High HIV prevalence and low HIV-service engagement among young women who sell sex:
A pooled analysis across nine sub-Saharan African countries

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Running Head: HIV outcomes among young women who sell sex

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Abstract

**Background:** Epidemiological data are needed to characterize the age-specific HIV burden and engagement in HIV services among young, marginalized women in sub-Saharan Africa.

**Setting:** Women aged ≥18 years who reported selling sex were recruited across nine countries in Southern, Central, and West Africa through respondent driven sampling (N=6592).
Methods: Individual-level data were pooled and age-specific HIV prevalence and antiretroviral therapy (ART) coverage were estimated for each region using generalized linear mixed models. HIV-service engagement outcomes (prior HIV testing, HIV status awareness, and ART use) were compared among women living with HIV across age strata (18-19, 20-24, and ≥25 years) using generalized estimating equations.

Results: By age 18-19, 45.4% (95% CI 37.9-53.0), 5.8% (95% CI 4.3-7.8) and 4.0% (95% CI 2.9-5.4) of young women who sell sex were living with HIV in Southern, Central, and West Africa respectively. Prevalence sharply increased during early adulthood in all regions, but ART coverage was suboptimal across age groups. Compared to adult women ≥25, young women aged 18-19 were less likely to have previously tested for HIV (PR 0.76; 95% CI 0.72-0.80), less likely to already be aware of their HIV status (PR 0.48; 95% CI 0.35-0.64), and less likely to be taking ART (PR 0.67; 95% CI 0.59-0.75).

Conclusions: HIV prevalence was already high by age 18-19 in this pooled analysis, demonstrating the need for prevention efforts that reach women who sell sex early in their adolescence. ART coverage remained low, with women in the youngest age group the least engaged in HIV-related services. Addressing barriers to HIV service delivery among young women who sell sex is central to a comprehensive HIV response.

Key words: HIV; women; girls; sex worker; sex work; healthcare utilization; Sub-Saharan Africa
INTRODUCTION

The sustained high incidence of HIV among young women across sub-Saharan Africa remains a challenge for achieving future HIV pandemic control. While overall declines in HIV incidence in the total population have been reported over the last decade, adolescent girls and young women (AGYW) aged 15-24 still experience a disproportionately high risk of HIV infection. Moreover, young women in sub-Saharan Africa are up to three times as likely to become infected with HIV compared to their male counterparts, and three-quarters of all new annual HIV infections among adolescents are among girls ages 15-19. Gendered disparities in HIV incidence are rooted in biological, individual, cultural, and structural factors that potentiate vulnerabilities particularly among young women. In the absence of economic opportunity and sufficient HIV prevention knowledge, sexual relationships that increase social status and young women’s financial resources, such as those that are defined by material exchanges, can exacerbate risk of HIV infection.

Sexual partnerships among young women exist within a range of economic and social conditions across which HIV risk may vary, including transactional sex and formal sex work. Adolescence and early adulthood are times of rapid transition for young women, accompanied by physical, physiological, emotional, and social changes that affect partner selection and sexual decision-making. While sexual relationships involving exchange of money or goods are not inherently risky for HIV acquisition, young women in transactional relationships often lack the autonomy or negotiating power to use condoms exposing them to the risk of acquiring HIV. Among sex workers more specifically, vulnerabilities including stigma, violence, criminalization, and displacement compound vulnerabilities of youth and further increase risk of HIV infection.
Women often acquire HIV soon after they first enter sex work, limiting opportunities to provide effective and comprehensive HIV prevention. Moreover, women who sell sex frequently begin selling sex during adolescence, when they may not have yet gained sufficient knowledge, empowerment, and self-efficacy of tools to reduce their risk of acquiring HIV. Limited access to adolescent-friendly sexual and reproductive health services also prevent young women from obtaining necessary HIV prevention information, and fear of laws around the criminalization of sex work can further deter young women who sell sex from engaging in HIV prevention, care and treatment.

Patterns of vulnerability and sexual risk are diverse among young women, yet within the context of HIV research AGYW are often considered a single, homogenous group. Understanding the specific HIV burden among distinct subgroups of young women, such as young women who sell sex, may be critical to designing more effective HIV prevention and treatment programs. In response, here, we compare age-specific differences in HIV prevalence, ART coverage, and HIV care engagement among female sex workers in sub-Saharan Africa.

METHODS
Study Population and Procedures
Data included in this pooled analysis of individual-level data were collected using respondent driven sampling (RDS) across 21 sites in nine countries in sub-Saharan Africa from 2011 through 2018: Burkina Faso, Cameroon, Côte d’Ivoire, The Gambia, Lesotho, Senegal, Kingdom of eSwatini, South Africa, and Togo. Detailed procedures for each study have been described
For each study site, women were selected in partnership with local community-based organizations to act as seeds and initiate sampling chains. Initial seeds were chosen to ensure diversity in demographic and geographic representation. Each seed received three recruitment coupons and was invited to recruit women from their social network into the study. In turn, women who were recruited into the study also received three coupons, with recruitment continuing until the required total sample size for each country was met. For each country, studies were powered to estimate the prevalence of HIV among female sex workers aged 18 and above.

Cisgender women who were 18 years of age or older and those who attributed more than half of their income in the past 12 months to selling sex were eligible for participation. After providing verbal informed consent, women meeting eligibility criteria completed an interviewer-administered questionnaire to assess demographic and behavioral characteristics including sexual risk behaviors and prior history of HIV testing and ART use. Routine biomedical HIV testing and counseling were offered as per each country’s national guidelines. Women who tested positive for HIV infection through the study were referred to a nearby facility for routine HIV care. All studies were co-led by the same core investigative team. Ethical approval was granted by institutional review boards in each country as well as the Johns Hopkins School of Public Health Institutional Review Board.

Measures

Women who received a positive HIV diagnosis at enrollment were considered to have prevalent HIV infection. ART coverage was defined per World Health Organization (WHO) guidelines as
the proportion of women living with HIV who were already receiving ART, as measured by self-report. Both outcomes were assessed dichotomously (yes/no). Among women who tested positive for established HIV infection, the following dichotomized self-reported HIV treatment outcomes were assessed: prior HIV testing (ever tested/never tested), aware of HIV status (yes/no) and ART use (on ART/not on ART).

**Statistical Analyses**

Data were combined from all countries into regions using standard UNAIDS classifications (Southern Africa, Central Africa, and West Africa). Demographics and behavioral characteristics were evaluated overall and by region.

Observed HIV prevalence and ART coverage proportions were calculated for each country with corresponding Wald 95% confidence intervals (CI). Pooled age-specific HIV prevalence estimates were calculated for Southern, Central, and West Africa using a generalized linear mixed model (GLMM) to account for potential clustering by region, specifying age as the main explanatory variable. Age was modeled using standard age categories (ages 18-19, 20-24, 25-29, 30-34, 35-39, 40-44, and 45 and older). A term for survey year was also included to account for potential changes to HIV testing and treatment procedures that might decrease the burden of HIV across regions over time. ART coverage was similarly estimated for all regions using a GLMM that included age and year as explanatory variables. Crude, instead of RDS adjusted estimates are presented for all models, as a standard for the use of RDS-adjusted estimates in pooled analyses is not yet established and the networks of women who sell sex across settings are not linked. All models were fit under a binomial distribution and a logit link. We calculated
predicted probabilities and 95% CIs for pooled HIV prevalence and ART coverage by age category.

HIV testing outcomes (ever tested for HIV, aware of HIV status, and ART use) were also compared by established age category (ages 18-19 years, 20-24 years, ≥25 years) among women found to be living with HIV. Given our interest in estimating the marginal association of age with each outcome,\textsuperscript{37,38} log-binomial generalized linear models were fit under a generalized estimating equation (GEE) framework with a robust variance estimator.\textsuperscript{39} An exchangeable correlation structure was specified to account for within-region correlation between outcomes.

We calculated the prevalence, prevalence ratios (PR) and 95% CIs for each outcome by age category, considering women ≥25 years (adult women) as the referent for all comparisons.

All statistical analyses were performed using SAS statistical software (version 9.4; Cary, North Carolina).

**RESULTS**

**Characteristics**

A total of 6,695 women were included in these analyses: Southern Africa (1,479; 22.1%), Central Africa (2,255; 33.7%), and West Africa (2,961; 44.2%) (Table 1). The median age for all women was 27 years (IQR: 23-34) (Table 2). Women reported having engaged in sex work for a median of four years (IQR: 2-8). Few (532; 8.0%) were married or cohabitating with a partner. Most (5,625; 84.1%) had experienced one or more pregnancies. Condomless sex at last sex was infrequent with regular clients (673; 11.8%), but common (2,434; 60.3%) with non-paying
partners. All characteristics varied by region, with the exception of age which was similarly distributed across Southern, Central, and West Africa.

Sexual behaviors, including number of clients and number of non-paying partners in the last month, were similar among women of all ages (see Table, Supplemental Digital Content 1, http://links.lww.com/QAI/B501). The proportion of those reporting condomless sex with clients and partners was also generally similar by age. Young women ages 18-19 had already been selling sex for a median of two years (IQR: 1-3). Nearly half (45.6%) had experienced a pregnancy.

**HIV prevalence**

HIV prevalence is summarized for each country and presented in the supplemental materials (see Table, Supplemental Digital Content 2, http://links.lww.com/QAI/B501). Overall HIV prevalence ranged from 5.3% (95% CI 3.7-6.9) in Senegal to 72% (95% CI 68.7-75.2) in Lesotho. Pooled HIV prevalence estimates are presented for each region in Figure 1, with supporting data included in the supplemental materials (see Table, Supplemental Digital Content 3, http://links.lww.com/QAI/B501). For all regions, HIV prevalence consistently increased through ages 30-34, exhibiting a relatively flat trend thereafter. Sharp increases in HIV prevalence were evident beginning with women in the youngest age group for all regions, with a particularly steep initial slope at younger ages in Southern Africa. HIV prevalence was 45.4% (95% CI 37.9-53.0) among women 18-19 years, increasing to 56.5% (95% CI 52.1-60.7) by age 20-24 in Southern Africa. In Central Africa, HIV prevalence increased from 5.8% (95% CI 4.3-7.8) among young women 18-19 years to 9.4% (95% CI 8.0-11.0) by age 20-24. Among women 18-
19 years in West Africa, HIV prevalence was 4.0% (95% CI 2.9-5.4), increasing to 5.7% (95% CI 4.7, 6.9) by age 20-24.

**ART coverage**

Overall ART coverage was 33.1% in Southern Africa, 41.7% in Central Africa, and 29.6% in West Africa (Table 3), and summary ART coverage proportions for each country are presented in the supplemental materials (see Table, Supplemental Digital Content 2, http://links.lww.com/QAI/B501). ART coverage was lowest among young women 18-19 years for all regions, increasing sharply through age 40-44 (Table 3). In Southern Africa, ART coverage ranged from 8.7% (95% CI 3.9-18.2) among women aged 18-19 years to 63.3% (95% CI 55.0-70.9) among women aged 40-44. Among women 18-19 years in Central Africa, ART coverage was 7.7% (95% CI 3.2-15.7), increasing to 58.7% (95% CI 51.5-65.9) by age 40-44. In West Africa, ART coverage was 4.4% (95% CI 1.9-9.8), increasing to 45.0% (95% CI 36.6-53.8) by age 40-44.

**HIV service engagement by age**

Of the 1,956 women diagnosed with HIV infection at the time of data collection, 1,781 (91.2%) had complete information regarding their last HIV test. Of these, 1,556 (87.4%) reported having previously tested for HIV (Table 4). Of those who had previously tested, 946 (62.2%) were reportedly aware of their HIV status. Of those who knew their HIV status, 397 (42.9%) reported they were taking ART.
Compared to adult women (women ≥25 years), young women 18-19 years were less likely to have previously tested for HIV (PR 0.76; 95% CI 0.72-0.80) and less likely to be aware of their HIV status (PR 0.48; 95% CI 0.35-0.64) (Table 4). Prior HIV testing among women aged 20-24 was comparable to those ≥25 years (PR 0.98; 95% CI 0.98-0.99). However, women aged 20-24 were less likely to be aware of their HIV status compared to women ≥25 years (PR 0.64; 95% CI 0.56-0.73). For both women ≤19 years and women aged 20-24, ART use was substantially lower compared to older women ((women ≤19 years: PR 0.67; 95% CI 0.59-0.75) (women 20-24 years: PR 0.86, 95% CI 0.78-0.95)).

**DISCUSSION**

HIV prevalence was already high by age 18-19 in this multicountry pooled analysis of individual-level data, demonstrating the need for reinforced HIV prevention efforts that reach women who sell sex early in their adolescence. Sharp increases in HIV prevalence during early adulthood highlight the ongoing unmet HIV prevention and treatment needs among young women who sell sex across both concentrated and generalized epidemic settings. ART coverage remained low across Southern, Central, and West Africa, likely reflecting both recently acquired infections and limited engagement across the HIV continuum of care. Women in the youngest age group were the least engaged in HIV-related services, including HIV testing, affirming that differentiated and effective HIV prevention and treatment services that address barriers to HIV service delivery among young women who sell sex is central to a comprehensive HIV response.

Within a complex sexual network of clients, non-paying partners, and partners of partners, high prevalence of undiagnosed and untreated HIV infection among young women who sell sex
creates ample opportunities for onward transmission. In Southern Africa, nearly half of young women aged 18-19 were estimated to already be living with HIV. A high burden of HIV by ages 18-19 followed by a notably sharp increase in HIV prevalence implies a high incidence of infection during adolescence and early adulthood. Risks of onward HIV transmission are greatest for newly acquired infections and exacerbated further in the absence of diagnosis and treatment.\textsuperscript{41} A long duration of undiagnosed and untreated HIV infection among young women who sell sex compounds these existing onward transmission risks, potentially impacting population-level HIV spread.\textsuperscript{42} Evidence from mathematical models suggests that the unmet HIV prevention and treatment needs of sex workers contribute substantially to HIV transmissions,\textsuperscript{43–45} directly and indirectly accounting for a high burden of new infections in both concentrated and generalized epidemic settings.\textsuperscript{42} Thus, addressing the specific needs of young women who sell sex in particular, including challenging the punitive legal and social barriers that prevent marginalized young women from accessing HIV prevention and treatment services,\textsuperscript{25} may be most effective in maximizing prevention impact at a population level.

Young women who sell sex often struggle to meet their most basic biological and physiological needs, and commodified sex offers a viable pipeline to food, clothing, and shelter in the presence of economic deprivation.\textsuperscript{46} Sexual exchanges also extend beyond the concept of necessity, and young women may sell sex with the notion of achieving eventual economic autonomy, social mobility, and their sequelae.\textsuperscript{47} In the context of economic hardship, gender inequities, punitive laws, and limited legal and social protections, young women selling sex often lack the agency to dictate their own sexual experiences. These higher-order factors also increase HIV risks for young women outside of formal sex work,\textsuperscript{10,17,48} although young women engaged in transactional
sexual relationships are generally considered distinct from young women who sell sex despite overlapping economic and social vulnerabilities.\textsuperscript{15,46} Importantly, there is a relative paucity of data delineating differences in HIV risk between young women engaged in transactional sex, those that informally or infrequently sell sex, and those engaged in commercialized sex work. Differentiating the distinct pathways from adolescence to adulthood that heighten HIV acquisition and transmission risks for some—but not all young women is essential to inform and refine the implementation of effective HIV prevention and treatment interventions.

Laws that prohibit young people from participating in research—along with criminalization, stigma, and absent legal protections—have challenged implementation of programs and limited the evidence base around effective interventions for young women who sell sex. Empirical estimates of HIV prevalence and HIV service engagement are generally lacking across sub-Saharan Africa,\textsuperscript{49} particularly among adolescents under the age of 18 who are unable to legally consent to the sale of sex.\textsuperscript{23,24,50,51} Recent estimates from Zimbabwe indicate an HIV prevalence of 28\% among young female sex workers and 15\% among other young women who sell sex,\textsuperscript{48} with limited engagement in HIV treatment services among those aged 18-24.\textsuperscript{21} Estimates of HIV incidence from prospectively collected data are also largely absent for young women who sell sex, precluding a more nuanced understanding of the immediacy of HIV risks before and after entry into sex work. As a result, implementation of existing HIV prevention and treatment interventions for female sex workers may not be fully sufficient to engage younger women who sell sex. These interventions, which have included alternative models of HIV testing (e.g., HIV self-testing, enhanced peer outreach)\textsuperscript{52,53}, decentralized ART delivery,\textsuperscript{54} and expanded availability of pre-exposure prophylaxis (PrEP)\textsuperscript{55} along with interventions that address overall
wellbeing and empowerment,\textsuperscript{56} are seemingly most effective in reaching women aged 18 and older. Yet, barring the DREAMS (Determined, Resilient, AIDS-free, Mentored and Safe) partnership in Zimbabwe,\textsuperscript{57,58} few existing programs for AGYW include distinct services for young women who sell sex. Interventions aimed at decreasing HIV incidence among AGYW more broadly have focused on incentivizing education,\textsuperscript{59,60} providing short-term economic opportunities to increase financial autonomy,\textsuperscript{61} or offering intensive sexual health counseling\textsuperscript{62} through stand-alone interventions, generally with limited impact. For marginalized young women, such as those who sell sex, these interventions are likely insufficient to address the multiple structural- and individual-level vulnerabilities that reinforce risk. While education- or empowerment-focused HIV prevention and treatment interventions have demonstrated effectiveness in reducing HIV incidence among AGYW in some settings,\textsuperscript{63} such interventions are likely misaligned young women who sell sex.

Interventions that offer more tangential opportunities for young women without considering the essential needs of those who sell sex may create further socioeconomic disparities if uptake is limited among those who are most marginalized. Moreover, because the benefits of HIV prevention and treatment are not equal with respect to differential HIV transmission risks across sexual networks,\textsuperscript{64} implementation of more generally focused interventions for all AGYW is likely less effective and less efficient in reducing incident infections. Strategies to improve uptake of HIV services for young women may include provision of youth-friendly programming,\textsuperscript{13} mobile-based outreach,\textsuperscript{65} and online approaches that offer dedicated counseling and support.\textsuperscript{66,67} Evidence supporting the effectiveness of these approaches for young women who sell sex, however, is limited. Instead, interventions that are designed to meet young
women’s more immediate and fundamental needs may be most effective in decreasing HIV acquisition and transmission risks among those who sell sex. These interventions include adaptive and comprehensive services beyond standard HIV prevention and treatment, including primary care and other services, vocational support for sustained income generation, legal assistance, and ongoing peer support. However, further evidence is still needed to optimize and appropriately scale interventions for young women who sell sex.

This study is not without limitations. Data are cross sectional across multiple years, and age-specific trends in HIV prevalence and HIV-service engagement may be, in part, attributable to age, period, or cohort effects. Moreover, country-specific guidelines have evolved over the last decade to offer expanded HIV testing and treatment services, including through HIV self-testing and early initiation of ART, and thus the generalizability of our results to the modern era of HIV prevention and treatment is uncertain. Data were collected using RDS methods, a common approach for sampling key and vulnerable populations who may otherwise be “hidden” from probabilistic sampling approaches. While RDS is thought to limit selection bias by including a representative and diverse sample of a connected population, in the case that recruitment was non-random (i.e., seeds systematically and preferentially recruited select individuals for study participation) estimates of HIV prevalence and HIV-service engagement may be biased. We also present crude estimates for all outcomes as methods for producing RDS-adjusted estimates in pooled analyses are not yet well-developed, with the caveat that the reported confidence intervals for these estimates may be overly narrow and represent sample averages rather than population estimates. In addition, measures of HIV testing and treatment experience were collected by self-report, and the magnitude of effects may be overestimated if
younger women living with HIV underreported knowledge of their HIV status or treatment history.\textsuperscript{73} We also note the presence of missing data across these measures, and while data were missing with similar frequency for women in all age categories it’s possible that effect estimates of HIV-service engagement were downwardly biased if young women with missing information were less likely to have previously tested for HIV. Further, young women ages 18 to 19 years comprised less than 10% of our total sample, reflecting larger legal challenges and complexities of engaging adolescents and young adults in research. Despite the noted limitations, a strength of this study was our use of pooled data to gain insights into this otherwise hard-to-engage population, and our findings reaffirm that engaging marginalized young women in HIV-associated research is necessary to address the needs of young people in sub-Saharan Africa.

Rapid increases in HIV prevalence among young women who sell sex reflect sustained exposure to HIV acquisition risks, perpetuating a high burden of HIV during early adulthood in sub-Saharan Africa. Amidst low ART coverage and relatively limited HIV-service engagement, a high prevalence of HIV among young women who sell sex creates ample opportunities for onward transmission. Young women who sell sex are among the most marginalized of young women in sub-Saharan Africa, and findings from this study reinforce that HIV-associated risks are not homogenous for young women as a whole. Recognition of the unique vulnerabilities experienced by marginalized young women who sell sex is essential for achieving measurable reductions in HIV incidence among AGYW more broadly and ultimately advancing the HIV pandemic response towards the goal of ending AIDS.
ACKNOWLEDGMENTS

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Contributors: KR drafted the initial manuscript and was responsible for leading the analysis and interpretation of the data. SS collaborated on the analytic plan and analysis. KR, SS, and SB collaborated on the conceptualization and framing of the research question. RPM, DD, TM, SK, AS, AK, BC, UT, SM, HH, IMN, VP, and SB collaborated on study design, implementation and investigation. SS, SM, RPM, DD, TM, SK, AS, AK, BC, UT, SM, HH, IMN, VP, and SB contributed to specific sections and offered critical feedback throughout manuscript revisions.

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**FIGURE CAPTIONS**

**Figure 1.** Pooled HIV prevalence and 95% confidence bands by age among women who sell sex in Southern (N=1,469), Central (N=2,248), and West Africa (N=2,932)a,b

a Pooled estimates for each region are presented by age with interpolation between each age category.

b Excludes 9 women with missing age information and 37 women with missing or inconclusive HIV status.

**SUPPLEMENTAL DIGITAL CONTENT**

Supplemental Digital Content 1.pdf
Supplemental Digital Content 2.pdf
Supplemental Digital Content 3.pdf
**TABLES**

**Table 1. Survey details for included countries**

<table>
<thead>
<tr>
<th>Country</th>
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### Table 2. Study characteristics by region

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<td><strong>Regular paying clients, last month</strong></td>
<td>5.0</td>
<td>3-10</td>
<td>7.0</td>
<td>4-12</td>
</tr>
<tr>
<td><strong>Non-paying partners, last month</strong></td>
<td>1.0</td>
<td>0-1</td>
<td>0.0</td>
<td>0-1</td>
</tr>
<tr>
<td><strong>n %</strong></td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
</tr>
<tr>
<td><strong>Age (years)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-19</td>
<td>488</td>
<td>7.3</td>
<td>131</td>
<td>8.9</td>
</tr>
<tr>
<td>20-24</td>
<td>1,894</td>
<td>28.3</td>
<td>481</td>
<td>32.5</td>
</tr>
<tr>
<td>≥25</td>
<td>4,304</td>
<td>64.4</td>
<td>867</td>
<td>58.6</td>
</tr>
<tr>
<td><strong>Completed primary education</strong></td>
<td>4,706</td>
<td>70.4</td>
<td>1,240</td>
<td>84.0</td>
</tr>
<tr>
<td><strong>Married/co-habitating</strong></td>
<td>532</td>
<td>8.0</td>
<td>113</td>
<td>7.7</td>
</tr>
<tr>
<td><strong>Ever pregnant</strong></td>
<td>5,625</td>
<td>84.1</td>
<td>1,145</td>
<td>77.6</td>
</tr>
<tr>
<td><strong>Living children</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1,433</td>
<td>22.0</td>
<td>457</td>
<td>31.0</td>
</tr>
<tr>
<td>1-2</td>
<td>3,474</td>
<td>53.3</td>
<td>817</td>
<td>55.4</td>
</tr>
<tr>
<td>≥3</td>
<td>1,609</td>
<td>24.7</td>
<td>200</td>
<td>13.6</td>
</tr>
<tr>
<td><strong>Condomless sex with regular client, last sex</strong> &amp;</td>
<td>673</td>
<td>11.8</td>
<td>213</td>
<td>16.0</td>
</tr>
<tr>
<td><strong>Condomless sex with non-paying partner, last sex</strong> &amp;</td>
<td>2,434</td>
<td>60.3</td>
<td>381</td>
<td>54.0</td>
</tr>
<tr>
<td><strong>Previously tested for HIV</strong></td>
<td>5,459</td>
<td>84.1</td>
<td>1,287</td>
<td>87.8</td>
</tr>
</tbody>
</table>

Abbreviations. IQR: interquartile range.

a Missing: age 9; time selling sex 335; regular paying clients 351; non-paying partners 19; education 13; marital status 38; ever pregnant 9; living children 179; condomless sex with client 53; condomless sex with partner 72; previous HIV test 203; syphilis 77.
b Among 5,753 women who reported having one or more regular clients in the last month.
c Among 4,038 women who reported having one or more non-paying partners in the last month.
### Table 3. Pooled ART coverage and 95% confidence intervals (CI) by age among women who sell sex in sub-Saharan Africa (N=1,956)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Southern Africa N=1,018</th>
<th>Central Africa N=547</th>
<th>West Africa N=391</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ART Coverage</td>
<td>95% CI</td>
<td>ART Coverage</td>
</tr>
<tr>
<td>18-19 years</td>
<td>8.7</td>
<td>3.9–18.2</td>
<td>7.7</td>
</tr>
<tr>
<td>20-24 years</td>
<td>20.9</td>
<td>16.6–26.0</td>
<td>17.9</td>
</tr>
<tr>
<td>25-29 years</td>
<td>28.5</td>
<td>23.6–34.0</td>
<td>24.7</td>
</tr>
<tr>
<td>30-34 years</td>
<td>43.1</td>
<td>37.2–49.1</td>
<td>38.4</td>
</tr>
<tr>
<td>35-39 years</td>
<td>52.0</td>
<td>45.0–59.3</td>
<td>47.2</td>
</tr>
<tr>
<td>40-44 years</td>
<td>63.3</td>
<td>55.0–70.9</td>
<td>58.7</td>
</tr>
<tr>
<td>45+ years</td>
<td>62.5</td>
<td>53.4–70.8</td>
<td>58.0</td>
</tr>
<tr>
<td>Overall</td>
<td>33.1</td>
<td>27.7–39.2</td>
<td>41.7</td>
</tr>
</tbody>
</table>

**Abbreviations.** ART: antiretroviral therapy, CI: confidence interval
Table 4. Association between age and prior HIV testing, HIV status awareness, and ART use among women living with HIV at enrollment (N=1,781)\textsuperscript{ab}

<table>
<thead>
<tr>
<th></th>
<th>n/N</th>
<th>Prevalence</th>
<th>PR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ever tested for HIV</strong></td>
<td>1,556/1,781</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-19 years</td>
<td>50/69</td>
<td>66.5</td>
<td>0.76</td>
<td>0.72–0.80</td>
</tr>
<tr>
<td>20-24 years</td>
<td>322/364</td>
<td>85.7</td>
<td>0.98</td>
<td>0.98–0.99</td>
</tr>
<tr>
<td>(\geq25) years</td>
<td>1,183/1,344</td>
<td>87.1</td>
<td>Ref.</td>
<td>Ref.</td>
</tr>
<tr>
<td><strong>Aware of HIV status</strong></td>
<td>946/1,556</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-19 years</td>
<td>21/50</td>
<td>27.5</td>
<td>0.48</td>
<td>0.35–0.64</td>
</tr>
<tr>
<td>20-24 years</td>
<td>173/322</td>
<td>37.0</td>
<td>0.64</td>
<td>0.56–0.73</td>
</tr>
<tr>
<td>(\geq25) years</td>
<td>751/1,183</td>
<td>57.8</td>
<td>Ref.</td>
<td>Ref.</td>
</tr>
<tr>
<td><strong>On ART</strong></td>
<td>529/946</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-19 years</td>
<td>6/21</td>
<td>48.9</td>
<td>0.67</td>
<td>0.59–0.75</td>
</tr>
<tr>
<td>20-24 years</td>
<td>70/173</td>
<td>63.4</td>
<td>0.86</td>
<td>0.78–0.95</td>
</tr>
<tr>
<td>(\geq25) years</td>
<td>453/751</td>
<td>73.6</td>
<td>Ref.</td>
<td>Ref.</td>
</tr>
</tbody>
</table>

Abbreviations. ART: antiretroviral therapy, CI: confidence interval, PR: prevalence ratio

\textsuperscript{a} Includes 1,781 (91.2\%) of the 1,956 women diagnosed with HIV for whom prior HIV testing data was available.

\textsuperscript{b} Missing; age 3; aware of HIV status 35; on ART 20