

PAEDIATRIC & ADOLESCENT HIV VIRAL LOAD MONITORING, 2014-2020

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Summary

Between July 2019 and June 2020, HIV viral load testing coverage among children and adolescents living with HIV aged <15 years and 15-19 years was approximately 51% and 57%, respectively. Among all children and adolescents (0-19 years of age) with an HIV viral load, 49.7% (130 952) were virally suppressed (<50 RNA copies per millilitre [cps/ml]), 22.7% (59 779) had low-level viraemia (50–<1 000 RNA cps/ml) and 27.6% (72 774) had a VL >1 000 RNA cps/ml. Over the past six and half years, improvement in the overall paediatric and adolescent suppression rate (<50 RNA cps/ml) has been modest at only 7.3%, although some sub-populations (<1 years and 15-19 years) have demonstrated greater improvement than other age groups. Differences in HIV viral load suppression between males and females were apparent among all paediatric and adolescent age groups, with 51.8% of females compared with 46.8% of males 0-19 years of age suppressed between July 2019 and June 2020. There are considerable differences in the volume of HIV viral load testing and suppression rates among South Africa's nine provinces. Whereas KwaZulu-Natal Province has the second highest viral suppression rate, it remains the province with the highest number of unsuppressed children and adolescents living with HIV.

Introduction

In 2014, UNAIDS launched a set of ambitious targets to accelerate the end of the AIDS epidemic, proposing that by 2020 90% of people living with HIV be diagnosed, 90% of those diagnosed be on antiretroviral therapy (ART), and 90% of those on ART be virally suppressed.¹ Importantly, these goals acknowledge the need to achieve equity across diverse patient populations, including children and adolescents who have traditionally lagged behind with regards to accessing diagnosis and treatment services.

Although South Africa has made great strides in reducing the vertical transmission rate to <5%, thanks to a comprehensive Prevention of Mother-to-Child Transmission (PMTCT) programme² the absolute burden of paediatric and adolescent HIV remains high. Mathematical modelling estimates suggest more than 400 000 children and adolescents are presently living with HIV in South Africa.³ This is on account of an extremely high maternal HIV prevalence, which has remained around 30% for over a decade,⁴ as well as a high HIV-incidence among adolescent girls and young women, including during pregnancy and breastfeeding periods.⁵ Hence, monitoring of the paediatric and adolescent HIV programme has been identified as an essential requirement for

improving overall HIV care.⁶ Unless effective measures to reduce the HIV infection rate amongst adolescent girls and young women are rapidly implemented, children and adolescents will remain an important population for targeted intervention in the decades to come.

Routine HIV viral load data provides an opportunity to gauge programmatic outcomes, disaggregated by age and sex, whereby progress towards achieving the second and third 90-90-90 targets can readily be assessed. Here we report on paediatric and adolescent HIV viral load monitoring within the National Health Laboratory Service (NHLS) between 2014 and mid-2020.

Methods

HIV viral load results were evaluated using rolling 12-month periods per calendar quarter, from quarter 4 (31 December) 2014 to quarter 2 (30 June) 2020. Test results were de-duplicated to represent the last viral load result per patient during each 12-month period using the NHLS Corporate Data Warehouse probabilistic patient-linking algorithm. The number of patients with a viral load done was used as a proxy for people on ART (viz. the second 90 target), with viral suppression rates calculated at both the <1 000 RNA cps/ml and <50 RNA cps/ml thresholds.

Results

For the 12-month period between July 2019 and June 2020, 263 505 children and adolescents (aged 0-19 years) had evidence of HIV virological monitoring in South Africa. HIV viral load testing coverage was 51% and 57% among children and adolescents living with HIV aged <15 years and 15-19 years, respectively, as suggested by Thembisa Model prevalence estimates. Among all children and adolescents with an HIV viral load (VL) test, 49.7% (130 952) were virally suppressed (<50 RNA cps/ml), 22.7% (59 779) had low-level viraemia (50-<1 000 RNA cps/ml), and 27.6% (72 774) had a VL >1 000 RNA cps/ml. Figure 1 represents the HIV viral load breakdown per age group for the 12-month period between July 2019 and June 2020, with a total of 7 829 infants increasing to 111 469 adolescents aged 15-19 years having a viral load result.

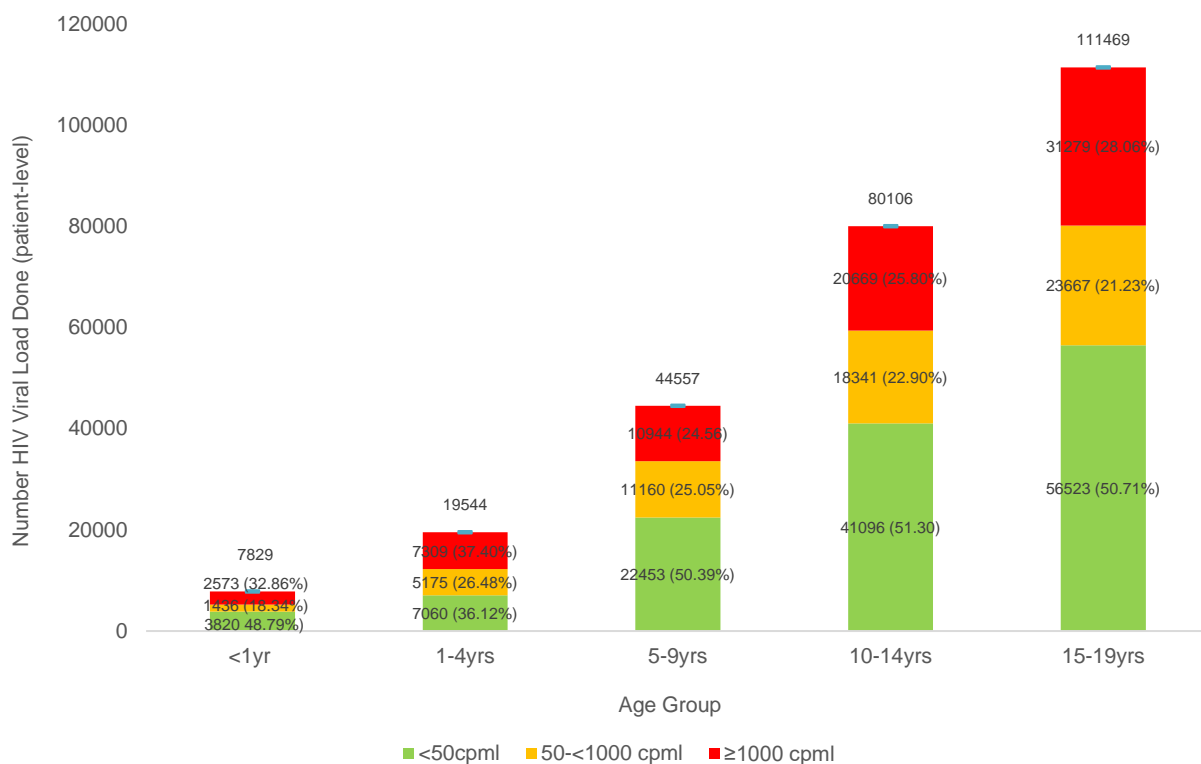


Figure 1. HIV viral load done (VLD) breakdown by result and age group, South Africa, July 2019–June 2020.

Between 2014 and mid-2020, the total antiretroviral therapy (ART) programme showed an improvement in the rolling 12-month suppression rate of 8.2% (from 80.4% to 88.6%) at the <1 000 RNA cps/ml threshold and 15.5% (from 56.3% to 71.8%) at the <50 RNA cps/ml threshold. However, improvements among children and adolescents, in comparison to all age groups, was more modest at 7.2% (from 65.2% to 72.4%) and 7.3% (from 42.4% to 49.7%), respectively (Figure 2). An evaluation of viral load suppression rates among different paediatric and adolescent age groups demonstrates that children aged 1-4 years had the lowest suppression rate (<50 RNA cps/ml) of 36.3%, with an improvement of only 1.5% (from 34.8% to 36.3%) since 2014 (Figure 3). All other paediatric and adolescent age groups converged at an approximate 50% viral suppression rate (<50 RNA cps/ml) in mid-2020. Low-level viraemia (50-<1 000 RNA cps/ml) ranged from 18.3% in infants to 26.5% in 1-4 year olds and high viral loads (>1 000 RNA cps/ml) ranged from 24.6% in the 5-9 year old age group to 37.4% in the 1-4 year olds with 73% (n=51 948) of high viral loads occurring in those aged 10 years and older.

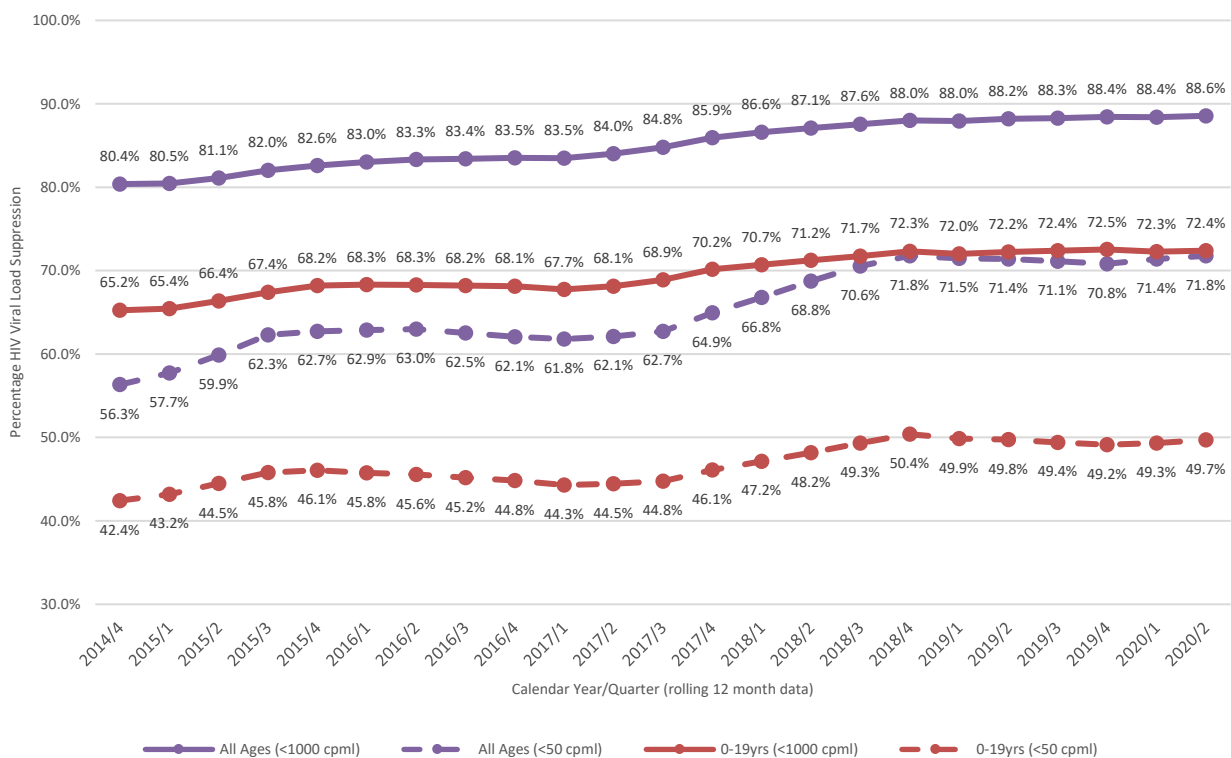


Figure 2. HIV viral load suppression (VLS) trends comparing all ages vs 0-19 years by year and quarter, South Africa 2014-2020.

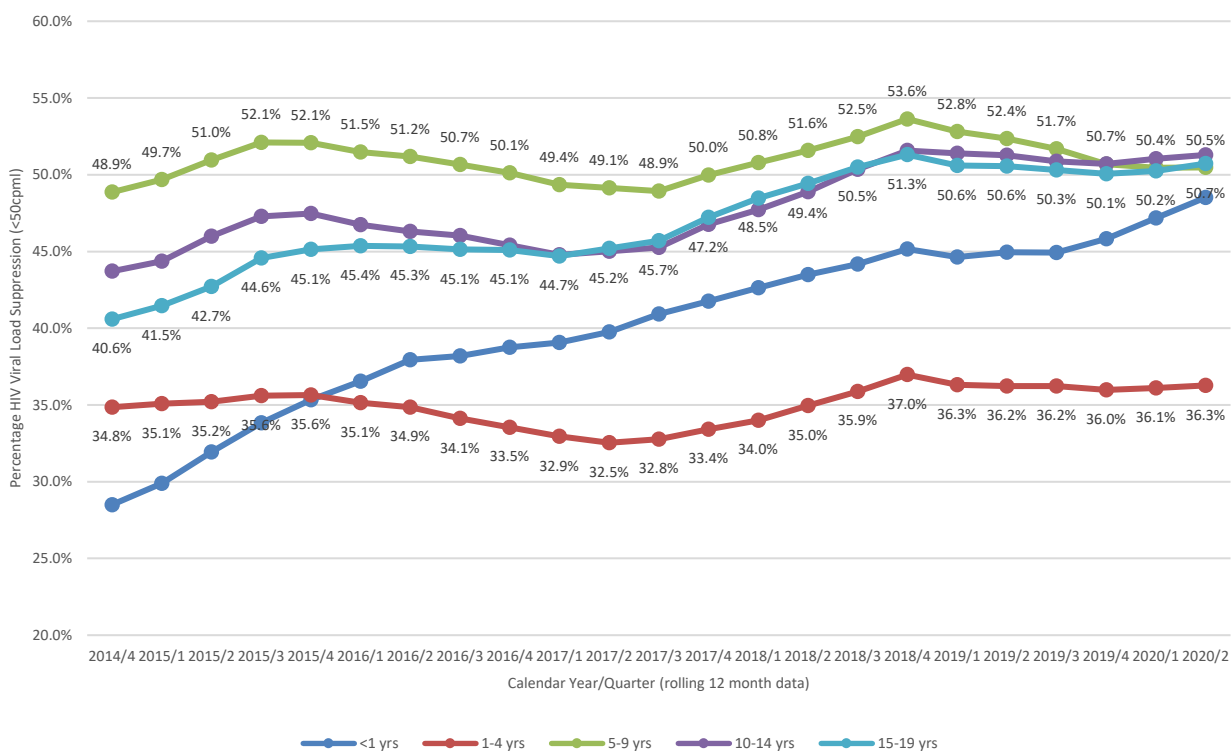


Figure 3. Paediatric and adolescent HIV viral load suppression (<50 cps/ml) trends by age group by year and quarter, South Africa, 2014–2020.

Considerable differences in the volume of HIV viral load testing and suppression rates can be seen among the nine provinces, with similar suppression patterns among those aged <15 years and 15-19 years (Figures 4 and 5). The numbers of children and adolescents aged <15 years with a viral load done between July 2019 and June 2020 per province were as follows: KwaZulu-Natal Province (46 081, 30.3%), Gauteng Province (28 397, 18.7%), Eastern Cape Province (18 296, 12.0%), Mpumalanga Province (17 224, 11.3%) Limpopo Province (14 847, 9.8%), North West Province (8 955, 5.9%), Free State Province (8 659, 5.7%), Western Cape Province (6 979, 4.6%), and Northern Cape Province (2 598, 1.7%). Among adolescents 15-19 years, the provincial breakdowns were as follows: KwaZulu-Natal (37 283, 33.4%), Gauteng Province (19 712, 17.7%), Mpumalanga Province (12 971, 11.6%), Eastern Cape Province (12 830, 11.5%), Limpopo Province (8 582, 7.7%), North West Province (7 005, 6.3%), Free State Province (6 744, 6.1%), Western Cape Province (4 678, 4.2%) and Northern Cape Province (1 664, 1.5%). The province with the highest suppression rate (<50 RNA cps/ml) was Western Cape, with 57.0% and 62.5% <15 year olds and 15-19 year olds suppressed, respectively, followed by Kwa-Zulu Natal and Gauteng provinces. Whereas KwaZulu-Natal Province has the second highest paediatric and adolescent suppression rate, it remains the province with the highest number of unsuppressed patients (Figures 4 and 5).

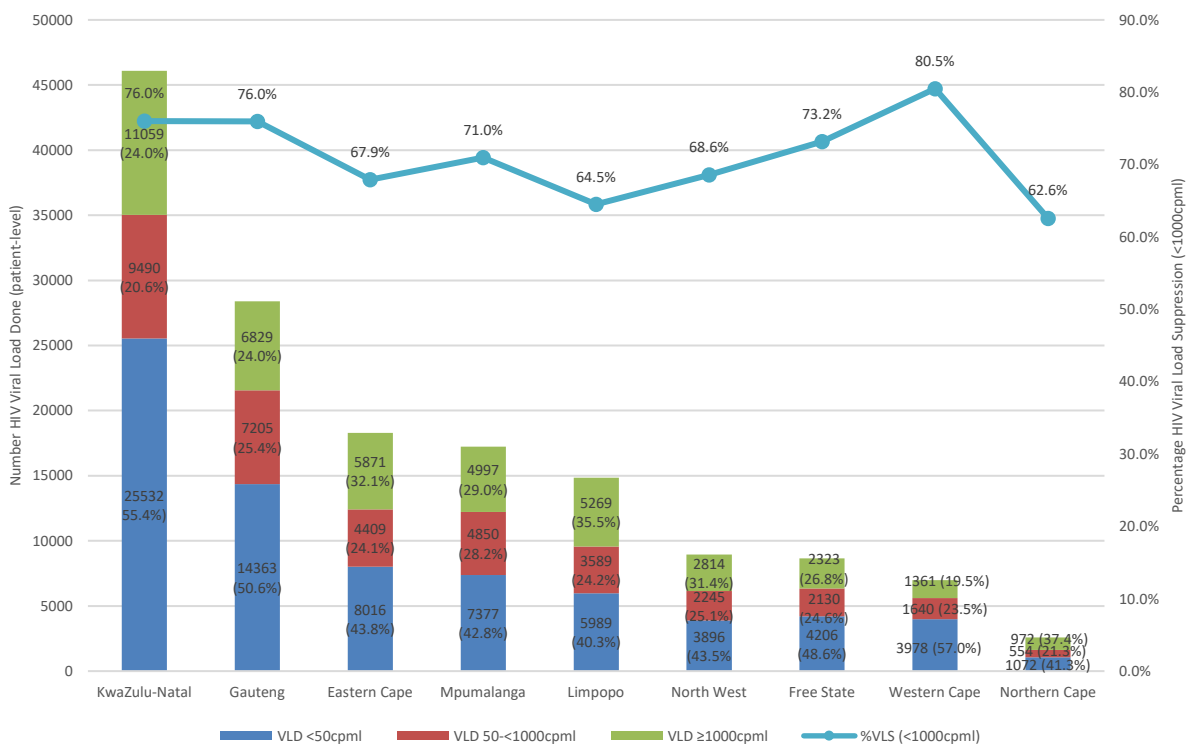


Figure 4. Provincial breakdown of HIV viral load (VLD) and viral load suppression (VLS) among patients <15 years of age, South Africa, July 2019–June 2020.

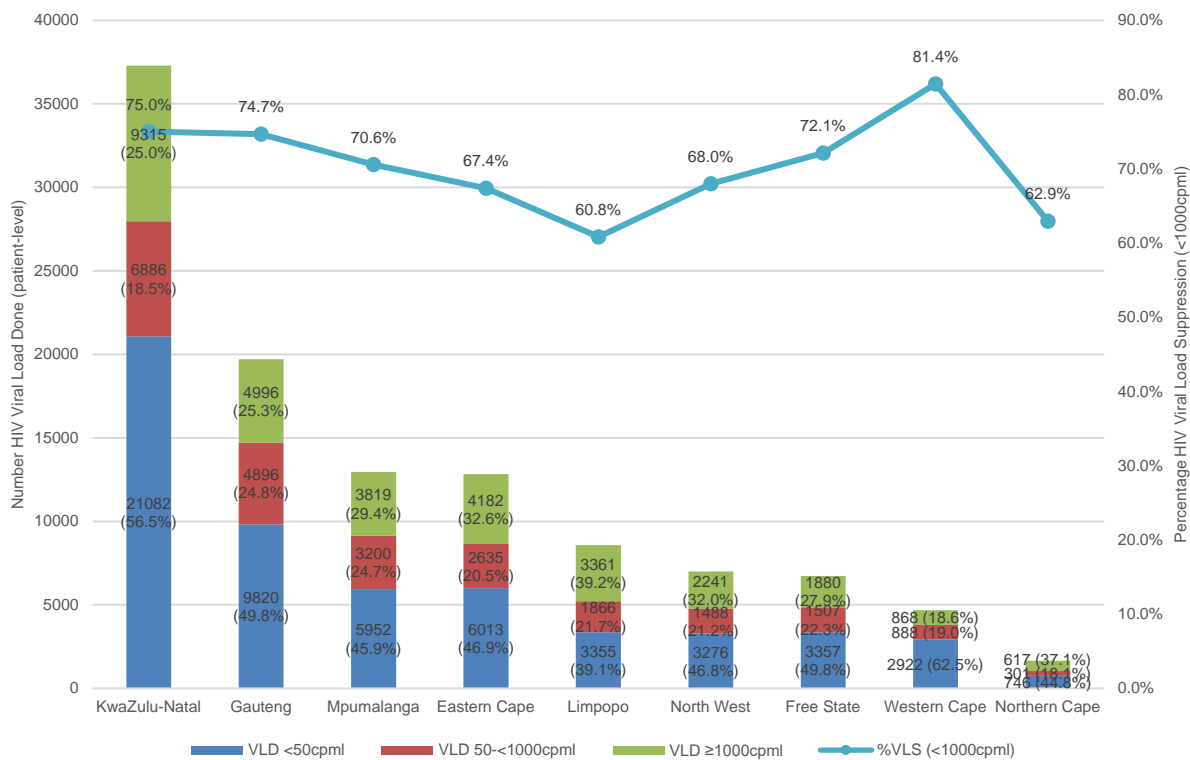


Figure 5. Provincial breakdown of HIV viral load (VLD) and viral load suppression (VLS) among patients 15-19 years of age, South Africa, July 2019–June 2020.

Differences in viral load suppression rates between males and females were apparent among all paediatric and adolescent age groups, with 51.8% of females compared with 46.8% of males aged 0-19 years suppressed between July 2019 and June 2020 (Figure 6). The biggest difference in the suppression rate between males and females was in the <1 year age group with 9.5% more females suppressed than males. Disaggregating HIV viral load data by age and sex, the group with the lowest suppression rate was males aged 1-4 years of whom only 33.4% had a viral load <50 RNA cps/ml.

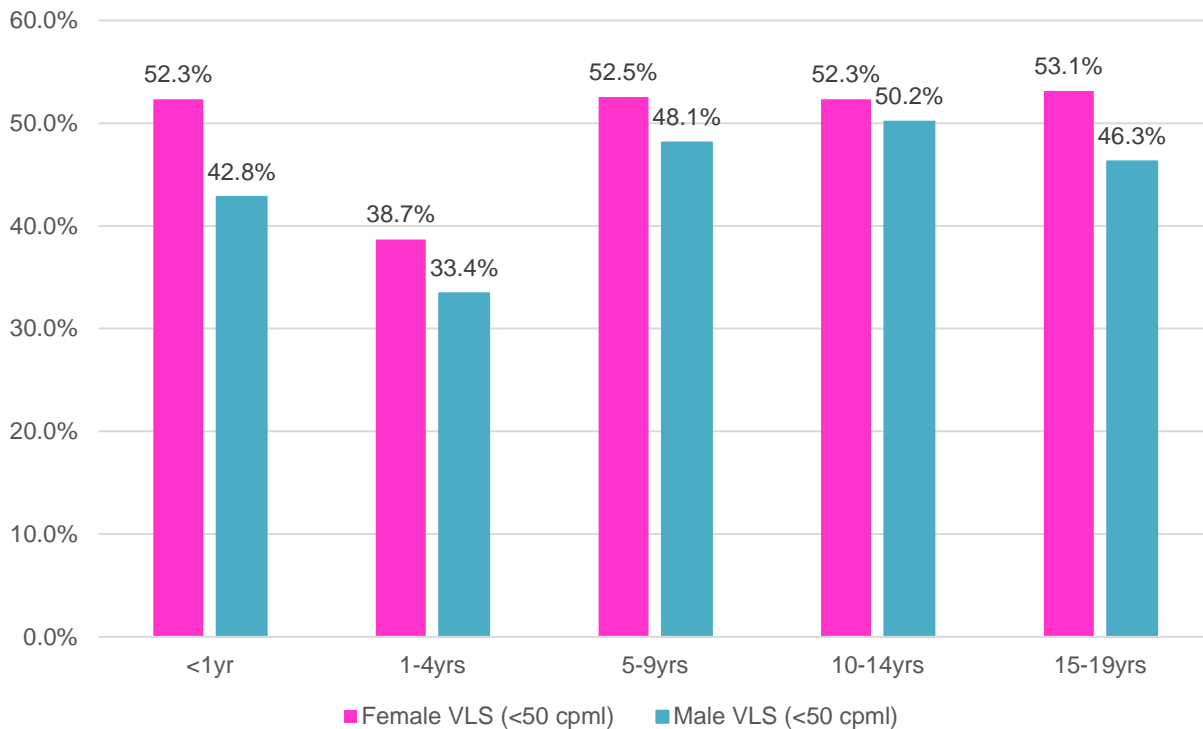


Figure 6. Differences in HIV viral load suppression (VLS) between males and females, South Africa, July 2019–June 2020.

Discussion

Although children and adolescents comprise only 5.5% of South Africa’s total population living with HIV, they represent a critical group for monitoring and evaluation of the HIV treatment programme. Analysis of routine HIV viral load data, however, suggests that paediatric and adolescent populations are far from achieving the UNAIDS second and third 90 targets. Furthermore, data over the past six years demonstrates only marginal improvement towards reaching these goals from when they were initially set.

Nearly half of the HIV population aged 0-19 years have no evidence of viral load monitoring, which equates to approximately 140 000 and 89 000 children and adolescents aged <15 years and 15-19 years, respectively, who are presently not in care. Furthermore, viral suppression rates among children and adolescents with a viral load done remain extremely low with only 72% of patients having a viral load <1 000 RNA cps/ml and 50% having a viral load <50 RNA cps/ml. Although UNAIDS initially set viral suppression targets at <1 000 RNA cps/ml, subsequent evidence has demonstrated that low-level viraemia (i.e. 50-<1 000 RNA cps/ml) is clinically relevant.⁷ Hence, targets aimed at ending the AIDS epidemic will require viral suppression to be redefined as <50 RNA cps/ml, highlighting considerable disparity between progress in the overall ART programme with that of children and adolescents.

Disaggregating HIV viral load data has revealed substantial variation in viral load testing coverage and suppression rates within the paediatric and adolescent population living with HIV. Of note is the markedly lower suppression rates among children 1-4 years of age, as well as reduced suppression rates among males

compared with females among all age groups - findings which warrant further investigation and analysis. Despite these variations in treatment outcomes within paediatric subpopulations, it is clear that as a whole children and adolescents living with HIV continue to represent a particularly vulnerable group within the overall ART programme.

Conclusions

Children and adolescents living with HIV in South Africa remain an especially vulnerable population who are far from achieving UNAIDS 90:90:90 targets. Major advances in paediatric HIV care, in particular retention in care and treatment adherence, will be required if South Africa is to achieve an end to the AIDS epidemic within the next 10 years.

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