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## Contraception and intersection with HIV services in 11 high HIV burden sub-Saharan African countries: Results from the population-based HIV Impact Assessment cross-sectional studies conducted from 2015 to 2018

Chelsea Solmo<sup>1</sup>, Katharine A. Yuengling<sup>1</sup>, Michael L. Cooney<sup>2</sup>, Karampreet Sachathap<sup>1</sup>, Sarah Ayton<sup>3</sup>, Neena Phillip<sup>1</sup>, Abigail Greenleaf<sup>1</sup>, Elizabeth Gummerson<sup>4</sup>, Nora Hennesy<sup>5</sup>, Sileshi Lulseged<sup>1</sup>, Dereje Habte<sup>6</sup>, Magreth Kagashe<sup>7</sup>, John H. Rogers<sup>8</sup>, Wilford Kirungi<sup>9</sup>, Katherine Battey<sup>10</sup>, Munyaradzi Pasipamire<sup>11</sup>, Phoebe Namukanja<sup>12</sup>, Clement Ndongmo<sup>13</sup>, Stephane Bodika<sup>14</sup>, Andrea Low<sup>1</sup>

<sup>1</sup>ICAP at Columbia University, New York, New York, USA

<sup>2</sup>Icahn School of Medicine at Mount Sinai, New York, New York, USA

<sup>3</sup>Escuela de Medicina y Ciencias de la Salud, Monterrey, Mexico

<sup>4</sup>Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA

<sup>5</sup>Public Health Institute, Dar es Salaam, Tanzania

<sup>6</sup>Division of Global HIV & TB, US Centers for Disease Control and Prevention (CDC), Addis Ababa, Ethiopia

<sup>7</sup>National AIDS Control Programme, Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC), Dodoma, Tanzania

<sup>8</sup>Center for Global Health, US Centers for Disease Control and Prevention (CDC), President's Malaria Initiative, Abuja, Nigeria

<sup>9</sup>AIDS Control Programme, Ministry of Health, Kampala, Uganda

<sup>10</sup>Division of Global HIV & TB, US Centers for Disease Control and Prevention (CDC), Windhoek, Namibia

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**Correspondence:** Chelsea Solmo, ICAP at Columbia University, New York, NY 10032, USA. csolmo@jhsph.edu.

### AUTHOR CONTRIBUTIONS

Karampreet Sachathap, Sarah Ayton, Neena Phillip, Abigail Greenleaf, Elizabeth Gummerson, Nora Hennesy, DP, Sileshi Lulseged, Dereje Habte, Magreth Kagashe, John H. Rogers, Wilford Kirungi, Katherine Battey, Munyaradzi Pasipamire, Phoebe Namukanja, Clement Ndongmo, and Stephane Bodika all contributed by helping to write, review, and provide feedback on the manuscript. Katharine A. Yuengling and Michael L. Cooney carried out the analyses for the manuscript. AL oversaw and reviewed the manuscript. Chelsea Solmo designed and wrote the manuscript.

### CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest.

### SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

<sup>11</sup>Division of Global HIV & TB, US Centers for Disease Control and Prevention (CDC), Manzini, Eswatini

<sup>12</sup>Division of Global HIV & TB, US Centers for Disease Control and Prevention (CDC), Kampala, Uganda

<sup>13</sup>Division of Global HIV & TB, US Centers for Disease Control and Prevention (CDC), Yaounde, Cameroon

<sup>14</sup>Division of Global HIV & TB, US Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, USA

## Abstract

**Objective:** The United Nations' Sustainable Development Goal 3.7.1 addresses the importance of family planning. The objective of this paper is to provide information on family planning to policymakers to help increase access to contraceptive methods to women in sub-Saharan Africa.

**Methods:** We analyzed data from the Population-based HIV Impact Assessment studies conducted in 11 sub-Saharan African countries from 2015 to 2018 to assess the relationship between HIV services and family planning. Analyses were restricted to women aged 15–49 years who reported being sexually active within the past 12 months and had data on contraceptive use.

**Results:** Approximately 46.4% of participants reported using any form of contraception; 93.6% of whom used modern contraceptives. Women with a positive HIV status were more likely to use contraceptives ( $P < 0.0001$ ) than HIV-negative women. Unmet need was higher among women who were confirmed to be HIV-negative in Namibia, Uganda, and Zambia than confirmed to be positive. Women aged 15–19 years used contraception less than 40% of the time.

**Conclusion:** This analysis highlights crucial gaps in progress among HIV-negative and young women (aged 15–19 years). To provide access to modern contraception for all women, programs and governments need to focus on women who desire but do not have access to these family planning resources.

## Keywords

contraception; HIV; LARC; reproductive health; sub-Saharan Africa; unmet need

## 1 | INTRODUCTION

Worldwide, contraceptive use is widely accepted as an effective, cost-efficient way to improve health and social outcomes.<sup>1</sup> The Sustainable Development Goals (SDGs) emphasize the need for universal access to sexual and reproductive health services and rights by 2030, as laid out in SDGs 3 and 5.<sup>2</sup> The increased use of contraception has resulted in a decrease in maternal and infant mortality<sup>3,4</sup> and has reduced the rate of unsafe abortions.<sup>5</sup> A key to this increase in access and acceptance of family planning was the integration of reproductive care into existing health services, optimizing the use of resources from other health sectors, particularly HIV services.

Reaching global sexual and reproductive health targets depends on improvement in sub-Saharan Africa (SSA), where the brunt of unintended pregnancies and HIV occur.<sup>5</sup> For women living with HIV, contraception is especially important to help with pregnancy planning, to avoid unintended pregnancies, and to prevent mother to child transmission of HIV.<sup>3</sup>

The Population-based HIV Impact Assessments (PHIA) project is conducted in high HIV burden countries and assesses the status of the HIV epidemic and the impact of the scale-up of global HIV treatment.<sup>6</sup> In order to assess the progress towards the family planning SDG, we analyzed data from the PHIA, nationally representative HIV-focused surveys, in order to estimate the status of contraception coverage in relation to the 2030 targets. Specifically, here we describe contraceptive use in 11 countries in SSA. We compared these data with previous national surveys in these countries to assess trends over time in the modern contraceptive prevalence and examined the relationship between HIV prevention and family planning. Our aim was to predict how far each of these countries must progress to reach the SDG.

## 2 | MATERIALS AND METHODS

### 2.1 | Survey methods and data collection

We included PHIA data from countries where data collection occurred between 2015 and 2018: Cameroon, Côte d'Ivoire, Eswatini, Ethiopia, Lesotho, Malawi, Namibia, Tanzania, Uganda, Zambia, and Zimbabwe. The PHIA surveys are national representative cross-sectional, two-stage, cluster sampling design surveys.<sup>6</sup> Survey sample size calculations were powered to provide annualized national HIV incidence estimates among adults, aged 15–49 years, with a relative standard error of 30% or less and subnational prevalence of viral load suppression among HIV-seropositive adults with 95% confidence intervals (CI) of  $\pm 10\%$ . A laboratory-based recency determination algorithm (HIV-1 limiting antigen avidity + viral load + antiretroviral detection) was used to distinguish recent from long-term infections.<sup>6</sup>

Structured household and individual questionnaires were used to collect data on demographic characteristics (Appendix S1) and risk behaviors, including questions on self-reported contraceptive use and family planning. After completing the individual interview, participants could consent to have their blood drawn and HIV viral load testing was conducted using plasma specimens or dried blood spots. Home-based rapid HIV testing was conducted according to each country's national algorithm.<sup>6</sup> Trained nurses or lay counselors provided pre- and post-test counseling, with referral to a preferred health facility for all those who tested seropositive. All participants were asked to consent separately to the interview and the blood draw; a guardian or parent provided permission for interviewers to approach adolescents aged 15–17 years who provided assent. The PHIA protocol was approved by ethics committees in each country and the institutional review boards at Columbia University and the US Centers for Disease Control and Prevention. Further details are available in Appendix S2.

## 2.2 | Definitions of variables

The primary outcome of interest was contraceptive use, which was measured as the percentage of women of reproductive age who reported themselves or their partners as currently using at least one contraceptive method of any type (modern or non-modern). Modern methods of contraception included sterilization, oral contraceptive pills, intrauterine devices (IUD), male and female condoms, injectables, the implant, and lactational/amenorrhea.<sup>7</sup> Non-modern contraceptives included rhythm, withdrawal, and folk methods. Modern contraceptive methods were divided into non-hormonal (IUDs, sterilization, lactational/amenorrhea, and male and female condoms) and hormonal (implants, oral contraceptive pills, and injectables), and a third subgroup of long-acting reversible contraceptives (LARC; IUDs [non-hormonal] and implants [hormonal]) (Figure S1). We defined the modern contraception prevalence rate as the proportion of women aged 15–49 years who reported currently using a modern method of contraception. These data were collected from two questions: (1) Are you or your partner currently doing something or using any method to delay or avoid getting pregnant? (2) Which method are you or your partner using? If a participant selected more than one answer, both methods of contraception were included in the analyses. In questions asking about contraception type, “contraception” was explained and specified as a method to prevent pregnancy. The use of condoms for sexually transmitted infection prevention exclusively was not included in this analysis.

Following the methods described in the literature, the PHIA surveys in Malawi, Namibia, Uganda, and Zambia also determined unmet needs by capturing the number of women who reported not wanting a child but who did not report any contraceptive use.<sup>8,9</sup> Women who reported wanting another child were excluded from the unmet need category (Appendix Table S2).

## 2.3 | Statistical analyses

The analysis was restricted to a sample of women who self-reported being sexually active within the past 12 months and who were not missing data on contraceptive use.

The counts displayed are raw, unweighted frequencies from the sample. The percentages displayed were estimated using Taylor series variance estimation to adjust for survey design and non-response, unless otherwise stated to be unweighted. The unweighted  $n$  alone could not be used to calculate the weighted percentages nor to assess magnitude between categories. Two sets of weights were created in the PHIA: one for interview responses and another for blood testing. Most characteristics used the interview weights. Overall HIV prevalence used the blood testing weights to more accurately reflect testing non-response, but interview weights were used for statistics involving contraceptive use so that the group not tested could be characterized. All statistics for antiretrovirals detected and viral load suppression used the blood testing weights. Comparisons used the Rao-Scott chi-squared test for categorical variables.

We examined characteristics of modern contraceptive use, as defined by a woman reporting at least one type of modern contraception. Multivariable log-binomial regression models with Taylor series variance estimation were used to estimate the relative risk of modern

contraceptive use. All models were adjusted for characteristics selected a priori: HIV status (confirmed with a blood test), age, residence, wealth quintile, education, and marital status. The statistical analysis was performed by using SAS version 9.4 software (SAS Institute, Cary, NC, USA) and Stata version 14.2 (StataCorp LLC, College Station, TX, USA). All hypothesis tests were two-sided and assessed on the 5% level of significance.

### 3 | RESULTS

Counts are unweighted and percentages are weighted unless otherwise specified.

#### 3.1 | Characteristics

Among the 11 countries there were 115 392 eligible women aged 15–49 years who responded to the survey. Of those women, 72 987 (63.3%) reported sexual activity in the past 12 months and had contraceptive data. Uganda had the highest number of eligible sexually active women (9888; 18.0%), although Tanzania had the highest percentage after weighting (9840; 25.6%). Eswatini had the least number of sexually active women (3548; 0.7%) (Table 1).

Most sexually active women were married or living with their partner (51 069; 71.0%), 15 457 (20.9%) were aged 20–24 years, 41 343 (54.0%) lived in rural areas, and 62 799 (83.7%) attended at least primary school. Among women aged 15–49 years who were sexually active in the past 12 months, 8951 (8.5%) were HIV-seropositive. Among the respondents, Eswatini had the highest HIV prevalence, with 1334 (38.8%) of the 3346 tested eligible respondents being HIV-positive, whereas Côte d'Ivoire had the lowest HIV prevalence at 4% (166 HIV-positive of 5523). Of all respondents that were confirmed to be HIV-positive, 5912 (59.4%) had antiretrovirals detected and 5842 (58.8%) were virally suppressed (Table 1).

### 4 | CONTRACEPTIVE USE

Overall, 37 564 (46.4%; 95% CI 45.76–47.07) respondents used some form of contraception. Among those women using contraception, 35 857 (96.3%; 95% CI 93.21–94.03) used modern contraceptives, 24 929 (69.1%; 95% CI 68.23–70.06) used hormonal contraceptives, and 5949 (19.5%; 95% CI 18.79–20.15) used LARCs (Table 2).

The data showed geographic variation in contraception use. Southern Africa had the greatest percentage of overall contraception use, 64.9% (22 630 of 34 175), whereas West Africa had the lowest, 31.9% (4170 of 14 199). Of those using contraception, Southern Africa also had the greatest percentage using modern methods, 98.4% (22 302 of 22 630), whereas West Africa had the lowest percentage, 86.7% (3574 of 4170) (Table 1; Figures S2–S4). Similarly, of those using contraception, Southern Africa used hormonal contraception the most (76.2%; 15 168 of 22 630) and West Africa the least (43.1%; 1820 of 4170) (Table 1; Figure S5). Of those using hormonal contraception, Zimbabwe had the greatest percentage of women who used the contraceptive pill (65.8%; 2702 of 4265), in Namibia the majority of women used injectables (77.2%; 1291 of 1563), whereas in Tanzania the greatest percentage (36.3%; 960 of 2723) used an implant (Table S4b).

Among women who reported any contraception use, self-reported use of modern contraception was high. Use of hormonal contraception differed by country, ranging from 29.5% (794 of 2446; 95% CI 26.54–32.45) in Cameroon to 88.5% (2195 of 2447; 95% CI 86.71–90.31) in Ethiopia. LARC use also differed, ranging from 2.7% (62 of 3669; 95% CI 1.10–4.35) in Namibia to 28.6% (686 of 2447; 95% CI 26.51–30.78) in Ethiopia (Table 2).

As supported by the literature, contraception use increased with increasing education and wealth quintile.<sup>10</sup> Among women with a secondary educational level or higher, more than half reported using a form of contraception (Table 1). Of women aged 15–19, 36.7% (3132 of 7649) used any contraception (Table 1; Figure S6).

Of women who reported being married or living with a partner, 48.1% (26 644 of 51 069) used any type of contraception, whereas 42.3% (7553 of 14 480) of women who reported being never married used any type of contraception (Table 1). Married women were 30% more likely to use modern types of contraception than those who were never married ( $P < 0.001$ ) (relative risk 1.30) (Table 3). Of women using contraception, hormonal contraception use was higher among women who reported being married (76%; 20 026 of 26 644), compared with women who reported never being married (38.4%; 2747 of 7553) (Table 2). Women who reported having one child were significantly more likely than women with no children to use modern contraception ( $P < 0.001$ ) (Table 3).

#### 4.1 | HIV and contraception

In a multivariable analysis, women who were HIV-positive, younger, in a higher wealth quintile, or had any education were more likely to report modern contraceptive use than women who were HIV-negative (adjusted relative risk 1.17, 95% CI 1.13–1.21), older (adjusted relative risk 1.09, 95% CI 1.06–1.11), in the lowest wealth quintile (adjusted relative risk 1.11–1.18) or not educated (adjusted relative risk 1.64–1.91) (Table 3).

The number of women who reported using condoms as a form of contraception in addition to another form of contraception did not vary greatly depending on the type of primary contraception (e.g., IUD, pill, implant) (Table S3). Women with a positive HIV status (8951) were more likely to use modern contraception (50.8%; 5395), than women who were HIV-negative (42.7%; 28 277 of 59 739), using condoms more often either in conjunction with other modern methods (4.1% [687] vs. 0.8% [974]) or alone (14.9% [2157] vs. 6.9% [5655]) (Table 4).

Women who self-reported that they made their own health decisions were more likely to use modern contraception compared with women whose spouse or partner made the health decisions (RR 1.32, 95% CI 1.26–1.37). Similarly, women who made their own financial decisions were more likely to use modern contraception than women whose spouses made the money decisions (RR 1.08, 95% CI 1.03–1.13). Women who reported that both themselves and their spouse make health and financial decisions were more likely to use modern contraception than when the woman or the spouse alone made the decisions (Table 3).

## 4.2 | Unmet need

The calculated unmet need for Malawi, Namibia, Uganda, and Zambia ( $n = 26\,507$ ) ranged from 9.0% (475 of 4973) in Namibia to 27.4% (1588 of 5912) in Zambia. Unmet need was higher among women who were confirmed to be HIV-negative than confirmed to be positive in Namibia (9.4% vs. 6.8%), Uganda (15.1% vs. 12.7%), and Zambia (27.0% vs. 24.2%) (Table 5). In Malawi, Uganda, and Zambia, the greatest unmet need was found in women who were never married (Table 2).

## 5 | DISCUSSION

This paper presents recent, nationally representative data on 33 873 women using contraception in countries in SSA with a high HIV burden, of whom 94% are using modern contraceptives. Southern Africa was the region with the greatest reported use of both contraception and modern contraception, with hormonal contraception being the most commonly used contraceptive type. Contraception use increased with increasing education, wealth, and parity. Women who were married or living with a partner used contraception more than women who were never married. Despite these improvements, this paper highlights crucial gaps in progress for women aged 15–19 years and women who are HIV-negative.

Consistent with previous studies, less than 40% of women aged 15–19 years used contraception.<sup>11,12</sup> Literature has shown that women aged 15–19 years experience challenges accessing family planning services due to a lack of knowledge of where to receive such services or means to travel to and/or afford the services.<sup>13–15</sup> Other crucial barriers young women face is the lack of assurance that their identity will be kept confidential, myths and misconceptions about contraception, and poor communication between health professionals and their young clients.<sup>5</sup>

In 2013, UNAIDS included strengthening HIV and reproductive health service integration in one of their 10 goals to reduce HIV infections and AIDS-related deaths.<sup>16</sup> In their 2013 Global Report, UNAIDS reported two-thirds of the countries having integrated HIV in sexual and reproductive health services, with more than 45 countries having conducted the rapid assessment for sexual and reproductive health and HIV linkages. The data in this paper and others highlight the results of service integration, with HIV-positive women having a higher rate of modern contraception use, perhaps due to increased access to services.<sup>17–19</sup> The use of contraception, and specifically modern contraception and condoms, is lower and the unmet need is higher for HIV-negative women. These data are consistent with findings from other studies.<sup>20–24</sup> In a study in South Africa, 563 sexually active, non-pregnant women were surveyed to assess contraception prevalence among HIV-positive and -negative women.<sup>20</sup> The study showed that HIV-positive women overall were significantly more likely to use contraception compared with HIV-negative women. A similar study in Kenya showed a 19% decrease in pregnancy incidence after integrating family planning into HIV care.<sup>25</sup>

This paper shows that overall HIV-positive women were significantly more likely to use contraception compared with HIV-negative women. Unmet need was also higher in HIV-negative women, further suggesting access to care may be the root cause in lower

contraceptive use and not just the desire from HIV-positive women to decrease the risk of pregnancy. Government and development partners need to target these risk groups in order to achieve their SDG target of universal access to sexual and reproductive health services and rights by 2030.

### 5.1 | Limitations

The analysis of unmet needs was limited to only Malawi, Namibia, Uganda, and Zambia, as the questions regarding unmet needs were only asked in those countries. There is a possibility of response bias from the women participating in the PHIA interviews, as the participants may have felt pressure to provide answers to contraception questions that were socially desirable or may have found it challenging to recall the contraception specifics from their previous sexual events.

Although women in urban areas were more likely to use modern contraceptives, the difference between urban and rural areas was not as large as expected. This may be due to more reproductive health programming targeting rural areas in these countries. At the time of these PHIA surveys, IUDs available in the surveyed countries were the non-hormonal copper IUDs and therefore the survey did not differentiate between the copper non-hormonal IUD and the LNG hormonal IUD. Despite these limitations, this study used nationally representative data that provide important insights into contraceptive use within and across countries in SSA.

## 6 | CONCLUSION

Despite positive strides in improving access to modern contraceptive use in SSA, this highlights the gaps in progress for HIV-negative women aged 15–19 years. Additionally, the higher unmet need for modern contraceptive use among HIV-negative women further suggests access challenges to care as the potential root cause for lower contraceptive use. Failure to address barriers affecting these groups may hinder SSA from reaching the SDG by the year 2030.

### Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

### FUNDING INFORMATION

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### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.



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Characteristics of the study sample and any contraception use among all sexually active women aged 15–49 years by demographic characteristics ( $n = 72\ 987$ )<sup>a</sup>: findings from Population-based HIV Impact Assessments 2015–2018.

**TABLE 1**

Characteristics	All sexually active women aged 15–49 years			Any contraception		
	Unweighted		Weighted	Unweighted		Weighted
	<i>n</i>	%	<i>n</i>	<i>n</i>	%	95% CI
Overall	72 987	72 987	100.0	33 875	46.41	45.76–47.07
Country						
Cameroon	8388	8635	11.83	2837	32.85	31.15–34.55
Côte d'Ivoire	5811	8951	12.26	2780	31.05	28.95–33.16
Ethiopia	4885	5799	7.94	2927	50.49	48.37–52.60
Lesotho	4658	822	1.13	546	66.42	64.93–67.90
Malawi	6990	5742	7.87	3848	67.01	65.65–68.37
Namibia	5404	851	1.17	588	69.17	67.47–70.87
Eswatini	3548	507	0.69	390	76.92	75.43–78.42
Tanzania	9840	18 678	25.59	7608	40.73	39.15–42.31
Uganda	9888	13 105	17.95	6153	46.95	45.62–48.28
Zambia	6448	4717	6.46	2497	52.94	51.37–54.51
Zimbabwe	7127	5182	7.10	3702	71.44	70.25–72.63
Region						
West	14 199	17 586	24.09	5616	31.94	30.57–33.30
East	24 613	37 581	51.49	16 688	44.41	43.43–45.38
South	34 175	17 820	24.42	11 571	64.93	64.22–65.65
Age (years)						
15–19	7649	8581	11.76	3146	36.66	35.06–38.25
20–24	15 457	15 259	20.91	7605	49.84	48.62–51.07
25–29	14 773	14 396	19.72	7496	52.07	50.91–53.22
30–34	12 471	12 642	17.32	6504	51.45	50.14–52.76
35–39	10 033	9735	13.34	4664	47.91	46.43–49.39
40–44	7474	7305	10.01	2999	41.06	39.47–42.64

Characteristics	All sexually active women aged 15–49 years				Any contraception			
	Unweighted		Weighted		Unweighted		Weighted	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	95% CI
45–49	5130	5070	6.95	1462	28.84	27.10–30.58		
Residence								
Urban	31 644	33 597	46.03	16 157	48.09	47.14–49.04		
Rural	41 343	39 390	53.97	17 719	44.98	44.07–45.90		
Wealth quintile								
1	15 127	13 990	19.17	5362	38.33	36.84–39.82		
2	13 951	13 678	18.74	6123	44.76	43.51–46.02		
3	14 380	14 317	19.62	6979	48.75	47.51–49.98		
4	14 319	15 221	20.85	7627	50.11	48.82–51.39		
5	15 155	15 732	21.56	7765	49.35	47.97–50.73		
Missing	55	49	0.07	20	41.31	15.69–66.93		
Education								
None	10 071	11 770	16.13	3354	28.49	27.10–29.89		
Primary	30 953	34 083	46.70	15 843	46.48	45.58–47.39		
Secondary	24 460	20 784	28.48	11 172	53.75	52.80–54.71		
Tertiary	7386	6225	8.53	3444	55.33	53.81–56.86		
Missing	117	125	0.17	62	49.86	38.75–60.98		
Married								
Never married	14 480	13 223	18.12	5588	42.26	40.86–43.66		
Married or living together	51 069	51 846	71.03	24 950	48.12	47.34–48.90		
Divorced or separated	5850	6503	8.91	2759	42.43	40.67–44.20		
Widowed	1417	1257	1.72	504	40.10	36.49–43.71		
Missing	171	159	0.22	74	46.72	36.78–56.67		
Number of children in past 3 years								
0	23 372	22 186	30.40	9740	43.90	42.84–44.96		
1	27 920	27 700	37.95	15 261	55.09	54.13–56.06		
2	7518	8167	11.19	3678	45.03	43.48–46.58		
3 or more	906	975	1.34	379	38.83	34.74–42.91		

Characteristics	All sexually active women aged 15–49 years				Any contraception			
	Unweighted		Weighted		Unweighted		Weighted	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	95% CI
Missing	13 271	13 958	13 958	19.12	4818	34.52	4818	33.19–35.84
Who makes health decisions? (among those married or living together)								
Respondent	16 128	16 563	16 563	31.95	8384	50.62	8384	49.39–51.84
Spouse/partner	12 369	13 387	13 387	25.82	5192	38.79	5192	37.51–40.06
Both	22 037	21 385	21 385	41.25	11 148	52.13	11 148	51.13–53.13
Someone else	444	420	420	0.81	170	40.55	170	35.04–46.06
Missing	91	91	91	0.18	56	61.28	56	47.88–74.68
Who makes money decisions? (among those married or living together)								
Respondent	10 041	10 754	10 754	20.74	4899	45.56	4899	44.06–47.05
Spouse/partner	13 515	14 947	14 947	28.83	6179	41.34	6179	40.11–42.57
Both	27 183	25 808	25 808	49.78	13 742	53.25	13 742	52.32–54.17
Someone else	230	224	224	0.43	83	37.05	83	29.09–45.00
Missing	100	113	113	0.22	47	41.63	47	28.34–54.92
HIV status								
HIV-positive	8951	5850 <sup>b</sup>	5850 <sup>b</sup>	8.52 <sup>b</sup>	3080	52.08	3080	50.47–53.69
HIV-negative	59 739	62 840 <sup>b</sup>	62 840 <sup>b</sup>	91.48 <sup>b</sup>	28 818	45.77	28 818	45.08–46.47
Not tested	4297	<sup>b,c</sup>	<sup>b,c</sup>	<sup>b,c</sup>	1977	48.05	1977	45.93–50.17
ARVs detected (among HIV-positive) <sup>b</sup>								
Detected	5912	3475	3475	59.40	1983	57.07	1983	55.07–59.08
Not detected	2980	2328	2328	39.81	1032	44.33	1032	41.74–46.93
Not tested	59	47	47	0.80	26	56.52	26	38.28–74.75
Virally suppressed (among HIV-positive) <sup>b</sup>								
Suppressed	5842	3437	3437	58.76	1962	57.10	1962	55.09–59.11
Not suppressed	3085	2393	2393	40.91	1068	44.64	1068	42.07–47.20
Viral load not tested	24	19	19	0.33	11	56.40	11	36.95–75.85

Note: For each characteristic, counts and percentages on rows sum down to 72 987 (100%) for the overall columns. Counts and percentages for the “Any contraception” columns are row specific, using the overall weighted *n* for the denominator.

Abbreviations: ARV, antiretroviral; CI, confidence interval.

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<sup>g</sup>All reported *n* and percentages are weighted, unless specified otherwise. Weights were scaled so that the weighted population total matched the unweighted sample total (72 987).

<sup>h</sup>Used the weights for blood testing.

<sup>c</sup>Not calculated, because the weights for blood testing were used to adjust for non-response. Using the interview weights, the weighted frequencies were 5914 (8.1%) HIV-positive, 62 958 (86.3%) HIV-negative, and 4115 (5.6%) not tested; these are the values used as the denominator for the “Any contraception” columns. The blood testing weights were always used for ARVs detected and virally suppressed calculations.

TABLE 2

Contraception types among women aged 15–49 years who reported modern contraception use, by demographic characteristics ( $n = 44\ 801$ )<sup>a</sup>: findings from Population-based HIV Impact Assessments 2015–2018.

Characteristics	Using modern contraception												
	Any contraception						Type of modern contraception						
	Any modern contraception <sup>b</sup>		Hormonal contraception		Non-hormonal contraception		LARC <sup>c</sup>						
<i>n</i>	%	95% CI	<i>n</i>	%	95% CI	<i>n</i>	%	95% CI	<i>n</i>	%	95% CI		
Overall	33 875	31 714	93.62	93.21–94.03	23 423	69.14	68.23–70.06	8291	24.48	23.66–25.29	6596	19.47	18.79–20.15
Country													
Cameroon	2837	2334	82.29	80.46–84.12	837	29.49	26.54–32.45	1498	52.80	49.57–56.02	296	10.44	9.13–11.75
Côte d'Ivoire	2780	2533	91.13	89.51–92.75	1584	56.99	53.29–60.69	949	34.14	30.77–37.51	252	9.08	7.20–10.95
Ethiopia	2927	2869	98.01	97.33–98.68	2591	88.51	86.71–90.31	278	9.49	7.84–11.14	839	28.64	26.51–30.78
Lesotho	546	544	99.65	99.43–99.86	319	58.51	56.52–60.50	224	41.13	39.14–43.13	43	7.89	6.85–8.92
Malawi	3848	3781	98.27	97.83–98.71	2850	74.08	72.45–75.71	931	24.19	22.57–25.81	868	22.55	20.77–24.34
Namibia	588	575	97.71	97.06–98.36	233	39.59	36.61–42.57	342	58.12	55.23–61.01	16	2.72	1.10–4.35
Eswatini	390	388	99.43	99.14–99.72	168	43.20	40.96–45.43	219	56.24	54.00–58.47	20	5.22	4.24–6.20
Tanzania	7608	6928	91.06	89.85–92.28	5361	70.47	68.43–72.51	1567	20.60	18.77–22.42	2141	28.14	26.19–30.09
Uganda	6153	5669	92.14	91.20–93.08	4233	68.80	67.06–70.55	1436	23.34	21.77–24.90	1136	18.46	17.01–19.91
Zambia	2497	2412	96.60	95.81–97.39	2087	83.57	81.99–85.14	325	13.04	11.68–14.39	351	14.05	12.62–15.49
Zimbabwe	3702	3681	99.42	99.21–99.63	3159	85.32	84.32–86.33	522	14.10	13.12–15.07	634	17.13	15.90–18.35
Region													
West	5616	4867	86.67	85.39–87.94	2421	43.10	40.49–45.72	2447	43.56	41.11–46.02	548	9.77	8.62–10.92
East	16 688	15 466	92.68	92.01–93.35	12 186	73.02	71.82–74.22	3281	19.66	18.59–20.73	4115	24.66	23.54–25.78
South	11 571	11 381	98.35	98.12–98.59	8817	76.20	75.43–76.97	2564	22.16	21.41–22.90	1932	16.70	15.91–17.48
Age (years)													
15–19	3146	2975	94.59	93.42–95.76	1532	48.72	46.21–51.22	1443	45.87	43.33–48.41	294	9.34	7.87–10.81
20–24	7605	7214	94.85	94.11–95.59	5510	72.45	70.86–74.04	1704	22.41	21.00–23.81	1455	19.13	17.81–20.44
25–29	7496	7006	93.47	92.66–94.29	5794	77.30	75.85–78.74	1213	16.18	14.93–17.43	1687	22.51	21.15–23.88
30–34	6504	6112	93.97	93.15–94.79	4952	76.15	74.67–77.63	1159	17.83	16.57–19.08	1565	24.07	22.62–25.51
35–39	4664	4349	93.25	92.24–94.26	3213	68.89	67.12–70.66	1136	24.36	22.69–26.03	932	19.99	18.46–21.51

Characteristics	Using modern contraception						Type of modern contraception						
	Any contraception		Any modern contraception <sup>b</sup>		Hormonal contraception		Non-hormonal contraception		LARC <sup>c</sup>				
	n	%	n	%	n	%	n	%	n	%	n	%	95% CI
40-44	2999	91.13	2733	91.13	1735	57.84	55.45-60.24	998	33.28	31.12-35.44	490	16.35	14.43-18.27
45-49	1462	90.60	1325	90.60	687	46.97	43.33-50.61	638	43.63	40.14-47.13	172	11.79	9.62-13.95
Residence													
Urban	16 157	92.45	14 937	92.45	10 553	65.32	64.03-66.61	4384	27.13	25.96-28.30	3165	19.59	18.57-20.61
Rural	17 719	94.69	16 778	94.69	12 870	72.63	71.30-73.96	3908	22.05	20.90-23.21	3431	19.36	18.44-20.29
Wealth quintile													
1	5362	94.39	5061	94.39	3881	72.38	70.12-74.64	1180	22.01	19.97-24.05	962	17.95	16.23-19.67
2	6123	94.84	5807	94.84	4492	73.37	71.68-75.06	1315	21.47	19.86-23.09	1128	18.42	17.01-19.83
3	6979	94.68	6607	94.68	4981	71.38	69.79-72.96	1626	23.30	21.80-24.80	1324	18.98	17.69-20.27
4	7627	93.72	7148	93.72	5234	68.63	66.99-70.26	1914	25.09	23.72-26.46	1560	20.45	18.99-21.91
5	7765	91.07	7071	91.07	4819	62.07	60.38-63.76	2251	29.00	27.47-30.52	1619	20.86	19.66-22.05
Missing	20	100.0	20	100.0	15	76.00	59.80-92.20	5	24.00	7.80-40.20	2	10.25	0.00-21.13
Education													
None	3354	92.97	3118	92.97	2487	74.16	71.70-76.62	631	18.81	16.80-20.82	659	19.65	17.43-21.88
Primary	15 843	94.91	15 037	94.91	11 823	74.63	73.59-75.67	3214	20.28	19.31-21.26	3430	21.65	20.63-22.67
Secondary	11 172	93.43	10 438	93.43	7443	66.62	65.39-67.84	2995	26.81	25.68-27.94	1988	17.79	16.82-18.77
Tertiary	3444	88.91	3062	88.91	1634	47.44	44.44-50.43	1428	41.47	38.74-44.20	514	14.92	13.22-16.61
Missing	62	95.31	59	95.31	36	58.50	42.97-74.04	23	36.80	21.50-52.11	5	8.11	0.48-15.75
Married													
Never married	5588	92.85	5189	92.85	2147	38.42	36.46-40.37	3042	54.44	52.51-56.37	433	7.76	6.69-8.82
Married or living together	24 950	93.54	23 337	93.54	18 972	76.04	75.18-76.90	4366	17.50	16.75-18.24	5403	21.65	20.89-22.41
Divorced or separated	2759	95.53	2636	95.53	1962	71.10	68.72-73.48	674	24.43	22.20-26.67	642	23.27	20.81-25.74
Widowed	504	96.41	486	96.41	309	61.25	55.81-66.69	177	35.16	29.81-40.51	111	22.09	16.70-27.48
Missing	74	89.58	66	89.58	34	46.25	32.42-60.08	32	43.33	28.55-58.11	6	8.25	0.93-15.58
Number of children in past 3 years													
0	9740	93.44	9101	93.44	6289	64.57	63.07-66.06	2812	28.87	27.50-30.24	1849	18.98	17.86-20.11
1	15 261	94.18	14 373	94.18	12 158	79.67	78.74-80.59	2215	14.52	13.72-15.31	3482	22.82	21.82-23.82



Characteristics	Using modern contraception										Type of modern contraception									
	Any contraception			Any modern contraception <sup>b</sup>			Hormonal contraception				Non-hormonal contraception				LARC <sup>c</sup>					
	n	%	95% CI	n	%	95% CI	n	%	95% CI	n	%	95% CI	n	%	95% CI	n	%	95% CI		
2	3678	3372	91.68	90.28–93.07	2833	77.02	74.84–79.21	539	14.65	12.92–16.38	844	22.93	21.03–24.84							
3 or more	379	359	94.90	92.36–97.43	287	75.80	70.38–81.21	72	19.10	13.96–24.25	88	23.12	16.85–29.39							
Missing	4818	4509	93.59	92.62–94.57	1856	38.53	36.41–40.65	2653	55.06	52.94–57.18	334	6.93	5.88–7.98							
Who makes health decisions? (among those married and living together)																				
Respondent	8384	7825	93.33	92.53–94.14	6349	75.73	74.38–77.07	1476	17.61	16.42–18.79	1851	22.08	20.88–23.28							
Spouse/partner	5192	4809	92.61	91.60–93.61	3945	75.97	74.07–77.86	864	16.64	15.06–18.22	1057	20.35	18.78–21.93							
Both	11148	10496	94.15	93.51–94.79	8513	76.37	75.26–77.47	1982	17.78	16.83–18.73	2462	22.08	20.93–23.24							
Someone else	170	161	94.24	90.73–97.75	130	76.26	69.25–83.27	31	17.98	11.51–24.44	26	15.36	9.18–21.55							
Missing	56	48	85.56	73.09–98.03	35	62.73	46.03–79.42	13	22.83	7.68–37.98	7	12.81	0.00–25.93							
Who makes money decisions? (among those married and living together)																				
Respondent	4899	4488	91.61	90.47–92.75	3551	72.49	70.74–74.24	937	19.12	17.59–20.65	1071	21.86	20.28–23.45							
Spouse/partner	6179	5782	93.57	92.75–94.40	4770	77.20	75.58–78.83	1011	16.37	14.97–17.76	1275	20.64	19.20–22.09							
Both	13742	12950	94.24	93.66–94.82	10555	76.81	75.81–77.81	2395	17.43	16.57–18.29	3041	22.13	21.12–23.13							
Someone else	83	77	92.63	83.56–100.0	62	75.06	61.43–88.69	15	17.57	5.56–29.59	11	13.79	5.15–22.43							
Missing	47	41	85.85	71.36–100.0	33	69.21	52.65–85.76	8	16.64	3.46–29.82	4	8.99	0.00–21.50							
HIV status																				
HIV-positive	3080	3004	97.52	96.82–98.22	1841	59.75	57.78–61.73	1163	37.77	35.83–39.70	559	18.14	16.46–19.82							
HIV-negative	28818	26899	93.34	92.89–93.80	20222	70.17	69.18–71.16	6677	23.17	22.28–24.06	5756	19.97	19.21–20.73							
Not tested	1977	1811	91.61	89.87–93.35	1361	68.81	65.92–71.69	451	22.80	20.36–25.24	281	14.22	12.26–16.19							
ARV's detected (among HIV-positive) <sup>d</sup>																				
Detected	1983	1952	98.45	97.84–99.06	1128	56.90	54.52–59.27	824	41.56	39.21–43.90	351	17.71	15.64–19.78							
Not detected	1032	990	95.90	94.30–97.51	678	65.72	61.97–69.47	312	30.18	26.49–33.87	189	18.31	15.59–21.03							
Not tested	26	23	88.81	68.76–100.0	13	48.32	24.79–71.85	11	40.48	18.10–62.86	8	30.74	8.73–52.75							
Virally suppressed (among HIV-positive) <sup>d</sup>																				
Suppressed	1962	1925	98.10	97.38–98.83	1131	57.65	55.27–60.04	794	40.45	38.08–42.82	349	17.77	15.66–19.89							
Not suppressed	1068	1029	96.38	94.96–97.79	679	63.58	59.86–67.31	350	32.79	29.18–36.40	199	18.67	15.94–21.40							

Characteristics	Using modern contraception													
	Any contraception		Any modern contraception <sup>b</sup>			Type of modern contraception			Non-hormonal contraception		LARC <sup>c</sup>			
	<i>n</i>	%	<i>n</i>	%	95% CI	<i>n</i>	%	95% CI	<i>n</i>	%	95% CI	<i>n</i>	%	95% CI
Viral load not tested	11	100.0	11	100.0	100.0–100.0	9	80.40	59.38–100.0	2	19.60	0.00–40.62	0	0.00	0.00–0.00

Abbreviations: ARV, antiretroviral; CI, confidence interval; LARC, long-acting reversible contraception.

<sup>a</sup>All reported *n* and percentages are weighted, unless specified otherwise. Weights were scaled so that the weighted population total matched the unweighted sample total (72 987). The weighted *n* for “Any contraception” is the denominator for all percentages.

<sup>b</sup>Includes hormonal, non-hormonal, and LARC contraceptives. Condom use as a contraception was included in this analysis.

<sup>c</sup>Implant, intrauterine device, injectable.

<sup>d</sup>Used the weights for blood testing.

Key predictors of modern contraception use among women aged 15–49 years ( $n = 72\,987$ ) from a Taylor series log-binomial model: findings from Population-based HIV Impact Assessments (PHIA) 2015–2018.

TABLE 3

Model	<i>n</i>	Unadjusted			Multivariable adjusted		
		RR	95% CI	<i>P</i> -value	aRR	95% CI	<i>P</i> -value
<b>Characteristics</b>							
PHIA-confirmed HIV status							
HIV-positive	8951	1.19	1.15–1.23	<0.001	1.17	1.13–1.21	<0.001
HIV-negative	59 739	ref			ref		
Missing	4297	1.03	0.98–1.08	0.249	1.02	0.97–1.07	0.471
Age (years)							
15–29	37 879	1.08	1.05–1.10	<0.001	1.09	1.06–1.11	<0.001
30–49	35 108	ref			ref		
Residence							
Urban	31 644	1.04	1.01–1.08	0.005	0.98	0.95–1.01	0.256
Rural	41 343	ref			ref		
Wealth quintile							
1	15 127	ref			ref		
2	13 951	1.17	1.12–1.23	<0.001	1.11	1.06–1.16	<0.001
3	14 380	1.28	1.22–1.34	<0.001	1.18	1.13–1.24	<0.001
4	14 319	1.30	1.24–1.36	<0.001	1.18	1.13–1.24	<0.001
5	15 155	1.24	1.18–1.31	<0.001	1.11	1.05–1.17	<0.001
Missing	55	1.14	0.62–2.12	0.674	1.00	0.58–1.70	0.991
Education							
None	10 071	ref			ref		
Primary	30 953	1.67	1.58–1.76	<0.001	1.64	1.55–1.73	<0.001
Secondary	24 460	1.90	1.79–2.01	<0.001	1.90	1.79–2.01	<0.001
Tertiary	7386	1.86	1.75–1.97	<0.001	1.91	1.79–2.03	<0.001
Missing	117	1.79	1.42–2.26	<0.001	1.84	1.46–2.33	<0.001
Marital status							
Never married	14 480	0.87	0.84–0.90	<0.001	0.77	0.74–0.80	<0.001

Model	Characteristics	n	Unadjusted			Multivariable adjusted		
			RR	95% CI	P-value	aRR	95% CI	P-value
	Married or living together	51 069	ref	ref		ref		
	Divorced or separated	5850	0.90	0.86–0.94	<0.001	0.85	0.82–0.89	<0.001
	Widowed	1417	0.86	0.78–0.94	0.002	0.83	0.76–0.91	<0.001
	Missing	171	0.93	0.73–1.18	0.551	0.82	0.65–1.04	0.099
	Number of children in past 3 years							
	0	23 372	ref	ref				
	1	27 920	1.26	1.23–1.30	<0.001			
	2	7518	1.01	0.96–1.05	0.780			
	3 or more	906	0.90	0.80–1.01	0.065			
	Missing	13 271	0.79	0.75–0.82	<0.001			
	Who makes health decisions? (among those married and living together)							
	Respondent	16 128	1.32	1.26–1.37	<0.001			
	Spouse/partner	12 369	ref	ref				
	Both	22 037	1.37	1.31–1.42	<0.001			
	Someone else	444	1.06	0.92–1.23	0.403			
	Missing	91	1.46	1.13–1.89	0.004			
	Who makes money decisions? (among those married and living together)							
	Respondent	10 041	1.08	1.03–1.13	0.001			
	Spouse/partner	13 515	ref	ref				
	Both	27 183	1.30	1.26–1.34	<0.001			
	Someone else	230	0.89	0.71–1.11	0.296			
	Missing	100	0.92	0.65–1.31	0.657			

Abbreviations: aRR, relative risk adjusted for the other variables in the model; CI, confidence interval.

Male condom and modern contraception use among all women aged 15–49 years ( $n = 72\,987$ ): findings from Population-based HIV Impact Assessments (PHIA) 2015–2018.

**TABLE 4**

Characteristics	Male condoms only		Other modern contraceptive methods <sup>a</sup> (not male condoms)		Male condoms and other modern contraceptives		Total <i>n</i>
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Result of PHIA survey HIV test							
HIV-positive	2157	14.9	2551	31.8	687	4.1	8951
HIV-negative	5655	6.9	21 598	35.0	974	0.8	59 739
Not tested	555	7.8	1580	35.0	100	1.2	4297

*Note:* All reported *n* are unweighted and percentages are weighted.

<sup>a</sup>Included sterilization, oral contraceptive pills, intrauterine devices, male and female condoms, injectables, the implant, and lactational/amenorrhea.

Unmet need<sup>a</sup> and HIV status in Malawi, Namibia, Uganda, and Zambia in women aged 15–49 years ( $n = 26\,507$ ): findings from Population-based HIV Impact Assessments 2015–2018.

**TABLE 5**

Country	HIV status								
	HIV-positive		HIV-negative		Overall				
	Unmet need	Total	Unmet need	Total	Unmet need	Total			
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%			
Malawi	109	12.10	870	559	10.79	4298	780	11.37	6486
Namibia	65	6.77	776	379	9.35	3806	475	8.98	4973
Uganda	89	12.72	683	1309	15.08	8368	1415	14.94	9136
Zambia	201	24.22	850	1208	26.99	4539	1588	27.36	5912

*Note:* All reported *n* are unweighted and percentages are weighted.

<sup>a</sup> Defined as the number of women who reported not wanting a child but who did not report any contraceptive use.