



## SUMMARY SHEET

# Population Size Estimation of Adolescent Girls and Young Women at Risk of HIV Acquisition in Lesotho, 2023

## BACKGROUND

Lesotho has made great progress in reducing HIV incidence rates in recent years with annual incidence among those 15-49 declining from 1.19% in 2016 to 0.55% in 2020. Furthermore, HIV prevalence has decreased between 2016 and 2020 by 31% for 15-19 year old adolescent girls and young women (AGYW), 22% for AGYW 20-24 and by 12% for AGYW 25-29 years old.<sup>1</sup> Yet, HIV acquisition remains high in women 15-29 who represent more than two-thirds of all new infections.<sup>ii</sup>

In response to the continued burden of new cases among AGYW, President's Emergency Plan for AIDS Relief (PEPFAR) and partners created Determined, Resilient, Empowered, AIDS-free, Mentored, and Safe (DREAMS) programs. To assist both the Ministry of Health in Lesotho and Centers for Disease Control and Prevention (CDC) in planning for HIV prevention, testing, care and treatment programs for AGYW, ICAP has conducted a population size estimation of AGYW at risk of HIV acquisition in Lesotho in 2023.

## METHODS

Utilizing existing nationally representative data sources, we estimated the number of AGYW at risk of HIV acquisition in Lesotho in 2023. We did not conduct a biobehavioral survey or any primary data collection for this exercise.

## DATA SOURCES

We used four data sources: the Lesotho Population-based HIV Impact Assessment 2016 (LePHIA 2016), the Lesotho Population-based HIV Impact Assessment 2020 (LePHIA 2020), the UNAIDS Naomi model,<sup>iii</sup> and the Lesotho population projections 2016-2036 report.<sup>iv</sup> The Population-based HIV Impact Assessment (PHIA Survey) is a project funded by the PEPFAR that supports national surveys across multiple countries to assess the HIV epidemic and progress towards UNAIDS targets. LePHIA 2016 was conducted between November 2016 and May 2017 and was followed by LePHIA 2020, which took place from December 2019 to March 2020. NAOMI HIV incidence estimates are created using Bayesian small-area estimation framework, triangulating data on population, household surveys, anti-retroviral treatment service delivery and HIV testing of pregnant women at antenatal clinics. Finally, the Lesotho population projections medium variant projection for 2023 were used.



# ANALYSIS

We used population projection data to estimate the overall number of AGYW in 2023, then applied LePHIA 2020 HIV prevalence rates to estimate the number of AGYW living with HIV. We subtracted the number of AGYW living with HIV from the total number of AGYW to estimate the number of AGYW living without HIV thus at risk of HIV acquisition. We applied NAOMI incidence rates to AGYW living without HIV to create an estimated number of new infections in 2023 by 5- year age groups. To create HIV incidence estimates by district, we used the 2023 district-level population estimates.

To provide the estimated number of AGYW living without HIV by risk category (low risk, medium risk, high risk), we used multivariable logistic regression with the LePHIA 2020 (15-19 years, 20-24 years, 25-29 years) and LePHIA2016 data (10-14 years) to identify age-specific correlates of HIV acquisition. Biological, behavioral, and socio-environmental variables that were significant in the bivariate model ( $p \leq 0.20$ ) were included in the multivariable model. Significant variables in the multivariable model were used to categorize HIV-negative AGYW into mutually exclusive risk groups. We created age-specific risk factor groups (see Table 1).

TABLE 1

Risk groups by age group and risk factors



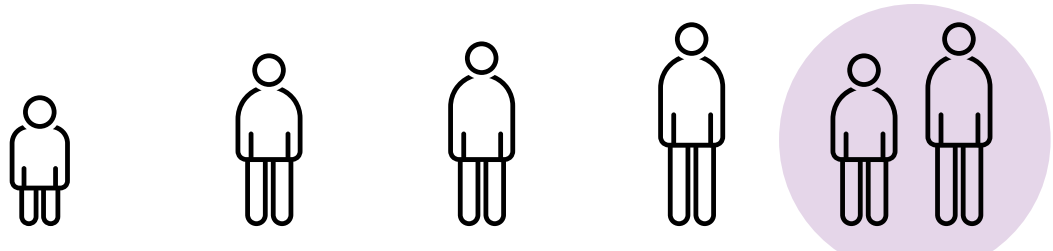
	10-14 years	15-19 years	20-24 years	25-29 years
Low risk	Not Sexually Active	Not Sexually Active	Not Sexually Active	Not Sexually Active
Medium Risk	Sexually Active	No Age Disparate Sex	1 Risk	1 Risk
High Risk	Sexually Active	Age Disparate Sex	2-4 Risks	2-4 Risks
Risks for ages 20-29: Transactional sex; Partner is living with HIV; Not enrolled in school; No condom use at last sex in past 12 months				

# RESULTS

## Estimates of HIV prevalence and AGYW living with and without HIV

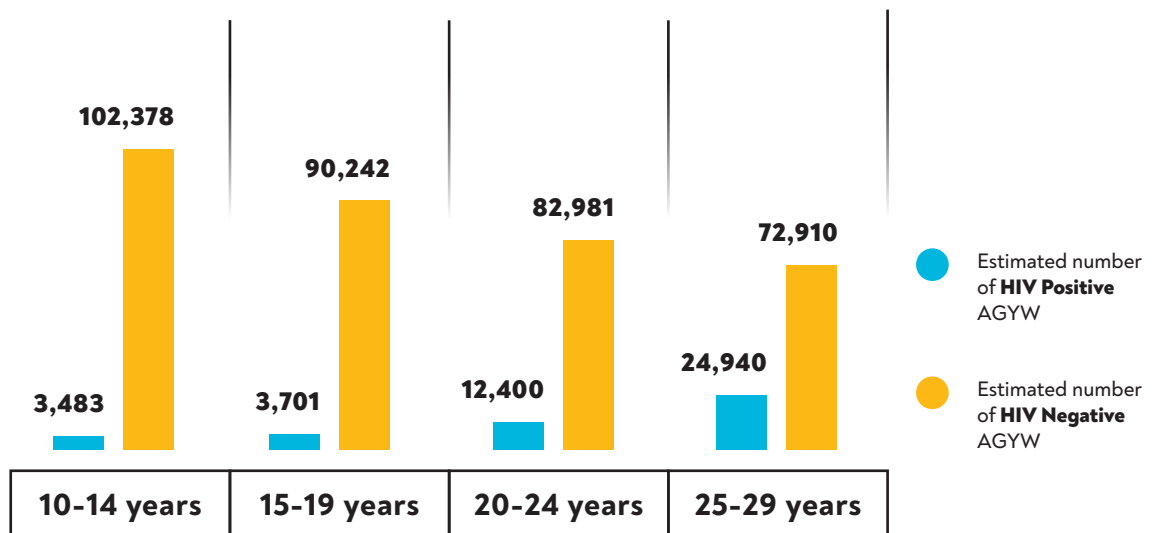
When comparing AGYW 10-14 years and 15-19 years, there is minimal difference in HIV prevalence; 3.29% and 3.94%, respectively (see Table 2). However, HIV prevalence increases to 13.0% among those 20-24 years and 27.50% among those 25-29 years. Using Lesotho Census projected population estimates of AGYW, we find that in 2023, about 42,904 AGYW are living with HIV, the majority of whom are 25-29 years (N=24,940) followed by those 20-24 years (N=12,400), 15-19 years (N=3,701), and 10-14 years (N=3,483) (see Image 1).

**TABLE 2**  
Overall HIV prevalence and projected number of AGYW living with and without HIV, by age group in 2023 using LEPHIA 2020 data



	10-14 years	15-19 years	20-24 years	25-29 years	15-29 years
% SAMPLE LIVING WITH HIV WEIGHTED (95%CI)	3.29% 2.10% - 5.10%	3.94% 2.75% - 5.00%	13.00% 11.00% - 15.00%	27.50% 24.80% - 30.00%	14.80% 13.40% - 16.00%
PROJECTED 2023 POPULATION COUNT (N)	105,861	93,943	95,381	100,566	289,890
ESTIMATED NUMBER OF AGYW LIVING WITH HIV IN 2023 (N; 95% CI)	3,483 2,223 - 5,399	3,701 2,583 - 4,697	12,400 10,492 - 14,307	24,940 24,940 - 30,170	42,904 38,845 - 46,382
ESTIMATED NUMBER OF AGYW HIV NEGATIVE IN 2023 (N; 95% CI)	102,378 100,462 - 103,638	90,242 89,246 - 91,360	82,981 81,074 - 84,889	72,910 70,396 - 75,626	246,986 243,508 - 251,045

**IMAGE 1**  
Number of AGYW living with and without HIV in 2023



## 2023 HIV incidence estimates and number of new HIV infections in AGYW in 2023

We identified the number of new HIV infections within each age group based on the NAOMI generated incidence (see Table 3). The NAOMI models do not estimate an HIV incidence rate for the 10-14 years group; please see footnote for the incidence rate estimation approach for this group. Incidence rate was highest in age 20-24 year (9.70 per 1,000 persons) followed by 25-29 year (9.20 per 1,000 persons), then 15-19 year (6.30 per 1,000 persons) and 10-14 year (3.65 per 1,000 persons) age groups.

TABLE 3  
NAOMI-estimated HIV Incidence Rates among AGYW in Lesotho per 1,000 population, 2023

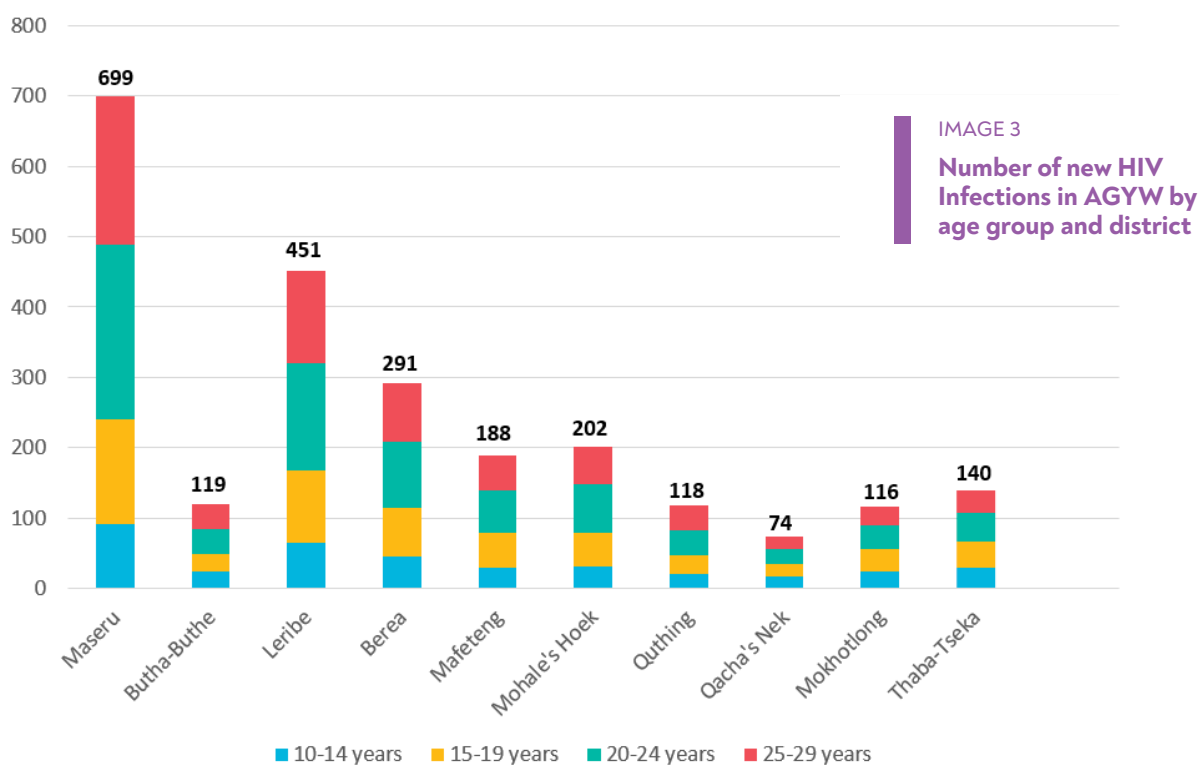
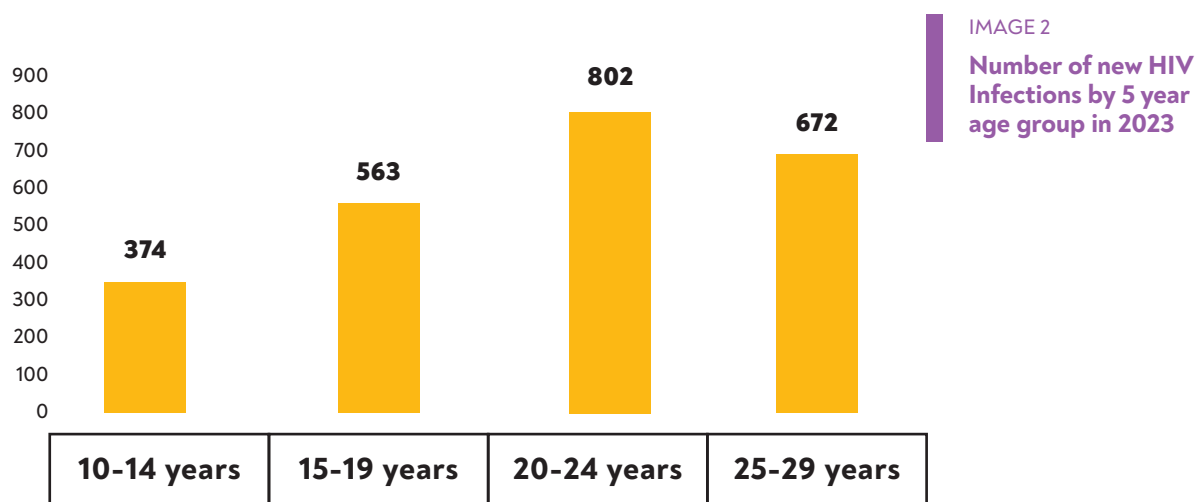
	3.65	6.30	9.70	9.20
<b>10-14 years</b>	<b>15-19 years</b>	<b>20-24 years</b>	<b>25-29 years</b>	



## New HIV infections by age group

We estimated that in 2023, 2,410 AGYW would be infected with HIV. The majority (802 new infections) would be in the 20-24 year age group. The other age groups estimated new infection counts for 2023 are 25-29 years (672), 15-9 years (563), and 10-14 years (374). (see Image 2).

**District:** By geography, Maseru district has the highest number of new annual cases (699), followed by Leribe (451), then Berea (291). In all districts except Quthing, AGYW age 20-24 years have the greatest number of new infections, followed by those 25-29 years (see Image 3).



To estimate the HIV incidence of AGYW ages 10-14 years, we first identified the ratio of the HIV prevalence between the 15-19 age group (5.7; LePHIA2016) and the 10-14 age group (3.3; LePHIA2016). We then applied that ratio to the incidence estimate for the 15-19 age group to derive the incidence estimate for the 10-14 age group. Thus, we multiplied the NAOMI-generated 2023 HIV estimate of 6.3 by 58% to calculate that AGYW ages 10-14 years would have an HIV incidence of 3.65 per 1,000 individuals.

# ESTIMATING RISK GROUPS

The number of AGYW in each risk group is summarized below (see Image 4). Among those 10-14 years, 50% were characterized as low risk (not sexually active) and 50% characterized as high risk (sexually active).

Among those 15-19 years old, 52% were characterized as low risk (not sexually active). Of those 15-19 years old who were sexually active, those who did not report age disparate sex (36%) were characterized as medium risk and those who did (12%) were characterized as high risk.

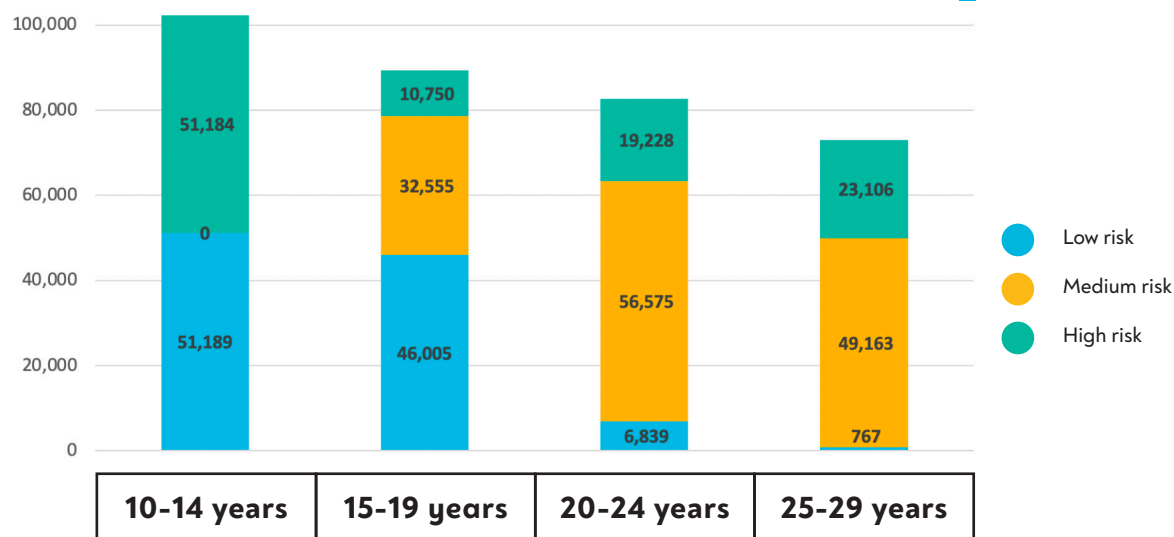
Among those 20-24 years old, only 8% were characterized as low risk (not sexually active). Those between 20-29 years old who are sexually active, were characterized by 5 risk factors (ever had sex; transactional sex; partner is living with HIV; not enrolled in school; no condom use at last sex in past 12 months) (see Table 1). Of those 20-24 years old who are sexually active, 68% reported 1 risk factor and 23% reported 2-4 risk factors. Ever fewer AGYW ages 25-29 were not sexually active and in the no risk group (1%) whereas 67% had 1 risk factor (medium risk) and 32% had 2-4 risk factors (high risk).

Overall, there were 104,800 AGYW in the low risk group, 138,293 in the medium risk group, and 104,268 in the high risk group. The number of AGYW in the low risk group decreased with increasing age group, and the number of AGYW high risk group increased with increasing age group. However, the majority of AGYW across all ages (15-29 years) were in the medium risk group (138,293).

To estimate the number of new infections by risk group, we distributed the overall NAOMI incidence rate by risk group by identifying the percentage of AGYW that would be considered “low” or “high” risk based on HIV prevalence, and then applied this distribution to the incidence data.

Finally, we multiplied the number of AGYW at risk of HIV acquisition by risk and age group with the incidence rates per risk group to distribute new infections by age and risk group.

IMAGE 4  
Number of AGYW by age group and risk



Overall, 75% (1,800) of new HIV infections are estimated to be among those assigned to the high risk group. Among the high risk group, the greatest number of new infections and highest incidence was in the 20-24 years group (n=558; incidence=6.75). Although an equal number of AGYW in the 15-19 and 25-29 years group are estimated to be diagnosed with HIV (434 estimated new infections for each group), AGYW ages 25-29 years group had a higher HIV incidence than those in the 15-19 years group (incidence=5.95 vs 4.87).

Among AGYW categorized as medium risk, HIV incidence was highest among the 25-29 years group (n=244, incidence=3.24) and A 20-24 years group (n=238, incidence=2.95). Relative to those AGYW in older age groups, AGYW in the 15-19 years group are at lower risk of HIV (n=128, incidence=1.43).

All AGYW at risk of HIV among 10-14 year-olds are in the same risk group, with an 374 estimated new infections. In summary, risk increases with age until 25-29 year-old age group, where there are fewer infections than those ages 20-24 years. Additionally, the HIV incidence rate ratio is at least 1.5 fold higher among AGYW in the high risk group for all age groups relative to those in the medium risk group (15-19 years IRR=3.40; 20-24 years IRR=2.29; 25-29 years IRR=1.83).



## CONCLUSIONS

Overall, 104,268 AGYW in Lesotho are at high risk for HIV acquisition, 138,293 are at medium risk for HIV acquisition, and 104,800 are at low risk for HIV acquisition. Ninety-three percent of those in the low risk group are between ages 10-19.

We estimated that in 2023, 2,410 AGYW would be infected with HIV, with majority of new cases occurring in the 20-24 year age group. New HIV cases in Lesotho are driven by AGYW engaging in sexual behaviors with elevated HIV risk, particularly among AGYW ages 20-24 years. By geography, Maseru district has the highest number of new annual cases (n=699), and Mohale's Hoek has the highest HIV incidence (15-19 years incidence=7.90, 20-24 years incidence=12.30, 25-29 years incidence=11.70).

### REFERENCES

- <sup>[1]</sup> Centers for Disease Control and Prevention, Lesotho Bureau of Statistics, US President's Emergency Plan for AIDS Relief, Westat, ICAP. Lesotho Population-Based HIV Impact Assessment 2020. 2021.
- <sup>[2]</sup> Lesotho HIV Recent Infection Surveillance data, Government of Lesotho.
- <sup>[3]</sup> Eaton JW, Dwyer-Lindgren L, Gutreuter S, et al. Naomi: a new modelling tool for estimating HIV epidemic indicators at the district level in sub-Saharan Africa. *J Int AIDS Soc.* 2021;24 Suppl 5(Suppl 5):e25788
- <sup>[4]</sup> Lesotho Population Projects 2016-2036 Report, Ministry of Development and Planning, Bureau of Statistics, 2019.

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### SUGGESTED CITATION

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