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Concurrent Sexual Partnerships and HIV Infection: Evidence from National Population-Based Surveys

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CONTENTS

TABLES

FIGURES

APPENDIX TABLES

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SUMMARY

Knowing the prevalence and correlates of multiple and concurrent sexual partnerships is important for understanding the dynamics of HIV transmission, and thus for developing effective prevention interventions. Although at least a few theoretical models of multiple and concurrent partnerships have been developed, there is little agreement about how to derive empirical measures and how to assess the relationship of multiple and concurrent sexual partnerships with HIV infection.

This study takes advantage of self-reported data on sexual partnerships and biomarker data on HIV serostatus that have been collected in recent years from adult women and men (age 15-49) by nationally representative Demographic and Health Surveys (DHS) and AIDS Indicator Surveys (AIS). Using information on up to three of the respondents' most recent sexual partners, we evaluate and compare the prevalence of concurrent sexual partnerships across countries—defining concurrent partnerships as having two or more sexual partners that overlapped in time in the year preceding the survey. We also examine key characteristics of respondents reporting concurrent partnerships in pooled samples for sub-Saharan Africa, and we evaluate the association between concurrency and HIV serostatus at the individual level, after controlling for educational level, wealth status, condom use, male circumcision, and other factors. Finally, we assess the relationship between prevalence of concurrency and HIV prevalence at the community and country levels.

We find that men are much more likely than women to have concurrent partners. Our analysis also shows that many reported multiple partnerships in the 12 months preceding the survey interview were not concurrent ones. Finally, very few men had overlapping partners for one year or longer.

In the pooled samples for sub-Saharan Africa, we find that urban, more-educated, and wealthier women and men are more likely to have concurrent partnerships than their rural, less-educated, and poorer counterparts. Circumcised men are also more likely to have concurrent partners than uncircumcised men. Those who had concurrent partners are more likely to report using condoms than those who did not have concurrent partners; yet only one-fifth of women and less than one-tenth of men with concurrent partners reported using condoms at last sex.

In most countries, at the individual level women and men who had concurrent sexual partners in the previous 12 months were more likely to be HIV-positive than those who had only one lifetime partner, or those who had multiple lifetime partners but no overlapping partners in the previous 12 months. Yet the duration of overlap in concurrent sexual relationships does not seem correlated with the likelihood of HIV infection. At the individual level, in the pooled samples for sub-Saharan Africa, a positive and significant relationship between concurrent sexual partnerships and HIV-positive status is observed for both women (aOR=3.32; 95%CI: 2.22-4.97) and men (aOR=2.87; 95%CI: 1.85-4.45), after adjusting for other factors such as educational level, wealth status, urban/rural residence, and condom use. Among men, controlling for male circumcision has virtually no effect on the adjusted association between sexual concurrency and HIV serostatus (aOR=2.85; 95%CI: 1.84-4.42).

In multivariate models, associating one's concurrency behavior with his/her HIV serostatus reveals that the likelihood of HIV infection is only slightly greater among individuals with concurrent partnerships in the previous 12 months (aOR=3.32 for women; aOR=2.87 for men) than among those with multiple lifetime partnerships that were not concurrent in the previous 12 months (but could have been previously) (aOR=2.86 for women; aOR=2.63 for men). This is to be expected because having concurrent partners increases the risk of transmitting

HIV infection to the partners, not necessarily one's own risk of infection above the risk of having multiple serial partners. One's own risk may be greater only to the extent his/her concurrency behavior is a proxy for partners' concurrency behavior or belonging to a higher-risk sexual network.

The prevalence of sexual concurrency does not seem correlated with HIV prevalence at the community level or at the country level, neither among women nor among men. The associations are even weaker when the prevalence of HIV among women is correlated with the prevalence of concurrency among men, and when the prevalence of HIV among men is correlated with the prevalence of concurrency among women. The lack of a relationship between the prevalence of concurrency and HIV prevalence among men at the community level does not seem due to varying prevalence levels of male circumcision. However, at the country level a stronger association between prevalence of concurrency among men and HIV prevalence emerges in countries with lower prevalence of male circumcision.

The study identifies a number of measurement issues and data constraints that limited the scope of our analysis and that should be kept in mind when interpreting the findings and planning future studies. Some of the major limitations of the study include the cross-sectional and self-reported nature of the survey data, the lack of data on complete sexual histories, and the lack of data on sexual networks.

Some of these data limitations have already been addressed in more recent DHS and AIS surveys by systematically including questions about the number of the respondent's lifetime sexual partners, and about consistent condom use with all partners (up to three) in the previous 12 months. The measurement of concurrency could be further improved by collecting information on the duration of the sexual relationship with each of the respondent's sexual partners in the previous 12 months, including his/her spousal partners, and by collecting information on the frequency of sexual intercourse during each relationship.

Despite the limitations inherent to the measurement of concurrency using self-reported data from cross-sectional population-based surveys, the findings of this study shed new light on the prevalence and correlates of concurrency, as well as on the association between concurrency and HIV.

1. INTRODUCTION

Study Aims

The main goal of this study is to evaluate and compare the prevalence of concurrent sexual partnerships (or sexual concurrency) across all countries with available data, as well as the association between sexual concurrency and HIV. In recent years, data on self-reported sexual partnerships as well as HIV serostatus from biomarker testing have been collected from adult women and men in about two dozen nationally representative Demographic and Health Surveys (DHS) and AIDS Indicator Surveys (AIS). These data provide a unique opportunity to measure the prevalence of concurrent sexual partnerships, and to assess the relationship between sexual concurrency and HIV infection. In this report, we take advantage of these survey data to achieve our goal.

Using information that the surveys collected on up to three of the respondents' most recent sexual partners (including their extra-marital sexual relationships), we define concurrent partnerships as having two or more sexual partners that overlapped in time in the year preceding the survey. When possible, we compare respondents with concurrent sexual partners to those who have not had multiple partners during their lifetime and to those who had multiple but not concurrent partners in the 12 months preceding the survey. We also examine the characteristics of respondents reporting concurrent partnerships in a pooled sample for all sub-Saharan African countries with available data to assess whether urban, more educated, and wealthier respondents are more likely to have concurrent partnerships, and whether respondents who have concurrent partners are more likely to use condoms than respondents who do not have concurrent partners. Finally, we evaluate the association between concurrency and HIV serostatus at the individual level, after controlling for educational level, wealth status, condom use, male circumcision, and other factors. We also assess the relationship between prevalence of concurrency and HIV prevalence at the community and country levels.

Background

It is well established that having multiple sexual partners increases the risk of getting infected with HIV and other sexually transmitted infections (STIs) (Mishra et al. 2009a, 2009b; Shelton et al. 2004; Stoneburner and Low-Beer 2004; Wilson 2004). Yet, in the attempt to explain widely varying levels of national and sub-national HIV prevalence, recently increasing attention has been paid to the role of concurrent sexual partnerships—that is, having multiple sexual partners during an overlapping time period (Mah and Halperin 2008; Epstein 2007; Shelton 2007; Halperin and Epstein 2007; Adimora et al. 2007; Morris et al. 2007).

Arguably, concurrent partnerships carry a much greater risk of HIV transmission than the same number of sequential, non-overlapping multiple sexual partnerships carry, because having concurrent sexual partners in a dense sexual network increases the risk of HIV infection by allowing the virus to spread rapidly to others (Watts and May 1992; Hudson 1993; Kretzschmar and Morris 1996; Morris and Kretzschmar 1997, 2000; Kohler and Helleringer 2006; Morris et al. 2007). In contrast, among non-overlapping sequential partners, the delay between ending one relationship and starting another one reduces the probability of HIV transmission (Pilcher et al. 2004). At the individual level, having concurrent partners increases the risk of transmitting HIV infection to the partners, while one's own risk of infection is the same whether partners are serial or concurrent. However, one's concurrency behavior may be correlated with own risk of HIV infection to the extent his/her concurrency behavior is a proxy for partners' concurrency behavior or belonging to a higher-risk sexual network (Mah and Halperin 2008). Concurrent partnerships may be riskiest if an infected individual has sexual intercourse during the acute transmission phase of HIV, which generally coincides with the first few weeks of infection (Pilcher et al. 2004; Wawer et al. 2005). At the population level, the role of concurrent sexual partnerships in increasing HIV risk may depend on overall HIV prevalence and levels of condom use, as well as other contextual factors such as marriage patterns, prevalence of male circumcision, and prevalence of other STIs.

The potential role of concurrent sexual partnerships in dense sexual networks in amplifying the spread of STIs, including HIV, has been demonstrated in mathematical models (Watts and May 1992; Kretzschmar and Morris 1996; Morris and Kretzschmar 1997; Doherty et al. 2006). Empirical research has also identified an association between concurrent sexual partnerships and increased risk of STIs (Gorbach et al. 2005; Drumright et al. 2004; Manhart et al. 2002; Rosenberg et al. 1999), including syphilis (Koumans et al. 2001), Chlamydia (Aral et al. 1999; Potterat et al. 1999) and gonorrhea (Ghani et al. 1997). However, there is limited empirical research on the association between sexual concurrency and the risk of HIV infection.

A recent analysis of cohabiting couples in four countries in sub-Saharan Africa has shown that being faithful to the spousal partner(s) is associated with lower likelihood of being HIV-infected (Mishra et al. 2009b). Because having sex with a non-spousal partner while cohabiting with another partner is akin to having concurrent sex, this study indirectly shows that concurrency may increase the risk of HIV infection. However, the only other empirical study, conducted in five cities in sub-Saharan Africa, that has attempted to directly correlate sexual concurrency and HIV prevalence did not find evidence that sexual concurrency is a major determinant of rate of HIV spread (Lagarde et al. 2001). Another study based on four of the five urban communities included in the study by Lagarde et al. (2001) study concluded that sexual concurrency was no more common in high-HIV-prevalence communities than in low-HIV-prevalence communities (Ferry et al. 2001).

The empirical understanding of the prevalence of sexual concurrency and its role in the spread of HIV in developing countries remains limited, partly due to limited availability of data on sexual partnerships and a lack of consensus on the measurement of concurrency. While there is general agreement on the broad definition, sexual concurrency can take several forms depending on the social context and the life stage of an individual, and certain forms can be more or less risky for HIV transmission. In a qualitative study of STI patients and adults in communities with high STI prevalence in Seattle, Washington, Gorbach et al. (2002) identified six main forms of concurrency: experimental, separational, transitional, reciprocal, reactive, and compensatory. Morris et al. (1996) identified as a particularly risky form of concurrency "sexual bridging", where a person with concurrent sexual partners serves as a bridge between a high-risk partner such as a commercial sex worker and a low-risk partner such as a spouse.

Nelson et al. (2007) compared two different measures of concurrency among young adults age 18-26 visiting STD clinics in the United States: one based on direct questions to respondents about any other sexual contact they had during their most recent sexual relationship; and the other derived by examining overlapping start and end dates of the respondents' two most recent relationships. The study found that the two measures captured different phenomena, both in terms of the concurrent sexual relationships identified and in terms of the correlates of concurrency. In an earlier study in three Caribbean countries, Le Pont et al. (2003) observed that the levels of concurrency depend highly on the definitions used to measure concurrency. In another study of urban adults age 18-39 in the United States, Manhart et al. (2002) arrived at similar conclusions.

2. DATA

This study uses data from 22 nationally representative surveys of adult women and men (age 15-49[1]) that were carried out between 2001 and 2006. Nineteen of these are DHS surveys, in Burkina Faso, Cambodia, Cameroon, the Dominican Republic, Ethiopia, Ghana, Guinea, Haiti, India, Kenya, Lesotho, Malawi, Mali, Niger, Rwanda, Senegal, Swaziland, Zambia, and Zimbabwe. The remaining three are AIS surveys, in Côte d'Ivoire, Tanzania, and Uganda.[2]

The present analysis uses the DHS/AIS surveys indicated above because they included HIV testing for all interviewed respondents who consented[3], as well as survey data on self-reported sexual partnerships (described in more detail below) and other demographic, behavioral and social indicators. Survey interviews are conducted in privacy after establishing the rapport with the respondent and after obtaining informed consent. Sexual behavior questions are asked after a long set of questions related to the respondent's background, reproduction, contraception, pregnancy and delivery care, immunization, child health, and nutrition.

Testing for HIV is conducted using standard blood collection, testing, and quality-control procedures (Macro International 2007a, 2007b). Specifically, HIV testing is done using two HIV enzyme immunosorbent assays (EIA), based on different antigens. Specimens with equivocal or discordant test results are resolved by Western Blot testing. For quality control, all HIV-positive specimens and a sample of HIV-negative specimens (usually 5 percent) are re-tested at a different laboratory using the same testing algorithm. HIV test results for individual respondents are linked anonymously to the information gathered in the household and individual survey

[1] In most countries the DHS/AIS surveys interview men aged up to age 54 or 59. Yet this analysis focuses on women and men age 15-49 in all countries to ensure results' comparability.
[2] In Vietnam an AIS was carried out in 2006, but HIV testing was restricted to the Hai Phong province. In addition, no respondents reported on multiple partnerships (General Statistical Office [Vietnam] and ORC Macro 2006). For these reasons, Vietnam is excluded from the present analysis.
[3] DHS/AIS respondents provided separate informed consent for the survey interview and for HIV testing.

questionnaires using bar codes.[4] Protocols for the HIV testing and survey interview are cleared by the Institutional Review Boards of Macro International and approved by the local governments and implementing partners.

Further details on survey design and implementation are provided in the individual country reports (Cayemittes et al. 2007; CBS [Kenya], MOH [Kenya], and ORC Macro 2004; CESDEM [Dominican Republic] and ORC Macro 2003; CPS/MS [Mali], DNSI/MEIC [Mali], and Macro International 2007; CSA [Ethiopia] and ORC Macro 2006; CSO [Swaziland] and Macro International 2008; CSO [Zambia], CBH [Zambia], and ORC Macro 2003; CSO [Zimbabwe] and Macro International 2007; DNS [Guinée] and ORC Macro 2006; GSS [Ghana], NMIMR [Ghana], and ORC Macro 2004; IIPS [India] and Macro International 2007; INS [Cameroun] and ORC Macro 2004; INS [Côte d'Ivoire] and ORC Macro 2006; INS [Niger] and Macro International 2007; INSD [Burkina Faso], and ORC Macro 2004; INSR [Rwanda] and ORC Macro 2006; MOH [Uganda] and ORC Macro 2006; MOHSW [Lesotho], BOS [Lesotho] and ORC Macro 2005; Ndiaye et al. 2006; NIPH [Cambodia], NIS [Cambodia], and ORC Macro 2006; NSO [Malawi] and ORC Macro 2005; TACAIDS [Tanzania], NBS [Tanzania], and ORC Macro 2005).

In the countries included in this analysis, the numbers of female respondents age 15-49 with completed interviews ranges from 4,987 in Swaziland to 124,385 in India, and the number of male respondents of same age ranges from 1,974 in Zambia to 69,751 in India (Table 1). HIV prevalence for respondents age 15-49 of both sexes ranges from 0.3 percent in India to 25.9 percent in Swaziland.

[4] Individual HIV test results cannot be linked to survey information for two of the earliest surveys with HIV testing included in this report—the Zambia 2001/02 DHS and the Dominican Republic 2002 DHS. In addition, in the 2006 Benin DHS, HIV testing was included but bar code links were destroyed following the preparation of the main survey report. Thus it is not possible to link individual HIV test results with survey information from the available data.

Table 1. Sample sizes and HIV prevalence for respondents age 15-49, by sex: DHS/AIS with HIV testing, 2001-2006

				Number of respondents interviewed		Number of respondents tested for HIV		HIV Prevalence		
Region	**Survey year**	**Survey type**	**PEPFAR country**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Both sexes**
Asia										
Cambodia	2005	DHS		16,823	6,731	8,188	6,514	0.6	0.6	0.6
India	2006	DHS		124,385	69,751	52,853	47,047	0.2	0.4	0.3
Latin America & Caribbean										
Dominican Republic[1]	2002	DHS		23,384	2,537	10,732	10,707	0.9	1.1	1.0
Haiti	2005	DHS	Yes	10,757	4,438	5,224	4,253	2.3	2.0	2.2
Sub-Saharan Africa										
Burkina Faso	2003	DHS		12,477	3,209	4,180	2,946	1.6	1.5	1.6
Cameroon	2004	DHS		10,656	4,815	5,154	4,597	6.6	4.1	5.4
Cote d'Ivoire	2005	AIS	Yes	5,183	4,503	4,534	3,888	6.4	2.9	4.8
Ethiopia	2005	DHS	Yes	6,751[3]	5,464	5,942	4,630	1.9	0.9	1.5
Ghana	2003	DHS		5,691	4,529	5,277	3,855	2.5	1.4	2.0
Guinea	2005	DHS		7,954	2,709	3,842	2,467	1.9	0.9	1.5
Kenya	2003	DHS	Yes	8,195	3,363	3,271	2,723	8.7	4.6	6.8
Lesotho	2004/05	DHS		7,095	2,496	3,020	2,008	26.4	19.2	23.5
Malawi	2004/05	DHS	Yes	11,698	3,114	2,864	2,272	13.3	10.2	11.9
Mali	2006	DHS		14,583	3,704	4,521	3,608	1.4	0.9	1.2
Niger	2006	DHS		9,223	3,101	4,439	2,841	0.7	0.7	0.7
Rwanda	2005	DHS	Yes	11,321	4,413	5,663	4,326	3.6	2.3	3.0
Senegal	2005	DHS		14,602	3,415	4,465	2,948	0.7	0.4	0.6
Swaziland	2006	DHS		4,987	4,156	4,424	3,763	31.2	19.7	25.9
Tanzania	2003/04	AIS	Yes	6,863	5,659	5,969	4,774	7.7	6.3	7.1
Uganda	2004/05	AIS	Yes	9,973	8,009	9,351	7,477	7.5	5.0	6.4
Zambia[1]	2001/02	DHS	Yes	7,658	1,974	2,073	1,734	17.8	12.9	15.6
Zimbabwe	2005/06	DHS	Yes	8,907	6,863	7,494	5,306	21.1	14.5	18.4
Total SSA (pooled)[2]				163,503	75,492	83,862	62,733	6.0	3.8	5.1

[1] Individual HIV data not merged with survey data.

[2] Total SSA figures were calculated by using appropriate pooled weights, taking into account the population size of each country.

[3] Restricted to interviewed women in households selected for the man's interview.

The DHS/AIS individual survey questionnaire collects information on the respondents' sexual histories in a specific section of the questionnaire. Although the general content of this section does not change much across surveys, for the purposes of the present analysis we make a fundamental distinction between two groups of surveys according to the specific type of information collected (Table 2).

Table 2. Availability of information on sexual partnerships: DHS/AIS with HIV testing, 2001-2006

Region/Country	Survey year	Survey type	Type of sexual history[2]	Lifetime partners[6]	Calendar[8]
Asia					
Cambodia	2005	DHS	Short form, 3 prts	Yes	
India	2006	DHS	Long form, 2 prts	Yes	Yes
Latin America & Caribbean					
Dominican Republic[1]	2002	DHS	Short form, 3 prts[3]		Yes
Haiti	2005	DHS	Long form, 3 prts	Yes	
Sub-Saharan Africa					
Burkina Faso	2003	DHS	Short form, 3 prts		
Cameroon	2004	DHS	Short form, 3 prts[4a]	Yes	
Cote d'Ivoire	2005	AIS	Short form, 3 prts[4b]	Yes	
Ethiopia	2005	DHS	Long form, 2 prts[5]	Yes	Yes
Ghana	2003	DHS	Short form, 3 prts		
Guinea	2005	DHS	Short form, 3 prts	Yes	
Kenya	2003	DHS	Short form, 3 prts		Yes
Lesotho	2004/05	DHS	Short form, 3 prts	Yes[7]	
Malawi	2004/05	DHS	Short form, 3 prts		Yes
Mali	2006	DHS	Short form, 3 prts	Yes	
Niger	2006	DHS	Short form, 3 prts[4a]	Yes	
Rwanda	2005	DHS	Short form, 3 prts	Yes	
Senegal	2005	DHS	Short form, 3 prts	Yes[7]	
Swaziland	2006	DHS	Long form, 3 prts	Yes	
Tanzania	2003/04	AIS	Short form, 3 prts[4b]	Yes	
Uganda	2004/05	AIS	Short form, 3 prts[4b]	Yes	
Zambia[1]	2001/02	DHS	Short form, 3 prts		
Zimbabwe	2005/06	DHS	Long form, 3 prts	Yes	Yes

prts: partners.

[1] Individual HIV data not merged with survey data.

[2] The sexual history section of the DHS/AIS questionnaire contains a set of questions about the respondents' sexual relationships during the 12 months before the survey. In most countries, information is collected on the 3 most recent partners (2 in Ethiopia and India). The sexual history can have two formats. The 'long form' includes detailed questions, for each partner, on the timing of the most recent intercourse and the duration of the sexual relationship, as well as on consistent condom use and partner's age. The 'short form', on the contrary, includes a more limited amount of questions and excludes, most notably, information on the timing of the most recent intercourse with the next-to-last and second-to-last sexual partners.

[3] Includes one question about the last date the respondent paid for sex (incl. condom use).

[4a] No information on duration for any non-marital sexual partner for men.

[4b] No information on duration for any non-marital sexual partner for both men and women.

[5] Women only.

[6] Question about the total number of sexual partners the respondent had during his or her whole life.

[7] Men only.

[8] Calendar containing information on the respondent's marriages during the five years preceding the survey (women only).

Short form surveys (which represent the majority of those considered in this study) ask respondents about the number of sexual partners they had in the 12 months preceding the survey, and for up to three of their most recent sexual partners (two in Ethiopia and India) in the previous 12 months. They also ask about:

- the type of relationship the respondent had with each sexual partner (spouse or live-in partner, acquaintance, commercial sex worker);
- the duration of the sexual relationship with each partner (in days, months, or years), if the partner was not a spouse or live-in partner.
- when was the last time (in terms of days, months, or years before the survey) that the respondent had sexual intercourse with his/her most recent sexual partner; and
- whether a condom was used the last time the respondent had sexual intercourse with each partner.

Long form surveys ask, in addition to the questions in the short form surveys, about (see Appendix Table A1):

- the last time (in terms of days, months, or years before the survey) the respondent had sexual intercourse with each of his/her three most recent sexual partners; and
- whether a condom was used every time the respondent had sexual intercourse with each of his/her three most recent partners during the previous 12 months.

Most short form and long form surveys conducted after 2004 also ask a question about the total number of sexual partners that the respondent had in his/her lifetime.[5]

It is important to note that in both the short form and long form surveys the question on the duration of the sexual relationship with each of the respondent's three most recent sexual

[5] In Lesotho and Senegal, the question on the number of lifetime partners was asked only to male respondents.

partners is asked only for non-spousal partners. For spousal partners, we thus assume that the length of the sexual relationship coincided with the duration of the current marriage. However, for respondents married at the time of the survey who have been married more than once, DHS/AIS surveys do not collect information on the duration in the current union, but only on the duration since the start of the respondent's first union (whether continuing or not).[6] Similarly, for men in polygynous unions (having more than one spouse) the DHS/AIS surveys do not collect information about the marriage date for each of the respondent's spouses. In light of this limitation of the data, for the purposes of the analysis we make specific assumptions about both groups of respondents (as illustrated in detail in the next section, on methods).

[6] In some countries, the DHS woman's questionnaire (but not the AIS questionnaire) includes a calendar where the interviewer records information on contraceptive use and discontinuation during the five years preceding the survey and, in some cases, also on the respondent's marriages, divorces, and remarriages during the same period. This information could thus be exploited to obtain the marriage date for female respondents married at the time of the survey who had been married more than once. However, for the purposes of the present analysis, we decided not to exploit the calendar information, for at least three reasons. First, as can be seen in Table 2, calendar data are available for less than one-third of all countries included in the analysis. Second, the time window considered by the calendar is too limited (five years) to permit us to have information on the marriage date for all respondents married more than once. Third, calendar data are collected only from women and it would be difficult to extrapolate from it corresponding information for men.

3. METHODS

Measurement of Concurrent Sexual Partnerships

In this study, concurrent sexual partnerships are defined as having more than two partners that overlapped in time in the 12 months preceding the survey. The measurement of the timing and duration of the respondent's most recent sexual relationships is central to the measurement of sexual concurrency. Since the information available on these two key attributes of an individual's sexual partnerships differs between the short form and long form surveys considered in this study, we adopt a different analytic strategy to measure concurrent partnerships in the two cases.

To identify concurrent partnerships using information from long form surveys, we examine the start and end dates of the respondent's three (two in Ethiopia and India) most recent sexual relationships in the previous 12 months, and identify the overlap of their respective durations. For this purpose, we use two main pieces of information from the DHS/AIS long form sexual histories:

- the duration elapsed from the respondent's last sexual encounter with partner i (i=1, 2, 3) to the survey date (henceforth e_i), expressed in days, weeks, months, or years before the survey;
- the duration of the respondent's sexual relationship with partner i (henceforth d_i), expressed in days, weeks, months, or years. For reasons discussed in the previous section on data, if partner i is the respondent's current spouse or live-in partner, this duration coincides with the duration of the current union (henceforth m_i).

From these two pieces of information we calculate the time elapsed from the beginning of the sexual relationship with partner i to the survey date (henceforth s_i). In order to have a common metric to measure durations, we convert e_i and d_i in days. We thus calculate:

$$s_i = e_i + d_i \text{ (for the respondent's non-spousal sexual partners)}$$

or:

$$s_i = e_i + m_i \text{ (if partner } i \text{ is the respondent's spouse or live-in partner)}$$

expressed in days before the survey.[7]

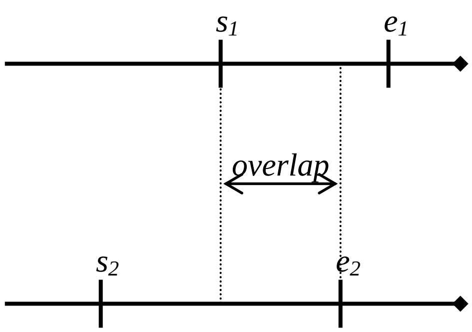
To identify overlapping partners we then proceed as follows:

- Respondents who reported two sexual partners in the 12 months preceding the survey: the overlap between the last and next-to-last sexual partner (henceforth o_{12}) occurs if $s_1 > e_2$.
- Respondents who reported three or more sexual partners in the 12 months preceding the survey:
  - the overlap between the last and next-to-last sexual partner (o_{12}) occurs if $s_1 > e_2$;
  - the overlap between the last and second-to-last sexual partner (o_{13}) occurs if $s_1 > e_3$; and
  - the overlap between the next-to-last and second-to-last sexual partner (o_{23}) occurs if $s_2 > e_3$.[8]

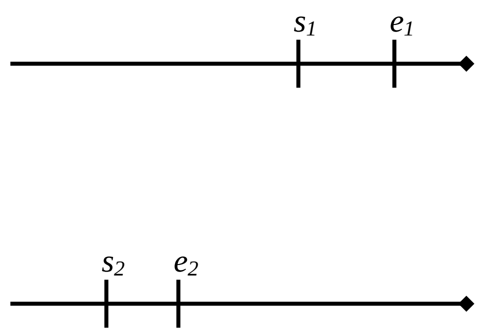
[7] Duration of sexual relationship for one-time sexual acts was recorded as one day.
[8] Theoretically, the condition $e_3 > e_2 > e_1$ should always be satisfied since questions on the last sexual partnership should have been asked before the questions on the next-to-last partnership. However, in some surveys a few cases violated this condition and were thus recoded as missing.

For example, in the simple case of two partners:

2 overlapping partners



2 partners, no overlap



We then calculate the duration of overlapping partnerships as follows:

- Between the last and next-to-last sexual partner (od_{12}):

  $od_{12} = s_1 – e_2$ if $s_2 > s_1$

  $od_{12} = s_2 – e_2$ if $s_2 < s_1$

- Between the last and second-to-last sexual partner (od_{13}):

  $od_{13} = s_1 – e_3$ if $s_3 > s_1$

  $od_{13} = s_3 – e_3$ if $s_3 < s_1$

- Between the next-to-last and second-to-last sexual partner (od_{23}):

  $od_{23} = s_2 – e_3$ if $s_3 > s_2$

  $od_{23} = s_3 – e_3$ if $s_3 < s_2$

For *short form surveys*, as discussed in the previous section, information on the timing of the most recent sexual intercourse with the respondent's next-to-last and second-to-last partner (s_2 and s_3, respectively) is not available, so that it is only possible to measure e_1, s_1, and d_1. Thus in these countries we can only adopt a loose definition of concurrent sexual relationships. We define respondents as having concurrent partnerships according to this basic indicator if they reported having two or more sexual partners in the 12 months preceding the survey <u>and</u> if the duration elapsed from the beginning of the sexual relationship with the respondent's most recent partner to the survey date (s_1) was longer than 12 months.

For both long form and short form countries, since information on the duration of the current relationship is available neither for respondents who are currently married but who have been married more than once nor for male respondents in a polygynous union, we make specific assumptions in these cases. Concerning the former group, available information from the few surveys with a calendar (see Table 2) suggests that most female respondents married more than once got married more than 12 months before the survey date (not shown). We thus assume that, if the respondent's sexual partner i was the spouse, the condition $s_i \geq 12$ months is automatically satisfied. Concerning the group of male respondents in a polygynous union, we assume that if the respondent had two or more partners in the previous 12 months, he had engaged in concurrent partnerships over the same time period.

Analytical Approach

Our analysis is divided into three parts. In the first part, we assess the prevalence of multiple sexual partnerships. We evaluate the prevalence of multiple sexual partnerships across countries by focusing on two indicators: the number of partners the respondent reports to have had in the 12 months preceding the survey (recent multiple partnerships); and the number of partners the respondent reports to have had during his/her lifetime (lifetime multiple partnerships).

In the second part of the analysis, we assess the prevalence of concurrent sexual partnerships across countries by focusing on all five long form surveys and eight short form surveys that contained information on number of lifetime sexual partners. By combining information on number of lifetime partners and on overlapping partnerships in the past 12 months, we group all respondents who ever had sex into the following three exclusive categories: (i) had only one lifetime sexual partner; (ii) had two or more lifetime partners, but no overlapping partners in the past 12 months; and (iii) had two or more overlapping partners in the past 12 months. This three-category indicator is the primary variable of interest in our study, which permits us to distinguish respondents who did not have multiple partners in their lifetime from those who had multiple partners in their lifetime but not recent concurrent partnerships, and those who had recent multiple concurrent partners.[9] We are able to compute this indicator for 11 countries for women and 13 countries for men.[10] For a smaller set of countries with available data, we also appraise whether the prevalence of concurrency varies according to the duration of the overlapping sexual partnerships. Finally, for the pooled sample of all sub-Saharan African countries in the analysis, we evaluate the correlates of sexual concurrency, including age, education, marital status, urban/rural residence, household wealth status, male circumcision, and condom use.

In the third part of the analysis, we examine the association between sexual concurrency and HIV at different levels of aggregation: the individual, the community, and the country as a whole.

At the individual level, we assess the relationship between concurrent sexual partnerships in the previous 12 months and HIV serostatus at the time of the survey; for five countries with available data, we assess this relationship by duration of overlap as well. Using the pooled sub-

[9] In the Appendix Tables B1-B8 we present results using an expanded categorization of this variable that is obtained by dividing the middle category into those who had 2 more lifetime partners but only 1 or no sexual partners in the past 12 months, and those who had 2 or more partners in the past 12 months but no overlapping partners. Respondents who ever had sex are thus divided into the following four exclusive categories: (i) had 1 lifetime sexual partner; (ii) had 2 or more lifetime partners, but only 1 or no partners in the past 12 months; (iii) had 2 or more partners in the past 12 months, but no overlapping partners; and (iv) had 2 or more overlapping partners in the past 12 months.

[10] For both the long form and short form surveys, we also present our basic indicator of concurrency and the association between concurrency and HIV serostatus for respondents who had sex in the past 12 months in Appendix Tables C1-C4.

Saharan Africa sample, we also conduct multivariate analyses to examine the associations between concurrency and HIV status, after controlling for potential confounders such as age, education, and wealth status.[11]

To examine if living in a community with higher prevalence of concurrency is associated with higher prevalence of HIV, separately for women and men in each country, we calculate the proportion of respondents reporting two more overlapping partners in the past 12 months in each survey cluster (usually a village or an urban block). We then group together all clusters in a survey according to five levels of prevalence of concurrency (none, less than 5 percent, 5-10 percent, 10-15 percent, 15 percent or more), and we compute the proportion of respondents testing positive for HIV in each group of clusters. To examine the association between concurrency for one sex and prevalence of HIV among individuals of the opposite sex, we repeat the same procedure but cross-tabulate HIV prevalence among women by the prevalence of concurrency among men, and HIV prevalence among men by the prevalence of concurrency among women.

Finally, we examine the association between the prevalence of sexual concurrency and the prevalence of HIV using aggregated country-level data, separately for women and men, as well as by cross-correlating HIV prevalence among women by concurrency prevalence among men and vice versa.

Data are analyzed using both descriptive and multivariate statistical methods. All analyses are carried out using STATA 9.0 (Stata Corporation 2005), incorporating sampling weights and accounting for clustering in the survey design. All analyses are carried out separately for women and men, as well as for the combined samples (women and men).

[11] The multivariate models are not carried out for individual countries because in most cases the number of respondents with overlapping partners is too small to allow for multivariate analyses (as it will become evident in the following).

Study Limitations

The first main limitation is that our analysis is based on self-reported data about sexual behaviors, which are known to be prone to measurement bias (Plummer et al. 2004). Women tend to underreport and men tend to exaggerate their premarital and extramarital sexual activity (Zaba et al. 2004). In a given social context, the extent of such misreporting could vary by sex, educational level, economic status, and area of residence (Hewett et al. 2004). Not surprisingly, some epidemiological studies in Africa have observed weak associations between self-reported risky sexual behavior and HIV status (Ferry et al. 2001). An evaluation of self-reported data in a large multicenter study on factors determining the differential spread of HIV in four African cities found considerable numbers of HIV-positive women who reported themselves to be virgins or having had only one sexual partner and few episodes of sexual intercourse, suggesting evidence of underreporting of sexual behavior (Buvé et al. 2001). Although sexual behavior is often believed to be underreported in the DHS surveys, a comparison with the multicenter study revealed greater reporting of higher-risk sex in the DHS surveys than in all four cities in the multicenter study (Buvé et al. 2001). Nevertheless, the findings of our study may be biased to the extent men and women misreport their number of sexual partners, sex with non-regular partners, condom use, and other related behaviors (Mensch et al. 2003), and to the extent that the degree of misreporting varies across regions or other population subgroups.

Another important limitation is that the analysis is based on cross-sectional data. It is therefore difficult to assess causality between sexual concurrency and HIV infection because, for many HIV-positive adults, the infection may have preceded their sexual and other behaviors recorded in the survey. Therefore, it is possible that sexual concurrency in the recent past does not correlate well with HIV serostatus at the time of survey. Moreover, the strength of the relationship between concurrency and HIV infection is likely to change over time, depending on the stage and spread of the epidemic. Although cross-sectional data do not allow examining this relationship at different stages of the epidemic in a population, our analysis does include surveys from countries with varying levels of HIV prevalence.

Third, the surveys used for the analysis did not collect information on complete sexual histories. Some overlapping partnerships may have thus been missed because the surveys only covered up to three of the respondent's sexual partners in the previous year; while some respondents (mostly men) reported having had more than three partners in the same period. Many more concurrent partnerships may have been missed because there is no information on concurrent partnerships that ended more than 12 months before the survey.

Some of the earlier surveys with HIV testing did not even include questions about the number of the respondents' lifetime sexual partners; about the duration of the respondents' sexual relationships with their second-to-last or third-to-last partners; or about consistent condom use. Thus we use reported condom use at last sex with all partners (up to three) in the past 12 months as a proxy for consistent condom use.

All DHS/AIS surveys did not collect information about the duration of sexual relationships with spousal partners, so we assumed that the sexual relationship with a spouse began at the time of marriage. This may not be a realistic assumption, and becomes a particularly important problem for respondents married more than once and for polygynous men, for whom the information on duration in union is only available for the first spousal partner.

Fourth, our measurement of concurrency may be biased to the extent it assumes regular sexual activity with each sexual partner during the overlapping period. This assumption was necessary because the surveys collected no information about the respondents' frequency of intercourse with their sexual partners. However, for a concurrent relationship to substantially increase the transmission risk of HIV, the sexual intercourse between the concurrent partners needs to occur within a short window of about three weeks (the high infectivity period following infection).

Fifth, the surveys used for the analysis did not collect data on sexual networks, which have been shown to increase the risk of HIV infection by allowing the virus to spread rapidly to others (Morris and Kretzschmar 1997; Kohler and Helleringer 2006). Our data thus do not allow examining the behaviors of one's sexual partner(s), which could be important in assessing one's own risk of HIV infection. However, we attempt to address this limitation by using aggregated data at the community level and at the country level to examine the associations between the prevalence of HIV among women and the prevalence of concurrency among men, as well as the association between the prevalence of HIV among men and the prevalence of concurrency among women.

Finally, our analysis is limited due to very small numbers of multiple partnerships and concurrent partnerships reported by women in most countries. Table 3 illustrates this problem by presenting data from two countries, one with a low prevalence of HIV (Cambodia) and another one with a high prevalence of HIV (Zimbabwe).

Table 3. Sample numbers of women in Cambodia and Zimbabwe surveys

Characteristic	Cambodia	Zimbabwe
Number interviewed	16,823	8,907
Number who ever had sex	11,479	7,059
Number who reported 2+ sexual partners in the past year	29	78
Number who had overlapping partners in the past year	26	47
Number who had overlapping partners and were tested for HIV	13	39
Number HIV-positive among those with overlapping partners	0	23

4. PREVALENCE OF MULTIPLE SEXUAL PARTNERSHIPS

In this section we present descriptive results about the prevalence of multiple marriages, polygamy, and multiple sexual partnerships in the countries considered. We examine both recent and lifetime sexual partnerships.[12]

Multiple Marriages and Polygamy

Multiple marriages and polygamy are of particular interest in the study of multiple and concurrent sexual partnerships. Table 4 shows the percentage of male respondents who were in polygynous unions at the time of the survey, the percentages of female and male respondents who were not in a marital or cohabiting union at the time of survey, and the percentages of female and male respondents who had been married more than once. In all countries considered, men are less likely than women to be in a marital union. In all countries outside of Latin America but Ethiopia, men are also slightly more likely than women to have been married more than once (including in polygynous unions). The percentage of women in union who had been married more than once ranges from less than 2 percent in India and Lesotho to more than 20 percent in Haiti and the Dominican Republic. For men, the percentage currently in union (monogamous or polygynous) and married more than once ranges from less than 4 percent in India, Ethiopia and Lesotho to more than 24 percent in Guinea, Mali, Niger, and Uganda. Polygynous marriages are more prevalent in West African countries than in other regions, with the notable exception of Uganda in East Africa.

[12] Appendix Tables D1-D4 provide sample numbers of women and men by marital status, polygamy, and recent and lifetime number of sexual partners for each country and for the pooled sub-Saharan Africa sample.

Table 4. Number and percent of respondents age 15-49, by marital status and sex

	Women				Men				
		Currently in union				Currently in union			
Region/Country	Not currently in union[3]	Married once	Married more than once	Total	Not currently in union[3]	Monogamous, married once	Monogamous, married more than once	Polygamous	Total
Asia									
Cambodia	40.0	54.8	5.0	16,823	41.0	52.7	6.0	0.0	6,731
India	25.2	73.4	1.5	124,385	37.6	59.0	2.8	0.5	69,751
Latin America & Caribbean									
Dominican Republic[1]	40.1	38.7	21.2	23,384	54.0	28.4	15.9	1.7	2,537
Haiti	41.2	38.1	20.5	10,757	57.3	28.1	10.6	3.7	4,438
Sub-Saharan Africa									
Burkina Faso	22.6	67.7	9.2	12,477	49.0	32.2	6.0	12.2	3,209
Cameroon	32.8	51.1	15.7	10,656	52.8	26.9	14.5	5.2	4,815
Cote d'Ivoire	41.0	49.2	9.5	5,183	55.6	29.3	8.1	6.4	4,503
Ethiopia	36.1	48.7	15.2	6,751	47.1	49.7	0.0	3.2	5,464
Ghana	37.6	45.8	16.3	5,691	50.8	29.8	13.7	5.7	4,529
Guinea	20.9	64.4	14.1	7,954	47.6	26.9	8.3	16.3	2,709
Kenya	40.0	55.9	4.1	8,195	52.0	37.2	6.4	4.4	3,363
Lesotho	47.7	50.5	1.5	7,095	61.7	34.3	1.8	1.9	2,496
Malawi	28.9	55.9	15.1	11,698	37.8	41.2	15.1	6.0	3,114
Mali	15.2	69.7	13.9	14,583	39.6	33.5	9.2	15.1	3,704
Niger	13.9	67.5	18.0	9,223	38.0	35.1	13.2	12.3	3,101
Rwanda	51.3	41.7	6.7	11,321	51.8	38.3	7.4	2.4	4,413
Senegal	32.4	54.3	12.5	14,602	55.1	27.9	7.1	8.9	3,415
Swaziland	58.7	38.2	3.0	4,987	70.7	20.1	7.5	1.5	4,156
Tanzania	36.4	51.4	12.1	6,863	46.9	35.4	12.5	5.2	5,659
Uganda	35.9	49.5	14.1	9,973	47.1	27.7	13.6	11.3	8,009
Zambia[1]	38.7	48.1	13.0	7,658	44.9	35.0	15.2	4.7	1,974
Zimbabwe	42.3	49.9	7.8	8,907	54.4	33.9	7.4	2.0	6,863
Total SSA[2]	34.7	52.6	12.5	163,503	48.5	36.4	8.3	6.4	75,492

Note: Percentages may not add to 100 due to missing values.

[1] Individual HIV data not merged with survey data.

[2] Total SSA figures were calculated by using appropriate pooled weights.

[3] Respondents not currently in union include respondents who are neither married nor living with a partner.

Multiple Sexual Partnerships

Recent multiple partnerships

In most countries, a large majority of women and men report having ever had sexual intercourse, and most of them report having had sexual intercourse in the previous 12 months (Table 5). The percentage of women having had sex in the previous 12 months ranges from 52 percent in Rwanda to 83 percent in Mali and Niger, and for men from 54 percent in Rwanda to 80 percent in the Dominican Republic and Zambia. In most countries studied, women are more likely than men to report having ever had sex and having had sex in the previous 12 months.

Table 5. Among respondents age 15-49, percent who ever had sex and who had sex in the 12 months preceding the survey, by sex[1]

Region/Country	Women			Men		
	Ever had sex	Had sex in past 12 months	Total	Ever had sex	Had sex in past 12 months	Total
Asia						
Cambodia	68.2	59.4	16,823	67.0	63.6	6,731
India	79.6	71.7	124,385	68.6	63.4	69,751
Latin America & Caribbean						
Dominican Republic[2]	81.6	72.7	23,384	86.2	79.7	2,537
Haiti	80.2	68.5	10,757	87.4	77.0	4,438
Sub-Saharan Africa						
Burkina Faso	87.4	65.5	12,477	74.0	62.6	3,209
Cameroon	87.1	75.6	10,656	82.2	76.0	4,815
Cote d'Ivoire	90.8	79.4	5,183	87.7	77.5	4,503
Ethiopia	76.0	64.5	6,751	63.1	57.1	5,464
Ghana	84.4	67.9	5,691	74.5	64.1	4,529
Guinea	90.6	67.2	7,954	85.5	74.0	2,709
Kenya	82.9	69.7	8,195	84.0	70.8	3,363
Lesotho	83.4	70.2	7,095	79.7	69.6	2,496
Malawi	88.9	77.7	11,698	87.2	77.1	3,114
Mali	89.2	82.7	14,583	74.2	68.1	3,704
Niger	90.3	83.0	9,223	73.5	66.5	3,101
Rwanda	69.0	52.0	11,321	69.2	54.4	4,413
Senegal	73.2	63.3	14,602	70.5	58.1	3,415
Swaziland	82.3	69.0	4,987	69.3	59.5	4,156
Tanzania	86.9	77.1	6,863	82.8	73.8	5,659
Uganda	86.2	74.1	9,973	82.0	70.4	8,009
Zambia[2]	88.1	74.1	7,658	89.8	79.8	1,974
Zimbabwe	79.3	66.0	8,907	73.9	63.7	6,863
Total SSA[3]	83.3	70.7	163,503	76.5	67.1	75,492

[1] The figures in the table might slightly differ from those presented in the individual country reports because of different adjustments used for inconsistencies in the sexual relationships reported by the respondents.

[2] Individual HIV data not merged with survey data.

[3] Total SSA figures were calculated by using appropriate pooled weights.

Among respondents who report having had sex in the previous 12 months, only a small proportion of women have had two or more sexual partners (Table 6 and Figure 1). In 12 of the 22 countries considered, less than 2 percent of sexually active women report having had two or more partners in the previous year. The highest percentage of women reporting multiple partners is in Lesotho (11 percent) and Cameroon (8 percent). In all 22 countries the percentage of women reporting three or more partners in the previous year is 1 percent or less.

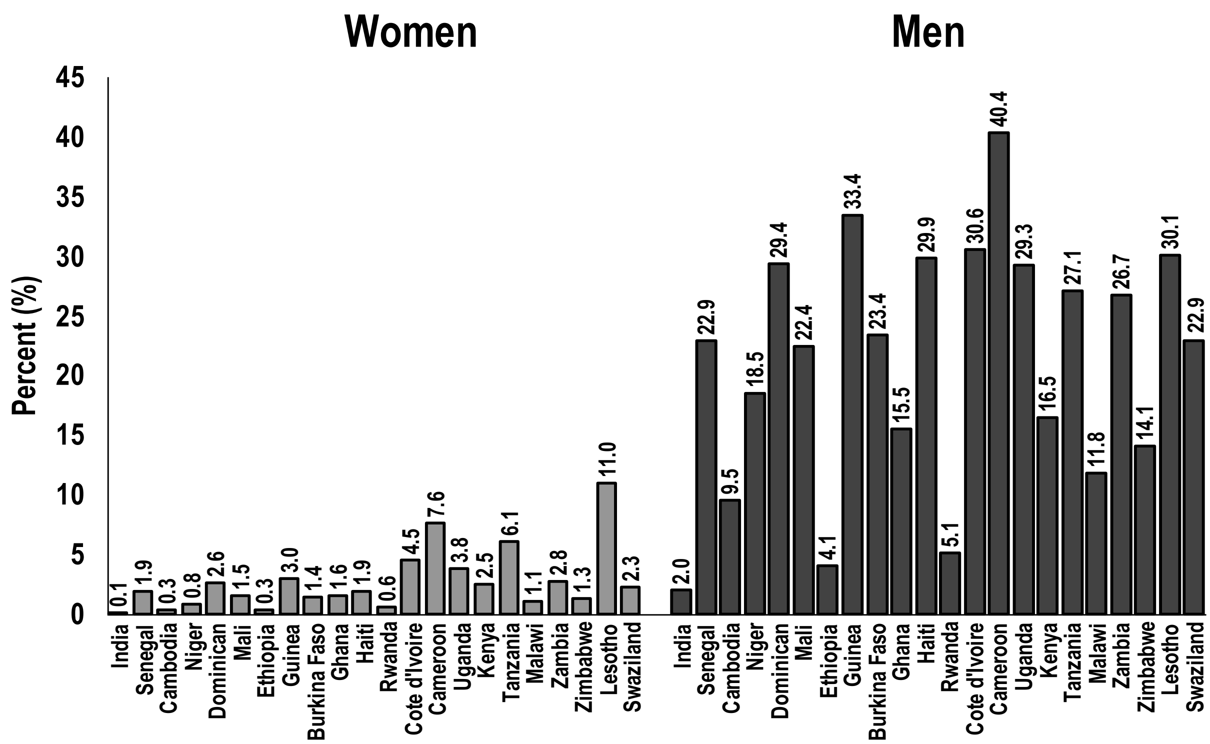
In all countries, men are more likely than women to report multiple sexual partners in the previous year. Among sexually active men, the percentage having two or more partners in the previous 12 months ranges from 2 percent in India to 40 percent in Cameroon. In 13 of the 22 countries considered, more than 20 percent of sexually active men report having had multiple sexual partners in the past year.

Table 6. Among respondents age 15-49 who had sex in the 12 months preceding the survey, percentage who had 1, 2 or 3+ sexual partners in the 12 months preceding the survey

	Women				Men			
Region/Country	**1**	**2**	**3+**	**# had sex in past 12 months**	**1**	**2**	**3+**	**# had sex in past 12 months**
Asia								
Cambodia	99.7	0.3	0.0	9,998	90.5	5.0	4.5	4,279
India	99.9	0.1	0.0	89,128	98.0	1.6	0.4	44,236
Latin America & Caribbean								
Dominican Republic[1]	97.4	2.2	0.5	16,991	70.6	16.5	12.9	2,022
Haiti	98.1	1.8	0.1	7,370	70.1	23.2	6.6	3,417
Sub-Saharan Africa								
Burkina Faso	98.6	1.4	0.0	8,168	76.6	19.0	4.4	2,008
Cameroon	92.4	6.7	0.9	8,057	59.6	26.1	14.2	3,658
Cote d'Ivoire	95.5	3.5	1.0	4,115	69.4	22.1	8.5	3,491
Ethiopia	99.7	0.2	0.0	4,353	95.9	3.8	0.3	3,121
Ghana	98.4	1.4	0.1	3,863	84.5	12.9	2.5	2,905
Guinea	97.0	2.9	0.1	5,344	66.6	26.3	7.1	2,005
Kenya	97.5	2.3	0.2	5,709	83.5	13.2	3.4	2,380
Lesotho	89.0	10.3	0.7	4,982	69.9	22.7	7.4	1,737
Malawi	98.9	1.0	0.0	9,087	88.2	10.2	1.6	2,401
Mali	98.5	1.4	0.1	12,065	77.7	18.5	3.9	2,521
Niger	99.2	0.7	0.1	7,654	81.5	17.1	1.4	2,062
Rwanda	99.4	0.6	0.0	5,887	94.9	5.1	0.0	2,399
Senegal	98.1	1.7	0.2	9,237	77.1	18.7	4.2	1,983
Swaziland	97.7	2.2	0.1	3,443	77.1	20.9	2.0	2,473
Tanzania	93.9	5.4	0.7	5,289	72.9	20.5	6.6	4,177
Uganda	96.2	3.5	0.3	7,387	70.7	22.3	7.0	5,642
Zambia[1]	97.2	2.6	0.1	5,677	73.3	20.1	6.6	1,575
Zimbabwe	98.7	1.2	0.1	5,879	85.9	11.8	2.2	4,373
Total SSA[2]	97.3	2.4	0.3	115,653	80.0	15.5	4.5	50,683

Note: Percentages may not add to 100 due to missing values.
[1] Individual HIV data not merged with survey data.
[2] Total SSA figures were calculated by using appropriate pooled weights.

Figure 1. Proportion reporting 2+ sexual partners in last 12 months among those who had sex in last 12 months



Lifetime multiple partnerships

In the countries with available data on number of lifetime sexual partners (16 for men and 14 for women), among respondents who ever had sex the average number of lifetime sexual partners for men ranges from 1.5 in India to 14.5 in Cameroon, and for women from 1.0 in India to 3.4 in Cameroon (Table 7 and Figure 2). Male respondents are more likely than female respondents to report multiple lifetime sexual partnerships. The percentage of women reporting two or more lifetime sexual partners ranges from 1.6 percent in India to more than 60 percent in Cameroon, Côte d'Ivoire, and Swaziland, and for men from 19 percent in India to 89 percent in Haiti and Cameroon. In all countries outside Asia, the majority of men report having had multiple sexual partners in their lifetime. In 10 of the 16 countries considered, the majority of men also report having had three or more lifetime partners. In Figure 2 as in Figure 1, countries with the highest HIV prevalence often do not have the highest average numbers of lifetime sexual partnerships.

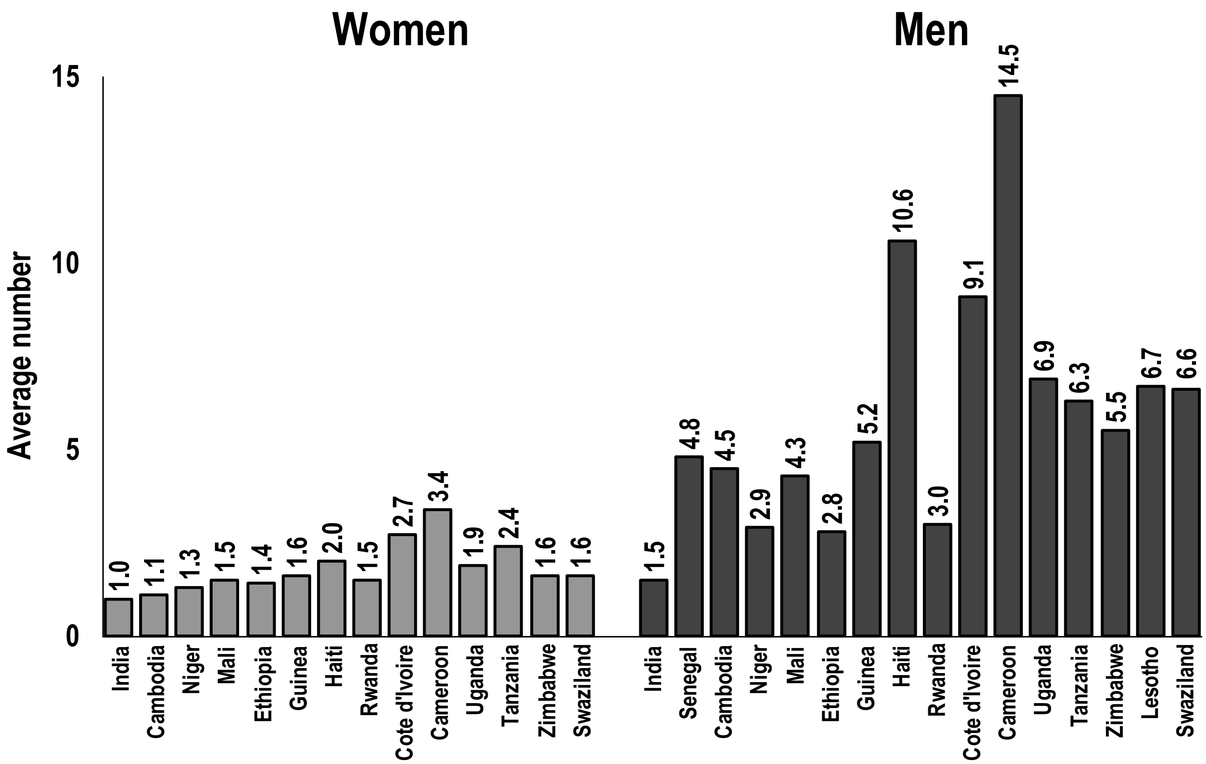
In the pooled sub-Saharan Africa sample, 20 percent women and 56 percent men report having had three or more lifetime sexual partners (see Table 7).

Table 7. Among respondents age 15-49 who ever had sex, percentage who had 1, 2, or 3+ lifetime sexual partners, and average number of lifetime sexual partners

	Women					Men				
Region/Country	**1**	**2**	**3+**	**Mean # of lifetime partners**	**# ever had sex**	**1**	**2**	**3+**	**Mean # of lifetime partners**	**# ever had sex**
Asia										
Cambodia	90.9	8.3	0.5	1.1	11,479	55.8	12.6	31.3	4.5	4,508
India	98.1	1.5	0.1	1.0	98,989	80.7	11.3	7.6	1.5	47,819
Latin America & Caribbean										
Haiti	45.4	29.3	25.0	2.0	8,628	9.0	9.2	79.5	10.6	3,879
Sub-Saharan Africa										
Cameroon	35.9	20.5	43.4	3.4	9,279	10.8	9.6	79.4	14.5	3,956
Cote d'Ivoire	35.0	25.5	37.8	2.7	4,706	9.2	10.8	76.1	9.1	3,948
Ethiopia	72.1	19.7	7.7	1.4	5,134	46.5	22.1	30.5	2.8	3,450
Guinea	61.0	25.0	12.7	1.6	7,209	11.8	15.6	68.6	5.2	2,315
Lesotho	n.a	n.a	n.a	n.a	n.a	19.8	13.3	63.1	6.7	1,990
Mali	71.9	21.4	6.3	1.5	13,006	24.3	22.2	46.5	4.3	2,748
Niger	78.5	18.0	3.1	1.3	8,331	42.5	27.6	28.8	2.9	2,278
Rwanda	71.3	20.6	7.9	1.5	7,816	38.3	25.5	36.0	3.0	3,053
Senegal	n.a	n.a	n.a	n.a	n.a	22.1	20.4	52.7	4.8	2,408
Swaziland	34.9	29.0	32.8	1.6	4,102	12.7	12.6	67.9	6.6	2,879
Tanzania	42.9	24.8	32.1	2.4	5,963	15.2	17.5	64.5	6.3	4,688
Uganda	41.8	27.0	30.6	1.9	8,599	14.9	16.9	65.4	6.9	6,571
Zimbabwe	65.9	21.3	12.5	1.6	7,059	19.1	18.1	60.9	5.5	5,070
Total SSA[1]	56.7	22.4	20.3	1.6	79,747	10.2	29.9	55.5	2.3	44,297

Note: Percentages may not add to 100 due to missing values.
[1] Total SSA figures were calculated by using appropriate pooled weights.

Figure 2. Average number of lifetime sexual partners among those who ever had sex



5. PREVALENCE AND CORRELATES OF CONCURRENT SEXUAL PARTNERSHIPS

In this section we present the prevalence of concurrent sexual partnerships across countries. We also present the prevalence and correlates of concurrency for the pooled sub-Saharan Africa sample.

Prevalence of Sexual Concurrency

For the 11 countries with available data, Table 8 compares the percentage of sexually experienced women (those who ever had sex) who had two or more overlapping partners in the previous 12 months with those who reported only one lifetime partner, and with those who had multiple lifetime partners but no overlapping partners in the previous 12 months. In 8 of the 11 countries considered, the percentage of women with two or more overlapping partners is below 1 percent. The percentage is highest in Cameroon, at 3.7 percent. Pooling all sub-Saharan countries studied, the prevalence of sexual concurrency among women is 0.8 percent. The percentage of women with two or more lifetime partners but no overlapping partners in the previous 12 months is far larger, at 32.6 percent for the pooled sub-Saharan Africa sample, and, among all countries studied, ranging from 1.8 percent in India to more than 50 percent in Haiti, Cameroon, and Swaziland.[13]

[13] Women who had two or more lifetime partners but no overlapping partners in the previous 12 months may have had overlapping partnerships that ended more than 12 months preceding the survey; however, the survey data do not allow us to identify these cases.

Table 8. Among respondents age 15-49 who ever had sex, number and percentage (with 95% confidence interval) who had only one lifetime sexual partner, who had 2+ lifetime partners but no overlapping partners in past 12 months, and who had 2+ overlapping partners in past 12 months: Women

	Number				Percentage (95% Conf. Interval)					
		2+ lifetime prts					2+ lifetime prts			
							No overlapping partners in past 12m		2+ overlapping partners in past 12 months	
Region/Country	1 lifetime partner	No overlapping partners in past 12m	2+ overlapping partners in past 12m	# ever had sex	1 lifetime partner	(95% CI)	%	(95% CI)	%	(95% CI)
Asia										
Cambodia[1]	10,429	1,024	26	11,479	90.9	(90.1 , 91.6)	8.9	(8.2 , 9.6)	0.2	(0.0 , 0.4)
India[2]	97,107	1,815	67	98,989	98.1	(98.0 , 98.2)	1.8	(1.7 , 2.0)	0.1	(0.0 , 0.1)
Latin America & Caribbean										
Haiti	3,916	4,627	85	8,628	45.4	(43.3 , 47.5)	53.6	(51.7 , 55.6)	1.0	(0.7 , 1.3)
Sub-saharan Africa										
Cameroon[1]	3,327	5,608	344	9,279	35.9	(33.1 , 38.6)	60.4	(58.0 , 62.9)	3.7	(3.2 , 4.2)
Ethiopia[2]	3,704	1,422	8	5,134	72.1	(33.2 , 35.8)	27.7	(25.2 , 30.2)	0.2	(0.0 , 0.1)
Guinea[1]	4,396	2,735	78	7,209	61.0	(58.5 , 63.5)	37.9	(35.5 , 40.4)	1.1	(0.8 , 1.4)
Lesotho[1]	n.a.	n.a.	n.a.	n.a.	n.a.		n.a.		n.a.	
Mali[1]	9,345	3,567	94	13,006	71.9	(69.3 , 74.5)	27.4	(25.0 , 29.8)	0.7	(0.4 , 1.0)
Niger[1]	6,538	1,744	49	8,331	78.5	(76.6 , 80.3)	20.9	(19.0 , 22.9)	0.6	(0.2 , 1.0)
Rwanda[1]	5,571	2,225	20	7,816	71.3	(70.1 , 72.6)	28.5	(27.2 , 29.7)	0.3	(0.1 , 0.4)
Senegal[1]	n.a.	n.a.	n.a.	n.a.	n.a.		n.a.		n.a.	
Swaziland	1,430	2,639	33	4,102	34.9	(33.1 , 36.7)	64.3	(62.6 , 66.1)	0.8	(0.5 , 1.1)
Zimbabwe	4,652	2,360	47	7,059	65.9	(64.0 , 67.8)	33.4	(31.5 , 35.3)	0.7	(0.4 , 0.9)
Total SSA[3]	39,636	19,383	474	59,493	66.6	(65.8 , 67.5)	32.6	(31.8 , 33.4)	0.8	(0.7 , 0.9)

[1] Only for respondents whose last sexual relationship started at least 12 months before the survey.
[2] Sexual history limited to the respondent's most recent 2 partners.
[3] Total SSA figures were calculated by using appropriate pooled weights.

As Table 9 and Figure 3 show, the prevalence of sexual concurrency is greater when considering men's reported sexual behavior. In 8 of 13 countries with available data, more than 10 percent of sexually experienced men had two or more overlapping sexual partnerships in the previous 12 months. The lowest percentage was in India (1.5 percent) and the highest in Haiti (18.7 percent). In the pooled sub-Saharan Africa sample, 8.4 percent of sexually experienced men had overlapping sexual partnerships in the previous 12 months.

The percentage of sexually experienced men reporting two or more lifetime sexual partners but no overlapping partners in the past 12 months ranges from 18 percent in India to 75 percent in Swaziland and Cameroon. Haiti (72 percent), Guinea (74 percent), and Zimbabwe (73 percent) also reported high levels of multiple lifetime partnerships that were not concurrent in the 12 months preceding the respective surveys. Overall, 59 percent of men in the pooled sub-Saharan Africa sample had multiple lifetime partnerships, but not concurrent sexual partnerships in the past 12 months.

Table 9. Among respondents age 15-49 who ever had sex, number and percentage (with 95% confidence interval) who had only one lifetime sexual partner, who had 2+ lifetime partners but no overlapping partners in past 12 months, and who had 2+ overlapping partners in past 12 months: Men

Region/Country	Number: 1 lifetime partner	Number: 2+ lifetime prts: No overlapping partners in past 12m	Number: 2+ lifetime prts: 2+ overlapping partners in past 12m	Number: # ever had sex	Percentage (95% Conf. Interval): 1 lifetime partner	(95% CI)	Percentage: 2+ lifetime prts: No overlapping partners in past 12m %	(95% CI)	Percentage: 2+ lifetime prts: 2+ overlapping partners in past 12 months %	(95% CI)
Asia										
Cambodia[1]	2,514	1,759	234	4,508	55.8	(53.4 , 58.2)	39.0	(36.7 , 41.3)	5.2	(4.2 , 6.1)
India[3]	38,609	8,475	735	47,819	80.7	(80.0 , 81.5)	17.7	(17.1 , 18.4)	1.5	(1.4 , 1.7)
Latin America & Caribbean										
Haiti	348	2,805	725	3,879	9.0	(7.8 , 10.2)	72.3	(70.2 , 74.4)	18.7	(16.9 , 20.5)
Sub-saharan Africa										
Cameroon[1,2]	426	2,965	565	3,956	10.8	(9.4 , 12.2)	74.9	(73.1 , 76.8)	14.3	(13.0 , 15.6)
Ethiopia[1,3]	1,604	1,750	96	3,450	46.5	(43.7 , 49.4)	50.7	(47.8 , 53.6)	2.8	(2.0 , 3.6)
Guinea[1]	273	1,720	322	2,315	11.8	(10.0 , 13.5)	74.3	(71.9 , 76.7)	13.9	(12.1 , 15.7)
Lesotho[1]	394	1,244	352	1,990	19.8	(17.4 , 22.0)	62.5	(60.0 , 65.0)	17.7	(16.0 , 19.6)
Mali[1]	667	1,637	444	2,748	24.3	(21.4 , 27.1)	59.6	(56.5 , 62.6)	16.2	(14.2 , 18.2)
Niger[1,2]	969	966	343	2,278	42.5	(39.4 , 45.7)	42.4	(39.3 , 45.6)	15.1	(12.6 , 17.5)
Rwanda[1]	1,168	1,788	97	3,053	38.3	(36.3 , 40.3)	58.6	(56.5 , 60.7)	3.2	(2.5 , 3.9)
Senegal[1]	531	1,593	284	2,408	22.1	(19.5 , 24.6)	66.2	(62.9 , 69.4)	11.8	(9.8 , 13.7)
Swaziland	366	2,160	353	2,879	12.7	(11.4 , 14.0)	75.0	(73.3 , 76.8)	12.3	(10.8 , 13.7)
Zimbabwe	968	3,701	401	5,070	19.1	(17.7 , 20.4)	73.0	(71.6 , 74.5)	7.9	(6.9 , 8.8)
Total SSA[4]	9,388	16,969	2,423	28,780	32.6	(31.6 , 33.6)	59.0	(57.9 , 60.0)	8.4	(8.0 , 8.9)

[1] Only for respondents whose last sexual relationship started at least 12 months before the survey.
[2] No information on duration for any non-marital sexual partner.
[3] Sexual history limited to the respondent's most recent 2 partners.
[4] Total SSA figures were calculated by using appropriate pooled weights.

Figure 3. Proportion reporting 2+ overlapping partners in last 12 months among those who ever had sex

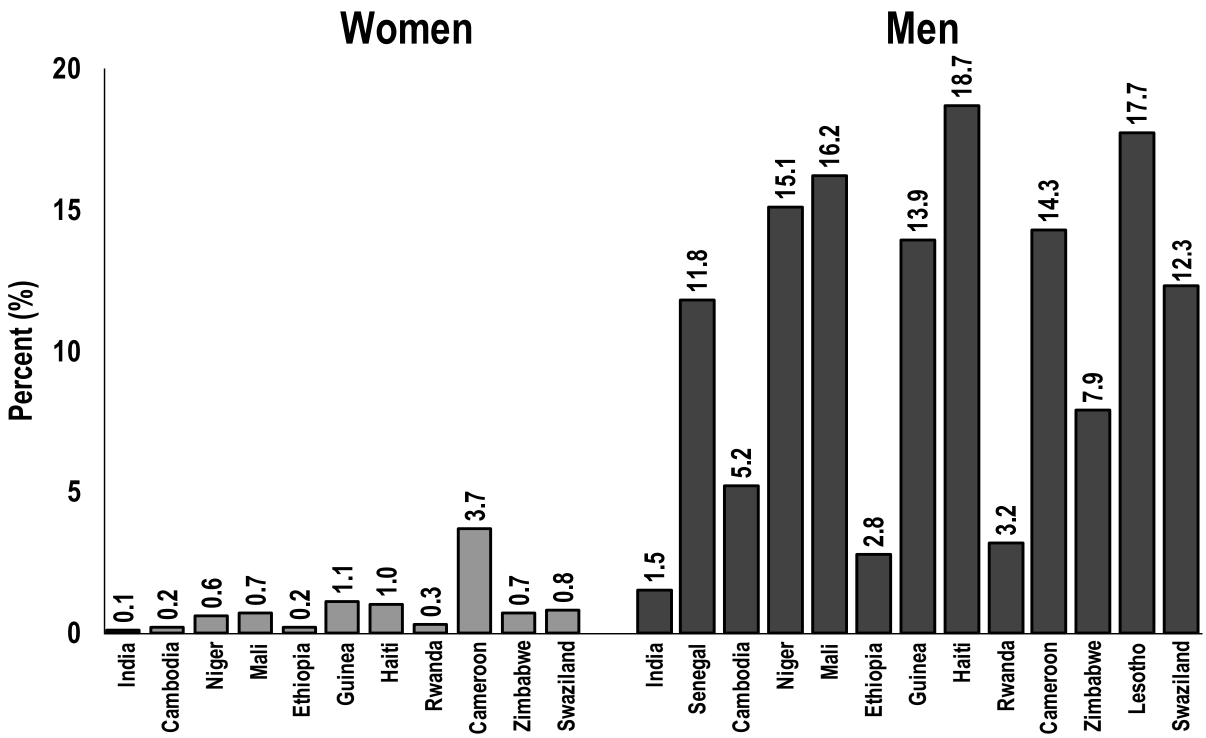
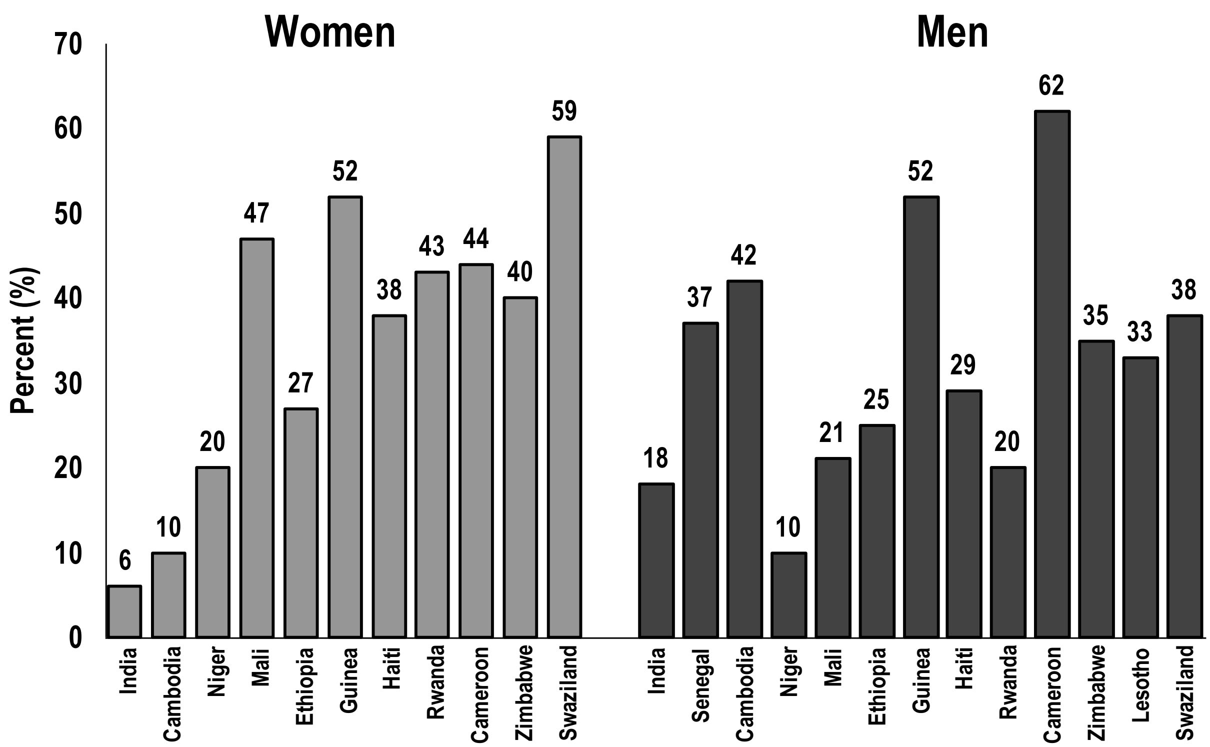


Figure 4 shows that, in most countries with available data, many recent multiple partnerships were not concurrent. In 7 of 11 countries with data for women, and in 6 of 13 countries with data for men, more than one-third of respondents with multiple partnerships in the past 12 months did not have concurrent partnerships.

Figure 4. Proportion reporting non-overlapping partners among those who had 2+ partners in last 12 months



Prevalence of Sexual Concurrency by Duration of Overlap

In a few countries (five for women and four for men), it is possible to calculate the duration of overlapping sexual partnerships. In Table 10 we present the distributions of women and men who had concurrent partnerships in the previous 12 months by the duration of overlap. Because the numbers of women reporting overlapping partnerships in the past 12 months are small in all five countries considered (ranging from 8 women in Ethiopia to 85 in Haiti), the breakdown of these numbers by duration of overlap results in so few cases that the data cannot be meaningfully analyzed. In contrast, the sample sizes for men are generally adequate due to the higher prevalence of concurrent partnerships. Thus in Table 10 we discuss results only for men.

Table 10. Among respondents age 15-49 who had 2 or more overlapping partners in the 12 months preceding the survey, number and percentage by duration of overlap

	Number								
	Women					Men			
Duration of overlap	Ethiopia[1]	Haiti	India[1]	Swaziland	Zimbabwe	Haiti	India[1]	Swaziland	Zimbabwe
1 day	1	9	6	3	7	128	137	20	57
2-7 days	0	6	1	4	12	43	23	36	64
8-30 days	2	12	1	10	12	179	59	105	69
1-12 months	0	13	28	11	6	128	246	85	48
1-5 years	0	2	14	0	0	2	135	0	0
More than 5 years	0	0	9	0	1	1	41	2	2
Polygamous	n.a.	n.a.	n.a.	n.a.	n.a.	150	77	44	86
No information	5	43	8	5	9	94	17	61	75
# with 2+ overlapping partners	8	85	67	33	47	725	735	353	401

	Percentage								
	Women					Men			
Duration of overlap	Ethiopia[1]	Haiti	India[1]	Swaziland	Zimbabwe	Haiti	India[1]	Swaziland	Zimbabwe
1 day	12.5	10.6	9.0	9.1	14.9	17.7	18.6	5.7	14.2
2-7 days	0.0	7.1	1.5	12.1	25.5	5.9	3.1	10.2	16.0
8-30 days	25.0	14.1	1.5	30.3	25.5	24.7	8.0	29.7	17.2
1-12 months	0.0	15.3	41.8	33.3	12.8	17.7	33.5	24.1	12.0
1-5 years	0.0	2.4	20.9	0.0	0.0	0.3	18.4	0.0	0.0
More than 5 years	0.0	0.0	13.4	0.0	2.1	0.1	5.6	0.6	0.5
Polygamous	n.a.	n.a.	n.a.	n.a.	n.a.	20.7	10.5	12.5	21.4
No information	62.5	50.6	11.9	15.2	19.1	13.0	2.3	17.3	18.7
# with 2+ overlapping partners	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] Sexual history limited to the respondent's most recent 2 partners.

In all four countries with available data for men (Haiti, India, Swaziland, and Zimbabwe), the majority of concurrent partnerships overlapped for less than 12 months. In three of the four countries, less than 1 percent of men had concurrent relationships that overlapped for more than 12 months, the exception being India where 24 percent of men with concurrent partners had overlapping relationship for more than 12 months. Polygynous marriages represent a considerable proportion of all concurrent relationships among men, ranging from 11 percent in India to 21 percent in Haiti and Zimbabwe.

Correlates of Sexual Concurrency

Because only a small proportion of survey respondents, especially women, had concurrent sexual partnerships in the previous 12 months, we evaluate the factors associated with sexual concurrency only for the pooled sub-Saharan Africa sample. Table 11 presents the distribution of sexually experienced women and men who had two or more overlapping partners in the previous 12 months by selected background characteristics.[14] In general, younger, never-married, urban, more educated, and wealthier men and women are more likely to have had overlapping partners. The associations between these characteristics and concurrency are stronger for men than for women. For men who ever had sex, the prevalence of concurrency decreases monotonically with age, from 15.3 percent among men age 15-19 to 1.3 percent among men age 45-49. Correspondingly, the prevalence of concurrency increases monotonically with educational level and household wealth. Also, circumcised men are more than twice as likely to have had two or more overlapping partners in the previous 12 months compared with uncircumcised men.

[14] Results for women and men from the pooled samples for sub-Saharan Africa are not strictly comparable because the pooled sample for women includes fewer countries with available data than for men.

Table 11. Among women and men age 15-49 who ever had sex, percent distribution by whether they had only one lifetime sexual partner, had 2+ lifetime partners but no overlapping partners in past 12 months, or had 2+ overlapping partners in past 12 months, by selected characteristics: Sub-Saharan Africa (pooled data)

	Women[1]				Men[2]			
		2+ lifetime prts				2+ lifetime prts		
Characteristic	1 lifetime partner	No overlapping partners in past 12m	2+ overlapping partners in past 12m	Ever had sex (total)	1 lifetime partner	No overlapping partners in past 12m	2+ overlapping partners in past 12m	Ever had sex (total)
Age group								
15-19	78.3	20.6	1.0	6,425	41.1	57.4	15.3	2,089
20-24	71.9	27.0	1.1	11,105	39.3	57.6	12.4	4,637
25-29	69.6	29.7	0.7	12,034	37.4	56.7	7.1	5,085
30-34	63.7	35.4	0.9	9,462	34.0	57.4	3.9	5,222
35-39	60.2	39.3	0.5	8,389	31.1	57.5	2.5	4,596
40-44	58.2	41.1	0.7	6,436	22.8	64.7	1.7	3,788
45-49	60.7	38.8	0.4	5,643	21.8	63.2	1.3	3,364
Education								
No education	70.2	29.5	0.4	37,315	38.3	51.5	2.3	11,576
Primary incomplete	68.7	30.6	0.8	10,321	38.4	54.6	4.3	7,093
Primary complete	49.1	48.7	2.2	2,684	27.8	64.1	9.1	1,859
Secondary or higher	55.0	42.8	2.1	9,173	20.7	71.9	11.5	8,252
Marital status								
Never married	53.1	44.3	2.6	2,825	30.0	68.9	16.5	5,950
Currently married	69.8	29.5	0.7	49,668	34.1	54.9	2.3	21,263
Formerly married	49.8	49.4	0.8	7,000	22.3	76.1	13.7	1,566
Residence								
Urban	55.6	42.6	1.8	14,114	19.3	72.5	11.6	8,632
Rural	70.0	29.5	0.5	45,379	38.3	53.2	3.4	20,149
Wealth status								
Lowest	70.4	29.1	0.5	11,968	37.8	52.8	3.1	4,771
Second	67.5	32.0	0.5	11,805	36.1	54.3	4.1	5,248
Third	67.5	31.7	0.8	11,478	36.8	54.3	5.2	5,406
Fourth	64.3	34.7	1.1	11,716	30.6	60.7	6.4	6,008
Highest	63.6	35.3	1.1	12,525	25.4	68.3	8.9	7,347
Circumcision								
No	n.a.	n.a.	n.a.	n.a.	31.9	61.2	3.1	4,722
Yes	n.a.	n.a.	n.a.	n.a.	32.8	58.5	6.4	24,007
Total SSA	66.6	32.6	0.8	59,493	32.6	59.0	5.9	28,779

[1] Pooled sample for women includes: Cameroon, Ethiopia, Guinea, Mali, Niger, Rwanda, Swaziland, and Zimbabwe.
[2] Pooled sample for men includes: Cameroon, Ethiopia, Guinea, Lesotho, Mali, Niger, Rwanda, Senegal, Swaziland, and Zimbabwe.

Tables 12a and 12b present adjusted associations between these background factors and sexual concurrency.[15] Controlling for other factors, women with primary or higher education are significantly more likely to have concurrent partnerships. Among men, the strong monotonically increasing associations between concurrency and educational level and household wealth observed in the bivariate analysis become small and statistically insignificant. The association with urban residence also becomes insignificant, while the associations with age and marital status are reversed. Yet, even controlling for other factors, circumcised men remain significantly more likely to have concurrent partners than uncircumcised men.

[15] The results are obtained using multinomial logit regression models including as covariates age, education, marital status, urban/rural residence, household wealth status, male circumcision (in the model for men only), and country of residence.

Table 12a. Multinomial logit regression results (relative risk ratios, RRR) of concurrency of sexual relations among respondents age 15-49 who ever had sex as a function of background characteristics and behaviours: sub-Saharan Africa (pooled data): Women[1]

	1 lifetime partner	2+ lifetime prts: No overlapping partners in past 12m RRR	(95% CI; p-value)	2+ lifetime prts: 2+ overlapping partners in past 12m RRR	(95% CI; p-value)
Age group					
15-24			ref.		
25-34	1.00	1.78	(1.60 , 1.98 ; .000)	1.35	(0.97 , 1.87 ; .078)
35+	1.00	2.43	(2.18 , 2.72 ; .000)	1.19	(0.84 , 1.69 ; .320)
Education					
No education			ref.		
Primary incomplete	1.00	0.89	(0.79 , 1.00 ; .060)	1.41	(0.99 , 2.01 ; .060)
Primary complete	1.00	1.27	(1.10 , 1.47 ; .001)	2.14	(1.47 , 3.12 ; .000)
Secondary or higher	1.00	1.16	(1.02 , 1.32 ; .021)	2.34	(1.65 , 3.31 ; .000)
Marital status					
Never married			ref.		
Currently married	1.00	0.61	(0.54 , 0.69 ; .000)	0.58	(0.43 , 0.79 ; .001)
Formerly married	1.00	1.42	(1.20 , 1.68 ; .000)	1.30	(0.89 , 1.89 ; .178)
Residence					
Urban			ref.		
Rural	1.00	0.80	(0.71 , 0.91 ; .000)	0.82	(0.63 , 1.08 ; .164)
Wealth status					
Lowest			ref.		
Second	1.00	1.22	(1.07 , 1.40 ; .003)	0.99	(0.59 , 1.69 ; .982)
Third	1.00	1.17	(1.02 , 1.33 ; .024)	1.46	(0.85 , 2.52 ; .172)
Fourth	1.00	1.23	(1.07 , 1.42 ; .004)	1.64	(0.96 , 2.80 ; .068)
Highest	1.00	1.04	(0.87 , 1.24 ; .684)	1.32	(0.75 , 2.30 ; .333)
Circumcision					
No	n.a.				
Yes	n.a.				
Country					
Cameroon			ref.		
Ethiopia	1.00	0.23	(0.20 , 0.26 ; .000)	0.03	(0.01 , 0.07 ; .000)
Guinea	1.00	0.39	(0.35 , 0.42 ; .000)	0.28	(0.21 , 0.38 ; .000)
Lesotho	n.a.				
Mali	1.00	0.25	(0.23 , 0.28 ; .000)	0.17	(0.11 , 0.26 ; .000)
Niger	1.00	0.18	(0.16 , 0.20 ; .000)	0.14	(0.09 , 0.21 ; .000)
Rwanda	1.00	0.21	(0.19 , 0.23 ; .000)	0.04	(0.03 , 0.07 ; .000)
Senegal	n.a.				
Swaziland	1.00	0.96	(0.87 , 1.06 ; .466)	0.18	(0.12 , 0.27 ; .000)
Zimbabwe	1.00	0.27	(0.24 , 0.29 ; .000)	0.08	(0.06 , 0.12 ; .000)
Total SSA			59,493		

[1] Pooled sample for women includes: Cameroon, Ethiopia, Guinea, Mali, Niger, Rwanda, Swaziland, and Zimbabwe.

Table 12b. Multinomial logit regression results (relative risk ratios, RRR) of concurrency of sexual relations among respondents age 15-49 who ever had sex as a function of background characteristics and behaviours: sub-Saharan Africa (pooled data): Men[1]

	1 lifetime partner	2+ lifetime prts: No overlapping partners in past 12m RRR	(95% CI; p-value)			2+ lifetime prts: 2+ overlapping partners in past 12m RRR	(95% CI; p-value)		
Age group									
15-24					ref.				
25-34	1.00	2.00	(1.73	, 2.33 ;	.000)	2.56	(2.04	, 3.21 ;	.000)
35+	1.00	3.64	(3.08	, 4.30 ;	.000)	6.50	(5.14	, 8.20 ;	.000)
Education									
No education					ref.				
Primary incomplete	1.00	1.05	(0.91	, 1.21 ;	.524)	1.00	(0.80	, 1.25 ;	.995)
Primary complete	1.00	1.34	(1.06	, 1.71 ;	.015)	1.09	(0.76	, 1.56 ;	.656)
Secondary or higher	1.00	1.49	(1.26	, 1.76 ;	.000)	1.21	(0.97	, 1.51 ;	.091)
Marital status									
Never married					ref.				
Currently married	1.00	0.69	(0.59	, 0.81 ;	.000)	7.22	(5.75	, 9.05 ;	.000)
Formerly married	1.00	1.24	(0.96	, 1.59 ;	.097)	1.26	(0.82	, 1.94 ;	.295)
Residence									
Urban					ref.				
Rural	1.00	0.71	(0.61	, 0.83 ;	.000)	0.98	(0.79	, 1.20 ;	.822)
Wealth status									
Lowest					ref.				
Second	1.00	1.08	(0.91	, 1.28 ;	.404)	1.16	(0.92	, 1.47 ;	.216)
Third	1.00	1.02	(0.86	, 1.21 ;	.833)	1.11	(0.87	, 1.41 ;	.404)
Fourth	1.00	1.12	(0.94	, 1.34 ;	.207)	1.24	(0.97	, 1.59 ;	.079)
Highest	1.00	1.16	(0.94	, 1.44 ;	.166)	1.11	(0.83	, 1.49 ;	.490)
Circumcision									
No					ref.				
Yes	1.00	1.67	(1.33	, 2.09 ;	.000)	1.46	(1.04	, 2.06 ;	.030)
Country									
Cameroon					ref.				
Ethiopia	1.00	0.18	(0.15	, 0.21 ;	.000)	0.03	(0.02	, 0.04 ;	.000)
Guinea	1.00	1.02	(0.84	, 1.25 ;	.813)	0.74	(0.57	, 0.96 ;	.024)
Lesotho	1.00	0.72	(0.58	, 0.89 ;	.002)	1.10	(0.82	, 1.46 ;	.525)
Mali	1.00	0.40	(0.34	, 0.48 ;	.000)	0.32	(0.25	, 0.41 ;	.000)
Niger	1.00	0.16	(0.13	, 0.19 ;	.000)	0.15	(0.11	, 0.19 ;	.000)
Rwanda	1.00	0.40	(0.31	, 0.51 ;	.000)	0.06	(0.04	, 0.09 ;	.000)
Senegal	1.00	0.45	(0.38	, 0.54 ;	.000)	0.33	(0.26	, 0.42 ;	.000)
Swaziland	1.00	1.39	(1.07	, 1.80 ;	.014)	1.29	(0.89	, 1.87 ;	.176)
Zimbabwe	1.00	0.85	(0.67	, 1.08 ;	.191)	0.36	(0.25	, 0.52 ;	.000)
Total SSA					28,727				

[1] Pooled sample for men includes: Cameroon, Ethiopia, Guinea, Lesotho, Mali, Niger, Rwanda, Senegal, Swaziland, and Zimbabwe.

Condom Use with Concurrent Sexual Partners

Women and men with overlapping partners in the past 12 months are more likely to report using condoms than those with only one lifetime sexual partner (Table 13). Yet, in all countries considered the levels of condom use are quite low. Among women and men who had concurrent partners in the previous 12 months, only 20 percent of women and 8 percent of men report using condoms at last sex. Among those who had concurrent partners, the percentages using condoms at last sex with all sexual partners (up to three) in the previous 12 months are even lower, at 15 percent among women and 6 percent among men.

Table 13. Among women and men age 15-49 who ever had sex, percentage who had only one lifetime sexual partner, had 2+ lifetime partners but no overlapping partners in past 12 months, or had 2+ overlapping partners in past 12 months by condom use: Sub-Saharan Africa (pooled data)

	Women[1]				Men[2]			
		2+ lifetime prts				2+ lifetime prts		
Characteristic	1 lifetime partner	No overlapping partners in past 12m	2+ overlapping partners in past 12m	Ever had sex (total)	1 lifetime partner	No overlapping partners in past 12m	2+ overlapping partners in past 12m	Ever had sex (total)
Condom use with last partner in past 12 months								
No	84.1	75.9	79.7	81.4	80.1	72.6	91.4	76.7
Yes	1.7	6.3	19.5	3.3	4.9	16.7	8.4	12.2
Did not have sex in past 12mo	14.0	17.4	0.0	15.0	14.9	10.5	0.0	11.0
Consistent condom use in past 12 months[3]								
No	84.1	76.2	84.6	81.5	80.1	73.7	94.2	77.6
Yes	1.7	6.0	15.3	3.2	4.8	15.5	5.7	11.2
Did not have sex in past 12mo	14.0	17.4	0.0	15.0	14.9	10.7	0.0	11.1
Total SSA	39,636	19,383	474	59,493	9,388	16,969	2,423	28,779

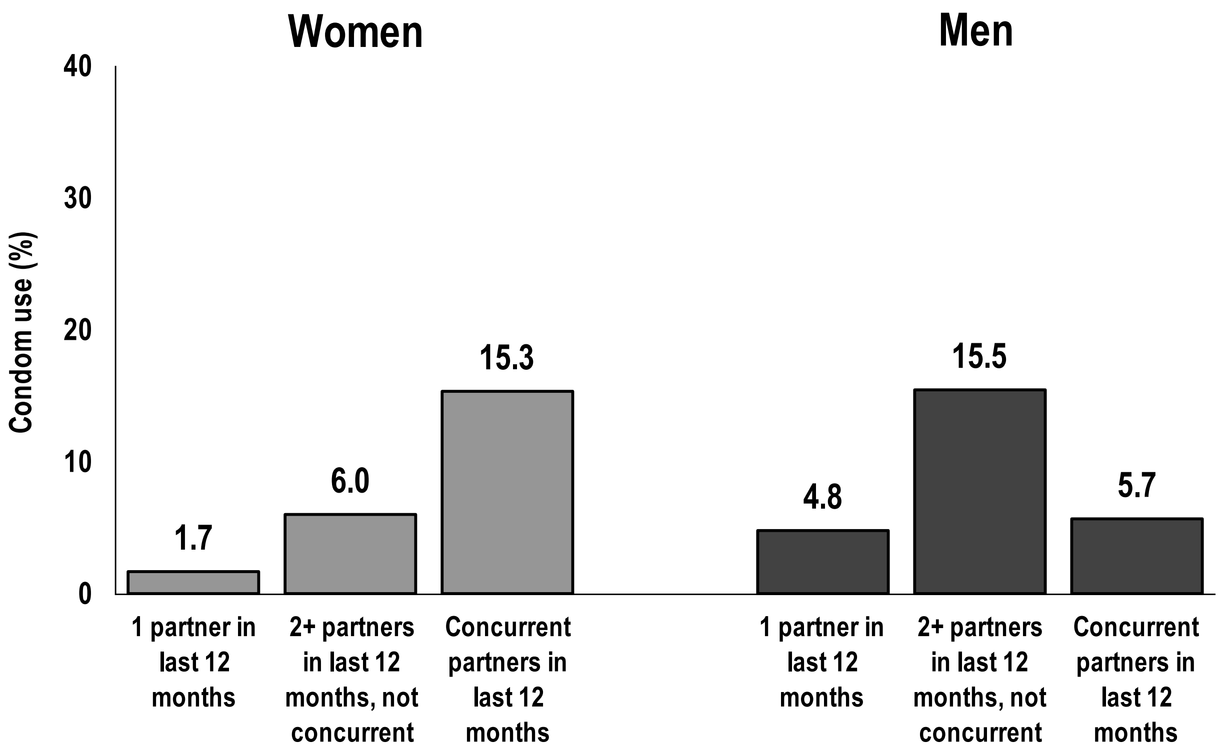
[1] Pooled sample for women includes: Cameroon, Ethiopia, Guinea, Mali, Niger, Rwanda, Swaziland, and Zimbabwe.

[2] Pooled sample for men includes: Cameroon, Ethiopia, Guinea, Lesotho, Mali, Niger, Rwanda, Senegal, Swaziland, and Zimbabwe.

[3] Condom use at most recent sex with all partners (up to 3) in the past year.

Among respondents who had sex in the previous 12 months, condom use at last sex with all sexual partners is more common among women and men who had two or more non-overlapping partners than among those who had two or more overlapping partners (Figure 5).

Figure 5. Consistent condom use* by partner concurrency among those who had sex in last 12 months: pooled sub-Saharan Africa



* Consistent condom use defined as condom use at most recent sex with all sexual partners (up to 3) in the past 12 months

6. THE ASSOCIATION BETWEEN SEXUAL CONCURRENCY AND HIV

In this section we present findings about the association between sexual concurrency and HIV, separately for three levels of aggregation—individuals, communities, and countries.

The data do not allow examining the behaviors of respondents' sexual partner(s), however, although these behaviors could be important in assessing the risk of HIV infection. To address this issue, we present the associations between the prevalence of HIV among women and the prevalence of concurrency among men, as well as the associations between the prevalence of HIV among men and the prevalence of concurrency among women. Such associations are obtained by using aggregated data at the community and country levels.

The Association between Sexual Concurrency and HIV Serostatus at the Individual Level

In Figure 1 the percentages of respondents reporting multiple partners in the past year are arranged by increasing prevalence of HIV at the country level, from India where HIV prevalence is lowest (0.3 percent) to Swaziland where it is highest (25.9 percent). There does not appear to be any clear association between the percentages of respondents reporting multiple sexual partnerships in the past year and HIV prevalence at the country level.

Table 14 presents, for 11 countries with data, sample distributions of women who ever had sex, who tested HIV-positive, and the resulting HIV prevalence by the three categories of sexual concurrency used in our study. In most survey samples both the number of women with overlapping partners and the number of women who tested HIV-positive among those with overlapping partners are small. In 3 of the 11 countries, there are no HIV-positive women among those who had overlapping partners in the previous 12 months; and in four other countries, there are only one or two HIV-positive women among those with concurrent partners.

Table 14. Among respondents age 15-49 who ever had sex, HIV prevalence by whether the respondent had had only one lifetime sexual partner, had 2+ lifetime partners but no overlapping partners in past 12 months, and had 2+ overlapping partners in past 12 months: Women

Region/ Country	Number HIV positive				Number tested for HIV				HIV prevalence (%)						
		2+ lifetime prts				2+ lifetime prts					2+ lifetime prts				
	1 lifetime partner	No over-lapping partners in past 12m	2+ over-lapping partners in past 12m	Ever had sex (total)	1 lifetime partner	No over-lapping partners in past 12m	2+ over-lapping partners in past 12m	Ever had sex (total)	1 lifetime partner %	(95% CI)	No overlapping partners in past 12m %	(95% CI)	2+ overlapping partners in past 12m %	(95% CI)	Ever had sex (total)
Asia															
Cambodia[1]	31	16	0	47	5,010	524	13	5,548	0.6	(0.4 , 0.9)	3.0	(1.3 , 4.8)	0.0	(0.0 , 0.0)	0.8
India[2]	103	8	1	112	41,655	842	20	42,518	0.2	(0.2 , 0.3)	0.9	(0.3 , 1.5)	5.6	(0.0 , 18.1)	0.3
Latin America & Caribbean															
Haiti	24	91	6	121	1,911	2,210	51	4,172	1.3	(0.6 , 1.9)	4.1	(3.1 , 5.1)	12.3	(0.0 , 25.3)	2.9
Sub-saharan Africa															
Cameroon[1]	44	274	18	335	1,623	2,708	171	4,502	2.7	(1.8 , 3.6)	10.1	(8.9 , 11.3)	10.4	(5.9 , 14.8)	7.4
Ethiopia[2]	45	59	1	105	3,148	1,211	6	4,364	1.4	(0.9 , 2.0)	4.8	(3.2 , 6.5)	20.0	(0.0 , 51.6)	2.4
Guinea[1]	21	48	2	70	2,066	1,268	51	3,385	1.0	(0.6 , 1.5)	3.8	(2.4 , 5.0)	3.2	(0.0 , 8.1)	2.1
Lesotho[1]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.		n.a.		n.a.		n.a.
Niger[1]	7	22	0	29	3,100	832	27	3,959	0.2	(0.1 , 0.4)	2.7	(1.3 , 4.0)	0.0	(0.0 , 0.0)	0.7
Mali[1]	31	32	0	63	2,816	1,179	41	4,037	1.1	(0.7 , 1.6)	2.7	(1.6 , 3.8)	0.0	(0.0 , 0.0)	1.6
Rwanda[1]	80	108	2	189	2,696	1,176	11	3,883	3.0	(2.3 , 3.6)	9.2	(7.5 , 10.8)	14.2	(0.0 , 45.1)	4.9
Senegal[1]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.		n.a.		n.a.		n.a.
Swaziland	286	1,033	16	1,335	1,249	2,362	30	3,640	22.9	(20.5 , 25.3)	43.7	(41.7 , 45.8)	53.3	(32.8 , 71.8)	36.7
Zimbabwe	656	734	23	1,413	3,617	1,875	39	5,531	18.1	(16.6 , 19.6)	39.1	(36.6 , 41.7)	57.9	(39.5 , 76.2)	25.5
Total SSA[3]	593	981	33	1,607	21,492	10,685	283	32,459	2.8	(2.4 , 3.1)	9.2	(8.4 , 10.0)	11.7	(8.0 , 15.4)	5.0

[1] Only for respondents whose last sexual relationship started at least 12 months before the survey.

[2] Sexual history limited to the respondent's most recent 2 partners.

[3] Total SSA figures were calculated by using appropriate pooled weights.

Yet in all countries with reasonable sample sizes, women who had overlapping partners in the previous 12 months are more likely to be HIV-infected than women with only one lifetime partner (Figure 6). In most countries, women who had overlapping partners are also more likely to be HIV-infected than women reporting multiple lifetime partners but who had no overlapping partners in the previous 12 months. For example, in Swaziland HIV prevalence rises from 22.9 percent among women reporting only one lifetime sexual partner to 43.7 percent among those reporting two or more lifetime partners but no overlapping partners in the previous 12 months, and to 53.3 percent among those who had two or more overlapping partners in the previous 12 months. The only exception to this finding is Guinea, where women with overlapping partners are slightly less likely to be HIV-infected than those with multiple lifetime partners but no overlapping partners in the previous 12 months.

Figure 6. Association between concurrency and HIV among WOMEN

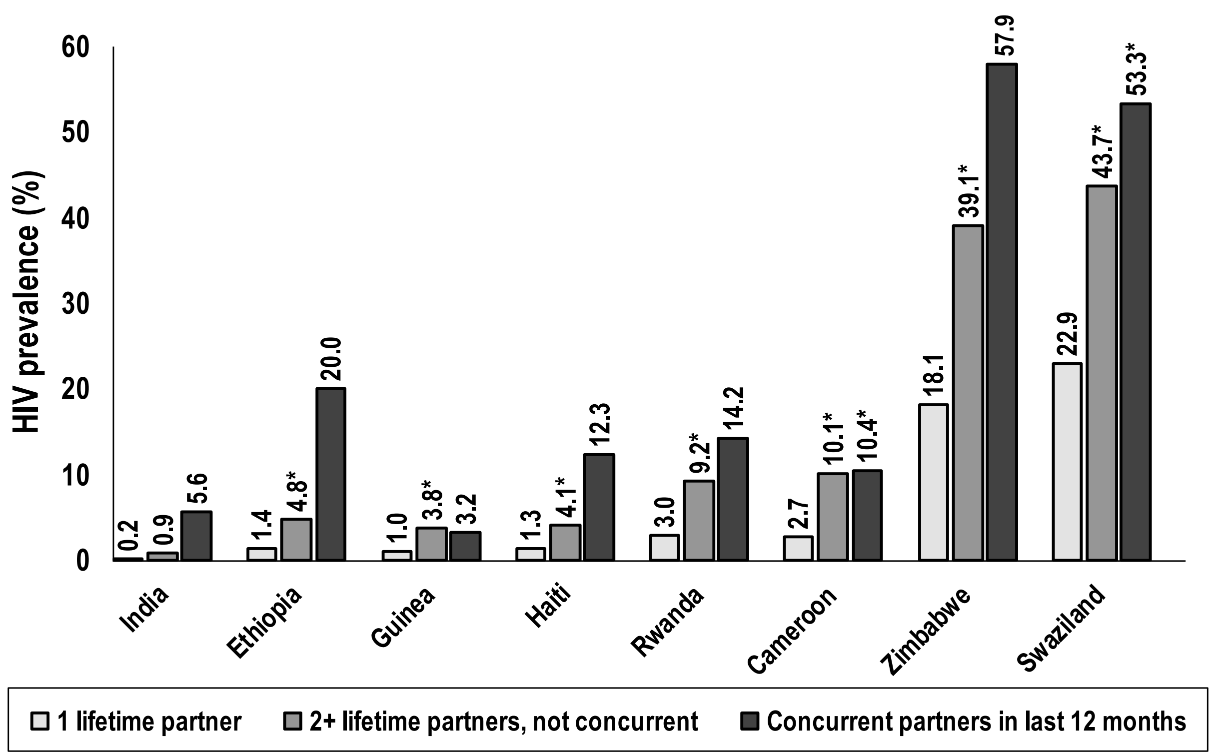


Table 15 presents, for 13 countries with data, sample distributions of men who ever had sex, who tested HIV-positive, and the resulting HIV prevalence by sexual concurrency. Although men, in general, reported more sexual partners in the previous 12 months and also overall had more concurrent partnerships than women, in some cases the sample sizes in Table 15 are as small as those in Table 14. Among men who had overlapping partnerships in the past 12 months, in one country (Senegal) there were no HIV-positive cases, and in six other countries there were only five or fewer HIV-positive cases.

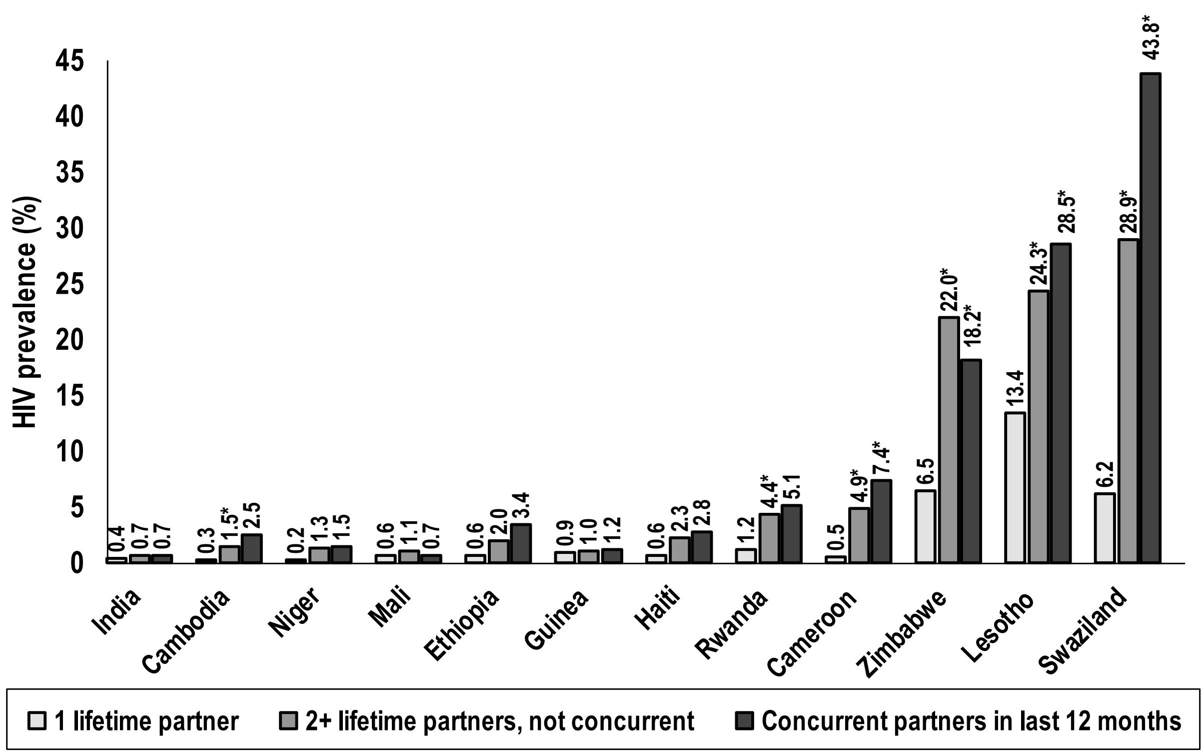
Table 15. Among respondents age 15-49 who ever had sex, HIV prevalence by whether the respondent had had only one lifetime sexual partner, had 2+ lifetime partners but no overlapping partners in past 12 months, and had 2+ overlapping partners in past 12 months: Men

Region/ Country	Number HIV positive				Number tested for HIV				HIV prevalence (%)							
		2+ lifetime prts				2+ lifetime prts					2+ lifetime prts					
	1 lifetime partner	No over-lapping partners in past 12m	2+ over-lapping partners in past 12m	Ever had sex (total)	1 lifetime partner	No over-lapping partners in past 12m	2+ over-lapping partners in past 12m	Ever had sex (total)	1 lifetime partner		No overlapping partners in past 12m		2+ overlapping partners in past 12m		Ever had sex (total)
									%	(95% CI)	%	(95% CI)	%	(95% CI)	
Asia															
Cambodia[1]	8	26	6	41	2,486	1,742	230	4,458	0.3	(0.1 , 0.6)	1.5	(0.8 , 2.3)	2.5	(0.0 , 5.5)	0.9
India[3]	101	42	4	147	25,678	5,842	528	32,048	0.4	(0.3 , 0.5)	0.7	(0.5 , 1.0)	0.7	(0.0 , 1.4)	0.5
Latin America & Caribbean															
Haiti	2	63	20	85	342	2,726	698	3,766	0.6	(0.0 , 1.8)	2.3	(1.5 , 3.1)	2.8	(1.5 , 4.1)	2.2
Sub-saharan Africa															
Cameroon[1,2]	2	140	40	182	406	2,850	538	3,794	0.5	(0.0 , 1.4)	4.9	(4.1 , 5.8)	7.4	(5.1 , 9.6)	4.8
Ethiopia[1,3]	9	31	3	42	1,419	1,539	85	3,043	0.6	(0.1 , 1.2)	2.0	(1.2 , 2.8)	3.4	(0.0 , 8.4)	1.4
Guinea[1]	2	16	4	22	265	1,612	325	2,202	0.9	(0.0 , 1.9)	1.0	(0.5 , 1.5)	1.2	(0.0 , 2.5)	1.0
Lesotho[1]	43	238	88	369	321	981	309	1,610	13.4	(8.8 , 18.1)	24.3	(20.9 , 27.5)	28.5	(22.0 , 35.0)	22.9
Mali[1]	4	18	3	25	652	1,591	437	2,680	0.6	(0.0 , 1.3)	1.1	(0.4 , 1.8)	0.7	(0.0 , 1.6)	0.9
Niger[1,2]	2	12	5	19	892	890	307	2,089	0.2	(0.0 , 0.7)	1.3	(0.6 , 2.2)	1.5	(0.1 , 2.8)	0.9
Rwanda[1]	13	78	5	96	1,155	1,758	96	3,009	1.2	(0.5 , 1.8)	4.4	(3.5 , 5.4)	5.1	(0.4 , 9.8)	3.2
Senegal[1]	1	11	0	12	479	1,474	249	2,202	0.2	(0.0 , 0.5)	0.7	(0.2 , 1.4)	0.0	(0.0 , 0.4)	0.5
Swaziland	20	562	134	716	323	1,943	306	2,572	6.2	(3.3 , 9.0)	28.9	(26.7 , 31.2)	43.8	(37.8 , 50.0)	27.8
Zimbabwe	50	694	64	808	765	3,153	353	4,271	6.5	(4.4 , 8.6)	22.0	(20.1 , 23.9)	18.2	(13.2 , 23.1)	18.9
Total SSA[4]	84	747	118	949	8,598	15,549	2,213	26,360	1.0	(0.6 , 1.3)	4.8	(4.4 , 5.2)	5.3	(4.3 , 6.3)	3.6

[1] Only for respondents whose last sexual relationship started at least 12 months before the survey.
[2] No information on duration for any non-marital sexual partner.
[3] Sexual history limited to the respondent's most recent 2 partners.
[4] Total SSA figures were calculated by using appropriate pooled weights.

Consistent with our findings for women, however, in most countries with data HIV prevalence is lowest among men reporting only one lifetime sexual partner and highest among men who had two or more overlapping partners in the previous 12 months (Figure 7). For example, in Swaziland HIV prevalence rises from 6.2 percent among men reporting only one lifetime sexual partner to 28.9 percent among those reporting two or more lifetime partners but who had no overlapping partners in the past 12 months, and to 43.8 percent among those who had two or more overlapping partners in the past 12 months. The exceptions are Mali and Zimbabwe, where men reporting multiple lifetime partners but no overlapping partners in the previous 12 months were more likely to be HIV-infected than those with two or more overlapping partners in the previous 12 months.

Figure 7. Association between concurrency and HIV among MEN



The Association between Sexual Concurrency and HIV Serostatus at the Individual Level in the Pooled Sub-Saharan Africa Sample

In the pooled sub-Saharan Africa sample, HIV prevalence rises from 2.8 percent among women reporting only one lifetime sexual partner to 9.2 percent among those reporting two or more lifetime partners but with no overlapping partners in the previous 12 months, and to 11.7 percent among those who had two or more overlapping partners in the previous 12 months (Table 16). For men, HIV prevalence rises from 1.0 percent to 4.8 percent, and to 5.3 percent among these three groups. Looking at other background characteristics of the respondents, HIV prevalence among both women and men rises with age, peaking in the 30s and then declining at older ages. HIV prevalence is also higher among urban, more educated, and wealthier women and men than among their rural, less educated, and poorer counterparts. Finally, HIV prevalence is higher among formerly married women and men than among those currently married, and higher among women and men who reported using condoms at last sex than among those who did not use condoms.

Table 16. HIV prevalence among women and men age 15-49 who ever had sex and who were tested for HIV by concurrency of sexual relations and other selected characteristics and behaviors: sub-Saharan Africa (pooled data)

	Women			Men		
Characteristic	**Number HIV positive**	**Number tested for HIV**	**HIV prevalence (%)**	**Number HIV positive**	**Number tested for HIV**	**HIV prevalence (%)**
Concurrency of sexual relations						
1 lifetime partner	593	21,492	2.8	84	8,598	1.0
2+ lifetime prts, no overlapping prts in past 12 mo	981	10,685	9.2	747	15,549	4.8
2+ lifetime prts, 2+ overlapping prts past 12 mo	33	283	11.7	118	2,213	5.3
Age group						
15-19	99	3,554	2.8	14	1,963	0.7
20-24	294	6,031	4.9	82	4,246	1.9
25-29	357	6,534	5.5	145	4,609	3.1
30-34	311	5,290	5.9	250	4,785	5.2
35-39	285	4,490	6.3	201	4,231	4.8
40-44	170	3,501	4.9	175	3,455	5.1
45-49	91	3,059	3.0	83	3,069	2.7

(Cont'd)

Table 16 – cont'd

Characteristic	Women: Number HIV positive	Women: Number tested for HIV	Women: HIV prevalence (%)	Men: Number HIV positive	Men: Number tested for HIV	Men: HIV prevalence (%)
Education						
No education	301	20,313	1.5	140	10,646	1.3
Primary incomplete	419	5,742	7.3	201	6,612	3.0
Primary complete	157	1,482	10.6	95	1,685	5.6
Secondary or higher	730	4,923	14.8	514	7,416	6.9
Marital status						
Never married	162	1,562	10.4	134	5,413	2.5
Currently married	931	27,164	3.4	688	19,534	3.5
Formerly married	514	3,734	13.8	127	1,411	9.0
Residence						
Urban	839	7,716	10.9	423	7,607	5.6
Rural	767	24,744	3.1	526	18,753	2.8
Wealth status						
Lowest	179	6,424	2.8	123	4,437	2.8
Second	222	6,468	3.4	131	4,883	2.7
Third	256	6,358	4.0	158	5,075	3.1
Fourth	350	6,475	5.4	239	5,533	4.3
Highest	600	6,735	8.9	298	6,432	4.6
Condom use with last partner in past 12 months						
No	1,003	26,488	3.8	657	20,315	3.2
Yes	186	1,091	17.0	203	3,172	6.4
Did not have sex in past 12 months	406	4,789	8.5	86	2,832	3.0
Consistent condom use in past 12 months						
No	1,014	26,531	3.8	679	20,555	3.3
Yes	175	1,047	16.7	180	2,908	6.2
Did not have sex in past 12 months	409	4,794	8.5	86	2,861	3.0
Country						
Cameroon	306	4,101	7.5	153	3,187	4.8
Ethiopia	376	15,614	2.4	154	11,065	1.4
Guinea	47	2,248	2.1	19	1,867	1.0
Lesotho	n.a.	n.a.	n.a.	86	377	22.8
Mali	46	2,929	1.6	18	1,967	0.9
Niger	23	3,045	0.8	20	2,151	0.9
Rwanda	88	1,804	4.9	47	1,480	3.2
Senegal	n.a.	n.a.	n.a.	11	2,022	0.5
Swaziland	93	254	36.6	51	182	28.0
Zimbabwe	629	2,464	25.5	390	2,061	18.9
Total SSA	1,607	32,459	5.0	949	26,360	3.6

[1] Pooled sample for women includes: Cameroon, Ethiopia, Guinea, Mali, Niger, Rwanda, Swaziland, and Zimbabwe.

[2] Pooled sample for men includes: Cameroon, Ethiopia, Guinea, Lesotho, Mali, Niger, Rwanda, Senegal, Swaziland, and Zimbabwe.

Tables 17a and 17b present unadjusted and adjusted associations (odds ratios) between sexual concurrency and HIV infection, calculated using logistic regression models for the pooled sub-Saharan Africa sample. In unadjusted models, women and men who had two or more overlapping partners in the previous 12 months are four-to-six times more likely to be HIV-infected than those with only one lifetime partner (OR=4.69 for women; and OR=5.67 for men). Those with two or more lifetime partners but no overlapping partners in the past 12 months are also more likely to be HIV-infected than those with only one lifetime partner (OR=3.56 for women and OR=5.10 for men). After controlling for various potential confounders and other risk factors (Tables 17a and 17b and Figures 8 and 9), women and men who had two or more overlapping partners in the past 12 months are significantly more likely to be HIV-infected than those who had only one lifetime sexual partner (aOR=3.32, $p<0.001$ for women; and aOR=2.87, $p<0.001$ for men). Women and men who report two or more lifetime partners but no overlapping partners in the previous 12 months are also significantly more likely to be HIV-infected than those who had only one lifetime sexual partner (aOR=2.86, $p<0.001$ for women; and aOR=2.63, $p<0.001$ for men).

Table 17a. Logistic regression results (odds ratios, OR) of HIV risk as a function of concurrency of sexual relations among respondents age 15-49 who ever had sex and other background characteristics and behaviours: sub-Saharan Africa (pooled data): Women[1]

	Unadjusted model		Adjusted model	
Characteristic	**OR**	**(95% CI; p-value)**	**OR**	**(95% CI; p-value)**
Concurrency of sexual relations				
1 lifetime partner	ref.		ref.	
2+ lifetime prts, no overlapping prts in past 12 mo	3.56	(3.07 , 4.14 ; .000)	2.86	(2.35 , 3.48 ; .000)
2+ lifetime prts, 2+ overlapping prts in past 12 mo	4.69	(3.23 , 6.81 ; .000)	3.32	(2.22 , 4.97 ; .000)
Age group				
15-24			ref.	
25-34			1.50	(1.23 , 1.85 ; .000)
35+			1.28	(1.02 , 1.60 ; .032)
Education				
No education			ref.	
Primary incomplete			2.53	(1.83 , 3.50 ; .000)
Primary complete			3.19	(2.21 , 4.60 ; .000)
Secondary or higher			2.63	(1.83 , 3.76 ; .000)
Marital status				
Never married			ref.	
Currently married			0.90	(0.68 , 1.17 ; .421)
Formerly married			2.43	(1.84 , 3.21 ; .000)
Residence				
Urban			ref.	
Rural			0.51	(0.40 , 0.65 ; .000)
Wealth status				
Lowest			ref.	
Second			1.26	(0.97 , 1.63 ; .084)
Third			1.30	(1.03 , 1.62 ; .024)
Fourth			1.15	(0.90 , 1.47 ; .259)
Highest			1.51	(1.08 , 2.09 ; .015)
Circumcision				
No			n.a.	
Yes			n.a.	
Consistent condom use in past 12 months				
No			ref.	
Yes			1.15	(0.88 , 1.52 ; .305)
Did not have sex in past 12 months			1.13	(0.92 , 1.38 ; .231)
Country				
Cameroon			ref.	
Ethiopia			0.93	(0.64 , 1.34 ; .689)
Guinea			0.73	(0.51 , 1.03 ; .073)
Lesotho			n.a.	
Mali			0.61	(0.42 , 0.88 ; .008)
Niger			0.39	(0.24 , 0.63 ; .000)
Rwanda			1.14	(0.89 , 1.45 ; .293)
Senegal			n.a.	
Swaziland			9.74	(8.06 , 11.79 ; .000)
Zimbabwe			6.72	(5.61 , 8.05 ; .000)
Total SSA[1]	32,449		32,361	

[1] Pooled sample for women includes: Cameroon, Ethiopia, Guinea, Mali, Niger, Rwanda, Swaziland, and Zimbabwe.

Table 17b. Logistic regression results (odds ratios, OR) of HIV risk as a function of concurrency of sexual relations among respondents age 15-49 who ever had sex and other background characteristics and behaviours: sub-Saharan Africa (pooled data): Men[1]

	Unadjusted model		Adjusted model 1		Adjusted model 2	
Characteristic	**OR**	**(95% CI; p-value)**	**OR**	**(95% CI; p-value)**	**OR**	**(95% CI; p-value)**
Concurrency of sexual relations						
1 lifetime partner		ref.		ref.		ref.
2+ lifetime prts, no overlapping prts in past 12 mo	5.10	(3.53 , 7.35 ; .000)	2.63	(1.79 , 3.88 ; .000)	2.63	(1.79 , 3.86 ; .000)
2+ lifetime prts, 2+ overlapping prts in past 12 mo	5.67	(3.77 , 8.53 ; .000)	2.87	(1.85 , 4.45 ; .000)	2.85	(1.84 , 4.42 ; .000)
Age group						
15-24				ref.		ref.
25-34			3.15	(2.32 , 4.25 ; .000)	3.14	(2.32 , 4.25 ; .000)
35+			3.82	(2.75 , 5.30 ; .000)	3.81	(2.74 , 5.28 ; .000)
Education						
No education				ref.		ref.
Primary incomplete			1.11	(0.78 , 1.60 ; .559)	1.10	(0.77 , 1.58 ; .597)
Primary complete			1.79	(1.07 , 2.98 ; .026)	1.79	(1.07 , 2.98 ; .026)
Secondary or higher			1.46	(0.94 , 2.26 ; .093)	1.46	(0.94 , 2.25 ; .093)
Marital status						
Never married				ref.		ref.
Currently married			1.55	(1.17 , 2.07 ; .003)	1.55	(1.16 , 2.07 ; .003)
Formerly married			3.16	(2.23 , 4.49 ; .000)	3.16	(2.23 , 4.49 ; .000)
Residence						
Urban				ref.		ref.
Rural			0.79	(0.58 , 1.06 ; .114)	0.79	(0.58 , 1.06 ; .120)
Wealth status						
Lowest				ref.		ref.
Second			0.93	(0.69 , 1.27 ; .658)	0.94	(0.69 , 1.28 ; .698)
Third			1.19	(0.87 , 1.62 ; .280)	1.20	(0.88 , 1.64 ; .258)
Fourth			1.13	(0.80 , 1.59 ; .503)	1.14	(0.80 , 1.61 ; .474)
Highest			1.36	(0.87 , 2.11 ; .175)	1.37	(0.88 , 2.13 ; .165)
Circumcision						
No						ref.
Yes					1.03	(0.78 , 1.35 ; .835)
Consistent condom use in past 12 months						
No				ref.		ref.
Yes			1.10	(0.90 , 1.35 ; .352)	1.10	(0.90 , 1.35 ; .370)
Did not have sex in past 12 months			1.09	(0.76 , 1.55 ; .651)	1.08	(0.76 , 1.55 ; .672)

(Cont'd)

Table 17b – cont'd

Characteristic	Unadjusted model OR	Unadjusted model (95% CI; p-value)	Adjusted model 1 OR	Adjusted model 1 (95% CI; p-value)	Adjusted model 2 OR	Adjusted model 2 (95% CI; p-value)
Country						
Cameroon				ref.		ref.
Ethiopia			0.44	(0.27 , 0.70 ; .001)	0.44	(0.27 , 0.70 ; .001)
Guinea			0.27	(0.16 , 0.44 ; .000)	0.27	(0.16 , 0.44 ; .000)
Lesotho			9.82	(7.49 , 12.87 ; .000)	9.95	(7.55 , 13.10 ; .000)
Mali			0.24	(0.14 , 0.44 ; .000)	0.24	(0.14 , 0.44 ; .000)
Niger			0.29	(0.16 , 0.51 ; .000)	0.29	(0.16 , 0.51 ; .000)
Rwanda			0.98	(0.72 , 1.33 ; .907)	1.01	(0.70 , 1.45 ; .965)
Senegal			0.14	(0.07 , 0.30 ; .000)	0.14	(0.07 , 0.30 ; .000)
Swaziland			10.55	(8.40 , 13.26 ; .000)	10.79	(7.93 , 14.70 ; .000)
Zimbabwe			5.82	(4.67 , 7.24 ; .000)	5.93	(4.34 , 8.10 ; .000)
Total SSA[1]		26,349		26,312		26,262

[1] Pooled sample for men includes: Cameroon, Ethiopia, Guinea, Lesotho, Mali, Niger, Rwanda, Senegal, Swaziland, and Zimbabwe.

Figure 8. Unadjusted and adjusted association between concurrency and HIV among WOMEN, pooled sub-Saharan Africa

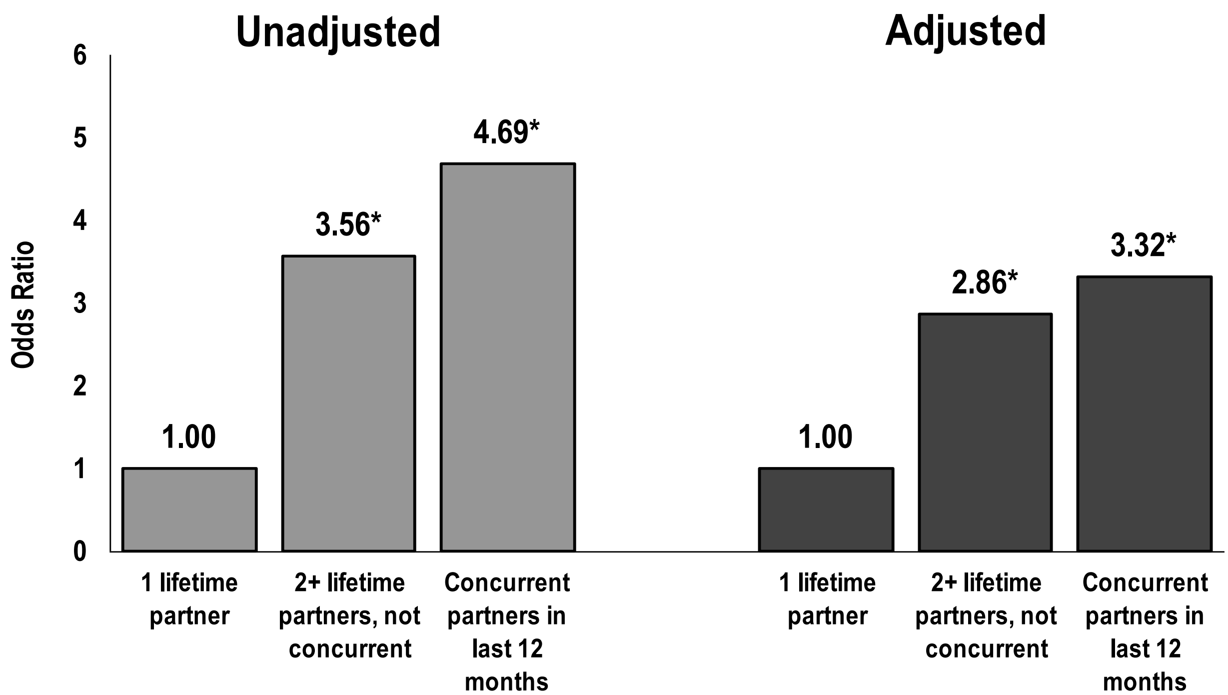
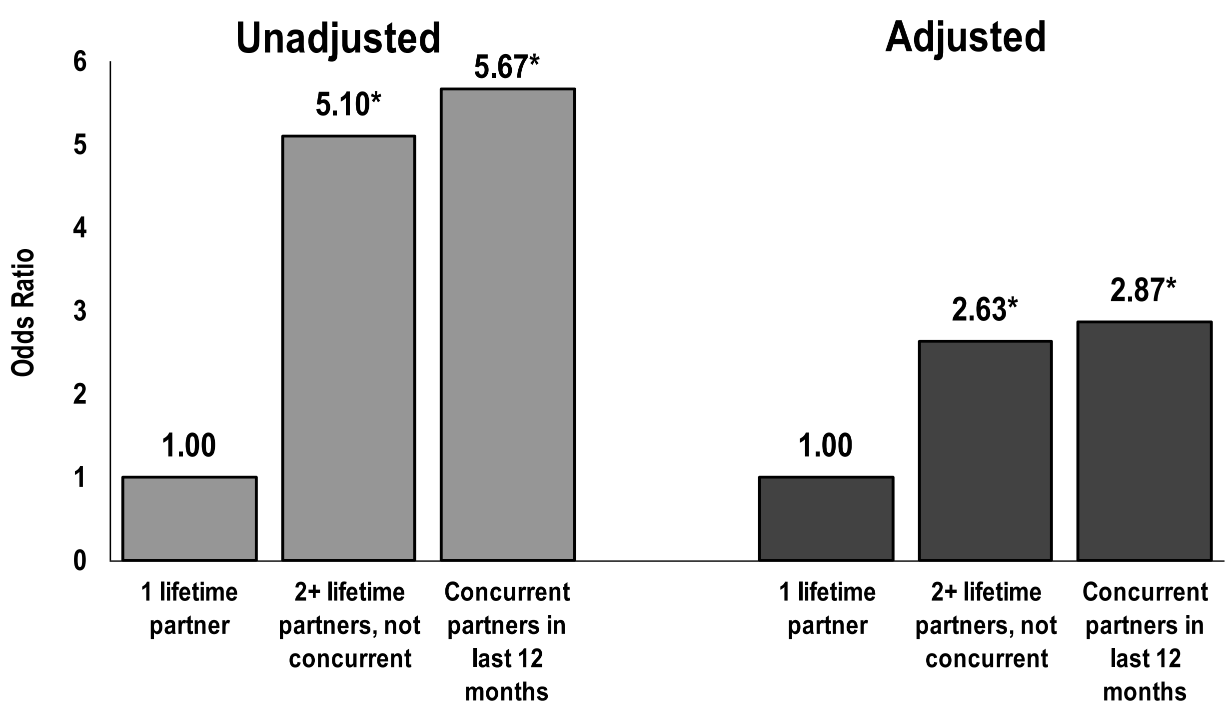


Figure 9. Unadjusted and adjusted association between concurrency and HIV among MEN, pooled sub-Saharan Africa

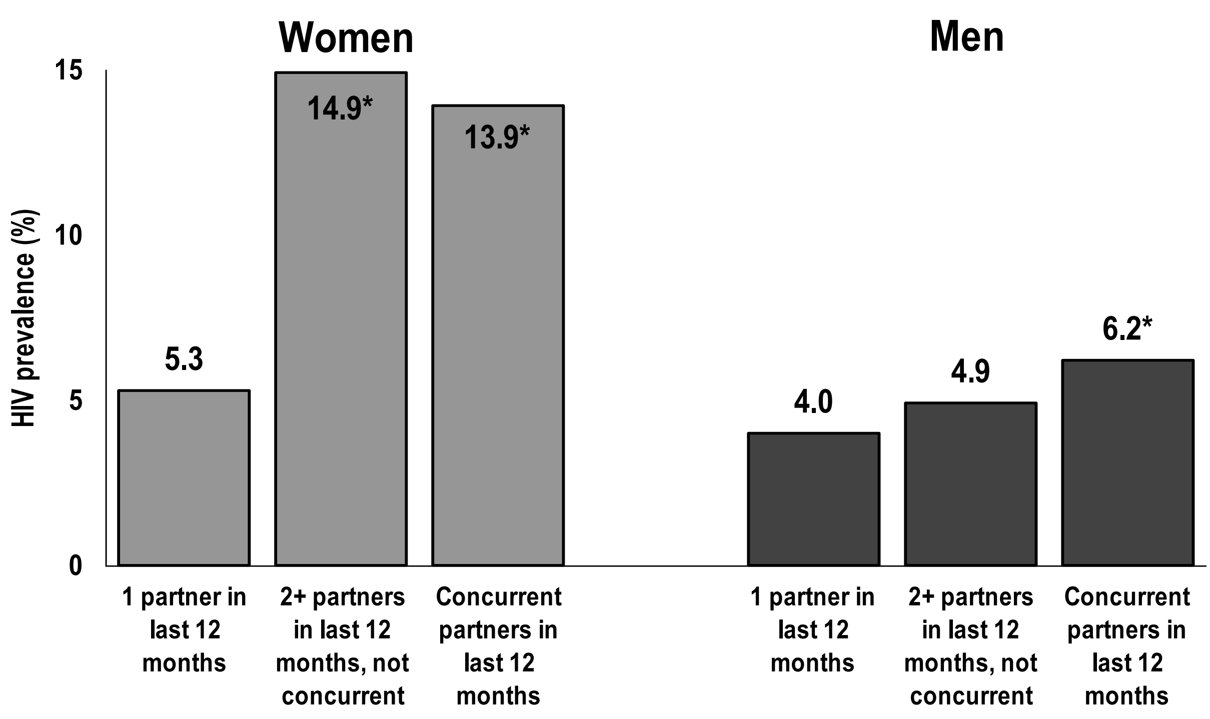


Controlling for sexual concurrency and other factors included in the models, it appears that age, education, marital status, and urban/rural residence have significant associations with the likelihood of HIV infection, but condom use has no significant association.

Additionally, controlling for male circumcision has virtually no effect on the adjusted association between sexual concurrency and the likelihood of HIV infection among men (see adjusted model 2 in Table 17b). The adjusted effect of male circumcision itself is small and not statistically significant.

Among respondents who had sex in the past year, Figure 10 compares HIV prevalence among those who had two or more non-overlapping partners with those who had two or more overlapping partners. Men who had two or more overlapping partners are slightly more likely to be HIV-infected than those who had multiple but non-overlapping partners in the previous 12 months, but for women the reverse was true.

Figure 10. Association between concurrency and HIV among those who had sex in last 12 months: pooled sub-Saharan Africa



The Association between the Duration of Overlapping Sexual Partnerships and HIV Serostatus at the Individual Level

Table 18 presents the distribution of HIV cases among women and men who report two or more overlapping partners in the previous 12 months by duration of overlap in four countries with data: Haiti, India, Swaziland, and Zimbabwe. In all four countries for women, and in Haiti and India for men, the survey samples contain too few cases to carry out a meaningful analysis of the association between duration of overlap and HIV serostatus. Even in Swaziland and Zimbabwe for men, there are too few respondents who had overlapping sexual partnerships for more than one year, and there does not appear to be any correlation between other durations of overlap and HIV serostatus (Figure 11). However, in both countries HIV prevalence is highest among men in polygynous unions.

Figure 11. Association between concurrency and HIV by duration of overlap among MEN

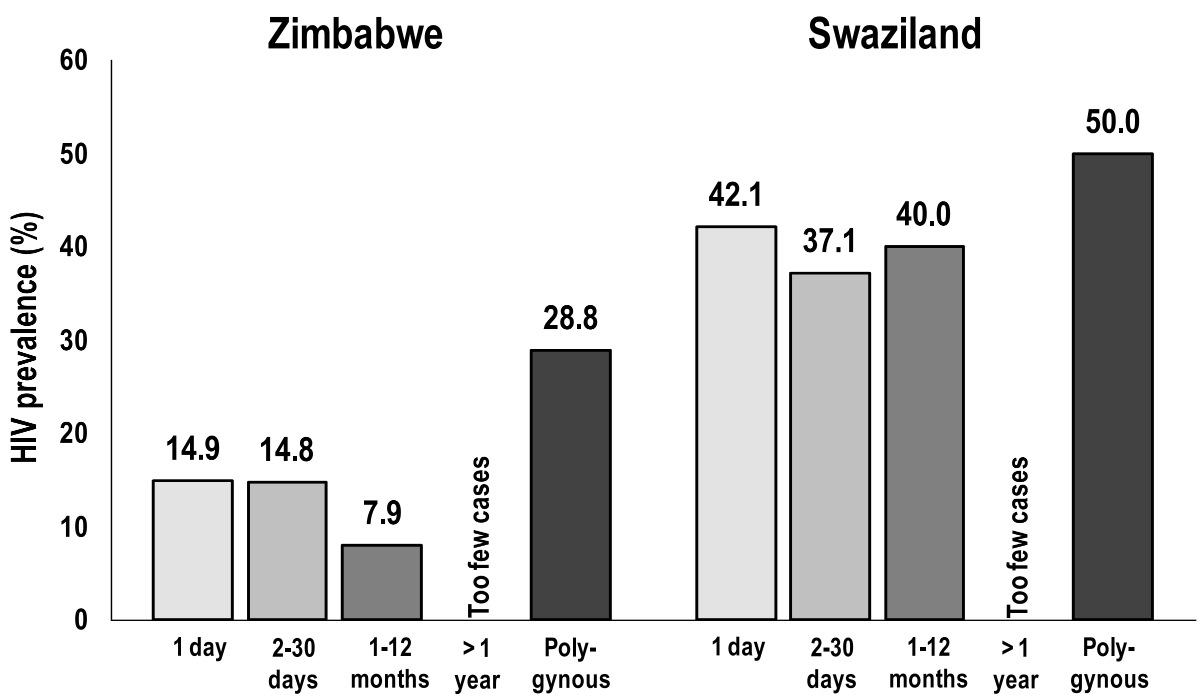


Table 18. Among respondents age 15-49 who had 2 or more overlapping partners in the 12 months preceding the survey, number HIV positive, number tested for HIV, and HIV prevalence by duration of overlap

	Number HIV positive							
	Women				Men			
Duration of overlap	Haiti	India[1]	Swaziland	Zimbabwe	Haiti	India[1]	Swaziland	Zimbabwe
1 day	1	1	1	3	0	1	8	7
2-30 days	0	0	4	13	4	0	46	18
1-12 months	0	0	7	2	6	1	28	3
More than 1 year	0	0	0	0	0	1	0	0
Polygamous	n.a.	n.a.	n.a.	n.a.	4	1	20	21
No information	5	0	4	5	6	0	33	16
# with 2+ overlapping partners	6	1	16	23	20	4	134	64
	Number tested for HIV							
	Women				Men			
Duration of overlap	Haiti	India[1]	Swaziland	Zimbabwe	Haiti	India[1]	Swaziland	Zimbabwe
1 day	6	1	3	6	127	101	19	47
2-30 days	7	0	14	24	204	50	124	122
1-12 months	11	10	8	2	122	181	70	38
More than 1 year	2	4	0	1	3	139	2	1
Polygamous	n.a.	n.a.	n.a.	n.a.	148	43	40	73
No information	25	5	5	6	94	14	52	72
# with 2+ overlapping partners	51	20	30	39	698	528	306	353
	HIV prevalence (%)							
	Women				Men			
Duration of overlap	Haiti	India[1]	Swaziland	Zimbabwe	Haiti	India[1]	Swaziland	Zimbabwe
1 day	16.7	100.0	33.3	50.0	0.0	1.0	42.1	14.9
2-30 days	0.0	0.0	28.6	54.2	2.0	0.0	37.1	14.8
1-12 months	0.0	0.0	87.5	100.0	4.9	0.6	40.0	7.9
More than 1 year	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Polygamous	n.a.	n.a.	n.a.	n.a.	2.7	2.3	50.0	28.8
No information	20.0	0.0	80.0	83.3	6.4	0.0	63.5	22.2
# with 2+ overlapping partners	11.8	5.0	53.3	59.0	2.9	0.8	43.8	18.1

Notes: The definition of concurrency adopted in this table takes into account the duration of all sexual partnerships the respondent has had in the 12 months precending the survey, if available. Ethiopia was excluded because of the small number of cases.

[1] Sexual history limited to the respondent's most recent 2 partners.

The Association between the Prevalence of Sexual Concurrency and HIV Prevalence at the Community Level

Sexual concurrency among women and HIV prevalence among women

Table 19 shows HIV prevalence among women in groups of clusters with different levels of the prevalence of sexual concurrency among women in 11 countries with data, as well as for the pooled sub-Saharan Africa sample. In 4 of the 11 countries—Haiti, Cameroon, Swaziland, and Zimbabwe—HIV prevalence among women tends to rise with increasing prevalence of sexual concurrency among women. In the remaining countries, however, there is no clear pattern.

Table 19. HIV prevalence among women age 15-49 who ever had sex in clusters with different levels of councurrency among women, by country and pooled sample for sub-Saharan Africa

Mean prevalence of concurrency among women[1]	Number of women interviewed[1]	Number of women tested for HIV[2]	Number HIV+ women[2]	Percent HIV+ among tested women[2]
Asia				
Cambodia				
None	16,381	7,828	44	0.6
Less than 5 %	216	109	0	0.0
5-10 %	165	78	5	6.4
10-15 %	61	33	0	0.0
India				
None	122,364	52,476	112	0.2
Less than 5 %	1,656	723	1	0.2
5-10 %	365	133	2	1.3
Latin America & Caribbean				
Haiti				
None	8,327	4,040	86	2.1
Less than 5 %	2,024	986	29	2.9
5-10 %	401	201	7	3.4
10-15 %	5	2	0	7.1
Sub-Saharan Africa				
Cameroon				
None	5,994	2,845	163	5.7
Less than 5 %	1,637	785	41	5.3
5-10 %	1,891	927	83	8.9
10-15 %	897	467	40	8.7
15 % or more	237	104	12	11.3
Ethiopia				
None	6,656	5,660	103	1.8
Less than 5 %	3	3	0	8.0
5-10 %	89	69	3	4.0
10-15 %	4	4	1	28.6
Guinea				
None	6,293	2,952	56	1.9
Less than 5 %	1,216	566	11	1.9
5-10 %	319	154	2	1.0
10-15 %	125	71	2	3.2

(Cont'd)

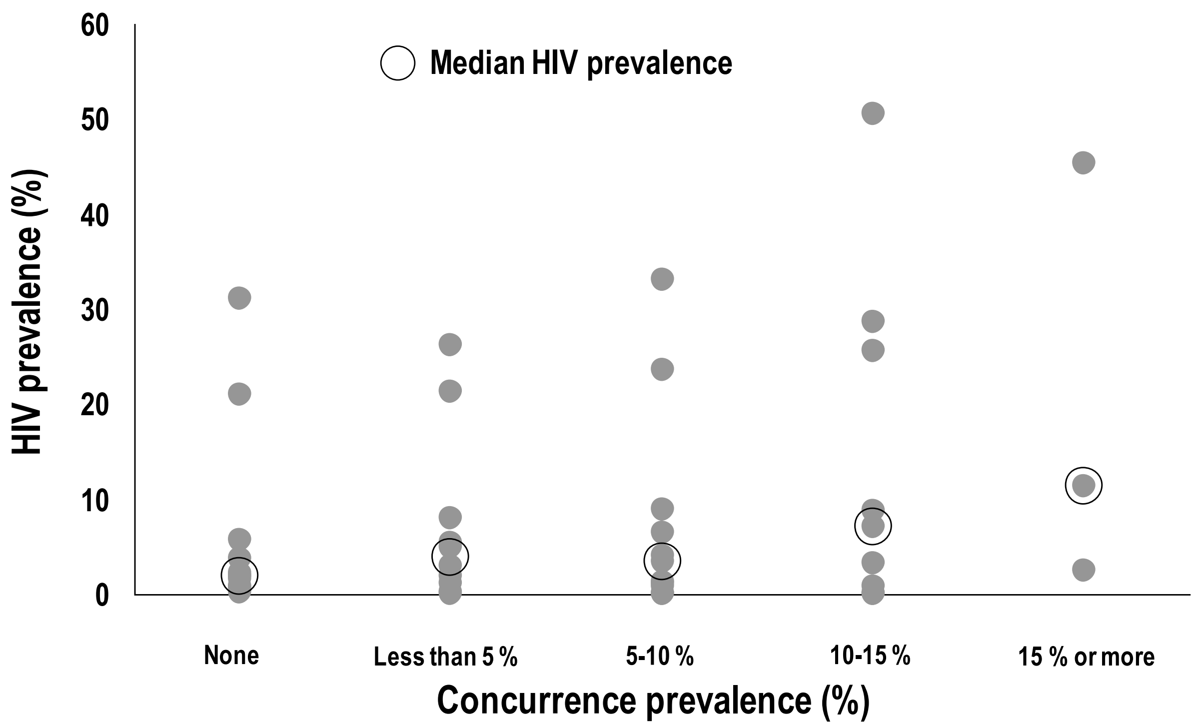
Table 19 – cont'd

Mean prevalence of concurrency among women[1]	Number of women interviewed[1]	Number of women tested for HIV[2]	Number HIV+ women[2]	Percent HIV+ among tested women[2]
Lesotho				
None	n.a.	n.a.	n.a.	n.a.
Less than 5 %	n.a.	n.a.	n.a.	n.a.
5-10 %	n.a.	n.a.	n.a.	n.a.
10-15 %	n.a.	n.a.	n.a.	n.a.
Mali				
None	11,960	3,683	55	1.5
Less than 5 %	2,246	728	8	1.0
5-10 %	374	115	1	0.8
10-15 %	3	1	0	0.0
Niger				
None	8,566	4,084	28	0.7
5-10 %	337	165	0	0.0
10-15 %	172	89	1	0.7
15 % or more	148	68	2	2.4
Rwanda				
None				
Less than 5 %	10,851	5,413	193	3.6
5-10 %	444	221	11	4.9
	26	7	0	0.0
Senegal				
None	n.a.	n.a.	n.a.	n.a.
Less than 5 %	n.a.	n.a.	n.a.	n.a.
5-10 %	n.a.	n.a.	n.a.	n.a.
10-15 %	n.a.	n.a.	n.a.	n.a.
Swaziland				
None	4,490	3,977	1,232	31.0
Less than 5 %	200	183	48	26.1
5-10 %	221	196	65	33.1
10-15 %	45	43	22	50.5
15 % or more	31	25	11	45.3
Zimbabwe				
None	7,992	6,246	1,312	21.0
Less than 5 %	573	456	97	21.2
5-10 %	300	217	51	23.5
10-15 %	42	29	7	25.5
Total SSA[3] (pooled data)				
None	86,843	36,192	1,374	3.8
Less than 5 %	4,406	2,074	103	5.0
5-10 %	3,161	1,460	115	7.9
10-15 %	988	503	47	9.3
15 % or more	342	149	13	8.6

[1] Weighted using survey weights.
[2] Weighted using HIV weights.
[3] Pooled sample includes women in Cameroon, Ethiopia, Guinea, Mali, Niger, Rwanda, Swaziland, and Zimbabwe surveys.

Figure 12 shows the spread in HIV prevalence among women by different levels of the prevalence of sexual concurrency among women, as well as median levels of HIV prevalence at each level of sexual concurrency. Across the 11 countries considered, HIV prevalence among women varies widely at each level of prevalence of concurrency. However, the median prevalence of HIV among women tends to rise with increasing levels of concurrency. In the pooled sample for sub-Saharan Africa, HIV prevalence among women also tends to increase as the prevalence of sexual concurrency among women increases—rising from 3.8 percent in clusters with no women with concurrent partners to 9.3 percent in clusters with 10-15 percent of women with concurrent partners, and then declining slightly to 8.6 percent in clusters with 15 percent or more women with concurrent partners (Table 19).

Figure 12. Prevalence of HIV by prevalence of concurrency at the community level among WOMEN



Sexual concurrency among men and HIV prevalence among men

No clear association appears between HIV prevalence among men and the prevalence of sexual concurrency among men in any of the 13 countries with data (Table 20). In the pooled sample for sub-Saharan Africa, HIV prevalence among men does not increase with increasing levels of prevalence of concurrency among men. HIV prevalence is highest (11.0 percent) among men living in clusters with less than 5 percent prevalence of concurrency and declines to 3.2 percent in clusters with 15 percent or higher levels of prevalence of concurrency. Similarly, we did not find any clear association between the prevalence of concurrency and the prevalence of HIV when we controlled for varying levels of prevalence of male circumcision across communities (data not shown).

Table 20. HIV prevalence among men age 15-49 who ever had sex in clusters with different levels of councurrency among men, by country and pooled sample for sub-Saharan Africa

Mean prevalence of concurrency among men[1]	Number of men interviewed[1]	Number of men tested for HIV[2]	Number HIV+ men[2]	Percent HIV+ among tested men[2]
Asia				
Cambodia				
None	4,769	4,702	18	0.4
5-10 %	855	854	3	0.4
10-15 %	693	690	13	1.9
15 % or more	414	410	7	1.8
India				
None	57,586	38,283	128	0.3
Less than 5 %	6,296	4,201	25	0.6
5-10 %	4,085	2,801	8	0.3
10-15 %	1,276	850	3	0.4
15 % or more	508	372	0	0.0
Latin America & Caribbean				
Haiti				
None	739	732	14	1.9
Less than 5 %	11	11	0	0.0
5-10 %	859	840	22	2.6
10-15 %	491	478	11	2.3
15 % or more	2,337	2,260	40	1.7

(Cont'd)

Table 20 – cont'd

Mean prevalence of concurrency among men[1]	Number of men interviewed[1]	Number of men tested for HIV[2]	Number HIV+ men[2]	Percent HIV+ among tested men[2]
Sub-Saharan Africa				
Cameroon				
None	1,283	1,235	38	3.1
Less than 5 %	123	118	6	4.9
5-10 %	1,105	1,067	48	4.5
10-15 %	743	710	34	4.8
15 % or more	1,560	1,488	64	4.3
Ethiopia				
None	4,643	4,064	42	1.0
5-10 %	402	368	3	0.7
10-15 %	292	261	1	0.3
15 % or more	126	111	0	0.0
Guinea				
None	928	858	7	0.8
5-10 %	478	458	2	0.5
10-15 %	448	413	3	0.8
15 % or more	855	847	11	1.3
Lesotho				
None	866	695	126	18.1
5-10 %	125	105	13	12.6
10-15 %	442	354	66	18.7
15 % or more	1,063	861	178	20.7
Mali				
None	1,439	1,404	16	1.2
5-10 %	419	408	0	0.0
10-15 %	534	525	3	0.5
15 % or more	1,313	1,277	13	1.0
Niger				
None	1,335	1,228	10	0.8
Less than 5 %	39	32	1	2.9
5-10 %	309	289	2	0.6
10-15 %	475	446	1	0.1
15 % or more	944	860	8	0.9
Rwanda				
None	3,670	3,610	84	2.3
5-10 %	199	198	4	2.3
10-15 %	345	341	9	2.6
15 % or more	199	199	1	0.6
Senegal				
None	1,638	1,539	8	0.5
Less than 5 %	16	14	0	0.0
5-10 %	628	572	0	0.1
10-15 %	380	360	2	0.4
15 % or more	752	698	3	0.4

(Cont'd)

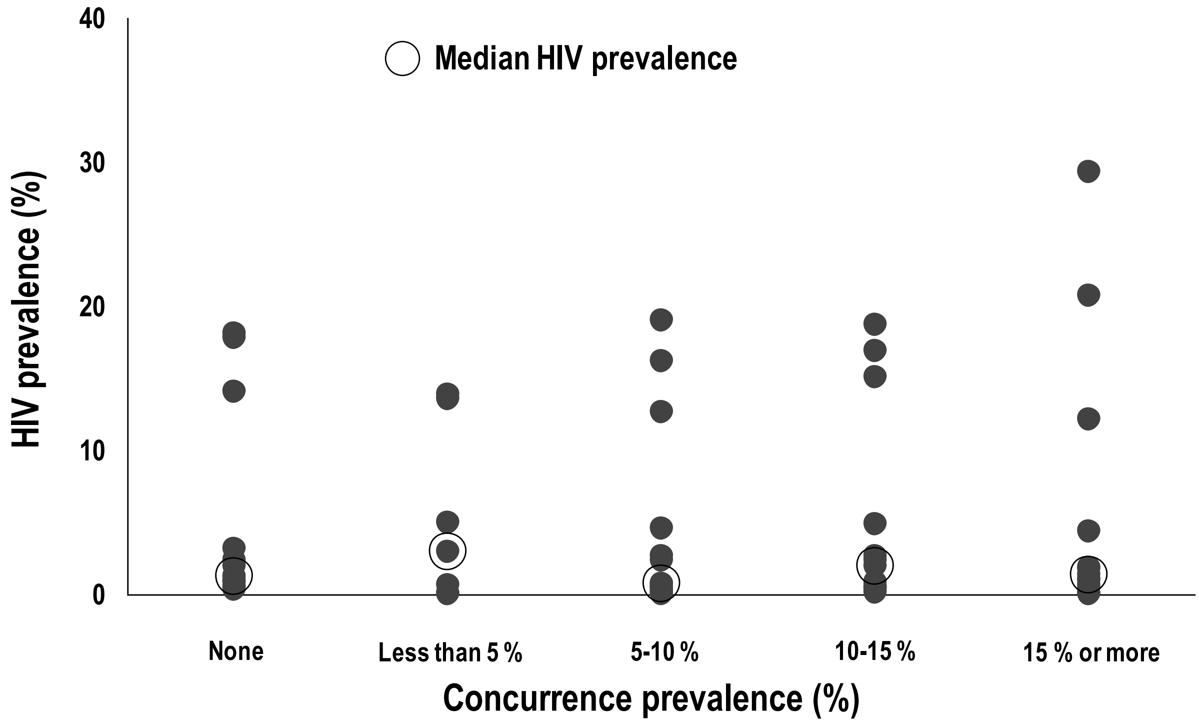
Table 20 – cont'd

Mean prevalence of concurrency among men[1]	Number of men interviewed[1]	Number of men tested for HIV[2]	Number HIV+ men[2]	Percent HIV+ among tested men[2]
Swaziland				
None	1,250	1,151	205	17.8
Less than 5 %	338	307	41	13.5
5-10 %	1,038	947	180	19.0
10-15 %	757	665	112	16.9
15 % or more	773	693	203	29.3
Zimbabwe				
None	2,681	2,208	310	14.0
Less than 5 %	859	716	99	13.8
5-10 %	1,633	1,475	240	16.2
10-15 %	1,002	861	130	15.1
15 % or more	688	588	71	12.1
Total SSA[3] (pooled data)				
None	25,533	23,337	455	2.0
Less than 5 %	553	512	57	11.0
5-10 %	4,934	4,644	187	4.0
10-15 %	4,109	3,785	129	3.4
15 % or more	6,004	5,468	175	3.2

[1] Weighted using survey weights.
[2] Weighted using HIV weights.
[3] Pooled sample includes men in Cameroon, Ethiopia, Guinea, Lesotho, Mali, Niger, Rwanda, Senegal, Swaziland, and Zimbabwe surveys.

Across countries, HIV prevalence among men varies widely at each level of reported prevalence of sexual concurrency among men, and the range of this variation does not appear to depend on the level of prevalence of concurrency (Figure 13). For example, HIV prevalence among men ranges from less than 1 percent to 18 percent in clusters with no cases of sexual concurrency and, similarly, from less than 1 percent to 19 percent in clusters with 10-15 percent prevalence of concurrency. The median prevalence of HIV among men also does not show any clear association with the prevalence of concurrency among men.

Figure 13. Prevalence of HIV by prevalence of concurrency at the community level among MEN



Sexual concurrency among men and HIV prevalence among women, and sexual concurrency among women and HIV prevalence among men

Using pooled data for eight countries in sub-Saharan Africa—Cameroon, Ethiopia, Guinea, Mali, Niger, Rwanda, Swaziland, and Zimbabwe—Figure 14 shows the prevalence of HIV among women by the prevalence of concurrency among men. The figure shows that HIV prevalence is highest (7.5 percent) among women living in communities with less than 5 percent prevalence of concurrency among men. In addition, HIV prevalence among women declines gradually with increasing prevalence of concurrency among men, from 7.5 to 3.4 percent in communities with 15 percent or higher prevalence of concurrency among men.

Figure 14. HIV prevalence among WOMEN by concurrency prevalence among MEN and HIV prevalence among MEN by concurrency prevalence among WOMEN in communities across pooled sub-Saharan Africa samples

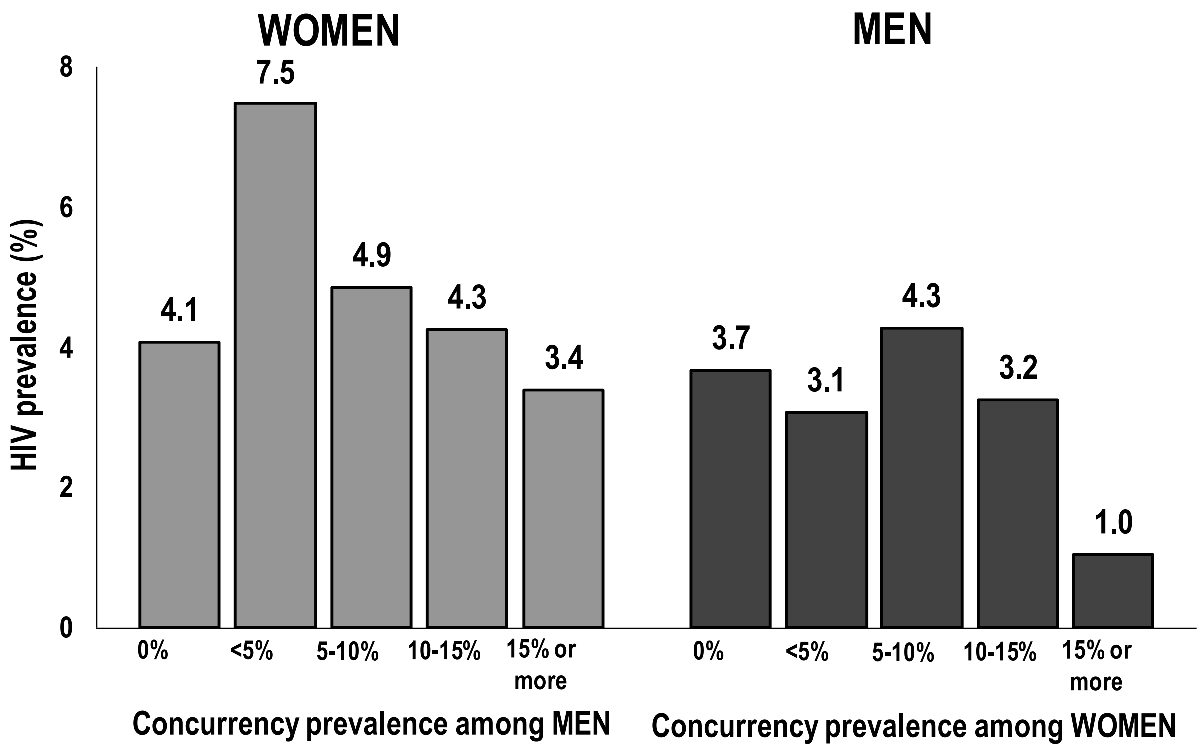


Figure 14 similarly shows HIV prevalence among men by the prevalence of concurrency among women in the pooled sample for the same eight sub-Saharan countries. There is no clear pattern of association between the prevalence of concurrency among women and HIV prevalence among men.

The Association between the Prevalence of Sexual Concurrency and HIV Prevalence at the Country Level

Figures 15 and 16 show the associations between the prevalence of sexual concurrency and the prevalence of HIV for women and men respectively, using country-level aggregated data. Clearly, there is only a weak association between the two, either among women (r=0.10) or among men (r=0.24). However, when the countries are divided into two categories based on the prevalence of male circumcision, a stronger correlation between prevalence of concurrency among men and HIV prevalence among men emerges in countries with low prevalence of male circumcision (r=0.51), but not in countries with high prevalence of male circumcision (r=0.18) (Figure 17).

Figure 15. Prevalence of HIV by prevalence of concurrency at the country level among WOMEN

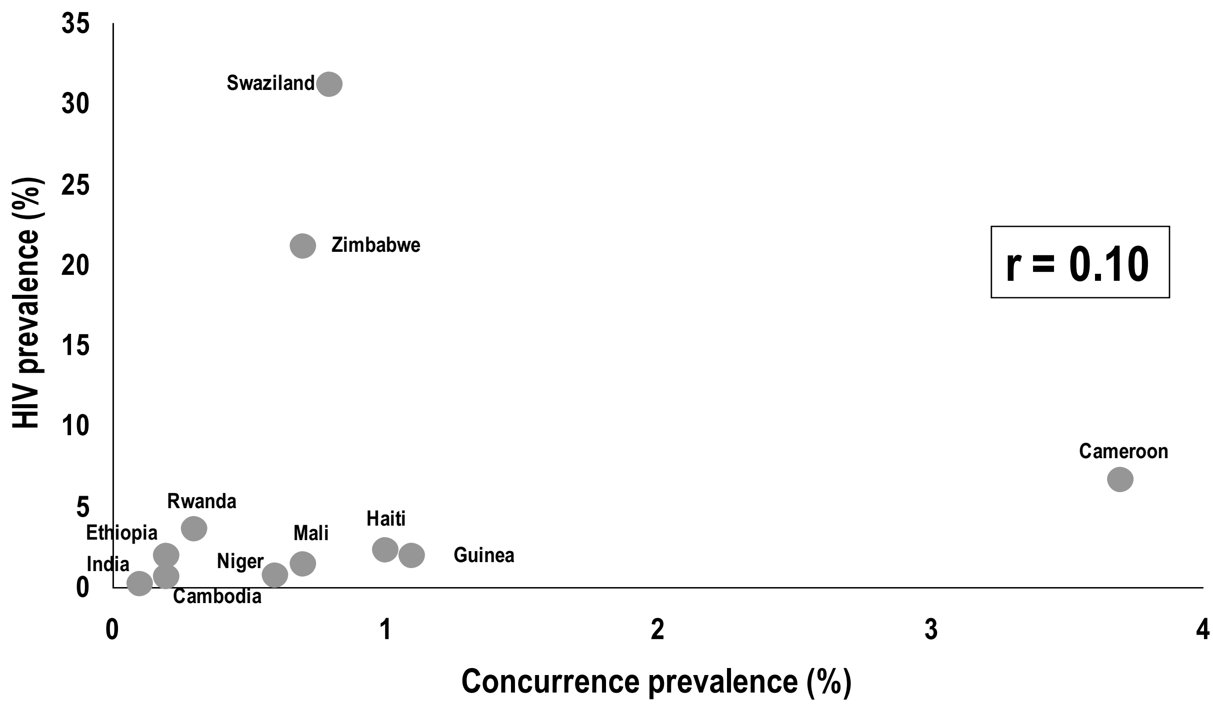


Figure 16. Prevalence of HIV by prevalence of concurrency at the country level among MEN

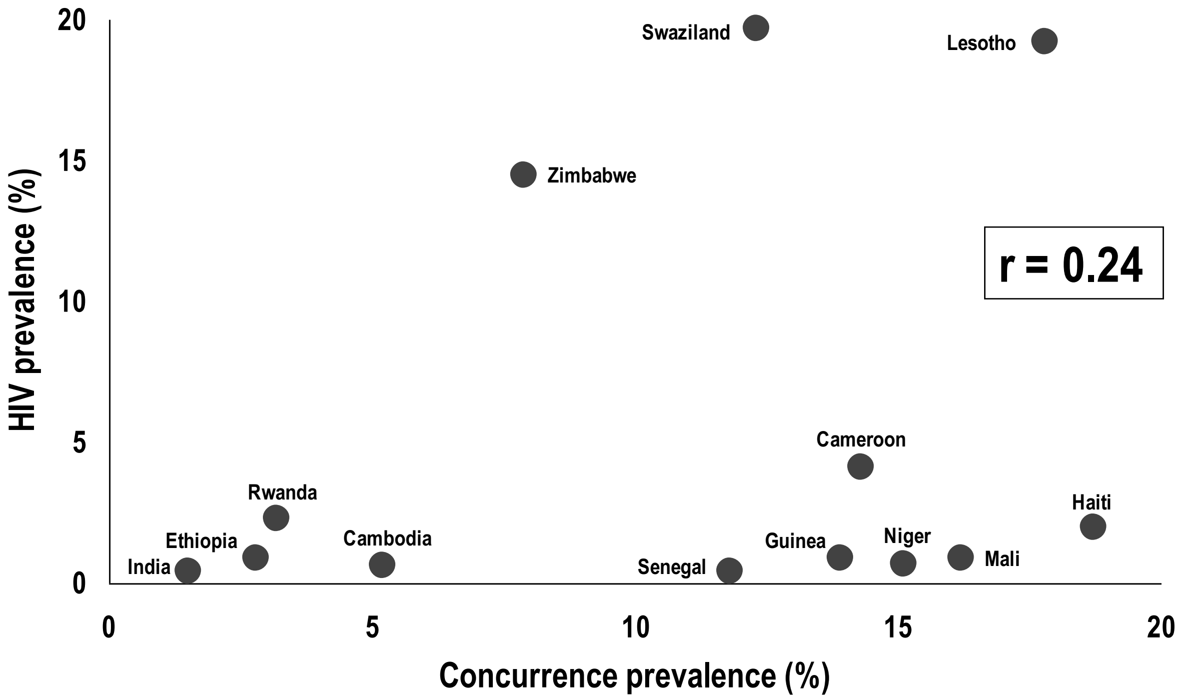
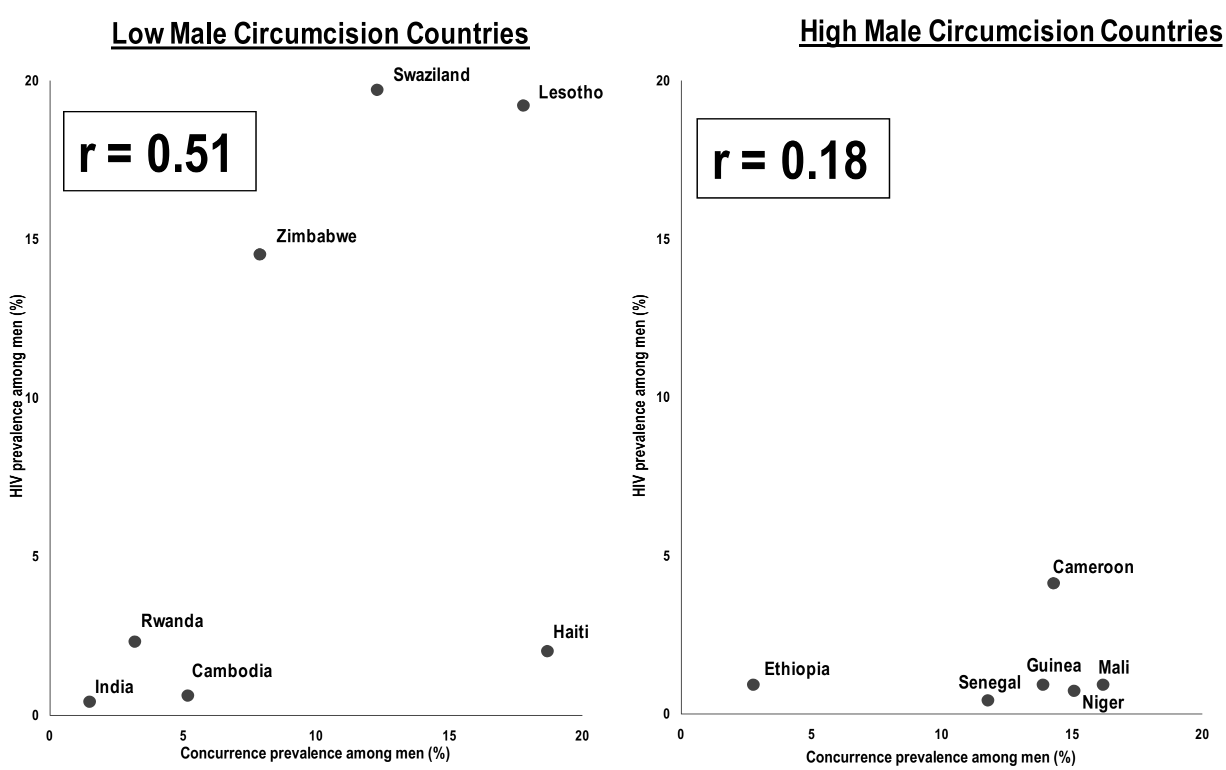


Figure 17. Prevalence of HIV by prevalence of concurrency at the country level among MEN, by prevalence of male circumcision



Figures 18 and 19 show that the country-level associations are even weaker when HIV prevalence among women is correlated with the prevalence of sexual concurrency among men (r=0.07), or when HIV prevalence among men is correlated with the prevalence of concurrency among women (r=0.09). Again, when the countries are divided into two groups based on the prevalence of male circumcision, a stronger correlation between prevalence of concurrency among men and HIV prevalence among women emerges in countries with low prevalence of male circumcision (r=0.31), but not in countries with high prevalence of male circumcision (r=0.07) (Figure 20).

Figure 18. Prevalence of HIV among WOMEN by prevalence of concurrency among MEN, at the country level

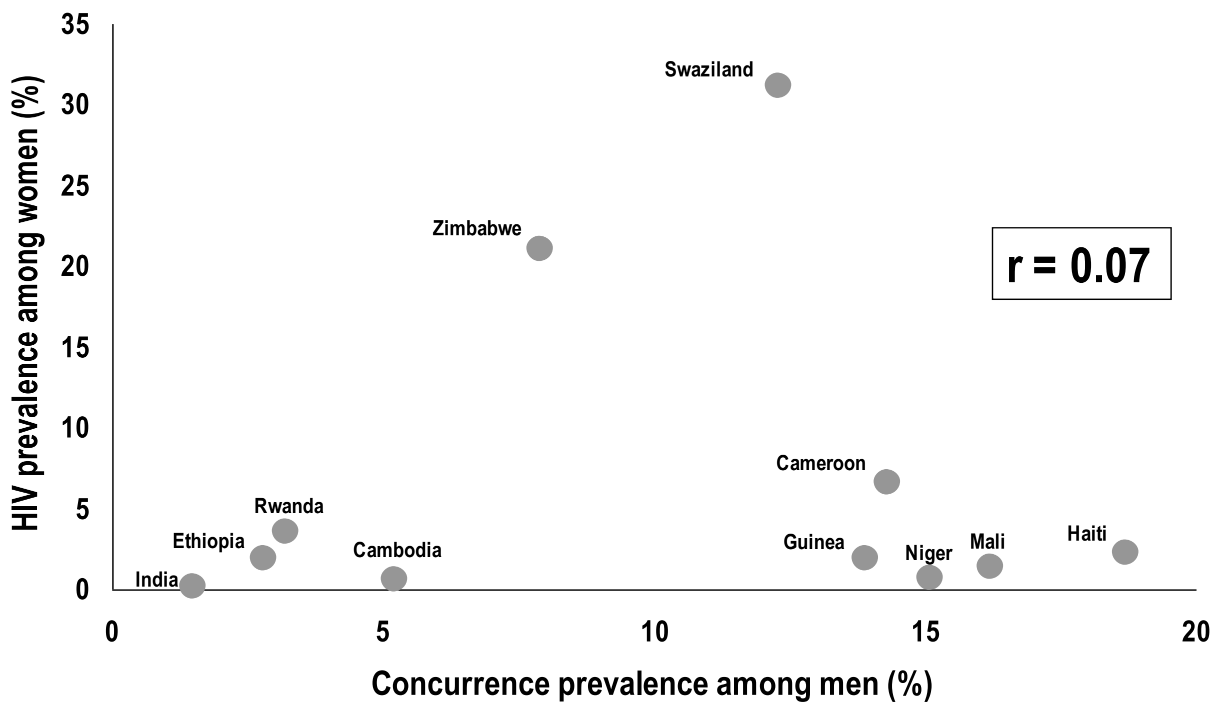


Figure 19. Prevalence of HIV among MEN by prevalence of concurrency among WOMEN, at the country level

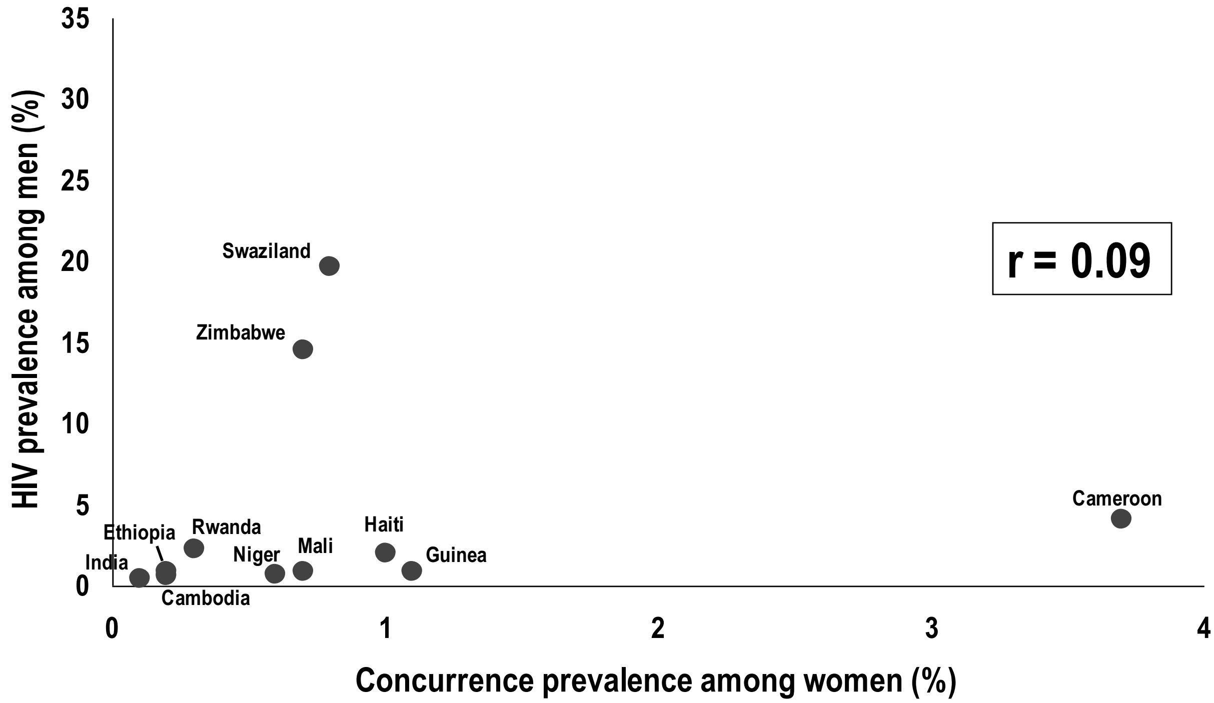
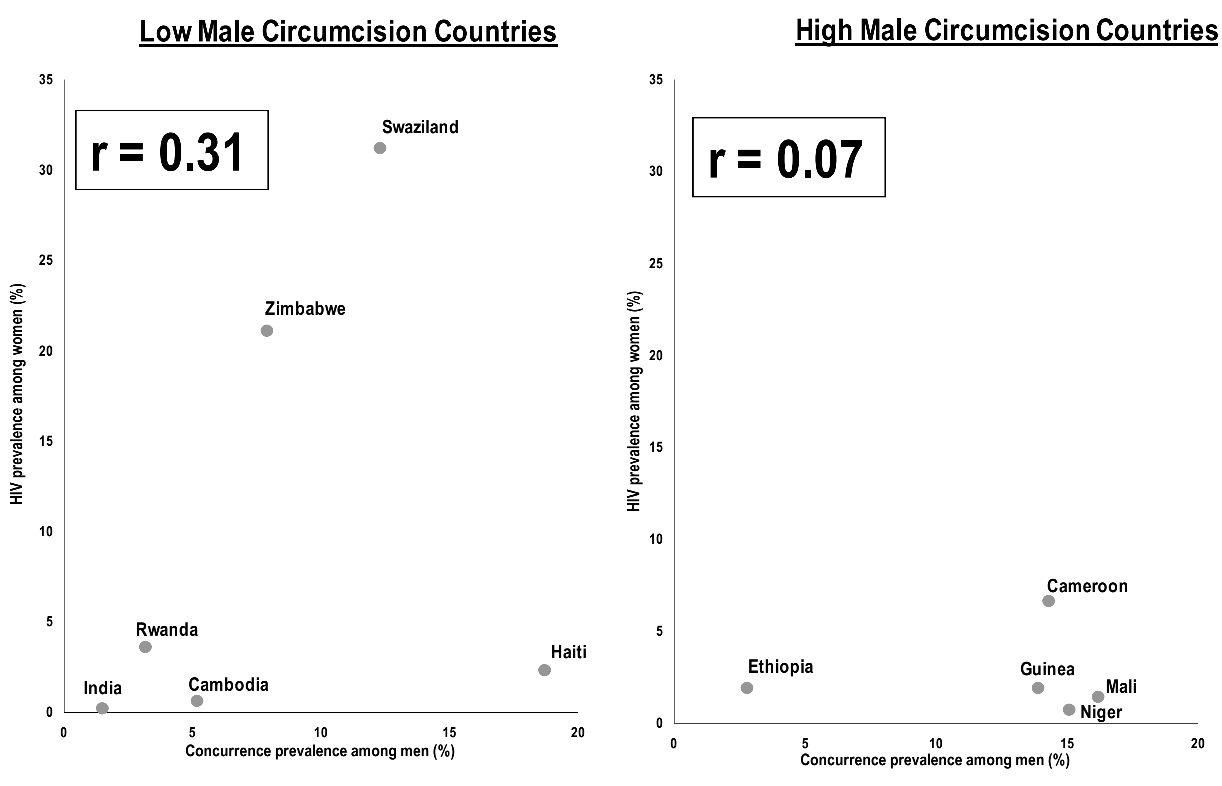


Figure 20. Prevalence of HIV among WOMEN by prevalence of concurrency among MEN at the country level, by prevalence of male circumcision



7. CONCLUSIONS

The study finds that men are more likely than women to have multiple and concurrent sexual partnerships. The study also finds that many multiple partnerships in the past 12 months were not concurrent and that, for men, the majority of concurrent partnerships (excluding polygynous marriages) overlapped for less than one year.

In the pooled samples for sub-Saharan Africa, urban, more-educated, and wealthier women and men are more likely to have had concurrent partnerships than their rural, less-educated, and poorer counterparts. Circumcised men are also more likely than uncircumcised men to have had concurrent partners. Women and men who had concurrent partners were more likely to use condoms than those who did not have concurrent partners; yet only one-fifth of women and less than one-tenth of men with concurrent partners used condoms at last sex.

In most countries, at the individual level, women and men who had concurrent sexual partners in the previous 12 months are more likely to be HIV-positive than those who had only one lifetime partner, or those who had multiple lifetime partners but no overlapping partners in the previous 12 months. A positive and statistically significant relationship between sexual concurrency and HIV-positive status at the individual level is observed for both women and men in the pooled sub-Saharan Africa samples, after adjusting for potentially confounding factors such as educational level, wealth status, urban/rural residence, and condom use. Among men, additionally controlling for male circumcision has virtually no effect on the adjusted association between concurrency and HIV serostatus. The duration of overlap of concurrent relationships does not seem correlated with the likelihood of HIV infection.

In multivariate models, associating one’s concurrency behavior with his/her HIV serostatus reveals that the likelihood of HIV infection is only slightly greater among individuals with concurrent partnerships in the previous 12 months than among those with multiple lifetime partnerships that were not concurrent in the past year (but could have been previously). This is to be expected because having concurrent partners increases the risk of transmitting HIV infection to the partners, not necessarily one's own risk of infection above the risk of having multiple serial partners. One's own risk may be greater only to the extent his/her concurrency behavior is a proxy for partners' concurrency behavior or belonging to a higher-risk sexual network.

The prevalence of sexual concurrency does not seem correlated with HIV prevalence at the community or country levels, either among women or among men. The associations are even weaker when HIV prevalence among women is correlated with the prevalence of concurrency among men, and when HIV prevalence among men is correlated with the prevalence of concurrency among women. The lack of a relationship between the prevalence of concurrency and HIV prevalence among men at the community and level does not seem due to varying prevalence levels of male circumcision. However, at the country level a stronger association between prevalence of concurrency among men and HIV prevalence emerges in countries with lower prevalence of male circumcision.

A number of measurement issues and data constraints limited the scope of our analysis in this study and should be kept in mind when considering our findings.

Because the DHS and AIS surveys collect self-reported data on sexual behavior, differential misreporting of certain behaviors may have biased some of the results. In addition, cross-sectional correlations with HIV status do not allow assessing causality between sexual concurrency and HIV infection. Moreover, concurrency in the recent past may not correlate well with HIV serostatus at the time of survey, as for many HIV-positive adults HIV infection may have preceded the sexual behavior reported in the survey. Cross-sectional data also do not allow examining the relationship at different stages of the HIV/AIDS epidemic in a population.

In our analysis, some overlapping partnerships may have been missed because surveys only cover up to three sexual partners in the past year, while some respondents (mostly men) reported having more than three partners in that period. Many more concurrent partnerships may have been missed because there is no information on sexual partnerships that ended more than 12 months before the survey. Some of the earlier surveys did not even include questions about the number of the respondents' lifetime partners or about the duration of the respondents' sexual relationships with their second-to-last and third-to-last partners. None of the surveys collected information about the duration of sexual relationships with spousal partners.

An additional limitation of the surveys used for the study is that they collected no data on the sexual behaviors of respondents' sexual partner(s)—information that could be important in understanding how concurrency may affect the risk of HIV infection. Moreover, the surveys collected no information about the respondents' frequency of intercourse with their sexual partners. Thus we can only measure overlapping sexual relationships, but not concurrent sexual activity. Our measurement of concurrency may be biased to the extent it assumes regular sexual activity with each sexual partner during the overlapping period. Finally, our analysis is limited due to very small numbers of multiple partnerships and concurrent partnerships reported, especially by women, in most countries.

Some of these data limitations have been addressed in recent DHS and AIS surveys by systematically including questions about the number of the respondent's lifetime sexual partners, and about consistent condom use with all partners (up to three) the respondent had in the 12 months preceding the survey. The measurement of concurrency could be further improved by collecting information on the duration of the sexual relationship with each of the respondent's sexual partner in the previous 12 months, including his/her spousal partners. In addition, the surveys could collect information on the frequency of sexual intercourse during each relationship, to permit assessing the concurrency of sexual activity rather than just the concurrency of sexual relationships.[16]

Despite the limitations inherent to the measurement of concurrency using self-reported data from cross-sectional population-based surveys, the findings of this study shed new light on the prevalence and correlates of sexual concurrency, as well as on the association between concurrency and HIV at different levels of aggregation.

[16] To fully understand the role of concurrency for the spread of HIV and other STIs, it may also be desirable to collect information on the start and end dates of the sexual relationships as well as the frequency of sexual intercourse for all sexual partners the respondent had in his/her lifetime. Collecting information about the sexual behavior of the respondent's sexual partner(s) could be important as well. However, it would not necessarily be practical to reliably collect information on complete sexual histories, sexual networks, and sexual behaviors of respondents' partners in a survey context.

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APPENDIX TABLES

Table A1. DHS core questions on sexual partners in the Last 12 months

NO.	QUESTIONS AND FILTERS		CODING CATEGORIES	SKIP
626	When was the <u>last</u> time you had sexual intercourse? IF LESS THAN 12 MONTHS, ANSWER MUST BE RECORDED IN DAYS, WEEKS OR MONTHS. IF 12 MONTHS (ONE YEAR) OR MORE, ANSWER MUST BE RECORDED IN YEARS.		DAYS AGO . . . . 1 WEEKS AGO . . . . 2 MONTHS AGO . . . . 3 YEARS AGO 4	 → 640

NO.	QUESTIONS AND FILTERS	LAST SEXUAL PARTNER	SECOND-TO-LAST SEXUAL PARTNER	THIRD-TO-LAST SEXUAL PARTNER
626A	Now I would like to ask you some questions about your recent sexual activity. Let me assure you again that your answers are completely confidential and will not be told to anyone. If we should come to any question that you don't want to answer, just let me know and we will go to the next question. → SKIP TO 628			
627	When was the last time you had sexual intercourse with this person?		DAYS . 1 WEEKS 2 MONTHS 3	DAYS . 1 WEEKS 2 MONTHS 3
628	The last time you had sexual intercourse (with this second/third person), was a condom used? **(4)**	YES . . . . 1 NO . . . . 2 (SKIP TO 630)	YES . . . . 1 NO . . . . 2 (SKIP TO 630)	YES . . . . 1 NO . . . . 2 (SKIP TO 630)
629	Did you use a condom every time you had sexual intercourse with this person in the last 12 months?	YES . . . . 1 NO 2	YES . . . . 1 NO 2	YES . . . . 1 NO 2
630	What was your relationship to this person with whom you had sexual intercourse? IF BOYFRIEND: Were you living together as if married? IF YES, CIRCLE '2'. IF NO, CIRCLE '3'.	HUSBAND . . . . 1 (SKIP TO 636) LIVE-IN PARTNER . . . . 2 BOYFRIEND NOT LIVING WITH RESPONDENT . . . . 3 CASUAL ACQUAINTANCE . . . 4 PROSTITUTE . . . . 5 OTHER ____________ 6 (SPECIFY)	HUSBAND . . . . 1 (SKIP TO 636) LIVE-IN PARTNER . . . . 2 BOYFRIEND NOT LIVING WITH RESPONDENT . . . . 3 CASUAL ACQUAINTANCE . . . 4 PROSTITUTE . . . . 5 OTHER ____________ 6 (SPECIFY)	HUSBAND . . . . 1 (SKIP TO 636) LIVE-IN PARTNER . . . . 2 BOYFRIEND NOT LIVING WITH RESPONDENT . . . . 3 CASUAL ACQUAINTANCE . . . 4 PROSTITUTE . . . . 5 OTHER ____________ 6 (SPECIFY)
631	For how long (have you had/did you have) a sexual relationship with this person? IF ONLY HAD SEXUAL RELATIONS WITH THIS PERSON ONCE, RECORD '01' DAYS.	DAYS . 1 MONTHS 2 YEARS 3	DAYS . 1 MONTHS 2 YEARS 3	DAYS . 1 MONTHS 2 YEARS 3
632	CHECK 107:	AGE 15-24 / AGE 25-49 (SKIP TO 636)	AGE 15-24 / AGE 25-49 (SKIP TO 636)	AGE 15-24 / AGE 25-49 (SKIP TO 636)

633	How old is this person?	AGE OF PARTNER [ ][ ] (SKIP TO 636) DON'T KNOW 98	AGE OF PARTNER [ ][ ] (SKIP TO 636) DON'T KNOW 98	AGE OF PARTNER [ ][ ] (SKIP TO 636) DON'T KNOW 98
634	Is this person older than you, younger than you, or about the same age?	OLDER .... 1 YOUNGER ..... 2 SAME AGE ..... 3 DON'T KNOW ... 8 (SKIP TO 636)	OLDER .... 1 YOUNGER ..... 2 SAME AGE ..... 3 DON'T KNOW ... 8 (SKIP TO 636)	OLDER .... 1 YOUNGER ..... 2 SAME AGE ..... 3 DON'T KNOW ... 8 (SKIP TO 636)
635	Would you say this person is ten or more years older than you or less than ten years older than you?	TEN OR MORE YEARS OLDER . 1 LESS THAN TEN YEARS OLDER . 2 OLDER, UNSURE HOW MUCH ... 3	TEN OR MORE YEARS OLDER . 1 LESS THAN TEN YEARS OLDER . 2 OLDER, UNSURE HOW MUCH ... 3	TEN OR MORE YEARS OLDER . 1 LESS THAN TEN YEARS OLDER . 2 OLDER, UNSURE HOW MUCH ... 3
636	The last time you had sexual intercourse with this person, did you or this person drink alcohol?	YES .... 1 NO .... 2 (SKIP TO 638)	YES .... 1 NO .... 2 (SKIP TO 638)	YES .... 1 NO .... 2 (SKIP TO 639)
637	Were you or your partner drunk at that time? IF YES: Who was drunk?	RESPONDENT ONLY 1 PARTNER ONLY ... 2 RESPONDENT AND PARTNER BOTH . 3 NEITHER 4	RESPONDENT ONLY 1 PARTNER ONLY ... 2 RESPONDENT AND PARTNER BOTH . 3 NEITHER 4	RESPONDENT ONLY 1 PARTNER ONLY ... 2 RESPONDENT AND PARTNER BOTH . 3 NEITHER 4
638	Apart from [this person/these two people], have you had sexual intercourse with any other person in the last 12 months?	YES .... 1 (GO BACK TO 627 IN NEXT COLUMN) NO .... 2 (SKIP TO 640)	YES .... 1 (GO BACK TO 627 IN NEXT COLUMN) NO .... 2 (SKIP TO 640)	
639	In total, with how many different people have you had sexual intercourse in the last 12 months? IF NON-NUMERIC ANSWER, PROBE TO GET AN ESTIMATE. IF NUMBER OF PARTNERS IS GREATER THAN 95, WRITE '95.'			NUMBER OF PARTNERS LAST 12 MONTHS ... [ ][ ] DON'T KNOW ... 98
640	In total, with how many different people have you had sexual intercourse in your lifetime? IF NON-NUMERIC ANSWER, PROBE TO GET AN ESTIMATE. IF NUMBER OF PARTNERS IS GREATER THAN 95, WRITE '95.'		NUMBER OF PARTNERS IN LIFETIME .... [ ][ ] DON'T KNOW 98	

Table B1. Among respondents age 15-49 who ever had sex, number and percentage (with 95% confidence interval) who had only one lifetime sexual partner, and who had multiple lifetime partners but no, only one, and 2+ partners (overlapping or non overlapping) in past12 months: Women

	Number					Percentage (95% Conf. Interval)							
		2+ lifetime prts						2+ lifetime prts					
								less than 2 prts in past 12 months		2+ non-overlapping prts in past 12 months		2+ overlapping prts in past 12 months	
Region/Country	1 lifetime prt	less than 2 prts in past 12m	2+ non overlapping prts in past 12m	2+ overlapping prts in past 12m	# ever had sex	1 lifetime prt		%	(95% CI)	%	(95% CI)	%	(95% CI)
Asia													
Cambodia[1]	10,429	1,021	3	26	11,479	90.9	(90.1 , 91.6)	8.9	(8.2 , 9.6)	0.0	(0.0 , 0.0)	0.2	(0.0 , 0.4)
India[2]	97,107	1,812	3	67	98,989	98.1	(98.0 , 98.2)	1.8	(1.7 , 2.0)	0.0	(0.0 , 0.0)	0.1	(0.0 , 0.1)
Latin America & Caribbean													
Haiti	3,916	4,576	51	85	8,628	45.4	(43.3 , 47.5)	53.0	(51.1 , 54.9)	0.6	(0.4 , 0.8)	1.0	(0.7 , 1.3)
Sub-Saharan Africa													
Cameroon[1]	3,327	5,341	267	344	9,279	35.9	(33.1 , 38.6)	57.6	(55.3 , 59.9)	2.9	(2.5 , 3.3)	3.7	(3.2 , 4.2)
Ethiopia[2]	3,704	1,419	3	8	5,134	72.1	(33.2 , 35.8)	27.6	(24.7 , 29.8)	0.1	(0.0 , 0.1)	0.2	(0.0 , 0.1)
Guinea[1]	4,396	2,652	83	78	7,209	61.0	(58.5 , 63.5)	36.8	(34.4 , 39.1)	1.2	(0.8 , 1.5)	1.1	(0.8 , 1.4)
Lesotho[1]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.		n.a.		n.a.		n.a.	
Mali[1]	9,345	3,485	82	94	13,006	71.9	(69.3 , 74.5)	26.8	(24.8 , 28.8)	0.6	(0.1 , 1.2)	0.7	(0.4 , 1.0)
Niger[1]	6,538	1,735	9	49	8,331	78.5	(76.6 , 80.3)	20.8	(18.9 , 22.8)	0.1	(0.0 , 0.2)	0.6	(0.2 , 1.0)
Rwanda[1]	5,571	2,210	15	20	7,816	71.3	(70.1 , 72.6)	28.3	(27.0 , 29.5)	0.2	(0.1 , 0.3)	0.3	(0.1 , 0.4)
Senegal[1]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.		n.a.		n.a.		n.a.	
Swaziland	1,430	2,592	47	33	4,102	34.9	(33.1 , 36.7)	63.2	(61.4 , 64.9)	1.1	(0.8 , 1.5)	0.8	(0.5 , 1.1)
Zimbabwe	4,652	2,330	30	47	7,059	65.9	(64.0 , 67.8)	33.0	(31.1 , 34.9)	0.4	(0.3 , 0.6)	0.7	(0.4 , 0.9)
Total SSA[3]	39,636	19,039	344	474	59,493	66.6	(65.8 , 67.5)	32.0	(31.2 , 32.8)	0.6	(0.5 , 0.7)	0.8	(0.7 , 0.9)

[1] Only for respondents whose last sexual relationship started at least 12 months before the survey.
[2] Sexual history limited to the respondent's most recent 2 partners.
[3] Total SSA figures were calculated by using appropriate pooled weights.

Table B2. Among respondents age 15-49 who ever had sex, number and percentage (with 95% confidence interval) who had only one lifetime sexual partner, and who had multiple lifetime partners but no, only one, and 2+ partners (overlapping or non overlapping) in past 12 months: Men

	Number					Percentage (95% Conf. Interval)							
		2+ lifetime prts						2+ lifetime prts					
								less than 2 prts in past 12 months		2+ non-overlapping prts in past 12 months		2+ overlapping prts in past 12 months	
Region/Country	1 lifetime prt	less than 2 prts in past 12m	2+ non overlapping prts in past 12m	2+ overlapping prts in past 12m	# ever had sex	1 lifetime prt		%	(95% CI)	%	(95% CI)	%	(95% CI)
Asia													
Cambodia[1]	2,514	1,587	172	234	4,508	55.8	(53.4 , 58.2)	35.2	(33.0 , 37.4)	3.8	(3.0 , 4.6)	5.2	(4.2 , 6.1)
India[3]	38,609	8,317	158	735	47,819	80.7	(80.0 , 81.5)	17.4	(16.7 , 18.1)	0.3	(0.3 , 0.4)	1.5	(1.4 , 1.7)
Latin America & Caribbean													
Haiti	348	2,509	296	725	3,879	9.0	(7.8 , 10.2)	64.7	(62.2 , 67.2)	7.6	(6.5 , 8.7)	18.7	(16.9 , 20.5)
Sub-Saharan Africa													
Cameroon[1,2]	426	2,052	913	565	3,956	10.8	(9.4 , 12.2)	51.9	(50.0 , 53.8)	23.1	(21.2 , 25.0)	14.3	(13.0 , 15.6)
Ethiopia[1,3]	1,604	1,717	33	96	3,450	46.5	(43.7 , 49.4)	49.8	(46.9 , 52.6)	1.0	(0.6 , 1.3)	2.8	(2.0 , 3.6)
Guinea[1]	273	1,372	348	322	2,315	11.8	(10.0 , 13.5)	59.3	(56.5 , 62.0)	15.0	(13.0 , 17.0)	13.9	(12.1 , 15.7)
Lesotho[1]	394	1,075	169	352	1,990	19.8	(17.4 , 22.0)	54.0	(51.4 , 56.7)	8.5	(6.9 , 10.0)	17.7	(16.0 , 19.6)
Mali[1]	667	1,518	119	444	2,748	24.3	(21.4 , 27.1)	55.2	(51.9 , 58.5)	4.3	(3.2 , 5.5)	16.2	(14.2 , 18.2)
Niger[1,2]	969	927	39	343	2,278	42.5	(39.4 , 45.7)	40.7	(37.6 , 43.8)	1.7	(1.0 , 2.4)	15.1	(12.6 , 17.5)
Rwanda[1]	1,168	1,764	24	97	3,053	38.3	(36.3 , 40.3)	57.8	(55.7 , 59.8)	0.8	(0.5 , 1.1)	3.2	(2.5 , 3.9)
Senegal[1]	531	1,424	169	284	2,408	22.1	(19.5 , 24.6)	59.1	(56.3 , 61.9)	7.0	(5.1 , 9.0)	11.8	(9.8 , 13.7)
Swaziland	366	1,946	214	353	2,879	12.7	(11.4 , 14.0)	67.6	(65.6 , 69.6)	7.4	(6.3 , 8.6)	12.3	(10.8 , 13.7)
Zimbabwe	968	3,485	216	401	5,070	19.1	(17.7 , 20.4)	68.7	(67.1 , 70.4)	4.3	(3.6 , 4.9)	7.9	(6.9 , 8.8)
Total SSA[4]	9,388	15,284	1,685	2,423	28,780	32.6	(31.6 , 33.6)	53.1	(52.1 , 54.1)	5.9	(5.5 , 6.2)	8.4	(8.0 , 8.9)

[1] Only for respondents whose last sexual relationship started at least 12 months before the survey.
[2] No information on duration for any non-marital sexual partner.
[3] Sexual history limited to the respondent's most recent 2 partners.
[4] Total SSA figures were calculated by using appropriate pooled weights.

Table B3. Among women and men age 15-49 who ever had sex, percent distribution by whether they had only one lifetime sexual partner, and they had multiple lifetime partners but no, only one, and 2+ partners (overlapping or non overlapping) in past 12 months, by selected characteristics: Sub-Saharan Africa (pooled data)

	Women[1]					Men[2]				
		2+ lifetime prts					2+ lifetime prts			
Characteristic	1 life-time prt	less than 2 prts in past 12m	2+ non over-lapping prts in past 12m	2+ over-lapping prts in past 12m	Ever had sex (total)	1 life-time prt	less than 2 prts in past 12m	2+ non over-lapping prts in past 12m	2+ over-lapping prts in past 12m	Ever had sex (total)
Age group										
15-19	78.3	18.8	1.9	1.0	6,425	41.1	42.1	15.3	1.5	2,089
20-24	71.9	26.1	0.9	1.1	11,105	39.3	45.2	12.4	3.2	4,637
25-29	69.6	29.3	0.5	0.7	12,034	37.4	49.6	7.1	5.9	5,085
30-34	63.7	35.0	0.3	0.9	9,462	34.0	53.5	3.9	8.5	5,222
35-39	60.2	39.1	0.2	0.5	8,389	31.1	55.0	2.5	11.4	4,596
40-44	58.2	41.0	0.1	0.7	6,436	22.8	62.9	1.7	12.5	3,788
45-49	60.7	38.7	0.1	0.4	5,643	21.8	61.9	1.3	15.0	3,364
Education										
No education	70.2	29.3	0.2	0.4	37,315	38.3	49.3	2.3	10.1	11,576
Primary incomplete	68.7	29.8	0.7	0.8	10,321	38.4	50.4	4.3	7.0	7,093
Primary complete	49.1	47.0	1.6	2.2	2,684	27.8	55.0	9.1	8.1	1,859
Secondary or higher	55.0	41.0	1.8	2.1	9,173	20.7	60.4	11.5	7.3	8,252
Marital status										
Never married	53.1	39.7	4.6	2.6	2,825	30.0	52.3	16.5	1.1	5,950
Currently married	69.8	29.3	0.2	0.7	49,668	34.1	52.6	2.3	11.0	21,263
Formerly married	49.8	48.1	1.3	0.8	7,000	22.3	62.5	13.7	1.6	1,566
Residence										
Urban	55.6	41.0	1.6	1.8	14,114	19.3	60.9	11.6	8.2	8,632
Rural	70.0	29.2	0.2	0.5	45,379	38.3	49.8	3.4	8.5	20,149
Wealth status										
Lowest	70.4	28.9	0.2	0.5	11,968	37.8	49.6	3.1	9.5	4,771
Second	67.5	31.7	0.4	0.5	11,805	36.1	50.2	4.1	9.6	5,248
Third	67.5	31.2	0.4	0.8	11,478	36.8	49.1	5.2	8.9	5,406
Fourth	64.3	33.9	0.8	1.1	11,716	30.6	54.4	6.4	8.7	6,008
Highest	63.6	34.2	1.1	1.1	12,525	25.4	59.4	8.9	6.3	7,347
Circumcision										
No	n.a.	n.a.	n.a.	n.a.	n.a.	31.9	58.1	3.1	6.9	4,722
Yes	n.a.	n.a.	n.a.	n.a.	n.a.	32.8	52.1	6.4	8.7	24,007
Total SSA	66.6	32.0	0.6	0.8	59,493	32.6	53.1	5.9	8.4	28,779

[1] Pooled sample for women includes: Cameroon, Ethiopia, Guinea, Mali, Niger, Rwanda, Swaziland, and Zimbabwe.
[2] Pooled sample for men includes: Cameroon, Ethiopia, Guinea, Lesotho, Mali, Niger, Rwanda, Senegal, Swaziland, and Zimbabwe.

Table B4a. Multinomial logit regression results (relative risk ratios, RRR) of concurrency of sexual relations among respondents age 15-49 who ever had sex as a function of background characteristics and behaviours: sub-Saharan Africa (pooled data): Women[1]

	1 lifetime prt	2+ lifetime prts: Less than 2 prts in past 12m		2+ lifetime prts: 2+ non overlapping prts in past 12m		2+ lifetime prts: 2+ overlapping prts in past 12m	
		RRR	**(95% CI; p-value)**	**RRR**	**(95% CI; p-value)**	**RRR**	**(95% CI; p-value)**
Age group							
15-24					ref.		
25-34	1.00	1.81	(1.6 , 2.0 ; .000)	0.75	(0.5 , 1.1 ; .114)	1.33	(1.0 , 1.8 ; .092)
35+	1.00	2.49	(2.2 , 2.8 ; .000)	0.36	(0.2 , 0.6 ; .000)	1.17	(0.8 , 1.6 ; .382)
Education							
No education					ref.		
Primary incomplete	1.00	0.88	(0.8 , 1.0 ; .046)	2.13	(1.3 , 3.6 ; .004)	1.41	(1.0 , 2.0 ; .058)
Primary complete	1.00	1.27	(1.1 , 1.5 ; .002)	2.28	(1.3 , 4.0 ; .004)	2.14	(1.5 , 3.1 ; .000)
Secondary or higher	1.00	1.15	(1.0 , 1.3 ; .029)	1.97	(1.1 , 3.4 ; .015)	2.33	(1.6 , 3.3 ; .000)
Marital status							
Never married					ref.		
Currently married	1.00	0.66	(0.6 , 0.7 ; .000)	0.17	(0.1 , 0.2 ; .000)	0.57	(0.4 , 0.8 ; .000)
Formerly married	1.00	1.50	(1.3 , 1.8 ; .000)	1.89	(1.3 , 2.7 ; .000)	1.31	(0.9 , 1.9 ; .163)
Residence							
Urban					ref.		
Rural	1.00	0.81	(0.7 , 0.9 ; .001)	0.62	(0.4 , 0.8 ; .003)	0.82	(0.6 , 1.1 ; .158)
Wealth status							
Lowest					ref.		
Second	1.00	1.22	(1.1 , 1.4 ; .004)	1.95	(1.1 , 3.6 ; .028)	1.00	(0.6 , 1.7 ; .992)
Third	1.00	1.16	(1.0 , 1.3 ; .026)	1.48	(0.9 , 2.3 ; .098)	1.46	(0.8 , 2.5 ; .173)
Fourth	1.00	1.22	(1.1 , 1.4 ; .006)	2.12	(1.3 , 3.5 ; .003)	1.65	(1.0 , 2.8 ; .065)
Highest	1.00	1.03	(0.9 , 1.2 ; .728)	2.12	(1.2 , 3.6 ; .006)	1.33	(0.8 , 2.3 ; .318)
Circumcision							
No	n.a.						
Yes	n.a.						

(Cont'd)

Table B4a – cont'd

	1 lifetime prt	2+ lifetime prts: Less than 2 prts in past 12m RRR	(95% CI; p-value)	2+ non overlapping prts in past 12m RRR	(95% CI; p-value)	2+ overlapping prts in past 12m RRR	(95% CI; p-value)
Country							
Cameroon				ref.			
Ethiopia	1.00	0.24	(0.2 , 0.3 ; .000)	0.02	(0.0 , 0.1 ; .000)	0.03	(0.0 , 0.1 ; .000)
Guinea	1.00	0.39	(0.4 , 0.4 ; .000)	0.47	(0.3 , 0.6 ; .000)	0.28	(0.2 , 0.4 ; .000)
Lesotho	n.a.						
Mali	1.00	0.25	(0.2 , 0.3 ; .000)	0.29	(0.2 , 0.5 ; .000)	0.17	(0.1 , 0.3 ; .000)
Niger	1.00	0.18	(0.2 , 0.2 ; .000)	0.05	(0.0 , 0.1 ; .000)	0.14	(0.1 , 0.2 ; .000)
Rwanda	1.00	0.22	(0.2 , 0.2 ; .000)	0.04	(0.0 , 0.1 ; .000)	0.04	(0.0 , 0.1 ; .000)
Senegal	n.a.						
Swaziland	1.00	1.01	(0.9 , 1.1 ; .811)	0.28	(0.2 , 0.4 ; .000)	0.18	(0.1 , 0.3 ; .000)
Zimbabwe	1.00	0.27	(0.3 , 0.3 ; .000)	0.07	(0.0 , 0.1 ; .000)	0.08	(0.1 , 0.1 ; .000)
Total SSA				59,493			

[1] Pooled sample for women includes: Cameroon, Ethiopia, Guinea, Mali, Niger, Rwanda, Swaziland, and Zimbabwe.

Table B4b. Multinomial logit regression results (relative risk ratios, RRR) of concurrency of sexual relations among respondents age 15-49 who ever had sex as a function of background characteristics and behaviours: sub-Saharan Africa (pooled data): Men[1]

	1 lifetime prt	2+ lifetime prts: Less than 2 prts in past 12m RRR	(95% CI; p-value)	2+ non overlapping prts in past 12m RRR	(95% CI; p-value)	2+ overlapping prts in past 12m RRR	(95% CI; p-value)
Age group							
15-24				ref.			
25-34	1.00	2.07	(1.8 , 2.4 ; .000)	1.62	(1.3 , 2.0 ; .000)	2.52	(2.0 , 3.2 ; .000)
35+	1.00	3.82	(3.2 , 4.5 ; .000)	1.38	(1.1 , 1.8 ; .020)	6.23	(4.9 , 7.8 ; .000)
Education							
No education				ref.			
Primary incomplete	1.00	1.04	(0.9 , 1.2 ; .583)	1.32	(1.0 , 1.7 ; .039)	1.00	(0.8 , 1.3 ; .989)
Primary complete	1.00	1.33	(1.0 , 1.7 ; .019)	1.84	(1.3 , 2.6 ; .001)	1.09	(0.8 , 1.6 ; .635)
Secondary or higher	1.00	1.46	(1.2 , 1.7 ; .000)	2.05	(1.6 , 2.6 ; .000)	1.21	(1.0 , 1.5 ; .090)
Marital status							
Never married				ref.			
Currently married	1.00	0.77	(0.7 , 0.9 ; .001)	0.26	(0.2 , 0.3 ; .000)	6.60	(5.3 , 8.3 ; .000)
Formerly married	1.00	1.29	(1.0 , 1.7 ; .058)	1.16	(0.9 , 1.6 ; .331)	1.23	(0.8 , 1.9 ; .346)
Residence							
Urban				ref.			
Rural	1.00	0.71	(0.6 , 0.8 ; .000)	0.70	(0.6 , 0.9 ; .001)	0.98	(0.8 , 1.2 ; .838)
Wealth status							
Lowest				ref.			
Second	1.00	1.07	(0.9 , 1.3 ; .465)	1.18	(0.9 , 1.6 ; .304)	1.16	(0.9 , 1.5 ; .216)
Third	1.00	1.01	(0.8 , 1.2 ; .947)	1.14	(0.9 , 1.5 ; .349)	1.11	(0.9 , 1.4 ; .411)
Fourth	1.00	1.11	(0.9 , 1.3 ; .247)	1.13	(0.8 , 1.5 ; .459)	1.24	(1.0 , 1.6 ; .083)
Highest	1.00	1.15	(0.9 , 1.4 ; .203)	1.40	(1.0 , 1.9 ; .045)	1.11	(0.8 , 1.5 ; .469)
Circumcision							
No				ref.			
Yes	1.00	1.63	(1.3 , 2.0 ; .000)	2.28	(1.6 , 3.2 ; .000)	1.46	(1.0 , 2.1 ; .028)

(Cont'd)

Table B4b – cont'd

	1 lifetime prt	2+ lifetime prts					
		Less than 2 prts in past 12m		2+ non overlapping prts in past 12m		2+ overlapping prts in past 12m	
		RRR	**(95% CI; p-value)**	**RRR**	**(95% CI; p-value)**	**RRR**	**(95% CI; p-value)**
Country							
Cameroon				ref.			
Ethiopia	1.00	0.24	(0.2 , 0.3 ; .000)	0.02	(0.0 , 0.0 ; .000)	0.03	(0.0 , 0.0 ; .000)
Guinea	1.00	1.18	(1.0 , 1.4 ; .112)	0.75	(0.6 , 1.0 ; .021)	0.78	(0.6 , 1.0 ; .064)
Lesotho	1.00	0.91	(0.7 , 1.1 ; .411)	0.32	(0.2 , 0.4 ; .000)	1.21	(0.9 , 1.6 ; .183)
Mali	1.00	0.53	(0.4 , 0.6 ; .000)	0.15	(0.1 , 0.2 ; .000)	0.37	(0.3 , 0.5 ; .000)
Niger	1.00	0.22	(0.2 , 0.3 ; .000)	0.04	(0.0 , 0.1 ; .000)	0.17	(0.1 , 0.2 ; .000)
Rwanda	1.00	0.56	(0.4 , 0.7 ; .000)	0.03	(0.0 , 0.0 ; .000)	0.07	(0.0 , 0.1 ; .000)
Senegal	1.00	0.58	(0.5 , 0.7 ; .000)	0.17	(0.1 , 0.2 ; .000)	0.37	(0.3 , 0.5 ; .000)
Swaziland	1.00	1.84	(1.4 , 2.4 ; .000)	0.49	(0.3 , 0.7 ; .000)	1.46	(1.0 , 2.1 ; .043)
Zimbabwe	1.00	1.16	(0.9 , 1.5 ; .232)	0.21	(0.1 , 0.3 ; .000)	0.42	(0.3 , 0.6 ; .000)
Total SSA				28,727			

[1] Pooled sample for men includes: Cameroon, Ethiopia, Guinea, Lesotho, Mali, Niger, Rwanda, Senegal, Swaziland, and Zimbabwe.

Table B5. Among respondents age 15-49 who ever had sex, percentage who had only one lifetime sexual partner, and who had multiple lifetime partners but no, only one, and 2 or more partners (overlapping or non overlapping) in the 12 months preceding the survey by sex and selected characteristics and behaviours: Sub-Saharan Africa (pooled data)

	Women[1]					Men[2]				
		2+ lifetime prts					2+ lifetime prts			
Characteristic	1 life-time prt	less than 2 prts in past 12m	2+ non overlap-ping prts in past 12m	2+ over-lapping prts in past 12m	Ever had sex (total)	1 life-time prt	less than 2 prts in past 12m	2+ non overlap-ping prts in past 12m	2+ over-lapping prts in past 12m	Ever had sex (total)
Condom use with last partner in past 12 months										
No	84.1	76.2	57.7	79.7	81.4	80.1	75.3	48.7	91.4	76.7
Yes	1.7	5.6	40.9	19.5	3.3	4.9	12.9	51.2	8.4	12.2
Did not have sex in past 12mo	14.0	17.7	0.0	0.0	15.0	14.9	11.6	0.0	0.0	11.0
Consistent condom use in past 12 months										
No	84.1	76.2	72.1	84.6	81.5	80.1	75.1	61.5	94.2	77.6
Yes	1.7	5.6	27.7	15.3	3.2	4.8	12.9	38.5	5.7	11.2
Did not have sex in past 12mo	14.0	17.7	0.0	0.0	15.0	14.9	11.8	0.0	0.0	11.1
Total SSA	39,636	19,039	344	474	59,493	9,388	15,285	1,685	2,423	28,779

[1] Pooled sample for women includes: Cameroon, Ethiopia, Guinea, Mali, Niger, Rwanda, Swaziland, and Zimbabwe.

[2] Pooled sample for men includes: Cameroon, Ethiopia, Guinea, Lesotho, Mali, Niger, Rwanda, Senegal, Swaziland, and Zimbabwe.

Table B6. Among respondents age 15-49 who ever had sex, HIV prevalence by whether the respondent had only one lifetime sexual partner, and had multiple lifetime partners but no, only one, and 2+ partners (overlapping or non overlapping) in past 12 months: Women

Region/ Country	Number HIV positive: 1 life-time prt	Number HIV positive, 2+ lifetime prts: less than 2 prts in past 12m	Number HIV positive, 2+ lifetime prts: 2+ non over-lap-ping prts in past 12m	Number HIV positive, 2+ lifetime prts: 2+ over-lap-ping prts in past 12m	Number HIV positive: Ever had sex (total)	Number tested for HIV: 1 life-time prt	Number tested for HIV, 2+ lifetime prts: less than 2 prts in past 12m	Number tested for HIV, 2+ lifetime prts: 2+ non over-lap-ping prts in past 12m	Number tested for HIV, 2+ lifetime prts: 2+ over-lap-ping prts in past 12m	Number tested for HIV: Ever had sex (total)	HIV prevalence (%): 1 lifetime prt %	1 lifetime prt (95% CI)	2+ lifetime prts: less than 2 prts in past 12 months %	less than 2 prts in past 12 months (95% CI)	2+ lifetime prts: 2+ non overlapping prts in past 12 months %	2+ non overlapping prts in past 12 months (95% CI)	2+ lifetime prts: 2+ overlapping prts in past 12 months %	2+ overlapping prts in past 12 months (95% CI)	Ever had sex (total)
Asia																			
Cambodia[1]	31	16	0	0	47	5,010	522	2	13	5,548	0.6	0.4 , 0.9	3.0	1.3 , 4.8	0.0	0.0 , 0.0	0.0	0.0 , 0.0	0.8
India[2]	103	8	0	1	112	41,655	841	1	20	42,518	0.2	0.2 , 0.3	0.9	0.3 , 1.5	0.0	0.0 , 0.0	5.6	0.0 , 18.1	0.3
Latin America & Caribbean																			
Haiti	24	90	1	6	121	1,911	2,185	25	51	4,172	1.3	0.6 , 1.9	4.1	3.2 , 5.1	2.7	0.0 , 8.4	12.3	0.0 , 25.3	2.9
Sub-saharan Africa																			
Cameroon[1]	44	260	14	18	335	1,623	2,567	141	171	4,502	2.7	1.8 , 3.6	10.1	8.9 , 11.3	10.2	5.0 , 15.4	10.4	5.9 , 14.8	7.4
Ethiopia[2]	45	59	0	1	105	3,148	1,210	1	6	4,364	1.4	0.9 , 2.0	4.8	3.2 , 6.5	0.0	0.0 , 58.1	20.0	0.0 , 51.6	2.4
Guinea[1]	21	46	2	2	70	2,066	1,224	44	51	3,385	1.0	0.6 , 1.5	3.7	2.4 , 5.1	3.4	0.0 , 8.8	3.2	0.0 , 8.1	2.1
Lesotho[1]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.		n.a.		n.a.		n.a.		n.a.
Niger[1]	7	22	0	0	29	3,100	829	3	27	3,959	0.2	0.1 , 0.4	2.7	1.3 , 4.0	0.0	0.0 , 0.0	0.0	0.0 , 0.0	0.7
Mali[1]	31	29	3	0	63	2,816	1,130	49	41	4,037	1.1	0.7 , 1.6	2.6	1.5 , 3.6	6.1	0.0 , 17.4	0.0	0.0 , 0.0	1.6
Rwanda[1]	80	108	0	2	189	2,696	1,168	8	11	3,883	3.0	2.3 , 3.6	9.2	7.6 , 10.9	n.a.		14.2	0.0 , 45.1	4.9
Senegal[1]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.		n.a.		n.a.		n.a.		n.a.
Swaziland	286	1,009	24	16	1,335	1,249	2,319	43	30	3,640	22.9	20.5 , 25.3	43.5	41.4 , 45.6	55.8	39.1 , 71.4	53.3	32.8 , 71.8	36.7
Zimbabwe	656	725	9	23	1,413	3,617	1,851	24	39	5,531	18.1	16.6 , 19.6	39.2	36.6 , 41.7	38.7	15.4 , 61.9	57.9	39.5 , 76.2	25.5
Total SSA[3]	593	958	22	33	1,607	21,492	10,468	217	283	32,459	2.8	2.4 , 3.1	9.2	8.4 , 9.9	10.3	6.3 , 14	11.7	8.0 , 15.4	5.0

[1] Only for respondents whose last sexual relationship started at least 12 months before the survey.
[2] Sexual history limited to the respondent's most recent 2 partners.
[3] Total SSA figures were calculated by using appropriate pooled weights.

Table B7. Among respondents age 15-49 who ever had sex, HIV prevalence by whether the respondent had only one lifetime sexual partner, and had multiple lifetime partners but no, only one, and 2+ partners (overlapping or non overlapping) in past 12 months: Men

	Number HIV positive					Number tested for HIV					HIV prevalence (%)								
		2+ lifetime prts					2+ lifetime prts						2+ lifetime prts						
											1 lifetime prt		less than 2 prts in past 12 months		2+ non overlapping prts in past 12 months		2+ overlapping prts in past 12 months		Ever had sex
Country	1 life-time prt	less than 2 prts in past 12m	2+ non over-lap-ping prts in past 12m	2+ over-lap-ping prts in past 12m	Ever had sex (total)	1 life-time prt	less than 2 prts in past 12m	2+ non over-lap-ping prts in past 12m	2+ over-lap-ping prts in past 12m	Ever had sex (total)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	(total)
Asia																			
Cambodia[1]	8	24	2	6	41	2,486	1,574	169	230	4,458	0.3	(0.1 , 0.6)	1.5	(0.7 , 2.4)	1.4	(0.0 , 3.2)	2.5	(0.0 , 5.5)	0.9
India[3]	101	41	1	4	147	25,678	5,717	125	528	32,048	0.4	(0.3 , 0.5)	0.7	(0.5 , 0.9)	0.8	(0.0 , 2.5)	0.7	(0.0 , 1.4)	0.5
Latin America & Caribbean																			
Haiti	2	62	1	20	85	342	2,442	284	698	3,766	0.6	(0.0 , 1.8)	2.5	(1.6 , 3.4)	0.5	(0.0 , 1.2)	2.8	(1.5 , 4.1)	2.2
Sub-saharan Africa																			
Cameroon[1,2]	2	79	61	40	182	406	1,968	883	538	3,794	0.5	(0.0 , 1.4)	4.0	(3.1 , 4.9)	6.9	(5.1 , 8.7)	7.4	(5.1 , 9.6)	4.8
Ethiopia[1,3]	9	29	2	3	42	1,419	1,511	28	85	3,043	0.6	(0.1 , 1.2)	1.9	(1.1 , 2.8)	5.7	(0.0 , 16.1)	3.4	(0.0 , 8.4)	1.4
Guinea[1]	2	9	7	4	22	265	1,285	327	325	2,202	0.9	(0.0 , 1.9)	0.7	(0.3 , 1.2)	2.1	(0.4 , 3.7)	1.2	(0.0 , 2.5)	1.0
Lesotho[1]	43	212	26	88	369	321	833	148	309	1,610	13.4	(8.8 , 18.1)	25.5	(21.8 , 29.0)	17.6	(9.5 , 25.3)	28.5	(22.0 , 35.0)	22.9
Mali[1]	4	16	2	3	25	652	1,476	115	437	2,680	0.6	(0.0 , 1.3)	1.1	(0.3 , 1.8)	1.7	(0.0 , 3.8)	0.7	(0.0 , 1.6)	0.9
Niger[1,2]	2	11	1	5	19	892	850	40	307	2,089	0.2	(0.0 , 0.7)	1.3	(0.5 , 2.1)	3.3	(0.0 , 8.8)	1.5	(0.1 , 2.8)	0.9
Rwanda[1]	13	78	0	5	96	1,155	1,733	25	96	3,009	1.2	(0.5 , 1.8)	4.5	(3.5 , 5.5)	0.0	(0.0 , 0.0)	5.1	(0.4 , 9.8)	3.2
Senegal[1]	1	10	1	0	12	479	1,305	169	249	2,202	0.2	(0.0 , 0.5)	0.8	(0.1 , 1.4)	0.6	(0.0 , 2.0)	0.0	(0.0 , 0.3)	0.5
Swaziland	20	514	48	134	716	323	1,742	201	306	2,572	6.2	(3.3 , 9.0)	29.5	(27.1 , 31.8)	23.9	(17.5 , 30.7)	43.8	(37.8 , 50.0)	27.8
Zimbabwe	50	675	19	64	808	765	2,956	197	353	4,271	6.5	(4.4 , 8.6)	22.8	(20.9 , 24.8)	9.7	(5.1 , 14.3)	18.2	(13.2 , 23.1)	18.9
Total SSA[4]	84	662	85	118	949	8,598	13,993	1,556	2,213	26,360	1.0	(0.6 , 1.3)	4.7	(4.3 , 5.2)	5.5	(4.3 , 6.7)	5.3	(4.3 , 6.3)	3.6

[1] Only for respondents whose last sexual relationship started at least 12 months before the survey.
[2] No information on duration for any non-marital sexual partner.
[3] Sexual history limited to the respondent's most recent 2 partners.
[4] Total SSA figures were calculated by using appropriate pooled weights.

Table B8a. Logistic regression results (odds ratios, OR) of HIV risk as a function of concurrency of sexual relations among respondents age 15-49 who ever had sex and other background characteristics and behaviours: sub-Saharan Africa (pooled data): Women[1]

	Unadjusted model		Adjusted model	
Characteristic	**OR**	**(95% CI; p-value)**	**OR**	**(95% CI; p-value)**
Concurrency of sexual relations				
1 lifetime partner		ref.		ref.
2+ lifetime prts, < 2 prts past 12 mo	3.55	(3.05 , 4.14 ; .000)	2.87	(2.36 , 3.49 ; .000)
2+ lifetime prts, 2+ non overlapping prts past 12 mo	4.06	(2.59 , 6.38 ; .000)	2.32	(1.39 , 3.88 ; .001)
2+ lifetime prts, 2+ overlapping prts past 12 mo	4.69	(3.23 , 6.81 ; .000)	3.29	(2.19 , 4.93 ; .000)
Age group				
15-24				ref.
25-34			1.50	(1.22 , 1.84 ; .000)
35+			1.27	(1.02 , 1.59 ; .034)
Education				
No education				ref.
Primary incomplete			2.53	(1.83 , 3.50 ; .000)
Primary complete			3.20	(2.22 , 4.61 ; .000)
Secondary or higher			2.62	(1.83 , 3.76 ; .000)
Marital status				
Never married				ref.
Currently married			0.89	(0.67 , 1.16 ; .381)
Formerly married			2.42	(1.83 , 3.21 ; .000)
Residence				
Urban				ref.
Rural			0.51	(0.40 , 0.65 ; .000)
Wealth status				
Lowest				ref.
Second			1.26	(0.97 , 1.63 ; .083)
Third			1.30	(1.03 , 1.62 ; .024)
Fourth			1.15	(0.90 , 1.47 ; .253)
Highest			1.51	(1.09 , 2.10 ; .014)
Circumcision				
No			n.a.	
Yes			n.a.	
Consistent condom use in past 12 months				
No				ref.
Yes			1.16	(0.88 , 1.52 ; .303)
Did not have sex in past 12 months			1.12	(0.91 , 1.37 ; .272)
Country				
Cameroon				ref.
Ethiopia			0.92	(0.64 , 1.33 ; .661)
Guinea			0.73	(0.51 , 1.03 ; .072)
Lesotho			n.a.	
Mali			0.61	(0.42 , 0.88 ; .008)
Niger			0.38	(0.23 , 0.63 ; .000)
Rwanda			1.13	(0.89 , 1.44 ; .319)
Senegal			n.a.	
Swaziland			9.66	(7.97 , 11.71 ; .000)
Zimbabwe			6.67	(5.57 , 8.00 ; .000)
Total SSA[1]		32,449		32,361

[1] Pooled sample for women includes: Cameroon, Ethiopia, Guinea, Mali, Niger, Rwanda, Swaziland, and Zimbabwe.

Table B8b. Logistic regression results (odds ratios, OR) of HIV risk as a function of concurrency of sexual relations among respondents age 15-49 who ever had sex and other background characteristics and behaviours: sub-Saharan Africa (pooled data): Men[1]

	Unadjusted model		Adjusted model 1		Adjusted model 2	
Characteristic	**OR**	**(95% CI; p-value)**	**OR**	**(95% CI; p-value)**	**OR**	**(95% CI; p-value)**
Concurrency of sexual relations						
1 lifetime partner		ref.		ref.		ref.
2+ lifetime prts, < 2 prts past 12 mo	5.02	(3.47 , 7.25 ; .000)	2.57	(1.74 , 3.78 ; .000)	2.56	(1.75 , 3.77 ; .000)
2+ lifetime prts, 2+ non overlapping prts past 12 mo	5.83	(3.81 , 8.92 ; .000)	4.17	(2.52 , 6.91 ; .000)	4.17	(2.52 , 6.88 ; .000)
2+ lifetime prts, 2+ overlapping prts past 12 mo	5.67	(3.77 , 8.53 ; .000)	2.95	(1.90 , 4.59 ; .000)	2.94	(1.89 , 4.56 ; .000)
Age group						
15-24				ref.		ref.
25-34			3.22	(2.38 , 4.35 ; .000)	3.21	(2.37 , 4.35 ; .000)
35+			3.95	(2.84 , 5.47 ; .000)	3.94	(2.84 , 5.46 ; .000)
Education						
No education				ref.		ref.
Primary incomplete			1.11	(0.77 , 1.60 ; .568)	1.10	(0.77 , 1.58 ; .606)
Primary complete			1.80	(1.08 , 3.00 ; .025)	1.80	(1.08 , 3.00 ; .025)
Secondary or higher			1.45	(0.93 , 2.25 ; .101)	1.45	(0.93 , 2.24 ; .101)
Marital status						
Never married				ref.		ref.
Currently married			1.68	(1.25 , 2.25 ; .001)	1.68	(1.25 , 2.25 ; .001)
Formerly married			3.16	(2.23 , 4.48 ; .000)	3.16	(2.23 , 4.48 ; .000)
Residence						
Urban				ref.		ref.
Rural			0.79	(0.58 , 1.06 ; .119)	0.79	(0.58 , 1.07 ; .125)
Wealth status						
Lowest				ref.		ref.
Second			0.93	(0.68 , 1.26 ; .636)	0.94	(0.69 , 1.28 ; .676)
Third			1.18	(0.87 , 1.62 ; .290)	1.19	(0.87 , 1.63 ; .266)
Fourth			1.12	(0.79 , 1.59 ; .511)	1.13	(0.80 , 1.60 ; .480)
Highest			1.35	(0.87 , 2.10 ; .187)	1.36	(0.87 , 2.12 ; .176)
Circumcision						
No						ref.
Yes					1.03	(0.78 , 1.35 ; .857)

(Cont'd)

Table B8b – cont'd

Characteristic	Unadjusted model		Adjusted model 1		Adjusted model 2	
	OR	(95% CI; p-value)	OR	(95% CI; p-value)	OR	(95% CI; p-value)
Consistent condom use in past 12 months						
No				ref.		ref.
Yes			1.10	(0.90 , 1.35 ; .367)	1.09	(0.89 , 1.34 ; .386)
Did not have sex in past 12 months			1.19	(0.83 , 1.72 ; .343)	1.19	(0.82 , 1.71 ; .358)
Country						
Cameroon				ref.		ref.
Ethiopia			0.48	(0.30 , 0.78 ; .003)	0.48	(0.30 , 0.78 ; .003)
Guinea			0.28	(0.17 , 0.46 ; .000)	0.28	(0.17 , 0.46 ; .000)
Lesotho			10.62	(8.05 , 14.02 ; .000)	10.75	(8.10 , 14.26 ; .000)
Mali			0.26	(0.15 , 0.47 ; .000)	0.26	(0.15 , 0.47 ; .000)
Niger			0.31	(0.18 , 0.55 ; .000)	0.31	(0.18 , 0.55 ; .000)
Rwanda			1.09	(0.79 , 1.49 ; .611)	1.11	(0.77 , 1.61 ; .579)
Senegal			0.15	(0.07 , 0.33 ; .000)	0.15	(0.07 , 0.33 ; .000)
Swaziland			11.68	(9.19 , 14.84 ; .000)	11.91	(8.67 , 16.37 ; .000)
Zimbabwe			6.44	(5.13 , 8.09 ; .000)	6.55	(4.76 , 9.02 ; .000)
Total SSA[1]	26,349		26,312		26,262	

[2] Pooled sample for men includes: Cameroon, Ethiopia, Guinea, Lesotho, Mali, Niger, Rwanda, Senegal, Swaziland, and Zimbabwe.

Table C1. Among respondents age 15-49 who had sex in past 12 months and whose last sexual relationship started at least 12 months before the survey, number and percentage (with 95% confidence interval) who had 1 sexual partner, who had 2+ non-overlapping partners, and who had 2+ overapping partners in past 12 months: Women

	Number				Percentage (95% Conf. Interval)					
					1 partner in past 12 months		2+ non overlapping prts in past 12 months		2+ overlapping partners in past 12 months	
Region/Country	1 partner in past 12 months	2+ non over-lapping prts in past 12 months	2+ over-lapping partners in past 12 months	# had sex in past 12 months	%	(95% CI)	%	(95% CI)	%	(95% CI)
Asia										
Cambodia	9,969	3	26	9,998	99.7	(99.5 , 100.0)	0.0	(0.0 , 0.0)	0.3	(3.7 , 4.9)
India	89,058	7	64	89,128	99.9	(99.9 , 100.0)	0.0	(0.0 , 0.0)	0.1	(1.0 , 1.8)
Latin America & Caribbean										
Dominican Republic[1]	16,547	208	236	16,991	97.4	(97.0 , 97.7)	1.2	(1.0 , 1.5)	1.4	(0.0 , 0.3)
Haiti	7,233	90	47	7,370	98.1	(97.7 , 98.6)	1.2	(0.9 , 1.5)	0.6	(0.0 , 0.1)
Sub-saharan Africa										
Burkina Faso	8,053	53	62	8,168	98.6	(98.1 , 99.0)	0.6	(0.4 , 0.9)	0.8	(0.0 , 0.5)
Cameroon	7,446	267	344	8,057	92.4	(91.5 , 93.3)	3.3	(2.9 , 3.8)	4.3	(1.1 , 1.7)
Ethiopia	4,342	4	7	4,353	99.7	(99.6 , 99.9)	0.1	(0.0 , 0.2)	0.2	(0.5 , 1.2)
Ghana	3,802	28	33	3,863	98.4	(98.0 , 98.9)	0.7	(0.4 , 1.0)	0.9	(1.1 , 1.9)
Guinea	5,183	83	78	5,344	97.0	(96.3 , 97.6)	1.6	(1.1 , 2.0)	1.5	(0.4 , 0.9)
Kenya	5,567	61	81	5,709	97.5	(97.0 , 98.0)	1.1	(0.7 , 1.4)	1.4	(8.1 , 10.0)
Lesotho	4,435	96	451	4,982	89.0	(88.0 , 90.1)	1.9	(1.5 , 2.4)	9.1	(0.4 , 0.8)
Malawi	8,989	43	55	9,087	98.9	(98.7 , 99.2)	0.5	(0.3 , 0.6)	0.6	(0.8 , 1.3)
Mali	11,889	82	94	12,065	98.5	(97.7 , 99.4)	0.7	(0.1 , 1.3)	0.8	(0.5 , 1.1)
Niger	7,593	8	53	7,654	99.2	(98.8 , 99.6)	0.1	(0.0 , 0.2)	0.7	(0.2 , 0.5)
Rwanda	5,852	15	20	5,887	99.4	(99.2 , 99.6)	0.3	(0.1 , 0.4)	0.3	(0.7 , 1.3)
Senegal	9,066	81	90	9,237	98.1	(97.5 , 98.8)	0.9	(0.4 , 1.3)	1.0	(1.3 , 2.1)
Swaziland	3,363	70	10	3,443	97.7	(97.1 , 98.3)	2.0	(1.5 , 2.6)	0.3	(0.1 , 0.5)
Zambia[1]	5,519	60	98	5,677	97.2	(96.7 , 97.7)	1.1	(0.7 , 1.4)	1.7	(0.2 , 0.5)
Zimbabwe	5,801	58	20	5,879	98.7	(98.3 , 99.0)	1.0	(0.7 , 1.3)	0.3	(0.0 , 0.0)
Total SSA[2]	95,507	767	1,020	97,294	98.2	(98.1 , 98.3)	0.8	(0.7 , 0.9)	1.0	(0.9 , 1.1)

[1] Individual HIV data not merged with survey data.

[2] Total SSA figures were calculated by using appropriate pooled weights.

Table C2. Among respondents age 15-49 who had sex in past 12 monthsand whose last sexual relationship started at least 12 months before the survey, number and percentage (with 95% confidence interval) who had 1 sexual partner, who had 2+ non-overlapping partners, and who had 2+ overapping partners in past 12 months: Men

	Number				Percentage (95% Conf. Interval)					
					1 partner in past 12 months		2+ non overlapping prts in past 12 months		2+ overlapping partners in past 12 months	
Region/Country	1 partner in past 12 months	2+ non over-lapping prts in past 12 months	2+ over-lapping partners in past 12 months	# had sex in past 12 months	%	(95% CI)	%	(95% CI)	%	(95% CI)
Asia										
Cambodia	3,873	172	234	4,279	90.5	(89.2 , 91.9)	4.0	(3.2 , 4.9)	5.5	(4.5 , 6.5)
India	43,342	245	649	44,236	98.0	(97.8 , 98.2)	0.6	(0.4 , 0.6)	1.5	(1.3 , 1.7)
Latin America & Caribbean										
Dominican Republic[1]	1,427	252	343	2,022	70.6	(67.4 , 73.8)	12.5	(10.3 , 14.6)	17.0	(14.5 , 19.4)
Haiti	2,396	603	419	3,417	70.1	(67.5 , 72.7)	17.6	(15.5 , 19.7)	12.3	(10.7 , 13.8)
Sub-saharan Africa										
Burkina Faso	1,538	132	338	2,008	76.6	(73.6 , 79.6)	6.6	(5.0 , 8.1)	16.8	(14.5 , 19.2)
Cameroon	2,181	913	565	3,658	59.6	(57.6 , 61.6)	25.0	(22.9 , 27.0)	15.4	(14.0 , 16.9)
Ethiopia	2,992	32	96	3,121	95.9	(94.9 , 96.8)	1.0	(0.6 , 1.5)	3.1	(2.2 , 4.0)
Ghana	2,456	110	339	2,905	84.5	(83.0 , 86.1)	3.8	(3.0 , 4.6)	11.7	(10.3 , 13.0)
Guinea	1,335	348	322	2,005	66.6	(63.7 , 69.5)	17.4	(15.1 , 19.6)	16.1	(14.1 , 18.0)
Kenya	1,986	151	242	2,380	83.5	(81.6 , 85.3)	6.4	(5.2 , 7.6)	10.2	(8.6 , 11.7)
Lesotho	1,214	168	354	1,737	69.9	(67.0 , 72.8)	9.7	(7.9 , 11.5)	20.4	(18.3 , 22.4)
Malawi	2,117	68	216	2,401	88.2	(86.5 , 89.8)	2.8	(2.0 , 3.6)	9.0	(7.6 , 10.4)
Mali	1,958	119	444	2,521	77.7	(75.2 , 80.1)	4.7	(3.5 , 6.0)	17.6	(15.5 , 19.8)
Niger[2]	1,680	39	343	2,062	81.5	(78.7 , 84.2)	1.9	(1.1 , 2.7)	16.6	(14.0 , 19.2)
Rwanda	2,277	24	97	2,399	94.9	(93.9 , 96.0)	1.0	(0.6 , 1.4)	4.0	(3.1 , 5.0)
Senegal	1,529	169	284	1,983	77.1	(74.6 , 79.6)	8.5	(6.2 , 10.9)	14.3	(12.0 , 16.7)
Swaziland	1,906	377	190	2,474	77.0	(75.1 , 79.1)	15.2	(13.5 , 17.0)	7.7	(6.4 , 8.9)
Zambia[1]	1,155	143	277	1,575	73.3	(70.7 , 76.0)	9.1	(7.4 , 10.8)	17.6	(15.4 , 19.7)
Zimbabwe	3,757	299	318	4,373	85.9	(84.5 , 87.3)	6.8	(5.9 , 7.8)	7.3	(6.2 , 8.3)
Total SSA[3]	31,022	2,360	3,876	37,258	83.3	(82.8 , 83.8)	6.3	(6.0 , 6.6)	10.4	(10.0 , 10.8)

[1] Individual HIV data not merged with survey data.

[2] No information on duration for any non-marital sexual partner.

[3] Total SSA figures were calculated by using appropriate pooled weights.

Table C3. Among respondents age 15-49 who had sex in past 12 months and whose last sexual relationship started at least 12 months before the survey, HIV prevalence (and 95% confidence interval) by whether the respondent had 1 sexual partner, 2+ non-overlapping partners, and 2+ overlapping partners in past 12 months: Women

	Number HIV positive				Number tested for HIV				HIV prevalence (%)									
									1 partner in past 12 months			2+ non overlapping prts in past 12 months			2+ overlapping prts in past 12 months			Had sex in past 12m (total)
Region/Country	1 partner in past 12m	2+ non over-lapping prts in past 12m	2+ over-lapping prts in past 12m	Had sex in past 12m (total)	1 partner in past 12m	2+ non over-lapping prts in past 12m	2+ over-lapping prts in past 12m	Had sex in past 12m (total)	%	(95% CI)		%	(95% CI)		%	(95% CI)		
Asia																		
Cambodia	31	0	0	31	4,770	2	13	4,785	0.6 (	0.4 ,	0.9)	0.0 (	0.0 ,	0.0)	0.0 (	0.0 ,	0.0)	0.6
India	80	1	0	81	38,237	2	19	38,259	0.2 (	0.2 ,	0.3)	53.4 (	0.0 ,	6.9)	0.0 (	0.0 ,	0.0)	0.2
Latin America & Caribbean																		
Haiti	98	3	4	105	3,486	47	29	3,562	2.8 (	2.2 ,	3.5)	6.3 (	0.0 ,	14.3)	13.7 (	0.0 ,	33.4)	2.9
Sub-saharan Africa																		
Burkina Faso	43	0	2	46	2,549	23	22	2,594	1.7 (	1.1 ,	2.3)	1.6 (	0.0 ,	4.3)	9.4 (	0.0 ,	28.4)	1.8
Cameroon	248	14	18	280	3,580	141	171	3,892	6.9 (	6.0 ,	7.8)	10.2 (	5.0 ,	15.4)	10.4 (	5.9 ,	14.8)	7.2
Ethiopia	69	1	0	70	3,719	2	5	3,726	1.9 (	1.3 ,	2.4)	56.3 (	0.0 ,	122.7)	1.6 (	0.0 ,	6.4)	1.9
Ghana	93	1	3	97	3,412	25	29	3,466	2.7 (	2.1 ,	3.3)	5.5 (	0.0 ,	16.5)	11.2 (	0.0 ,	24.0)	2.8
Guinea	52	2	2	55	2,397	44	51	2,492	2.2 (	1.5 ,	2.9)	3.4 (	0.0 ,	8.8)	3.2 (	0.0 ,	8.1)	2.2
Kenya	207	6	7	220	2,166	21	38	2,225	9.6 (	8.2 ,	10.9)	26.0 (	3.9 ,	48.1)	18.2 (	1.9 ,	34.5)	9.9
Lesotho	571	8	83	662	1,944	37	198	2,179	29.4 (	26.9 ,	31.8)	22.2 (	3.2 ,	41.1)	42.1 (	34.2 ,	50.0)	30.4
Malawi	284	3	5	292	2,135	3	15	2,153	13.3 (	11.8 ,	14.8)	92.2 (	61.6 ,	122.8)	32.9 (	0.0 ,	66.0)	13.6
Mali	57	3	0	60	3,639	49	41	3,729	1.6 (	1.0 ,	2.0)	6.1 (	0.0 ,	17.4)	0.0 (	0.0 ,	0.0)	1.6
Niger	25	0	0	25	3,617	3	27	3,647	0.7 (	0.4 ,	1.0)	0.0 (	0.0 ,	0.0)	0.0 (	0.0 ,	0.0)	0.7
Rwanda	100	0	2	101	2,882	8	11	2,901	3.5 (	2.8 ,	4.1)	0.0 (	0.0 ,	0.0)	14.2 (	0.0 ,	45.1)	3.5
Senegal	19	0	0	19	2,842	37	19	2,898	0.7 (	0.3 ,	1.0)	0.0 (	0.0 ,	0.0)	0.0 (	0.0 ,	0.0)	0.7
Swaziland	1,071	30	9	1,110	2,989	63	10	3,061	35.8 (	34.1 ,	37.6)	47.6 (	35.0 ,	61.5)	90.0 (	71.6 ,	110.9)	36.3
Zimbabwe	1,018	26	6	1,050	4,565	50	14	4,629	22.3 (	20.9 ,	23.7)	51.4 (	34.9 ,	67.9)	44.3 (	13.4 ,	75.2)	22.7
Total SSA[1]	2,241	54	66	2,361	42,382	363	475	43,220	5.3 (	5.0 ,	5.6)	14.9 (	10.2	19.6)	13.9 (	9.6 ,	18.1)	5.5

[1] Total SSA figures were calculated by using appropriate pooled weights.

Table C4. Among respondents age 15-49 who had sex in past 12 months and whose last sexual relationship started at least 12 months before the survey, HIV prevalence (and 95% confidence interval) by whether the respondent had 1 sexual partner, 2+ non-overlapping partners, and 2+ overlapping partners in past 12 months: Women

	Number HIV positive				Number tested for HIV				HIV prevalence (%)									
									1 partner in past 12 months			2+ non overlapping prts in past 12 months			2+ overlapping prts in past 12 months			Had sex in past 12m
Region/Country	1 partner in past 12m	2+ non over-lapping prts in past 12m	2+ over-lapping prts in past 12m	Had sex in past 12m (total)	1 partner in past 12m	2+ non over-lapping prts in past 12m	2+ over-lapping prts in past 12m	Had sex in past 12m (total)	%	(95% CI)		%	(95% CI)		%	(95% CI)		(total)
Asia																		
Cambodia	26	2	6	34	3,833	169	230	4,231	0.7 (	0.4 ,	1.0)	1.4 (	0.0 ,	3.2)	2.5 (	0.0 ,	5.5)	0.8
India	124	1	4	128	28,983	178	476	29,637	0.4 (	0.3 ,	0.5)	0.6 (	0.0 ,	1.7)	0.8 (	0.0 ,	1.5)	0.4
Latin America & Caribbean																		
Haiti	59	6	15	80	2,336	575	407	3,318	2.5 (	1.6 ,	3.4)	1.0 (	0.3 ,	1.7)	3.7 (	1.6 ,	5.9)	2.4
Sub-saharan Africa																		
Burkina Faso	26	1	3	30	1,455	118	326	1,900	1.8 (	0.9 ,	2.6)	1.1 (	0.0 ,	2.6)	1.0 (	0.0 ,	2.1)	1.6
Cameroon[1]	76	61	40	177	2,092	883	538	3,513	3.7 (	2.8 ,	4.5)	6.9 (	5.1 ,	8.7)	7.4 (	5.1 ,	9.6)	5.0
Ethiopia	33	2	3	37	2,665	28	85	2,778	1.2 (	0.7 ,	1.7)	5.7 (	0.0 ,	16.1)	3.4 (	0.0 ,	8.4)	1.3
Ghana	42	0	6	48	2,177	92	292	2,561	1.9 (	1.3 ,	2.6)	0.0 (	0.0 ,	0.0)	2.2 (	0.3 ,	4.1)	1.9
Guinea	10	7	4	21	1,245	327	325	1,897	0.8 (	0.3 ,	1.3)	2.1 (	0.4 ,	3.7)	1.2 (	0.0 ,	2.5)	1.1
Kenya	91	5	22	119	1,700	128	197	2,025	5.4 (	4.2 ,	6.6)	4.1 (	0.0 ,	8.3)	11.3 (	6.3 ,	16.3)	5.9
Lesotho	226	26	88	339	994	149	321	1,463	22.7 (	19.6 ,	25.9)	17.3 (	9.5 ,	25.2)	27.4 (	21.1 ,	33.7)	23.2
Malawi	189	3	35	226	1,713	56	185	1,954	11.0 (	9.2 ,	12.8)	5.5 (	0.0 ,	13.5)	18.7 (	11.7 ,	25.7)	11.6
Mali	20	2	3	25	1,910	115	437	2,462	1.0 (	0.4 ,	1.7)	1.7 (	0.0 ,	3.8)	0.7 (	0.0 ,	1.6)	1.0
Niger[1]	12	1	5	18	1,544	40	307	1,891	0.8 (	0.3 ,	1.3)	3.3 (	0.0 ,	8.8)	1.5 (	0.1 ,	2.8)	1.0
Rwanda	74	0	5	79	2,238	25	96	2,359	3.3 (	2.6 ,	4.1)	0.0 (	0.0 ,	0.0)	5.1 (	0.4 ,	9.8)	3.4
Senegal	10	1	0	11	1,661	186	302	2,149	0.6 (	0.1 ,	1.1)	0.6 (	0.0 ,	1.8)	0.1 (	0.0 ,	0.3)	0.5
Swaziland	478	101	82	661	1,708	346	160	2,214	28.0 (	25.7 ,	30.3)	29.2 (	23.9 ,	34.6)	51.3 (	42.4 ,	59.2)	29.9
Zimbabwe	641	27	56	724	3,126	271	279	3,676	20.5 (	18.7 ,	22.4)	10.0 (	5.9 ,	14.0)	20.1 (	14.4 ,	25.9)	19.7
Total SSA[2]	1,088	99	201	1,388	27,418	2,011	3,261	32,690	4.0 (	3.7 ,	4.3)	4.9 (	3.8 ,	6.0)	6.2 (	5.0 ,	7.2)	4.2

[1] No information on duration for any non-marital sexual partner.
[2] Total SSA figures were calculated by using appropriate pooled weights.

Table D1. Number of respondents age 15-49, by marital status and sex

	Women				Men				
		Currently in union				Currently in union			
Region/Country	Not currently in union[3]	Married once	Married more than once	Total	Not currently in union[3]	Mono-gamous, married once	Mono-gamous, married more than once	Poly-gamous	Total
Asia									
Cambodia	6,736	9,215	845	16,823	2,758	3,550	404	0	6,731
India	31,296	91,254	1,831	124,385	26,249	41,184	1,920	360	69,751
Latin America & Caribbean									
Dominican Republic[1]	9,388	9,042	4,954	23,384	1,370	720	405	43	2,537
Haiti	4,434	4,099	2,209	10,757	2,543	1,246	472	165	4,438
Sub-Saharan Africa									
Burkina Faso	2,822	8,452	1,149	12,477	1,572	1,033	192	390	3,209
Cameroon	3,491	5,442	1,673	10,656	2,544	1,294	697	250	4,815
Cote d'Ivoire	2,126	2,551	493	5,183	2,503	1,319	366	287	4,503
Ethiopia	2,434	3,291	1,026	6,751	2,574	2,717	0	172	5,464
Ghana	2,142	2,608	929	5,691	2,301	1,350	620	258	4,529
Guinea	1,662	5,122	1,124	7,954	1,290	729	224	441	2,709
Kenya	3,276	4,579	340	8,195	1,747	1,249	216	149	3,363
Lesotho	3,386	3,581	105	7,095	1,541	856	45	46	2,496
Malawi	3,385	6,543	1,770	11,698	1,177	1,281	470	186	3,114
Mali	2,218	10,170	2,020	14,583	1,468	1,241	342	558	3,704
Niger	1,282	6,225	1,657	9,223	1,178	1,088	408	381	3,101
Rwanda	5,811	4,716	760	11,321	2,287	1,691	325	104	4,413
Senegal	4,737	7,923	1,832	14,602	1,881	952	243	306	3,415
Swaziland	2,925	1,905	151	4,987	2,937	835	312	64	4,156
Tanzania	2,501	3,529	833	6,863	2,654	2,002	707	295	5,659
Uganda	3,583	4,933	1,405	9,973	3,772	2,220	1,091	906	8,009
Zambia[1]	2,964	3,686	998	7,658	887	691	301	93	1,974
Zimbabwe	3,764	4,447	693	163,503	3,731	2,324	507	140	75,492
Total SSA[2]	56,740	86,029	20,390	163,503	36,584	27,477	6,267	4,849	75,492

Note: Numbers in the individual columns may not add to the total number of respondents interviewed due to missing values.

[1] Individual HIV data not merged with survey data.

[2] Total SSA figures were calculated by using appropriate pooled weights.

[3] Respondents not currently in union include respondents who are neither married nor living with a partner.

Table D2. Among respondents age 15-49, number who ever had sex and who had sex in past 12 months, by sex

	Women		Men	
Region/Country	**Ever had sex**	**Had sex in past 12 months**	**Ever had sex**	**Had sex in past 12 months**
Asia				
Cambodia	11,479	9,998	4,508	4,279
India	98,989	89,128	47,819	44,236
Latin America & Caribbean				
Dominican Republic[1]	19,078	16,991	2,188	2,022
Haiti	8,628	7,370	3,879	3,417
Sub-Saharan Africa				
Burkina Faso	10,906	8,168	2,375	2,008
Cameroon	9,279	8,057	3,956	3,658
Cote d'Ivoire	4,706	4,115	3,948	3,491
Ethiopia	5,134	4,353	3,450	3,121
Ghana	4,806	3,863	3,376	2,905
Guinea	7,209	5,344	2,315	2,005
Kenya	6,795	5,709	2,825	2,380
Lesotho	5,915	4,982	1,990	1,737
Malawi	10,395	9,087	2,715	2,401
Mali	13,006	12,065	2,748	2,521
Niger	8,331	7,654	2,278	2,062
Rwanda	7,816	5,887	3,053	2,399
Senegal	10,684	9,237	2,408	1,983
Swaziland	4,102	3,443	2,879	2,473
Tanzania	5,963	5,289	4,688	4,177
Uganda	8,599	7,387	6,571	5,642
Zambia[1]	6,750	5,677	1,772	1,575
Zimbabwe	7,059	5,879	5,070	4,373
Total SSA[2]	136,133	115,653	57,771	50,683

Note: The figures in the table might slightly differ from those presented in the individual country reports because of different adjustments used for inconsistencies in the sexual relationships reported by the respondents.

[1] Individual HIV data not merged with survey data.

[2] Total SSA figures were calculated by using appropriate pooled weights.

Table D3. Among respondents age 15-49 who had sex in past 12 months, number who had 1, 2 or 3+ sexual partners

	Women				Men			
Region/Country	**1**	**2**	**3+**	**# had sex in past 12 months**	**1**	**2**	**3+**	**# had sex in past 12 months**
Asia								
Cambodia	9,969	28	1	9,998	3,873	213	193	4,279
India	89,058	65	5	89,128	43,342	721	173	44,236
Latin America & Caribbean								
Dominican Republic[1]	16,547	367	77	16,991	1,427	334	261	2,022
Haiti	7,233	129	8	7,370	2,396	794	227	3,417
Sub-Saharan Africa								
Burkina Faso	8,053	113	2	8,168	1,538	382	88	2,008
Cameroon	7,446	537	74	8,057	2,181	956	521	3,658
Cote d'Ivoire	3,929	144	41	4,115	2,423	770	298	3,491
Ethiopia	4,342	9	2	4,353	2,992	119	10	3,121
Ghana	3,802	56	5	3,863	2,456	375	74	2,905
Guinea	5,183	153	8	5,344	1,335	528	142	2,005
Kenya	5,567	129	13	5,709	1,986	313	81	2,380
Lesotho	4,435	513	34	4,982	1,214	394	128	1,737
Malawi	8,989	94	4	9,087	2,117	246	38	2,401
Mali	11,889	168	8	12,065	1,958	466	98	2,521
Niger	7,593	52	9	7,654	1,680	352	30	2,062
Rwanda	5,852	35	0	5,887	2,277	121	0	2,399
Senegal	9,066	155	16	9,237	1,529	370	84	1,983
Swaziland	3,363	75	5	3,443	1,906	518	49	2,473
Tanzania	4,966	287	36	5,289	3,044	856	277	4,177
Uganda	7,107	259	21	7,387	3,989	1,257	396	5,642
Zambia[1]	5,519	150	8	5,677	1,155	317	103	1,575
Zimbabwe	5,801	71	7	5,879	3,757	518	98	4,373
Total SSA[2]	112,547	2,774	332	115,653	40,532	7,869	2,282	50,683

Note: Numbers in the individual columns may not add to the total number of respondents who had sex in past 12 months due to missing values.

[1] Individual HIV data not merged with survey data.

[2] Total SSA figures were calculated by using appropriate pooled weights.

Table D4. Among respondents age 15-49 who ever had sex, number who had 1, 2, or 3+ lifetime sexual partners

	Women				Men			
Region/Country	**1**	**2**	**3+**	**# ever had sex**	**1**	**2**	**3+**	**# ever had sex**
Asia								
Cambodia	10,429	958	59	11,479	2,514	570	1,411	4,508
India	97,107	1,507	74	98,989	38,609	5,396	3,628	47,819
Latin America & Caribbean								
Haiti	3,916	2,526	2,153	8,628	348	357	3,084	3,879
Sub-Saharan Africa								
Cameroon	3,327	1,902	4,023	9,279	426	379	3,143	3,956
Cote d'Ivoire	1,645	1,200	1,780	4,706	361	427	3,003	3,948
Ethiopia	3,704	1,009	393	5,134	1,604	762	1,052	3,450
Guinea	4,396	1,800	912	7,209	273	362	1,587	2,315
Lesotho	n.a.	n.a.	n.a.	n.a.	394	264	1,256	1,990
Mali	9,345	2,784	822	13,006	667	611	1,277	2,748
Niger	6,538	1,501	255	8,331	969	629	656	2,278
Rwanda	5,571	1,609	621	7,816	1,168	777	1,099	3,053
Senegal	n.a.	n.a.	n.a.	n.a.	531	491	1,268	2,408
Swaziland	1,430	1,188	1,344	4,102	366	363	1,954	2,879
Tanzania	2,557	1,476	1,917	5,963	714	823	3,022	4,688
Uganda	3,597	2,324	2,628	8,599	982	1,113	4,299	6,571
Zimbabwe	4,652	1,501	881	7,059	968	919	3,089	5,070
Total SSA[1]	45,202	17,877	16,185	79,747	11,207	8,166	23,879	44,297

Note: Numbers in the individual columns may not add to the total number of respondents who ever had sex due to missing values.

[1] Total SSA figures were calculated by using appropriate pooled weights.