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# Comparing Condom Use with Different Types of Partners

## Evidence from National HIV Surveys in Africa

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## Abstract

Based on nationally representative samples from 13 Sub-Saharan African countries, this paper reinforces and expands previous findings that condom use in general is low in this region, men report using condoms more frequently than women, and unmarried individuals report they use condoms more frequently than married individuals with their spouse. Based on descriptive, bivariate, and multivariate analyses, the authors also demonstrate to a degree not previously shown in the current literature that married men from most countries report using condoms with extramarital partners about as frequently as unmarried men. However, married women from most countries included use condoms with extramarital partners less frequently than unmarried women. This result is especially troubling because marriage usually ensures regular sexual intercourse, providing more opportunities to pass HIV from extramarital partner to spouse than an unmarried person who may also have multiple partners but not as regular sexual intercourse.


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This paper—a product of the Human Development and Public Services Team, Development Research Group—is part of a larger effort in the department to understand the determinants of the HIV/AIDS epidemic. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at ddewalque@worldbank.org.

# Comparing condom use with different types of partners: Evidence from national HIV surveys in Africa

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## Section 1: Introduction

Condoms are one of the best methods for protection against HIV (Davis and Weller, 1999) and they have great potential to keep the epidemic from expanding further if used broadly. However, across Sub-Saharan Africa, where HIV prevalence is among the highest in the world, condom use is generally insufficient to lower infection rates (Lagarde et al. 2001). Condom use varies widely among different sub-sectors of the population and in different contexts. While condom use needs to increase overall, it is important to consider this variation to identify areas of particular need and direct specific prevention efforts.

An additional reason for this inquiry into condom use stems from recent data from five African countries (de Walque, 2007) showing a surprisingly high number of discordant couples (cohabitating or married), in which one partner is HIV positive and the other is not. Among couples in which at least one of two partners is HIV infected, approximately one-third are concordant positive (male and female positive), one-third are discordant male (male positive, female negative) and one-third are discordant female (female positive, male negative). After exploring different possible reasons, de Walque concludes that extramarital sex is an important source of discordant HIV infection. Though men self-reported extramarital sex levels that are consistent with these results, women report much less frequent extramarital sex. Therefore, it is likely that women are reporting much less extramarital sex than they are having or that they are having extramarital sex in riskier conditions than men. Having extramarital sex without using a condom could be one of those risky situations. This paper investigates whether this is the

case by comparing condom use among different groups, including married men and women during extramarital sex.

Many studies have explored condom use in Africa but most have not been comprehensive analyses of condom use in both a variety of contexts and by many sub-groups of the population. This study uses nationally representative data from 13 Sub-Saharan African countries to describe and compare condom use by different sectors of the population. By analyzing and contrasting condom use by men, women, married and unmarried individuals with different types of partners (any type, spouse, someone other than a spouse), patterns emerge that both substantiate findings from earlier studies and provide new insights into high risk behavior.

Specifically, we confirm across all countries included that condom use overall is generally low, that men report using condoms more than women, and that unmarried individuals report using condoms more than married individuals with their spouses. We also describe condom use in extramarital intercourse for males and females. Reported condom use by males in extramarital situations is fairly similar to condom use by unmarried males. However, an alarming result that has not been shown across so many contexts in the current literature is that married females report using condoms in extramarital sex significantly less than unmarried females.

## Section 2: Literature Review

### *Levels of condom use*

Previous studies have shown that, in general, condom use is low in many parts of Africa. Largarde et al. (2001) compare condom use between regions with higher HIV prevalence and lower HIV prevalence to determine if condom use can account for the differences in HIV. The study determines that "variations in levels of condom use in African populations, including those in our study, all ranged below the necessary threshold to achieve a significant impact on the level of the HIV epidemic, and that the slight variations we observed were not sufficient to modulate overall levels of HIV/STI infections" (Lagarde et al. 2001, p. S77). In a population study in Uganda, only 4.4 percent reported consistent condom use (Ahmed et al. 2001). Condom use may be increasing in some areas but it is far from universal. Condom use among urban Zambian males was 68% while it was only 15% among rural males at last non-regular sex (Fylkesnes et al. 2001). Even among HIV positive patients, condom use can be alarmingly deficient. 54.4 percent of sexually active recently diagnosed HIV positive study participants had not used a condom during their most recent intercourse (Olley et al. 2005) and Bunnell et al. (2008) show 83 percent of last sex acts of an HIV positive sample in Uganda were unprotected, though many of these were with a married or cohabitating partner. Other studies reinforce this finding (Holmes et al. 1997; Gersovitz 2005; Kiene et al. 2006). Though overall levels are low, distinguishing levels of condom use between different groups is still important in determining how to increase condom use through prevention efforts directed at specific groups. This study reinforces the

results in the literature that condom use overall is low but also separates the results by different groups in the population.

The literature consistently describes more condom use by males than females. In 1997, a study in Tanzania finds significantly more men (34.1 percent) than women (14.1 percent) reported having ever used a condom (Mnyika et al. 1997). Approximately ten years later, 18.1 percent of rural males in Uganda reported condom use compared to 9.9 percent of rural females (Biraro et al. 2009). Various other studies report similar differences (Gardner et al. 1999; Kamali et al. 2000; Ahmed et al. 2001; Fylkesnes et al. 2001; Hartung et al. 2002; Mumtaz et al. 2005; Pullum et al. 2005; Gregson et al. 2006; Chimbiri 2007). Hendrikson and others (2007) show that condom use is higher among youth than adults but the differences between the genders are maintained with 59 percent of young males and 48 percent of young females reporting condom use at their last intercourse. Another study finds that in discordant couples, where one spouse is HIV positive and the other is not, condom use is higher when the man is uninfected (17.1 percent) than when the woman is uninfected (9.5 percent) (Serwadda et al. 1995). The results from our analysis also show that significantly more men than women report using condoms in all countries included.

Another consistent result in the literature is that condom use within marriage is very low. Based on nationally representative data sets from around the world, Ali and others (2004) report that only 2 percent of married couples used condoms. The level of condom use for unmarried individuals was more than double that of the married respondents in a study done in Kenya (Bauni and Jarabi 2003). Cleland and others (2006) compare condom use for single and married women in 1993 and 2001 using nationally

representative data sets from 13 countries. While single women reporting condom use at last sex increased from 19.3 percent to 28.1 percent, married women reporting condom use at last sex was much lower and hardly increased (3.7 percent to 4.5 percent). Biraro and others (2009) find that unmarried women were 11.4 times and unmarried men were 7.0 times more likely to use a condom at last sex than married women and men, respectively. Numerous other studies demonstrate that condom use with a spouse is very low (Bertrand et al. 1991; Kapiga et al. 1995; Ahmed et al. 2001; Chimbiri 2007; Maharaj and Cleland2004; Hendrikson et al. 2007). Our analysis also illustrates the vast differences between condom use with a spouse and condom use with another type of partner.

In contrast, much less has been said in the current literature about condom use during extramarital intercourse. There seems to be agreement among researchers that men report significantly higher instances of extramarital sex than women. A study in Tanzania shows that 40 percent of married men but only 3 percent of married women reported having non-marital partners in the last year (Nnko et al. 2004). Based on a nationally representative sample for Uganda, Kirungi and others (2006) report that 12 percent of males versus 3 percent of females report extramarital sex in the previous 12 months. In Zimbabwe, 30 percent of married males compared with 10 percent of married females reported partners outside their marriage in the last year (Mumtaz et al. 2005). 23 percent of married males and only 1 percent of married females reported extramarital sex during the past six months in a sample in Democratic Republic of Congo (Bertrand et al. 1991). Pullum and others (2005) report Demographic Health Survey (DHS) data on men's extramarital partners from five African countries; the highest is Tanzania with 36

percent of men reporting at least one more partner other than a spouse and Uganda is the lowest with 12 percent of men reporting at least one extramarital partner in the past year. Corresponding percentages for females are not reported in this study. Other studies show similar results (Kamali et al. 2000; Allen et al. 2003; Mnyika et al. 1997).

Based on the above-described percentages of extramarital relations, condom use is of concern because of the substantial chances of contracting HIV through having multiple partners and then passing it to a spouse. However, few studies describe condom use in these extramarital situations and none use nationally representative data sets for a variety of countries. The studies that include information on condom use in extramarital sex agree that men use condoms more than women and condom use is higher than within marriage, especially for men. In a study of the Kinshasa region in the Democratic Republic of Congo, 24 percent of males reported condom use in extramarital sex during the previous six months compared to 12 percent of females. Half of the male users also reported using the condoms either always or most of the time, which was more regular than in marriage. This rate of condom use and frequency is similar to condom use by unmarried males however the rate for females is more similar to the rate of condom use of married women with their spouse. It should be noted that the number of females observed who had extramarital sex was only 22 individuals, compared with 401 men reporting extramarital sex, therefore condom use results for females in extramarital sex should be considered with caution (Bertrand et al. 1991). In a study in rural Uganda, the most recent data shows that 63 percent of males and 38 percent of females used a condom at last sex outside their marriage though females reported fewer extramarital intercourses overall (Biraro et al. 2009).

There is a gap in the current literature on condom use that this study helps to fill. There is not a lot of information available about condom use in extramarital situations, especially using nationally representative samples from many different countries in Africa. In addition to establishing baseline condom use by men and women inside marriage, this study compares condom use for married males and females outside their marriage to condom use by unmarried males and females. In almost all of countries included, reported condom use by married males in extramarital intercourse is similar to reported condom use by unmarried males. However, in over half of the countries, married females report using condoms in extramarital sex significantly less than unmarried females. This is of great concern because of the increased possibility of becoming infected or infecting their multiple partners with HIV. Based on the data on discordant couples (de Walque 2007) discussed earlier that shows females are likely having more extramarital sex than they are reporting, the low levels of condom use during extramarital sex by married females seen in this analysis is even more troubling.

***Reasons for lack of condom use***

There are many possible reasons for low condom use across Africa that are often intertwined with traditional belief systems about sex, reproduction, and gender roles. Bond and Dover (1997) explain cultural attitudes surrounding sex and condom use based on research on migrant workers in rural Zambia. The importance of sex in order to procreate, that ejaculation into the female is fundamental to the enjoyment of sex by both partners, and how sexual intercourse relates to beliefs about being a virile male and fertile

women all stand in the way of the easy acceptance of condom use, even in the face of understanding HIV risk and that condoms can prevent it. In addition to ways condom use can clash with traditional beliefs, condoms themselves are generally viewed negatively for a variety of reasons. The most commonly cited motive by respondents from eight Sub-Saharan African countries for not using a condom at last sex with a casual partner was a dislike of condoms (Agha et al. 2002). Not being able to afford condoms and their not being available are also cited as reasons for not using condoms but in this study, these reasons were given by few respondents. Another study in Kinshasa, Democratic Republic of Congo (Bertrand et al. 1991) found that over 52 percent of male respondents thought that condoms tear easily during sex, that they can stay in the vagina after sex, and that they decrease sexual enjoyment. 68 percent of urban Rwandan women in another study thought that condoms could cause infertility by getting stuck in the body (Lindan et al. 1991). Even sex workers avoided condoms because of their negative associations with disease and the perception that HIV was a remote threat rather than an immediate, present risk (Varga, 1997).

Even if a woman did want to use a condom, there may be cultural barriers that would prevent her from negotiating condom use with her partner (Gardner et al. 1999). In a qualitative study of condom use in southern and eastern Africa, there was consensus among participants that it is not acceptable for women to ask their partners to use a condom, though there was more flexibility if the partner was not a spouse or not regular (Pullum et al. 2005).

There are then additional reasons that condoms are used even less in marriage, despite the risk of infection. Based on a qualitative analysis, Chimbiri (2007) describes

the perception among a sample of married people in Malawi that bringing up a discussion of condoms is akin to bringing an intruder into the marriage because it implies that one partner is having extramarital sex and it interferes with the marriage as something created by God for the purpose of enjoyment of sex and procreation. In a study of condom use in cohabitating and marital partnerships in KwaZulu Natal, South Africa, Maharaj and Cleland (2004), also find both men and women have strong negative attitudes towards condom use in marriage because it implies infidelity and a lack of trust.

In a study investigating the reasons for non-condom use in eight Sub-Saharan African countries, the most commonly cited reason for not using a condom at last sex with a spouse or regular partner was that they trusted their partner (Agha et al. 2002). This belief can be misguided and may have deadly consequences in contexts with high HIV prevalence rates and low testing rates, as in much of Sub-Saharan Africa. Another study of HIV transmission risk behavior of HIV positive adults in Uganda, Bunnell and others (2008) reported that almost half of those HIV positive adults who did not use condoms during the last sexual encounter gave as reason that they trusted their partner was not infected. Almost all of these unprotected sex acts were with spouses or regular partners (84 percent with cohabitating partners and 13 percent with steady partners). However, 87 percent of these HIV positive adults did not know that, in fact, they themselves were infected and only 9 percent actually knew their partner's status. De Walque (2007) also demonstrates that there is serious risk of HIV infection, even within cohabitating, committed relationships. Based on DHS data for Burkina Faso, Cameroon, Ghana, Kenya, and Tanzania, at least two-thirds of HIV positive couples were discordant

- couples in which only one partner is HIV positive. This means that, in the absence of consistent condom use, the HIV negative partner is at great risk for infection.

If someone does not use condoms within marriage mainly because they imply a lack of trust or infidelity and that person were to have extramarital sex, he or she may be more likely to use a condom outside the marriage when the question of fidelity is not part of the equation. It would therefore be logical for married individuals engaging in extramarital sex to use condoms as frequently as unmarried individuals engaging in casual sex. This seems to be the case for married men but not for married women. Gersovitz (2005) summarizes studies that report that men are more likely to use condoms with their casual partners than with their regular partners. Our results confirm that married men use condoms at similar rates to unmarried men during extramarital sex however married women use condoms less than unmarried women when they have extramarital sex. This high-risk behavior will be explored in more detail in the coming sections of this paper.

**Section 3: Methodology**

This analysis uses nationally representative and comparable data from 13 Sub-Saharan African countries. Data from Burkina Faso, Cameroon, Ethiopia, Ghana, Guinea, Kenya, Lesotho, Malawi, Rwanda, Senegal, and Zimbabwe all come from the most recent DHS which all have similar questions (Burkina Faso 2003, Cameroon 2004, Ethiopia 2005, Ghana 2003, Guinea 2005, Kenya 2003, Lesotho 2004, Malawi 2004, Rwanda 2005, Senegal 2005 and Zimbabwe 2005/06). The data from Côte d'Ivoire and Tanzania (Côte d'Ivoire 2005 and Tanzania 2004) are from the HIV/AIDS Indicator Survey (AIS), which

includes more limited socio-demographic variables than the DHS but are sufficient for this study. For Lesotho, there is only data for females because males were not asked the questions about condom use. The data is weighted using the sample weights suggested by the data provider and the standard errors are clustered at the enumeration area level.

The samples of the surveys include women ages 15 to 49. There is more variation in the ages of the men; in Burkina Faso, Cameroon, Ethiopia, Ghana, Guinea, Lesotho, Rwanda, and Senegal, men are ages 15-59, in Kenya, Malawi, and Zimbabwe, men are ages 15-54, and in Côte d'Ivoire and Tanzania, the men are ages 14-49.

Table 1 compares condom use with different categories of partners for males and females, with statistical significance indicated by the p-values from T-tests. Table 1a gives the percentages and standard errors for whether males and females used a condom during the last sexual intercourse they had, regardless of with whom it was. Table 1b shows the percentages and standard errors for males and females for condom use at the last sexual intercourse with a spouse, and table 1c is if a condom was used at the last sexual intercourse with someone other than a spouse. The p-values indicate whether the results are significantly different by gender. The analysis in table 1c includes single, divorced, separated and widowed individuals who, by definition, do not have a spouse. It also includes any condom use in extramarital sex by a married person.

We further compare condom use by married and non-married individuals. Table 1d has the percentages and standard errors for whether a condom was used at last intercourse with any person, spouse or non-spouse. In table 1e, the same comparison is made for whether the individual used a condom at the last intercourse with someone other

than his/her spouse. In tables 1d and 1e, the p-values indicate whether the results are significantly different by marital status (married vs. non-married).

We extend the analysis by doing bivariate and multivariate regressions for similar comparisons, with the results shown as odds ratios. Table 2a includes the unadjusted results for whether a married individual (compared to an unmarried individual, the reference group) used a condom at their last sexual intercourse with any partner. The multivariate regression results that follow under table 2b are also for whether a condom was used at the last sexual intercourse with any partner but they adjust for age, education, wealth, urban location, religion, ethnicity, and polygamy as potential confounding factors. The last results are the bivariate (table 2c) and multivariate (table 2d) odds ratios for whether a condom was used at the last intercourse with someone other than his/her spouse. In Côte d'Ivoire, Lesotho, Rwanda, Tanzania and Zimbabwe, no information about ethnicity was collected and in Lesotho, there was no information about polygamy so it was not possible to adjust for these factors in these countries.

It is important to note that condom use is a self-reported variable so is therefore likely to suffer from some reporting bias. This possible bias will be explored in more detail in the discussion section of this paper.

**Section 4: Results**

For all countries, males report that they used a condom at their last sexual intercourse more than females and the difference was consistently statistically significant at the 1 percent confidence level (table 1a). This difference could not be calculated for Lesotho because there is no data for males. Male reported condom use varied between almost 30

percent (Cameroon) and 5 percent or under (Ethiopia and Rwanda). Fewer than 10 percent of females used a condom in most countries. Only in Cameroon, Côte d'Ivoire, Ethiopia, Lesotho and Tanzania was female condom use higher than 10 percent but all were still below 20 percent.

Interestingly, when we limit, in table 1b, the analysis to those who used a condom during the last intercourse with a spouse, there are often still significant differences between what males and females report. It would make more sense if there were little or no difference between what males and females report for condom use within marriage because the condom use is only within this closed group. In all countries, except in Rwanda, men report a higher condom use within marriage and that difference is statistically significant at the 1 or 5 percent confidence level for all countries, except in Ethiopia and Tanzania where it is only significant at the 10 percent level. More males (10 percent or fewer) than females (5 percent or fewer, except in Lesotho and Cameroon) report condom use but overall, usage is lower than with condom use with any person, spouse or otherwise (compare with table 1a). When asked if they used a condom during their last intercourse with someone other than their spouse, whether they are married or not, the differences (in table 1c) between the response from males and females are statistically significant for all countries, always with more males reporting condom use. Between 67 percent (Burkina Faso) and 32 percent (Rwanda) of males reported condom use at last sex not with their spouse. Between 40 and 50 percent of males from half of the countries reported using a condom with a person other than their spouse. Less than 40 percent of females from most countries reported condom use with someone other than their spouse (from: Côte d'Ivoire, Ethiopia, Ghana, Guinea, Kenya, Malawi, Rwanda,

Senegal and Tanzania). In all other countries, less than 55 percent of females reported condom use with someone other than their spouse.

The remaining tables compare those married to those not married across countries in order to investigate the relative degree of condom use by married individuals, especially in extramarital situations. When asked if they had used a condom the last time they had intercourse with anyone, the differences in table 1d between married and unmarried individuals were statistically significant for all countries. As seen in table 1d, females overall report using a condom less than men do. The range for unmarried females is between 53 percent (Burkina Faso) and 13 percent (Ethiopia) for condom use at last intercourse, with between 20 and 40 percent of females from most countries reporting condom use.

The last descriptive analysis in table 1e reports the percentages of married males and females who used a condom at their last intercourse that was not with their spouse (extramarital sex) compared to unmarried males and females. The differences between the married and unmarried groups were not as consistent as in the other analyses however there are still a number of countries with statistically significant differences. These differences indicate that those engaging in extramarital sex do not seem to be using condoms as frequently as unmarried individuals. The differences are statistically significant for females from over half of the countries at the 1 percent confidence level (Cameroon, Côte d'Ivoire, Ghana, Kenya, Lesotho, Rwanda, and Zimbabwe), in Burkina Faso at the 5 percent level, and in Ethiopia at the 10 percent level. Differences for men are also significant at the 1 percent confidence level for Côte d'Ivoire, Ethiopia, Rwanda and Zimbabwe and at the 10 percent level in Ghana.

Overall, condom use for married females at last intercourse with someone other than their spouse is low compared to married males. In most countries, 20 percent or fewer of married females report condom use during extramarital sex (exceptions: Cameroon, Guinea, Malawi, Senegal, and Tanzania). In contrast, most countries have higher percentages of married men who use condoms during extramarital sex. Between 30 and 40 percent of married males from Côte d'Ivoire, Ghana, Guinea, Kenya, and Malawi report condom use in sex with someone other than their spouse. Between 47 and 60 of married men in Burkina Faso, Cameroon, Tanzania, and Zimbabwe reported condom use in extramarital sex.

For unmarried individuals, condom use is generally higher than for married individuals. Most countries show over 40 percent of unmarried males reporting condom use (with the exception of men from Guinea and Rwanda). Between 40 and 50 percent of unmarried men from Côte d'Ivoire, Ghana, Kenya, Malawi, and Tanzania reported condom use and 50 to 70 percent of unmarried men from Burkina Faso, Cameroon, Ethiopia, Senegal, and Zimbabwe said they used a condom at last intercourse. The results for condom use by unmarried females were also generally higher than married females with a non-spousal partner. The highest percentage was 57 percent of unmarried females from Burkina Faso and the lowest percentages of unmarried females reporting condom use was between 20 and 30 percent (Ethiopia, Guinea, Kenya, and Rwanda).

The remaining results are from bivariate and multivariate regression analyses. As a basis for comparison, tables 2a and 2b first show that married males and females from all countries are significantly less likely to use a condom during their last sexual intercourse with any partner than unmarried males or females at the 1 percent confidence

level for both unadjusted and adjusted regressions. However, when we examine behavior if the last sexual intercourse was with someone other than a spouse in tables 2c (unadjusted) and 2d (adjusted), the results are more varied. When asked if they used a condom during their last intercourse with someone other than their spouse, most differences between the responses of married and unmarried men were not significant. The only countries where married men were less likely to use a condom than unmarried men during sex outside of marriage for both unadjusted and adjusted regressions at the 1 percent confidence level were Ethiopia, Rwanda, and Zimbabwe. Married men from Côte d'Ivoire were also less likely to use condoms outside of marriage but when the results were adjusted for age, education, wealth, urban location, religion, ethnicity, and polygamy, the results are no longer significant. The same is true for males from Ghana but the unadjusted odds ratios were only significantly less than one at the 10 percent confidence level.

For females, however, the differences are more widespread. In over half of the countries, married females are significantly less likely to use condoms during extramarital sex than unmarried females. When unadjusted, married females from Cameroon, Côte d'Ivoire, Ghana, Kenya, Lesotho, Rwanda, and Zimbabwe all use condoms significantly less than unmarried females at the 1 or 5 percent confidence level. Married females from Burkina Faso also use condoms significantly less but to the 10 percent confidence level. After adjusting for potential confounding factors, the differences for married females from Côte d'Ivoire and Kenya lose their significance and results from Ghana are now significant at the 10 percent confidence level but the difference in Burkina Faso becomes significant to the 5 percent confidence level. After

adjusting, married females from Cameroon, Lesotho, Rwanda, and Zimbabwe still report using condoms significantly less than unmarried females at the 1 or 5 percent confidence level.

**Section 5: Discussion**

The results from this analysis confirm a number of findings from earlier studies. The first is that, overall, reported condom use is fairly low, despite the grave dangers posed by HIV throughout Sub-Saharan Africa. Other studies have shown this. Bunnell and others (2008) report that 67% of an HIV positive nationally representative sample in Uganda had never used a condom and nearly half of them were in HIV-discordant relationships. We also corroborate that males generally report using condoms more frequently than females. Lastly, we substantiate that unmarried individuals use condoms more frequently than married individuals with their spouse. This study also highlights a little documented finding that married females often use condoms significantly less than unmarried females in extramarital situations while married males tend to use condoms during extramarital sex at similar rates to unmarried males.

An important aspect of this study is that the data comes from nationally representative samples that are comparable across all the 13 Sub-Saharan African countries included. The data sets come from the most recent standard DHS (Burkina Faso, Cameroon, Ethiopia, Ghana, Guinea, Kenya, Lesotho, Malawi, Rwanda, Senegal, and Zimbabwe) and the AIS (Côte d'Ivoire and Tanzania), which both include similar questions relating to condom use. These provide a powerful tool to understand condom

use in many contexts and be able to generalize the findings more than with data from smaller or more isolated sample populations common in the current condom literature.

Previous studies on condom use have often used non-representative samples either because they follow a specific cohort in a particular location (for example, Biraro et al. 2009; Chimbiri 2007; Gregson et al. 2006; Kirungi et al. 2006, Taha et al. 1996), examine one group in a particular region in depth (for example, Maharaj and Cleland 2004; Mnyika et al. 1997) or compare samples from different environments (for example, Fylkesnes et al. 2001). Others use data from national surveys but are limited to one country (for example, Bunnell et al. 2008; Hendriksen et al. 2007). Cleland et al. (2006) also use data DHS from countries across Africa but they compare only single and married women, not men. Pullum and others (2005) use nationally representative data from the WHO for many African countries but focus more on attitudes towards contraception. This is one of the few studies to use nationally representative data to compare a wide range of data on condom use for both genders.

It has been established in a number of previous studies that males report using condoms more often than females (Ahmed et al. 2001; Biraro et al. 2009; Chimbiri 2007; Gregson et al. 2006; Mnyika 1997; Pullum 2005). This study confirms that men consistently report using condoms more often at last intercourse than women both inside and outside of marriage for married and unmarried individuals in all countries with differences significant to the 1 percent confidence level, except for Rwanda. In Rwanda, there is not a significant difference between condom use between males and females at last intercourse with a spouse, however the differences are still significant to the 1 percent confidence level for the last intercourse with any partner and specifically with

someone other than a spouse. Differences in condom use for males and females cannot be determined for Lesotho because males were not asked about condom use in that DHS. Overall, these results are a powerful indicator that men report using condoms more frequently than women across Sub-Saharan Africa.

This analysis also shows that condoms are used much more often in the last intercourse with someone that is not a spouse than the last intercourse with any partner or with a spouse. The category of last intercourse with someone that is not a spouse includes single, divorced, separated or widowed individuals who have intercourse with any type of partner because, by definition, they do not have spouses. This category also includes married individuals who have extramarital sex. While some of these people may be in committed relationships, these results are consistent with other studies that show condom use is higher in extramarital situations, by unmarried individuals, and in casual relationships (Ahmed et al. 2001; Biraro et al. 2009). It is logical that condom use is higher in less committed relationships where more risk may be perceived, however, we have shown in more specific analyses that condom use is still very low among certain groups even in very high risk situations.

We reinforce the above results by comparing condom use during the last intercourse for married and unmarried individuals. In all countries studied, both unmarried males and females use condoms more than married individuals with their spouses. All these differences are statistically significant to the 1 percent confidence level. Previous studies have reported similar findings (Bertrand et al. 1991; Kapiga et al. 1995; de Boer et al. 1998; Ahmed et al. 2001; Bauni and Jarabi 2003; Maharaj and

Cleland 2004; Cleland et al. 2006; Chimbiri 2007; Hendrikson et al. 2007; Biraro et al. 2009).

Because these results are based on self-reported sexual behavior data, they should be considered with caution. Self-reported sexual behaviors, including both condom use and sexual intercourse, have been shown to be unreliable in certain instances and it is very difficult to independently validate the data because, apart from biological evidence of sexually transmitted diseases (STD), there is no outside indicator of the reported sexual behavior (Weinhardt et al. 1998). One study (Zenilman et al. 1995) done in the United States calls into question the validity of self-reported condom use by demonstrating that 15 percent of men who reported to always use condoms had acquired STD during the study period compared with 15.3 percent of those who reported never using a condom. Similarly, in the same study, 23.5 percent of women who reported always using a condom had STD compared with 26.8 percent of women who reported never using a condom. Also using biological markers, Allen and others (2003) show that reported condom use in discordant couples (where one partner has HIV and the other does not) was also not reliable by showing that sperm was present in 15.1 percent of vaginal smears when no unprotected sex was reported compared with 24.7 percent of smears when unprotected sex was reported. In contrast, by comparing reported condom use by married partners, de Boer and others (1998) find fair to good agreement in couples in Thailand regarding their reported condom use. Another study found that, based on data from 23 countries, men over-report contraception use, though to widely varying degrees (Becker and Costenbader 2001).

In addition to inaccurate reporting of condom use, participants may also over or under-report intercourse, especially extramarital intercourse. Married females in this study reported fewer instances of extramarital sex than married males. These differences may be valid, however, reports of intercourse are also difficult to validate. Gersovitz (2005) explains that the DHS show inconsistencies with women who often report less sexual activity than men. Nnko and others (2004) find that females under-report the number of sexual partners though they do so consistently and that men also may mis-report their sexual partners but in a less consistent way. In a study of discordant couples, de Walque (2007) shows that, though few females report extramarital sex, a substantial number of discordant couples are ones in which the female is HIV positive and the males is HIV negative. This is very difficult to explain if females are not under-reporting their extramarital intercourse. In many African societies, there may be negative ramifications for women who have extramarital relations including divorce or expulsion from a community. Often men would not suffer the same consequences as extramarital sex for men can be more acceptable. These societal pressures can be a deterrent for females to report extramarital intercourse. The low sample size of females who reported extramarital sex may also affect the results, making the degree of statistical significance lower than it would be if there had been more observations.

Similar societal pressures may influence reporting of condom use. Because condom use is sometimes viewed negatively, a person who used a condom may not report using one. Women may feel more of these types of pressures as extramarital sex for pleasure if often more socially acceptable for men than women. Therefore, if a

woman has extramarital sex for pleasure, she may not feel comfortable admitting to the sex and/or the condom use.

Reports of sexual behavior may also be inaccurate because of various other influences including recall bias, and incorrect use (of condoms specifically). Subjects may intend to report condom use or sexual encounters accurately, but they may not remember correctly or tend to remember differently from the reality based on their belief about what a good answer would be. One study showed that couples had a high level of agreement on the number of recent sexual intercourse but then men tended to over-report sexual encounters if more than a week had passed since the encounter (Lagarde et al. 1995). Though this study uses data about the last sexual intercourse, that intercourse could have happened more than a week before, possibly increasing the likelihood of recall bias. The knowledge that not using a condom use is considered risky may cause subjects to report more condom use because they are trying to appear they practice safer sex to the interviewer. This type of perceived social pressure may cause subjects to over-report condom use. However, there are many negative views of condoms (Maharaj and Cleland 2004) that may cause people to under-report their use. Incorrect use of condoms can also affect results. Someone may use a condom but use it incorrectly, thereby rendering it ineffective. One study found that 13 percent of condom users applied them after initial penetration and an additional 38 percent reported late application of condoms (de Visser and Smith 2000). Late application and other improper uses of condoms can make them less effective.

The results from this study that show that married females use condoms in extramarital intercourse less frequently than unmarried females may be subject to the

above-discussed biases. However, while there is a strong argument for women reporting less extramarital sex because of possible negative outcomes, it does not seem as likely that women would under-report condom use in the extramarital intercourse they have already reported. Once a woman has admitted having extramarital sex (despite strong societal pressures to not report it), admitting to condom use seems more likely. These tendencies may make the sample size smaller than they should be but condom use within these observations should be more or less accurate. This lends more credibility to the finding that condom use is low during sex among married women with extramarital partners.

These married females are acting like single females in that they have multiple sexual partners, however in terms of their condom use, they are acting more like married females, even though the level of risk of HIV is greatly increased by their extramarital relations. It is not clear why married women use condoms less frequently than unmarried women. It may be that it is more difficult for a married woman to obtain a condom without her husband's or anyone else's knowledge. She also may not have the financial resources at her discretion that a single female may have who is employed. Further research investigating the reasons for low condom use in women's extramarital relations could help make prevention efforts more effective.

**Section 6: Conclusion**

Based on nationally representative samples from 13 Sub-Saharan African countries, we reinforce and expand previous findings that condom use in general is low in this region, that men report using condoms more frequently than women, and that unmarried

individuals report they use condoms more frequently than married individuals with their spouse. Based on descriptive, bivariate and multivariate analyses, we also demonstrate to a degree not previously shown in the current literature that married men from most countries report using condoms with extramarital partners about as frequently as unmarried men. However, married women from most countries included use condoms with extramarital partners less frequently than unmarried women. This result is especially troubling because HIV is primarily spread in Africa through heterosexual intercourse and having multiple partners is a risk factor for HIV infection. Being married usually ensures regular sexual intercourse, providing more opportunities to pass HIV from extramarital partner to spouse than an unmarried person who may also have multiple partners but not as regular sexual intercourse.

Prevention efforts aimed at increasing condom use in general need to be more widely instituted. However, using this research as a starting point, prevention can be aimed at the groups that tend to use condoms less frequently, such as married women. Prevention for this group can be geared towards encouraging condom use during sex outside of marriage and also discouraging extramarital sex. While increasing condom use is a daunting proposition, Foss and others (2007) investigated the effects of 62 condom use interventions and found that, despite many different approaches, it is possible to increase condom use. However, there was less evidence about the intervention impacts on casual sex because this has not been studied as much. More research on the reasons for not using a condom, especially for women in extramarital sex, and effective interventions may help to contain the HIV epidemic.

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**Table 1, parts 1a-1e: Percentage of males, females, married and unmarried who used a condom from thirteen Demographic and Health Surveys and AIDS Indicator Surveys.**

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Burkina Faso 2003 | | Cameroon 2004 | | Cote d'Ivoire 2005 | | Ethiopia 2005 | | Ghana 2003 | | Guinea 2005 | | Kenya 2003 | |
| | males | females | males | females | males | Females | males | females | males | females | males | females | males | females |
| **Table 1a: Percentage who used condom at last intercourse with any partner and T-test (P-value) for difference by males and females** | | | | | | | | | | | | | | |
| | 0.2707 | 0.0944 | 0.2971 | 0.1516 | 0.2847 | 0.1375 | 0.043 | 0.0102 | 0.182 | 0.0857 | 0.1667 | 0.0463 | 0.167 | 0.0549 |
| | [0.0173] | [0.0119] | [0.0121] | [0.0081] | [0.0197] | [0.0133] | [0.0050] | [0.0021] | [0.0090] | [0.0059] | [0.0112] | [0.0052] | [0.0090] | [0.0042] |
| N | 2376 | 2842 | 4084 | 7977 | 3057 | 3662 | 3684 | 4197 | 3302 | 3852 | 2420 | 5266 | 2575 | 5678 |
| P-value | <0.0001 | | <0.0001 | | <0.0001 | | <0.0001 | | <0.0001 | | <0.0001 | | <0.0001 | |
| **Table 1b: Percentage who used condom at last intercourse with spouse and T-test (P-value) for difference by males and females** | | | | | | | | | | | | | | |
| | 0.1013 | 0.0425 | 0.0729 | 0.0572 | 0.0954 | 0.0458 | 0.0078 | 0.0039 | 0.0781 | 0.0346 | 0.0285 | 0.0104 | 0.0327 | 0.0193 |
| | [0.0102] | [0.0055] | [0.0069] | [0.0044] | [0.0226] | [0.0069] | [0.0018] | [0.0012] | [0.0066] | [0.0037] | [0.0064] | [0.0019] | [0.0047] | [0.0024] |
| N | 1607 | 2483 | 2150 | 5812 | 1571 | 2566 | 3259 | 4035 | 2433 | 3131 | 1473 | 4588 | 1803 | 4735 |
| P-value | <0.0001 | | 0.021 | | 0.014 | | 0.077 | | <0.0001 | | 0.005 | | 0.002 | |
| **Table 1c: Percentage who used condom at last intercourse with someone other than spouse and T-test (P-value) for difference by males and females** | | | | | | | | | | | | | | |
| | 0.6673 | 0.5358 | 0.5528 | 0.415 | 0.4711 | 0.321 | 0.5186 | 0.2453 | 0.452 | 0.2823 | 0.3784 | 0.2606 | 0.4615 | 0.2365 |
| | [0.0294] | [0.0445] | [0.0166] | [0.0140] | [0.0212] | [0.0263] | [0.0437] | [0.0560] | [0.0210] | [0.0188] | [0.0226] | [0.0243] | [0.0213] | [0.0173] |
| N | 891 | 487 | 1928 | 2148 | 1486 | 1094 | 422 | 160 | 868 | 719 | 944 | 677 | 772 | 943 |
| P-value | 0.007 | | <0.0001 | | <0.0001 | | <0.0001 | | <0.0001 | | <0.0001 | | <0.0001 | |
| **Table 1d: Percentage who used condom at last intercourse with any partner and T-test (P-value) for difference by married and non married** | | | | | | | | | | | | | | |
| Married | 0.1325 | 0.0442 | 0.1596 | 0.0901 | 0.1083 | 0.0503 | 0.008 | 0.0042 | 0.0938 | 0.0377 | 0.0757 | 0.02 | 0.0393 | 0.0195 |
| | [0.0109] | [0.0062] | [0.0104] | [0.0061] | [0.0135] | [0.0069] | [0.0019] | [0.0013] | [0.0072] | [0.0038] | [0.0093] | [0.0030] | [0.0052] | [0.0025] |
| N | 1700 | 2501 | 2576 | 6459 | 1734 | 2592 | 3223 | 3955 | 2538 | 3175 | 1678 | 4685 | 1826 | 4646 |
| Non married | 0.672 | 0.5266 | 0.539 | 0.4243 | 0.4865 | 0.3246 | 0.4521 | 0.1278 | 0.4558 | 0.286 | 0.3723 | 0.235 | 0.457 | 0.2179 |
| | [0.0330] | [0.0464] | [0.0179] | [0.0169] | [0.0251] | [0.0258] | [0.0417] | [0.0300] | [0.0221] | [0.0198] | [0.0251] | [0.0240] | [0.0218] | [0.0161] |
| N | 676 | 341 | 1508 | 1518 | 1323 | 1070 | 461 | 242 | 764 | 677 | 742 | 581 | 749 | 1032 |
| P-value | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| **Table 1e: Percentage who used condom at last intercourse with somebody other than a spouse and T-test (P-value) for difference by married and non married** | | | | | | | | | | | | | | |
| Married | 0.5932 | 0.202 | 0.5445 | 0.3433 | 0.334 | 0.1642 | 0.1394 | 0.0965 | 0.3685 | 0.1629 | 0.3906 | 0.3096 | 0.3497 | 0.074 |
| | [0.0588] | [0.1514] | [0.0279] | [0.0207] | [0.0404] | [0.0536] | [0.1147] | [0.0835] | [0.0496] | [0.0350] | [0.0399] | [0.0497] | [0.0763] | [0.0408] |
| N | 226 | 169 | 477 | 755 | 178 | 66 | 14 | 22 | 125 | 99 | 209 | 138 | 45 | 39 |
| Non married | 0.6813 | 0.5659 | 0.5556 | 0.4552 | 0.4862 | 0.3347 | 0.5309 | 0.2697 | 0.4661 | 0.3014 | 0.3747 | 0.248 | 0.4676 | 0.2449 |
| | [0.0329] | [0.0463] | [0.0182] | [0.0174] | [0.0226] | [0.0259] | [0.0437] | [0.0607] | [0.0225] | [0.0208] | [0.0250] | [0.0251] | [0.0218] | [0.0174] |
| N | 665 | 318 | 1451 | 1393 | 1308 | 1028 | 408 | 138 | 743 | 620 | 735 | 539 | 727 | 904 |
| P-value | 0.194 | 0.026 | 0.71 | <0.0001 | 0.001 | 0.001 | 0.001 | 0.063 | 0.065 | <0.0001 | 0.717 | 0.234 | 0.133 | <0.0001 |

**Table 1, parts 1a-1e *continued*: Percentage of males, females, married and unmarried who used a condom from thirteen Demographic and Health Surveys and AIDS Indicator Surveys.**

| | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) | (25) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Lesotho 2004 | Malawi 2004 | | Rwanda 2005 | | Senegal 2005 | | Tanzania 2004 | | Zimbabwe 2005/6 | |
| | females | males | females | males | females | males | females | males | females | males | females |
| **Table 1a: Percentage who used condom at last intercourse with any partner and T-test (P-value) for difference by males and females** | | | | | | | | | | | |
| | 0.195 | 0.1508 | 0.052 | 0.052 | 0.0269 | 0.2262 | 0.0334 | 0.204 | 0.1157 | 0.2443 | 0.0826 |
| | [0.0104] | [0.0102] | [0.0036] | [0.0052] | [0.0026] | [0.0148] | [0.0033] | [0.0100] | [0.0080] | [0.0093] | [0.0054] |
| N | 4971 | 2590 | 9169 | 2763 | 5848 | 2308 | 9443 | 4161 | 5294 | 4620 | 5846 |
| P-value | | <0.0001 | | <0.0001 | | <0.0001 | | <0.0001 | | <0.0001 | |
| **Table 1b: Percentage who used condom at last intercourse with spouse and T-test (P-value) for difference by males and females** | | | | | | | | | | | |
| | 0.1104 | 0.0695 | 0.0304 | 0.0135 | 0.0124 | 0.0336 | 0.0127 | 0.0619 | 0.0515 | 0.0753 | 0.0347 |
| | [0.0077] | [0.0069] | [0.0027] | [0.0023] | [0.0017] | [0.0058] | [0.0017] | [0.0052] | [0.0045] | [0.0053] | [0.0030] |
| N | 3509 | 2057 | 8438 | 2401 | 5357 | 1529 | 8888 | 2806 | 4264 | 3301 | 5089 |
| P-value | | <0.0001 | | 0.653 | | <0.0001 | | 0.078 | | <0.0001 | |
| **Table 1c: Percentage who used condom at last intercourse with someone other than spouse and T-test (P-value) for difference by males and females** | | | | | | | | | | | |
| | 0.4019 | 0.4613 | 0.3033 | 0.3193 | 0.1952 | 0.6185 | 0.3897 | 0.4908 | 0.3778 | 0.678 | 0.4188 |
| | [0.0197] | [0.0280] | [0.0218] | [0.0307] | [0.0217] | [0.0234] | [0.0306] | [0.0200] | [0.0228] | [0.0228] | [0.0245] |
| N | 1457 | 533 | 727 | 362 | 491 | 775 | 539 | 1355 | 1030 | 1319 | 757 |
| P-value | | <0.0001 | | 0.001 | | <0.0001 | | <0.0001 | | <0.0001 | |
| **Table 1d: Percentage who used condom at last intercourse with any partner and T-test (P-value) for difference by married and non married** | | | | | | | | | | | |
| Married | 0.1093 | 0.0722 | 0.0307 | 0.0136 | 0.0115 | 0.1098 | 0.0262 | 0.0875 | 0.0508 | 0.081 | 0.0322 |
| | [0.0078] | [0.0068] | [0.0027] | [0.0023] | [0.0016] | [0.0117] | [0.0028] | [0.0065] | [0.0045] | [0.0055] | [0.0029] |
| N | 3488 | 2069 | 8070 | 2446 | 5226 | 1815 | 9158 | 2928 | 4198 | 3328 | 4983 |
| Non married | 0.395 | 0.4645 | 0.2088 | 0.3689 | 0.1609 | 0.6047 | 0.231 | 0.4708 | 0.3581 | 0.6734 | 0.3762 |
| | [0.0195] | [0.0285] | [0.0173] | [0.0304] | [0.0176] | [0.0277] | [0.0336] | [0.0212] | [0.0219] | [0.0233] | [0.0226] |
| N | 1483 | 521 | 1099 | 317 | 622 | 493 | 285 | 1233 | 1096 | 1292 | 863 |
| P-value | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| **Table 1e: Percentage who used condom at last intercourse with somebody other than a spouse and T-test (P-value) for difference by married and non married** | | | | | | | | | | | |
| Married | 0.1868 | 0.3606 | 0.2218 | 0.0335 | 0.0102 | 0.6453 | 0.4112 | 0.54 | 0.2449 | 0.4745 | 0.0775 |
| | [0.0425] | [0.0920] | [0.0889] | [0.0195] | [0.0107] | [0.0362] | [0.0364] | [0.0451] | [0.0914] | [0.0641] | [0.0287] |
| N | 117 | 38 | 29 | 66 | 21 | 287 | 372 | 161 | 38 | 66 | 84 |
| Non married | 0.4179 | 0.4696 | 0.307 | 0.3921 | 0.2029 | 0.6075 | 0.3578 | 0.4845 | 0.3821 | 0.688 | 0.4559 |
| | [0.0203] | [0.0296] | [0.0221] | [0.0320] | [0.0224] | [0.0277] | [0.0466] | [0.0219] | [0.0231] | [0.0239] | [0.0261] |
| N | 1340 | 495 | 698 | 296 | 470 | 488 | 167 | 1194 | 992 | 1253 | 673 |
| P-value | <0.0001 | 0.262 | 0.337 | <0.0001 | <0.0001 | 0.376 | 0.336 | 0.273 | 0.137 | 0.002 | <0.0001 |

*Note*: Standard errors in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. *Source*: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ethiopia 2005, Ghana 2003, Guinea 2005, Kenya 2003, Lesotho 2004, Malawi 2004, Rwanda 2005, Senegal 2005 and Zimbabwe 2005/06) and AIDS Indicator Surveys (Côte d'Ivoire, 2005 and Tanzania, 2004)

**Table 2, parts 2a-2d: Unadjusted and adjusted odds ratios for condom use by married and unmarried males and females from thirteen Demographic and Health Surveys and AIDS Indicator Surveys.**

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Burkina Faso 2003 | | Cameroon 2004 | | Cote d'Ivoire 2005 | | Ethiopia 2005 | | Ghana 2003 | | Guinea 2005 | | Kenya 2003 | |
| | males | females | males | females | males | females | males | females | males | females | males | females | males | females |
| **Table 2a: Unadjusted odds ratio for using a condom at last sexual intercourse with any partner.** | | | | | | | | | | | | | | |
| Married | 0.07*** | 0.04*** | 0.16*** | 0.13*** | 0.13*** | 0.11*** | 0.01*** | 0.03*** | 0.12*** | 0.10*** | 0.14*** | 0.07*** | 0.05*** | 0.07*** |
| | [0.05 - 0.10] | [0.03 - 0.06] | [0.14 - 0.19] | [0.11 - 0.16] | [0.10 - 0.17] | [0.08 - 0.16] | [0.01 - 0.02] | [0.01 - 0.06] | [0.10 - 0.16] | [0.08 - 0.13] | [0.10 - 0.19] | [0.05 - 0.09] | [0.04 - 0.07] | [0.05 - 0.10] |
| Observations | 2376 | 2842 | 4084 | 7977 | 3057 | 3662 | 3684 | 4197 | 3302 | 3852 | 2420 | 5266 | 2575 | 5678 |
| **Table 2b: Adjusted odds ratio for using a condom at last sexual intercourse with any partner. Adjusted for age, education wealth, urban location, religion, ethnicity, and polygamy.** | | | | | | | | | | | | | | |
| Married | 0.13*** | 0.17*** | 0.32*** | 0.26*** | 0.20*** | 0.34*** | 0.01*** | 0.01*** | 0.24*** | 0.21*** | 0.36*** | 0.11*** | 0.04*** | 0.06*** |
| | [0.08 - 0.21] | [0.10 - 0.30] | [0.25 - 0.42] | [0.21 - 0.32] | [0.13 - 0.30] | [0.21 - 0.55] | [0.00 - 0.01] | [0.00 - 0.02] | [0.17 - 0.34] | [0.14 - 0.30] | [0.22 - 0.59] | [0.07 - 0.18] | [0.03 - 0.08] | [0.04 - 0.08] |
| Observations | 2261 | 2566 | 3973 | 7733 | 3033 | 3214 | 3010 | 1987 | 3252 | 3705 | 2049 | 4460 | 2504 | 5031 |
| **Table 2c: Unadjusted odds ratio for using a condom with someone other than spouse.** | | | | | | | | | | | | | | |
| Married | 0.68 | 0.19* | 0.96 | 0.63*** | 0.53*** | 0.39** | 0.14** | 0.29 | 0.67* | 0.45*** | 1.07 | 1.36 | 0.61 | 0.25** |
| | [0.39 - 1.20] | [0.03 - 1.32] | [0.75 - 1.21] | [0.50 - 0.78] | [0.36 - 0.79] | [0.19 - 0.80] | [0.02 - 0.88] | [0.05 - 1.83] | [0.43 - 1.04] | [0.27 - 0.76] | [0.74 - 1.54] | [0.83 - 2.22] | [0.31 - 1.20] | [0.08 - 0.78] |
| Observations | 891 | 487 | 1928 | 2148 | 1486 | 1094 | 422 | 160 | 868 | 719 | 944 | 677 | 772 | 943 |
| **Table 2d: Adjusted odds ratio for using a condom with someone other than spouse. Adjusted for age, education wealth, urban location, religion, ethnicity, and polygamy.** | | | | | | | | | | | | | | |
| Married | 1.33 | 0.11** | 1.21 | 0.65*** | 0.96 | 0.8 | 0.09*** | 0.03 | 0.94 | 0.59* | 1.18 | 0.6 | 0.61 | 0.25 |
| | [0.36 - 4.90] | [0.02 - 0.60] | [0.88 - 1.67] | [0.50 - 0.84] | [0.60 - 1.54] | [0.35 - 1.84] | [0.02 - 0.47] | [0.00 - 3.03] | [0.50 - 1.75] | [0.33 - 1.03] | [0.69 - 2.04] | [0.29 - 1.23] | [0.22 - 1.72] | [0.03 - 2.13] |
| Observations | 880 | 459 | 1886 | 2122 | 1456 | 1026 | 387 | 92 | 850 | 681 | 920 | 621 | 751 | 894 |

**Table 2, parts 2a-2d *continued*: Unadjusted and adjusted odds ratios for condom use by married and unmarried males and females from thirteen Demographic and Health Surveys and AIDS Indicator Surveys.**

| | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) | (25) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Lesotho 2004 | Malawi 2004 | | Rwanda 2005 | | Senegal 2005 | | Tanzania 2004 | | Zimbabwe 2005/6 | |
| | females | males | females | males | Females | males | females | males | females | males | females |
| **Table 2a: Unadjusted odds ratio for using a condom at last sexual intercourse with any partner.** | | | | | | | | | | | |
| Married | 0.19*** | 0.09*** | 0.12*** | 0.02*** | 0.06*** | 0.08*** | 0.09*** | 0.11*** | 0.10*** | 0.04*** | 0.06*** |
| | [0.16 - 0.23] | [0.07 - 0.12] | [0.09 - 0.15] | [0.02 - 0.03] | [0.04 - 0.09] | [0.06 - 0.11] | [0.06 - 0.13] | [0.09 - 0.13] | [0.08 - 0.12] | [0.03 - 0.05] | [0.04 - 0.07] |
| Observations | 4971 | 2590 | 9169 | 2763 | 5848 | 2308 | 9443 | 4161 | 5294 | 4620 | 5846 |
| **Table 2b: Adjusted odds ratio for using a condom at last sexual intercourse with any partner. Adjusted for age, education wealth, urban location, religion, ethnicity, and polygamy.** | | | | | | | | | | | |
| Married | 0.13*** | 0.10*** | 0.12*** | 0.02*** | 0.06*** | 0.14*** | 0.18*** | 0.12*** | 0.11*** | 0.02*** | 0.03*** |
| | [0.10 - 0.18] | [0.06 - 0.15] | [0.09 - 0.17] | [0.01 - 0.04] | [0.03 - 0.10] | [0.08 - 0.25] | [0.09 - 0.37] | [0.08 - 0.16] | [0.08 - 0.15] | [0.02 - 0.03] | [0.02 - 0.04] |
| Observations | 4881 | 2516 | 8927 | 2463 | 5525 | 2111 | 8870 | 4160 | 5234 | 4583 | 5605 |
| **Table 2c: Unadjusted odds ratio for using a condom with someone other than spouse.** | | | | | | | | | | | |
| Married | 0.32*** | 0.64 | 0.64 | 0.05*** | 0.04*** | 1.18 | 1.25 | 1.25 | 0.52 | 0.41*** | 0.10*** |
| | [0.18 - 0.56] | [0.28 - 1.45] | [0.24 - 1.75] | [0.02 - 0.17] | [0.01 - 0.31] | [0.82 - 1.69] | [0.79 - 2.00] | [0.84 - 1.86] | [0.20 - 1.38] | [0.24 - 0.70] | [0.04 - 0.23] |
| Observations | 1457 | 533 | 727 | 362 | 491 | 775 | 539 | 1355 | 1030 | 1319 | 757 |
| **Table 2d: Adjusted odds ratio for using a condom with someone other than spouse. Adjusted for age, education wealth, urban location, religion, ethnicity, and polygamy.** | | | | | | | | | | | |
| Married | 0.30*** | 0.88 | 1.34 | 0.11*** | 0.05** | 1.34 | 1.82 | 1.52 | 0.99 | 0.21*** | 0.09*** |
| | [0.15 - 0.58] | [0.30 - 2.61] | [0.50 - 3.64] | [0.03 - 0.44] | [0.00 - 0.61] | [0.78 - 2.33] | [0.84 - 3.96] | [0.88 - 2.63] | [0.33 - 2.97] | [0.10 - 0.43] | [0.03 - 0.26] |
| Observations | 1424 | 519 | 687 | 306 | 450 | 745 | 462 | 1352 | 1004 | 1306 | 727 |

*Note*: 95% confidence intervals in brackets, * significant at 10%; ** significant at 5%; *** significant at 1%. *Source*: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ethiopia 2005, Ghana 2003, Guinea 2005, Kenya 2003, Lesotho 2004, Malawi 2004, Rwanda 2005, Senegal 2005 and Zimbabwe 2005/06) and AIDS Indicator Surveys (Côte d'Ivoire, 2005 and Tanzania, 2004). No data about ethnicity in DHS/AIS from Côte d'Ivoire, Lesotho, Rwanda, Tanzania, and Zimbabwe so not adjusted for in tables 2b or 2d. No data about polygamy in DHS from Lesotho so not adjusted for in tables 2b or 2d.