

**Note:** This is Online Appendix 1 of Rikhotso RR, Mitchell EM, Wilson DT, et al. Prevalence and distribution of selected cervical human papillomavirus types in HIV infected and HIV uninfected women in South Africa, 1989–2021: A narrative review. *S Afr J Infect Dis.* 2022;37(1), a363. <https://doi.org/10.4102/sajid.v37i1.363>

**TABLE 1: Characteristics of the 69 articles analysed for HPV among South African women living with and without HIV**

Author (year) and title	Study design, sampling period and age range	Study population	Study participants according to HIV status if reported	Cervical diseases data n (%)	Study setting
<b>1. Mbulawa et al. (2021)</b> High human papillomavirus prevalence among females attending high school in the Eastern Cape Province of South Africa [21]	This study was conducted between April and May 2019 among women aged 15 to 22 years old	The study recruited high school learners situated in Chris Hani District Municipality	Of the study participants, 172 women were living without HIV while 9 were living with HIV	Cytology data was not reported	Not clearly reported
<b>2. Taku et al. (2021)</b> Distribution of Human Papillomavirus (HPV) Genotypes in HIV-Negative and HIV Positive Women with Cervical Intraepithelial Lesions in the Eastern Cape Province, South Africa [63]	This cross-sectional study was conducted between September 2017 and March 2019 among women who were $\geq 18$ years old	The study recruited women who were referred to the Nelson Mandela Academic Hospital Gynaecology Outpatient Clinic located in the OR Tambo municipality area	Of the study participants, 46 women were living without HIV while 147 were living with HIV	Abnormal pap smear n=193 (100%)	Rural
<b>3. Saidu et al. (2021)</b> Performance of Xpert HPV on Self-collected Vaginal Samples for Cervical Cancer Screening Among Women in South Africa [64]	This prospective-observational study was conducted among women aged 30 to 65 years old however, the sampling period was not reported	The study recruited women at the Khayelitsha Site B Primary Health Care Clinic	Of the study participants, 375 women were living without HIV while 330 were living with HIV	Cytology data was not reported	Township
<b>4. Taku et al. (2021)</b> Detection of sexually transmitted pathogens and co-infection with human papillomavirus in women residing in rural Eastern Cape, South Africa [65]	This cross-sectional study was conducted between September 2017 and August 2018 among women aged 30 to 98 years old	The study recruited women from a community-based clinic within the OR Tambo District	Of the study participants, 126 women were living without HIV while 79 were living with HIV	Normal pap smear n=182 (89%) Abnormal pap smear n=23 (11%)	Rural
<b>5. Chamuso et al. (2020)</b> Age, absolute CD4 count, and CD4 percentage in relation to HPV infection and the stage of cervical disease in HIV-1-positive women [66]	This cross-sectional study was conducted between June 2016 and March 2017 among women who were above 18 years of age	The study recruited women with histologically confirmed cervical disease from the Groote Schuur Hospital, Somerset Hospital and Victoria Wynberg Hospital	Of the study participants, 94 women were living without HIV while 87 were living with HIV	Abnormal pap smear n=181 (100%)	Urban
<b>6. Taku et al. (2020)</b> Acceptability of self-collection for human papillomavirus detection in the Eastern Cape, South Africa [67]	This cross-sectional study was conducted between September 2017 and March 2019 among women who were $\geq 18$ and $\geq 30$ years old	The study recruited women with abnormal pap smears at a community health clinic and the referral clinic	Of the study participants, 349 women were living without HIV while 385 were living with HIV	Normal pap smear n=45 (15%) Abnormal pap smear n=240 (82%)	Rural
<b>7. Kuhn et al. (2020)</b> Clinical evaluation of modifications to a human papillomavirus assay to optimise its utility for cervical cancer screening in low-	This diagnostic-accuracy study was conducted between February 2015 and May 2016 among women aged 30 to 65 years old	The study recruited women at a primary-care facility (Khayelitsha Site B Day Hospital), through community	Of the study participants, 586 women were living without HIV while 535 were living with HIV	Normal pap smear n=679 (61%) Abnormal pap smear n=427 (39%)	Township

resource settings: a diagnostic Accuracy study [68]		outreach and at a referral colposcopy clinic			
<b>8. Johnson et al. (2020)</b> Selecting human papillomavirus genotypes to optimize the performance of screening tests among South African women [69]	This study was conducted among women aged 30 to 65 years old however, the sampling period was not reported	The study recruited women from a community-based clinic and those referred to a colposcopy clinic	Of the study participants, 382 women were living without HIV while 332 were living with HIV	Normal pap smear n=712 (100%) Abnormal pap smear n=1 (0%)	Township
<b>9. Taku et al. (2020)</b> Human papillomavirus prevalence and risk factors among HIV-negative and HIV-positive women residing in rural Eastern Cape, South Africa [70]	This cross-sectional study was conducted between September 2017 and August 2018 among women aged 30 to 98 years old	The study recruited women from a community health clinic within OR Tambo district municipality	Of the study participants, 262 women were living without HIV while 155 were living with HIV	Normal pap smear n=373 (90%) Abnormal pap smear n= 41 (10%)	Rural
<b>10. van de Wijgert et al. (2020)</b> Human papillomavirus infection and cervical dysplasia in HIV-positive women: potential role of the vaginal microbiota [71]	This prospective-cohort study was conducted between 2011 and 2012 among women aged 25 to 50 years old	The study recruited women from HIV treatment centers and surrounding communities	Six hundred and twenty-three (623) women living with HIV participated in this study	Cytology data was not reported	Urban
<b>11. Chikandiwa et al. (2018)</b> Prevalence, incidence and correlates of low risk HPV infection and anogenital warts in a cohort of women living with HIV in Burkina Faso and South Africa [72]	This prospective-study was conducted between December 2011 and October 2012 among women aged 25 to 50 years old	The study recruited women from the HIV treatment centres and surrounding communities in Johannesburg	Six hundred and twenty-three (623) women living with HIV participated in this study	Normal pap smear n=261 (45%) Abnormal pap smear n=313 (55%)	Urban
<b>12. Mbulawa et al. (2018)</b> High human papillomavirus (HPV) prevalence in South African adolescents and young women encourages expanded HPV vaccination campaigns [73]	This cross-sectional study was conducted between November 2013 and December 2014 among women aged 16 to 22 years old	The study recruited sexually experienced HIV non-infected black women	Two hundred and ninety-eight (298) women living without HIV participated in this study	Cytology data was not reported	Urban
<b>13. Mbatha et al. (2017)</b> High-risk human papillomavirus types in HIV- infected and HIV-uninfected young women in KwaZulu-Natal, South Africa: implications for vaccination [74]	This cross-sectional study was conducted between 2010 and 2013 among women who were above 16 years of age	The study recruited women who were sexually active from high schools	Of the study participants, 956 women were living without HIV while 267 were living with HIV	Cytology data was not reported	Rural
<b>14. Mbatha et al. (2017)</b> Self-sampling for human papillomavirus testing among rural young women of KwaZulu-Natal, South Africa [75]	This cross-sectional study was conducted among women aged 16 to 22 years old. The study sampling period was not reported	The study recruited women from randomly selected high schools	Ninety-eight (98) women participated in this study of whom the HIV status was not reported	Cytology data was not reported	Rural
<b>15. Kelly et al. (2017)</b> Epidemiology of high-risk human papillomavirus and cervical lesions in African women living with HIV/AIDS: effect of anti-retroviral therapy [76]	This prospective study was conducted between December 2011 and October 2012 among women aged 25 to 50 years old	The study recruited women who were HIV infected from the HIV treatment centres and surrounding communities in Johannesburg	Six hundred and twenty-three (623) women living with HIV participated in this study	Normal pap smear n=261 (45%) Abnormal pap smear n=313 (55%)	Urban
<b>16. Kelly et al. (2017)</b> Associations of Human Papillomavirus (HPV) genotypes with high-grade cervical neoplasia (CIN2+) in a cohort of women	This prospective study was conducted between December 2011 and October 2012 among women aged 25 to 50 years old	The study recruited women who were HIV infected from the HIV treatment centres and	Six hundred and twenty-three (623) women living with HIV participated in this study	Normal pap smear n=261 (45%) Abnormal pap smear n=313 (55%)	Urban

living with HIV in Burkina Faso and South Africa <sup>[77]</sup>		surrounding communities in Johannesburg			
<b>17. Dylla et al. (2017)</b> Human papillomavirus clustering patterns among HIV-infected and HIV-uninfected adolescent females in South Africa <sup>[78]</sup>	This cross-sectional study was conducted between October 2012 and October 2014 among women aged 17 to 21 years old	The study recruited women from the youth community center and clinic	Of the study participants, 50 women were living without HIV while 50 were living with HIV	Cytology data was not reported	Urban
<b>18. Rad et al. (2017)</b> HPV types in cervical cancer tissue in South Africa A head-to-head comparison by mRNA and DNA tests <sup>[79]</sup>	This cross-sectional study was conducted between January 2008 and July 2011 among women aged 25 to 89 years old	The study recruited women who were referred to the gynaecologic oncology unit at the University of Pretoria	Of the study participants, 98 women were living without HIV while 69 were living with HIV	Cervical cancer n=167 (100%)	Urban
<b>19. Adler et al. (2016)</b> Cumulative Impact of HIV and Multiple Concurrent Human Papillomavirus Infections on the Risk of Cervical Dysplasia <sup>[80]</sup>	This longitudinal study was conducted between October 2013 and March 2015 among women aged 17 to 21 years old	The study recruited women through the Youth Centre in Masiphumelele and the Hannan Crusaid Clinic in Gugulethu	Of the study participants, 50 women were living without HIV while 50 were living with HIV	Normal pap smear n=82 (82%) Abnormal pap smear n=18 (18%)	Urban
<b>20. Segondy et al. (2016)</b> Performance of careHPV for detecting high-grade cervical intraepithelial neoplasia among women living with HIV-1 in Burkina Faso and South Africa: HARP study <sup>[81]</sup>	This cross-sectional study was conducted between November 2011 and October 2012 among women aged 25 to 50 years old	The study recruited women from the HIV treatment centres and surrounding primary health care clinics in Hillbrow	Six hundred and twenty-four (624) women living with HIV participated in this study	Normal pap smear n=14 (3%) Abnormal pap smear n=489 (97%)	Urban
<b>21. Ebrahim et al. (2016)</b> High Burden of Human Papillomavirus (HPV) Infection among Young Women in KwaZulu-Natal, South Africa <sup>[27]</sup>	This prospective study was conducted between March 2004 and May 2007 among women aged 14 and 30 years old	The study recruited women who were attending public sector primary health care Clinics for family planning services and management of sexually transmitted infections	Two hundred and twenty-four (224) women living without HIV participated in this study	Cytology data was not reported	Both rural and urban
<b>22. van Aardt et al. (2016)</b> Oncogenic and incidental HPV types associated with histologically confirmed cervical intraepithelial neoplasia in HIV-positive and HIV-negative South African women <sup>[82]</sup>	This descriptive study was conducted between July 2010 and August 2013 among women aged ≥18 years	The study recruited women attending public healthcare facilities in the Tshwane region	Of the study participants, 45 women were living without HIV while 225 were living with HIV	Abnormal pap smear n=270 (100%)	Urban
<b>23. Mbulawa et al. (2016)</b> Xpert human papillomavirus test is a promising cervical cancer screening test for HIV-seropositive women <sup>[83]</sup>	This VICAR-1 study cohort was conducted between November 2009 and August 2011 however, the study	The study recruited women from a HIV treatment clinic Themba Lethu Clinic	One thousand one hundred and ninety-three (1193) women living with HIV participated in this study	Normal pap smear n=321 (27%)	Urban

	sampling period and participants age was not reported			Abnormal pap smears n=872 (73%)	
<b>24. Papasavvas et al. (2016)</b> High-risk oncogenic HPV genotype infection associates with increased immune activation and T cell exhaustion in ART-suppressed HIV-1-infected women <sup>[84]</sup>	This was a cross-sectional study, the study sampling period and age of the participants were not reported	The study participants were initially identified from populations of patients of the Themba Lethu clinic and Clinical HIV Research Unit at the Helen Joseph hospital	Fifty-five (55) women living with HIV participated in this study	Normal pap smear n=16 (29%) Abnormal pap smear n=39 (71%)	Urban
<b>25. Mbatani et al. (2016)</b> Performance of an Human Papillomavirus Test in Samples From Women With Histopathologically Confirmed Invasive Cervical Cancer <sup>[85]</sup>	This prospective study was conducted among women aged 26 to 81 years old. The study sampling period was not reported	The study recruited women diagnosed with clinically invasive cervical cancer	Of the study participants, 36 women were living without HIV while 14 were living with HIV	Abnormal smear n=50 (100%)	Urban
<b>26. Mbulawa et al. (2015)</b> Human papillomavirus prevalence in South African women and men according to age and human immunodeficiency virus status <sup>[86]</sup>	This cross-sectional study was conducted between 2006 and 2009 among women aged 18 to 66 years old	The study recruited women from the Manyanani clinic, Empilisweni centre	Of the study participants, 207 women were living without HIV while 277 were living with HIV	Normal pap smear n= 324 (67%) Abnormal pap smear n=134 (28%)	Township
<b>27. van Aardt et al. (2015)</b> Unique Human Papillomavirus Type Distribution in South African Women With Invasive Cervical Cancer and the Effect of Human Immunodeficiency Virus Infection <sup>[87]</sup>	This retrospective-descriptive study was conducted between January 2003 and ended in December 2004 and 2008 and lasted until July 2011 among women who were 18 years or older	The study recruited women referred for staging and treatment of histologically confirmed invasive cervical cancer	Of the study participants, 154 women were living without HIV while 77 were living with HIV	Abnormal pap smear n=299 (100%)	Urban
<b>28. Tayib et al. (2015)</b> Human papillomavirus genotypes and clinical management of genital warts in women attending a colposcopy clinic in Cape Town, South Africa <sup>[88]</sup>	This prospective-observational study was conducted between April and September 2010 among women aged 15 to 53 years old	The study recruited women who were diagnosed with genital warts referred to the Colposcopy Clinic at Groot Schuur Hospital	Of the study participants, 29 women were living without HIV while 123 were living with HIV	Normal pap smear n=40 (36%) Abnormal pap smear n=72 (64%)	Urban
<b>29. Zeier et al. (2015)</b> Combination antiretroviral therapy reduces the detection risk of cervical human papilloma virus infection in women living with HIV <sup>[89]</sup>	This prospective-cohort study was conducted between November 2009 and October 2011 among women aged 15 to 45 years and older	The study recruited HIV infected women who were cART naïve	Three hundred (300) women living with HIV participated in this study	Normal pap smear n=98 (33%) Abnormal pap smear n=202 (67%)	Not clearly reported
<b>30. Adler et al. (2015)</b> High Risk Human Papillomavirus Persistence Among HIV-infected Young Women in South Africa <sup>[90]</sup>	This longitudinal study was conducted between October 2012 and January 2014 among women aged 17 to 21 years old	The study recruited women who were enrolled through a youth community center	Of the study participants, 50 women were living without HIV while 33 were living with HIV	Cytology data was not reported	Township

<b>31. Lebelo et al. (2015)</b> Detection, Genotyping and Quantitation of Multiple HPV Infections in South African Women With Cervical Squamous Cell Carcinoma <sup>[91]</sup>	This cross-sectional study was conducted between 2008 and 2009 among women aged 25 to 97 years old	The study recruited women at Dr George Mukhari Academic Hospital	Ninety (90) women participated in this study of whom the HIV status was not reported	Abnormal pap smear n=90 (100%)	Peri-urban
<b>32. Ngou et al. (2015)</b> Comparison of Analytical and Clinical Performances of the Digene HC2 HPV DNA Assay and the INNO-LiPA HPV Genotyping Assay for Detecting High-Risk HPV Infection and Cervical Neoplasia Among HIV-Positive African Women <sup>[92]</sup>	This cross-sectional study was conducted between November 2011 and October 2012 among women aged 25 to 50 years old	The study recruited women from Esselen street clinic, a primary health clinic and Ward 21 at Hillbrow community Health Centre	Six hundred and twenty-four (624) women living with HIV participated in this study	Normal pap smear n=40 (6%) Abnormal pap smear n=563 (91%)	Urban
<b>33. Aneur et al. (2014)</b> Comprehensive profiling of the vaginal microbiome in HIV positive women using massive parallel semiconductor sequencing <sup>[93]</sup>	This prospective-cohort study was conducted between 2006 and 2009 among women aged 18 to 49 years old	The study recruited women from a study conducted at the Empilisweni centre	Twenty (20) women living with HIV participated in this study	Normal pap smear n=3 (15%) Abnormal pap smear n=17 (85%)	Urban
<b>34. McDonald et al. (2014)</b> Distribution of human papillomavirus genotypes among HIV-positive and HIV-negative women in Cape Town, South Africa <sup>[19]</sup>	This prospective study was conducted between January 1998 and June 2006 among women aged 35-65 years old	The study recruited women through outreach activities, including handing out fliers at bus and train stations, meeting with church and women's groups in the area and recruited from the general population	Of the study participants, 8050 women were living out HIV while 1371 were living with HIV	Normal pap smear n=8601 (91%) Abnormal pap smear n=820 (9%)	Peri-urban
<b>35. Adler et al. (2014)</b> Cervical Dysplasia and High-Risk Human Papillomavirus Infections among HIV-Infected and HIV-Uninfected Adolescent Females in South Africa <sup>[94]</sup>	This cross-sectional study was conducted between October 2012 and February 2014 among women aged 17 to 21 years old	The study recruited women through a youth community center	Of the study participants, 50 women were living without HIV while 35 were living with HIV	Cytology data was not reported	Township
<b>36. Adler et al. (2013)</b> High Rate of Multiple Concurrent Human Papillomavirus Infections among HIV-Uninfected South African Adolescents <sup>[95]</sup>	This cross-sectional study was conducted between July 2010 and April 2012. The age of the study participants was not reported	The study recruited adolescent females who were being screened for possible recruitment into an HPV vaccine acceptability study	Thirty-nine (39) women living without HIV participated in this study	Cytology data was not reported	Not clearly reported
<b>37. Adler et al. (2013)</b> A Viable and Simple Self-Sampling Method for Human Papillomavirus Detection among South African Adolescents <sup>[96]</sup>	This cross-sectional prevalence study was conducted between July 2010 and April 2012 among women aged 16 to 17 years old	The study recruited women from two urban outpatient clinics	Thirty (30) women participated in this study of whom HIV status was not reported	Cytology data was not reported	Urban

<p><b>38. Denny et al. (2014)</b> Human papillomavirus prevalence and type distribution in invasive cervical cancer in sub-Saharan Africa <sup>[97]</sup></p>	<p>This cross-sectional study was conducted between October 2007 and March 2010 among women aged 21 years old and above</p>	<p>The study recruited women by a gynaecologist as part of routine investigative procedures at the participating hospital</p>	<p>Of the study participants, 147 women were living without HIV while 56 were living with HIV</p>	<p>Abnormal pap smear n=288 (100%)</p>	<p>Not clearly reported</p>
<p><b>39. Richter et al. (2013)</b> Age-specific prevalence of cervical human papillomavirus infection and cytological abnormalities in women in Gauteng Province, South Africa <sup>[98]</sup></p>	<p>This cross-sectional study was conducted between July 2008 and June 2011 among women aged &lt;25-≥55 years old</p>	<p>The study recruited women attending public sector primary health care clinics for routine gynaecological and non-gynaecological primary health care related reasons</p>	<p>One thousand and twenty-four (1524) women living without HIV participated in this study</p>	<p>Normal pap smear n=1217 (83%) Abnormal pap smear n=255 (17%)</p>	<p>Urban</p>
<p><b>40. Ngou et al. (2013)</b> Comparison of careHPV and Hybrid Capture 2 Assays for Detection of High-Risk Human Papillomavirus DNA in Cervical Samples from HIV-1-Infected African Women <sup>[99]</sup></p>	<p>This HARP study was conducted between February and April 2013 among women aged 25 to 50 years old</p>	<p>The study recruited women who were attending their regular research clinic appointment 12 months after enrolment</p>	<p>Seventy-five (75) women living with HIV participated in this study</p>	<p>Cytology data was not reported</p>	<p>Urban</p>
<p><b>41. Dols et al. (2012)</b> PCR-Based Identification of Eight Lactobacillus species and 18 hr-HPV Genotypes in Fixed Cervical Samples of South African Women at Risk of HIV and BV <sup>[100]</sup></p>	<p>This cross-sectional study was conducted among women aged 16 years and above. The study sampling period was not reported</p>	<p>The study recruited women attending the Ndlovu Medical Centre in Elandsdoorn in Moutse District for HIV testing</p>	<p>Of the study participants, 49 women were living without HIV while 51 were living with HIV</p>	<p>Cytology data was not reported</p>	<p>Urban</p>
<p><b>42. Dols et al. (2012)</b> HPV Type Distribution and Cervical Cytology among HIV-Positive Tanzanian and South African Women <sup>[101]</sup></p>	<p>This study was conducted in 2008 among women who were over 18 years of age</p>	<p>The study recruited women from the Ndlovu Medical Centre in Elandsdoorn In Moutse District</p>	<p>Fifty-one (51) women living with HIV participated in this study</p>	<p>Normal pap smear n=35 (69%) Abnormal pap smear n=16 (31%)</p>	<p>Township</p>
<p><b>43. McDonald et al. (2012)</b> Distribution of High-Risk Human Papillomavirus Genotypes among HIV-Negative Women with and without Cervical Intraepithelial Neoplasia in South Africa <sup>[102]</sup></p>	<p>This cross-sectional study was conducted between January 1998 and June 2006 among women aged 17 to 65 years old</p>	<p>The study recruited women from the general population</p>	<p>Eight thousand and fifty (8050) women living without HIV participated in this study</p>	<p>Normal pap smear n=7569 (94%) Abnormal pap smear n=481 (6%)</p>	<p>Peri-urban</p>

<b>44. Meiring et al. (2012)</b> Next-generation sequencing of cervical DNA detects human papillomavirus types not detected by commercial kits <sup>[33]</sup>	This cross-sectional study was conducted in 2007 among women aged 20 to 60 years old	The study recruited women visiting an anti-retroviral (ARV) treatment clinic	One hundred and nine (109) women living with HIV participated in this study	Normal pap smear n=33 (34%) Abnormal pap smear n=65 (66%)	Urban
<b>45. Mbulawa et al. (2012)</b> Impact of Human Immunodeficiency Virus on the Natural History of Human Papillomavirus Genital Infection in South African Men and Women <sup>[16]</sup>	This study was conducted among women aged 18 to 66 years old. The study sampling period was not reported	The study recruited women from the Empilisweni Center for Wellness Studies	Of the study participants, 104 women were living without HIV while 139 were living with HIV	Cytology data was not reported	Township
<b>46. De Vuyst et al. (2012)</b> Prevalence of human papillomavirus in women with invasive cervical carcinoma by HIV status in Kenya and South Africa <sup>[103]</sup>	This case–case study was conducted between August 2007 and June 2009 among women aged <40 to >50 years old	The Study recruited women at two teaching hospitals that concentrate a large proportion of local invasive cervical carcinoma cases: the Kenyatta National Hospital (KNH), Nairobi, Kenya and the Inkosi Albert Luthuli Central Hospital	Of the study participants, 49 women were living without HIV while 60 were living with HIV	Cytology data was not reported	Urban
<b>47. Taylor et al. (2011)</b> A comparison of human papillomavirus testing of clinician-collected and self-collected samples during follow-up after screen-and-treat <sup>[104]</sup>	The study subjects were derived from the randomized clinical trial conducted between June 2000 and December 2002 and 2008 among women aged 35 to 65 years old	Women recruited were derived from the randomized clinical trial evaluating the safety and efficacy of two screen-and-treat approaches for cervical cancer prevention	Of the study participants, 5760 women were living without HIV while 782 were living with HIV	Cytology data was reported yet not clear enough	Township
<b>48. Auvert et al. (2011)</b> High-Risk Human Papillomavirus Is Associated with HIV Acquisition among South African Female Sex Workers <sup>[105]</sup>	This longitudinal study was conducted between 1996 and 2000 among women aged 19 to 45 years old	The study recruited South African female sex workers	Eighty-eight (88) women living without HIV participated in this study	Cytology data was not reported	Urban
<b>49. Wang et al. (2011)</b> Rapid Rise in Detection of Human Papillomavirus (HPV) Infection Soon After Incident HIV Infection Among South African Women <sup>[106]</sup>	This study was conducted between June 2000 and December 2002 among women aged 35 to 65 years old	The study participants were recruited in Khayelitsha	Of the study participants, 4895 women were living without HIV while 700 were living with HIV	Normal pap smear n=not reported Abnormal pap smear n=542 (10%)	Township
<b>50. Mbulawa et al. (2010)</b> Influence of human immunodeficiency virus and CD4 count on the prevalence of human papillomavirus in heterosexual couples <sup>[107]</sup>	This cross-sectional study was conducted between 2006 and 2009 among women aged 18 to 66 years old	The study recruited women for investigations of genital HPV transmission but were ineligible for an HIV transmission trial or	Of the study participants, 207 women were living without HIV while 277 were living with HIV	Cytology data was not reported	Township



		had completed the HIV transmission trial			
<b>51. Firnhaber et al. (2010)</b> Association between cervical dysplasia and human papillomavirus in HIV seropositive women from Johannesburg South Africa [108]	This cross-sectional observational study was conducted among women aged 18 to 65 years old. The study sampling period was not reported	The study recruited women from an adult HIV outpatient clinic in a teaching hospital	One thousand and ten (1010) women living with HIV participated in this study	Normal pap smear n=507 (50%) Abnormal pap smear n=503 (50%)	Urban
<b>52. Firnhaber et al. (2009)</b> Diverse and High Prevalence of Human Papillomavirus Associated with a Significant High Rate of Cervical Dysplasia in Human Immunodeficiency Virus-Infected Women in Johannesburg, South Africa [109]	This cross-sectional study was conducted among women aged 18 to 65 years old. The study sampling period was not reported	The study recruited women from an adult HIV government outpatient clinic in a tertiary teaching hospital	One forty-eight (148) women living with HIV participated in this study	Normal pap smear n=64 (43%) Abnormal pap test n=83 (56%)	Urban
<b>53. Mbulawa et al. (2009)</b> Genital Human Papillomavirus Prevalence and Human Papillomavirus Concordance in Heterosexual Couples Are Positively Associated with Human Immunodeficiency Virus Coinfection [36]	This cross-sectional study was conducted between 2006 and 2009 among women aged 18 to 66 years old	The study recruited women for investigations of genital HPV transmission but were ineligible for an HIV transmission trial or had completed the HIV transmission trial	Of the study participants, 107 women were living without HIV while 145 were living with HIV	Cytology data was not reported	Township
<b>54. Moodley et al. (2009)</b> Human papillomavirus prevalence, viral load and pre-cancerous lesions of the cervix in women initiating highly active antiretroviral therapy in South Africa: a cross-sectional study [110]	This cross-sectional study was conducted between January and May 2007 among women aged 20 to 60 years old	The study recruited women from an ART treatment clinic	One hundred and nine (109) women living with HIV participated in this study	Normal pap smear n=33 (34%) Abnormal pap smear n=65 (66%)	Urban
<b>55. Said et al. (2009)</b> HPV genotypes in women with squamous intraepithelial lesions and normal cervixes participating in a community-based microbicide study in Pretoria, South Africa [111]	This was a cross-sectional study. The study sampling period and the age of study participants were not reported	The study recruited women who were participating in a phase III microbicide	One fifty-nine (159) women participated in this study of whom the HIV status was not reported	Normal pap smear n=103 (65%) Abnormal pap smear n=56 (35%)	Urban
<b>56. Richter et al. (2008)</b> Human papilloma virus types in the oral and cervical mucosa of HIV-positive South African women prior to antiretroviral therapy [112]	This study was conducted among women aged 22 to 64 years old. The study sampling period was not reported	The study recruited women attending the Antiretroviral Clinic at the Pretoria Academic Hospital, for initiation of antiretroviral treatment	Thirty (30) women living with HIV participated in this study	Normal pap smear n=16 (53%) Abnormal pap smear n=14 (47%)	Urban
<b>57. Marais et al. (2008)</b> Cervical and Oral Human Papillomavirus Types in HIV-1 Positive and Negative Women With Cervical Disease in South Africa [113]	This cross-sectional study was conducted among women aged 22 to 62 years old. The study sampling period was not reported	The study recruited women who were amongst the first time attendees of the Colposcopy Clinic at Groote Schuur Hospital	Of the study participants, 78 women were living without HIV while 37 were living with HIV	Normal pap smear n=29 (25%) Abnormal pap smear 85 (74%)	Urban

<b>58. Marais et al. (2008)</b> Cervical Human Papillomavirus (HPV) Infection and HPV Type 16 Antibodies in South African Women <sup>[114]</sup>	This case-control study was conducted among women aged 18 to 59 years old. The study sampling period was not reported	The study recruited women from hospitals or clinics	Of the study participants, 225 women were living without HIV while 502 were living with HIV	Normal pap smear n=848 (85%) Abnormal pap smear n=155 (15%)	Urban
<b>59. Allan et al. (2008)</b> Cervical Human Papillomavirus (HPV) Infection in South African Women: Implications on HPV Screening and Vaccine Strategies <sup>[115]</sup>	This case control study was conducted between January 1998 and December 2001 among women aged 21 to 59 years old	The study recruited women attending hospitals and community health services with primary diagnoses such as trauma or acute infections that were judged to be independent of contraceptive use or cervical cancer risk	One thousand four hundred and ninety one (1491) women participated in this study of whom the HIV status was not reported	Normal pap smear n=1264 (85%) Abnormal pap smear n=2279 (15%)	Not clearly reported
<b>60. Jones et al. (2007)</b> Agreement between Self- and Clinician-Collected Specimen Results for Detection and Typing of High-Risk Human Papillomavirus in Specimens from Women in Gugulethu, South Africa <sup>[116]</sup>	This cross-sectional study was conducted between January and August 2002 among women who were 18 years and older	The study recruited women who were attending the clinic with reproductive tract infection (RTI) symptoms (RTI group) and those attending for any other reason (non-RTI group)	Four hundred and fifty (450) women participated in this study of whom the HIV status was not reported	Normal pap smear n=368 (83%) Abnormal pap smear n=75 (17%)	Peri-urban
<b>61. Kay et al. (2003)</b> High Prevalence of HPV 16 in South African Women With Cancer of the Cervix and Cervical Intraepithelial Neoplasia <sup>[117]</sup>	This cross-sectional study was conducted between April 1993 and November 1993 among women aged 19 to 77 years old	The study recruited women at Groote Schuur Hospital and colposcopy clinic	One hundred and ninety seven (197) women participated in this study of whom the HIV status was not reported	Abnormal pap smear n=197 (100%)	Urban
<b>62. Wright et al. (2000)</b> HPV DNA testing of self-collected vaginal samples compared with cytologic screening to detect cervical cancer <sup>[118]</sup>	This cross-sectional observational study was conducted between January 1998 and April 1999 among women aged 35 to 65 years old	The study recruited women from the outpatient clinics	One thousand four hundred and fifteen (1415) women participated in this study of whom the HIV status was not reported	Normal pap smear n=1269 (93%) Abnormal pap smear n=96 (7%)	Peri-urban
<b>63. Kuhn et al. (2000)</b> Human Papillomavirus DNA Testing for Cervical Cancer Screening in Low-Resource Settings <sup>[119]</sup>	This study was conducted among women who were between the ages of 35 to 65 years old. The study sampling period was not reported	The study recruited women at a primary care clinical site	Two thousand nine hundred and forty-four (2944) women participated in this study of whom the HIV status was not reported	Normal pap smear n=2680 (94%) Abnormal pap smear n=181 (6%)	Peri-urban
<b>64. Ramesar et al. (1996)</b> Human papillomavirus in normal cervical smears from Cape Town <sup>[120]</sup>	This study was conducted among women who were between the ages of 19 to 85 years old. The study sampling period was not reported	The study recruited women attending the family planning clinic of the Gynaecology Department at Groote Schuur Hospital, and women consulting several private gynaecology practices in the Cape Town metropolitan area	Two hundred and six (206) women participated in this study of whom the HIV status was not reported	Normal pap smear n=192 (93%) Abnormal pap smear n=14 (7%)	Urban
<b>65. Williamson et al. (1994)</b>	This study was conducted among women who were between the ages	The study women recruited attending the Gynaecological	Sixty-eight (68) women participated in this study of	Abnormal pap smear n=68 (100%)	Urban

Typing of Human Papillomaviruses in Cervical Carcinoma Biopsies From Cape Town <sup>[121]</sup>	of 28 to 77 years old. The study did not report the sampling period	Oncology Clinic at Groote Schuur Hospital	whom the HIV status was not reported		
<b>66. Copper et al. (1992)</b> Integration of human papillomavirus types 16 and 18 in-cervical adenocarcinoma <sup>[122]</sup>	This study used the archived samples collected between 1988 and 1991. The age of the study participants was not reported	The study participants were obtained from the surgical files of King Edward VIII Hospital, Durban, South Africa (SA)	Twenty-two (22) women participated in this study of whom the HIV status was not reported	Abnormal pap smear n=22 (100%)	Urban
<b>67. Cooper et al. (1991)</b> In situ human papillomavirus (HPV) genotyping of cervical intraepithelial neoplasia in South African and British patients: Evidence for putative HPV integration in vivo <sup>[123]</sup>	This cross-sectional study was conducted in 1988 among women aged 15 to 50 years old	The study recruited women randomly from the routine surgical file of the King Edward VIII hospital	Seventy-two (72) women participated in this study of whom the HIV status was not reported	Abnormal pap smear n=72 (100%)	Urban
<b>68. Copper et al. (1991)</b> In situ evidence for HPV 16,18,33 integration in cervical squamous cell cancer in Britain and South Africa <sup>[124]</sup>	This cross sectional study was conducted between 1988 and 1990 among women who were younger than 30 to 60 years and above	The study recruited women with cervical squamous cell cancer from the surgical file of the King Edward VIII hospital	Sixty-nine (69) women participated in this study of whom the HIV status was not reported	Abnormal pap smear n=69 (100%)	Urban
<b>69. Williamson et al. (1989)</b> Typing of Human Papillomaviruses in Cervical Intraepithelial Neoplasia Grade 3 Biopsies From Cape Town <sup>[125]</sup>	The study sampling period and age of the study participants were not reported	The study participants were recruited at the Groote Schuur Hospital colposcopy clinic	Ninety-eight (98) women participated in this study of whom the HIV status was not reported	Abnormal pap smear n=98 (100%)	Urban

**TABLE 2: Individual studies, collection devices and diagnostic HPV genotyping tools used across South Africa, n=69**

Author (year) and study title	Sample type, sampling device and genotyping technique	Province in South Africa
<b>1. Mbulawa et al. (2021)</b> High human papillomavirus prevalence among females attending high school in the Eastern Cape Province of South Africa [21]	The sample type comprised self-collected specimens collected using the Evalyn brush. HPV genotyping was conducted using Roche's Linear Array HPV Test	Eastern Cape
<b>2. Taku et al. (2021)</b> Distribution of Human Papillomavirus (HPV) Genotypes in HIV-Negative and HIV-Positive Women with Cervical Intraepithelial Lesions in the Eastern Cape Province, South Africa [63]	The sample type comprised cervical specimens collected using a Viba-brush. HPV genotyping was conducted using HPV direct-flow chip	Eastern Cape
<b>3. Saidu et al. (2021)</b> Performance of Xpert HPV on Self-collected Vaginal Samples for Cervical Cancer Screening Among Women in South Africa [64]	The sample type comprised self-sampled specimens collected using a standard flock tip swab while cervical specimens were obtained using an extended tip plastic spatula and an endocervical cytobrush. HPV genotyping was conducted using Xpert HPV	Western Cape
<b>4. Taku et al. (2021)</b> Detection of sexually transmitted pathogens and co-infection with human papillomavirus in women residing in rural Eastern Cape, South Africa [65]	The sample type comprised cervical specimens collected using a cervical brush. HPV genotyping was conducted using Hybrid Capture 2	Eastern Cape
<b>5. Chambuso et al. (2020)</b> Age, absolute CD4 count, and CD4 percentage in relation to HPV infection and the stage of cervical disease in HIV-1-positive women [66]	The sample type comprised biopsy specimens, collection device was not reported. HPV genotyping was conducted using Roche's Linear Array HPV Test	Western Cape
<b>6. Aku et al. (2020)</b> Acceptability of self- collection for human papillomavirus detection in the Eastern Cape, South Africa [67]	The sample type comprised cervical specimens collected using cervical brushes while self-collected specimens were collected using Viba-brushes. HPV genotyping was conducted using Digene Hybrid Capture 2 and hpVIR real-time PCR assay	Eastern Cape
<b>7. Kuhn et al. (2020)</b> Clinical evaluation of modifications to a human papillomavirus assay to optimise its utility for cervical cancer screening in low-resource settings: a diagnostic accuracy study [68]	The sample type comprised cervical specimens collected using a plastic spatula with an endocervical cytobrush. HPV genotyping was conducted using Xpert HPV	Western Cape
<b>8. Johnson et al. (2020)</b> Selecting human papillomavirus genotypes to optimize the performance of screening tests among South African women [69]	The sample type comprised cervical specimens collected using a cytobrush and plastic spatula. HPV genotyping was conducted using Roche's Linear Array HPV Test and Xpert HPV	Western Cape
<b>9. Taku et al. (2020)</b> Human papillomavirus prevalence and risk factors among HIV-negative and HIV-positive women residing in rural Eastern Cape, South Africa [70]	The sample type comprised cervical specimens collected using a cervical brush. HPV genotyping was conducted using Hybrid Capture 2	Eastern Cape
<b>10. van de Wijgert et al. (2020)</b> Human papillomavirus infection and cervical dysplasia in HIV-positive women: potential role of the vaginal microbiota [71]	The sample type comprised cervical specimens collected using a Digene cervical sampler. HPV genotyping was conducted using INNO-LiPA	Gauteng
<b>11. Chikandiwa et al. (2018)</b> Prevalence, incidence and correlates of low risk HPV infection and anogenital warts in a cohort of women living with HIV in Burkina Faso and South Africa [72]	The sample type comprised cervical specimens collected using Digene cervical sampler. HPV genotyping was conducted using INNO-LiPA	Burkina Faso and South Africa (Gauteng)
<b>12. Mbulawa et al. (2018)</b> High human papillomavirus (HPV) prevalence in South African adolescents and young women encourages expanded HPV vaccination campaigns [73]	The sample type comprised cervical specimens collected using Digene cervical sampler. HPV genotyping was conducted using Roche's Linear Array Test	Western Cape
<b>13. Mbatha et al. (2017)</b> High-risk human papillomavirus types in HIV-infected and HIV-uninfected young women in	The sample type comprised cervicovaginal specimens collected by spraying 10 ml of saline on the cervix four times before drawing it back into the syringe and	KwaZulu-Natal

KwaZulu-Natal, South Africa: implications for vaccination <sup>[74]</sup>	depositing it into the sterile tube. HPV genotyping was conducted using genotyped by enzyme immunoassay (EIA)	
<b>14. Mbatha et al. (2017)</b> Self-sampling for human papillomavirus testing among rural young women of KwaZulu-Natal, South Africa <sup>[75]</sup>	The sample type comprised self-sampled specimens collected using a Dacron swab and Viba brush. HPV genotyping was conducted using an enzyme immunoassay (EIA).	KwaZulu-Natal
<b>15. Kelly et al. (2017)</b> Epidemiology of high-risk human papillomavirus and cervical lesions in African women living with HIV/AIDS: effect of anti-retroviral therapy <sup>[76]</sup>	The sample type comprised cervical specimens collected using Digene cervical sampler. HPV genotyping was conducted using INNO-LiPA	Burkina Faso and South Africa (Gauteng)
<b>16. Kelly et al. (2017)</b> Associations of Human Papillomavirus (HPV) genotypes with high-grade cervical neoplasia (CIN2+) in a cohort of women living with HIV in Burkina Faso and South Africa <sup>[77]</sup>	The sample type comprised cervical specimens collected using Digene and careHPV cervical samplers. HPV genotyping was conducted using INNO-LiPA	Burkina Faso and South Africa (Gauteng)
<b>17. Dylla et al. (2017)</b> Human papillomavirus clustering patterns among HIV-infected and HIV-uninfected adolescent females in South Africa <sup>[78]</sup>	The sample type comprised self-sampled specimens collected using a Dacron swab. HPV genotyping was conducted using Roche's Linear Array HPV Test	Western Cape
<b>18. Rad et al. (2017)</b> HPV types in cervical cancer tissue in South Africa: A head-to-head comparison by mRNA and DNA tests <sup>[79]</sup>	The sample type comprised biopsy specimens, the collection device was not reported. HPV genotyping was conducted using Reverse line blot (RLB) assay and PreTect HPV-proofer.	Gauteng
<b>19. Adler et al. (2016)</b> Cumulative Impact of HIV and Multiple Concurrent Human Papillomavirus Infections on the Risk of Cervical Dysplasia <sup>[80]</sup>	The sample type comprised self-collected specimens collected using a Dacron swab. HPV genotyping was conducted using Roche's Linear Array Test	Western Cape
<b>20. Segondy et al. (2016)</b> Performance of careHPV for detecting high-grade cervical intraepithelial neoplasia among women living with HIV-1 in Burkina Faso and South Africa: HARP study <sup>[81]</sup>	The sample type comprised cervical specimens collected using a careHPV sample collection device. HPV genotyping was conducted using careHPV and INNO-LiPA	Burkina Faso and South Africa (Gauteng)
<b>21. Ebrahim et al. (2016)</b> High Burden of Human Papillomavirus (HPV) Infection among Young Women in KwaZulu-Natal, South Africa <sup>[27]</sup>	The sample type comprised cervicovaginal specimens, the collection device was not reported. HPV genotyping was conducted using Roche's Linear Array Test	KwaZulu-Natal
<b>22. Van Aardt et al. (2016)</b> Oncogenic and incidental HPV types associated with histologically confirmed cervical intraepithelial neoplasia in HIV-positive and HIV-negative South African women <sup>[82]</sup>	The sample type comprised biopsy specimens, the collection device was not reported. HPV genotyping was conducted using Roche's Linear Array HPV Test	Gauteng
<b>23. Mbulawa et al. (2016)</b> Xpert human papillomavirus test is a promising cervical cancer screening test for HIV-seropositive women <sup>[83]</sup>	The sample type comprised cervical specimens collected using a Digene cervical sampler. HPV genotyping was conducted using Xpert HPV	Gauteng
<b>24. Papisavvas et al. (2016)</b> High-risk oncogenic HPV genotype infection associates with increased immune activation and T cell exhaustion in ART-suppressed HIV-1-infected women <sup>[84]</sup>	The sample type comprised cervical specimens collected using a Digene DNA Collection Device (brush). HPV genotyping was conducted using Roche's Linear Array HPV Test	Gauteng
<b>25. Mbatani et al. (2016)</b> Performance of an Human Papillomavirus Test in Samples From Women With Histopathologically Confirmed Invasive Cervical Cancer <sup>[85]</sup>	The sample type comprised cervical specimens collected using a cervical brush. HPV genotyping was conducted using Cobas HPV test, Roche's Linear Array HPV Test and Hybrid Capture 2	Western Cape
<b>26. Mbulawa et al. (2015)</b> Human papillomavirus prevalence in South African women and men according to age and human immunodeficiency virus status <sup>[86]</sup>	The sample type comprised cervical specimens collected using Digene cervical samplers. HPV genotyping was conducted using Roche's Linear Array Test	Western Cape
<b>27. Van Aardt et al. (2015)</b> Unique Human Papillomavirus Type Distribution in South African Women With	The sample type comprised biopsy specimens collected using punch biopsy forceps. HPV	Gauteng

Invasive Cervical Cancer and the Effect of Human Immunodeficiency Virus Infection <sup>[87]</sup>	genotyping was conducted using Roche's Linear Array HPV Test	
<b>28. Tayib et al. (2015)</b> Human papillomavirus genotypes and clinical management of genital warts in women attending a colposcopy clinic in Cape Town, South Africa <sup>[88]</sup>	The sample type comprised biopsy specimens, the collection device was not reported. HPV genotyping was conducted using Roche's Linear Array Test	Western Cape
<b>29. Zeier et al. (2015)</b> Combination antiretroviral therapy reduces the detection risk of cervical human papilloma virus infection in women living with HIV <sup>[89]</sup>	The sample type comprised cervical specimens collected using a cervex brush. HPV genotyping was conducted using Roche's Linear Array Test	Province not reported
<b>30. Adler et al. (2015)</b> High Risk Human Papillomavirus Persistence Among HIV-infected Young Women in South Africa <sup>[90]</sup>	The sample type comprised self-sampled specimens collected using a Dacron swab. HPV genotyping was conducted using Roche's Linear Array HPV Test	Western Cape
<b>31. Lebelo et al. (2015)</b> Detection, Genotyping and Quantitation of Multiple HPV Infections in South African Women With Cervical Squamous Cell Carcinoma <sup>[91]</sup>	The sample type comprised biopsy specimens collection device was not reported. HPV genotyping was conducted using TaqMan-based quantitative qPCR	Gauteng
<b>32. Ngou et al. (2015)</b> Comparison of Analytical and Clinical Performances of the Digene HC2 HPV DNA Assay and the INNO-LiPA HPV Genotyping Assay for Detecting High-Risk HPV Infection and Cervical Neoplasia Among HIV-Positive African Women <sup>[92]</sup>	The sample type comprised cervical specimens collected using Digene cervical sampler. HPV genotyping was conducted using Hybrid Capture 2 and the INNO-LiPA	Burkina Faso and South Africa (Gauteng)
<b>33. Ameer et al. (2014)</b> Comprehensive profiling of the vaginal microbiome in HIV positive women using massive parallel semiconductor sequencing <sup>[93]</sup>	The sample type comprised cervical specimens collected using Digene cervical sampler. HPV genotyping was conducted using Roche's Linear Array Test, HPVIR real-time PCR, and Massively parallel DNA sequencing	Western Cape
<b>34. McDonald et al. (2014)</b> Distribution of human papillomavirus genotypes among HIV-positive and HIV-negative women in Cape Town, South Africa <sup>[19]</sup>	The sample type comprised cervical specimens collected using a plastic spatula and cytobrush. HPV genotyping was conducted using Hybrid Capture 2 and Roche's Linear Array Test	Western Cape
<b>35. Adler et al. (2014)</b> Cervical Dysplasia and High-Risk Human Papillomavirus Infections among HIV-Infected and HIV-Uninfected Adolescent Females in South Africa <sup>[94]</sup>	The sample type comprised self-sampled specimens collected using a Dacron swab. HPV genotyping was conducted using Roche's Linear Array HPV Test	Western Cape
<b>36. Adler et al. (2013)</b> High Rate of Multiple Concurrent Human Papillomavirus Infections among HIV Uninfected South African Adolescents <sup>[95]</sup>	The sample type comprised cervical specimens, the collection device was not reported. HPV Genotyping was performed using Roche's Linear Array	Province not reported
<b>37. Adler et al. (2013)</b> A Viable and Simple Self-Sampling Method for Human Papillomavirus Detection among South African Adolescents <sup>[96]</sup>	The sample type comprise self-sampled specimens collected using a Dacron swab. HPV genotyping was conducted using Roche's Linear Array HPV Test	Gauteng
<b>38. Denny et al. (2014)</b> Human papillomavirus prevalence and type distribution in invasive cervical cancer in sub-Saharan Africa <sup>[97]</sup>	The sample type comprised biopsy specimens collection device was not reported. HPV genotyping was conducted using Roche's Linear Array Test	Ghana, Nigeria, and South Africa (Province in South Africa was not reported)
<b>39. Richter et al. (2013)</b> Age-specific prevalence of cervical human papillomavirus infection and cytological abnormalities in women in Gauteng Province, South Africa <sup>[98]</sup>	The sample type comprised biopsy specimens collected using dry swabs and tampons. HPV genotyping was conducted using Roche's Linear Array Test	Gauteng
<b>40. Ngou et al. (2013)</b> Comparison of <i>care</i> HPV and Hybrid Capture 2 Assays for Detection of High-Risk Human Papillomavirus DNA in Cervical Samples from HIV-1-Infected African Women <sup>[99]</sup>	The sample type comprised cervical specimens collected using a Digene cervical sampler and <i>care</i> HPV sample collection device. HPV genotyping was conducted using <i>care</i> HPV and Hybrid Capture 2 and INNO-LiPA	Burkina Faso and South Africa (Gauteng)

<b>41. Dols et al. (2012)</b> PCR-Based Identification of Eight Lactobacillus species and 18 hr-HPV Genotypes in Fixed Cervical Samples of South African Women at Risk of HIV and BV <sup>[100]</sup>	The sample type comprised cervical specimens collected using a standard sampling brush. HPV genotyping was conducted using INNO LiPA	Limpopo
<b>42. Dols et al. (2012)</b> HPV Type Distribution and Cervical Cytology among HIV-Positive Tanzanian and South African Women <sup>[101]</sup>	The sample type comprised cervical specimens collected using a standard sampling brush. HPV genotyping was conducted using INNO LiPA	Tanzania and South Africa (Limpopo)
<b>43. McDonald et al. (2012)</b> Distribution of High-Risk Human Papillomavirus Genotypes among HIV-Negative Women with and without Cervical Intraepithelial Neoplasia in South Africa <sup>[102]</sup>	The sample type comprised cervical specimens collected using a plastic spatula and cytobrush. HPV genotyping was conducted using Hybrid Capture 2 and Roche's Linear Array Test	Western Cape
<b>44. Meiring et al. (2012)</b> Next-generation sequencing of cervical DNA detects human papillomavirus types not detected by commercial kits <sup>[33]</sup>	The sample type comprised cervical specimens collected using a Digene cervical sampler. HPV genotyping was conducted using Roche's Linear Array Test and Illumina sequencing	Western Cape
<b>45. Mbulawa et al. (2012)</b> Impact of Human Immunodeficiency Virus on the Natural History of Human Papillomavirus Genital Infection in South African Men and Women <sup>[16]</sup>	The sample type comprised cervical specimens collected using a Digene cervical sampler. HPV genotyping was conducted using Roche's Linear Array HPV Test	Western Cape
<b>46. De Vuyst et al. (2012)</b> Prevalence of human papillomavirus in women with invasive cervical carcinoma by HIV status in Kenya and South Africa <sup>[103]</sup>	The sample type comprised biopsy specimens, the collection device was not reported. HPV genotyping was conducted using an enzyme immunoassay (EIA)	Kenya and South Africa (KwaZulu-Natal)
<b>47. Taylor et al. (2011)</b> A comparison of human papillomavirus testing of clinician-collected and self-collected samples during follow-up after screen-and-treat <sup>[104]</sup>	The sample type comprised self-collected specimens collected using a Dacron swab, while for cervical specimens, a plastic spatula and a cytobrush were used. HPV genotyping was conducted using Hybrid Capture 2	Western Cape
<b>48. Auvert et al. (2011)</b> High-Risk Human Papillomavirus Is Associated with HIV Acquisition among South African Female Sex Workers <sup>[105]</sup>	The sample type comprised cervicovaginal specimens, the collection device was not reported. HPV genotyping was conducted using Roche's Linear Array Test	Gauteng and KwaZulu-Natal
<b>49. Wang et al. (2011)</b> Rapid Rise in Detection of Human Papillomavirus (HPV) Infection Soon After Incident HIV Infection Among South African Women <sup>[106]</sup>	The sample type comprised cervical specimens collection device was not reported. HPV genotyping was conducted using Roche's Linear Array HPV Test and Hybrid Capture 2	Western Cape
<b>50. Mbulawa et al. (2010)</b> Influence of human immunodeficiency virus and CD4 count on the prevalence of human papillomavirus in heterosexual couples <sup>[107]</sup>	The sample type comprised cervical specimens collected using a Digene cervical sampler. HPV genotyping was conducted using Roche's Linear Array HPV Test	Western Cape
<b>51. Firnhaber et al. (2010)</b> Association between cervical dysplasia and human papillomavirus in HIV seropositive women from Johannesburg South Africa <sup>[108]</sup>	The sample type comprised cervical specimens collected using a using endocervical brush. HPV genotyping was conducted using Roche's Linear Array Test	Gauteng
<b>52. Firnhaber et al. (2009)</b> Diverse and High Prevalence of Human Papillomavirus Associated with a Significant High Rate of Cervical Dysplasia in Human Immunodeficiency Virus-Infected Women in Johannesburg, South Africa <sup>[109]</sup>	The sample type comprised cervical specimens, a collection device was not reported. HPV genotyping was conducted using Roche's Linear Array HPV Test	Gauteng
<b>53. Mbulawa et al. (2009)</b> Genital Human Papillomavirus Prevalence and Human Papillomavirus Concordance in Heterosexual Couples Are Positively Associated with Human Immunodeficiency Virus Coinfection <sup>[36]</sup>	The sample type comprised cervical specimens collected using a Digene cervical sampler. HPV genotyping was conducted using Roche's Linear Array Test	Western Cape
<b>54. Moodley et al. (2009)</b> Human papillomavirus prevalence, viral load and pre-cancerous lesions of the cervix in women initiating highly active antiretroviral	The sample type comprised cervical specimens collected using a Digene cervical sampler. HPV genotyping was conducted using Hybrid Capture 2 and Roche's Linear Array Test	Western Cape

therapy in South Africa: a cross-sectional study [110]		
<b>55. Said et al. (2009)</b> HPV genotypes in women with squamous intraepithelial lesions and normal cervixes participating in a community-based microbicide study in Pretoria, South Africa [111]	The sample type comprised cervical specimens collected using a cytobrush. HPV genotyping was conducted using Roche's Linear Array Test	Gauteng
<b>56. Richter et al. (2008)</b> Human papilloma virus types in the oral and cervical mucosa of HIV-positive South African women prior to antiretroviral therapy [112]	The sample type comprised cervical specimens collected using a Cytobrush Plus cell collector. HPV genotyping was conducted using Roche's Linear Array HPV Test	Gauteng
<b>57. Marais et al. (2008)</b> Cervical and Oral Human Papillomavirus Types in HIV-1 Positive and Negative Women With Cervical Disease in South Africa [113]	The sample type comprised cervical specimens collected using a Digene cervical samplers. HPV genotyping was conducted using Roche's Linear Array Test	Western Cape
<b>58. Marais et al. (2008)</b> Cervical Human Papillomavirus (HPV) Infection and HPV Type 1 Antibodies in South African Women [114]	The sample type comprised cervical scrapings (biopsy) specimens, a collection device was not reported. HPV genotyping was conducted using Roche's Linear Array Test	Western Cape
<b>59. Allan et al. (2008)</b> Cervical Human Papillomavirus (HPV) Infection in South Africa Women: Implications for HPV Screening and Vaccine Strategies [115]	The sample type comprised cervical specimens, the collection device was not reported. HPV genotyping was conducted using Roche's Linear Array Test	Western Cape
<b>60. Jones et al. (2007)</b> Agreement between Self- and Clinician-Collected Specimen Results for Detection and Typing of High-Risk Human Papillomavirus in Specimens from Women in Gugulethu, South Africa [116]	The sample type comprised cervical specimens collected using a Digene cervical sampling brush, self-collected swabs or tampons were also collected. HPV genotyping was conducted using Roche's Linear Array Test and Hybrid Capture 2	Western Cape
<b>61. Kay et al. (2003)</b> High Prevalence of HPV 16 in South African Women With Cancer of the Cervix and Cervical Intraepithelial Neoplasia [117]	The sample type comprised biopsy specimens, collection device was not reported. Restriction fragment length polymorphism (RFLP) was employed, HPV genotyping was also done by Direct sequencing	Western Cape
<b>62. Kuhn et al. (2000)</b> Human Papillomavirus DNA Testing for Cervical Cancer Screening in Low-Resource Settings [118]	The sample type comprised cervical specimens collected using an extended tip plastic spatula with endocervical cytobrush. HPV genotyping was conducted using Hybrid Capture I and HC2	Western Cape
<b>63. Wright et al. (2000)</b> HPV DNA testing of self-collected vaginal samples compared with cytologic screening to detect cervical cancer [119]	The sample type comprised self-sampled and cervical specimens collected using a Dacron swab and a special conically shaped brush. HPV genotyping was conducted using Hybrid Capture 2	Western Cape
<b>64. Ramesar et al. (1996)</b> Human papillomavirus in normal cervical smears from Cape Town [120]	The sample type comprised biopsy specimens collected using a spatula. HPV genotyping was conducted using Southern blot hybridisation	Western Cape
<b>65. Williamson et al. (1994)</b> Typing of Human Papillomaviruses in Cervical Carcinoma Biopsies From Cape Town [121]	The sample type comprised biopsy specimens collection device was not reported. HPV genotyping was conducted using Southern blot hybridisation and Sequencing	Western Cape
<b>66. Cooper et al. (1992)</b> Integration of human papillomavirus types 16 and 18 in-cervical adenocarcinoma [122]	The sample type comprised biopsy specimens collection device was not reported. HPV genotyping was conducted using Non-isotopic in situ hybridization (NISH)	Britain and South Africa (KwaZulu-Natal)
<b>67. Copper et al. (1991)</b> In situ evidence for HPV 16,18,33 integration in cervical squamous cell cancer in Britain and South Africa [123]	The sample type comprised biopsy specimens, a collection device was not reported. HPV genotyping was conducted using Non-isotopic in situ hybridization (NISH)	Britain and South Africa (KwaZulu-Natal)
<b>68. Cooper et al. (1991)</b> In situ human papillomavirus (HPV) genotyping of cervical intraepithelial neoplasia in South African and British patients: Evidence for putative HPV integration in vivo [124]	The sample type comprised biopsy specimens collection device was not reported. HPV genotyping was conducted using non-isotopic in situ hybridization (NISH)	Britain and South Africa (KwaZulu-Natal)



<b>69. Williamson et al. (1989)</b> Typing of Human Papillomaviruses in Cervical Intraepithelial Neoplasia Grade 3 Biopsies From Cape Town <sup>[125]</sup>	The sample type comprised biopsy specimens collection device was not reported. HPV genotyping was conducted using Southern blotting hybridization	Western Cape
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**TABLE 3: Estimated prevalence of 14 known hrHPV types across 46 studies regardless of HIV status in South Africa**

		HPV type 16	HPV type 18	HPV type 31	HPV type 33	HPV type 35	HPV type 39	HPV type 45	HPV type 51	HPV type 52	HPV type 56	HPV type 58	HPV type 59	HPV type 68	HPV type 70
Total number of participants (n) who tested positive for HPV		2700	1270	795	829	1491	631	1045	991	1110	703	1120	656	637	226
Overall number of participants	30,677														
Prevalence (%)		8,80	4,14	2,59	2,70	4,86	2,06	3,41	3,23	3,62	2,29	3,65	2,14	2,08	0,74





**Abbreviations:**

AIDS, Acquired immunodeficiency syndrome

ART, Antiretroviral therapy

CC, Cervical cancer

CD4, Cluster of differentiation

CIN, Cervical intraepithelial neoplasia

DNA, Deoxyribonucleic acid

EIA, Enzyme immunoassay

HC2, Hybrid capture 2

HIV, Human Immunodeficiency virus

HPV, Human papillomavirus

ICC, Invasive cervical cancer

LA, Linear array

LR/HR, Low/high risk

n, Number

NISH, Non isotopic in situ hybridization

NGS, Next generation sequencing

P, P value

PCR, Polymerase chain reaction

RFLP, Restriction fragment length polymorphism

RLB, Reverse line blot

STI, Sexually transmitted infections