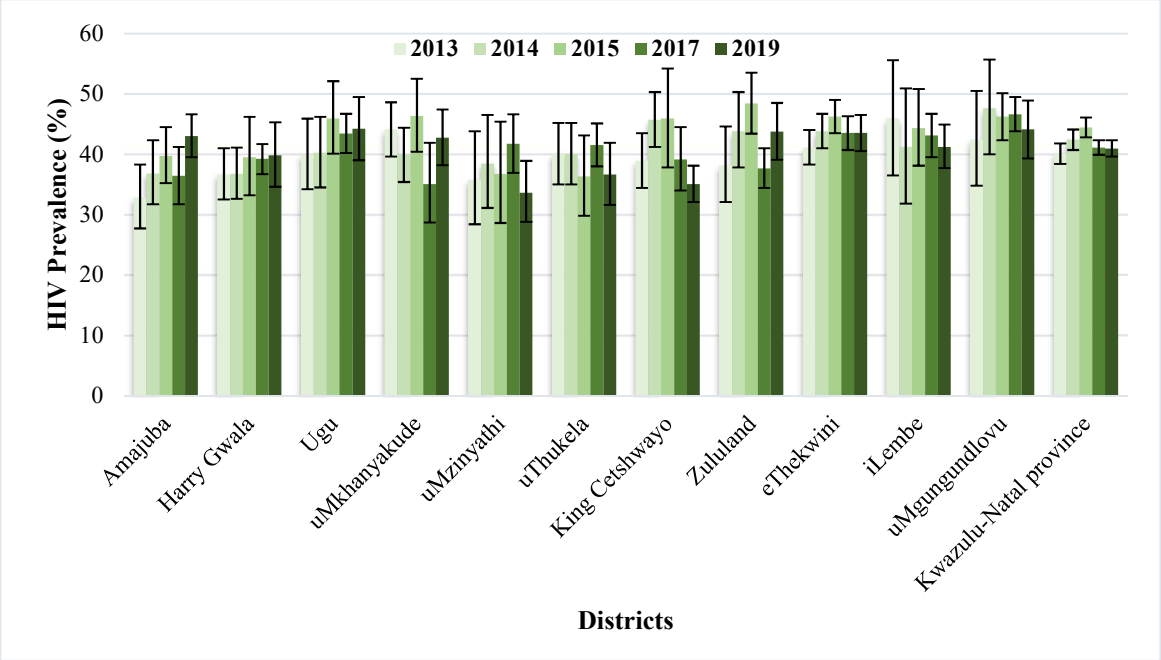
Figure 39: Change in district HIV prevalence estimates, 2017–2019, Antenatal HIV Sentinel Survey, KwaZulu-Natal

At district level, in Amajuba and Harry Gwala, overall prevalence increased between 2013 and 2019 except the slight decline in 2017. In King Cetshwayo and eThekwini, prevalence increased between 2013 and 2015, then declined in 2017 and 2019. In uMkhanyakude, uMzinyathi and uThukela districts prevalence fluctuated over the years with no clear trend. In uMgungundlovu district prevalence increased sharply in 2014 to 47.6% and over the years gradually declined to 44.1% in 2019. In iLembe prevalence declined from almost 46% in 2013 to 41.2% in 2019. In Ugu and Zululand districts prevalence increased between 2013 and 2015, however in 2017 prevalence declined and then increased again in 2019 (Table 4 and Figure 40).

Table 4: HIV prevalence by district in the KwaZulu-Natal province, Antenatal HIV Sentinel Survey, 2013 to 2019

District	2013		2014		2015		2017		2019	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Amajuba	32.8	27.7 – 38.3	36.8	32.3 – 41.6	39.7	34.9 – 44.8	36.4	31.7–41.2	43.0	39.5–46.6
Harry Gwala	36.6	32.5 – 41.0	36.7	30.4 – 43.4	39.5	35.8 – 43.4	39.2	36.7–41.7	39.8	34.6–45.3
King Cetshwayo	38.9	34.4 – 43.5	45.7	37.6 – 54.0	45.9	37.0 – 55.1	39.1	34.0–44.5	35.0	32.1–38.1
Ugu	39.9	34.2 – 45.9	40.2	34.4 – 46.4	45.9	39.9 – 52.1	43.4	40.2–46.7	44.2	39.0–49.5
uMkhanyakude	44.1	39.6 – 48.6	39.9	34.0 – 46.1	46.3	40.4 – 52.3	35.0	28.7–41.9	42.7	38.2–47.4
uMzinyathi	35.7	28.4 – 43.8	38.4	30.3 – 47.1	36.7	28.5 – 45.8	41.7	36.9–46.6	33.6	28.8–38.9
uThukela	40.0	35.0 – 45.2	40.0	33.5 – 46.8	36.3	31.3 – 41.7	41.5	38.0–45.1	36.6	31.6–41.9
Zululand	38.1	32.1 – 44.6	43.8	38.8 – 48.9	48.4	40.2 – 56.8	37.6	34.4–41.0	43.7	39.1–48.5
eThekwini	41.1	38.3 – 44.0	43.8	41.1 – 46.6	46.2	43.0 – 49.5	43.5	40.7–46.3	43.5	40.5–46.4
iLembe	45.9	36.5 – 55.6	41.2	35.0 – 47.7	44.3	38.3 – 50.5	43.1	39.5–46.7	41.2	37.7–44.9
uMgungundlovu	42.4	34.8 – 50.5	47.6	43.7 – 51.5	46.2	39.3 – 53.1	46.6	43.8–49.5	44.1	39.3–48.9
KwaZulu-Natal province	**40.1**	**38.4 – 41.8**	**42.4**	**40.8 – 44.1**	**44.4**	**42.5 – 46.3**	**41.1**	**39.9–42.3**	**40.9**	**39.6–42.3**

The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees

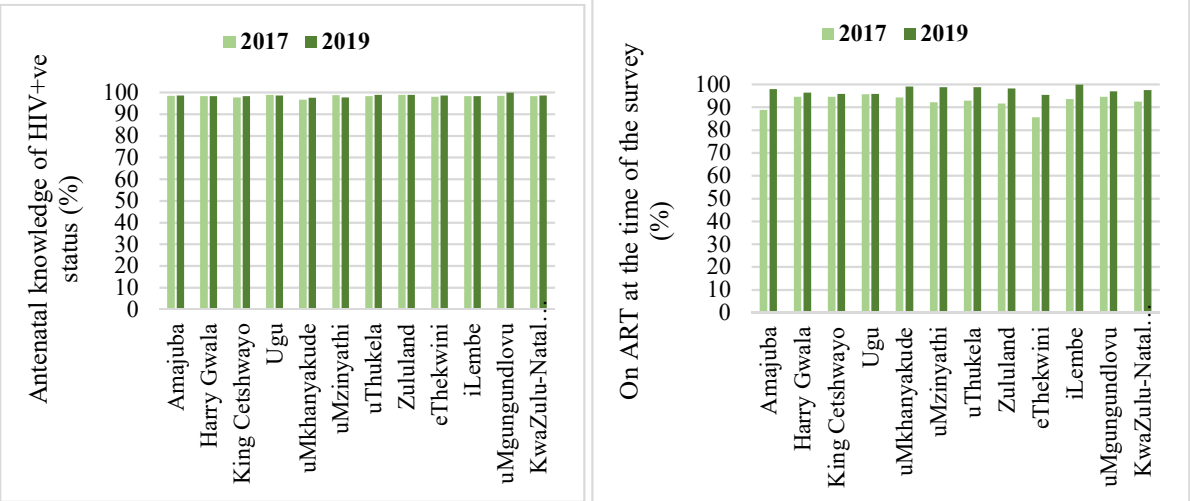


The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees. The confidence intervals are wide due to small sample size at district level

Figure 40: HIV prevalence trend by district, 2013–2019, Antenatal HIV Sentinel Survey, KwaZulu-Natal

PMTCT cascade

KwaZulu-Natal had the highest knowledge of HIV status and ART initiation in the ANC nationally. Almost all (98.6%) HIV-positive women were aware of their HIV status at the time of the survey and of those who knew their HIV-positive status, 97.5% were on ART (Figure 41). Knowledge of HIV-positive status was above 97% across all districts. ART initiation among those who knew their HIV status ranged between 95.4% in eThekwini district to 100% in iLembe district.

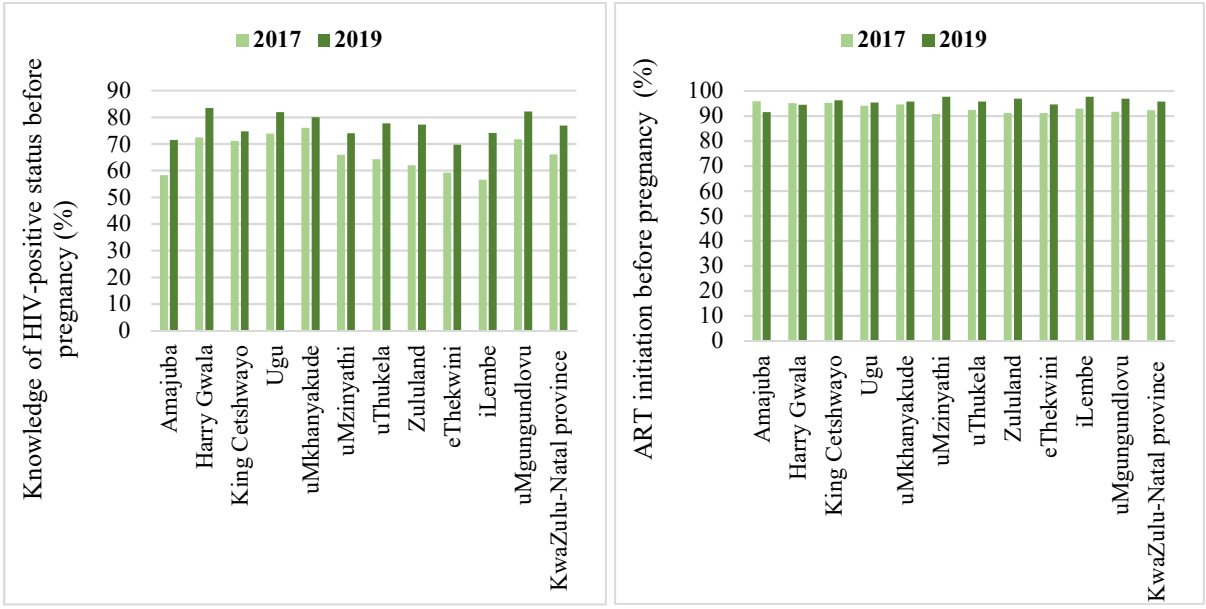


`Weighted percentages; HIV+ve: HIV positive; ART – Antiretroviral therapy

Figure 41: Knowledge of HIV-positive status and ART initiation by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, KwaZulu-Natal

Knowledge of HIV-positive status and ART initiation before pregnancy

Knowledge of HIV-positive status before pregnancy and ART initiation was high in KwaZulu-Natal compared to the national average. At province level 76.8% of HIV-positive women were aware of their HIV-positive status before pregnancy. Knowledge of HIV status before pregnancy among HIV-positive pregnant women was above the national average (72.7%) in nine of the eleven districts (except eThekwini and Amajuba districts) (Figure 42). Of those who were aware of their HIV status before pregnancy, 95.7% initiated ART before pregnancy. The highest knowledge of HIV status before pregnancy was in Harry Gwala (83.5%) and the lowest was in eThekwini (69.7%). Between 2017 and 2019, the percentage of women who knew their HIV-positive status before pregnancy increased in all districts. ART initiation before pregnancy ranged between 91.5% in Amajuba to 97.7% in uMzinyathi district. ART initiation before pregnancy increased in nine of the eleven districts (except in Amajuba and Harry Gwala districts).



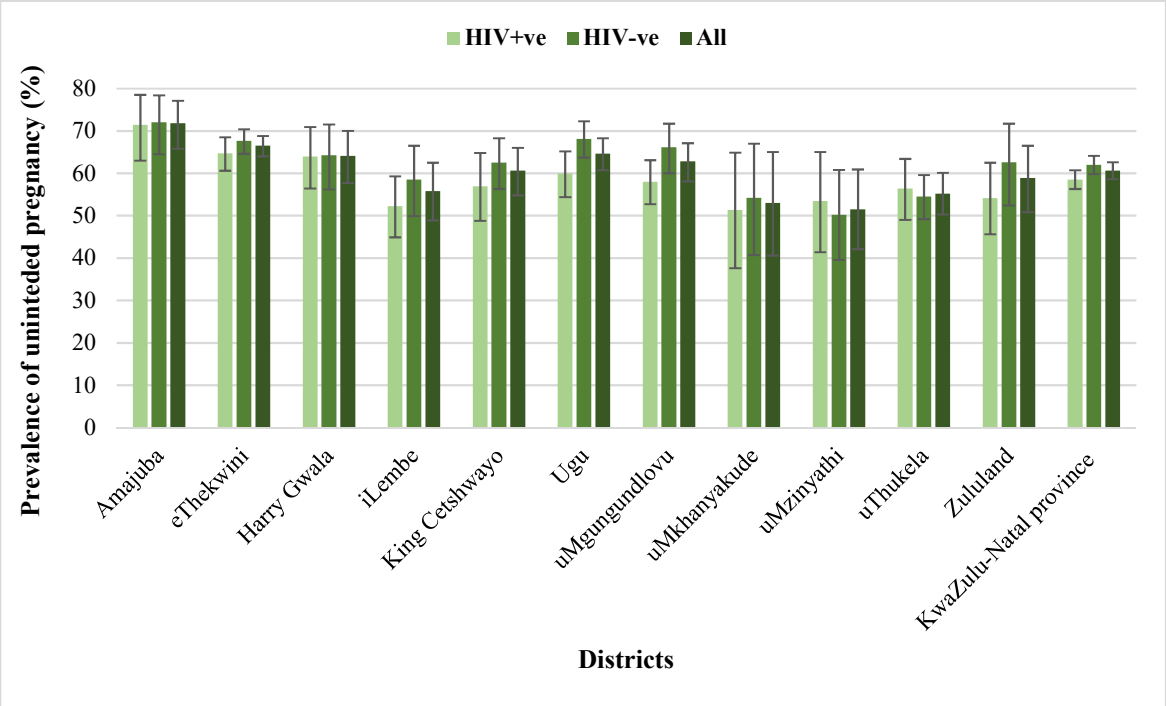
Denominator for knowledge of HIV-positive status before pregnancy was EIA positives.
Denominator for ART initiation before pregnancy was the number of HIV-positive women who were aware of their HIV-positive status before pregnancy

Figure 42: Knowledge of HIV-positive status and ART initiation before pregnancy by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, KwaZulu-Natal

Planning of pregnancy

KwaZulu-Natal had the highest prevalence of unintended pregnancy nationally at 60.6% (Figure 43). By district, prevalence of unintended pregnancy ranged from 51.5% in uMzinyathi to 71.8% in Amajuba district. Unintended pregnancy was higher than the national average in ten of the eleven districts in KwaZulu-Natal (except uMzinyathi district). In nine of the eleven districts (except uThukela and uMzinyathi districts) the prevalence of unintended pregnancy was higher among HIV-negative women compared to HIV-positive women. This difference (in unintended pregnancy between HIV-negative women and HIV-

positive women) was large (>5%) in five districts (iLembe, King Cetshwayo, Ugu, uMgungundlovu and Zululand districts). However, all differences observed between HIV-negative and HIV-positive women were statistically non-significant. In all districts, adolescent girls (15–19 years) had the highest level of unintended pregnancy (ranging between 61.8% in Amajuba districts to 85.5% in uMgungundlovu districts) followed by young women (20–24 years: ranging between 50.8% in uMzinyathi to 76.9% in eThekwini districts) *(data not presented in graph)*. The prevalence of unintended pregnancy was >75% among single women and >60% among women in a non-cohabiting relationship in all the eleven districts (*data not presented in graph*). Married women had lower unintended pregnancy (<42%) across districts compared to unmarried women.



The confidence intervals are wide due to small sample size at district level

Figure 43: The prevalence of unintended pregnancy by district, in the 2019 Antenatal HIV Sentinel Survey, KwaZulu-Natal

Early ANC attendance

KwaZulu-Natal had the second highest early ANC attendance rate nationally (next to Western Cape) with 73.7% of participants in the province initiating ANC before 20 weeks of gestational age (Figure 44). By district, attendance of ANC before 20 weeks ranged between 65.4% (in Amajuba) and 79.7% (in Ugu). In all districts, except Amajuba and uThukela districts, attendance of ANC before 20 weeks was higher than the national average (70.1%). Between 2.0% (in uMzinyathi) and 6.2% (in Amajuba and uMgungundlovu) of participants across districts (4.4% at provincial level) initiated ANC in their third trimester *(data not presented in graph).* In all districts, the youngest (15–19 years) age group had the lowest attendance of ANC compared to the other age groups. In addition in four districts (eThekwini, iLembe, Harry Gwala and uThukela), the oldest age group (35–49 years) had the

second lowest attendance of ANC in the province. Women who had unintended pregnancy had lower attendance of ANC (71.4%) compared to women whose pregnancy was intended (79.5%). There was no difference in early attendance of ANC between primigravida and multigravida women.

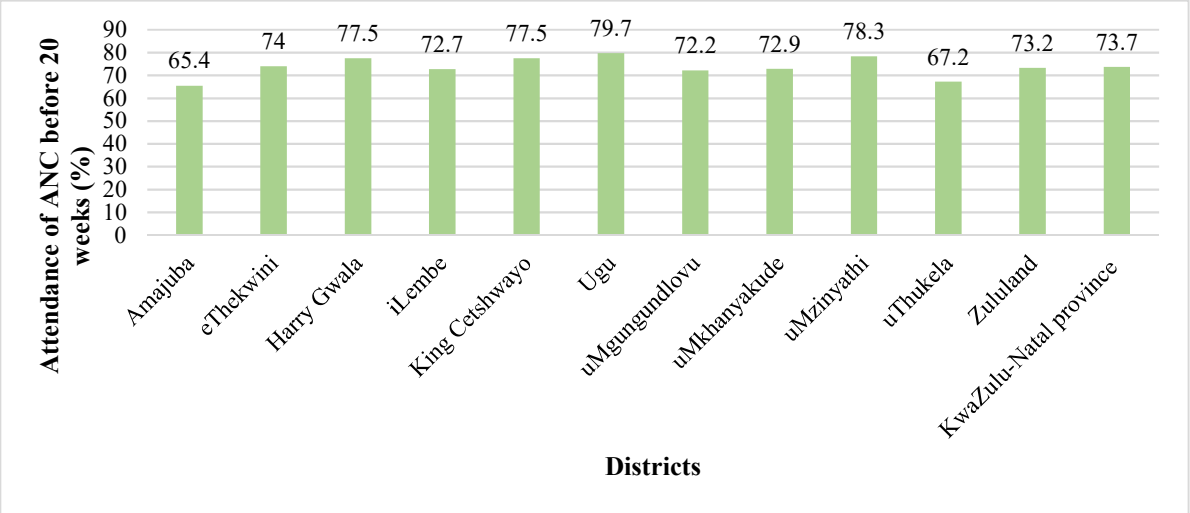


Figure 44: Attendance of antenatal care before 20 weeks of gestational age, in the 2019 Antenatal HIV Sentinel Survey, KwaZulu-Natal

Maternal syphilis screening and treatment coverage

Maternal syphilis screening coverage was 98.7% in KwaZulu-Natal, representing an increase of 0.3% points in syphilis screening coverage from the level in 2017 (98.4%) (Figure 45). All districts had greater than 95% maternal syphilis screening coverage in 2019.

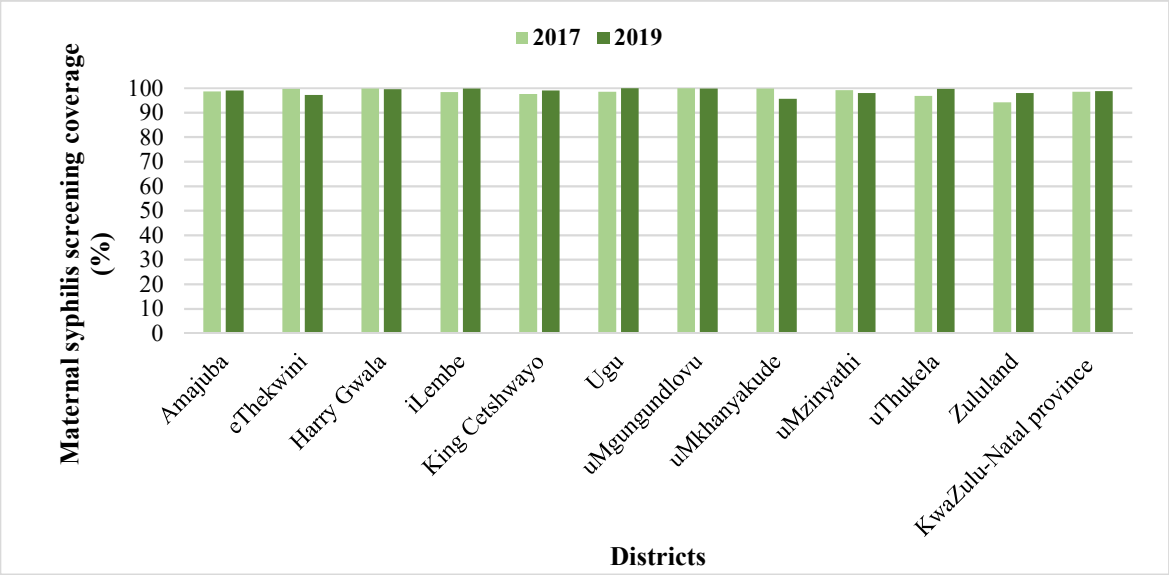


Figure 45 Maternal syphilis screening coverage by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, KwaZulu-Natal

Of those who had syphilis screening, at province level, 2.8% (95% CI: 2.5%–3.2%) were positive for syphilis, 86.8% were negative, 9.5% were awaiting result and 0.9% results were not in their file (Figure 46). Pending results ranged from only 0.3% in uThukela to 17% in uMgungundlovu (14% of the pending results in uMgungundlovu were for follow-up visit attendees and 86% were for first-ANC-visit attendees).

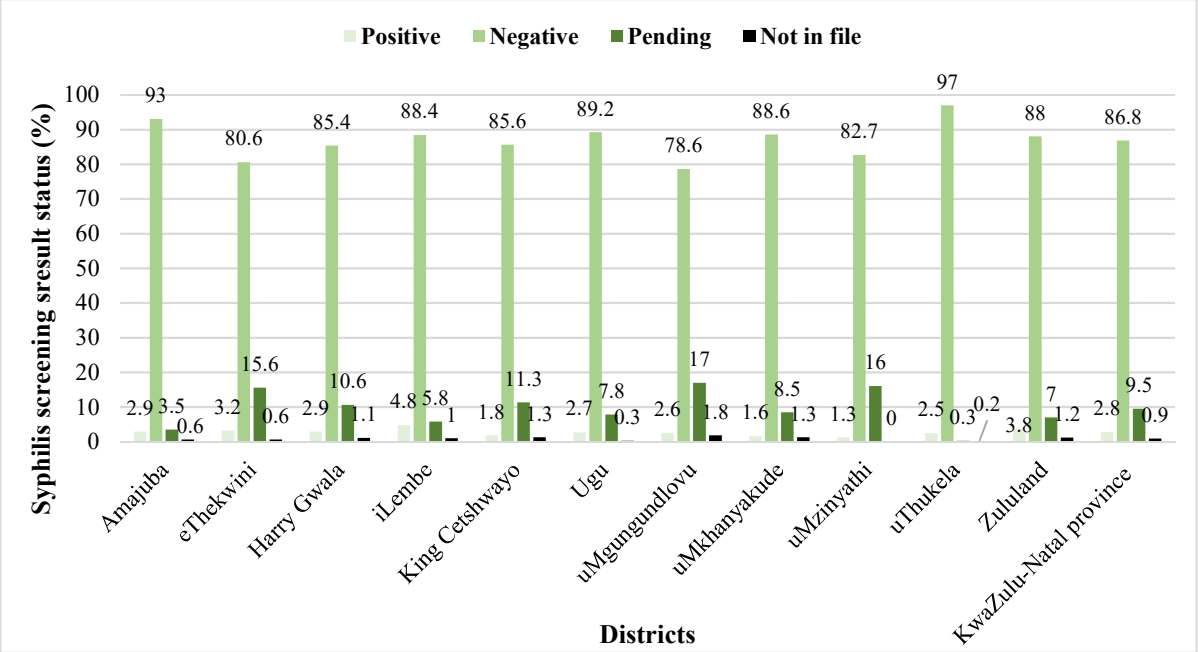
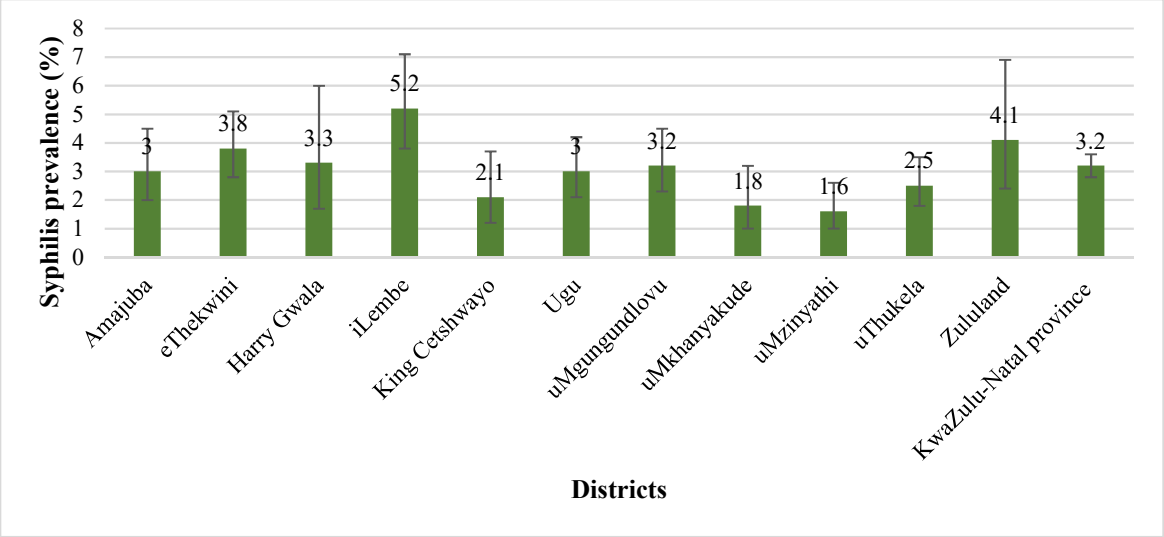


Figure 46: Maternal syphilis screening test result status by district, in the 2019 Antenatal HIV Sentinel Survey, KwaZulu-Natal

After excluding the pending results and the results not in file, the prevalence of syphilis (per medical record review data) in KwaZulu-Natal province among those who had syphilis test result was 3.2% (95% CI: 2.8%–3.6%), and this was 0.6% points higher than the national average (2.6%) and represented a 0.9% points increase from the prevalence in 2015 (2.3%). By district, the prevalence of syphilis ranged from 1.6% in uMzinyathi to 5.2% in iLembe (Figure 47). The district level prevalence estimates need to be interpreted with caution as the CIs around these estimates are wide due to small sample size.



The confidence intervals are wide due to small sample size at district level

Figure 47: Syphilis prevalence among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, KwaZulu-Natal

Of 209 participants who were syphilis positive and whose syphilis treatment status was reported in KwaZulu-Natal, 93.9% (196) received at least one dose of treatment for syphilis (Figure 48). Of those treated for syphilis and had type of treatment data reported (163), 92.9% (151) were treated with at least one dose of BCG. Syphilis treatment data was missing for 8.3% (19) of syphilis positive participants in the province, and type of treatment data was missing for 16.8% (33) of participants treated for syphilis; these missing data were excluded from the above analysis. If we assume that all missing responses mean that the subjects did not receive treatment for syphilis, the coverage of syphilis treatment and treatment with BCG drops from 93.9% to 86% and from 92.9% to 77.2% respectively. The syphilis treatment estimates need to be interpreted with caution as the sample size is small.

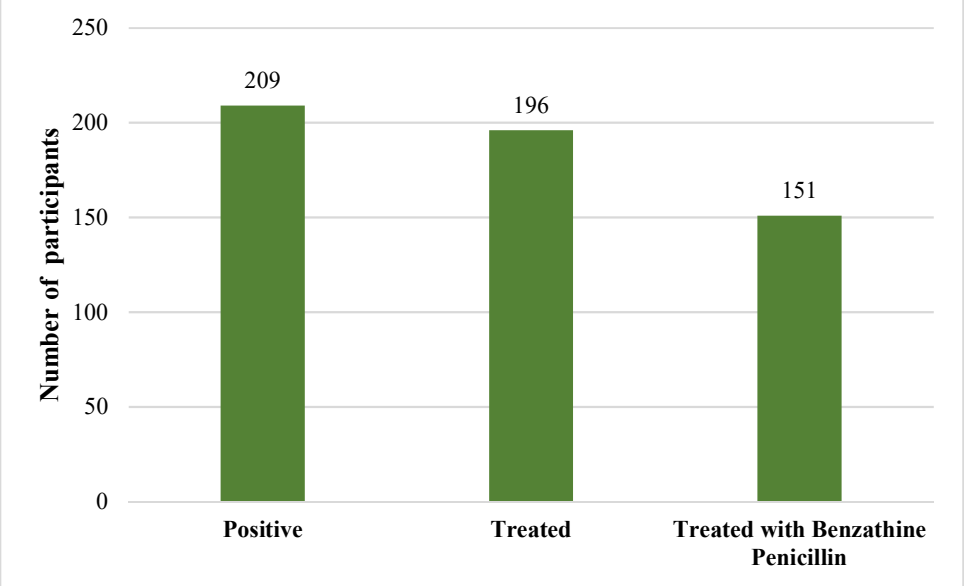


Figure 48: Syphilis treatment cascade among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, KwaZulu-Natal

Limpopo

Sample size realization and demographic characteristics

The sample size realization in Limpopo was 96% (3 053). At district level, the lowest sample size realization was in Mopani district (86%) and the highest was in Sekhukhune district (108%). Just above two-fifths (40.8%) of participants were women in the age group 15–24 years and 14.6% were ≥35 years old (Figure 49).

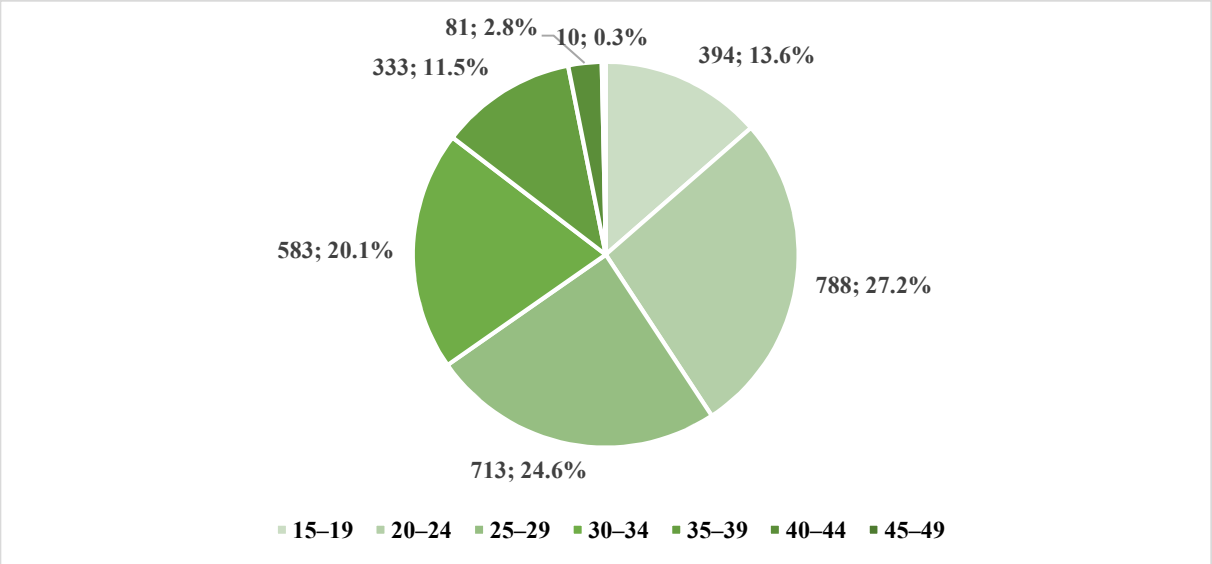
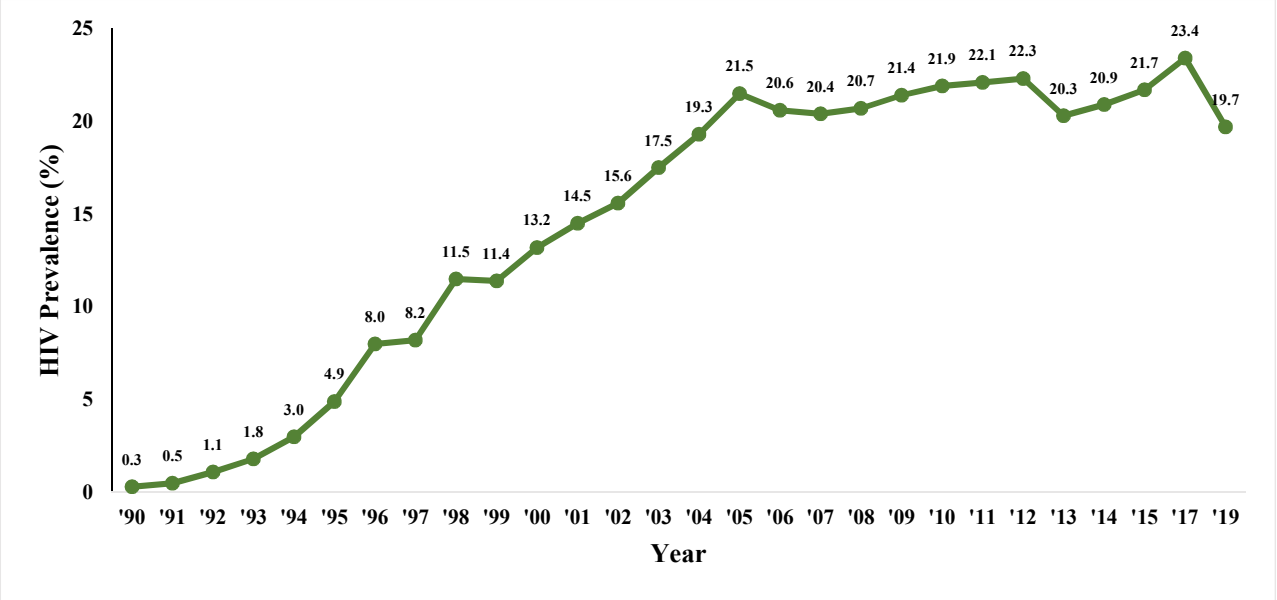


Figure 49: Distribution of survey participants by five-year age group – Limpopo, Antenatal HIV Sentinel Survey, 2019

HIV Prevalence

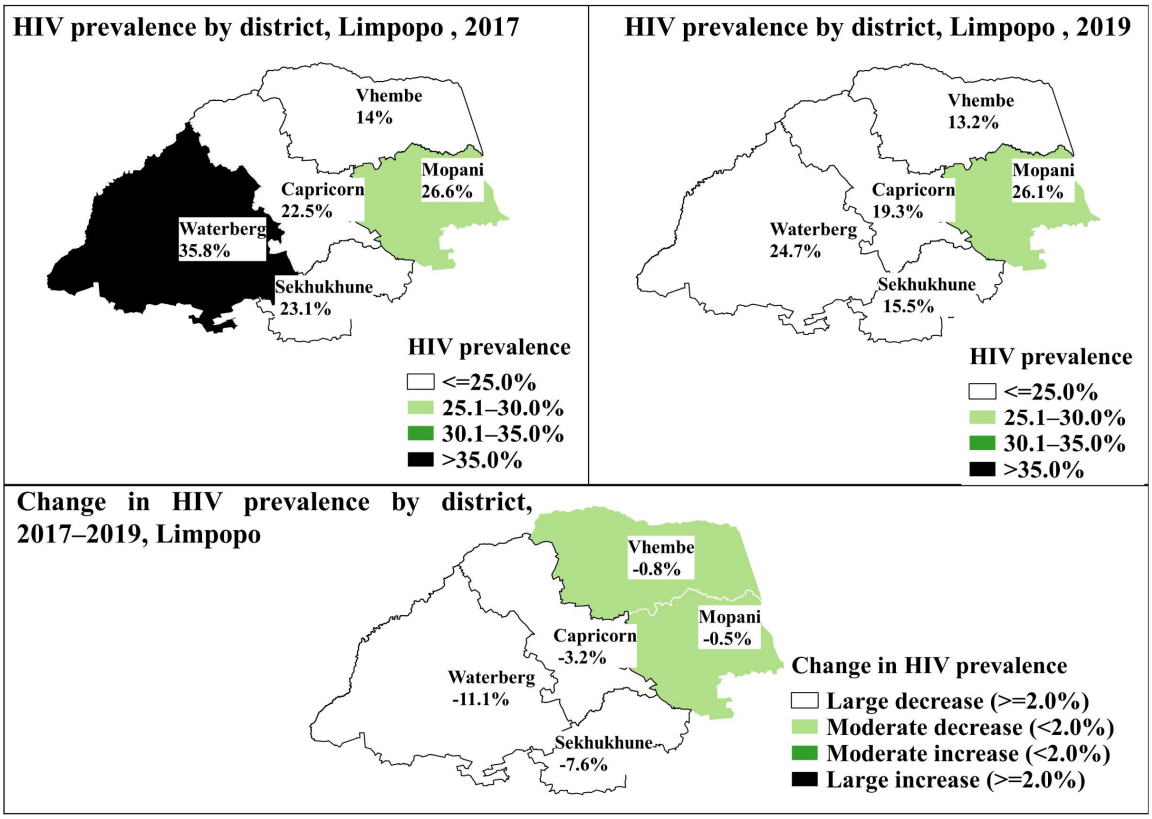
The epidemic curve in Figure 50 shows the rapid increase in HIV prevalence in Limpopo province between 1990 and 2005, followed by slowing down in the rate of prevalence increase between 2015 (21.5%) and 2017 (23.4%). Prevalence dropped sharply (from 23.4% to 19.7%) between 2017 and 2019.



The prevalence reported in 2015, 2017, and 2019 is for both first and follow-up visit attendees

Figure 50: The HIV epidemic curve among antenatal women, Limpopo, 1990–2019, Antenatal HIV Sentinel Survey

In 2019, district level prevalence ranged between 13.2% in Vhembe to 26.1% in Mopani. Prevalence between 2017 and 2019 declined in all 5 districts in Limpopo. The highest decline was in Waterberg district (by 11.1%) (Figure 51). The prevalence in Vhembe district was the second lowest prevalence (13.2%) nationally, next to Central Karoo (7.2%).



The prevalence reported is for both first and follow-up visit attendees

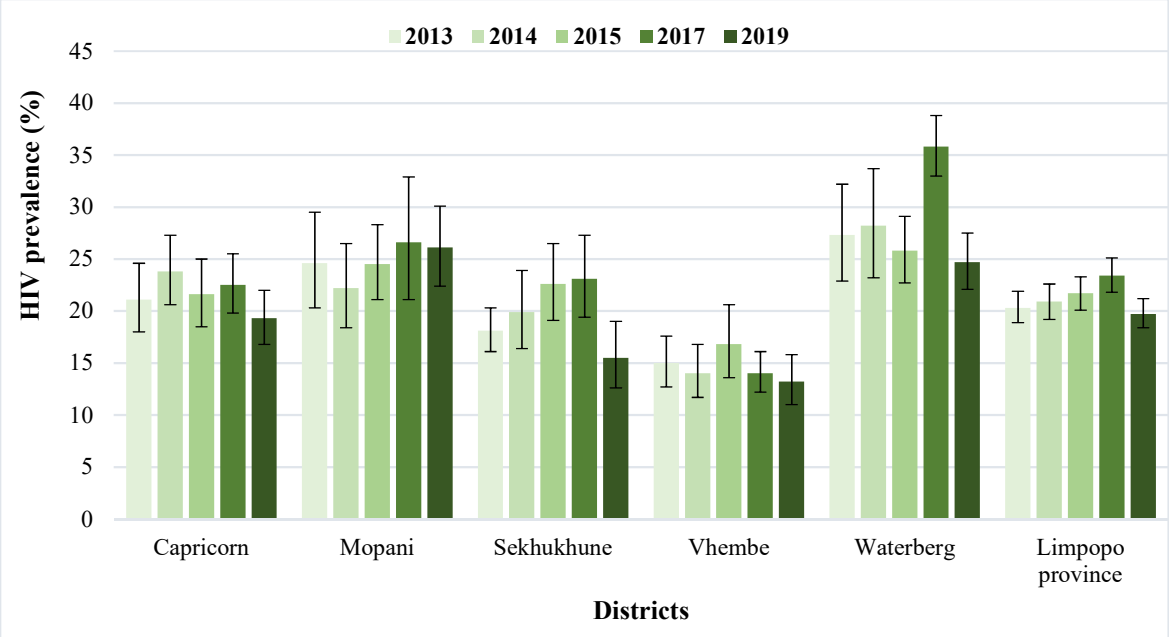
Figure 51: Change in district HIV prevalence estimates – 2017–2019, Antenatal HIV Sentinel Survey, Limpopo

Over the last five surveys, prevalence at district level fluctuated in two of the five (Capricorn, and Mopani) districts in Limpopo (Table 5 and Figure 52). In Vhembe, overall, prevalence showed declining trend between 2013 and 2019 except the sharp rise in prevalence in 2015. In Sekhukhune, prevalence increased from 18.1% in 2013 to 23.1% in 2017, then declined to 15.5% in 2019. In Waterberg, prevalence declined between 2014 and 2019, except the sharp rise in prevalence in 2017. The prevalence decline in Limpopo between 2017 and 2019 was largely driven by the decline in prevalence in Waterberg and Sekhukhune districts.

Table 5: HIV prevalence by district, in the Limpopo province, Antenatal HIV Sentinel Survey, 2013–2019

District	2013		2014		2015		2017		2019	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Capricorn	21.1	18.0 – 24.6	23.8	20.6 – 27.3	21.6	18.5 – 25.0	22.5	19.8–25.5	19.3	16.8–22.0
Mopani	24.6	20.3 – 29.5	22.2	18.4 – 26.5	24.5	21.1 – 28.3	26.6	21.1–32.9	26.1	22.4–30.1
Sekhukhune	18.1	16.1 – 20.3	19.9	16.4 – 23.9	22.6	19.1 – 26.5	23.1	19.4–27.3	15.5	12.6–19.0
Vhembe	15.0	12.7 – 17.6	14.0	11.7 – 16.8	16.8	13.6 – 20.6	14.0	12.2–16.1	13.2	11.0–15.8
Waterberg	27.3	22.9 – 32.2	28.2	23.2 – 33.7	25.8	22.7 – 29.1	35.8	33.0–38.8	24.7	22.1–27.5
Limpopo province	**20.3**	**18.9 – 21.9**	**20.9**	**19.2 – 22.6**	**21.7**	**20.1 – 23.3**	**23.4**	**21.8–25.1**	**19.7**	**18.4–21.2**

The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees

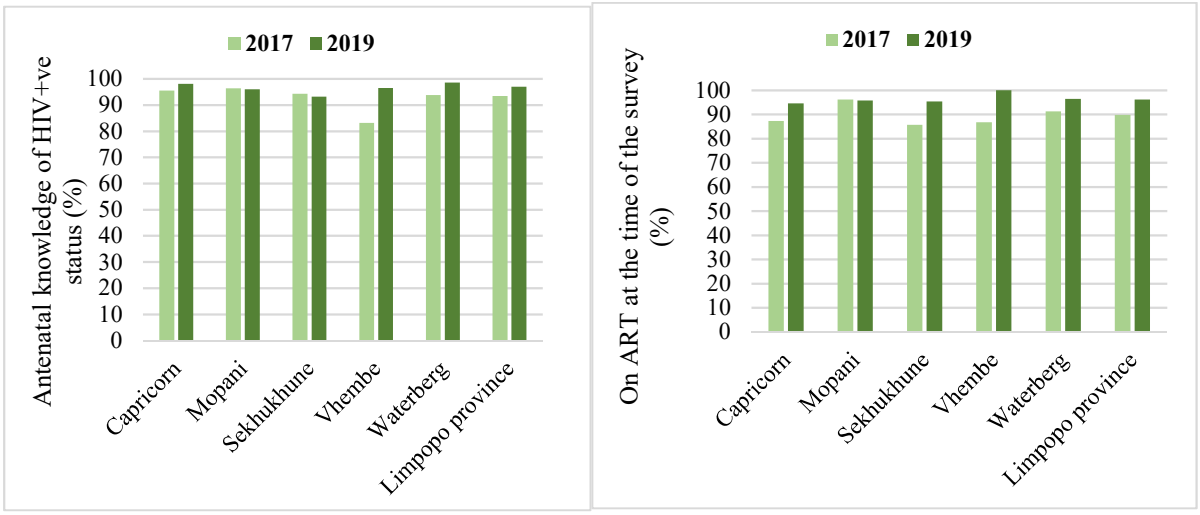


The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees. The confidence intervals are wide due to small sample size at district level

Figure 52: HIV prevalence trend by district, Antenatal HIV Sentinel Survey, 2013–2019, Limpopo

PMTCT cascade

Among HIV-positive pregnant women attending ANC service in Limpopo, knowledge of HIV status in the ANC was 97%. Of those who knew their HIV-positive status, 96.1% were on ART (Figure 53). The lowest knowledge of HIV status was in Sekhukhune at 93.2% and the highest was in Waterberg district at 98.6%. ART initiation ranged between 94.5% and 100% in Capricorn and Vhembe districts respectively. Between 2017 and 2019, knowledge of HIV status improved in Capricorn, Vhembe and Waterberg districts; and ART initiation improved in four of the five districts (except Mopani).

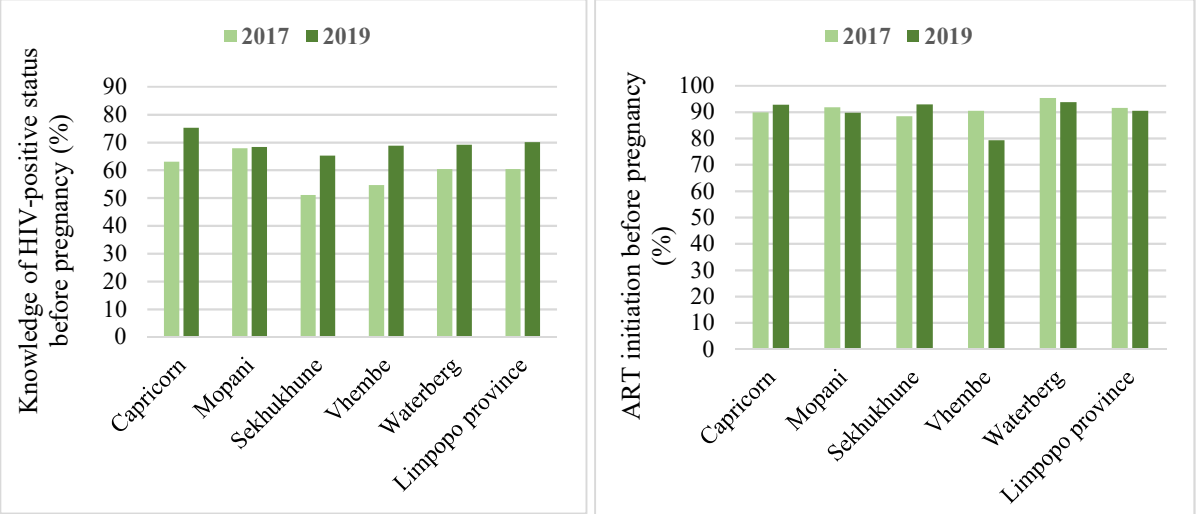


Weighted percentages. HIV+ve: HIV positive; ART – Antiretroviral therapy

Figure 53: Knowledge of HIV-positive status and ART initiation by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Limpopo

Knowledge of HIV-positive status and ART initiation before pregnancy

Knowledge of HIV status before pregnancy among pregnant women was lower than the national average (70.1% in Limpopo vs 72.7% national). However, there was substantial improvement across districts in knowledge of HIV status before pregnancy between 2017 and 2019. In 2019, at district level, the highest knowledge of HIV-positive status before pregnancy was in Capricorn at 75.2% and the lowest was in Sekhukhune district at 65.2% (Figure 54). Of those who knew their HIV-positive status before pregnancy, 90.5% were initiated on ART before pregnancy in 2019, this represented a 1% point decline in ART initiation between 2017 and 2019 (91.5% vs 90.5%). The lowest ART initiation before pregnancy was in Vhembe at 79.3% and the highest was in Waterberg at 93.7%. ART initiation before pregnancy declined between 2017 and 2019 in three districts (except Capricorn and Sekhukhune districts).

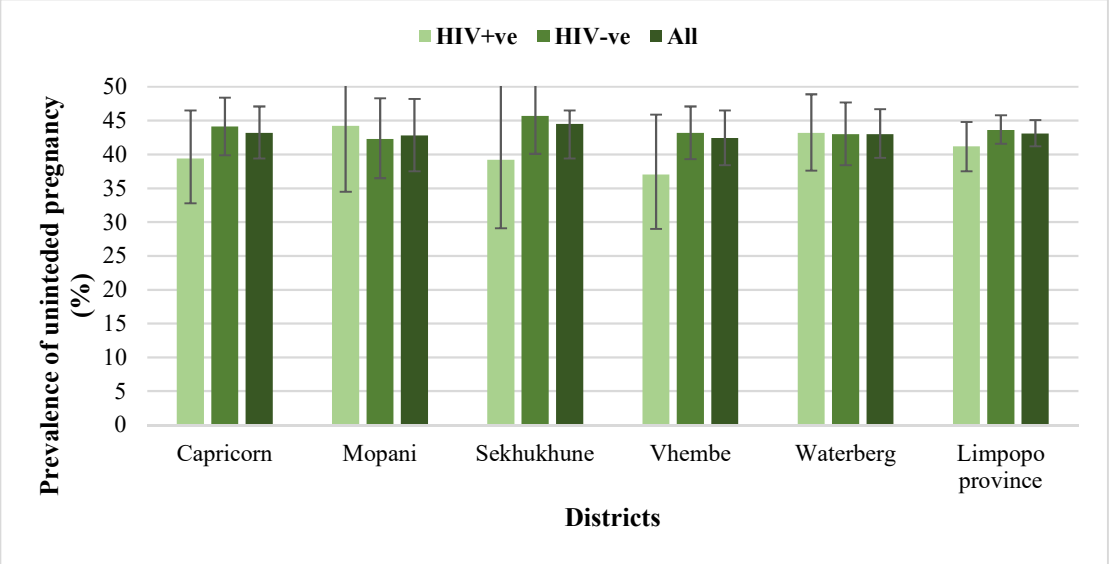


Denominator for knowledge of HIV-positive status before pregnancy was EIA positives.
Denominator for ART initiation before pregnancy was the number of HIV-positive women who were aware of their HIV-positive status before pregnancy

Figure 54: Knowledge of HIV-positive status and ART initiation before pregnancy by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Limpopo

Planning of pregnancy

Limpopo had the lowest prevalence of unintended pregnancy nationally at 43.1% (Figure 55). By district, prevalence of unintended pregnancy ranged from 42.4% in Vhembe to 44.5% in Sekhukhune districts. The prevalence of unintended pregnancy was lower than the national average in all districts. HIV-positive women had lower prevalence of unintended pregnancy compared to HIV-negative women in three districts (Capricorn, Sekhukhune and Vhembe), while in two districts, prevalence (of unintended pregnancy) was higher (Mopani) or equal (Waterberg) between HIV-positive and HIV-negative women. This difference in unintended pregnancy between HIV-negative and HIV-positive women was not statistically significant. In all districts, adolescent girls (15–19 years) had the highest level of unintended pregnancy ranging between 68% in Waterberg to 82.5% in Sekhukhune districts *(data not presented in graph)*. Unintended pregnancy among women in the age group 20–24 years was similar (ranging between 38.9% and 47.4% across districts) to the provincial average *(data not presented in graph)*. Next to adolescent girls, single women and women in a non-cohabiting relationship had higher levels of unintended pregnancy (ranging 51.2%–58.5% and 61.9%–91.7% respectively) compared to married women (<25% in four of the five districts and 38.9% in Sekhukhune district) *(data not presented in graph)*.



The confidence intervals are wide due to small sample size at district level

Figure 55: The prevalence of unintended pregnancy by district, in the 2019 Antenatal HIV Sentinel Survey, Limpopo

Early ANC attendance

Just above two-thirds of participants in Limpopo Province initiated ANC before 20 weeks of gestational age (Figure 56). By district, attendance of ANC before 20 weeks ranged between 63.2% (in Sekhukhune) to 74.6% (in Mopani). Between 4% (in Mopani and Waterberg) and 8.1% (in Sekhukhune) of participants across districts initiated ANC in their third trimester (5.3% provincially)*(data not presented in graph).* In all districts, the youngest (15–19 years) age group had the lowest attendance of ANC compared to the other age groups. In Waterberg, Capricorn and Vhembe districts, both the youngest (15–19 years) and the oldest (35–49 years) age groups had lower attendance of ANC compared to the other age groups. Women who had unintended pregnancy had lower attendance of ANC (62.5%) compared to women whose pregnancy was intended (70.9%). There was no difference in early attendance of ANC between primigravida and multigravida women.

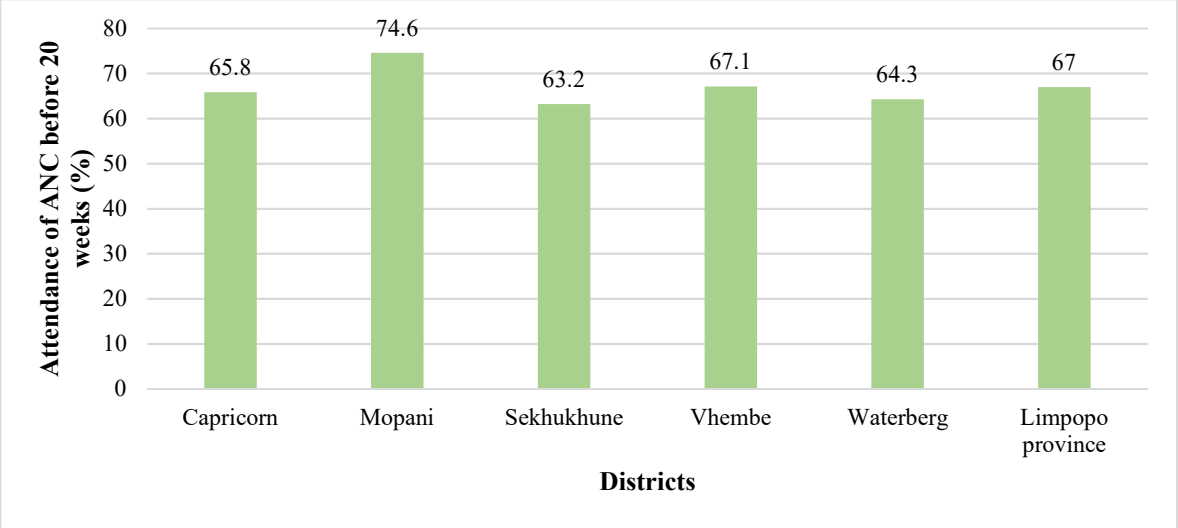


Figure 56: Attendance of antenatal care before 20 weeks of gestational age, in the 2019 Antenatal HIV Sentinel Survey, Limpopo

Maternal syphilis screening and treatment coverage

Limpopo recorded the lowest maternal syphilis screening coverage nationally at 90.8% in 2019. In the same year, by district, maternal syphilis screening coverage ranged between 88.8% in Mopani to 92% in Vhembe and Waterberg districts. At provincial level maternal syphilis screening declined from 95.5% to 90.8% between 2017 and 2019 (Figure 57). Maternal syphilis screening coverage declined in all districts between 2017 and 2019.

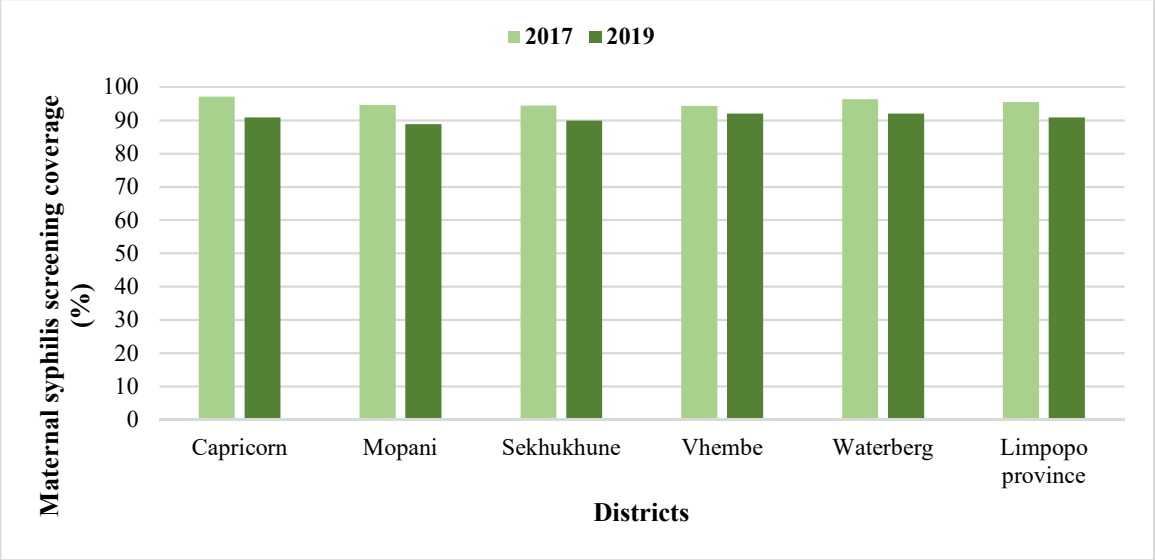


Figure 57: Maternal syphilis screening coverage by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Limpopo

Of those who had syphilis screening, at provincial level, 0.9% (95% CI: 0.7%–1.3%) were positive for syphilis, 68% were negative, 29.4% were awaiting result and 1.7% results were not in file (Figure 58). Limpopo had the highest pending results nationally. Pending results by district ranged from 24.9% in Mopani to 34.7% in Sekhukhune districts (21.9% and 18.8% of the pending results in Mopani and Sekhukhune districts respectively were for follow-up visit attendees).

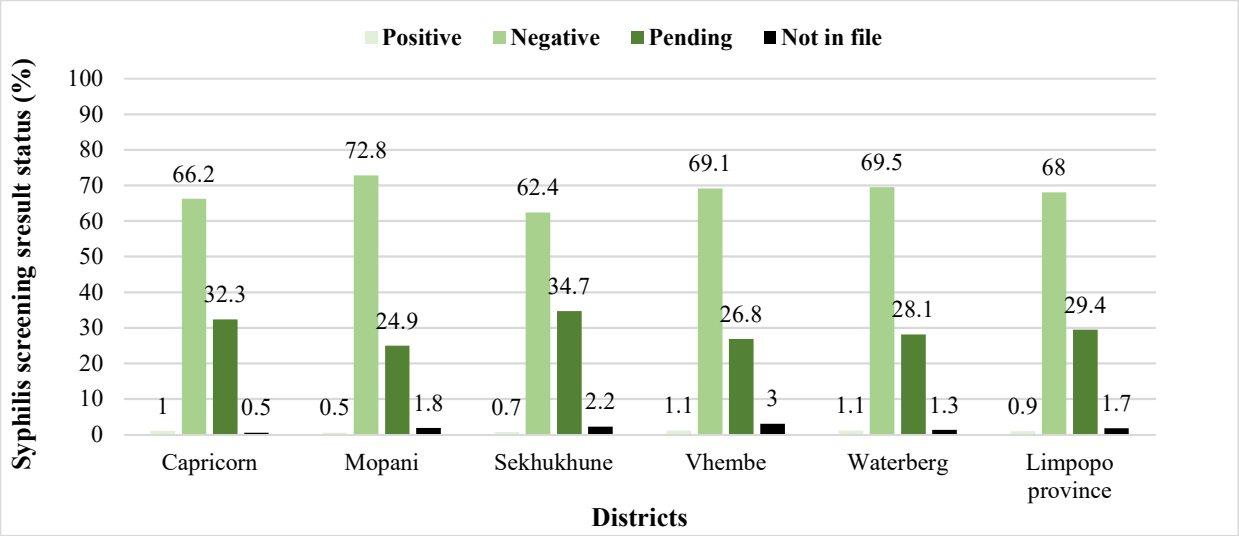
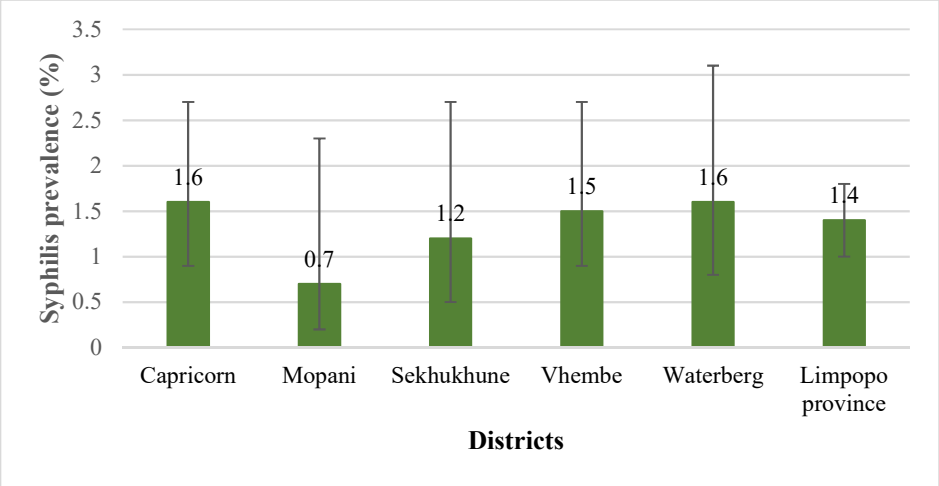


Figure 58: Maternal syphilis screening test result status by district, in the 2019 Antenatal HIV Sentinel Survey, Limpopo

After excluding the pending results and the results not in file, the prevalence of syphilis (per medical record review data) in Limpopo among those who had syphilis test result was 1.4% (95% CI:1.0%–1.8%), and this was the lowest provincial syphilis prevalence nationally. By district, the prevalence of syphilis ranged from 0.7% in Mopani to 1.6% in Waterberg and Capricorn districts (Figure 59). The district level prevalence estimates need to be interpreted with caution as the CIs around these estimates are wide due to small sample size.



The confidence intervals are wide due to small sample size at district level

Figure 59: Syphilis prevalence among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, Limpopo

Of 24 participants who were syphilis positive in Limpopo, 87.3% (21) received at least one dose of treatment for syphilis (Figure 60). All (17, 100%) those who were treated for syphilis (and have data on type of treatment received) were treated with at least one dose of BCG. Type of syphilis treatment data was missing for 19% (4) of participants – these missing data were excluded from the above analysis. If we assume that all missing responses mean that the subjects did not receive BCG treatment, the coverage of BCG drops from 100% to 82.2%. The syphilis treatment estimates need to be interpreted with caution as the sample size is small.

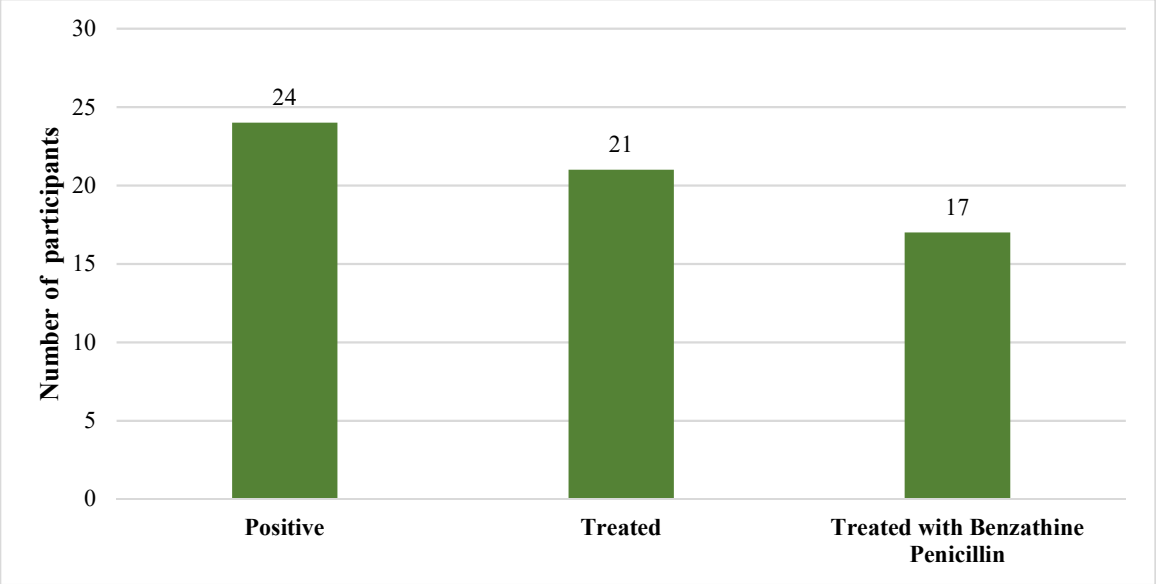
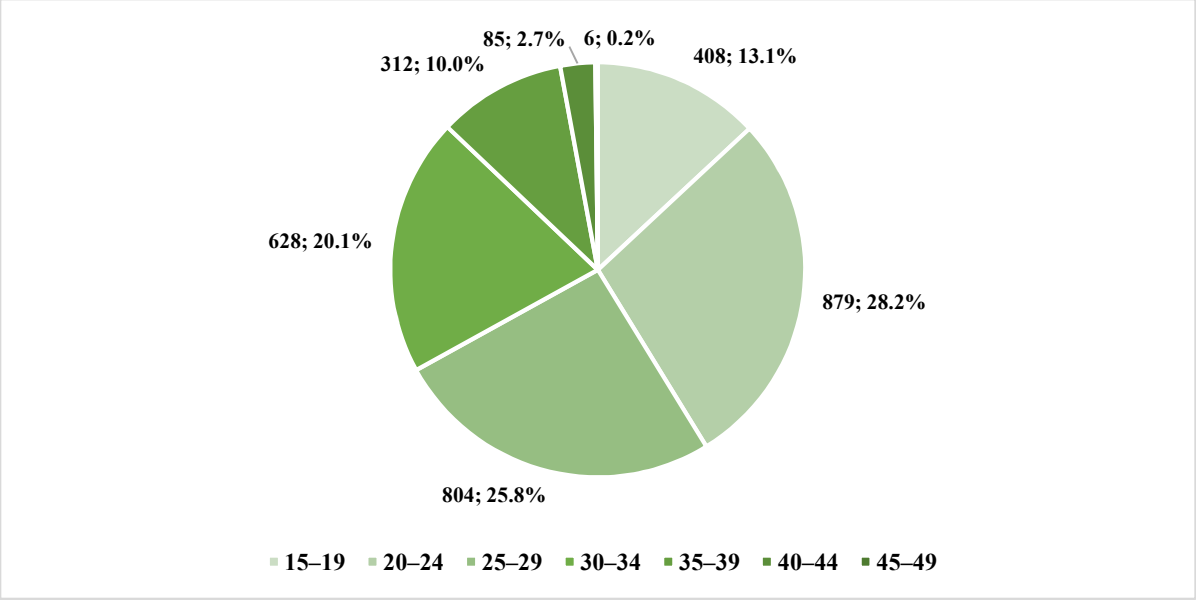


Figure 60: Syphilis treatment cascade among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, Limpopo

Mpumalanga

Sample size realization and demographic characteristics

In Mpumalanga, 108% (3 186) of the planned sample size was achieved. The lowest sample size realization was in Nkangala district (89%) and the highest was in Gert Sibande district (126%). The distribution of participants by age had similar distribution as the national average with adolescent girls and young women accounting for 41.3% of the sample, while women in the 35 years or older age group accounted for 12.9% of the sample (Figure 61).

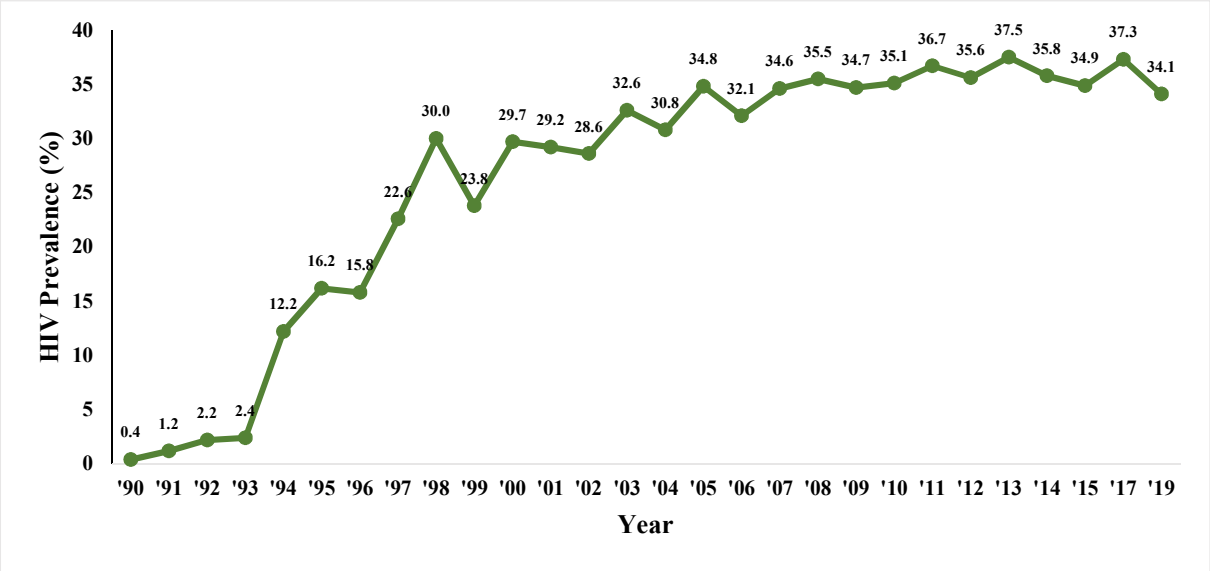


Age groups are in years

Figure 61: Distribution of survey participants by five-year age group – Mpumalanga, Antenatal HIV Sentinel Survey, 2019

HIV prevalence

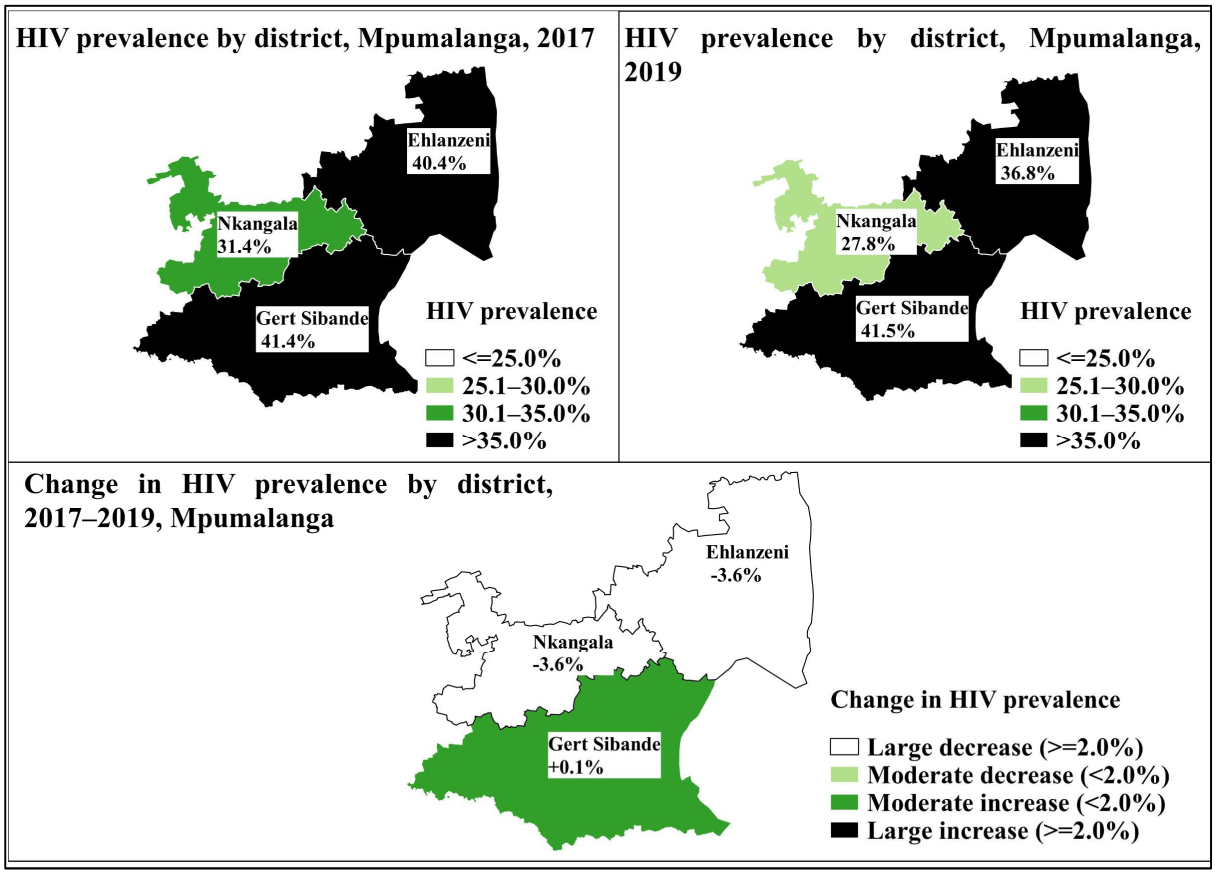
HIV prevalence in Mpumalanga increased rapidly between 1990 and 1998, then the rate of increase slowed down. Between 2005 and 2019, prevalence fluctuated around 34%–35%, except the few deviations in 2011 (to 36.7%), 2013 (36.7%) and 2017 (37.3%). In 2019, HIV prevalence was 34.1% (Figure 62).



The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees

Figure 62: The HIV epidemic curve among antenatal women, Mpumalanga, 1990–2019, Antenatal HIV Sentinel Survey

At district level, in Nkangala and Ehlanzeni districts, HIV prevalence declined by 3.6% points between 2017 and 2019, while prevalence increased by 0.1% point in Gert Sibande – none of these changes were statistically significant (Figure 63).



The prevalence reported is for both first and follow-up visit attendees

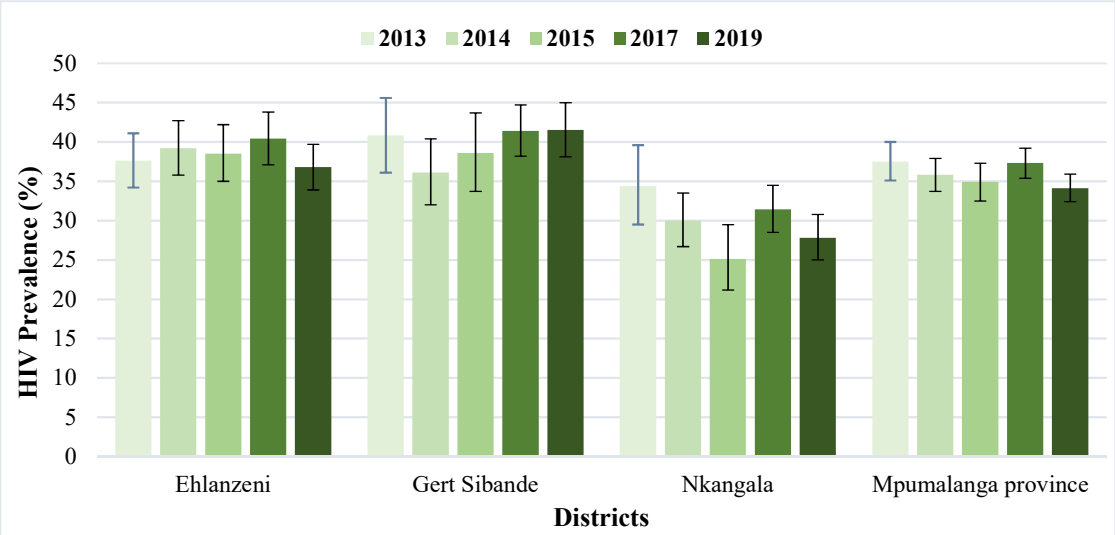
Figure 63: Change in district HIV prevalence estimates – 2017–2019, Antenatal HIV Sentinel Survey, Mpumalanga

Between 2013 and 2017, in the Ehlanzeni district, HIV prevalence had an overall increasing trend except the decline observed in 2015. In the same district, in 2019 prevalence declined to its 5 years lowest level at 36.8%. In Gert Sibande district HIV prevalence consistently increased between 2014 and 2019. In Nkangala district, although prevalence had declined between 2013 and 2015, there appear to be no clear trend in recent years (i.e. in 2017 and 2019) (Table 6 and Figure 64).

Table 6: HIV prevalence by district, in the Mpumalanga province, Antenatal HIV Sentinel Survey, 2013–2019

District	2013		2014		2015		2017		2019	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Ehlanzeni	37.6	34.2–41.1	39.2	35.8–42.7	38.5	35.0 – 42.2	40.4	37.1–43.8	36.8	33.9–39.7
Gert Sibande	40.8	36.1–45.6	36.1	32.0–40.4	38.6	33.7 – 43.7	41.4	38.2–44.7	41.5	38.1–45.0
Nkangala	34.4	29.5–39.6	30.0	26.7–33.5	25.1	21.2 – 29.5	31.4	28.5–34.5	27.8	25.0–30.8
Mpumalanga province	**37.5**	**35.1–40.0**	**35.8**	**33.7–37.9**	**34.9**	**32.5 – 37.3**	**37.3**	**35.4–39.2**	**34.1**	**32.4–35.9**

The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees

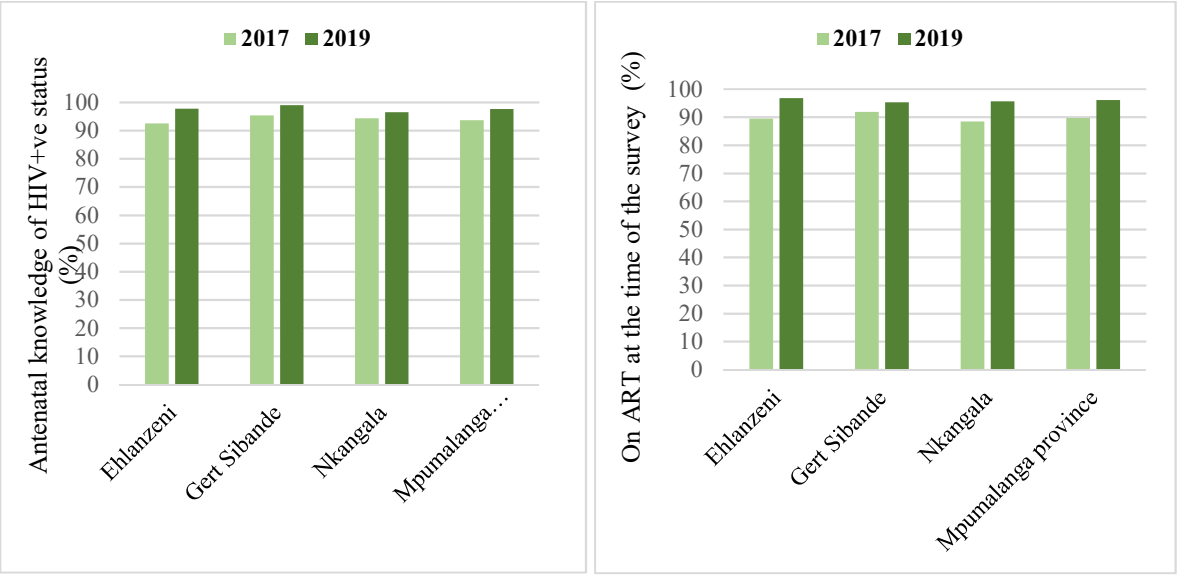


The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees. The confidence intervals are wide due to small sample size at district level

Figure 64: HIV prevalence trend by district, 2013–2019, Antenatal HIV Sentinel Survey, Mpumalanga

PMTCT cascade

In Mpumalanga, in 2019, knowledge of HIV status was 97.6% among HIV-positive pregnant women attending ANC. Of those who knew their HIV-positive status, 96.1% were on ART at the time of the survey (Figure 65). The lowest knowledge of HIV status was in Nkangala at 96.5% and the highest was in Gert Sibande at 99%. All districts had >95% ART initiation. Both knowledge of HIV status and ART initiation improved in Mpumalanga between 2017 and 2019.

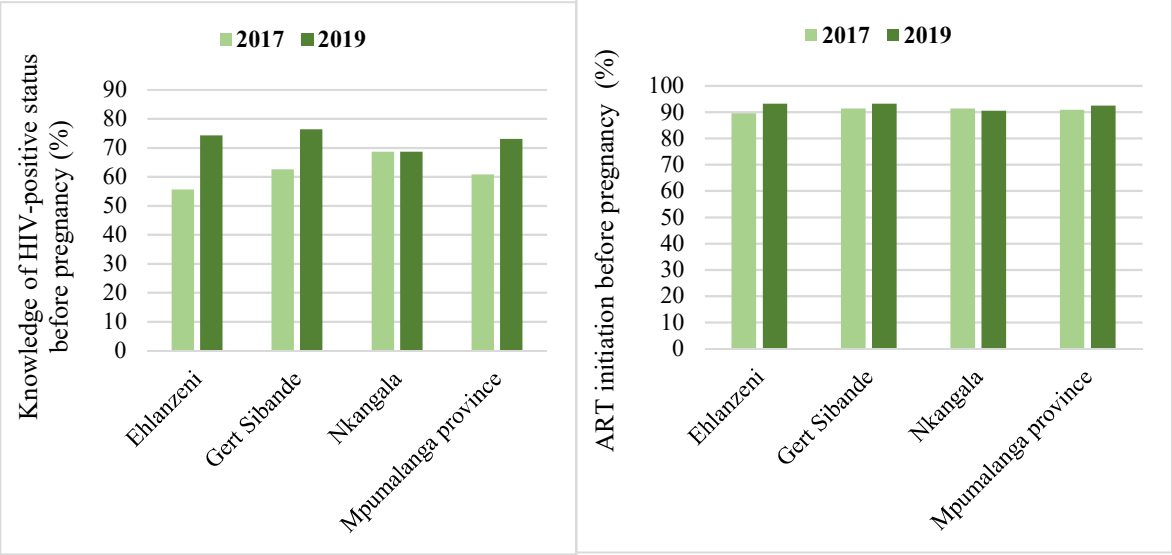


Weighted percentages; HIV+ve: HIV positive; ART – Antiretroviral therapy

Figure 65: Knowledge of HIV-positive status and ART initiation by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Mpumalanga

Knowledge of HIV-positive status and ART initiation before pregnancy

Knowledge of HIV status before pregnancy in the Mpumalanga province was slightly above the national average (73% vs 72.7% national average), and 92.4% of those who knew their HIV status before pregnancy were initiated on ART before pregnancy (Figure 66). By district, the lowest and highest knowledge of HIV-positive status before pregnancy were in Nkangala (68.6%) and Gert Sibande (76.3%) districts respectively. The coverage of ART initiation before pregnancy among those who knew their HIV status was 90.5% in the Nkangala district and 93.2% in Ehlanzeni and Gert Sibande districts. In two of the districts (except in Nkangala), both knowledge of HIV status and ART initiation before pregnancy increased between 2017 and 2019.

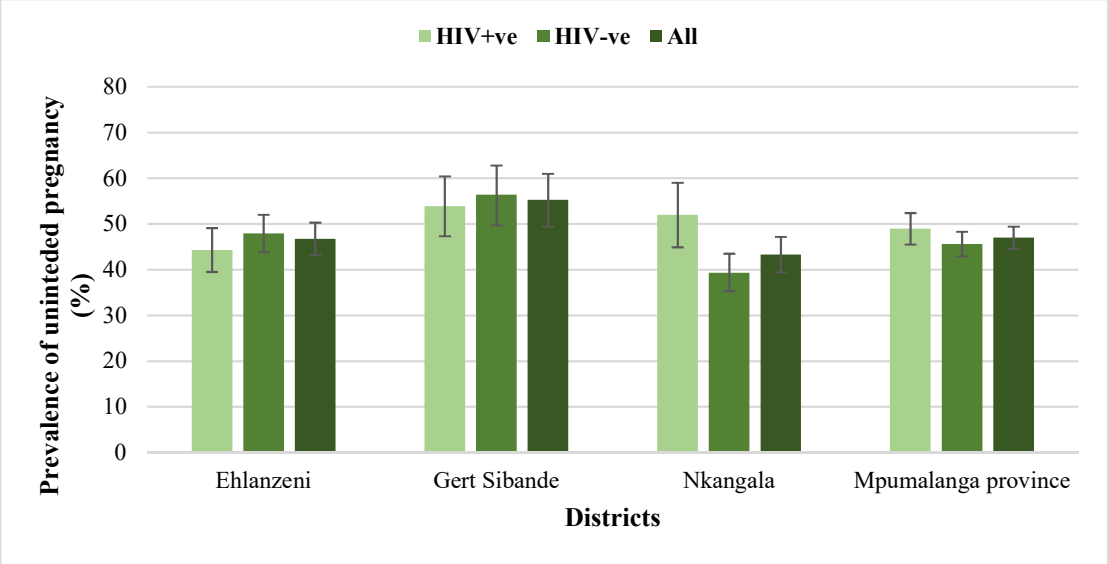


Denominator for knowledge of HIV-positive status before pregnancy was EIA positives. Denominator for ART initiation before pregnancy was the number of HIV-positive women who were aware of their HIV-positive status before pregnancy

Figure 66: Knowledge of HIV-positive status and ART initiation before pregnancy by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Mpumalanga

Planning of pregnancy

In Mpumalanga the prevalence of unintended pregnancy was below the national average at 47% (Figure 67). By district, the prevalence of unintended pregnancy ranged from 43.3% in Nkangala to 55.3% in Gert Sibande districts. The prevalence of unintended pregnancy was significantly higher among HIV-positive women compared to HIV-negative women in Nkangala district (52% vs 39.3% respectively). In the other two districts, HIV-positive women had a slightly lower prevalence of unintended pregnancy than HIV-negative women. In all districts, adolescent girls (15–19 years) had the highest level of unintended pregnancy ranging between 64.1% in Nkangala to 76.7% in Ehlanzeni districts. Unintended pregnancy was not higher than the provincial average among young women in the age 20–24 years, except in Ehlanzeni that had a slightly higher unintended pregnancy (at 49.2%) than the provincial average. Single women and women in a non-cohabiting relationship had higher levels of unintended pregnancy (compared to married women) ranging between 62.5% and 94.7%, and 51.5% and 61.4% respectively across districts *(data not presented in graph)*.



The confidence intervals are wide due to small sample size at district level

Figure 67: The prevalence of unintended pregnancy by district, in the 2019 Antenatal HIV Sentinel Survey, Mpumalanga

Early ANC attendance

In Mpumalanga province, ANC attendance before 20 weeks of gestational age was a little above the national average (71.5% vs 70.1% national average) (Figure 68). By district, attendance of ANC before 20 weeks ranged between 62.4% (in Gert Sibande) to 78.2% (in Ehlanzeni). Between 3.6% (in Ehlanzeni) and 7.8% (in Gert Sibande) of participants across districts (5.2% provincially) initiated ANC in their third trimester *(data not presented in graph).* In two of the districts (except Ehlanzeni district), the youngest (15–19 years) age group had the lowest attendance of ANC before 20 weeks at 51.1% and 57.3% in Gert Sibande and Nkangala districts respectively. In Ehlanzeni district, the oldest age (35–49 years) group had the lowest attendance of ANC before 20 weeks (at 71.9% compared to the district average of 78.2%). In addition, women who had unintended pregnancy had lower attendance of ANC before 20 weeks (67%) compared to women whose pregnancy was intended (75.9%). There was no difference in early attendance of ANC between primigravida and multigravida women.

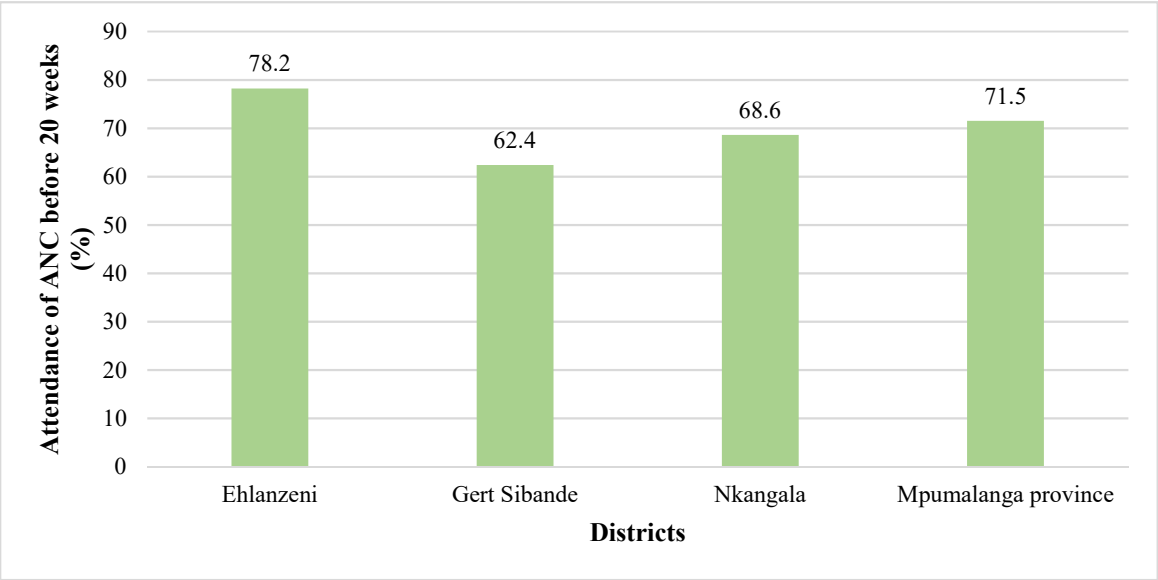


Figure 68: Attendance of antenatal care before 20 weeks of gestational age, in the 2019 Antenatal HIV Sentinel Survey, Mpumalanga

Maternal syphilis screening and treatment coverage

Maternal syphilis screening coverage declined from 96.6% to 93.2% between 2017 and 2019 in Mpumalanga (Figure 69). By districts maternal syphilis screening coverage ranged between 92.2% (in Gert Sibande) to 94.7% (Nkangala). In all districts coverage declined slightly between 2017 and 2019.

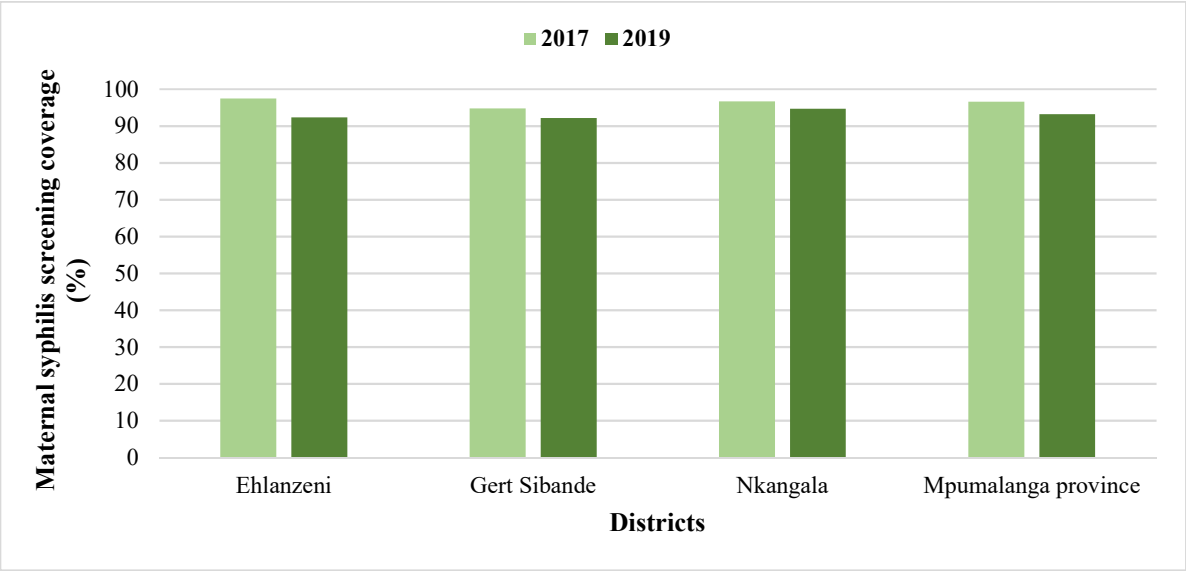


Figure 69: Maternal syphilis screening coverage by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Mpumalanga

Of those who had syphilis screening, at province level, 1.5% (95% CI: 0.9%–2.4%) were positive for syphilis, 73.6% were negative, 22.4% were awaiting results and 2.5% results were not in their file (Figure 70). Pending results ranged from 18.5% in Ehlanzeni to 25.7%

in Nkangala districts (between 13.1%–17.3% of pending results across districts were for follow-up visit attendees).

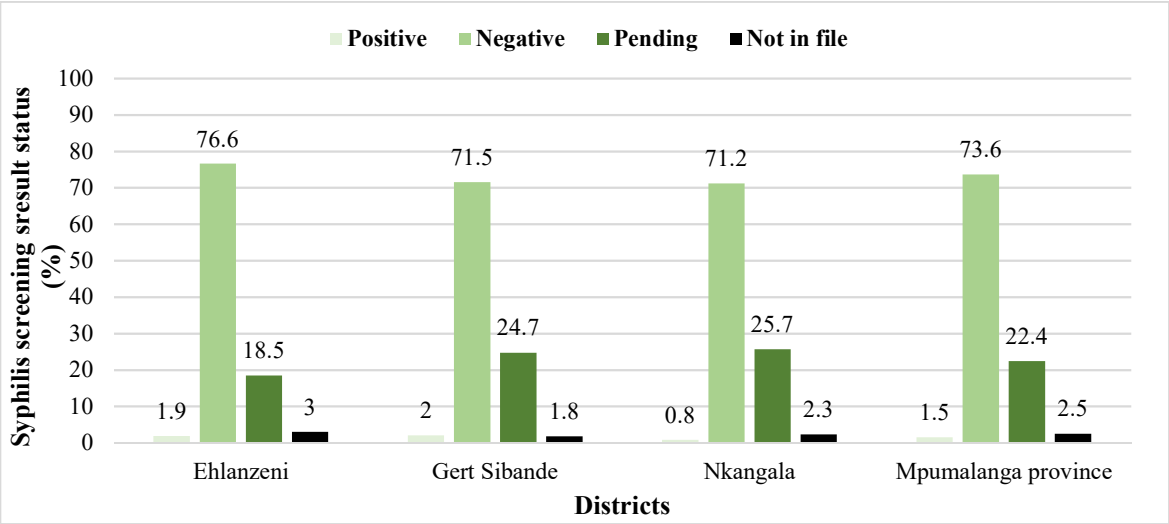
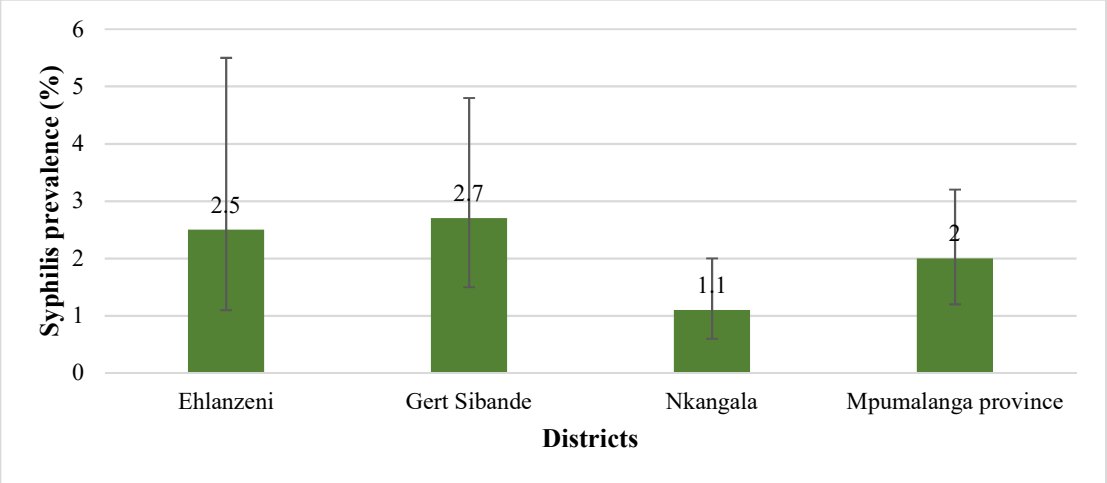


Figure 70: Maternal syphilis screening test result status by district, in the 2019 Antenatal HIV Sentinel Survey, Mpumalanga

After excluding the pending results and the results not in file, the prevalence of syphilis (per medical record review data) in Mpumalanga among those who had syphilis test result was 2.0% (95% CI: 1.2%–3.2%), and this was the third lowest prevalence nationally (next to North West and Limpopo). Prevalence increased by 0.3% points from its level in 2015 (1.7%). Prevalence varied at district level with the lowest prevalence reported in Nkangala at 1.1% and the highest in Gert Sibande at 2.7% (Figure 71). The district level prevalence estimates need to be interpreted with caution as the CIs around these estimates are wide due to small sample size.



The confidence intervals are wide due to small sample size at district level

Figure 71: Syphilis prevalence among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, Mpumalanga

Of 40 participants who were syphilis positive and whose syphilis treatment status was reported in Mpumalanga, only 61.5% (24) received at least one dose of treatment for syphilis. Of those treated for syphilis and had type of treatment data reported (21), 73.5% (15) were treated with at least one dose of BCG (Figure 72). Syphilis treatment data was missing for 7% (3) of syphilis positive participants in the province, and type of treatment data was missing for 12.5% (3) of participants treated for syphilis; these missing data were excluded from the above analysis. If we assume that all missing responses mean that the subjects did not receive treatment for syphilis, the coverage of syphilis treatment and treatment with BCG drops from 61.5% to 57.1% and from 73.5% to 64.1% respectively. Mpumalanga had the lowest syphilis treatment coverage. The syphilis treatment estimates need to be interpreted with caution as the sample size is small.

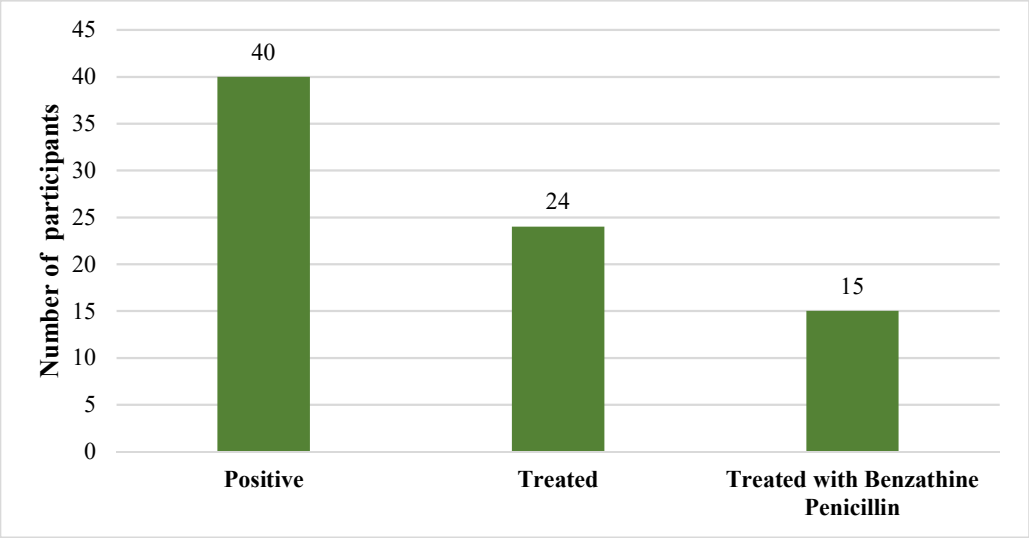
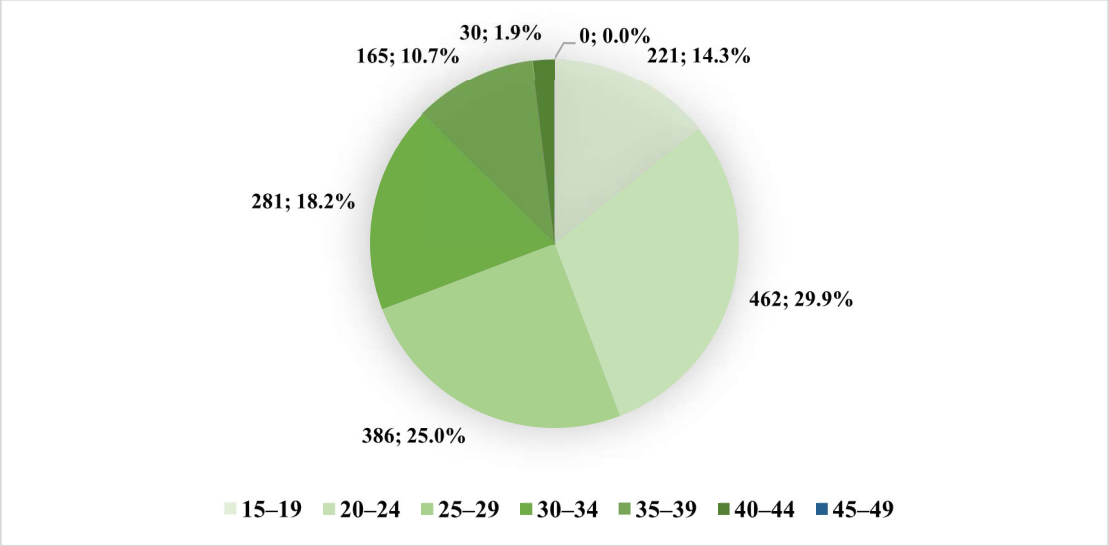


Figure 72: Syphilis treatment cascade among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, Mpumalanga

Northern Cape

Sample size realization and demographic characteristics

In Northern Cape, 102% (1 685) of the planned sample size was achieved. The districts with the lowest sample size realization in the province were Pixley Ka Seme and J.T. Gaetsewe districts (at 98% for both) and the district with the highest sample size realization was Namakwa district (110%). Close to half (44.2%) of participants were 15–24 years old and 12.6% were ≥35 years old (Figure 73).

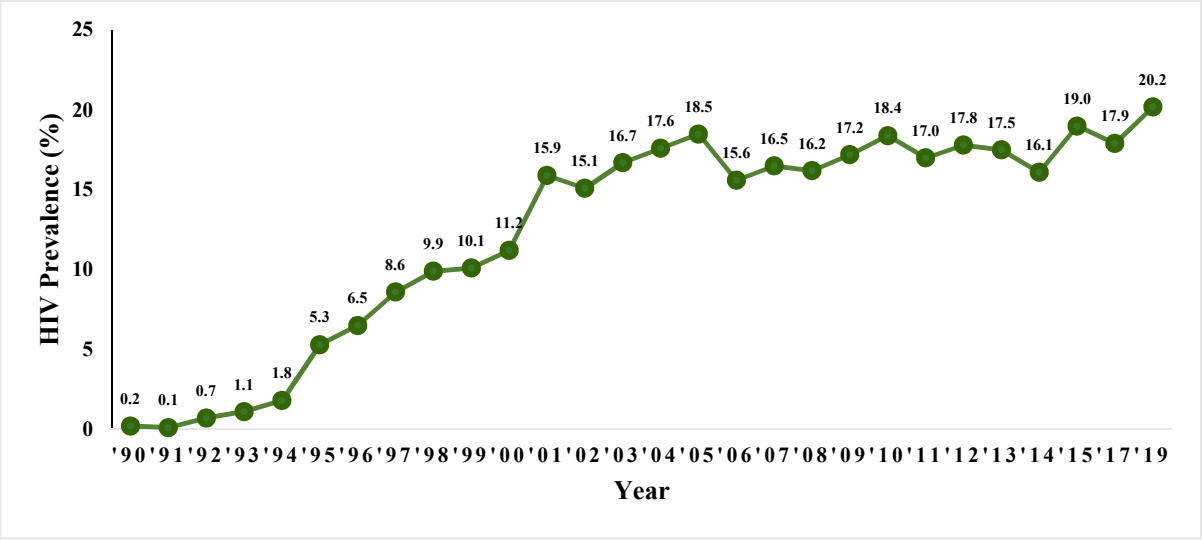


Age groups are in years

Figure 73: Distribution of survey participants by five-year age group – Northern Cape, Antenatal HIV Sentinel Survey, 2019

HIV prevalence

In the Northern Cape province, the HIV prevalence rate among pregnant women attending ANC clinics appeared to be increasing at a relatively high rate till 2005 in general; thereafter the prevalence dropped to a value of 15.6% in 2006 and started increasing consistently till 2010 as shown in Figure 74. HIV prevalence fluctuated within the range of 16%–20% between 2011 and 2019. HIV prevalence increased from 17.9% to 20.2% between 2017 and 2019.

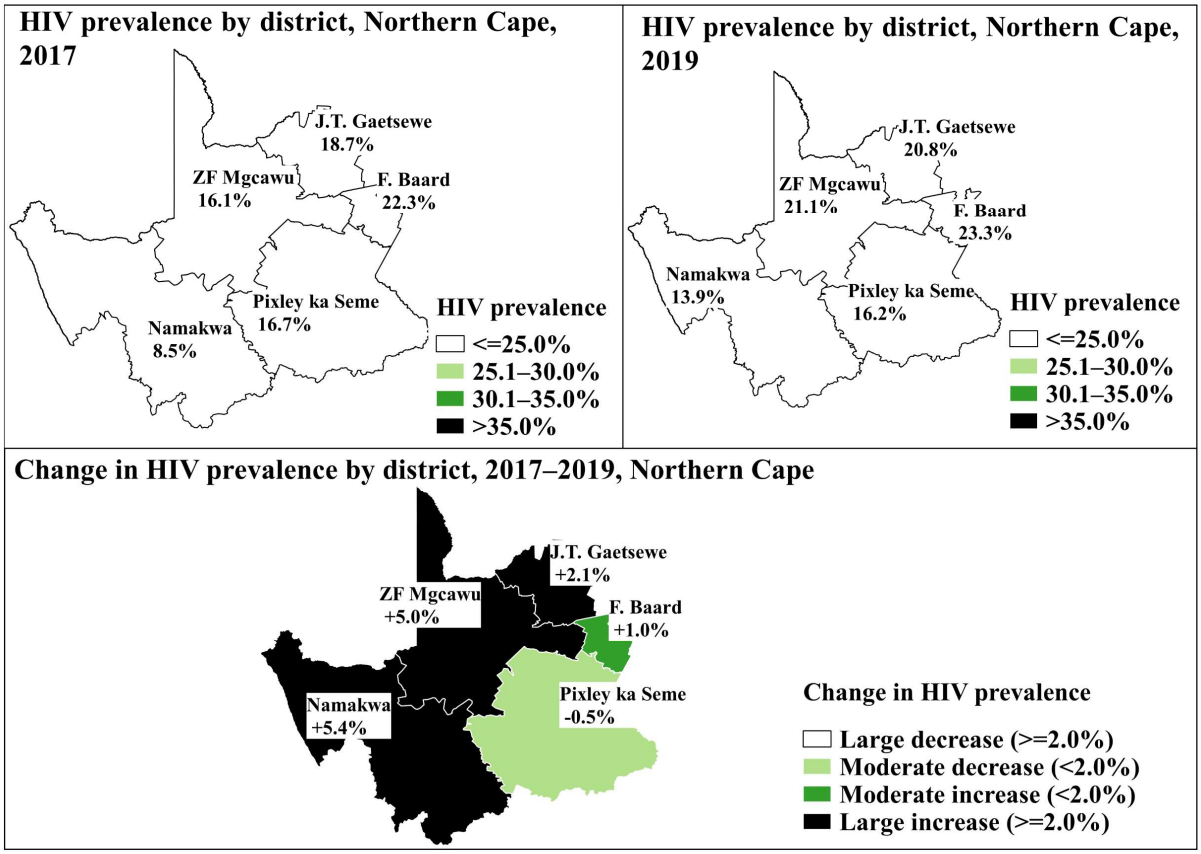


The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees

Figure 74: The HIV epidemic curve among antenatal women, Northern Cape, 1990–2019, Antenatal HIV Sentinel Survey

Figure 75 shows a map of HIV prevalence among antenatal women and a change in HIV prevalence by district in the Northern Cape province between 2017 and 2019. Between 2017 and 2019, HIV prevalence increased by 5.4%, 5.0%, 2.1%, and 1.0% in Namakwa, ZF Mgcawu

J. T. Gaetsewe, and Frances Baard districts respectively. HIV prevalence decreased by 0.5% in Pixley Ka Seme district in the same period.



The prevalence reported is for both first and follow-up visit attendees

Figure 75: Change in district HIV prevalence estimates – 2017 to 2019, Antenatal HIV Sentinel Survey, Northern Cape

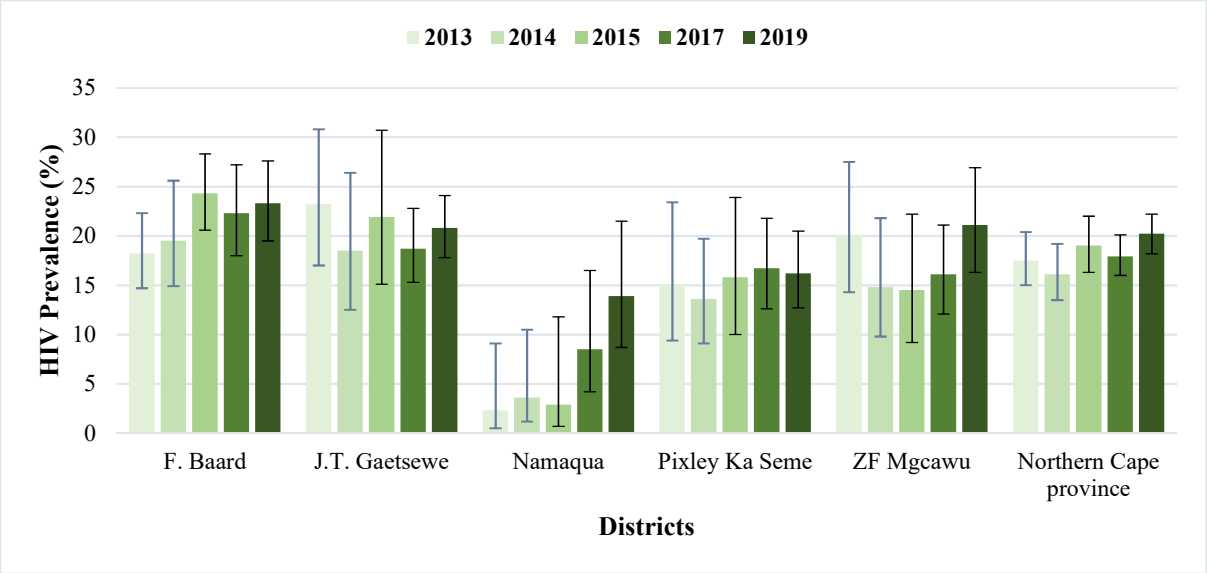
The level of HIV prevalence among antenatal women varied by district between 2013 and 2019; the highest level of prevalence was observed in Frances Baard district and the lowest level was observed in Namakwa district as shown in Table 7 and Figure 76. On average HIV prevalence appears to be increasing over the last five years in Namakwa. In Frances Baard, overall, the prevalence has increased from its level of 18.2% in 2013 to 24.3% in 2015, however in the last 2 surveys (2017 and 2019) prevalence showed fluctuation. In ZF Mgcawu prevalence increased between 2015 and 2019. In J.T. Gaetsewe and Pixley Ka Seme, prevalence appeared to be fluctuating overtime.

Table 7: HIV prevalence by district in the Northern Cape province, Antenatal HIV Sentinel Survey, 2013 to 2019

District	2013		2014		2015		2017		2019	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
F. Baard	18.2	14.7–22.3	19.5	14.9 –25.6	24.3	20.6–28.3	22.3	18.0–27.2	23.3	19.5–27.6
J.T. Gaetsewe	23.2	17.0 –30.8	18.5	12.5 –26.4	21.9	15.1–30.7	18.7	15.3–22.8	20.8	17.8–24.1
Namakwa	2.3	0.5–9.1	3.6	1.2 –10.5	2.9	0.7–11.8	8.5	4.2–16.5		

									13.9	8.7–21.5
Pixley Ka Seme	15.1	9.4–23.4	13.6	9.1–19.7	15.8	10.0 – 23.9	16.7	12.6– 21.8	16.2	12.7– 20.5
ZF Mgcawu	20.1	14.3–27.5	14.8	9.8–21.8	14.5	9.2 – 22.2	16.1	12.1– 21.1	21.1	16.3– 26.9
Northern Cape province	**17.5**	**15.0–20.4**	**16.1**	**13.5–19.2**	**19**	**16.3– 22.0**	**17.9**	**16.0– 20.1**	**20.2**	**18.2– 22.2**

The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees

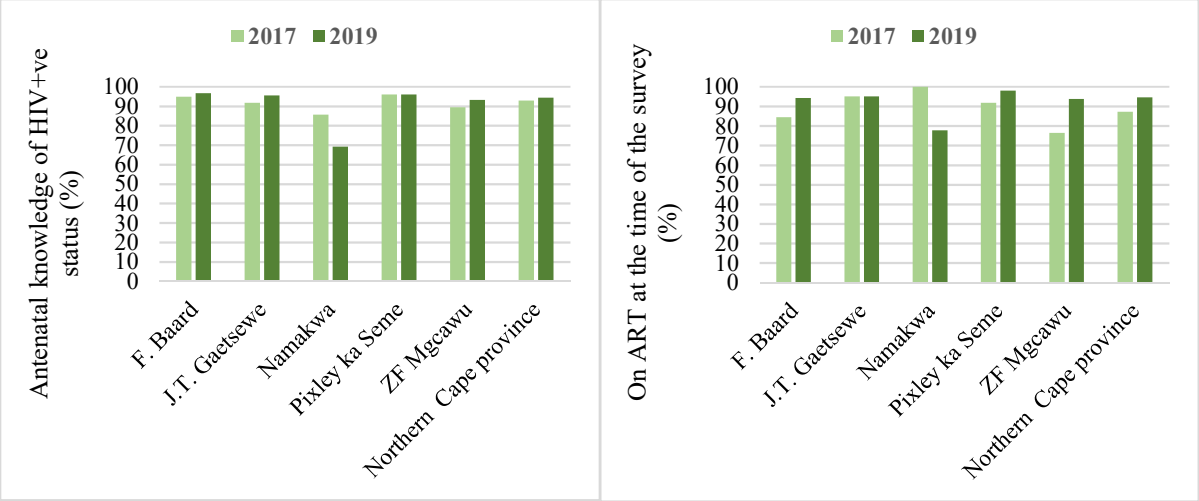


The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees. The confidence intervals are wide due to small sample size at district level

Figure 76: HIV prevalence trend by district, 2013–2019, Northern Cape, Antenatal HIV Sentinel Survey

PMTCT cascade

In 2019, knowledge of HIV status among HIV-positive women attending ANC in the Northern Cape Province was 94.4%. Among those who knew their HIV-positive status, 94.6% were on ART (Figure 77). By district, knowledge of HIV status ranged between 69.2% in Namakwa to 96.7% in Frances Baard in 2019. However, there were only 13 HIV-positive participants in Namakwa district. ART initiation ranged from 77.8% in Namakwa to 98% in Pixley Ka Seme. Knowledge of HIV status and ART initiation increased between 2017 and 2019 in four of the five districts (except in Namakwa).

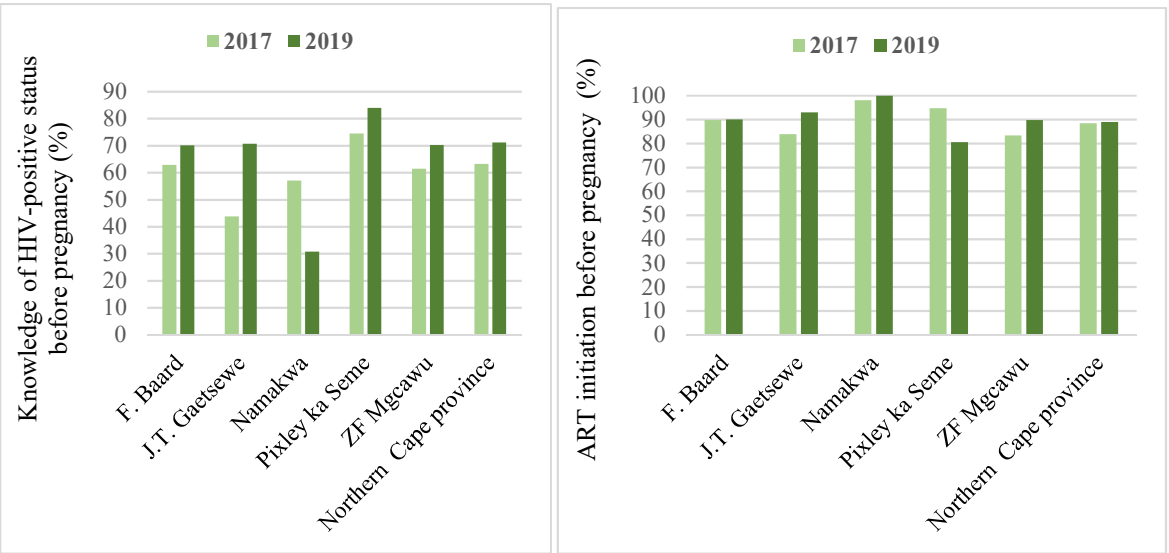


Weighted percentages. HIV+ve: HIV positive; ART – Antiretroviral therapy

Figure 77: Knowledge of HIV-positive status and ART initiation by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Northern Cape

Knowledge of HIV-positive status and ART initiation before pregnancy

In the Northern Cape Province, in 2019, knowledge of HIV status before pregnancy was lower than the national average (71.1% in Northern Cape vs 72.7% nationally); 89% of those who knew their HIV-positive status before pregnancy initiated ART before pregnancy (Figure 78). In the same year, knowledge of HIV status and ART initiation before pregnancy varied by district. Knowledge of HIV status before pregnancy was lower than the national average in all except one district (except Pixley Ka Seme district) and ART initiation before pregnancy was lower than the national average (93.3%) in four of the five districts (except Namakwa). The lowest and highest knowledge of HIV status before pregnancy was reported in Namakwa (30.8%) and Pixley Ka Seme (84%) districts respectively. In three districts (except Pixley Ka Seme and Namakwa districts) both knowledge of HIV status and ART initiation before pregnancy increased between 2017 and 2019.

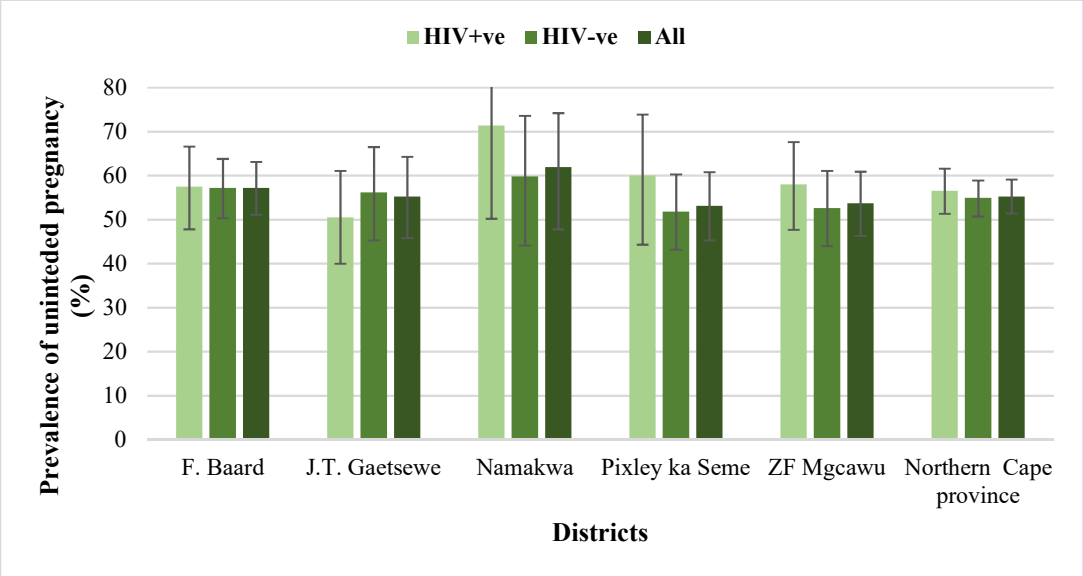


Denominator for knowledge of HIV-positive status before pregnancy was EIA positives. Denominator for ART initiation before pregnancy was the number of HIV-positive women who were aware of their HIV-positive status before pregnancy

Figure 78: Knowledge of HIV-positive status and ART initiation before pregnancy by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Northern Cape

Planning of pregnancy

In Northern Cape, the prevalence of unintended pregnancy was above the national average (55.2% vs 51.6%) (Figure 79). By district, prevalence of unintended pregnancy ranged from 53.1% in Pixley Ka Seme to 61.9% in Namakwa districts. The prevalence of unintended pregnancy was higher among HIV-positive women compared to HIV-negative women in four of the five districts (except in J.T. Gaetsewe) but the difference was not statistically significant. In the Namakwa district there was >10% difference in the prevalence of unintended pregnancy between HIV-positive (71.4%, 95% CI: 50.2%–86.1%) and HIV-negative women (59.8%, 95% CI: 44.1%–73.6%) but this estimate could have been affected by small sample size as there were only 14 HIV-positive women enrolled in the survey from Namakwa district. In all districts, adolescent girls (15–19 years) had the highest level of unintended pregnancy ranging between 73.1% in J.T. Gaetsewe to 93.8% in Namakwa districts. Unintended pregnancy was higher among women in the age group 20–24 years (compared to 25–49 years old women) in Pixley Ka Seme and ZF Mgcawu districts (65.2% and 60.5% respectively). Single women and women in a non-cohabiting relationship had higher levels of unintended pregnancy (ranging between 72.2% and 100%, and 62.1% and 67.7% respectively across districts) compared to married women *(data not presented in graph)*.



The confidence intervals are wide due to small sample size at district level

Figure **79***:* The prevalence of unintended pregnancy by district, in the 2019 Antenatal HIV Sentinel Survey, Northern Cape

Early ANC attendance

In the Northern Cape province, ANC attendance before 20 weeks of gestational age was a little below the national average (69.7% vs 70.1% national average) (Figure 80). By district, attendance of ANC before 20 weeks ranged between 62.7% (in J.T. Gaetsewe) to 82.7% (in Namakwa). Between 4.0% (in Namakwa) and 8.3% (in ZF Mgcawu) of participants across districts (6.1% provincially) initiated ANC in their third trimester *(data not presented in*

graph). In one district (ZF Mgcawu), women between the ages of 30–34 years and 35–49 years had the lowest attendance of ANC (at 51.5% and 50% respectively) compared to the other age groups. In Pixley Ka Seme, the youngest (15–19 years) age group had the lowest attendance of ANC at 61%. In the other three districts early attendance of ANC was not substantially different by age group. Women who had unintended pregnancy had lower attendance of ANC before 20 weeks (63.9%) compared to women whose pregnancy was intended (78.6%). Multigravida women had lower (68.3%) attendance of ANC before 20 weeks compared to primigravida women (72.7%).

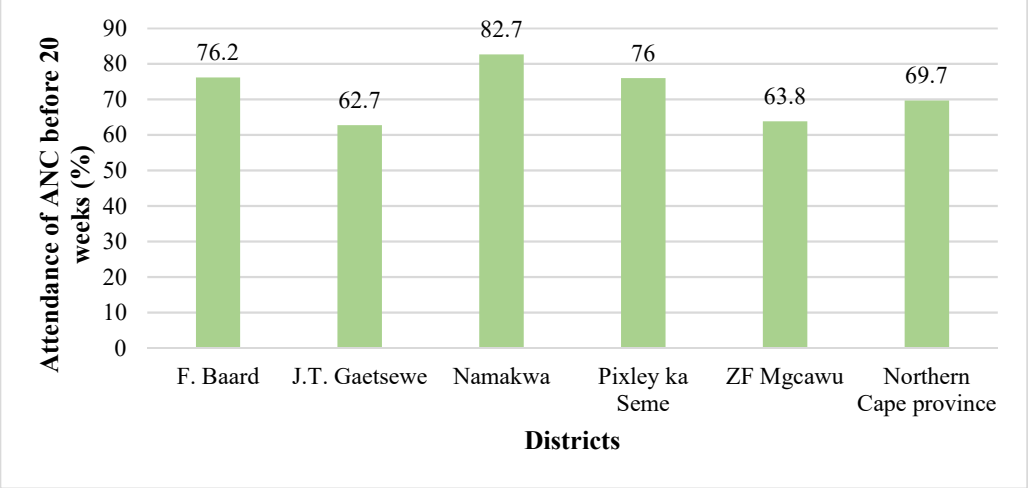


Figure 80: Attendance of antenatal care before 20 weeks of gestational age, in the 2019 Antenatal HIV Sentinel Survey, Northern Cape

Maternal syphilis screening and treatment coverage

Maternal syphilis screening coverage was 97.8% in Northern Cape, representing a 1.1% points increase in syphilis screening coverage from the level in 2017 (96.7%) (Figure 81). All districts except Frances Baard had greater than 99% maternal syphilis screening coverage in 2019. In Frances Baard maternal syphilis screening coverage declined from 98.7% to 92.2% between 2017 and 2019.

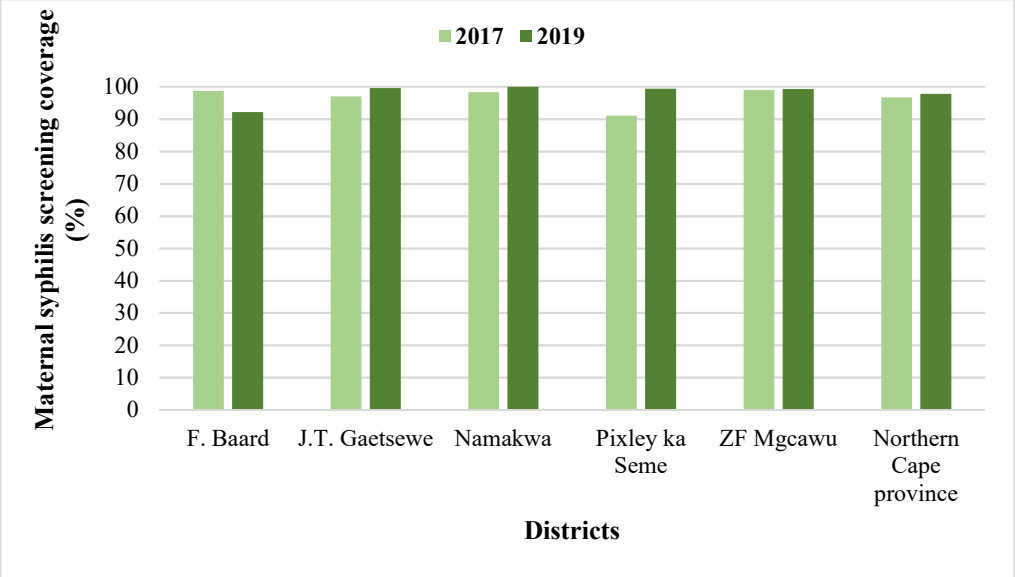


Figure 81: Maternal syphilis screening coverage by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Northern Cape

Of those who had syphilis screening, at province level, 3% (95% CI: 2.4%–4.0%) were positive for syphilis, 87.1% were negative, 9.3% were awaiting result and 0.6% results were not in their file (Figure 82). Pending results ranged from 1.3% in Pixley Ka Seme to 18.8% in J.T. Gaetsewe (35.9% of the pending results in J.T. Gaetsewe were for follow-up visit attendees).

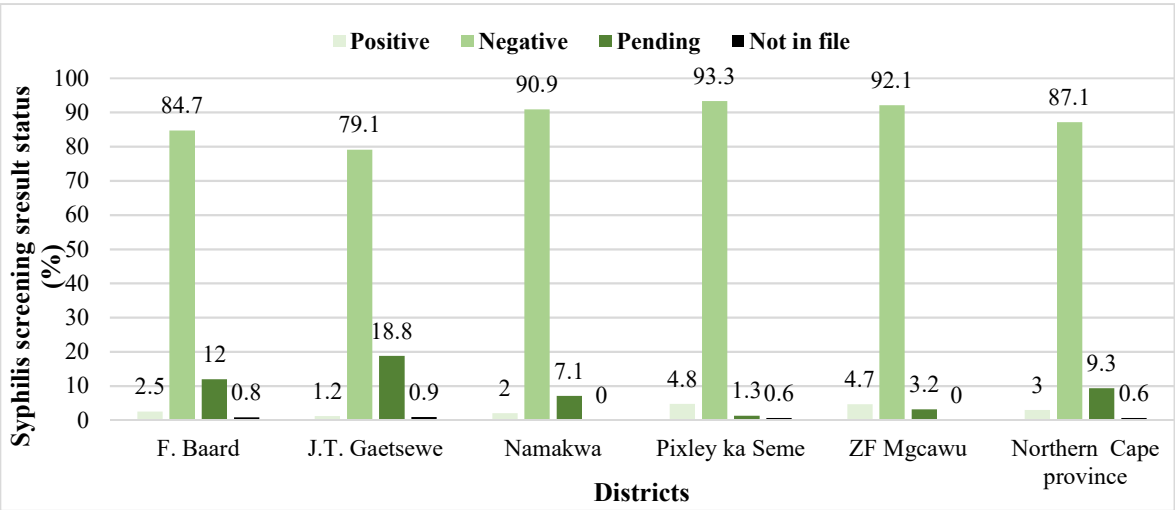
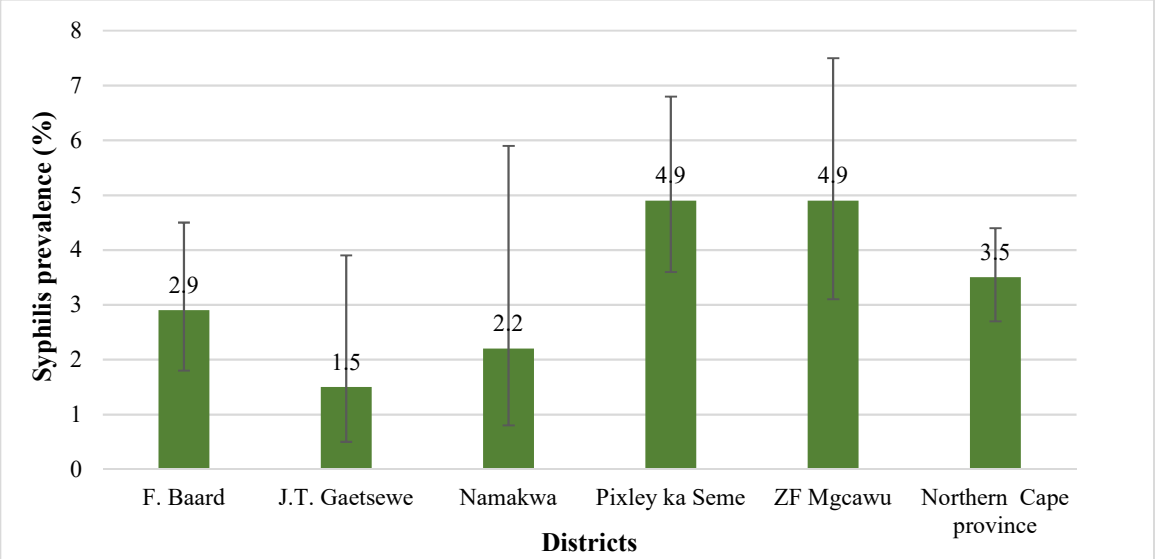


Figure 82: Maternal syphilis screening test result status by district, in the 2019 Antenatal HIV Sentinel Survey, Northern Cape

After excluding the pending results and the results not in file, the prevalence of syphilis (per medical record review data) in Northern Cape among those who had syphilis test result was 3.5% (95% CI: 2.7%–4.4%), and this was the second highest provincial prevalence nationally next to Eastern Cape. Prevalence showed a very small increase (by 0.1% point) from its level in 2015 (3.4%). By district, the prevalence of syphilis ranged from 1.5% in J.T. Gaetsewe to 4.9% in ZF Mgcawu and Pixley Ka Seme (Figure 83). The district level prevalence estimates

need to be interpreted with caution as the CIs around these estimates are wide due to small sample size.



The confidence intervals are wide due to small sample size at district level

Figure 83: Syphilis prevalence among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, Northern Cape

Of 46 participants who were syphilis positive and whose syphilis treatment status was reported in Northern Cape, 93.5% (43) received at least one dose of treatment for syphilis. Of those treated for syphilis and had type of treatment data reported (38), 92.1% (35) were treated with at least one dose of BCG (Figure 84). Syphilis treatment data was missing for 8% (4) of syphilis positive participants in the province, and type of treatment data was missing for 11.6% (5) of participants treated for syphilis; these missing data were excluded from the above analysis. If we assume that all missing responses mean that the subjects did not receive treatment for syphilis, the coverage of syphilis treatment and treatment with BCG drops from 93.5% to 85.9% and from 92.1% to 81.5% respectively. The syphilis treatment estimates need to be interpreted with caution as the sample size is small.

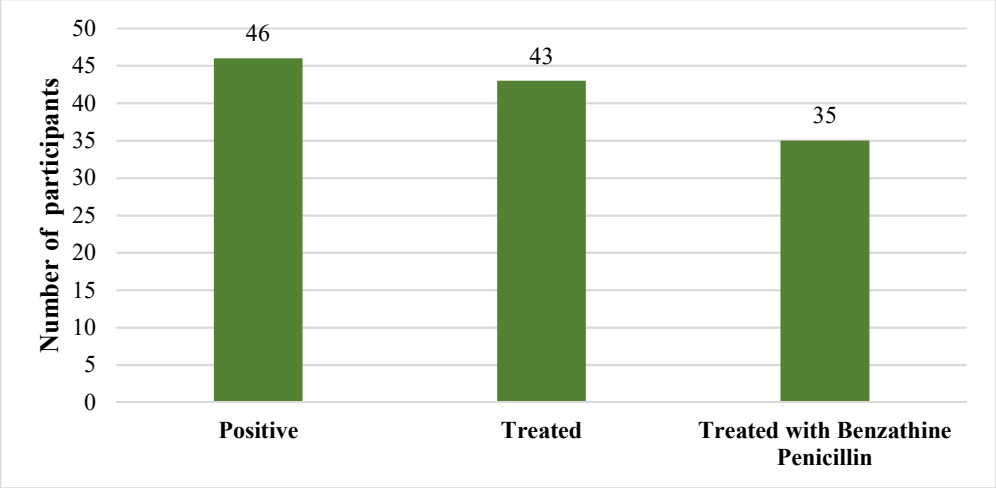
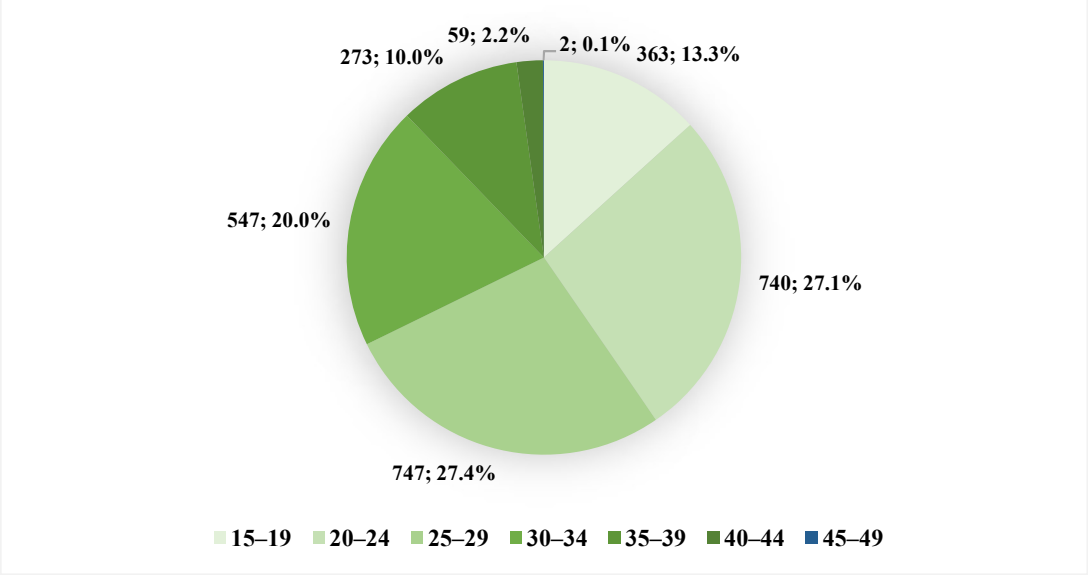


Figure 84: Syphilis treatment cascade among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, Northern Cape

North West

Sample size realization and demographic characteristics

In North West, 95% (2 901) of the planned sample size was achieved. Dr Ruth Segomotsi and Bojanala districts had the lowest (82%) and highest (103%) sample size realizations respectively at district level. About two-fifths (40.4%) of participants were 15–24 years old and 12.3% were ≥35 years old (Figure 85).

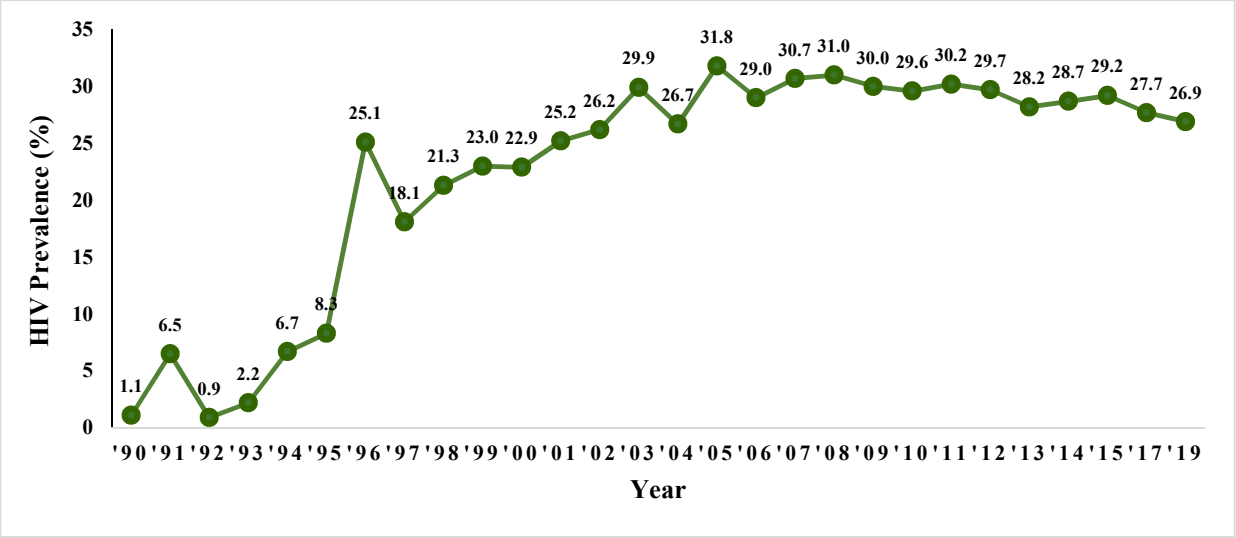


Age groups are in years

Figure 85: Distribution of survey participants by five-year age group – North West, Antenatal HIV Sentinel Survey, 2019

HIV prevalence

HIV prevalence among pregnant women attending ANC clinics in the North West province was linearly increasing between 1997 and 2005 except in 2004 where it dropped by 3.2% points (Figure 86). The prevalence dropped by a little less than 2% points between 2005 and 2006. Since 2005 prevalence has been declining slowly starting from 31.0% in 2008 to 26.9% in 2019.

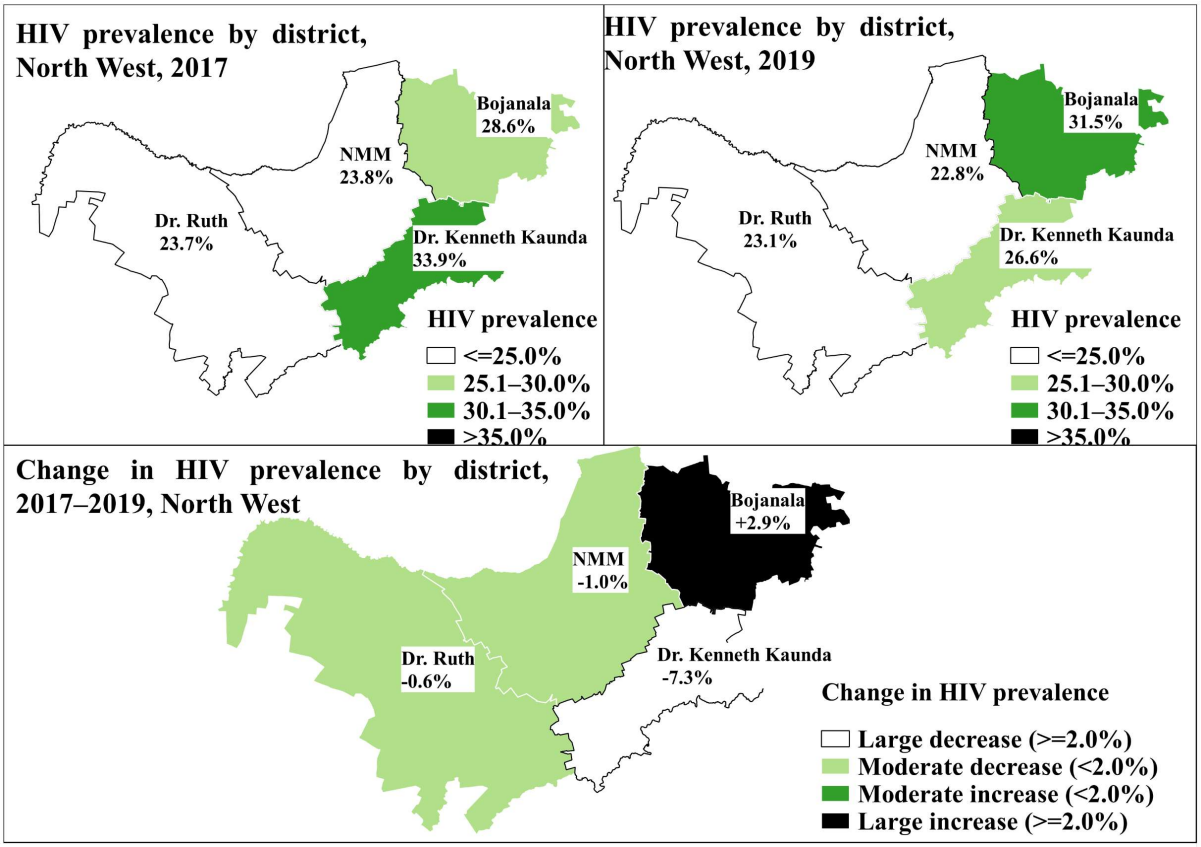


The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees

Figure 86: The HIV epidemic curve among antenatal women, North West, 1990–2019, Antenatal HIV Sentinel Survey

At district level prevalence ranged between 23.1% in Dr Ruth to 31.5% in Bojanala. Figure 87 provides a geographic representation of HIV prevalence and change in HIV prevalence by district in the North West province between 2017 and 2019. The level of HIV prevalence among antenatal women increased by 2.9% points in Bojanala district between 2017 and 2019.

In the same period, prevalence declined (by 7.3% points) in Dr Kenneth Kaunda, (by 1% point) in Ngaka Modiri Molema and (by 0.6% points) in Dr Ruth districts.



The prevalence reported is for both first and follow-up visit attendees

Figure 87: Change in district HIV prevalence estimates, 2017−2019, Antenatal HIV Sentinel Survey, North West

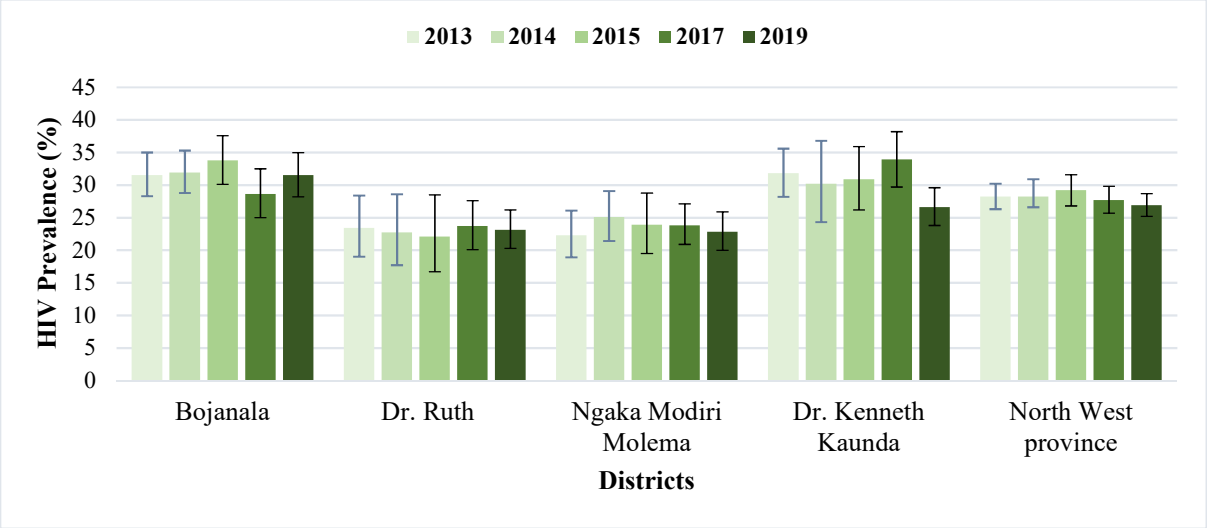
As can be seen in Table 8 and Figure 88, HIV prevalence appear to be higher in Bojanala and Dr Kenneth Kaunda districts (compared to the other districts in the province) between 2013 and 2019. HIV prevalence among antenatal women in Ngaka Modiri Molema district appeared to be declining slowly between 2014 and 2019. There is no clear pattern in prevalence in Dr Kenneth Kaunda, Dr Ruth and Bojanala districts.

Table 8: HIV prevalence by district in the North West province, Antenatal HIV Sentinel Survey, 2013–2019

District	2013		2014		2015		2017		2019	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Bojanala	31.5	28.3–35.0	31.9	28.8–35.3	33.8	30.1–37.6	28.6	25.0–32.5	31.5	28.2–35.0
Dr Ruth	23.4	19.0–28.4	22.7	17.7–28.6	22.1	16.7–28.5	23.7	20.1–27.6	23.1	20.3–26.2
Ngaka Modiri Molema	22.3	18.9–26.1	25.1	21.4–29.1	23.9	19.5–28.8	23.8	20.9–27.1	22.8	20.0–25.9

Dr Kenneth Kaunda	31.8	28.2–35.6	30.2	24.3–36.8	30.9	26.2–35.9	33.9	29.7–38.2	26.6	23.8–29.6
North West Province	**28.2**	**26.3–30.2**	**28.2**	**26.6–30.9**	**29.2**	**26.8–31.6**	**27.7**	**25.7–29.8**	**26.9**	**25.2–28.7**

The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees

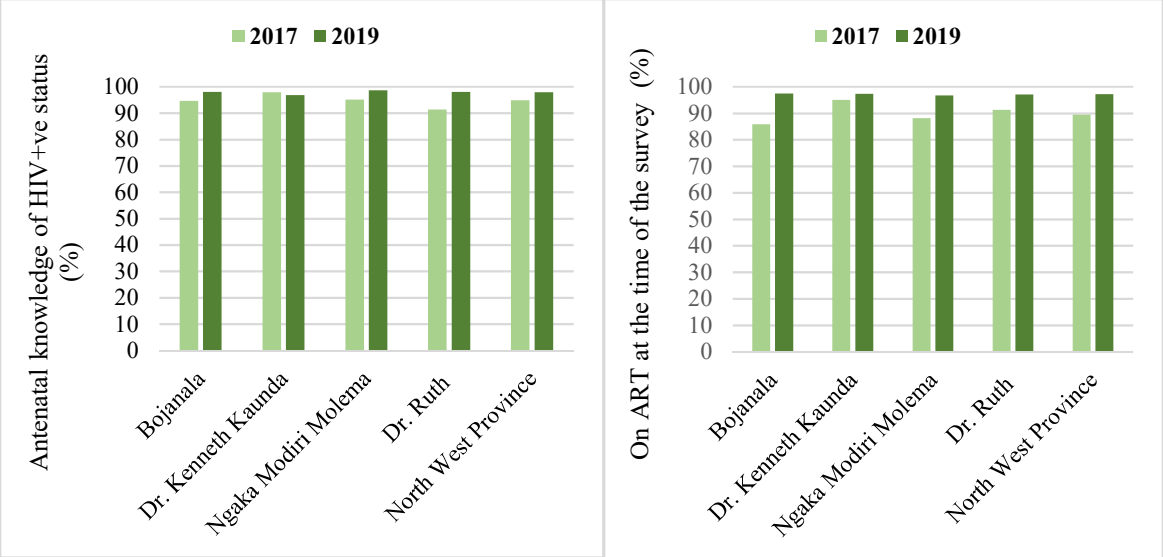


The prevalence reported in 2015, 2017and 2019 is for both first and follow-up visit attendees. The confidence intervals are wide due to small sample size at district level

Figure 88: HIV prevalence trend by district, 2013–2019, Antenatal HIV Sentinel Survey, North West

PMTCT cascade

In the North West province, 97.9% of HIV-positive pregnant women at ANC knew their HIV status. Of those women who knew their HIV status, 97.2% were initiated on ART (Figure 89). The lowest knowledge of HIV status was in Dr Kenneth Kaunda at 96.8% and the highest was in Ngaka Modiri Molema district at 98.7%. ART initiation ranged between 96.7% and 97.4% in Ngaka Modiri Molema and Bojanala districts respectively. Both knowledge of HIV status and ART initiation increased across districts between 2017 and 2019.

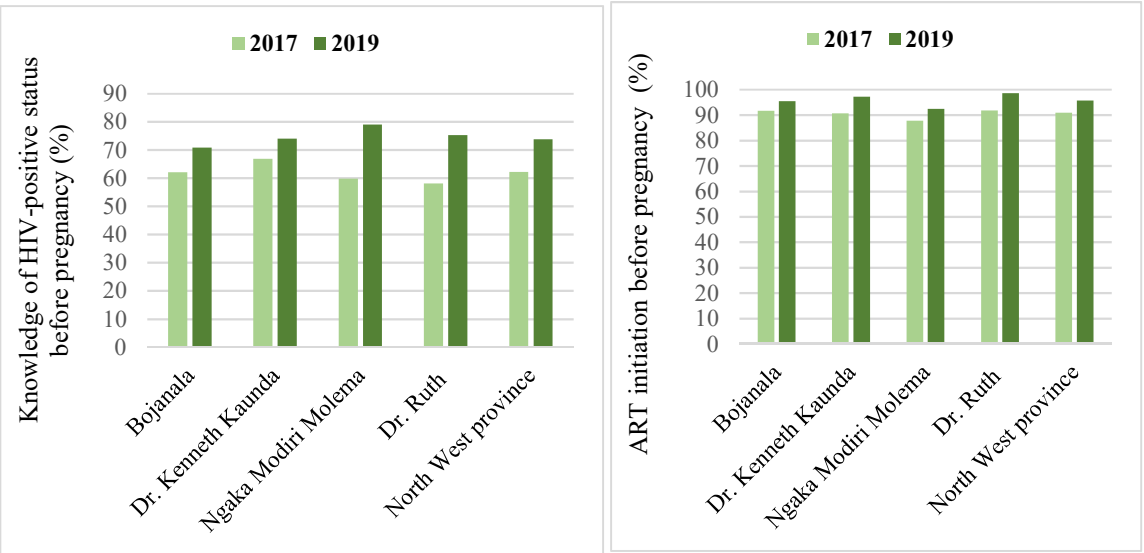


Weighted percentages. HIV+ve: HIV positive; ART – Antiretroviral therapy

Figure 89: Knowledge of HIV-positive status and ART initiation by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, North West

Knowledge of HIV-positive status and ART initiation before pregnancy

Knowledge of HIV status before pregnancy among pregnant women in North West province (73.8%) was slightly higher than the national average (72.7%). ART initiation before pregnancy among women who knew their HIV-positive status before pregnancy (95.7%) was higher than the national average (93.3%) (Figure 90). Knowledge of HIV status before pregnancy among pregnant women was higher than the national average in all districts except in Bojanala district (70.8%). ART initiation before pregnancy was higher than the national average (93.3%) in all districts except in Ngaka Modri Molema (92.4%). Both knowledge of HIV status and ART initiation before pregnancy improved between 2017 and 2019.

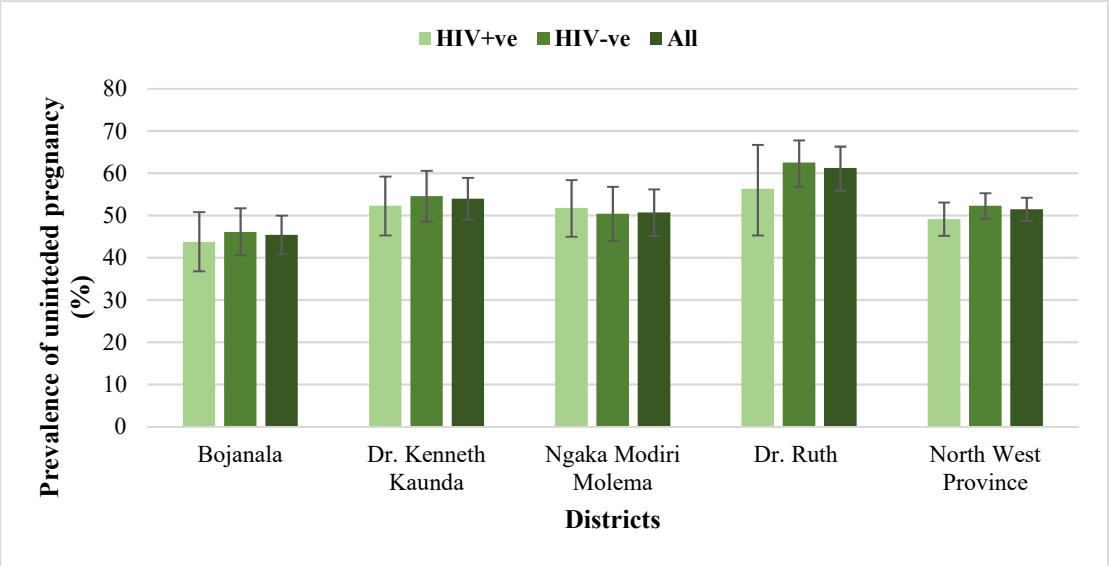


Denominator for knowledge of HIV-positive status before pregnancy was EIA positives.
Denominator for ART initiation before pregnancy was the number of HIV-positive women who were aware of their HIV-positive status before pregnancy

Figure 90: Knowledge of HIV-positive status and ART initiation before pregnancy by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, North West

Planning of pregnancy

In North West the prevalence of unintended pregnancy was similar with the national average (51.5% vs 51.6%) (Figure 91). By district, prevalence of unintended pregnancy ranged from 45.4% in Bojanala to 61.2% in Dr Ruth districts. The prevalence of unintended pregnancy was slightly higher among HIV-positive women compared to HIV-negative women in Ngaka Modiri Molema district (51.8% vs 50.4% respectively). In the other three districts, HIV-positive women had slightly lower prevalence of unintended pregnancy than HIV-negative women. In all districts, adolescent girls (15–19 years) had the highest level of unintended pregnancy ranging between 70.2% in Ngaka Modiri Molema to 87.1% in Dr Ruth districts. In three districts (except Bojanala), young women in the age group 20–24 years also had a higher level of unintended pregnancy (ranging between 54.8% to 64.9%) compared to women older than 24 years. In all districts, single women and women in a non-cohabiting relationship had higher level of unintended pregnancy (ranging between 54.8% to 92.9% and 53.6% to 67.7% respectively) compared to married women *(data not presented in graph)*.



The confidence intervals are wide due to small sample size at district level

Figure 91: The prevalence of unintended pregnancy by district, in the 2019 Antenatal HIV Sentinel Survey, North West

Early ANC attendance

In the North West province, ANC attendance before 20 weeks of gestational age was a little higher than the national average (at 70.4% vs 70.1% nationally) (Figure 92). By district, attendance of ANC before 20 weeks of gestational age ranged between 66.5% (in Bojanala) to 76.5% (in Dr Kenneth Kaunda). Between 2.5% (in Dr Kenneth Kaunda) and 7.6% (in Bojanala) of participants across districts (provincially 5.7%) initiated ANC in their third trimester *(data not presented in graph).* In Dr Ruth and Dr Kenneth Kaunda districts the oldest age group (35–49 years) had the lowest attendance of ANC (at 57.1% and 66.7% respectively) compared to the other age groups. In Bojanala district, the 30–34 years age group had the lowest attendance of ANC (at 59.1%) compared to the other age groups. In the

other districts attendance of ANC was slightly lower in 15–19 years age group compared to the other age groups. The difference in early attendance of ANC between women whose pregnancy was intended (73.1%) and women whose pregnancy was unintended (68.6%) was modest in the province. Multigravida women had lower (68.1%) attendance of ANC compared to primigravida women (75.1%).

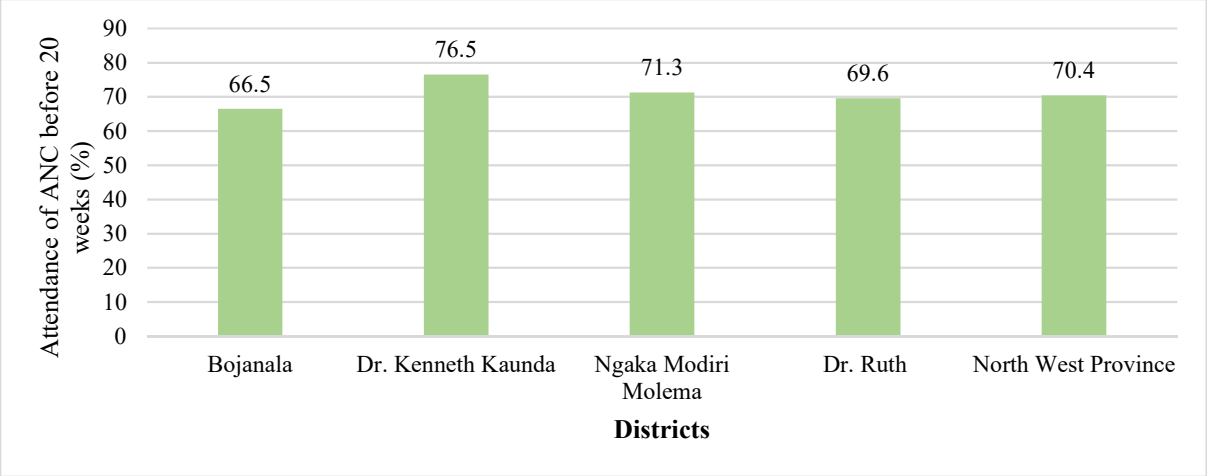


Figure 92: Attendance of antenatal care before 20 weeks of gestational age, in the 2019 Antenatal HIV Sentinel Survey, North West

Maternal syphilis screening and treatment coverage

North West had the second lowest maternal syphilis screening coverage nationally in 2019 (at 93.1%) (Figure 93). Between 2017 and 2019, syphilis screening coverage declined in all districts except in Bojanala district which showed an increase of syphilis screening coverage by 5.4% points (from 88.6% to 94%).

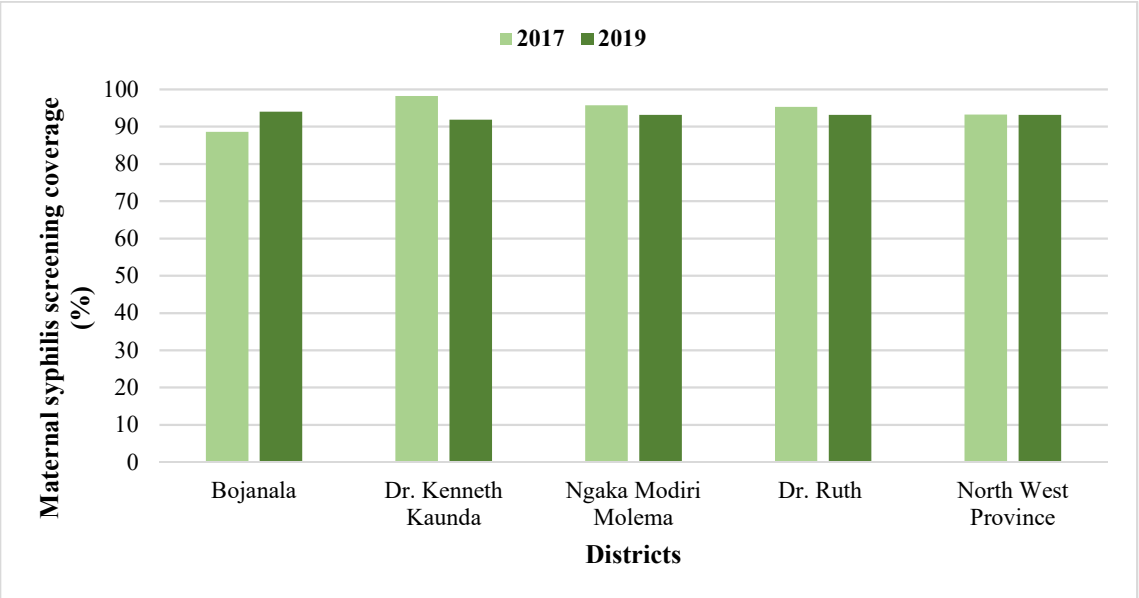


Figure 93: Maternal syphilis screening coverage by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, North West

Of those who had syphilis screening, at province level, 1.2% (95% CI: 0.8%–1.7%) were positive for syphilis, 67.3% were negative, 28.8% were awaiting result and 2.7% results were not in their file (Figure 94). Pending results ranged from 25.1% in Ngaka Modiri Molema to 30.6% in Bojanala districts (18.5% and 19.8% of pending results in Ngaka Modiri Molema and Bojanala districts were for follow-up visit attendees).

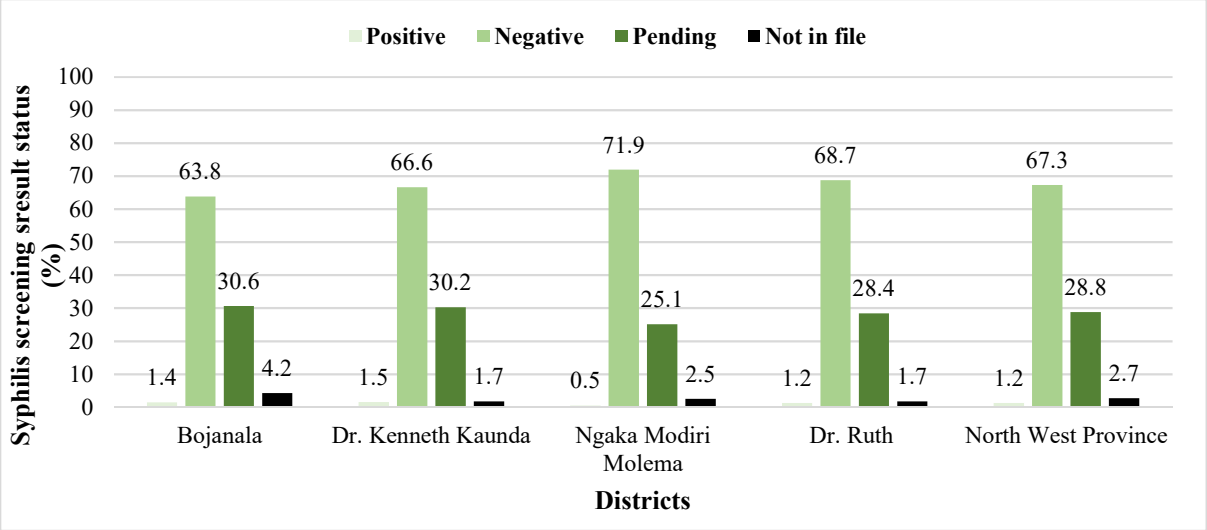
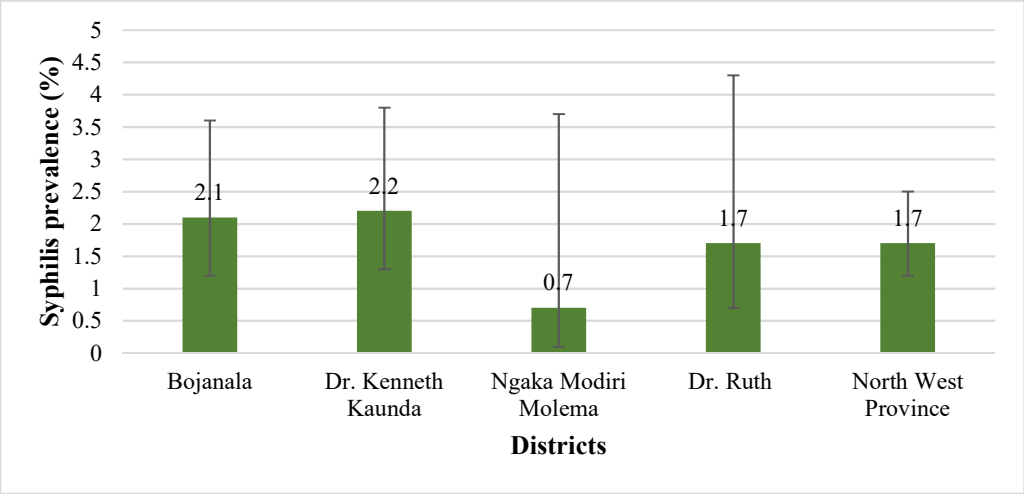


Figure 94: Maternal syphilis screening test result status by district, in the 2019 Antenatal HIV Sentinel Survey, North West

After excluding the pending results and the results not in file, the prevalence of syphilis (per medical record review data) in North West Province among those who had syphilis test result was 1.7% (95% CI: 1.2%–2.5%), and this was the second lowest provincial syphilis prevalence nationally. Syphilis prevalence declined by 0.5% points from the level in 2015 (2.2%). By district, the prevalence of syphilis ranged from 0.7% in Ngaka Modiri Molema to 2.2% in Dr Kenneth Kaunda (Figure 95). The district level prevalence estimates need to be interpreted with caution as the CIs around these estimates are wide due to small sample size.



The confidence intervals are wide due to small sample size at district level

Figure 95: Syphilis prevalence among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, North West

Of 23 participants who were syphilis positive and whose syphilis treatment status was reported in North West, 96.1% (22) received at least one dose of treatment for syphilis. Of those treated for syphilis and had type of treatment data reported (18), 77.8% (14) were treated with at least one dose of BCG (Figure 96). Syphilis treatment data was missing for 17.9% (5) of syphilis positive participants in the province, and type of treatment data was missing for 18.2% (4) of participants treated for syphilis; these missing data were excluded from the above analysis. If we assume that all missing responses mean that the subjects did not receive treatment for syphilis, the coverage of syphilis treatment and treatment with BCG drops from 96.1% to 79.4% and from 77.8% to 64.5% respectively. The syphilis treatment estimates need to be interpreted with caution as the sample size is small.

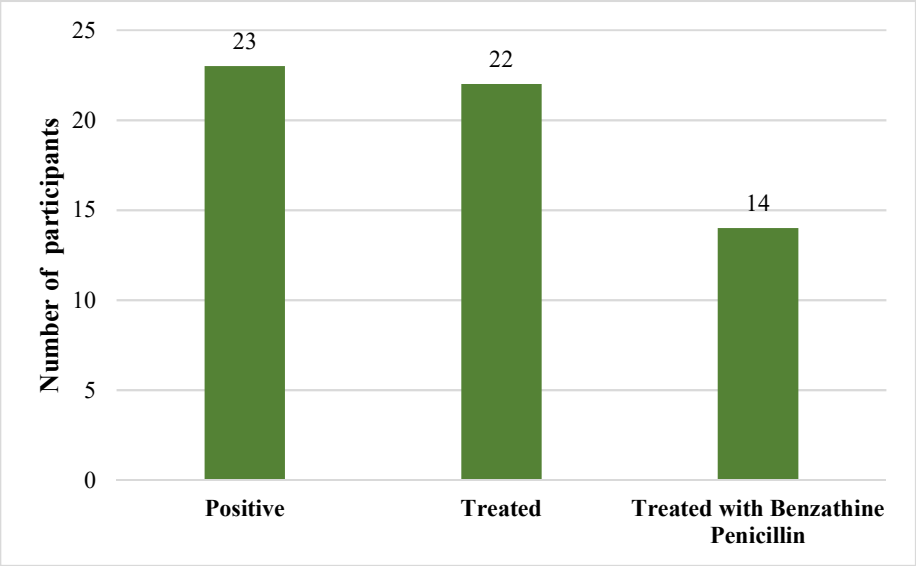
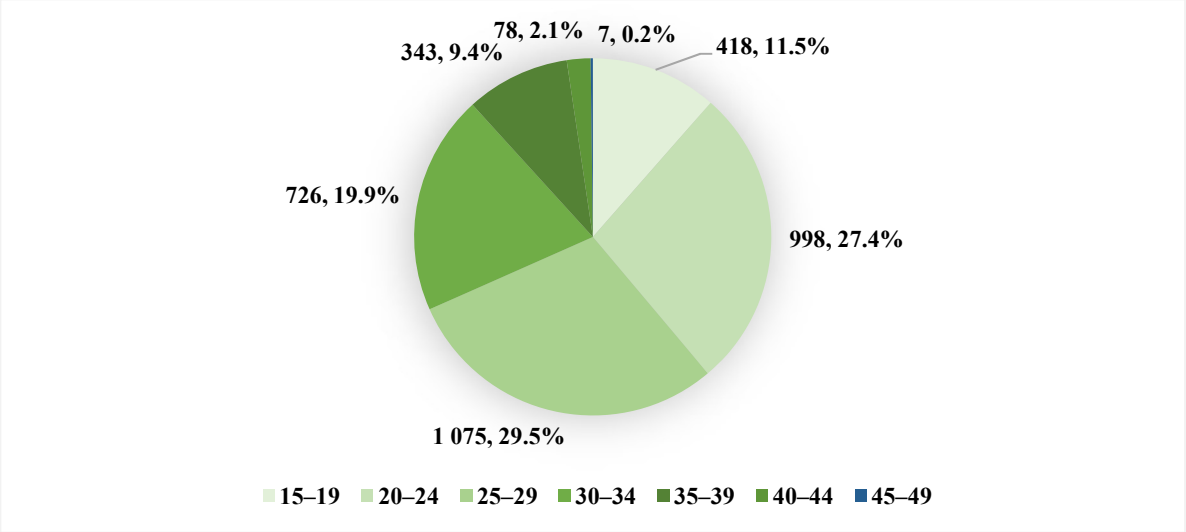


Figure 96: Syphilis treatment cascade among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, North West

Western Cape

Sample size realization and demographic characteristics

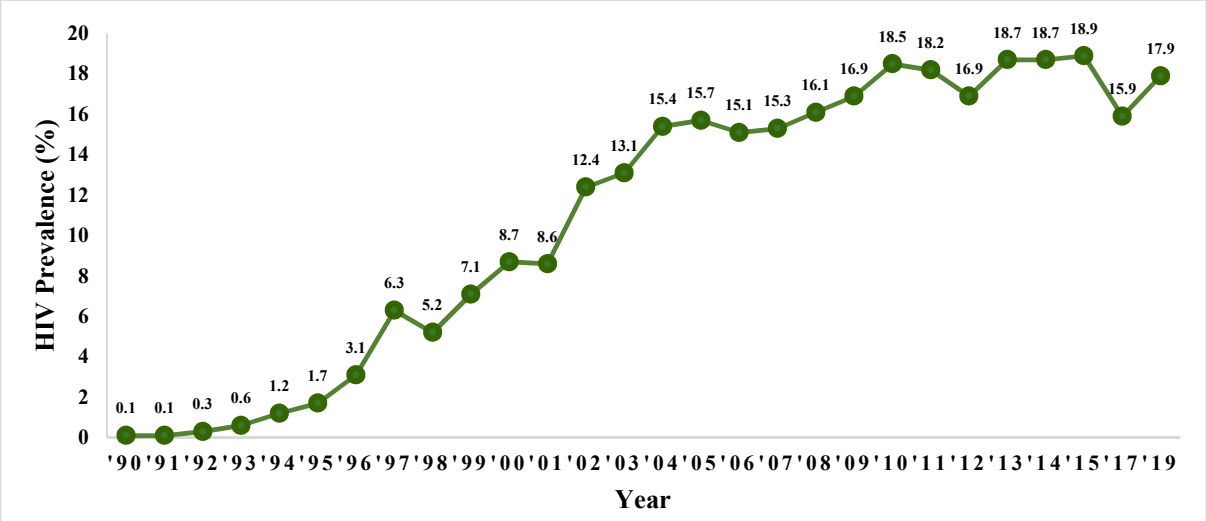
The total sample size achieved in the Western Cape province was 3 943. Sample size realization was 109%. The highest sample size realization (118%) was in the city of Cape Town Metropolitan Municipality and the lowest sample size realization (98%) was in West Coast district. The largest proportion of participants (38.9%) were in the 15–24 years age group and the lowest was in the age groups ≥35 (11.7%) (Figure 97).



Age groups are in years

Figure 97: Distribution of survey participants by five-year age group – Western Cape, Antenatal HIV Sentinel Survey, 2019

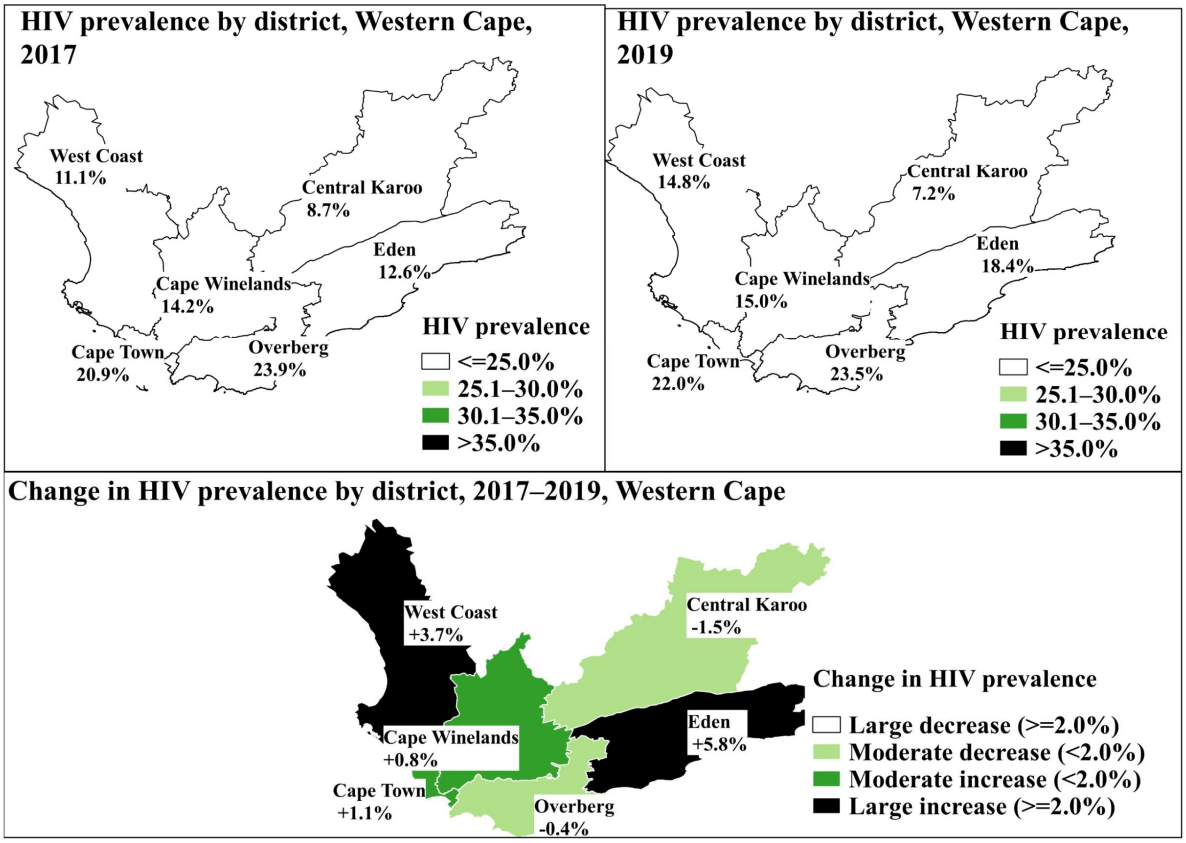
The HIV prevalence rate among pregnant women attending ANC clinics in the Western Cape province had been increasing until 2010; thereafter the prevalence seemed to be stabilizing (around 18%) till 2019 except the sharp drops observed in 2012 and 2017 (Figure 98).



The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees

Figure 98: The HIV epidemic curve among antenatal women, Western Cape, 1990–2019, Antenatal HIV Sentinel Survey

Map of antenatal HIV prevalence and change in antenatal HIV prevalence by district in Western Cape between 2017 and 2019 is shown in Figure 99. Antenatal HIV prevalence has increased by 5.8% and 3.7% between 2017 and 2019 in Eden and West Coast districts respectively. In the same period,a moderate increase has been observed in Cape Town (1.1% points increase) and Cape Winelands (0.8% points increase) districts. In Central Karoo and Overberg districts antenatal HIV prevalence declined by 1.5% and 0.4% points respectively, between 2017 and 2019. None of these changes are statistically significant.



The prevalence reported is for both first and follow-up visit attendees

Figure 99: Change in district HIV prevalence estimates – 2017 to 2019, Antenatal HIV Sentinel Survey, Western Cape

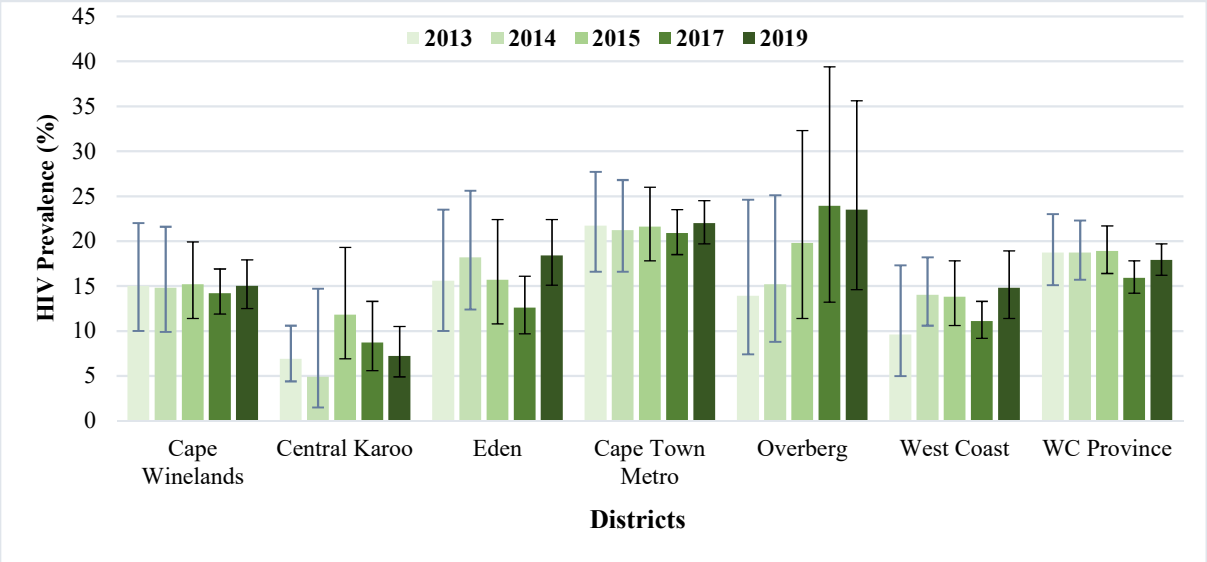
HIV prevalence among antenatal women varied by district between 2013 and 2019 as shown in Table 9 and Figure 100. HIV prevalence fluctuated around 15% in Cape Winelands between 2013 and 2019. In the same period, in Central Karoo HIV prevalence ranged between 6.9% and 8.7% except in 2014 and 2015 where prevalence was 4.9% and 11.8% respectively. In Cape Town Metro prevalence ranged between 20% and 22% in the last five survey years (2013 –2019). Antenatal HIV prevalence overall increased between 2013 and 2019 in Overberg and West Coast districts in the same period.

Table 9: HIV prevalence by district in the Western Cape province, Antenatal HIV Sentinel Survey, 2013 to 2019

District	2013		2014		2015		2017		2019	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Cape Winelands	15.0	10.0 –22.0	14.8	9.9 –21.6	15.2	11.4 – 19.9	14.2	11.9– 16.9	15.0	12.5– 17.9
Central Karoo	6.9	4.4 –10.6	4.9	1.5 –14.7	11.8	6.9 – 19.3	8.7	5.6–13.3	7.2	4.9– 10.5
Eden	15.6	10.0 –23.5	18.2	12.4 –25.6	15.7	10.8 – 22.4	12.6	9.7–16.1	18.4	15.1– 22.4
Cape Town Metro	21.7	16.6 –27.7	21.2	16.6 –26.8	21.6	17.8 – 26.0	20.9	18.5– 23.5	22.0	19.7– 24.5
Overberg	13.9	7.4 – 24.6	15.2	8.8 – 25.1	19.8	11.4 – 32.3	23.9	13.2– 39.4	23.5	14.6– 35.6

West Coast	9.6	5.0 – 17.3	14	10.6 – 18.2	13.8	10.6 – 17.8	11.1	9.2–13.3	14.8	11.4–18.9
Western Cape province	**18.7**	**15.1 – 23.0**	**18.7**	**15.7 – 22.3**	**18.9**	**16.4 – 21.7**	**15.9**	**14.2–17.8**	**17.9**	**16.2–19.7**

The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees

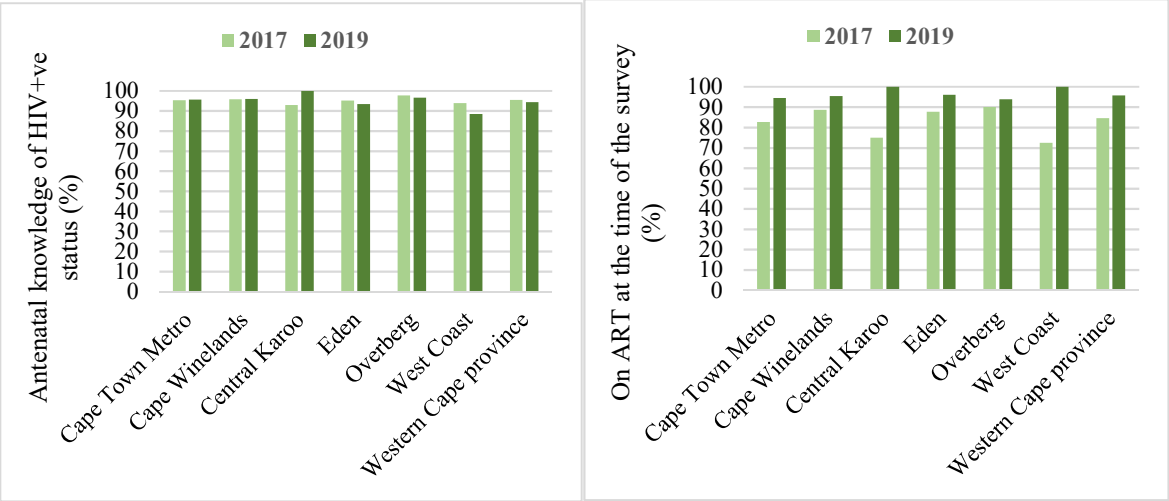


The prevalence reported in 2015, 2017 and 2019 is for both first and follow-up visit attendees. The confidence intervals are wide due to small sample size at district level

Figure 100: HIV prevalence trend by district, 2013–2019, Antenatal HIV Sentinel Survey, Western Cape

PMTCT cascade

Knowledge of HIV status among HIV-positive pregnant women attending ANC was 94.4%; and 95.7% of women who knew their HIV status were on ART (Figure 101). The lowest knowledge of HIV status was in West Coast at 88.4% and the highest was in Central Karoo district at 100% (but there were only 12 HIV-positive participants in Central Karoo therefore this estimate may be unstable). ART initiation ranged between 93.8% and 100% in Overberg and West Coast districts respectively. Knowledge of HIV status increased in three of the six districts (except West Coast, Overberg and Eden districts) and ART initiation increased in all districts between 2017 and 2019.

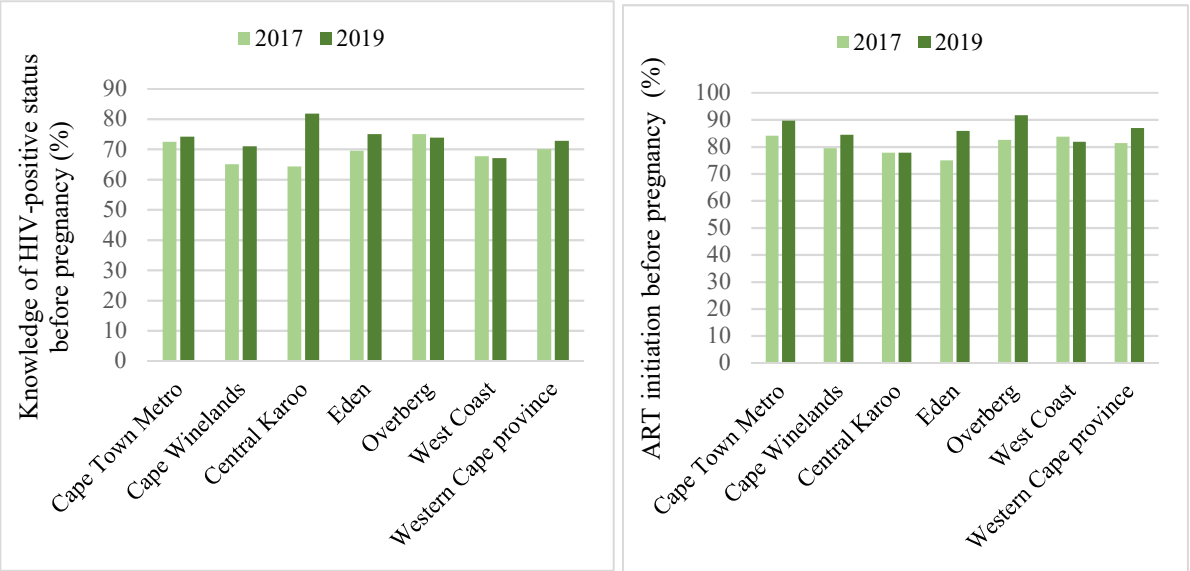


Weighted percentages; HIV+ve: HIV positive; ART – Antiretroviral therapy

Figure 101: Knowledge of HIV-positive status and ART initiation by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Western Cape

Knowledge of HIV-positive status and ART initiation before pregnancy

Knowledge of HIV status before pregnancy among pregnant women was 72.8% in the Western Cape province (Figure 102). Knowledge of HIV status before pregnancy was higher than the national average (72.7%) in four of the six districts (except in Cape Winelands and West Coast). Central Karoo (81.8%) and Eden (75%) districts reported the highest proportion of pregnant women who knew their HIV-positive status before pregnancy. At provincial level, ART initiation before pregnancy among those who knew their HIV status before pregnancy was lower than the national average at 86.9%. At district level, Central Karoo and West Coast districts had the lowest ART initiation before pregnancy at 77.8% and 81.8% respectively. However Central Karoo had a small number of participants who were HIV-positive before pregnancy (n=9) which inflates the CI around this estimate (95% CI: 46.1%–93.5%). The highest ART initiation before pregnancy was in Overberg at 91.7%.

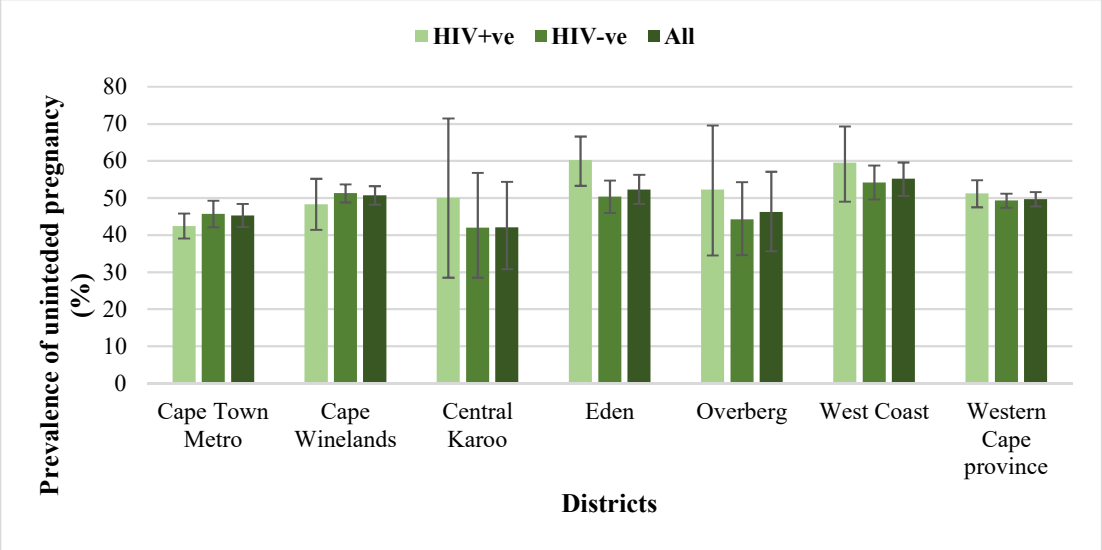


Denominator for knowledge of HIV-positive status before pregnancy was EIA positives.
Denominator for ART initiation before pregnancy was the number of HIV-positive women who were aware of their HIV-positive status before pregnancy

Figure 102: Knowledge of HIV-positive status and ART initiation before pregnancy by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Western Cape

Planning of pregnancy

In Western Cape the prevalence of unintended pregnancy was below the national average at 49.7% (Figure 103). By district, prevalence of unintended pregnancy ranged from 42.1% in Central Karoo to 55.2% in West Coast districts. The prevalence of unintended pregnancy was higher among HIV-positive women compared to HIV-negative women in four districts (except in Cape Town Metro and Cape Winelands), but this difference was not statistically significant. In all districts, adolescent girls (15–19 years) had the highest level of unintended pregnancy (compared to all other age groups) ranging between 50% in Central Karoo to 82.7% in Cape Winelands districts. Young women (20–24 years) had higher unintended pregnancy (than provincial average) in Cape Town Metro and Cape Winelands districts. Single women and women in a non-cohabiting relationship had a high level of unintended pregnancy ranging between 66.7% to 90.7% and 56.1 and 70.8% (across districts) respectively *(data not presented in graph)*.



The confidence intervals are wide due to small sample size at district level

Figure 103: The prevalence of unintended pregnancy by district, in the 2019 Antenatal HIV Sentinel Survey, Western Cape

Early ANC attendance

The Western Cape province had the highest ANC attendance before 20 weeks of gestational age nationally at 76.9% (Figure 104). By district, attendance of ANC before 20 weeks ranged between 71.4% (in Cape Winelands) to 82.7% (in Central Karoo). Between 3.6% (in West Coast) and 6.9% (in Cape Winelands) of participants across districts (5.7% provincially) initiated ANC in their third trimester *(data not presented in graph).* In the Cape Town Metro, and Cape Winelands districts, the youngest age group (15–19 years) had the lowest attendance of ANC before 20 weeks at 65.2%, and 63.3% respectively compared to the other age groups. In the other four districts attendance of ANC before 20 weeks was not substantially different by age group. At province level, women who had unintended pregnancy had lower attendance of ANC before 20 weeks (74.8%) compared to women whose pregnancy was intended (79.3%). There was no difference in early attendance of ANC between primigravida and multigravida women.

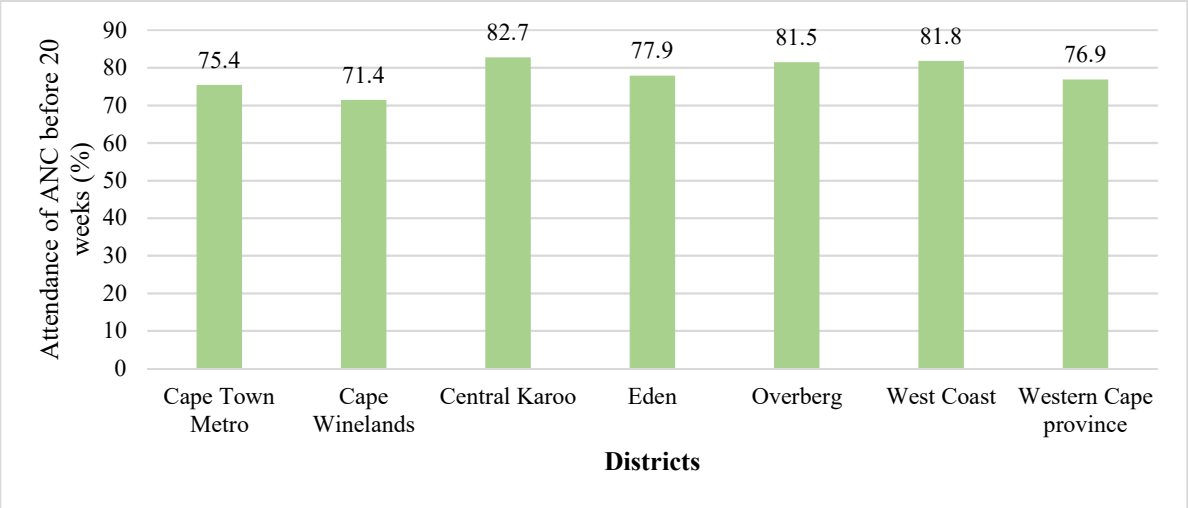


Figure 104: Attendance of antenatal care before 20 weeks of gestational age, in the 2019 Antenatal HIV Sentinel Survey, Western Cape

Maternal syphilis screening and treatment coverage

Maternal syphilis screening coverage was 97.9% in Western Cape, representing an increase of 2.4% points in syphilis screening coverage from the level in 2017 (95.3%) (Figure 105). Syphilis screening coverage increased between 2017 and 2019 in all districts. Except Cape Town Metro which had syphilis screening coverage of 95.4%, all other districts had syphilis screening coverage of >98%.

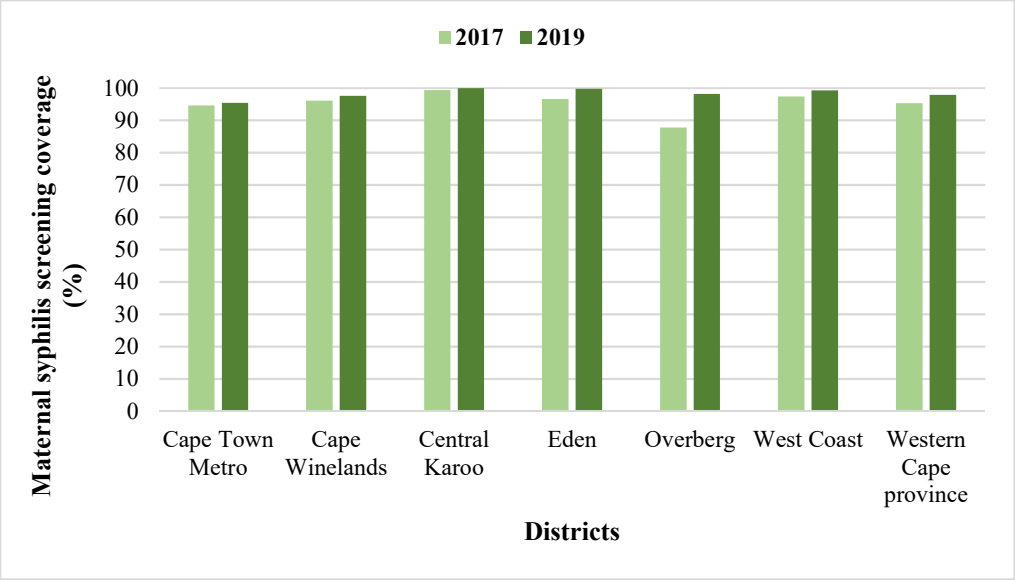


Figure 105: Maternal syphilis screening coverage by district, in the 2017 and 2019 Antenatal HIV Sentinel Surveys, Western Cape

Of those who had syphilis screening, at province level, 2.2% (95% CI: 1.9%–2.6%) were positive for syphilis, 96.7% were negative, 0.8% were awaiting result and 0.3% results were not in file (Figure 106). Western Cape had the lowest pending results nationally. Pending results ranged from none in West Coast and Central Karoo to 2.7% in Cape Town.

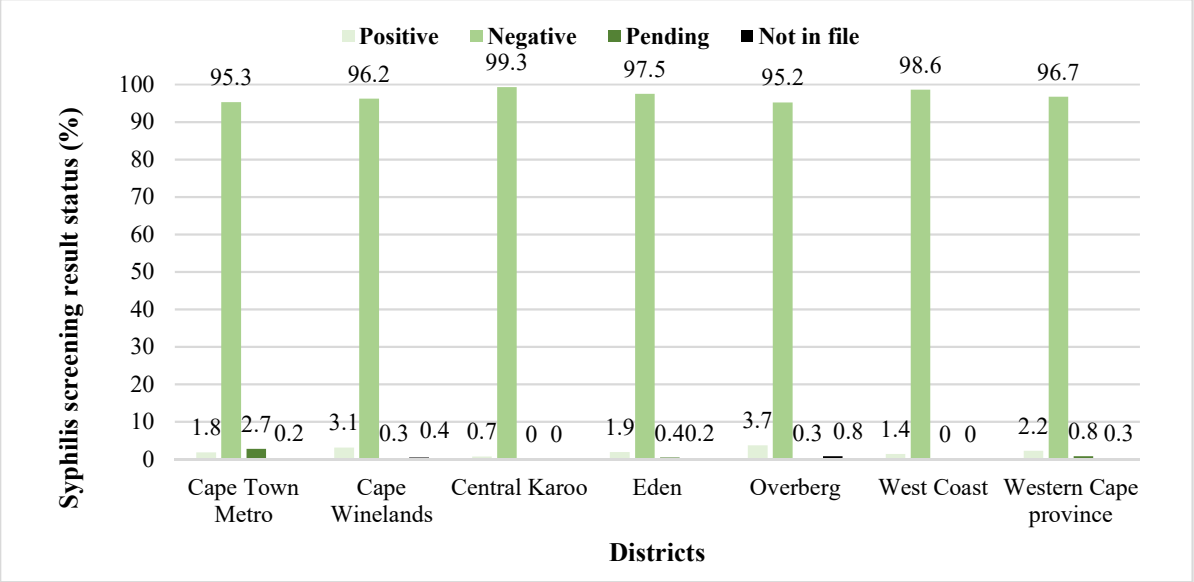
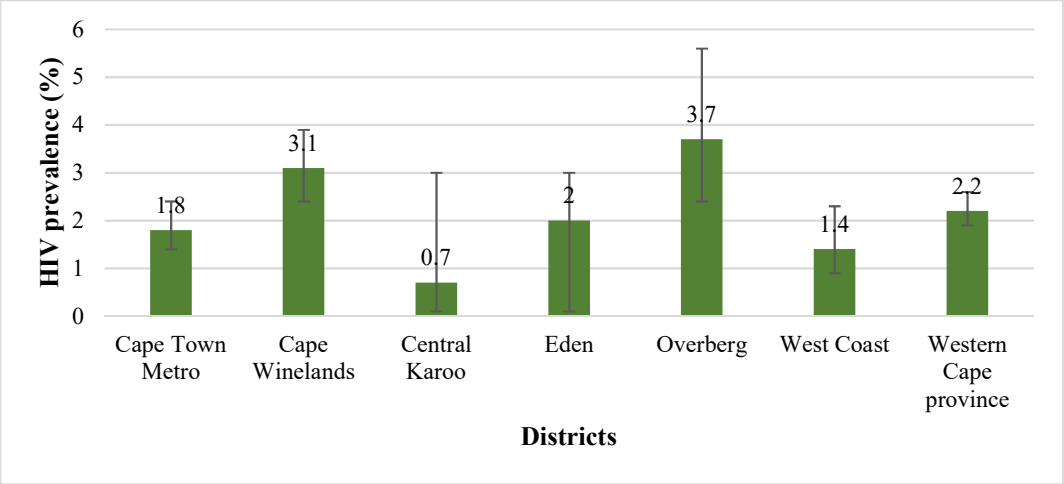


Figure 106: Maternal syphilis screening test result status by district, in the 2019 Antenatal HIV Sentinel Survey, Western Cape

After excluding the pending results and the results not in file, the prevalence of syphilis (per medical record review data) in Western Cape among those who had syphilis test result was 2.2% (95% CI: 1.9%–2.6%), and this was lower than the national average (2.6%) by 0.4% points. Syphilis prevalence increased by 0.5% points from the level in 2015 (1.7%). By district, the prevalence of syphilis ranged from 0.7% in Central Karoo to 3.7% in Overberg (Figure 107). The district level prevalence estimates need to be interpreted with caution as the CIs around these estimates are wide due to small sample size.



The confidence intervals are wide due to small sample size at district level

Figure 107: Syphilis prevalence among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, Western Cape

Of 75 participants who were syphilis positive and whose syphilis treatment status was reported in Western Cape, 97.6% (73) received at least one dose of treatment for syphilis. Of those treated for syphilis and had type of treatment data reported (64), 93.6% (60) were treated with at least one dose of BCG (Figure 108). Syphilis treatment data was missing for 8.5% (7) of syphilis positive participants in the province, and type of treatment data was

missing for 12.3% (9) of participants treated for syphilis; these missing data were excluded from the above analysis. If we assume that all missing responses mean that the subjects did not receive treatment for syphilis, the coverage of syphilis treatment and treatment with BCG drops from 97.6% to 89.2% and from 93.6% to 83% respectively. The syphilis treatment estimates need to be interpreted with caution as the sample size is small.

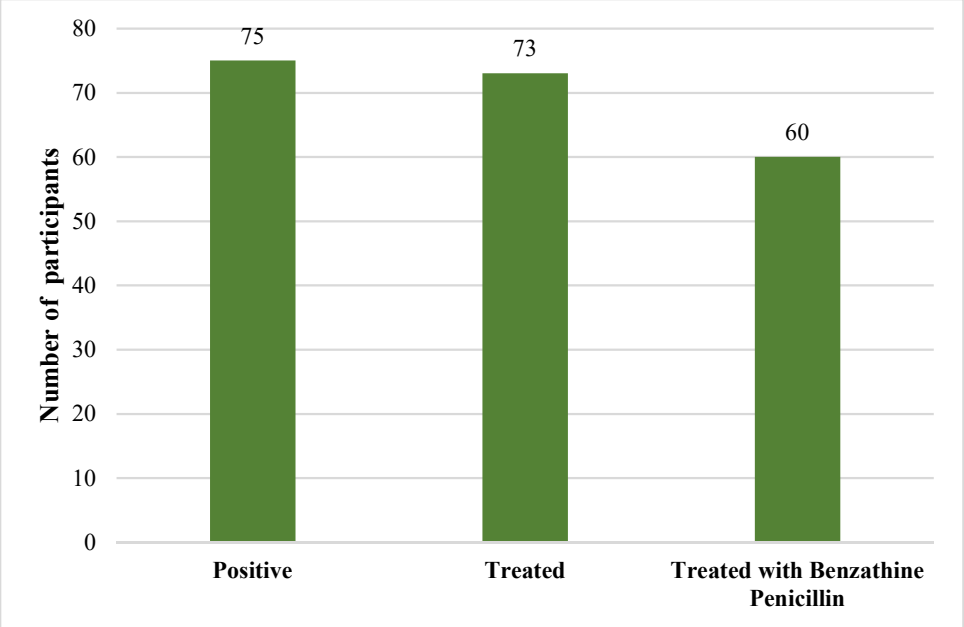


Figure 108: Syphilis treatment cascade among antenatal women, in the 2019 Antenatal HIV Sentinel Survey, Western Cape