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Who Gets AIDS and How?

The determinants of HIV infection and sexual behaviors in Burkina Faso, Cameroon, Ghana, Kenya and Tanzania

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Abstract

This paper analyzes the determinants of HIV infection and associated sexual behaviors using data from the first five Demographic and Health Surveys to include HIV testing for a representative sample of the adult population. Emerging from a wealth of country relevant results, four important findings can be generalized. First, married women who engage in extra-marital sex are less likely to use condoms than single women when doing so. Second, having been in successive marriages is a significant risk-factor, as evidenced by the results on HIV infection and on sexual behaviors. Contrary to prima facie evidence, education is not associated positively with HIV status. But schooling is one of the most consistent predictors of behavior and knowledge: education predicts protective behaviors like condom use, use of counseling and testing, discussion among spouses and knowledge, but it also predicts a higher level of infidelity and a lower level of abstinence. Finally, male circumcision and female genital mutilation are often associated with sexual behaviors, practices and knowledge related to AIDS. This might explain why in the analysis in the five countries there is no significant negative association between male circumcision and HIV status, despite recent evidence from a randomized control trial that male circumcision has a protective effect.

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1. Introduction

The HIV/AIDS epidemic is probably the greatest challenge facing Africa. According to UNAIDS (2004), in 2004, between 23.4 and 28.4 million people were infected by HIV/AIDS in Sub-Saharan Africa (this represents around 65 percent of the worldwide total), between 2.1 and 2.6 million died from the virus and between 2.7 and 3.8 million became newly infected.

The socio-economic profile of the HIV/AIDS epidemic has been analyzed in the epidemiological literature and to a lesser extent in the economics literature. Few of these studies have used nationally representative samples. Data sets which include the results of individual HIV tests are generally drawn either from cohort studies limited to a specific area (see for example, Nunn and others, 1994; De Walque, 2003 and 2004; De Walque and others, 2005) or from surveillance data taken from pregnant women attending ante-natal care clinics (see for example Fylkesnes and others, 1997; Kilian and others, 1999) or from high risk groups (Nagot and others, 2002). Some of these data sets have only a limited number of socio-demographic variables and most of them cannot claim to be representative. Clark and Vencatachellum (2003), however, use a nationally representative sample from South Africa. Fylkesnes and others (2001) compare results from surveillance data among pregnant women and from population based surveys.

This study uses data from the first five Demographic and Health Surveys to include HIV testing for a nationally representative sample of the adult population. The data sets are from Burkina Faso (2003), Cameroon (2004), Ghana (2003), Kenya (2003) and Tanzania (2003-2004), five African countries with different HIV/AIDS epidemics. The five data sets have very similar variables allowing easy comparisons across countries[1]. They also include a large set of socio-demographic variables and numerous questions about sexual behaviors and other practices and attitudes related to the AIDS epidemic[2].

Using these five data sets, I analyze the socio-economic determinants of HIV infection in the general population, looking at the association between HIV status and urban status, marital status, education, wealth, religion as well as male circumcision and female genital

[1] Buvé, Caraël, and Hayes Rea (2001) describes an interesting multi-centre study of risk-factors for HIV infection in four cities in different African countries.
[2] Gersovitz 2005 provides a useful discussion of the variables describing sexual behavior in Demographic and Health Surveys.

mutilation. Further, I analyze the association between these factors and a large range of sexual behaviors and other practices and attitudes which are related to the HIV/AIDS epidemic, allowing a better understanding of the channels through which socio-economic variables can affect HIV infection.

The detailed description of the results provides a lot of results relevant at the country level and gives a contrasted view of the HIV/AIDS epidemic. However, there are few major contradictions in results across countries. I take advantage of having similar information about five different African countries at the same period to assess which results can be generalized and are broadly relevant for policy makers engaged in the fight against the epidemic. One important result is that married women who engage in extra-marital sex are less likely to use condoms than single women when doing so. Having been in successive marriages is also a significant risk-factor, as evidenced by the results on HIV prevalence and on sexual behaviors. Those results suggest that specific prevention efforts should be targeted to these two groups of individuals.

Further and contrary to prima facie evidence, education is not associated positively with HIV status. But schooling is one of the most consistent predictors of behavior and knowledge: education predicts protective behaviors like condom use, use of counseling and testing, discussion among spouses and knowledge about AIDS but it also predicts a higher level of infidelity and a lower level of abstinence. It is possible that these associations going in opposite directions cancel each other and that, as a consequence, education is not significantly associated with HIV status.

Finally, male circumcision and female genital mutilation are often associated with sexual behaviors, practices and knowledge related to AIDS. This might explain why in the analysis in the five countries there is no significant negative association between male circumcision and HIV status, despite recent evidence from a randomized control trial (Auvert and others, 2005) that male circumcision has a protective effect.

Section 2 of this paper describes the data sets and the methodology used. Section 3 covers the analysis of HIV status, including the analysis of the coverage of HIV testing in the survey. Section 4 analyzes a large range of sexual behaviors ant other attitudes related to the epidemic. Section 5 determines which results can be generalized across countries and Section

6 discusses in greater detail the association between male circumcision, female genital mutilation, HIV infection and sexual behaviors. Section 7 concludes.

2. Data description and methodology

2.1 Data description

The five data sets used are very similar: four of them (Burkina Faso 2003, Cameroon 2004, Ghana 2003 and Kenya 2003) are standard Demographic and Health Surveys which in addition include HIV testing for a sub-sample of the population. The 2003-2004 HIV/AIDS Indicator Survey for Tanzania is a lighter survey that focuses on HIV/AIDS, but for the purpose of this study, the available variables are very similar. I have used in the analysis variables that were defined similarly across the five surveys.

The independent variables used in the regressions are almost always the same: urban location, marital status, including polygamy and the existence of successive marriages, education, wealth quintiles, religion, male circumcision and female genital mutilation. Summary statistics for them are available in table 1. Not shown in the tables but included in the regression are five year age group dummies, regional dummies and ethnicity dummies (except in Tanzania where the ethnicity variable is not available).

Table 1 indicates that the share of the urban population is much higher in Cameroon and Ghana. Educational achievement, measured by the highest grade achieved, is generally higher for males than for females and is much lower in Burkina Faso than in the other countries. The variables describing marital status are defined as follows. The omitted category is composed of individuals who have never been married. Marriage is defined as being legally married or living with a partner with the intention of staying together and therefore covers both formal and informal marriage. Formerly married include widowed, divorced and separated individuals. The proportion of widows and widowers is calculated as the fraction of all formerly married individuals and should be understood in the regressions as an interaction term with that variable. Being in a polygamous union is also calculated as a fraction of all currently married individuals and is used as an interaction term in the analysis. But the mean for the variable for having been in successive marriages, which should not be confused with polygamy, is taken on the entire sample and can apply to both currently married and formerly married persons.

More females than males are currently married which can be explained either by polygamy or by the age differences between spouses and the fact that the survey only includes women ages 15 to 49 in all surveys and males ages 15 to 59 for Burkina Faso, Cameroon and Ghana, ages 15-54 for Kenya and ages 15 to 49 for Tanzania.

Widowhood is defined as having lost one spouse and not being remarried. The variable is not recorded in the Tanzanian survey and in the Cameroon survey only a very limited number of males are widowers. Widows and widowers constitute a substantial portion of the formerly married individuals and there are usually more widows than widowers, either because women have a longer life-expectancy and get married with older men, or because it is easier for males to remarry after the death of their spouse.

A large fraction of all individuals have been engaged in successive marriages, ranging from 5.1 percent of females and 13 percent of males in Kenya to 19 percent of females and 25.3 of males in Ghana. More males than females have been in successive marriages a likely indication that it is easier for them to remarry.

There are important variations in the proportion of married individuals who are in a polygamous union, ranging from 48.3 percent of females and 29.4 percent of males in Burkina Faso to 9.8 percent of males and 9.7 percent of females in Tanzania. Logically, there are more females than males in polygamous unions, with the exception of Tanzania where the equal fraction of males and females in polygamous unions is explained by the fact that the age range for the survey is the same (15-49) for both males and females and that polygamy is more prevalent among old men.

The measure of wealth included in the regressions (not reported in table 1) is a set of dummies for quintiles of a wealth index calculated by the data provider and based on assets. I have regrouped the religious affiliations in four categories: Muslim---the omitted dummy in the regressions---Catholic, Protestant and other religions. Other religion includes animists and no religion in Burkina Faso, animists, no religion and other religions ("religions de l'éveil") in Cameroon, traditionalists and no religion in Ghana, and no religion in Kenya and Tanzania. In Ghana, other Christians have been included under Protestants.

In table 1, "circumcised" refers to male circumcision for males and to female genital mutilation for females. In Cameroon, the question of whether a woman had experienced female genital mutilation was only asked to women who were aware of the existence of the

practice. I have assumed, as does the final report of the Demographic and Health Survey (Cameroon Government and ORC Macro, 2004), that women who did not know about the practice did not experience female genital mutilation. Only 1.4 percent of women in Cameroon have experienced female genital mutilation, against 79.2 percent of women in Burkina Faso. Male circumcision is more widespread with rates ranging from 95.2 percent in Ghana to 69.8 percent in Tanzania.

The summary statistics for the dependent variables used in the analysis are presented at the bottom of each table and discussed in the relevant sections.

2.1 Methodology and potential sources of bias

Even though this is regularly done in the epidemiological literature, I have chosen not to enter sexual behaviors and other variables as controls in the HIV infection regression or in regressions with other behaviors as the dependent variable. In a cross-section analysis, the estimates derived from such regressions would suffer from reverse causality or from endogeneity. For example, condom use could prevent HIV infection (negative association expected), but on the other hand, HIV positive people or high-risk people are more likely to use condoms because of their higher exposure (positive association possible).

Instead, I have chosen to run separate regressions, first with HIV status as the dependent variable (tables 3 and 4) and then with sexual behaviors and others attitudes and practices related to HIV/AIDS epidemic as the dependent variable (tables 6 to 14). Table 15 summarizes most of the results.

It remains that most of the individual characteristics used as regressors, with the exception of age and ethnic background, cannot be defined as completely exogenous variables. Location, marital status, education, wealth and even religion and practices like male circumcision and female genital mutilation are, at least to some extent, choice variables for the individual or his family. The data set does not offer sources of exogenous variations for those variables. Throughout the analysis, the coefficient in the analysis should therefore be interpreted with caution, as associations rather than causal effects.

Sexual behavior, male circumcision, female genital mutilation and other practices are all self-reported. This is an obvious, but inescapable limitation. Diverging reports on self-reported behaviors between males and females spouses (for example more married males report using a condom in marriage or discussing AIDS with their spouse than married

women) lead to the suspicion that some of the behaviors are not truthfully reported. Gersovitz (2005) discusses the issue of self-reporting sexual behaviors in the Demographic and Health Surveys and shows several inconsistencies, in particular regarding the age at first sexual intercourse and virginity. Some discrepancies in reported sexual behavior between males and females, for example on condom use or the number of partners can potentially be explained by the fact that extra-marital partners of men with a high intensity of sexual activity, typically commercial sex workers, are not included, or under-represented in the survey. Gersovitz and others (1998) study the balance of reported sexual activity between males and females in Ivory Coast by comparing the reported number of sexual intercourse in a given period with the reported time since the last intercourse. Although they cannot significantly reject the hypothesis that the discrepancy is due to the under-representation of commercial sex workers in the sample, they favor under-reporting behavior by women as the explanation. Polygamy, which is frequent in the studied countries, might also explain some of the reported discrepancies between married men and women.

One dependent variable which is not self-reported is HIV status since it is determined by an HIV test on a blood sample. This is one of the great advantages of the new DHS surveys including HIV testing. However, some individuals who had been sampled for HIV testing have refused to be tested or were absent. If the absence of a test is not random, this could be a source of bias. Table 5 deals with this issue and indicates that acceptance of the test is somewhat less likely in urban areas and among the wealthy. However, the coverage of the HIV test is usually high (between 82.3 and 95 percent).

Anti-retroviral treatment is currently scaled-up in the five countries. Although the data does not allow looking into that question (but table 12 indicates that individuals in urban areas and especially educated and richer people are more likely to use voluntary counseling and testing services), it is expected that access to treatment is easier in urban centers and for educated and richer people. If access to treatment keeps those individual alive while its absence implies that poorer and less educated individuals in rural areas are more likely to die, this would bias upwards the coefficient on education, wealth and urban location in a regression where the dependent variable is HIV status. This should be kept in mind in the analysis, even if only a small proportion of the HIV positive individuals are on treatment.

Indeed, only a fraction of the HIV positive population is medically eligible for treatment. There is a long interval between HIV infection –seroconversion- and the actual development of AIDS. It has been estimated that, for adults in Uganda, the median time from seroconversion to AIDS was 9.4 years (Morgan and others, 2002). Anti-retroviral treatment is only recommended for individuals at the AIDS stage (generally, with less than 200 CD4 cells/mm3)**.** In addition since access to the treatment programs is recent, only a fraction of the medically eligible patients gets it. Estimates of the proportion of HIV individuals on treatment varied from 0.66 percent in Tanzania to 5.35 percent in Burkina Faso[3]. The number of people on treatment was probably even smaller by 2003 and 2004 when the data sets analyzed in this paper were collected.

Except in the regressions with age at first sex and circumcision and female genital mutilation (where I have used a linear regression in order to get R-square that can be readily interpreted) as dependent variable where a linear regression is used, all the estimates presented are marginal effects (at the mean) of probit[4] coefficients.

3. HIV status

This section includes the analysis of individual HIV status. Figures 1 and 2 display the unadjusted age profile for both genders. For both genders and in almost all countries, the age profile is hump-shaped, first increasing with age and thereafter decreasing. The peak of HIV prevalence is generally earlier for females than males, with the exception of Burkina Faso. This is explained both by the fact that women tend to initiate their sexual activity earlier than males (see table 11, with an exception in Kenya) and that, biologically, the probability of transmission from male to female is substantially higher than from female to male. The age profile seems to be more tilted towards older ages (to the right) in Tanzania, Ghana and for females in Burkina Faso while it is more tilted towards younger ages (to the left) in Cameroon, Kenya and for males in Burkina Faso. It should be noted however that HIV prevalence is not a perfect measure of the current state of the epidemic since it is a stock

[3] The estimates are 4 percent for Cameroon and Kenya and 1.3 percent for Ghana. These figures are calculated by the author and are based on data on treatment coverage from June 2005 (WHO and UNAIDS 2005 and report by the Comité Ministériel de Lutte Contre le Sida for Burkina Faso).

[4] The probit specification takes into account the fact that the dependent variable is a 0-1 variable. In the probit specification, when there is no variation in the dependent variable for a specific control variable, that specific control variable is omitted from the regression. This explains some variations in sample sizes.

affected by past incidence rates and mortality rates. HIV individuals are asymptomatic for nine years on average before they get AIDS. In the absence of treatment (but treatment is currently scaled-up in all of these countries), individuals at the AIDS stage die within on average one year. Therefore, lower HIV prevalence at older ages does not necessary mean that those birth cohorts were less likely to be infected but might be due to the fact that a substantial portion of the HIV positive in those birth cohorts have already died.

Table 2 reports unadjusted means of HIV prevalence by education and wealth levels and by male circumcision and female genital mutilation. These unadjusted means are usually reported in the reports of the Demographic and Health Surveys (Burkina Faso Government and ORC Macro, 2004; Cameroon Government and ORC Macro, 2004; Ghana Government and ORC Macro, 2004; Kenya Government and ORC Macro, 2004 and, Tanzania Government and ORC Macro, 2005). I report them as starting point for the analysis and to compare and contrast them with regression coefficients in multivariate analyses. From the unadjusted means in table 2, it would appear that HIV infection is generally increasing with educational achievement, although the increase seems larger and more consistent from no education to some primary education than from some primary education to some secondary education or more. The unadjusted means in table 2 also suggest that the risk of HIV infection is increasing with wealth, although not always monotonically. It has long been postulated that male circumcision has a protective effect against HIV infection and this hypothesis has been recently confirmed by a randomized control trial in South Africa (Auvert and others, 2005). Looking at unadjusted means, only in Kenya are circumcised males significantly less likely to be infected. Actually, in Cameroon, Ghana and Tanzania, circumcised males appear more likely to be infected, but the difference is only significant in Cameroon. The evidence about the link between female genital mutilation and HIV infection is more tenuous, but it is generally thought that it is a risk factor because of the bleeding involved. The unadjusted means in table 2, however, seems to suggest that the difference between women who have experienced female genital mutilation and those who have not is either not significant or that uncircumcised women are more at risk (Ghana, Kenya and Tanzania). The remainder of the paper will go beyond unadjusted means.

Tables 3 and 4 present very similar regressions. In both tables, the dependent variable is HIV status (0 for HIV negative and 1 for HIV positive). The only difference is that, in table

4, male circumcision and female genital mutilation are included in the regressions. HIV prevalence is reported at the bottom of the table. HIV prevalence is substantially higher in Cameroon (3.9 percent for males, 6.6 percent of females), Kenya (4.6 percent and 8.6 percent) and Tanzania (6.2 percent and 7.6 percent) than in Burkina Faso (1.9 percent and 1.8 percent) and Ghana (1.6 and 2.7 percent). Usually women are more likely to be HIV positive, with the exception of Burkina Faso. Notice however that the age ranges in the survey are not the same for males and females except in Tanzania.

HIV infection is positively associated with urban status for males in Burkina Faso, females in Cameroon and for both genders in Tanzania. Being currently married is only positively associated with HIV infection for males in Burkina Faso. There is a strong positive association between being formerly married and HIV status for females in the three high prevalence countries, Cameroon, Kenya and Tanzania. This effect is reinforced for widows. It is likely that marital disruption and widowhood are a consequence rather than a cause of HIV infection and that widows in Cameroon and Kenya are more likely to be HIV positive because their husband died of AIDS. In Tanzania, where it is not possible to distinguish between formerly married individuals and widowed individuals, formerly married males are also more likely to be infected.

Having been in successive marriage seems to be an important risk factor. It is positively associated with HIV infection for females in Cameroon, Ghana and Tanzania as well as for males in Tanzania. This association could be due to self-selection as individuals who find it difficult to commit to one partner might also be more likely to be infected by HIV/AIDS. Nevertheless, this result, together with the fact that a substantial fraction of the population has been engaged in successive marriages suggests that this group, especially females, could be targeted for specific prevention efforts. Polygamy does not seem to be associated with HIV infection, except in Burkina Faso where the association is negative.

Contrary to the unadjusted means reported in table 2, there is no significant association between years of education and HIV infection in the multivariate analysis. If, instead of entering years of education linearly, dummies for the education categories are entered, the results are very similar: the only significant association is a positive relationship between the primary education dummy and HIV infection for women in Kenya (results not shown). De Walque (2004) shows that more educated women under age 30 are less likely to

be HIV positive in rural Uganda[5]. I have restricted the sample to individuals under age 30 to verify whether the association between education and HIV status was different for younger individuals: only in the case of young women in Kenya is there a significant negative association between education and the risk of HIV infection (results not shown).

Wealth tends to be positively associated with HIV infection, especially for females (in Cameroon, Kenya and Tanzania, but the associations are however not always monotonic). Among males, the association between HIV status and wealth is positive in Cameroon but marginally negative in Burkina Faso. Compared to Muslims, the omitted category in all regressions, male Catholics are less at risk in Cameroon and Burkina Faso. Male Protestants are less likely to be HIV positive in Cameroon but female Protestants are more at risk in Kenya. Other more traditional religions tend to be less at risk especially in Cameroon and for females in Burkina Faso and Ghana.

Controlling for circumcision and female genital mutilation in table 4 does not modify significantly the coefficient on the other variables, indicating that there was no omitted variable bias due to the non-inclusion of the circumcision variables. I will therefore, in the remainder of the paper always include male circumcision and female genital mutilation.

Male circumcision is understood to have a strong protective effect as evidenced by the results from a recent randomized control trial in South Africa (Auvert and others 2005). The results from the multivariate regression do not show such a negative association (there is no significant relationship between male circumcision and HIV, contrary to the bivariate analysis in table 2). Section 6 will try to discuss and explain in further detail this unexpected finding.

Table 4 also reports a negative association between female genital circumcision and HIV in Ghana and Tanzania (notice that in the regression for Tanzania there is no control for ethnicity). Female genital mutilation is generally thought to increase the risk of HIV infection because of bleeding. Section 6 will also attempt to shed more light on these surprising results.

Some individuals, who were randomly selected to be tested in the survey, do not have a test result either because they refused to be tested or because they were absent or due to a technical problem. The proportion of people being tested, reported at the bottom of table 5, is

[5] Out of 27 studies reviewed by Hargreaves and Glynn (2002), only one, among sugar estate workers in Ethiopia, reported a significantly negative association between HIV infection and education. Most of these studies, however, are in urban settings and based on data collected in the beginning of the 1990s, at an earlier stage of the epidemic.

always above 82%, but is higher (above 92%) in Burkina Faso and Cameroon and for females in Ghana. Refusal to be tested is the main reason for the absence of a test, as reported in table 5. The absence of a test result, if not random, might cause a bias and this is why table 5 analyses the determinants of the likelihood to be tested if selected in the HIV sample of the surveys.

Urban individuals are less likely to be tested: this is true in Burkina Faso and Cameroon, among males in Ghana and females in Tanzania. Since HIV prevalence is generally higher in urban areas this might cause a downward bias in the HIV estimate.

Married women are less likely to be tested in Burkina Faso, Cameroon and Ghana. Married men in Ghana, on the other end, tend to be more likely to be tested. Formerly married males are more likely to be tested in Burkina Faso, but formerly married women are less likely to be tested in Cameroon. Men who have been in more than one marriage successively are more likely to have been tested in Cameroon. Men in a polygamous union in Burkina Faso are less likely to be tested, while women in a polygamous union are more likely to be tested in Cameroon.

Education does not seem to have an impact. Wealthier people appear less likely to be tested (males in Cameroon, both gender in Ghana, females in Kenya and males in Tanzania). Since in some of these countries HIV prevalence is associated with wealth, this might also cause a downward bias of the estimate of HIV prevalence in the Demographic and Health Surveys.

Compared to the Muslim population, female Catholics are more likely to be tested in Burkina Faso, Cameroon and Tanzania and female Protestants more likely in Cameroon. Female from other religions are more likely to be tested in Burkina Faso, but less likely in Tanzania. Male circumcision is negatively associated with being tested in Burkina Faso and Kenya. Female genital mutilation is positively linked with being tested in Burkina Faso.

On balance, it seems that not being tested in the survey is positively associated with characteristics (urban location and wealth) that tend to be positively associated with HIV infection. This could imply a slight downward bias in the estimates of overall HIV prevalence as well as bias, probably downwards, the coefficients on urban location and wealth. However, overall, the coverage of the surveys is very good and this limits the scope for bias.

4. Sexual behaviors and attitudes related to the HIV/AIDS epidemic

Tables 6 to 14 report the results from the analysis of a range of sexual behavior (condom use, extra-marital sex, abstinence, virginity and age at sexual initiation) which are assumed to have an impact on the risk of HIV infection. Filmer (1998), Blanc (2000) have used earlier Demographic and Health Surveys to study the socio-economic correlates of sexual behavior. De Walque (2003 and 2004) contains a similar analysis for a cluster of villages in rural Uganda. Those sexual behaviors are at the hearth of most prevention efforts and constitute the core of the so-called "ABC" strategy: abstain, be faithful or use a condom. I also analyze the use of voluntary counseling and testing facilities, the probability that AIDS is discussed among spouses and the knowledge that an asymptotic person can be HIV positive. The description of those tables might appear somewhat repetitive for a reader interested by a general perspective, but it includes a lot of results which are important at a country level. Section 5 will provide a summary of the results and attempt to make broader conclusions.

4.1 Condom use during the last sexual intercourse if inside marriage

The Demographic and Health Surveys ask the respondent whether a condom was used during the last sexual intercourse and then asks whether that intercourse occurred with a spouse or with another partner. Condom use is recommended in both cases, but not using a condom outside marriage is considered even more risky. The levels of condom use at the last intercourse differ widely whether the last intercourse was inside or outside marriage (compare the means in tables 6 and 7). This is why I have separated the analysis according to this criterion.

In four of the five countries, men report a higher use of condom than females inside the marriage. This discrepancy seems to indicate that either male over-report condom use or that females under-report it. Another potential explanation might be polygamy if polygamous males use a condom with only some of their spouses. The discrepancy between males and females is slightly higher in Burkina Faso the country with the highest rate of polygamy.

In Cameroon, females report a higher rate of condom use in marriage than males. Cameroon is also the country with the highest rate of condom use in marriage (19.87 percent according to females). Reported condom use in marriage is lowest in Kenya.

Condom use in marriage is higher in urban areas in Cameroon for males and for females in Ghana. Kenyan females who have been in more than one marriage are less likely to use a condom. Females in a polygamous marriage in Burkina Faso and males in Kenya are less likely to use a condom.

The positive association between condom use in marriage and education is robust (only for males in Burkina Faso, is it not significant). The association with wealth is not very clear: it is increasing but not monotonic in Burkina Faso ; declining at low level of wealth for males in Cameroon ; increasing for males in Ghana, increasing but not monotonically for females in Kenya and Cameroon and (not always significantly) in Tanzania.

Compared to Muslims, female Catholics are less likely to report using a condom in Tanzania, but females Protestants in Cameroon and male Protestants in Kenya are more likely to report that they used a condom with their spouse. Generally, another religion is associated with a smaller likelihood of using a condom in marriage, and this is significant for females in Burkina Faso and in Tanzania.

Male circumcision is positively associated with using a condom inside marriage in Ghana and Tanzania (where there is no control for ethnicity). Female genital mutilation is negatively associated with condom use in marriage in Ghana.

4.2 Condom use during the last sexual intercourse if outside marriage

Table 7 looks at the same question as table 6 but limits the sample to the cases when the last sexual intercourse is outside marriage, including all individuals having extra-marital sex, whether or not they are married. The levels of condom use are much higher than within marriage and indicate that condom use is much more prevalent in non-marital sexual intercourse.

Males report that they are more likely to use a condom in relationships outside marriage, once again raising the question of over-reporting by males or under-reporting by females. In the case of non-marital sex, another possible explanation, not exclusive of the previous one, would be that men are actually more likely to use a condom when they are having extra-marital sex but that their extra-marital female partners are not largely represented in the interviewed sample (for example if they are commercial sex workers not included in the sample frame of the household surveys). Condom use outside marriage seems

more widespread in cities in Burkina Faso, for males in Cameroon and in Kenya, for females in Tanzania, with the exception of males in Ghana where it is less common in urban areas.

The fact that married females who engage in non-marital sex are less likely to use a condom is, if it is not a consequence of under-reporting, a substantial cause of concern. This negative association between current marriage and the use of a condom in extra-marital sex for females is confirmed in Burkina Faso, Cameroon and Kenya. Married males are more likely to use a condom in extra-marital intercourse in Tanzania.

Formerly married females in Burkina Faso are also less likely to use a condom in extra marital sexual activity and so are formerly married males in Kenya. Widowers in Burkina Faso are more likely to use a condom when they have sex, but the opposite is true for widowers in Ghana and widows in Cameroon. Females who have been in more than one marriage are less likely to use a condom when they have sex outside marriage in Tanzania.

Education increases the likelihood to use a condom in non-marital relationships everywhere, except for males in Kenya. The association with wealth is less evident, although there is a positive association with wealth in Cameroon, Ghana, for females in Kenya and males in Tanzania. Filmer (1998) also generally finds, with earlier data sets, a positive association between condom use outside marriage and education and urban status. Compared to Muslims, Catholic males are more likely to report using a condom outside marriage in Tanzania. The same is true for male Protestants in Burkina Faso, Kenya and Tanzania and female Protestants in Ghana. Individuals from other religion tend to be less likely to report using a condom outside marriage, especially females in Burkina Faso and Tanzania.

Female genital mutilation is negatively associated with condom use outside marriage in Kenya, while male circumcision is positively associated with it in Tanzania (but the analysis of the Tanzanian data does not control for ethnicity).

4.3 Non marital sex in the last 12 months

Only the currently married sample is analyzed in table 8 because others, by definition, have only non marital sex if they are sexually active. In table 9, I will look at sexual activity in the last twelve months for all and in table 10, I will look, for singles, at the probability to ever have had sex.

There are large variations in reported extra-marital sexual activity in table 8, with Cameroon having higher levels. Males always report higher levels of extra marital sex. This could again be due to over-reporting by males and/or under-reporting by females, but such statistics could also reflect actual practices if most married males have extra-marital sex with non married women.

Only in Cameroon are married women in cities more likely to have extra marital affairs. With the exception of Burkina Faso, having been in successive marriages increases the probability of extra-marital sex. This might be the result of self-selection, since having been in successive marriages could be a sign of the difficulty to commit to one partner. Women in a polygamous union are more likely to have extra-marital sex in Cameroon, Kenya and Tanzania while men in polygamous unions in Burkina Faso are less likely to report extra-marital sex. It seems logical that men in polygamous unions, who already have multiple spousal partners, have a lower propensity to seek other partners in addition to their spouses. On the other hand, it is interesting to note that polygamy seems to encourage extra-marital affairs for women.

Education is positively associated with extra-marital sex for males in Burkina Faso and females in Cameroon and Ghana. Wealth tends to be positively associated with extra-marital sexual activity for males in Cameroon, Ghana and Kenya. The inverse association is present for females in Tanzania.

Compared to Muslims, males Catholics are more likely to have extra-marital affairs in Cameroon and Tanzania. The same is true for females in Burkina Faso. Protestant females are less likely to engage in extra-marital sex in Ghana. The same is true for Protestant males in Burkina Faso, but the contrary holds for Protestant males in Cameroon. Males from other religion are more likely to engage in extra-marital sex in Cameroon and Tanzania, but females with other religious beliefs are less likely to do so in Ghana.

Male circumcision is positively associated with extra-marital sex in Cameroon and Tanzania (in Tanzania, there is no control for ethnicity, however), but it is negatively associated with infidelity in Kenya. Female genital mutilation is negatively associated with extra marital sex in Kenya. It is surprising to find such an association between male circumcision and non-marital sex even after controlling for religion, region and ethnicity (only religion and region in the case of Tanzania). This suggests that, over and above being

determined by religion, ethnicity and region, male circumcision and female genital mutilation are the signals of other, unobserved attributes of individuals.

4.4 Abstinence during the last 12 months

After condom use and fidelity, a third strategy to avoid AIDS is abstinence. The levels of abstinence in the last twelve months, reported at the bottom of table 9, are comparable across countries, although they are higher in Burkina Faso and Ghana. The discrepancies between males and females are less substantial than for other reported behaviors.

Abstinence is less likely for female in cities in Burkina Faso. Very logically it is much less common among married people than among singles. It is also, but to a lesser extent, less common among formerly married individual than among singles, except for females in Ghana. Widowed women are more likely to abstain than other formerly married women in Burkina Faso, Cameroon and Kenya. Females who have been in successive marriages in Ghana are less likely to abstain than other married women: the same is true for males in Cameroon and Kenya. Men in polygamous unions are less likely to abstain than other married men in all five countries except Kenya, probably because they have a larger pool of potential partners and maybe also due to self-selection. Women from Ghana are more likely to abstain if they are in a polygamous union.

Abstinence is negatively associated with education in Cameroon for both genders and for females in Burkina Faso and Tanzania and for males in Ghana. Wealth tends to be negatively associated with abstinence, especially among females in Burkina Faso and Ghana (not monotonically though) and males in Kenya. A positive association with being in the fifth quintile of wealth and abstinence is found among males in Tanzania. Catholics and Protestant females are less likely to abstain than Muslims, but only in Ghana.

Abstinence is negatively associated with male circumcision in Burkina Faso, Cameroon and Tanzania, where there is no controls for ethnicity and with female genital mutilation in Burkina Faso and Kenya. Again sexual behaviors seem to be strongly associated with male circumcision or female genital mutilation, even after controlling for a large range of personal characteristics, suggesting that unobservable traits might be associated with those practices.

4.5 Virginity

The analysis is done for singles since it can be assumed that all ever married individuals have had sexual activity (the data confirm this). In general the proportion of single women who have never had sex is similar across four countries and is around 55 percent. Burkina Faso is an exception with the self-reported virginity rate among single women at 67 percent. Except in Ghana (differences across gender is not statistically different), single males are less likely than single females to have not experience sexual activity. Kenya, Cameroon and Tanzania have virginity rates among single males well below 50 percent.

Virginity is less common for females in urban areas of Cameroon, Kenya and Tanzania. The effect of education on virginity is mixed for females: education is positively associated with virginity among females in Kenya and Tanzania, but negatively associated with it in Burkina Faso and Cameroon. More educated single males are less likely to be virgins in Cameroon and Ghana. High levels of wealth are positively associated with virginity for women in Cameroon, Ghana and Tanzania and for men in Tanzania. The opposite appears to be true, but not monotonically for males in Cameroon.

Single Catholic men in Cameroon are more likely to report being virgin than Muslims, but the opposite is true for single women who are Catholic and Protestants. Catholics and Protestant women are more likely to be virgin before marriage in Tanzania. This is also true for Protestant women in Burkina Faso. In Burkina Faso, single women with other religious beliefs are less likely to remain virgins, but in Tanzania, the opposite is true for both males and females with other religious beliefs.

Male circumcision is negatively associated with reported virginity in Burkina Faso, Kenya and Tanzania. Female genital mutilation is negatively associated with self-reported virginity in Burkina Faso and Kenya, but positively associated with it in Cameroon (where its prevalence is however very low).

4.6 Age at first sexual intercourse

Table 11 which looks at the age of sexual debut for individuals who have initiated their sexual activity is a complement to table 10. It is generally assumed that a later age at of sexual initiation is a way to prevent HIV/AIDS infection. Gersovitz (2005) shows several inconsistencies in self-reported age at first sexual intercourse by comparing subsequent

Demographic and Health Surveys in the same countries. The results of this analysis should therefore be considered with caution.

In general males tend to initiate sexual activity later, with the exception of Kenya. It is in Burkina Faso that males tend to initiate sexual activity the latest, while it is in Cameroon that the average age of sexual initiation is the lowest for females.

Men in urban areas of Burkina Faso report having their first sexual experience later, but the opposite is true in Tanzania. Females in Kenya start to have sex earlier in urban areas.

Currently married males report a later age of sexual debut in Burkina Faso and Tanzania, but currently married women report the opposite in all countries except Burkina Faso. The same is true for formerly married women in Ghana, Kenya and Tanzania and for widows in Cameroon and Ghana. It seems therefore that, for females, marriage does correspond with an earlier age of sexual debut. All individuals who have been in successive marriages, except males in Burkina Faso, tend to have started their sexual activity earlier. There might be reverse causality involved in this relationship since earlier marriage, and earlier sexual debut, might be associated with subsequent marital instability. Women in polygamous unions tend to have an earlier sexual debut in Burkina Faso and Kenya.

Education is always associated with a later sexual debut for females. This relationship might also be affected by reverse causality since pregnancy frequently implies for a girl that she has to drop out of school. Education is also positively associated with age of sexual debut for males in Kenya and Tanzania, but educated males in Burkina Faso and Cameroon have earlier sexual experiences. Wealth is negatively associated with age at first sexual intercourse for males in Burkina Faso, but positively associated with it for females in Ghana and Kenya and for both genders in Tanzania.

Regarding the age at sexual initiation, Catholics and Protestants differ in similar fashion from Muslims: males in Cameroon and Ghana start earlier, females in Ghana also start earlier, but females in Burkina Faso and Tanzania start later. Other religious beliefs are negatively associated with age at sexual debut for males in Cameroon and females in Kenya, but are positively associated with it for females in Tanzania. Circumcised males report an earlier age of sexual debut in Cameroon. Female genital mutilation is associated with a lower age of sexual debut in Burkina Faso, Kenya and Tanzania.

4.7 Use of voluntary counseling and testing facilities

Tables 12 to 14 reports results of attitudes and practices which are not sexual behaviors but are related to the HIV/AIDS epidemic. The dependant variable in table 12, which looks at having been tested and obtained the results of an HIV test prior to the Demographic and Health Survey – and not at getting the results conditional on being tested - was not available for females in Burkina Faso.

The use of voluntary testing facilities is lower in the two countries with the lowest HIV prevalence, Burkina Faso and Ghana. There are no large differences between genders in reporting having obtained the results from an HIV/AIDS test except in Cameroon where women are more likely to have obtained the results.

Individuals living in urban areas are more likely to have received results in Tanzania and for females in Kenya. Given that HIV testing facilities tend to be more available in urban areas, it is somewhat surprising not to find an association with urban areas on Burkina Faso, Cameroon and Ghana.

Married people are more likely to try to know their HIV status (married females in all four countries where the information is available and males in Burkina Faso and Kenya). The same is true for formerly married people in Kenya and formerly married women in Cameroon. Tanzanian males who have been in more than one successive marriage are also more likely to seek information about their HIV status. Males in polygamous union in Cameroon are more likely to get the results from a test while females in polygamous unions in Kenya are less likely.

Education is always positively associated with obtaining information about one's HIV status. The same is true for wealth, except for Kenyan males. This might reflect easier access to health services for the rich.

Compared to Muslims, Protestant and Catholics males in Cameroon are less likely to be tested and get the results of an HIV test. The opposite is true for females in Ghana and Catholic females in Tanzania. Females with other religious beliefs in Cameroon and Tanzania are less likely than Muslims to use voluntary counseling and testing. Male circumcision is positively associated with the use of HIV testing in Burkina Faso, Cameroon and Tanzania. There is no association between HIV testing and female genital mutilation.

4.8 Discussion about AIDS between spouses

Table 13 reports results of the analysis of discussion between spouses about AIDS which is assumed to facilitate prevention. The dependent variable is not available in the Tanzania data set. On average, a large fraction of married people report having discussed AIDS with their spouse. It is however lower in Burkina Faso. Males are more likely to report that they have discussed AIDS with their spouse. Once again, this might be due either to over-reporting by males or under-reporting by females or a combination or both. Another potential explanation might be polygamy if polygamous males only discuss AIDS with some of their spouses. The discrepancy between males and females is slightly higher in Burkina Faso the country with the highest rate of polygamy.

Women in urban areas of Burkina Faso and Ghana are more likely to have discussed AIDS than in rural areas. The opposite is true for males in Cameroon.

Females who have been in more than one marriage in Cameroon and Ghana are more likely to have discussed with their husband. Polygamous men in Burkina Faso and Cameroon are more likely to discuss while the opposite is true for women in polygamous unions in Burkina Faso, Ghana and Kenya. This opposite association between polygamy and discussion about AIDS in marriage across genders is consistent with polygamy as an explanation for the discrepancies in the reports between males and females.

In all countries, education predicts an increased level of discussion between spouses. The same relationship is valid for wealth except for males in Cameroon.

Catholics are more likely to report a discussion about AIDS with their spouse than Muslims, everywhere except for males in Cameroon and females in Kenya. Males in Burkina Faso, Ghana and Kenya are also more likely to report a discussion if they are Protestant. The same is true for female Protestants in Ghana. Females who profess other religious beliefs in Burkina Faso and Kenya are less likely to report such discussion than Muslims, but the contrary is true for males in Kenya. In Burkina Faso there is a positive association between discussion about AIDS in marriage and male circumcision as well as female genital mutilation.

4.9 Knowledge that an HIV positive individual can be asymptomatic

Table 14 uses the knowledge of the fact that a healthy looking person can be HIV positive as an indicator of knowledge about the HIV/AIDS epidemic. Knowing this fact has also important implications for prevention. The knowledge that an HIV positive individual can be asymptomatic is quite widespread but is slightly lower in Burkina Faso, the country with the lowest level of HIV prevalence. Men are on average more knowledgeable about this fact (it is difficult to think that there would be over-reporting or under-reporting about knowledge), but they are also on average more educated.

In Burkina Faso for both gender, in Cameroon for males and in Ghana and Kenya for females, urban status is positively associated with the knowledge that a healthy looking person can have HIV. The opposite is true for males in Kenya.

Married people are more likely to know that fact in Burkina Faso, in Kenya and in Tanzania (males only). The same is true of formerly married males in Burkina Faso and of females in Cameroon and Kenya. Being widowed or having been in successive marriages does not affect the acquisition of that information. Women in polygamous union and males in polygamous unions in Kenya are less likely to have that information while the opposite is true of males with several spouses in Cameroon.

Education is always positively associated with this knowledge, and so is wealth, except in Ghana and for males in Kenya (but more than 90 percent of all Kenyans males know this fact).

Among Kenyan males, Catholics, Protestants and people with other beliefs are more likely to know this fact than Muslims. But in Tanzania, another religion is associated with a lower level of knowledge. The same is true for females from Burkina Faso. Male circumcision is positively associated with this knowledge in Burkina Faso and Tanzania. Women in Burkina Faso who have experienced female genital mutilation are also more knowledgeable about this important feature of the disease.

5. General findings

The description of the results for each dependent variable in section 4 might appear lengthy, even tough many of the findings are important for policy purposes at country level. Table 15 attempts to take a broader perspective and summarizes the direction of the associations found

between the dependent variables and most independent variables covered in the paper. In each cell, the figure before the comma reports the number of significantly positive associations and the figure after the comma reports the number of significantly negative associations (10% confidence level at least). Unless otherwise stated, the maximum is five (for five countries). I have specified the independent variable other than HIV infection so that they are defined as potentially protective against HIV: condom use, fidelity (I had to inverse the signs from table 8 where the dependent variable is having had non marital sex in the last 12 months), abstinence (no sexual intercourse in the last twelve months), virginity (never had sex), late age at sexual initiation, use of voluntary counseling and testing, discussion about AIDS with one's spouse and knowledge that a healthy looking person can have AIDS are all generally expected to reduce the risk of HIV infection.

In bold are cells with opposite associations across countries. With the exception of the column for wealth and the rows related to sexual initiation (virginity and age at sexual debut), there are remarkably few cases where an independent variable has contradicting coefficients across countries. The association with wealth varies substantially across countries. Regularities about sexual initiation seem also to vary across countries. In italics are pairs of cells where the association goes in opposite directions for males and females.

Education is one of the most consistent predictors of behavior and knowledge. Education predicts protective behaviors like condom use, use of counseling and testing, discussion among spouses and knowledge but it also predicts a higher level of infidelity or a lower level of abstinence. As a result of these contradicting associations, education is not significantly associated with HIV status.

The association with wealth tends to go in the same direction as education, but not always as consistently and with more contradicting results across countries. Wealth tends to be positively associated with HIV infection among females.

Although, there are in some countries significant associations between religion and behavior, it is interesting to note that these associations are less consistent than the association with education for example. The same conclusion can be made about location in urban areas: it is generally associated with behavior, but not as strongly as education.

Marital status is also associated with behavior, sometimes for obvious reasons: married people are less likely to abstain from sexual intercourse. Married people are more

likely to use HIV testing and to know about AIDS. But, for women, the use of condom in extra-marital relationships is negatively associated with being married. This should be a cause of concern and potentially a target of prevention efforts. The association between having been married previously and behavior tend to follow the same pattern than for currently married individuals.

An important finding is also that having been in successive marriages tends to be associated with risky behavior: compared to other married people, they appear less likely to use condoms, to be faithful, to abstain and to initiate sexual activity at later ages. And they are more likely to be HIV positive. Of course, these results, like others related to marital status could be due to self-selection (or even reverse causality if they have lost previous partners due to HIV/AIDS), but they still indicate that this segment of the population is at risk and that specific prevention efforts might need to be targeted to them. The summary statistics in table 1 also show that this is not a small fraction of the population (between 13 and 25 percent of all males and 5 and 19 percent of all females).

Being in a polygamous union has not such a strong impact. In the column for polygamy there are many cases where the effect goes in opposite direction for males and females: polygamy is associated positively with infidelity for females but not for males; it is negatively associated with abstinence for males, but positively for females. Similar opposite effects are found for HIV testing and discussion between spouses about AIDS. These opposite effects are probably not too surprising given that in polygamous unions men and women find themselves in very unbalanced situations.

Male circumcision and female genital mutilation also tend to produce associations going in opposite directions. This is not very surprising given that those are very different practices which, as evidenced by table 16, have also different socio-economic determinants. The next section discusses the role of male circumcision and female genital mutilation more extensively.

6. Male circumcision and female genital mutilation

All regressions except those in table 3 include controls for male circumcision and female genital mutilation. I included male circumcision because it has long been understood to have a protective effect against HIV infection (Auvert and others, 2001; Gray and others, 2000; Weiss and others, 2000). This effect has recently been established in a randomized control

trial in South Africa (Auvert and others, 2005). Not including male circumcision could therefore lead to omitted variable bias. The comparison between tables 3 and 4, however, indicates that the coefficient on other variables is not significantly affected by the inclusion or the exclusion of the controls for male circumcision and female genital mutilation. I included female genital mutilation in the regressions for females, by symmetry and also because female genital mutilation is generally thought to increase the risk of HIV infection because of bleeding.

The results from the multivariate regressions are surprising, at least at first glance: they do not show a negative association between male circumcision and HIV but there are two cases of a negative association between female genital circumcision and HIV, in Ghana and Tanzania (notice that in the regression for Tanzania there is no control for ethnicity). This section further investigates these results and attempts to provide an explanation for the reported correlations. The coefficients on male circumcision and female genital mutilation in the tables should be taken with caution and not interpreted as causal. The results from this paper do not suggest that male circumcision is not an effective way to prevent HIV infection, since this has been recently established (two other randomized control trials are ongoing and, if their results confirm the South African findings, the evidence on the protective role of male circumcision will be further reinforced). Nor should the results in this paper be read as a suggestion that female genital mutilation offers any protection against HIV and should therefore be encouraged. I believe, however, that I should not have hidden these surprising findings and that it is interesting to try to understand what can explain them.

Previous cross-sectional analyses of the association between male circumcision and HIV infection have been criticized for lacking controls for religion or ethnicity (Oster, 2004). The results displayed in table 4 and reproduced in table 16 (columns 1 and 2) do control for religion, ethnicity and region. The analysis for Tanzania, however, does not include a control for ethnicity as this variable is not included in the data set (columns 3 and 4 for Tanzania).

In table 16, I repeat the analysis of table 4, focusing on male circumcision and female genital mutilation, and I gradually remove controls for region, ethnicity and religion. If the association between male circumcision or female genital mutilation was not significant when controlling for region, ethnicity and religion but became significant after removing some of these controls, this might indicate that the association between those practices and HIV

infection is actually due to other characteristics linked to region, ethnicity or religion. This is not the case for male circumcision: even without controls for region, ethnicity or religion, there is no apparent association between male circumcision and HIV infection. In the case of female genital mutilation, the negative association between this practice and HIV infection is robust to the inclusion of controls for region, ethnicity or religion in Ghana and for region and religion in Tanzania. In Kenya, however, the negative association is present when there is no control for ethnicity but is not significant anymore when the ethnic origin is included in the regression. It therefore appears that, in Kenya, the negative association between HIV infection and female genital mutilation is due to characteristics linked to the ethnic group rather than to female genital mutilation itself or other personal characteristics correlated with it.

The objective of table 17 is first to determine whether variables like education, wealth, religion, ethnicity and region entirely explain male circumcision and female genital mutilation. If this would be the case, including male circumcision and female genital mutilation together with those variables in a regression where HIV status is the dependent variable would create multicolinearity and could explain why for example male circumcision appears not to have an effect. To this purpose, I have used a linear regression framework in order to be able to look at the R-squares. Although, the reported R-squares are high, by no means are they such that male circumcision and female genital mutilation can be entirely explained by education, wealth, religion, region or ethnicity. Only two R-squares are above 0.5, 0.66 for female genital mutilation in Cameroon where the practice affects only 1.4 percent of the population and 0.55 for male circumcision in Kenya. It is important to remember that the Tanzanian analysis does not control for ethnicity. These results suggest that the absence of an association between male circumcision and HIV status in tables 4 and 16 are not due to multicolinearity.

Table 17 also allows analyzing some determinants of male circumcision and female genital mutilation. Male circumcision is more common in urban areas in Cameroon and Tanzania.

There could be reverse causality with the marriage characteristics if either male circumcision and/or female genital mutilation are perceived as qualities of the spouse. Female genital mutilation is more common among married and formerly married women in Burkina Faso, Cameroon, Kenya and Tanzania, suggesting that for some segments of the population

this practice can be seen as condition for marriage. Male circumcision is associated with successive marriage in Burkina Faso and Tanzania. Female genital mutilation is positively associated with successive marriages in Burkina Faso but the opposite is true in Tanzania. Male circumcision is negatively associated with polygamy in Kenya and Tanzania and female genital mutilation is also negatively associated with polygamy in Burkina Faso and Kenya.

Education is positively associated with male circumcision in the five countries. It is not very likely that this is due to reports about the protective effect of circumcision with regard to HIV, because it is only after the date of the surveys that the protective effect has been scientifically established. However, the information about the likelihood of a protective effect was circulating before. Therefore, the adoption of male circumcision as a prevention mode against HIV cannot entirely be excluded, although the data does not offer any possibility to verify it because the data does not report the age at circumcision[6]. Female genital mutilation is negatively associated with education in all countries except in Cameroon where its prevalence is very low. Although the relationship is not always monotonic, male circumcision seems to be positively associated with wealth. Female genital mutilation is negatively associated with wealth in Kenya and Tanzania, but positively in Burkina Faso.

Male circumcision is always larger among Muslims: this is not surprising since it is a precept of the Koran. Female genital mutilation is not a religious obligation for Muslims (or for other religions), although it has sometimes been perceived as such. Muslim women are more likely to have been affected by female genital mutilation in Burkina Faso and Ghana.

Another surprising finding is that both male circumcision and female genital mutilation are often associated with behaviors as summarized in table 15. The evidence from a randomized control trial in South Africa has shown that there is a causal protective effect of male circumcision on the risk of HIV infection that can be explained by physiology, but there is no expectation that male circumcision would have an impact on behaviors. Similarly, although the scientific evidence is not as strong as for male circumcision, it is generally expected that female genital mutilation, because of the risk associated with bleeding, increases the risk of HIV infection. It is also assumed that female genital mutilation reduces the sexual pleasure of the woman and this might therefore have an impact on sexual behavior,

[6] Also previous Demographic and Health Surveys in the five countries studied do not include information about male circumcision, so that it is not possible to examine trends in male circumcision over time.

although there is no systematic evidence about this. Actually, the evidence in the analysis seems to go against the common belief in the populations where female genital mutilation is practiced, that circumcised women will be less active sexually: female genital mutilation tends to be negatively associated with abstinence and age at first sex. There are contradicting results about virginity (two negative associations and one positive) and only one positive association with fidelity. But there is, generally, on scientific grounds, no reason to believe that female genital mutilation has a direct impact on behaviors like condom use, discussion between spouses or knowledge about AIDS.

These surprising associations between male circumcision and female genital mutilation and behaviors suggest that those practices are correlated with other individual characteristics which might be unobservable. Given that both female genital mutilation and male circumcision are sometimes associated with rites of passage, it might be that they are correlated with integration into society or with desirability as a spouse or as a sexual partner.

These associations with behaviors might explain the absence of negative association between HIV status and male circumcision as well as the existence of two cases of negative associations between HIV infection and female genital mutilation, when, on the basis of physiological channels, there would be more reasons to expect a positive link between them. For example, table 15 suggests that if circumcised males appear somewhat more likely to use a condom, on the other hand, they are, on balance, less likely to be faithful. They are also less likely to practice abstinence, to remain virgins if single and they have a tendency to have earlier sexual initiations[7]. These surprising and unexpected associations obtained in the analysis also serve as a reminder that in many cases, given the endogeneity of several regressors and the omission of unobservable characteristics linked to individual behavior, the coefficients obtained in the regressions should be interpreted as correlations or associations rather than causal effects.

[7] It is difficult to know whether part of the tendency for circumcised males to have less protective behaviors might be due to their knowledge that circumcision protects them, albeit imperfectly, from HIV infection. Although it is only in 2005, i.e. after the data used in this paper has been collected, that the protective effect of circumcision has been established in a randomized control trial, the information that circumcision might have been a good protection was already circulating. To test this hypothesis one would need to see whether there has been a change in the sexual behavior of circumcised males over time, but previous Demographic and Health Surveys in the five countries do not include information on male circumcision.

7. Conclusions

The last wave of Demographic and Health Surveys includes, in many countries, especially in Africa, HIV testing for a representative sample of the population. This is a very useful addition that allows in each country a better assessment of the epidemic. It should be noted, however, that, as anti-retroviral treatment is scaled-up in many countries, HIV prevalence will become an ambiguous indicator. If prevalence is increasing, will it be due to a higher HIV incidence and therefore to a failure of prevention efforts or to a lower AIDS related mortality and therefore to the success of treatment programs? The development of nationally representative measures of HIV incidence should therefore be encouraged. It would also be interesting to include in the next wave of Demographic and Health Surveys questions about anti-retroviral treatment.

This paper takes advantage of this new source of data in order to study the socio-economic determinants of HIV status and sexual behaviors in Burkina Faso, Cameroon, Ghana, Kenya and Tanzania. Since the variables are defined similarly in the five surveys, the analysis allows, in addition to country-relevant results, interesting generalizations. While an important benefit of the new wave of Demographic and Health Surveys is to include the results of an HIV test, an objective biomarker, a limitation that needs to be kept in mind is that sexual behaviors are self-reported. Another shortcoming of the analysis is that each of the five data sets is a cross-section and that many of the variables used are potentially endogenous, even though I have avoided using the most obviously endogenous ones as regressors. I therefore warn the reader against interpreting the reported coefficients in this study as implying a causal relationship. Nevertheless, even if a causal link cannot be established, some reported associations clearly show that some categories of the population are at greater risk.

Several findings can be generalized and are of importance for policy-makers engaged in the fight against the HIV/AIDS epidemic. One important result is that married women who engage in extra-marital sex are less likely to use condoms than single women when doing so. This might point to an important gap in prevention efforts. Having been in successive marriages is also a significant risk-factor. Even if this result might be due to self-selection, it suggests that specific prevention efforts should be targeted to that group in the population. Contrary to the evidence derived from unadjusted means, education is not associated

positively with HIV status. But schooling is one of the most consistent predictors of behavior and knowledge: educational achievement predicts protective behaviors like condom use, HIV testing, discussion among spouses and knowledge about AIDS but it also predicts a higher level of extra-marital sex and a lower level of abstinence. It is not impossible that these associations going in opposite directions cancel each other and that this explains why education is not significantly associated with HIV status.

Finally this study contains unexpected results on male circumcision and female genital mutilation. Those practices are often associated with sexual behaviors and other activities related to AIDS. This might explain why in the analysis in the five countries there is no significant negative association between male circumcision and HIV status, despite recent evidence from a randomized control trial (Auvert and others, 2005) that male circumcision has a protective effect.

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Figure 1: Age profile of HIV prevalence. Males

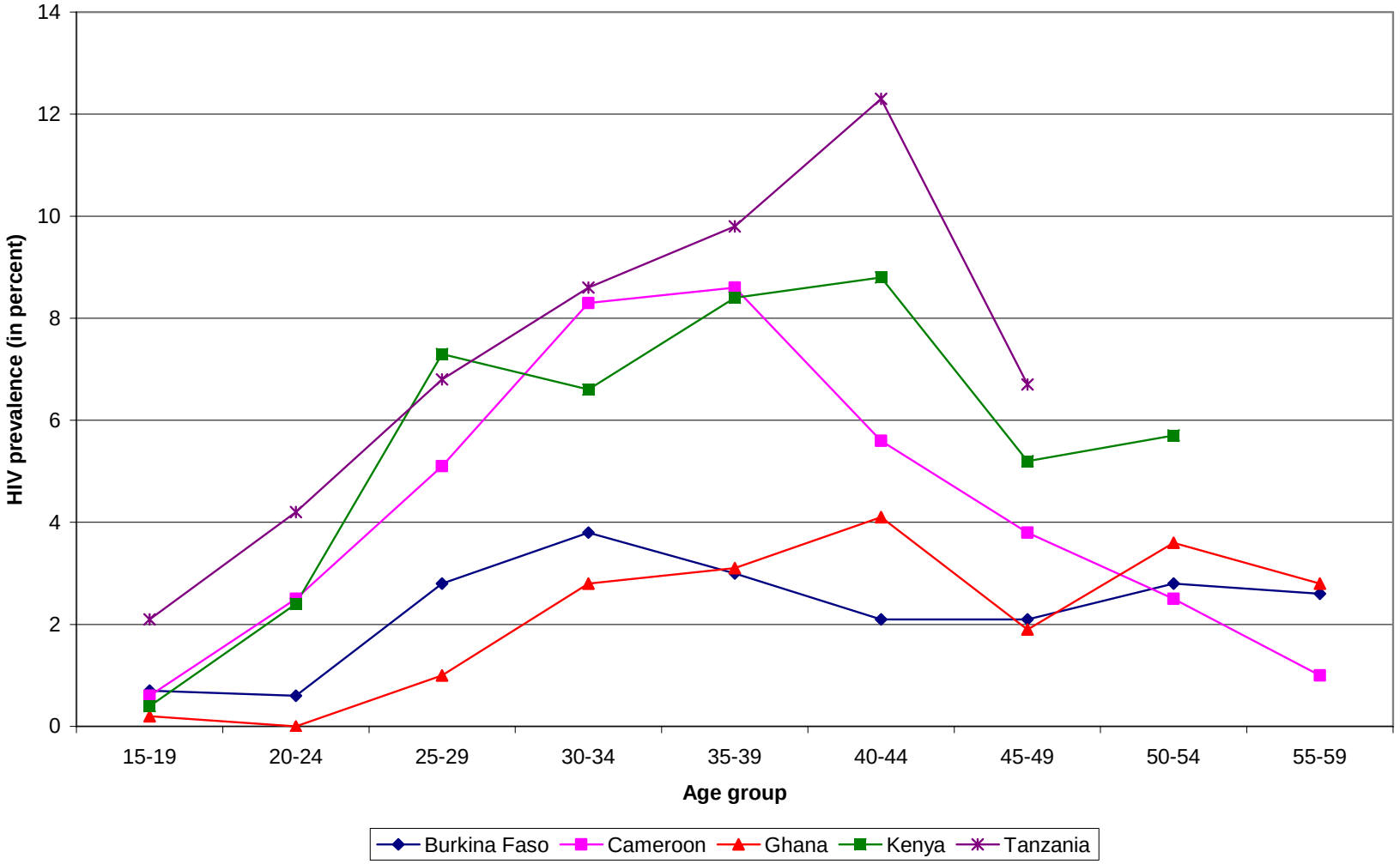

Figure 2: Age profile of HIV prevalence. Females

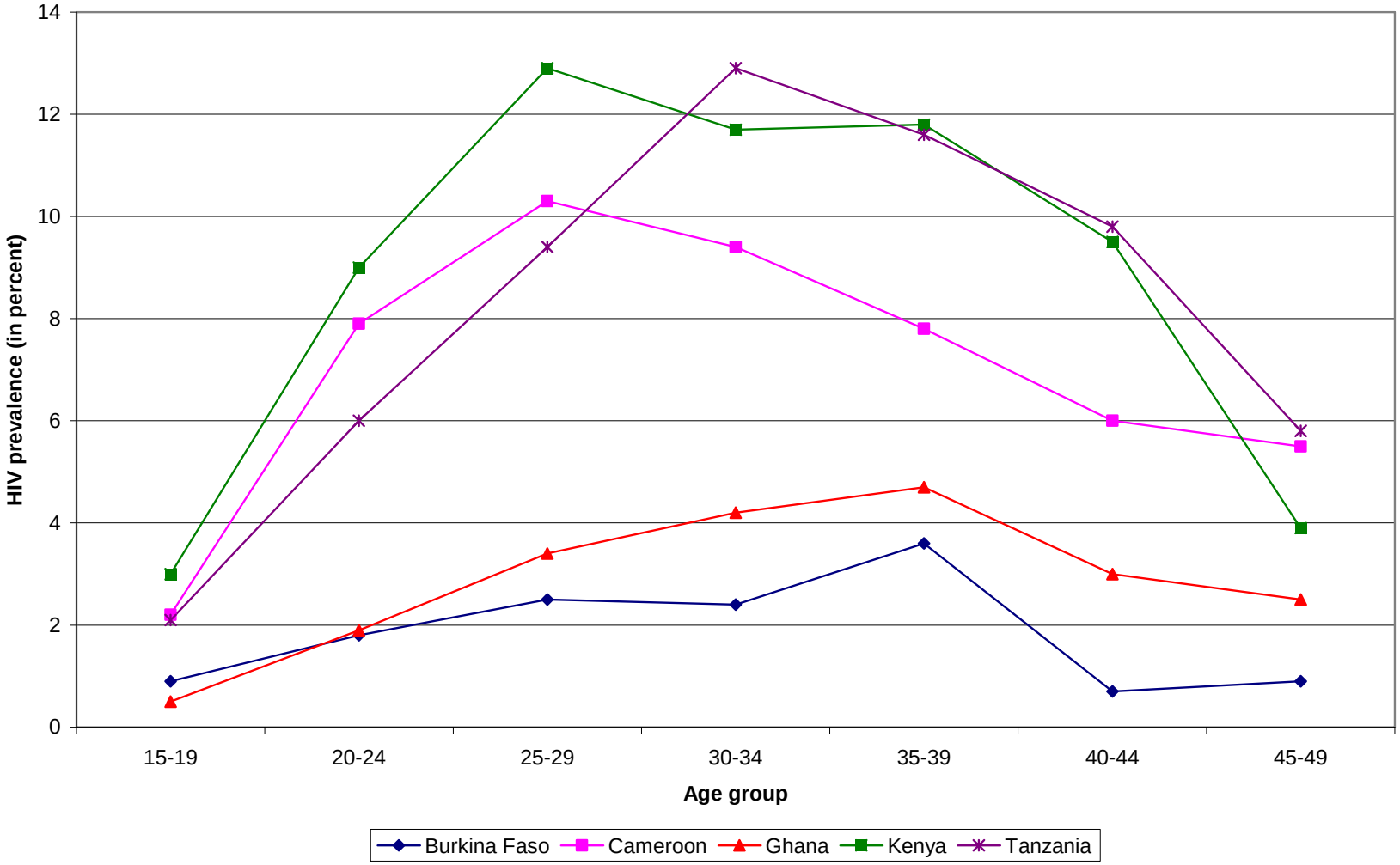

Table 1: Summary statistics for the independent variables used in the analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Burkina Faso 2003		Cameroon 2004		Ghana 2003		Kenya 2003		Tanzania 2003-04	
	males	females	males	females	males	females	males	females	males	females
Urban	0.240	0.216	0.573	0.547	0.448	0.484	0.253	0.250	0.302	0.308
	[0.030]	[0.027]	[0.026]	[0.027]	[0.027]	[0.027]	[0.024]	[0.023]	[0.029]	[0.029]
Currently married	0.559	0.773	0.507	0.672	0.532	0.623	0.508	0.600	0.531	0.635
	[0.010]	[0.011]	[0.009]	[0.009]	[0.009]	[0.010]	[0.009]	[0.007]	[0.009]	[0.009]
Formerly married	0.018	0.038	0.091	0.087	0.060	0.092	0.041	0.101	0.054	0.118
	[0.003]	[0.002]	[0.004]	[0.003]	[0.004]	[0.004]	[0.004]	[0.004]	[0.003]	[0.004]
Widowed	0.172	0.559	n.a.	0.319	0.097	0.209	0.156	0.414	n.a.	n.a.
	[0.061]	[0.036]		[0.018]	[0.019]	[0.019]	[0.031]	[0.023]		
> 1 marriage	0.221	0.098	0.252	0.173	0.253	0.190	0.130	0.051	0.178	0.145
	[0.010]	[0.004]	[0.010]	[0.006]	[0.007]	[0.007]	[0.007]	[0.003]	[0.007]	[0.006]
Polygamous	0.294	0.483	0.129	0.305	0.128	0.227	0.098	0.186	0.098	0.097
	[0.014]	[0.012]	[0.008]	[0.011]	[0.008]	[0.012]	[0.008]	[0.009]	[0.007]	[0.008]
Education (years)	2.62	1.39	7.06	5.61	7.75	5.89	7.93	7.12	6.20	5.36
	[0.218]	[0.144]	[0.160]	[0.181]	[0.178]	[0.167]	[0.139]	[0.137]	[0.108]	[0.115]
Muslim	0.577	0.600	0.177	0.180	0.187	0.155	0.064	0.075	0.298	0.306
	[0.022]	[0.020]	[0.016]	[0.017]	[0.017]	[0.015]	[0.008]	[0.009]	[0.020]	[0.020]
Catholic	0.249	0.231	0.396	0.376	0.155	0.144	0.266	0.252	0.326	0.310
	[0.018]	[0.014]	[0.014]	[0.014]	[0.009]	[0.009]	[0.012]	[0.012]	[0.017]	[0.016]
Protestant	0.041	0.051	0.304	0.327	0.592	0.664	0.602	0.650	0.264	0.290
	[0.004]	[0.005]	[0.012]	[0.013]	[0.017]	[0.017]	[0.014]	[0.014]	[0.015]	[0.016]
Other religion	0.132	0.116	0.121	0.114	0.112	0.070	0.066	0.021	0.110	0.092
	[0.013]	[0.012]	[0.007]	[0.010]	[0.008]	[0.006]	[0.007]	[0.003]	[0.016]	[0.013]
Circumcised	0.896	0.792	0.929	0.014	0.952	0.053	0.857	0.322	0.698	0.177
	[0.011]	[0.011]	[0.011]	[0.004]	[0.006]	[0.008]	[0.014]	[0.018]	[0.022]	[0.015]

Note: Standard errors in brackets. N.a.: not applicable, variable not included. The residual categories are rural and never married. "Widowed" is a mean taken on formerly married individuals and "polygamous" is taken on currently married individuals. Other religion includes animists and no religion in Burkina Faso, animists, no religion and other religions ("religions de l'éveil") in Cameroon, traditionalists and no religion in Ghana, and no religion in Kenya and Tanzania. In Ghana, other Christians have been included under Protestants. "Circumcised" refers to male circumcision for males and to female genital mutilation for females. The data are weighted with the sample weights given by the data provider.

Source: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ghana 2003, Kenya 2003 and Tanzania AIS 2004).

Table 2. HIV prevalence by selected characteristics: unadjusted means

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Burkina Faso 2003		Cameroon 2004		Ghana 2003		Kenya 2003		Tanzania 2004	
	males	females	males	females	males	females	males	females	males	females
No education	0.0173	0.0153	0.0213	0.0330	0.0126	0.0217	0.0225	0.0441	0.0416	0.0584
	[0.0035]	[0.0023]	[0.0063]	[0.0061]	[0.0042]	[0.0039]	[0.0120]	[0.0112]	[0.0103]	[0.0092]
Primary education	0.0190	0.0305	0.0416	0.0713	0.0186	0.0335	0.0459	0.0986	0.0640	0.0809
	[0.0071]	[0.0109]	[0.0052]	[0.0064]	[0.0053]	[0.0057]	[0.0067]	[0.0089]	[0.0053]	[0.0061]
Secondary education or above	0.0281	0.0305	0.0413	0.0799	0.0166	0.0274	0.0510	0.0817	0.0731	0.0925
	[0.0103]	[0.0109]	[0.0040]	[0.0064]	[0.0029]	[0.0033]	[0.0076]	[0.0098]	[0.0163]	[0.0160]
1st quintile wealth index	0.0119	0.0091	0.0123	0.0309	0.0126	0.0139	0.0391	0.0386	0.0414	0.0277
	[0.0050]	[0.0037]	[0.0041]	[0.0068]	[0.0037]	[0.0037]	[0.0108]	[0.0098]	[0.0079]	[0.0050]
2nd quintile wealth index	0.0282	0.0111	0.0217	0.0397	0.01802	0.0272	0.0400	0.0848	0.0429	0.0464
	[0.0072]	[0.0036]	[0.0052]	[0.0085]	[0.0055]	[0.0054]	[0.0100]	[0.0128]	[0.0071]	[0.0078]
3rd quintile wealth index	0.0133	0.0145	0.0420	0.0809	0.0213	0.0396	0.0249	0.0709	0.0428	0.0675
	[0.0052]	[0.0042]	[0.0066]	[0.0092]	[0.0053]	[0.0064]	[0.0093]	[0.0104]	[0.0075]	[0.0125]
4th quintile wealth index	0.0032	0.0170	0.0516	0.0911	0.0150	0.0295	0.0410	0.0973	0.0771	0.1093
	[0.0024]	[0.0056]	[0.0071]	[0.0101]	[0.0044]	[0.0057]	[0.0092]	[0.0141]	[0.0107]	[0.0108]
5th quintile wealth index	0.0321	0.0342	0.0526	0.0786	0.0144	0.0241	0.0734	0.1217	0.0944	0.1137
	[0.0068]	[0.0084]	[0.0069]	[0.0079]	[0.0050]	[0.0044]	[0.0105]	[0.0125]	[0.0107]	[0.0116]
Circumcised/FGM: yes	0.0182	0.0196	0.0413	0.0518	0.0163	0.0081	0.0304	0.0589	0.0654	0.0431
	[0.0032]	[0.0033]	[0.0032]	[0.0333]	[0.0022]	[0.0040]	[0.0041]	[0.0080]	[0.0057]	[0.0079]
Circumcised/FGM: no	0.0290	0.0145	0.0112	0.0664	0.0142	0.0282	0.1248	0.1006	0.0564	0.0843
	[0.0089]	[0.0039]	[0.0066]	[0.0043]	[0.0059]	[0.0025]	[0.0186]	[0.0084]	[0.0079]	[0.0060]

Note: Standard errors in brackets. "Circumcised/FGM" refers to male circumcision for males and to female genital mutilation for females. The data are weighted with the sample weights given by the data provider.
Source: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ghana 2003, Kenya 2003 and Tanzania AIS 2004).

Table 3: Determinants of HIV prevalence in five Demographic and Health Surveys

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Burkina Faso 2003		Cameroon 2004		Ghana 2003		Kenya 2003		Tanzania 2004	
	males	females	males	females	males	females	males	females	males	females
Urban	0.0186*	0.0150	0.0023	0.0195**	0.0035	0.0025	0.0096	0.0153	0.0358**	0.0268**
	[0.0102]	[0.0099]	[0.0066]	[0.0083]	[0.0039]	[0.0047]	[0.0109]	[0.0155]	[0.0157]	[0.0119]
Currently married	0.0138**	-0.0157	-0.0035	0.0138	0.0024	-0.0001	0.0075	0.0045	0.0167	-0.0010
	[0.0059]	[0.0103]	[0.0073]	[0.0098]	[0.0050]	[0.0074]	[0.0070]	[0.0152]	[0.0116]	[0.0117]
Formerly married	0.0183	-0.0050	0.0099	0.0967***	0.0070	0.0200	0.0053	0.1099***	0.0812**	0.1071***
	[0.0256]	[0.0058]	[0.0102]	[0.0315]	[0.0112]	[0.0143]	[0.0138]	[0.0423]	[0.0331]	[0.0264]
Widowed	0.0573	0.0098	(*)	0.0706**	-0.0058	0.0091	0.1830	0.0881**	n.a.	n.a.
	[0.0921]	[0.0174]		[0.0324]	[0.0044]	[0.0144]	[0.1197]	[0.0427]		
> 1 marriage	0.0030	0.0122	0.0007	0.0393***	0.0054	0.0206***	0.0037	0.0426	0.0280**	0.0554***
	[0.0053]	[0.0076]	[0.0055]	[0.0100]	[0.0039]	[0.0063]	[0.0074]	[0.0283]	[0.0123]	[0.0143]
Polygamous	-0.0060*	-0.0075**	-0.0014	0.0007	-0.0047	0.0092	0.0028	0.0279	0.0015	0.0185
	[0.0034]	[0.0037]	[0.0087]	[0.0088]	[0.0035]	[0.0069]	[0.0113]	[0.0180]	[0.0150]	[0.0131]
Years of education	0.0001	-0.0010	-0.0006	-0.0011	-0.0000	0.0001	-0.0005	-0.0007	-0.0008	-0.0002
	[0.0005]	[0.0007]	[0.0007]	[0.0011]	[0.0003]	[0.0005]	[0.0006]	[0.0014]	[0.0012]	[0.0011]
2nd quintile wealth	0.0121	-0.0003	0.0189	-0.0036	0.0055	0.0074	0.0100	0.0518*	-0.0055	0.0281*
	[0.0080]	[0.0059]	[0.0159]	[0.0121]	[0.0069]	[0.0081]	[0.0103]	[0.0274]	[0.0117]	[0.0152]
3rd quintile wealth	0.0007	0.0041	0.0450**	0.0357**	0.0069	0.0200**	0.0032	0.0646**	-0.0083	0.0491***
	[0.0058]	[0.0066]	[0.0177]	[0.0173]	[0.0074]	[0.0095]	[0.0105]	[0.0278]	[0.0104]	[0.0185]
4th quintile wealth	-0.0066*	0.0014	0.0579***	0.0374*	0.0005	0.0090	0.0184	0.0785***	0.0229	0.0916***
	[0.0037]	[0.0065]	[0.0187]	[0.0203]	[0.0060]	[0.0093]	[0.0121]	[0.0287]	[0.0153]	[0.0196]
5th quintile wealth	-0.0031	-0.0016	0.0584***	0.0287	0.0016	0.0070	0.0133	0.0834**	0.0212	0.0846***
	[0.0063]	[0.0082]	[0.0215]	[0.0194]	[0.0074]	[0.0100]	[0.0132]	[0.0335]	[0.0184]	[0.0237]
Catholic	-0.0057*	0.0004	-0.0143*	-0.0015	0.0017	-0.0000	-0.0007	0.0532	0.0093	0.0046
	[0.0031]	[0.0042]	[0.0086]	[0.0135]	[0.0072]	[0.0073]	[0.0119]	[0.0383]	[0.0092]	[0.0094]
Protestant	0.0068	-0.0002	-0.0142*	-0.0066	0.0063	-0.0057	0.0027	0.0405*	-0.0030	-0.0077
	[0.0101]	[0.0071]	[0.0077]	[0.0121]	[0.0058]	[0.0080]	[0.0113]	[0.0233]	[0.0108]	[0.0097]
Other religion	-0.0027	-0.0100***	-0.0178***	-0.0239**	0.0111	-0.0104*	0.0193	0.1222	-0.0137	-0.0154
	[0.0033]	[0.0034]	[0.0065]	[0.0101]	[0.0119]	[0.0063]	[0.0230]	[0.0905]	[0.0115]	[0.0141]
Observations	3013	3698	4577	4873	3284	4852	2768	3087	4772	5960
Mean	0.0194	0.0182	0.0391	0.0662	0.0162	0.0270	0.0463	0.0868	0.0626	0.0769
	[0.0031]	[0.0027]	[0.0030]	[0.0043]	[0.0022]	[0.0024]	[0.0051]	[0.0064]	[0.0047]	[0.0052]

Note: Marginal effects of probit estimations with HIV prevalence as the dependent variable. Standard errors in brackets. * Significant at 10%; ** significant at 5%; *** significant at 1%. N.a.: not applicable. (*) Predicts failure (HIV negative) perfectly. Controls for age, region and ethnicity are also included (ethnicity is not controlled for in Tanzania 2004 as the variable was not available). The omitted dummies are: rural, never married, 1st quintile of the wealth index and Muslim for the religion (see note in table 1). The data are weighted with the sample weights given by the data provider.

Source: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ghana 2003, Kenya 2003 and Tanzania AIS 2004).

Table 4: Determinants of HIV prevalence in five Demographic and Health Surveys with circumcision

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Burkina Faso 2003		Cameroon 2004		Ghana 2003		Kenya 2003		Tanzania 2004	
	males	females	males	females	males	females	males	females	males	females
Urban	0.0188*	0.0151	0.0024	0.0197**	0.0035	0.0024	0.0095	0.0154	0.0349**	0.0269**
	[0.0103]	[0.0104]	[0.0066]	[0.0083]	[0.0039]	[0.0046]	[0.0110]	[0.0155]	[0.0156]	[0.0118]
Currently married	0.0138**	-0.0170	-0.0035	0.0133	0.0024	-0.0004	0.0074	0.0053	0.0167	0.0002
	[0.0058]	[0.0108]	[0.0073]	[0.0099]	[0.0050]	[0.0073]	[0.0069]	[0.0151]	[0.0116]	[0.0115]
Formerly married	0.0180	-0.0055	0.0102	0.0957***	0.0070	0.0194	0.0053	0.1106***	0.0817**	0.1093***
	[0.0249]	[0.0059]	[0.0103]	[0.0315]	[0.0112]	[0.0140]	[0.0138]	[0.0425]	[0.0332]	[0.0265]
Widowed	0.0577	0.0039	(*)	0.0701**	-0.0059	0.0088	0.1828	0.0899**	n.a.	n.a.
	[0.0925]	[0.0140]		[0.0323]	[0.0043]	[0.0142]	[0.1196]	[0.0430]		
> 1 marriage	0.0029	0.0130	0.0007	0.0394***	0.0054	0.0205***	0.0037	0.0431	0.0278**	0.0533***
	[0.0053]	[0.0079]	[0.0055]	[0.0100]	[0.0039]	[0.0063]	[0.0074]	[0.0284]	[0.0123]	[0.0141]
Polygamous	-0.0060*	-0.0080**	-0.0014	0.0008	-0.0047	0.0093	0.0027	0.0275	0.0023	0.0194
	[0.0034]	[0.0039]	[0.0087]	[0.0088]	[0.0035]	[0.0069]	[0.0114]	[0.0179]	[0.0152]	[0.0132]
Years of education	0.0001	-0.0010	-0.0006	-0.0011	-0.0000	0.0001	-0.0005	-0.0009	-0.0009	-0.0004
	[0.0005]	[0.0007]	[0.0007]	[0.0011]	[0.0003]	[0.0005]	[0.0006]	[0.0015]	[0.0012]	[0.0011]
2nd quintile wealth	0.0121	-0.0004	0.0190	-0.0038	0.0057	0.0071	0.0100	0.0523*	-0.0056	0.0260*
	[0.0080]	[0.0061]	[0.0161]	[0.0121]	[0.0070]	[0.0078]	[0.0103]	[0.0275]	[0.0117]	[0.0149]
3rd quintile wealth	0.0007	0.0040	0.0455**	0.0353**	0.0071	0.0192**	0.0031	0.0654**	-0.0087	0.0458**
	[0.0057]	[0.0067]	[0.0183]	[0.0172]	[0.0075]	[0.0092]	[0.0105]	[0.0278]	[0.0104]	[0.0180]
4th quintile wealth	-0.0066*	0.0008	0.0584***	0.0372*	0.0006	0.0084	0.0184	0.0793***	0.0220	0.0870***
	[0.0037]	[0.0065]	[0.0191]	[0.0203]	[0.0061]	[0.0090]	[0.0121]	[0.0289]	[0.0150]	[0.0192]
5th quintile wealth	-0.0033	-0.0032	0.0589***	0.0276	0.0017	0.0064	0.0133	0.0826**	0.0197	0.0786***
	[0.0064]	[0.0082]	[0.0218]	[0.0192]	[0.0075]	[0.0097]	[0.0133]	[0.0332]	[0.0178]	[0.0233]
Catholic	-0.0056*	0.0001	-0.0148*	-0.0021	0.0015	-0.0014	-0.0008	0.0519	0.0108	0.0049
	[0.0032]	[0.0044]	[0.0083]	[0.0135]	[0.0072]	[0.0069]	[0.0120]	[0.0382]	[0.0096]	[0.0095]
Protestant	0.0069	0.0011	-0.0146**	-0.0067	0.0061	-0.0069	0.0027	0.0398*	-0.0020	-0.0068
	[0.0102]	[0.0081]	[0.0074]	[0.0122]	[0.0058]	[0.0080]	[0.0113]	[0.0234]	[0.0109]	[0.0097]
Other religion	-0.0027	-0.0101***	-0.0181***	-0.0239**	0.0102	-0.0105*	0.0192	0.1215	-0.0116	-0.0154
	[0.0034]	[0.0037]	[0.0062]	[0.0102]	[0.0115]	[0.0061]	[0.0230]	[0.0901]	[0.0125]	[0.0141]
Circumcised	0.0007	0.0020	-0.0062	0.0095	-0.0018	-0.0126***	-0.0002	-0.0109	0.0070	-0.0218**
	[0.0043]	[0.0038]	[0.0187]	[0.0255]	[0.0048]	[0.0039]	[0.0039]	[0.0137]	[0.0102]	[0.0093]
Observations	3013	3583	4572	4862	3284	4845	2768	3085	4769	5956

Note: Marginal effects of probit estimations with HIV prevalence as the dependent variable. Standard errors in brackets. * Significant at 10%; ** significant at 5%; *** significant at 1%. N.a.: not applicable. (*) Predicts failure (HIV negative) perfectly. Controls for age, region and ethnicity are also included (ethnicity is not controlled for Tanzania 2004). The omitted dummies are: rural, never married, 1st quintile of the wealth index and Muslim for the religion (see note under table 1). The data are weighted with the sample weights given by the data provider. *Source*: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ghana 2003, Kenya 2003 and Tanzania AIS 2004).

Table 5: Determinants of being tested for HIV in five Demographic and Health Surveys

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Burkina Faso 2003		Cameroon 2004		Ghana 2003		Kenya 2003		Tanzania 2004	
	males	females	males	females	males	females	males	females	males	females
Urban	-0.1242***	-0.0398*	-0.0158*	-0.0249**	-0.0429**	-0.0108	-0.0341	-0.0063	-0.0417	-0.0733***
	[0.0318]	[0.0241]	[0.0086]	[0.0100]	[0.0185]	[0.0122]	[0.0315]	[0.0296]	[0.0255]	[0.0219]
Currently married	-0.0053	-0.0217***	-0.0133	-0.0193***	0.0391*	0.0185	-0.0501**	0.0005	-0.0041	0.0209
	[0.0158]	[0.0075]	[0.0081]	[0.0073]	[0.0199]	[0.0127]	[0.0234]	[0.0197]	[0.0169]	[0.0139]
Formerly married	0.0409***	-0.0265	-0.0131	-0.0434**	-0.0300	0.0072	-0.0633	0.0344	0.0261	0.0101
	[0.0127]	[0.0346]	[0.0127]	[0.0218]	[0.0297]	[0.0153]	[0.0548]	[0.0225]	[0.0236]	[0.0169]
Widowed	-0.2032	-0.0108	(*)	-0.0036	-0.0259	-0.0125	-0.0098	0.0220	n.a.	n.a.
	[0.1984]	[0.0295]		[0.0208]	[0.0659]	[0.0301]	[0.0894]	[0.0347]		
> 1 marriage	0.0182	0.0075	0.0144**	-0.0097	-0.0115	0.0106	0.0017	-0.0189	0.0171	0.0114
	[0.0129]	[0.0110]	[0.0063]	[0.0097]	[0.0167]	[0.0102]	[0.0265]	[0.0313]	[0.0176]	[0.0121]
Polygamous	-0.0478**	0.0114	-0.0106	0.0139**	-0.0153	-0.0125	-0.0108	0.0003	0.0026	0.0231
	[0.0240]	[0.0073]	[0.0154]	[0.0063]	[0.0270]	[0.0132]	[0.0446]	[0.0212]	[0.0253]	[0.0182]
Years of education	-0.0015	-0.0003	-0.0008	-0.0011	0.0015	-0.0003	-0.0027	-0.0010	0.0020	-0.0004
	[0.0013]	[0.0008]	[0.0008]	[0.0010]	[0.0016]	[0.0009]	[0.0019]	[0.0022]	[0.0023]	[0.0015]
2nd quintile wealth	0.0110	-0.0061	-0.0321	0.0025	-0.0002	0.0020	0.0356	-0.0193	-0.0390	-0.0049
	[0.0142]	[0.0140]	[0.0234]	[0.0129]	[0.0224]	[0.0127]	[0.0264]	[0.0300]	[0.0249]	[0.0215]
3rd quintile wealth	0.0195	0.0084	-0.0557**	-0.0130	-0.0277	0.0058	0.0069	-0.0422	-0.0273	0.0122
	[0.0132]	[0.0107]	[0.0284]	[0.0178]	[0.0263]	[0.0147]	[0.0270]	[0.0284]	[0.0246]	[0.0188]
4th quintile wealth	0.0037	-0.0103	-0.0835**	-0.0296	-0.0323	-0.0210	-0.0084	-0.0662**	-0.0846***	-0.0039
	[0.0166]	[0.0143]	[0.0361]	[0.0236]	[0.0290]	[0.0193]	[0.0303]	[0.0321]	[0.0282]	[0.0212]
5th quintile wealth	0.0236	-0.0411	-0.1193***	-0.0451	-0.0825**	-0.0432**	-0.0077	-0.1451***	-0.0885***	0.0234
	[0.0167]	[0.0321]	[0.0424]	[0.0277]	[0.0357]	[0.0219]	[0.0334]	[0.0446]	[0.0341]	[0.0239]
Catholic	0.0083	0.0212**	0.0070	0.0209*	0.0164	-0.0237	0.0437	-0.0105	0.0251	0.0390***
	[0.0081]	[0.0088]	[0.0113]	[0.0126]	[0.0225]	[0.0222]	[0.0433]	[0.0522]	[0.0192]	[0.0149]
Protestant	0.0044	0.0131	0.0094	0.0298**	0.0338	-0.0146	0.0388	-0.0270	-0.0069	0.0092
	[0.0181]	[0.0137]	[0.0105]	[0.0118]	[0.0229]	[0.0172]	[0.0476]	[0.0475]	[0.0195]	[0.0145]
Other religion	-0.0343	0.0179*	-0.0158	-0.0036	-0.0128	-0.0462	-0.0136	-0.0927	-0.0390	-0.0549*
	[0.0211]	[0.0099]	[0.0159]	[0.0161]	[0.0334]	[0.0353]	[0.0575]	[0.0859]	[0.0293]	[0.0315]
Circumcised	-0.0236*	0.0209**	0.0214	0.0024	-0.0081	0.0153	-0.0262**	-0.0180	-0.0277	0.0021
	[0.0141]	[0.0098]	[0.0218]	[0.0357]	[0.0272]	[0.0126]	[0.0124]	[0.0191]	[0.0170]	[0.0160]
Observations	3562	4266	4957	5018	4656	5359	3521	4001	5650	6843
Mean tested	0.9252	0.9446	0.9496	0.9503	0.8446	0.9326	0.8290	0.8306	0.8233	0.8570
	[0.0091]	[0.0082]	[0.0047]	[0.0055]	[0.0081]	[0.0050]	[0.0105]	[0.0104]	[0.0110]	[0.0104]
Mean refused test	0.0503	0.0366	0.0447	0.0434	0.1083	0.0495	0.1188	0.1269	n.a.	n.a.
	[0.0064]	[0.0063]	[0.0044]	[0.0051]	[0.0064]	[0.0042]	[0.0079]	[0.0088]		

Note: Marginal effects of probit estimations with HIV prevalence as the dependent variable. Standard errors in brackets. * Significant at 10%; ** significant at 5%; *** significant at 1%. (*) Predicts failure (Not tested) perfectly. N.a.: not applicable. Controls for age, region and ethnicity are also included (ethnicity is not controlled for Tanzania 2004). The omitted dummies are like in tables 2 and 3. The data are weighted with the sample weights given by the data provider.
Source: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ghana 2003, Kenya 2003 and Tanzania AIS 2004).

Table 6: Determinants of using a condom at the last intercourse with spouse in five Demographic and Health Surveys (married sample)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Burkina Faso 2003		Cameroon 2004		Ghana 2003		Kenya 2003		Tanzania 2004	
	males	females	males	females	males	females	males	females	males	females
Urban	0.0290	0.0066	0.0317*	0.0077	0.0216	0.0173*	0.0167	0.0086	-0.0086	-0.0028
	[0.0285]	[0.0104]	[0.0168]	[0.0088]	[0.0171]	[0.0094]	[0.0116]	[0.0104]	[0.0135]	[0.0096]
> 1 marriage	0.0146	0.0035	-0.0159	-0.0017	0.0001	-0.0089	0.0068	-0.0076*	0.0014	-0.0023
	[0.0205]	[0.0066]	[0.0125]	[0.0094]	[0.0132]	[0.0071]	[0.0091]	[0.0043]	[0.0102]	[0.0076]
Polygamous	-0.0096	-0.0134***	0.0202	0.0091	-0.0206	-0.0081	-0.0129**	0.0037	-0.0100	0.0049
	[0.0215]	[0.0039]	[0.0251]	[0.0098]	[0.0163]	[0.0075]	[0.0058]	[0.0060]	[0.0149]	[0.0115]
Years of education	0.0033	0.0021***	0.0049***	0.0034**	0.0030**	0.0022***	0.0017**	0.0023***	0.0040**	0.0017**
	[0.0020]	[0.0007]	[0.0018]	[0.0013]	[0.0013]	[0.0007]	[0.0007]	[0.0005]	[0.0017]	[0.0008]
2nd quintile wealth	0.0644*	0.0067	-0.0377***	0.0221	0.0349	0.0032	0.0106	0.0195*	-0.0021	0.0088
	[0.0381]	[0.0070]	[0.0133]	[0.0206]	[0.0281]	[0.0111]	[0.0162]	[0.0108]	[0.0130]	[0.0102]
3rd quintile wealth	0.0788**	0.0156*	-0.0094	0.0176	0.0277	-0.0088	-0.0057	0.0026	0.0008	0.0093
	[0.0361]	[0.0084]	[0.0187]	[0.0182]	[0.0263]	[0.0096]	[0.0087]	[0.0081]	[0.0157]	[0.0109]
4th quintile wealth	0.0534	0.0019	-0.0069	0.0512*	0.0525	-0.0039	0.0133	-0.0013	0.0039	0.0220*
	[0.0412]	[0.0079]	[0.0218]	[0.0275]	[0.0321]	[0.0117]	[0.0143]	[0.0068]	[0.0170]	[0.0129]
5th quintile wealth	0.0428	0.0234	-0.0026	0.0261	0.0619*	-0.0012	0.0028	0.0009	0.0182	0.0224
	[0.0404]	[0.0161]	[0.0240]	[0.0239]	[0.0372]	[0.0144]	[0.0128]	[0.0099]	[0.0234]	[0.0173]
Catholic	-0.0151	0.0067	0.0111	0.0289	0.0077	-0.0053	0.0769	0.0001	0.0118	-0.0140**
	[0.0156]	[0.0058]	[0.0250]	[0.0257]	[0.0210]	[0.0101]	[0.0640]	[0.0088]	[0.0129]	[0.0062]
Protestant	-0.0221	-0.0058	0.0044	0.0477*	0.0030	-0.0069	0.0477*	-0.0035	0.0103	-0.0088
	[0.0285]	[0.0062]	[0.0237]	[0.0281]	[0.0193]	[0.0132]	[0.0246]	[0.0092]	[0.0127]	[0.0064]
Other religion	-0.0255	-0.0141***	-0.0201	0.0224	-0.0099	-0.0033	0.1230	-0.0037	0.0376	-0.0168**
	[0.0195]	[0.0051]	[0.0216]	[0.0279]	[0.0289]	[0.0222]	[0.1224]	[0.0112]	[0.0249]	[0.0083]
Circumcised	0.0233	0.0047	-0.0019	0.1157	0.0586***	-0.0157**	-0.0369	0.0048	0.0197**	-0.0049
	[0.0203]	[0.0045]	[0.0401]	[0.1180]	[0.0105]	[0.0065]	[0.0270]	[0.0045]	[0.0095]	[0.0094]
Observations	1593	6836	1642	2532	2221	2788	1634	4049	2764	4150
Mean	0.1043	0.0377	0.1227	0.1987	0.0799	0.0331	0.0318	0.0190	0.0815	0.0566
	[0.0098]	[0.0034]	[0.0168]	[0.0205]	[0.0067]	[0.0036]	[0.0046]	[0.0024]	[0.0091]	[0.0058]

Note: Marginal effects of probit estimations with the use of a condom at the last sexual intercourse (if it was with a spouse) as the dependent variable. The sample is limited to currently married individuals. Standard errors in brackets. * Significant at 10%; ** significant at 5%; *** significant at 1%. Controls for age, region and ethnicity are also included (ethnicity is not controlled for Tanzania 2004). The omitted dummies are: rural, currently married, 1st quintile of the wealth index and Muslim for the religion (see footnote). The data are weighted with the sample weights given by the data provider.
Source: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ghana 2003, Kenya 2003 and Tanzania AIS 2004).

Table 7: Determinants of using a condom at the last intercourse if not with spouse in five Demographic and Health Surveys (if non marital sex)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Burkina Faso 2003		Cameroon 2004		Ghana 2003		Kenya 2003		Tanzania 2004	
	males	females	males	females	males	females	males	females	males	females
Urban	0.2839***	0.1821*	0.0989**	0.0737	-0.1103*	-0.0368	0.0945*	-0.0260	0.0251	0.1778***
	[0.0865]	[0.1004]	[0.0413]	[0.0511]	[0.0600]	[0.0526]	[0.0567]	[0.0530]	[0.0448]	[0.0634]
Currently married	0.0513	-0.4009***	0.0139	-0.1809***	-0.0273	-0.0655	-0.1327	-0.1820**	0.1204*	0.0067
	[0.1006]	[0.1042]	[0.0417]	[0.0454]	[0.0871]	[0.0487]	[0.1051]	[0.0726]	[0.0666]	[0.1219]
Formerly married	0.0487	-0.1843*	-0.0329	0.0128	0.0022	-0.0193	-0.2175***	-0.0330	0.0222	-0.0203
	[0.1212]	[0.0970]	[0.0410]	[0.0600]	[0.0612]	[0.0656]	[0.0705]	[0.0411]	[0.0537]	[0.0455]
Widowed	0.2464***	0.1703	(*)	-0.2323***	-0.2978**	0.2019	0.0914	-0.0821	n.a.	n.a.
	[0.0485]	[0.1570]		[0.0751]	[0.1465]	[0.1641]	[0.1520]	[0.0586]		
> 1 marriage	-0.0398	-0.1701	-0.0491	-0.0247	-0.0416	0.0368	-0.0780	0.1110	-0.0935	-0.1106**
	[0.1568]	[0.1565]	[0.0483]	[0.0600]	[0.0782]	[0.0795]	[0.1256]	[0.1090]	[0.0695]	[0.0538]
Polygamous	-0.2624	(*)	-0.0058	-0.0023	-0.1185	-0.1508	-0.0483	-0.0490	0.0943	0.0006
	[0.2987]		[0.1331]	[0.0701]	[0.1836]	[0.1034]	[0.2551]	[0.1865]	[0.1914]	[0.1641]
Years of education	0.0160**	0.0187***	0.0274***	0.0229***	0.0245***	0.0236***	0.0049	0.0168***	0.0247***	0.0294***
	[0.0073]	[0.0065]	[0.0051]	[0.0071]	[0.0063]	[0.0058]	[0.0080]	[0.0056]	[0.0061]	[0.0064]
2nd quintile wealth	0.0803	-0.2378**	0.0033	0.0970	0.0019	0.0093	0.0547	-0.0264	0.0143	0.0936
	[0.0679]	[0.1118]	[0.0651]	[0.1110]	[0.0810]	[0.0907]	[0.1053]	[0.0764]	[0.0590]	[0.0698]
3rd quintile wealth	0.0356	-0.2519**	0.0336	0.1322	0.1501*	-0.0040	-0.0461	0.0017	0.0981*	0.0168
	[0.0816]	[0.1127]	[0.0695]	[0.1090]	[0.0769]	[0.0830]	[0.0891]	[0.0808]	[0.0540]	[0.0638]
4th quintile wealth	0.1184	0.0372	0.1228*	0.2090*	0.3033***	0.1813*	0.0705	0.0876	0.1135**	0.1101
	[0.0767]	[0.1212]	[0.0703]	[0.1133]	[0.0759]	[0.0945]	[0.0924]	[0.0869]	[0.0558]	[0.0748]
5th quintile wealth	0.0898	0.0474	0.1133	0.2332**	0.3421***	0.2436**	0.0744	0.2168**	0.2138***	0.1389
	[0.1050]	[0.1320]	[0.0785]	[0.1156]	[0.0894]	[0.1038]	[0.1024]	[0.0887]	[0.0638]	[0.0865]
Catholic	-0.0086	0.0008	-0.0920	0.1389	0.1245	0.0313	0.1790	0.0655	0.0790*	-0.0513
	[0.0589]	[0.0573]	[0.0635]	[0.1195]	[0.0841]	[0.0975]	[0.1142]	[0.0862]	[0.0466]	[0.0433]
Protestant	0.1503**	-0.1064	-0.0914	0.1378	0.0718	0.1391*	0.2534**	0.0173	0.0777*	-0.0314
	[0.0666]	[0.1259]	[0.0643]	[0.1226]	[0.0727]	[0.0732]	[0.1003]	[0.0777]	[0.0471]	[0.0464]
Other religion	-0.0536	-0.3213***	-0.0792	0.1154	0.1969	0.3717	0.0713	-0.0209	-0.0399	-0.2702***
	[0.0900]	[0.1014]	[0.0736]	[0.1475]	[0.1339]	[0.3365]	[0.1294]	[0.1087]	[0.0739]	[0.0496]
Circumcised	0.0652	-0.0544	0.0736	-0.0543	0.0992	0.0255	0.1158	-0.1369***	0.1812***	-0.0679
	[0.1090]	[0.0550]	[0.0997]	[0.3579]	[0.1194]	[0.1246]	[0.1004]	[0.0392]	[0.0480]	[0.0556]
Observations	691	787	1891	1042	796	700	763	903	1351	1029
Mean	0.6785	0.5288	0.6029	0.5788	0.4510	0.2822	0.4615	0.2354	0.5128	0.3871
	[0.0293]	[0.0325]	[0.0217]	[0.0303]	[0.0210]	[0.0187]	[0.0212]	[0.0172]	[0.0224]	[0.0234]

Note: Marginal effects of probit estimations with the use of condom at the last sexual intercourse, if that inter course was extramarital, as the dependent variable. Standard errors in brackets. * Significant at 10%; ** significant at 5%; *** significant at 1%. (*) Predicts failure (No condom used) perfectly. N.a.: not applicable. Controls for age, region and ethnicity are also included (ethnicity is not controlled for Tanzania 2004). The omitted dummies are: rural, never married, 1st quintile of the wealth index and Muslim for the religion (see footnote). The data are weighted with the sample weights given by the data provider.
Source: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ghana 2003, Kenya 2003 and Tanzania AIS 2004).

Table 8: Determinants of having non marital sex in the last 12 months in five Demographic and Health Surveys (currently married)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Burkina Faso 2003		Cameroon 2004		Ghana 2003		Kenya 2003		Tanzania 2004	
	males	females	males	females	males	females	males	females	males	females
Urban	0.0251	-0.0006	-0.0011	0.0392***	0.0027	0.0034	-0.0326	0.0018	-0.0225	0.0133
	[0.0270]	[0.0024]	[0.0312]	[0.0113]	[0.0240]	[0.0039]	[0.0251]	[0.0046]	[0.0265]	[0.0114]
More than one marriage	0.0063	-0.0013	0.0854***	0.1527***	0.0746***	0.0431***	0.0754***	0.0500***	0.0336*	0.0326***
	[0.0165]	[0.0015]	[0.0258]	[0.0204]	[0.0170]	[0.0111]	[0.0270]	[0.0145]	[0.0189]	[0.0105]
Polygamous	-0.0312**	0.0018	-0.0223	0.0768***	0.0259	0.0105	-0.0281	0.0363***	0.0199	0.0290**
	[0.0155]	[0.0014]	[0.0394]	[0.0128]	[0.0270]	[0.0065]	[0.0224]	[0.0083]	[0.0299]	[0.0130]
Years of education	0.0037**	0.0001	0.0036	0.0101***	0.0026	0.0012***	-0.0022	0.0002	0.0016	-0.0007
	[0.0016]	[0.0002]	[0.0036]	[0.0019]	[0.0018]	[0.0004]	[0.0023]	[0.0004]	[0.0032]	[0.0010]
2nd quintile wealth	0.0008	0.0009	0.0831**	0.0172	-0.0095	0.0026	0.0487	-0.0016	-0.0198	0.0006
	[0.0200]	[0.0025]	[0.0359]	[0.0187]	[0.0236]	[0.0062]	[0.0325]	[0.0036]	[0.0254]	[0.0083]
3rd quintile wealth	-0.0073	0.0007	0.1234***	0.0478**	0.0496	0.0057	0.0398	-0.0001	-0.0058	-0.0079
	[0.0194]	[0.0023]	[0.0363]	[0.0244]	[0.0304]	[0.0072]	[0.0312]	[0.0039]	[0.0262]	[0.0075]
4th quintile wealth	-0.0021	0.0028	0.1163**	0.0403	0.0564	0.0117	0.0850**	-0.0075**	0.0344	-0.0145*
	[0.0223]	[0.0029]	[0.0460]	[0.0246]	[0.0361]	[0.0092]	[0.0405]	[0.0035]	[0.0339]	[0.0080]
5th quintile wealth	0.0171	0.0068	0.1657***	0.0171	0.0703*	0.0143	0.0883**	-0.0023	-0.0257	-0.0338***
	[0.0320]	[0.0053]	[0.0501]	[0.0242]	[0.0424]	[0.0118]	[0.0429]	[0.0046]	[0.0390]	[0.0097]
Catholic	0.0124	0.0043*	0.1487***	-0.0023	0.0170	0.0049	0.0300	0.0148	0.0454*	0.0077
	[0.0196]	[0.0025]	[0.0463]	[0.0249]	[0.0299]	[0.0055]	[0.0500]	[0.0126]	[0.0249]	[0.0094]
Protestant	-0.0413**	0.0073	0.0857*	0.0169	0.0098	-0.0093*	-0.0143	0.0078	-0.0341	0.0004
	[0.0164]	[0.0068]	[0.0471]	[0.0261]	[0.0255]	[0.0053]	[0.0438]	[0.0054]	[0.0242]	[0.0093]
Other religion	0.0087	0.0002	0.1091**	-0.0253	0.0351	-0.0096***	0.1003	0.0572	0.0718*	-0.0011
	[0.0252]	[0.0030]	[0.0554]	[0.0205]	[0.0423]	[0.0030]	[0.0752]	[0.0387]	[0.0411]	[0.0112]
Circumcised	0.0240	-0.0004	0.1697***	-0.0343	-0.0157	-0.0038	-0.0622*	-0.0082**	0.0991***	0.0060
	[0.0206]	[0.0015]	[0.0591]	[0.0330]	[0.0408]	[0.0045]	[0.0336]	[0.0035]	[0.0229]	[0.0099]
Observations	1967	7353	2594	3414	2477	3416	1676	4159	3014	4018
Mean	0.1059	0.0092	0.3491	0.1300	0.1350	0.0327	0.1039	0.0227	0.2308	0.0468
	[0.0096]	[0.0018]	[0.0142]	[0.0077]	[0.0095]	[0.0049]	[0.0084]	[0.0027]	[0.0103]	[0.0042]

Note: Marginal effects of probit estimations with having non marital sex as the dependent variable. Standard errors in brackets. * Significant at 10%; ** significant at 5%; *** significant at 1%. Controls for age, region and ethnicity are also included (ethnicity is not controlled for Tanzania 2004). The omitted dummies are: rural, never married, 1st quintile of the wealth index and Muslim for the religion (see footnote). The data are weighted with the sample weights given by the data provider.
Source: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ghana 2003, Kenya 2003 and Tanzania AIS 2004).

Table 9: Determinants of having had no sex in the last 12 months in five Demographic and Health Surveys

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Burkina Faso 2003		Cameroon 2004		Ghana 2003		Kenya 2003		Tanzania 2004	
	males	females	males	females	males	females	males	females	males	females
Urban	-0.0739	-0.0487*	0.0216	-0.0062	0.0235	0.0147	0.0156	0.0134	-0.0212	-0.0209
	[0.0512]	[0.0275]	[0.0174]	[0.0189]	[0.0267]	[0.0207]	[0.0244]	[0.0234]	[0.0171]	[0.0181]
Currently married	-0.4284***	-0.6034***	-0.3393***	-0.5420***	-0.5577***	-0.5199***	-0.5382***	-0.7261***	-0.4239***	-0.5415***
	[0.0363]	[0.0200]	[0.0221]	[0.0226]	[0.0246]	[0.0225]	[0.0259]	[0.0133]	[0.0234]	[0.0186]
Formerly married	-0.1119**	-0.1561***	-0.0869***	-0.1176***	-0.0988***	0.0066	-0.0930***	-0.1604***	-0.1118***	-0.1094***
	[0.0559]	[0.0390]	[0.0098]	[0.0152]	[0.0305]	[0.0323]	[0.0160]	[0.0096]	[0.0130]	[0.0095]
Widowed	0.1495	0.1674***	(*)	0.1230**	0.0142	0.0577	0.0950	0.1596***	n.a.	n.a.
	[0.1812]	[0.0623]		[0.0512]	[0.0921]	[0.0577]	[0.1030]	[0.0374]		
> 1 marriage	-0.0166	-0.0287	-0.0296*	0.0020	-0.0204	-0.0441*	-0.0616*	-0.0360	0.0028	-0.0123
	[0.0369]	[0.0179]	[0.0179]	[0.0200]	[0.0279]	[0.0226]	[0.0318]	[0.0271]	[0.0267]	[0.0175]
Polygamous	-0.1686***	0.0234	-0.1047***	-0.0011	-0.1098***	0.0425*	0.0040	0.1318***	-0.1387***	-0.0073
	[0.0304]	[0.0150]	[0.0125]	[0.0188]	[0.0365]	[0.0232]	[0.0830]	[0.0264]	[0.0210]	[0.0256]
Education (years)	-0.0054	-0.0131***	-0.0064***	-0.0080***	-0.0087***	-0.0039	-0.0012	-0.0018	-0.0018	-0.0037**
	[0.0037]	[0.0023]	[0.0019]	[0.0028]	[0.0024]	[0.0024]	[0.0020]	[0.0019]	[0.0024]	[0.0016]
2nd quintile wealth	0.0536	-0.0129	0.0090	0.0213	0.0171	-0.0722***	-0.0197	-0.0113	0.0161	-0.0016
	[0.0381]	[0.0179]	[0.0227]	[0.0240]	[0.0335]	[0.0255]	[0.0231]	[0.0238]	[0.0197]	[0.0189]
3rd quintile wealth	-0.0196	-0.0187	-0.0124	0.0214	0.0076	-0.0742***	-0.0040	-0.0311	0.0323	0.0146
	[0.0346]	[0.0178]	[0.0197]	[0.0246]	[0.0341]	[0.0241]	[0.0242]	[0.0224]	[0.0219]	[0.0191]
4th quintile wealth	-0.0354	-0.0433**	-0.0292	0.0147	0.0239	-0.0565**	-0.0469**	-0.0244	0.0287	0.0048
	[0.0395]	[0.0196]	[0.0211]	[0.0274]	[0.0385]	[0.0286]	[0.0224]	[0.0249]	[0.0235]	[0.0214]
5th quintile wealth	-0.0332	-0.0733***	-0.0170	0.0265	0.0260	0.0252	-0.0572**	-0.0218	0.0476*	0.0198
	[0.0674]	[0.0278]	[0.0243]	[0.0314]	[0.0426]	[0.0346]	[0.0272]	[0.0298]	[0.0287]	[0.0268]
Catholic	0.0271	-0.0004	-0.0245	-0.0224	-0.0546	-0.0676***	-0.0003	-0.0320	-0.0070	0.0224
	[0.0274]	[0.0171]	[0.0220]	[0.0315]	[0.0367]	[0.0261]	[0.0341]	[0.0360]	[0.0189]	[0.0176]
Protestant	0.0386	0.0249	-0.0182	-0.0217	-0.0446	-0.0571**	0.0480	-0.0093	-0.0080	0.0230
	[0.0559]	[0.0308]	[0.0225]	[0.0319]	[0.0402]	[0.0289]	[0.0312]	[0.0383]	[0.0184]	[0.0175]
Other religion	0.0156	0.0387	-0.0051	0.0201	0.0056	0.0050	-0.0029	-0.0300	0.0001	0.0098
	[0.0346]	[0.0248]	[0.0265]	[0.0378]	[0.0554]	[0.0607]	[0.0400]	[0.0423]	[0.0272]	[0.0263]
Circumcised	-0.1683***	-0.0644***	-0.0892**	-0.0781	-0.0139	0.0082	0.0098	-0.0373**	-0.0633***	-0.0025
	[0.0456]	[0.0163]	[0.0425]	[0.0840]	[0.0378]	[0.0347]	[0.0251]	[0.0182]	[0.0212]	[0.0175]
Observations	3597	12003	5198	5328	4653	5363	3568	8136	5643	6843
Mean	0.3520	0.3443	0.2278	0.2420	0.3339	0.3209	0.2771	0.3014	0.2294	0.2605
	[0.0129]	[0.0086]	[0.0075]	[0.0066]	[0.0086]	[0.0088]	[0.0098]	[0.0075]	[0.0077]	[0.0082]

Note: Marginal effects of probit estimations with having had no sexual intercourse in the last 12 months as the dependent variable. Standard errors in brackets. * Significant at 10%; ** significant at 5%; *** significant at 1%. (*) Predicts failure (did not abstain) perfectly. N.a.: not applicable. Controls for age, region and ethnicity are also included (ethnicity is not controlled for Tanzania 2004). The omitted dummies are: rural, never married, 1st quintile of the wealth index and Muslim for the religion (see footnote). The data are weighted with the sample weights given by the data provider.

Source: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ghana 2003, Kenya 2003 and Tanzania AIS 2004).

Table 10: Determinants of never having had sex in five Demographic and Health Surveys (singles)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Burkina Faso 2003		Cameroon 2004		Ghana 2003		Kenya 2003		Tanzania 2004	
	males	females	males	females	males	females	males	females	males	females
Urban	-0.0527	0.0205	-0.0005	-0.1176**	0.0140	0.0182	0.0117	-0.1134**	-0.0418	-0.1029**
	[0.0527]	[0.0519]	[0.0475]	[0.0508]	[0.0424]	[0.0486]	[0.0522]	[0.0495]	[0.0347]	[0.0462]
Years of education	-0.0057	-0.0095***	-0.0187***	-0.0155*	-0.0122**	0.0027	-0.0023	0.0182***	-0.0052	0.0107**
	[0.0046]	[0.0035]	[0.0057]	[0.0084]	[0.0052]	[0.0055]	[0.0052]	[0.0047]	[0.0048]	[0.0051]
2nd quintile wealth	0.0966	0.0497	-0.0282	-0.0081	-0.0091	-0.0298	-0.0862*	-0.0511	0.0446	0.0784
	[0.0688]	[0.0496]	[0.0590]	[0.1054]	[0.0552]	[0.0725]	[0.0523]	[0.0501]	[0.0439]	[0.0534]
3rd quintile wealth	-0.0015	0.0786*	-0.0493	0.0839	-0.0109	-0.0322	0.0141	-0.0429	0.0993**	0.0814
	[0.0681]	[0.0426]	[0.0540]	[0.0953]	[0.0593]	[0.0695]	[0.0582]	[0.0493]	[0.0437]	[0.0606]
4th quintile wealth	0.0248	-0.0294	-0.1062*	0.1195	-0.0456	0.0660	-0.0808	-0.0162	0.0833*	0.0512
	[0.0699]	[0.0596]	[0.0598]	[0.1005]	[0.0637]	[0.0771]	[0.0567]	[0.0522]	[0.0463]	[0.0610]
5th quintile wealth	-0.0842	-0.0106	-0.0400	0.2347**	0.0068	0.1921**	-0.0617	0.0774	0.1456**	0.1728***
	[0.0785]	[0.0655]	[0.0734]	[0.0999]	[0.0659]	[0.0755]	[0.0685]	[0.0615]	[0.0571]	[0.0631]
Catholic	0.0280	-0.0122	0.1355*	-0.3027**	-0.0587	0.0265	0.0394	-0.0939	0.0020	0.1076**
	[0.0447]	[0.0329]	[0.0757]	[0.1180]	[0.0672]	[0.0683]	[0.0856]	[0.1044]	[0.0394]	[0.0489]
Protestant	0.1570	0.1313***	0.1217	-0.2356**	-0.0516	0.0009	0.1205	-0.0221	0.0119	0.0923**
	[0.0974]	[0.0500]	[0.0743]	[0.1201]	[0.0602]	[0.0688]	[0.0760]	[0.1018]	[0.0394]	[0.0460]
Other religion	0.0227	-0.1143*	0.1155	-0.2331	-0.0282	-0.0331	0.0575	0.0384	0.1074**	0.1630*
	[0.0573]	[0.0627]	[0.0833]	[0.1435]	[0.1177]	[0.1442]	[0.1133]	[0.1572]	[0.0547]	[0.0878]
Circumcised	-0.1596***	-0.0713***	-0.1459	0.2747*	0.0347	-0.1149	-0.2099***	-0.1093**	-0.1924***	-0.0260
	[0.0562]	[0.0267]	[0.0975]	[0.1531]	[0.0781]	[0.0851]	[0.0573]	[0.0506]	[0.0403]	[0.0566]
Observations	1563	2305	2052	1158	1887	1480	1517	2306	2321	1639
Mean	0.5476	0.6708	0.4021	0.5337	0.5643	0.5468	0.3345	0.5694	0.4133	0.5333
	[0.0219]	[0.0172]	[0.0158]	[0.0162]	[0.0139]	[0.0150]	[0.0160]	[0.0129]	[0.0152]	[0.0172]

Note: Marginal effects of probit estimations with never having had sex as the dependent variable. Standard errors in brackets. * Significant at 10%; ** significant at 5%; *** significant at 1%. Controls for age, region and ethnicity are also included (ethnicity is not controlled for Tanzania 2004). The omitted dummies are: rural, never married, 1st quintile of the wealth index and Muslim for the religion (see footnote). The data are weighted with the sample weights given by the data provider.
Source: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ghana 2003, Kenya 2003 and Tanzania AIS 2004).

Table 11: Age at first sexual intercourse in five Demographic and Health Surveys (individuals who initiated sexual activity)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Burkina Faso 2003		Cameroon 2004		Ghana 2003		Kenya 2003		Tanzania 2004	
	males	females	males	females	males	females	males	females	males	females
Urban	0.5813*	0.0598	0.2046	-0.0711	-0.0049	0.0887	-0.1642	-0.3636**	-0.3328**	-0.0701
	[0.3499]	[0.0994]	[0.1739]	[0.1027]	[0.2051]	[0.1384]	[0.2680]	[0.1700]	[0.1534]	[0.1147]
Currently married	0.8799***	0.0520	0.0199	-0.4063***	0.2593	-0.7387***	0.3215	-0.2364**	0.3339**	-0.5116***
	[0.2741]	[0.1394]	[0.1401]	[0.1083]	[0.2172]	[0.1348]	[0.2279]	[0.1004]	[0.1626]	[0.1170]
Formerly married	1.0363	-0.1672	-0.1291	-0.2394	-0.2142	-0.5629**	0.4335	-0.6515***	-0.2063	-0.9266***
	[0.7256]	[0.2280]	[0.1890]	[0.1509]	[0.2922]	[0.2278]	[0.4078]	[0.1667]	[0.2355]	[0.1549]
Widowed	-0.0636	-0.3509	(*)	-0.6979***	0.0696	-1.1842***	0.6294	0.0401	n.a.	n.a.
	[1.3379]	[0.2373]		[0.2114]	[0.7904]	[0.3050]	[1.0721]	[0.2149]		
> 1 marriage	-0.2117	-0.5205***	-0.6676***	-0.7567***	-0.9551***	-0.9418***	-0.7189***	-0.5392***	-0.6616***	-0.6921***
	[0.3031]	[0.0801]	[0.1581]	[0.0853]	[0.1993]	[0.1040]	[0.2660]	[0.1350]	[0.1627]	[0.1067]
Polygamous	-0.3426	-0.1840***	0.0356	0.0097	0.3647	0.0341	-0.0870	-0.3350***	-0.0431	-0.2423
	[0.3356]	[0.0596]	[0.2580]	[0.1006]	[0.2948]	[0.1283]	[0.3537]	[0.1132]	[0.2779]	[0.1489]
Years of education	-0.0423*	0.1258***	-0.0412**	0.1719***	0.0097	0.1097***	0.0486*	0.3148***	0.0928***	0.1856***
	[0.0229]	[0.0119]	[0.0175]	[0.0139]	[0.0169]	[0.0137]	[0.0249]	[0.0133]	[0.0207]	[0.0161]
2nd quintile wealth	-0.6531*	0.0828	0.1648	-0.2662**	0.0965	0.1864	-0.0735	-0.1687	0.2992	0.0394
	[0.3544]	[0.0702]	[0.2254]	[0.1158]	[0.2560]	[0.1280]	[0.2745]	[0.1362]	[0.1923]	[0.1252]
3rd quintile wealth	-0.8723***	0.0530	0.1974	-0.1364	-0.1607	0.1602	-0.2418	-0.3269**	0.5474***	0.1779
	[0.3026]	[0.0768]	[0.2251]	[0.1307]	[0.2451]	[0.1355]	[0.3006]	[0.1384]	[0.1975]	[0.1488]
4th quintile wealth	-0.8066**	-0.0394	0.2114	0.0504	0.3882	0.1396	0.1426	-0.0559	0.2461	0.0497
	[0.3478]	[0.0859]	[0.2501]	[0.1594]	[0.2735]	[0.1624]	[0.2831]	[0.1406]	[0.1964]	[0.1356]
5th quintile wealth	-1.2683***	-0.0642	0.0058	0.2031	0.1638	0.7514***	0.5313	0.3698*	0.6310**	0.5622***
	[0.4291]	[0.1026]	[0.2802]	[0.1765]	[0.3114]	[0.2004]	[0.3402]	[0.1981]	[0.2524]	[0.1712]
Catholic	-0.1565	0.2842***	-0.7615***	0.1684	-0.6465**	-0.5791***	-0.6240	-0.2184	-0.1214	0.3383***
	[0.2480]	[0.0761]	[0.2653]	[0.1340]	[0.2860]	[0.1917]	[0.4364]	[0.2836]	[0.1666]	[0.1007]
Protestant	0.3802	0.3590***	-0.6046**	0.1352	-0.4676*	-0.4320**	-0.4423	-0.2220	-0.1577	0.2953***
	[0.4361]	[0.1199]	[0.2742]	[0.1320]	[0.2585]	[0.1812]	[0.4180]	[0.2871]	[0.1521]	[0.1050]
Other religion	0.2889	-0.0366	-0.7859***	0.1557	-0.6118	-0.3664	-0.5277	-0.6205*	-0.0662	0.3928**
	[0.3516]	[0.0803]	[0.2872]	[0.1473]	[0.3744]	[0.2751]	[0.4592]	[0.3592]	[0.2397]	[0.1650]
Circumcised	-0.1261	-0.1597*	-1.1326***	0.6472	0.1572	-0.0811	0.1723	-0.3690***	-0.2526	-0.2306*
	[0.3460]	[0.0839]	[0.3758]	[0.5806]	[0.2642]	[0.2343]	[0.1807]	[0.1092]	[0.1596]	[0.1309]
Observations	2744	9891	4389	4509	3516	4217	2983	6404	4641	5953
R-squared	0.29	0.14	0.26	0.23	0.18	0.15	0.25	0.29	0.16	0.20
Mean	20.11	16.83	17.95	15.82	19.52	17.29	16.16	16.72	18.06	17.00
	[0.1331]	[0.0491]	[0.0872]	[0.0558]	[0.0846]	[0.0567]	[0.1056]	[0.0797]	[0.0783]	[0.0734]

Note: Linear regressions with age at first sexual intercourse for individuals who initiated sexual activity as the dependent variable. Standard errors in brackets. * Significant at 10%; ** significant at 5%; *** significant at 1%. (*) Too few observations. N.a.: not applicable. Controls for age, region and ethnicity are also included (ethnicity is not controlled for Tanzania 2004). The omitted dummies are: rural, never married, 1st quintile of the wealth index and Muslim for the religion (see footnote). The data are weighted with the sample weights given by the data provider. *Source*: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ghana 2003, Kenya 2003 and Tanzania AIS 2004).

Table 12: Determinants of having obtained the results of an HIV test before the survey in five Demographic and Health Surveys

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Burkina Faso 2003		Cameroon 2004		Ghana 2003		Kenya 2003		Tanzania 2004	
	males	females	males	females	males	females	males	females	males	females
Urban	0.0096	n.a.	0.0200	0.0114	0.0042	-0.0017	0.0049	0.0458***	0.0322**	0.0504***
	[0.0099]		[0.0130]	[0.0158]	[0.0096]	[0.0108]	[0.0188]	[0.0148]	[0.0155]	[0.0155]
Currently married	0.0213**	n.a.	0.0170	0.1230***	0.0188	0.0311***	0.0427**	0.0819***	0.0167	0.0341***
	[0.0090]		[0.0118]	[0.0147]	[0.0115]	[0.0110]	[0.0202]	[0.0101]	[0.0182]	[0.0119]
Formerly married	0.0502	n.a.	0.0078	0.2052***	0.0108	0.0233	0.1038**	0.1178***	0.0034	0.0752***
	[0.0453]		[0.0164]	[0.0383]	[0.0193]	[0.0194]	[0.0477]	[0.0262]	[0.0239]	[0.0226]
Widowed	(*)	n.a.	(*)	-0.0100	-0.0281	0.0170	0.0383	0.0270	n.a.	n.a.
				[0.0364]	[0.0299]	[0.0303]	[0.0894]	[0.0256]		
> 1 marriage	-0.0123	n.a.	-0.0036	0.0166	0.0154	0.0074	-0.0102	0.0030	0.0444***	0.0142
	[0.0081]		[0.0110]	[0.0147]	[0.0107]	[0.0099]	[0.0209]	[0.0174]	[0.0148]	[0.0127]
Polygamous	0.0099	n.a.	0.0463**	-0.0133	-0.0068	0.0027	0.0558	-0.0280**	-0.0079	0.0024
	[0.0144]		[0.0229]	[0.0147]	[0.0139]	[0.0119]	[0.0396]	[0.0119]	[0.0201]	[0.0175]
Years of education	0.0049***	n.a.	0.0149***	0.0190***	0.0045***	0.0058***	0.0097***	0.0129***	0.0069***	0.0088***
	[0.0008]		[0.0015]	[0.0021]	[0.0009]	[0.0009]	[0.0020]	[0.0014]	[0.0017]	[0.0015]
2nd quintile wealth	-0.0047	n.a.	-0.0003	0.0265	0.0067	0.0082	0.0027	0.0270	0.0360*	-0.0016
	[0.0119]		[0.0187]	[0.0283]	[0.0150]	[0.0141]	[0.0235]	[0.0187]	[0.0209]	[0.0167]
3rd quintile wealth	0.0071	n.a.	0.0351	0.0694**	0.0440**	0.0097	-0.0075	0.0471**	0.0666***	0.0105
	[0.0129]		[0.0243]	[0.0287]	[0.0201]	[0.0140]	[0.0222]	[0.0196]	[0.0225]	[0.0174]
4th quintile wealth	0.0308*	n.a.	0.0515**	0.1300***	0.0611***	0.0391**	-0.0084	0.0343*	0.0839***	0.0570***
	[0.0177]		[0.0260]	[0.0349]	[0.0217]	[0.0187]	[0.0221]	[0.0204]	[0.0234]	[0.0186]
5th quintile wealth	0.0320*	n.a.	0.0646**	0.1586***	0.0970***	0.0457**	0.0249	0.0475**	0.1028***	0.0944***
	[0.0180]		[0.0288]	[0.0372]	[0.0256]	[0.0202]	[0.0283]	[0.0234]	[0.0271]	[0.0249]
Catholic	0.0015	n.a.	-0.0424**	-0.0214	-0.0070	0.0436**	0.0150	0.0281	0.0160	-0.0174*
	[0.0075]		[0.0204]	[0.0316]	[0.0144]	[0.0209]	[0.0315]	[0.0238]	[0.0139]	[0.0095]
Protestant	-0.0120	n.a.	-0.0337*	-0.0362	-0.0147	0.0309***	0.0186	0.0168	0.0179	-0.0145
	[0.0087]		[0.0190]	[0.0304]	[0.0148]	[0.0119]	[0.0274]	[0.0202]	[0.0155]	[0.0101]
Other religion	-0.0116	n.a.	-0.0310	-0.0582**	-0.0116	-0.0109	0.0036	-0.0073	-0.0218	-0.0585***
	[0.0100]		[0.0189]	[0.0255]	[0.0181]	[0.0269]	[0.0338]	[0.0332]	[0.0211]	[0.0130]
Circumcised	0.0180***	n.a.	0.0857***	0.0721	0.0011	0.0181	0.0105	0.0006	0.0507***	-0.0075
	[0.0069]		[0.0103]	[0.0934]	[0.0229]	[0.0277]	[0.0128]	[0.0109]	[0.0112]	[0.0121]
Observations	3461	n.a.	5129	5103	4608	5253	3532	8024	5649	6843
Mean	0.0616	n.a.	0.1429	0.1976	0.0751	0.0750	0.1428	0.1332	0.1348	0.1289
	[0.0066]		[0.0068]	[0.0088]	[0.0048]	[0.0046]	[0.0074]	[0.0059]	[0.0069]	[0.0083]

Note: Marginal effects of probit estimations with having obtained the results of an HIV test before the survey as the dependent variable. Standard errors in brackets. * Significant at 10%; ** significant at 5%; *** significant at 1%. (*) Predicts failure (Not obtained result of an HIV test) perfectly. N.a.: not applicable. Controls for age, region and ethnicity are also included (ethnicity is not controlled for Tanzania 2004). The omitted dummies are: rural, never married, 1st quintile of the wealth index and Muslim for the religion (see footnote). The data are weighted with the sample weights given by the data provider.

Source: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ghana 2003, Kenya 2003 and Tanzania AIS 2004).

Table 13: Determinants of having spoken about AIDS with spouse in four Demographic and Health Surveys (Married sample)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Burkina Faso 2003		Cameroon 2004		Ghana 2003		Kenya 2003	
	males	females	males	females	males	females	males	females
Urban	0.0740	0.0674**	-0.0363*	0.0166	0.0220	0.1159***	-0.0042	-0.0243
	[0.0617]	[0.0293]	[0.0211]	[0.0316]	[0.0316]	[0.0280]	[0.0327]	[0.0375]
> 1 marriage	0.0115	-0.0127	-0.0014	0.0771***	0.0249	0.0542**	0.0060	0.0094
	[0.0390]	[0.0197]	[0.0171]	[0.0199]	[0.0218]	[0.0215]	[0.0229]	[0.0346]
Polygamous	0.0848**	-0.0518***	0.0798***	0.0055	0.0192	-0.0979***	-0.0043	-0.0848***
	[0.0402]	[0.0143]	[0.0164]	[0.0242]	[0.0286]	[0.0237]	[0.0369]	[0.0241]
Years of education	0.0194***	0.0340***	0.0156***	0.0452***	0.0105***	0.0203***	0.0082***	0.0190***
	[0.0059]	[0.0030]	[0.0024]	[0.0043]	[0.0023]	[0.0024]	[0.0027]	[0.0029]
2nd quintile wealth	0.1437***	0.0468**	0.0135	0.0520*	0.0608**	-0.0018	0.0579**	0.0390
	[0.0390]	[0.0211]	[0.0276]	[0.0281]	[0.0254]	[0.0288]	[0.0253]	[0.0297]
3rd quintile wealth	0.0919**	0.0343	0.0290	0.0585*	0.0618**	0.0240	0.0651***	0.0425
	[0.0416]	[0.0240]	[0.0258]	[0.0335]	[0.0278]	[0.0314]	[0.0252]	[0.0313]
4th quintile wealth	0.1710***	0.0870***	0.0128	0.1031***	0.0374	0.0270	0.0718***	0.0562*
	[0.0400]	[0.0245]	[0.0323]	[0.0372]	[0.0376]	[0.0394]	[0.0255]	[0.0313]
5th quintile wealth	0.1944***	0.1068***	0.0141	0.1392***	0.1175***	0.0831**	0.0396	0.0677
	[0.0632]	[0.0317]	[0.0372]	[0.0426]	[0.0375]	[0.0410]	[0.0337]	[0.0417]
Catholic	0.1005**	0.0385*	0.0460	0.0604*	0.0651**	0.1088***	0.0960***	0.0348
	[0.0414]	[0.0210]	[0.0308]	[0.0337]	[0.0274]	[0.0338]	[0.0332]	[0.0456]
Protestant	0.1105*	0.0273	0.0455	0.0538	0.0758**	0.0662**	0.0782*	0.0299
	[0.0660]	[0.0322]	[0.0299]	[0.0329]	[0.0296]	[0.0328]	[0.0446]	[0.0445]
Other religion	0.0463	-0.1117***	0.0402	0.0121	-0.0480	-0.0512	0.0704**	-0.1340*
	[0.0518]	[0.0205]	[0.0286]	[0.0660]	[0.0417]	[0.0591]	[0.0304]	[0.0712]
Circumcised	0.1393**	0.0550***	-0.0464	0.0844	0.0081	-0.0142	0.0308	-0.0405
	[0.0584]	[0.0164]	[0.0293]	[0.1000]	[0.0409]	[0.0457]	[0.0372]	[0.0268]
Observations	1943	8947	2597	3563	2481	3343	1821	4764
Mean	0.6211	0.3725	0.8715	0.6362	0.7703	0.6332	0.8510	0.6599
	[0.0016]	[0.0100]	[0.0143]	[0.0158]	[0.0123]	[0.0145]	[0.0121]	[0.0112]

Note: Marginal effects of probit estimations with having spoken with the spouse about AIDS as the dependent variable. Standard errors in brackets. * Significant at 10%; ** significant at 5%; *** significant at 1%. Controls for age, region and ethnicity are also included. The omitted dummies are: rural, never married, 1st quintile of the wealth index and Muslim for the religion (see footnote). The data are weighted with the sample weights given by the data provider.
Source: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ghana 2003, Kenya 2003 and Tanzania AIS 2004).

Table 14: Knowing that a healthy looking person can have HIV in five Demographic and Health Surveys

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Burkina Faso 2003		Cameroon 2004		Ghana 2003		Kenya 2003		Tanzania 2004	
	males	females	males	females	males	females	males	females	males	females
Urban	0.1388***	0.1377***	0.0360**	0.0106	-0.0001	0.0329*	-0.0344*	0.0268**	-0.0095	0.0248
	[0.0307]	[0.0308]	[0.0165]	[0.0226]	[0.0172]	[0.0180]	[0.0188]	[0.0135]	[0.0149]	[0.0192]
Currently married	0.1341***	0.0504**	0.0199	0.0140	-0.0141	-0.0008	0.0339*	0.0312**	0.0325*	0.0245
	[0.0397]	[0.0247]	[0.0182]	[0.0203]	[0.0202]	[0.0182]	[0.0181]	[0.0127]	[0.0171]	[0.0176]
Formerly married	0.1263*	-0.0549	0.0109	0.0730***	-0.0269	0.0001	0.0234	0.0453***	0.0167	0.0370*
	[0.0678]	[0.0477]	[0.0222]	[0.0278]	[0.0285]	[0.0270]	[0.0173]	[0.0131]	[0.0224]	[0.0204]
Widowed	-0.0705	0.0783	(*)	-0.0269	-0.0075	-0.0875	-0.0731	-0.0028	n.a.	n.a.
	[0.1759]	[0.0511]		[0.0556]	[0.0642]	[0.0584]	[0.0921]	[0.0240]		
> 1 marriage	-0.0251	0.0215	-0.0076	0.0288	-0.0090	-0.0039	0.0167	0.0189	0.0114	-0.0085
	[0.0393]	[0.0192]	[0.0160]	[0.0191]	[0.0152]	[0.0156]	[0.0120]	[0.0141]	[0.0148]	[0.0156]
Polygamous	0.0062	-0.0356***	0.0427**	-0.0094	0.0196	-0.0125	-0.0570*	-0.0046	0.0103	-0.0124
	[0.0386]	[0.0131]	[0.0200]	[0.0171]	[0.0181]	[0.0172]	[0.0314]	[0.0119]	[0.0221]	[0.0230]
Years of education	0.0208***	0.0342***	0.0296***	0.0525***	0.0101***	0.0148***	0.0141***	0.0182***	0.0126***	0.0252***
	[0.0048]	[0.0027]	[0.0021]	[0.0033]	[0.0013]	[0.0014]	[0.0014]	[0.0013]	[0.0018]	[0.0019]
2nd quintile wealth	0.0352	-0.0273	0.0234	0.0281	0.0044	-0.0149	-0.0002	0.0105	-0.0053	0.0206
	[0.0272]	[0.0204]	[0.0181]	[0.0233]	[0.0149]	[0.0196]	[0.0127]	[0.0113]	[0.0158]	[0.0170]
3rd quintile wealth	0.0539**	-0.0085	0.0558***	0.0539**	0.0192	0.0154	0.0033	0.0285***	0.0296**	0.0533***
	[0.0270]	[0.0201]	[0.0190]	[0.0240]	[0.0157]	[0.0177]	[0.0125]	[0.0101]	[0.0132]	[0.0139]
4th quintile wealth	0.0595**	0.0142	0.0511**	0.1467***	0.0177	0.0399*	0.0124	0.0367***	0.0621***	0.0770***
	[0.0292]	[0.0241]	[0.0218]	[0.0238]	[0.0200]	[0.0212]	[0.0116]	[0.0096]	[0.0142]	[0.0164]
5th quintile wealth	0.1007**	0.1212***	0.0959***	0.1826***	0.0329	0.0352	0.0203	0.0511***	0.0885***	0.0929***
	[0.0400]	[0.0271]	[0.0232]	[0.0253]	[0.0216]	[0.0245]	[0.0166]	[0.0143]	[0.0163]	[0.0222]
Catholic	0.0323	-0.0004	-0.0298	-0.0227	-0.0153	0.0095	0.0339**	-0.0191	0.0084	0.0042
	[0.0274]	[0.0216]	[0.0281]	[0.0323]	[0.0205]	[0.0225]	[0.0151]	[0.0263]	[0.0141]	[0.0166]
Protestant	0.0309	0.0389	0.0008	0.0017	-0.0021	0.0090	0.0454**	-0.0073	0.0191	-0.0021
	[0.0567]	[0.0273]	[0.0255]	[0.0314]	[0.0181]	[0.0233]	[0.0220]	[0.0236]	[0.0141]	[0.0165]
Other religion	-0.0598	-0.1119***	-0.0192	-0.0395	-0.0353	-0.0354	0.0317***	-0.0267	-0.0538**	-0.1039***
	[0.0407]	[0.0253]	[0.0305]	[0.0398]	[0.0261]	[0.0349]	[0.0114]	[0.0306]	[0.0250]	[0.0307]
Circumcised	0.1526***	0.0423**	0.0322	0.0422	0.0171	-0.0122	0.0112	-0.0173	0.0580***	-0.0164
	[0.0436]	[0.0171]	[0.0325]	[0.1001]	[0.0246]	[0.0286]	[0.0123]	[0.0122]	[0.0146]	[0.0186]
Observations	3,473	11,615	5,170	5,208	4,612	5,263	3,533	8,014	5,638	6,779
Mean	0.7128	0.5735	0.7984	0.6868	0.7703	0.6332	0.9033	0.8616	0.8444	0.7876
	[0.0144]	[0.0133]	[0.0094]	[0.0139]	[0.0123]	[0.0145]	[0.0077]	[0.0081]	[0.0091]	[0.0104]

Note: Marginal effects of probit estimations with knowing that a healthy looking person can be HIV positive as the dependent variable. Standard errors in brackets. * Significant at 10%; ** significant at 5%; *** significant at 1%. (*) Predicts failure (knows that a healthy looking person can be HIV positive) perfectly. N.a.: not applicable. Controls for age, region and ethnicity are also included (ethnicity is not controlled for Tanzania 2004). The omitted dummies are: rural, currently married, 1st quintile of the wealth index and Muslim for the religion (see footnote). The data are weighted with the sample weights given by the data provider.

Source: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ghana 2003, Kenya 2003 and Tanzania AIS 2004).

Table 15: Summary of associations between dependent and independent variables in five demographic and health surveys

	Urban	*Married*	*Formerly married*	*Widowed (4)*	*More than 1 marriage*	*Polygamy*	*Education*	*Wealth*	*Catholic*	*Protestant*	*Other religion*	*Circumcision/ FGM*
HIV ♂	2,0	1,0	1,0	0,0	1,0	0,1	0,0	**1,1**	0,2	0,0	0,1	0,0
HIV ♀	2,0	0,0	3,0	2,0	3,0	0,1	0,0	4,0	0,0	**1,1**	0,3	0,2
condom spouse ♂	1,0	n.a.	n.a.	n.a.	0,0	0,1	4,0	2,0	0,0	1,0	0,0	*2,0*
condom spouse ♀	1,0	n.a.	n.a.	n.a.	0,1	0,1	5,0	3,0	0,1	1,0	0,2	*0,1*
condom not spouse ♂	**3,1**	*1,0*	0,1	**1,1**	0,0	0,0	4,0	3,0	1,0	3,0	0,0	*1,0*
condom not spouse ♀	2,0	*0,3*	0,1	0,1	0,1	0,0	5,0	**3,1**	0,0	1,0	0,2	*0,1*
Fidelity ♂	0,0	n.a.	n.a.	n.a.	0,4	*1,0*	0,1	*0,3*	0,2	1,1	*0,2*	***1,2***
Fidelity ♀	0,1	n.a.	n.a.	n.a.	0,4	*0,3*	0,2	***2,1***	0,1	1,0	*1,0*	*1,0*
Abstinence ♂	0,0	0,5	0,5	0,0	0,2	*0,4*	0,2	**1,1**	0,0	0,0	0,0	0,3
Abstinence ♀	0,1	0,5	0,4	3,0	0,1	*1,0*	0,3	0,2	0,1	0,1	0,0	0,2
Virginity ♂	0,0	n.a.	n.a.	n.a.	n.a.	n.a.	0,2	***1,2***	1,0	0,0	1,0	0,3
Virginity ♀	0,3	n.a.	n.a.	n.a.	n.a.	n.a.	**2,2**	*4,0*	**1,1**	**2,1**	**1,1**	**1,2**
Age first sex ♂	1,1	*2,0*	0,0	0,0	0,4	0,0	**2,2**	**1,1**	*0,2*	*0,2*	**1,1**	0,1
Age first sex ♀	0,1	*0,4*	0,3	0,2	0,5	0,2	5,0	**2,1**	***2,1***	***2,1***	0,1	0,3
VCT ♂	1,0	2,0	1,0	0,0	1,0	*1,0*	5,0	4,0	0,1	*0,1*	0,0	3,0
VCT ♀ (4)	2,0	4,0	3,0	0,0	0,0	*0,1*	4,0	4,0	**1,1**	*1,0*	0,2	0,0
Discuss AIDS spouse ♂ (4)	*0,1*	n.a.	n.a.	n.a.	0,0	*2,0*	4,0	3,0	3,0	3,0	*1,0*	1,0
Discuss AIDS spouse ♀ (4)	*2,0*	n.a.	n.a.	n.a.	2,0	*0,3*	4,0	4,0	3,0	1,0	*0,2*	1,0
Knowledge AIDS ♂	**2,1**	3,0	1,0	0,0	0,0	**1,1**	5,0	3,0	1,0	1,0	**1,1**	2,0
Knowledge AIDS ♀	3,0	2,0	3,0	0,0	0,0	0,1	5,0	5,0	0,0	0,0	0,2	1,0

Note: ♂, ♀ denote males and females, respectively. N.a. = not available or not applicable. FGM stands for female genital mutilation, VCT for voluntary counseling and testing. In each cell, the figure before the coma reports the number of significantly positive associations and the figure after the comma reports the number of significantly negative associations (10% confidence level at least). Unless otherwise stated, the maximum is 5 (for 5 countries). In bold are cells with opposite associations across countries. In red and italics are pairs of cells where the association goes in opposite directions for males and females.

Table 16: Coefficients on male circumcision and female genital mutilation in five Demographic and Health Surveys

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Controlling for	Region, ethnicity, religion		Ethnicity, religion		Religion		-	
	males	females	males	females	males	females	males	females
Burkina Faso 2003	0.0007	0.0020	0.0002	0.0018	-0.0085	0.0025	-0.0088	0.0024
	[0.0043]	[0.0038]	[0.0047]	[0.0045]	[0.0074]	[0.0041]	[0.0063]	[0.0039]
Observations	3,013	3,583	3,298	3,583	3,340	4,045	3,340	4,045
Cameroon 2004	-0.0062	0.0095	-0.0031	0.0102	0.0128	0.0063	0.0140	-0.0012
	[0.0187]	[0.0255]	[0.0159]	[0.0279]	[0.0091]	[0.0353]	[0.0087]	[0.0318]
Observations	4,572	4,862	4,572	4,862	4,996	5,122	5,023	5,128
Ghana 2003	-0.0024	-0.0126***	-0.0038	-0.0138***	0.0002	-0.0132***	0.0001	-0.0135***
	[0.0049]	[0.0039]	[0.0058]	[0.0038]	[0.0051]	[0.0045]	[0.0055]	[0.0045]
Observations	3,282	4,845	3,282	4,845	3,405	4,990	3,677	5,268
Kenya 2003	-0.0002	-0.0109	0.0003	-0.0102	-0.0231	-0.0363***	-0.0239	-0.0387***
	[0.0039]	[0.0137]	[0.0040]	[0.0131]	[0.0177]	[0.0106]	[0.0179]	[0.0109]
Observations	2,768	3,085	2,914	3,237	2,914	3,259	2,915	3,263
Controlling for			Region, religion		Religion		-	
Tanzania 2004	n.a.	n.a.	0.0070	-0.0218**	-0.0091	-0.0280***	-0.0126	-0.0289***
			[0.0102]	[0.0093]	[0.0107]	[0.0077]	[0.0103]	[0.0077]
Observations	n.a.	n.a	4769	5956	4769	5956	4771	5963

Note: Marginal effects of probit estimations with HIV prevalence as the dependent variable. Standard errors in brackets. * Significant at 10%; ** significant at 5%; *** significant at 1%. N.a.: not applicable. Controls for age, urban, marital status, education and wealth are included as in table 2. Controls for religion, region and ethnicity are included as indicated (ethnicity and female circumcision are not available in Tanzania 2004). The data are weighted with the sample weights given by the data provider.
Source: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ghana 2003, Kenya 2003 and Tanzania AIS 2004).

Table 17: Determinants of male circumcision and female genital mutilation in five Demographic and Health Surveys

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Burkina Faso 2003		Cameroon 2004		Ghana 2003		Kenya 2003		Tanzania 2004	
	males	females	males	females	males	females	males	females	males	females
Urban	-0.0451	-0.0172	0.0324*	-0.0013	0.0066	0.0105	-0.0172	0.0249	0.0675**	-0.0155
	[0.0292]	[0.0302]	[0.0176]	[0.0024]	[0.0066]	[0.0070]	[0.0197]	[0.0234]	[0.0335]	[0.0265]
Currently married	-0.0027	0.0709***	0.0123	0.0082**	-0.0011	0.0010	0.0022	0.0958***	0.0213	0.0604***
	[0.0137]	[0.0209]	[0.0106]	[0.0036]	[0.0086]	[0.0067]	[0.0109]	[0.0167]	[0.0183]	[0.0147]
Formerly married	-0.0398	0.1149***	0.0132	0.0047	0.0009	-0.0010	0.0084	0.0913***	0.0018	0.0634***
	[0.0534]	[0.0310]	[0.0102]	[0.0035]	[0.0118]	[0.0083]	[0.0244]	[0.0232]	[0.0240]	[0.0176]
Widowed	0.0899	-0.0227	0.0000	0.0081	-0.0312	-0.0162	-0.0298	0.0217	n.a.	n.a.
	[0.0780]	[0.0356]	[0.0000]	[0.0085]	[0.0608]	[0.0165]	[0.0505]	[0.0288]		
> 1 marriage	0.0273*	0.0240*	-0.0046	-0.0054	0.0108	0.0001	-0.0184	-0.0216	0.0276*	-0.0471***
	[0.0154]	[0.0131]	[0.0094]	[0.0034]	[0.0082]	[0.0064]	[0.0145]	[0.0220]	[0.0166]	[0.0108]
Polygamous	-0.0214	-0.0243**	-0.0098	0.0021	-0.0064	0.0117	-0.0451*	-0.0452***	-0.0539**	0.0316
	[0.0167]	[0.0120]	[0.0165]	[0.0031]	[0.0146]	[0.0085]	[0.0245]	[0.0152]	[0.0266]	[0.0218]
Education (years)	0.0023*	-0.0118***	0.0045***	-0.0001	0.0026***	-0.0017***	0.0049***	-0.0218***	0.0118***	-0.0071***
	[0.0014]	[0.0026]	[0.0014]	[0.0005]	[0.0008]	[0.0007]	[0.0015]	[0.0018]	[0.0022]	[0.0016]
2nd quintile wealth	-0.0197	0.0310**	0.0656***	0.0062	0.0452***	-0.0044	0.0180	0.0323*	0.0011	-0.0602***
	[0.0170]	[0.0150]	[0.0243]	[0.0040]	[0.0143]	[0.0112]	[0.0217]	[0.0172]	[0.0203]	[0.0159]
3rd quintile wealth	0.0075	0.0241	0.0738***	0.0064*	0.0499***	-0.0124	0.0517***	0.0312	0.0319	-0.0687***
	[0.0186]	[0.0151]	[0.0249]	[0.0039]	[0.0127]	[0.0117]	[0.0187]	[0.0201]	[0.0202]	[0.0173]
4th quintile wealth	0.0036	0.0142	0.0492*	0.0053	0.0397***	-0.0212	0.0365	0.0076	0.0981***	-0.0983***
	[0.0194]	[0.0194]	[0.0259]	[0.0047]	[0.0134]	[0.0133]	[0.0230]	[0.0211]	[0.0223]	[0.0193]
5th quintile wealth	0.0924***	0.0545**	0.0351	0.0054	0.0338**	-0.0113	0.0613***	-0.0598**	0.1441***	-0.1402***
	[0.0273]	[0.0265]	[0.0265]	[0.0057]	[0.0141]	[0.0138]	[0.0216]	[0.0264]	[0.0331]	[0.0273]
Catholic	-0.0923***	-0.0980***	-0.1739***	-0.0036	-0.1203***	-0.0702***	-0.1110***	-0.0248	-0.1686***	0.0070
	[0.0209]	[0.0201]	[0.0302]	[0.0044]	[0.0208]	[0.0219]	[0.0326]	[0.0354]	[0.0208]	[0.0159]
Protestant	-0.0764***	-0.0953***	-0.1696***	-0.0014	-0.1113***	-0.0578***	-0.1010***	-0.0321	-0.1447***	0.0166
	[0.0280]	[0.0319]	[0.0303]	[0.0046]	[0.0193]	[0.0207]	[0.0311]	[0.0336]	[0.0220]	[0.0214]
Other religion	-0.1581***	-0.0686**	-0.1993***	-0.0010	-0.2813***	0.0066	-0.1254***	-0.0256	-0.3400***	-0.0137
	[0.0310]	[0.0270]	[0.0329]	[0.0043]	[0.0401]	[0.0381]	[0.0374]	[0.0425]	[0.0354]	[0.0221]
Observations	3603	12018	5229	5119	4657	5365	3566	8154	5650	6843
R-square	0.41	0.14	0.41	0.66	0.21	0.34	0.55	0.48	0.48	0.41

Note: Linear regressions with male circumcision and female genital mutilation as the dependent variable. Standard errors in brackets. * Significant at 10%; ** significant at 5%; *** significant at 1%. N.a.: not applicable. Controls for age, region and ethnicity are also included (ethnicity is not controlled for Tanzania 2004). The omitted dummies are: rural, never married, 1st quintile of the wealth index and Muslim for the religion (see note under table 1). The data are weighted with the sample weights given by the data provider. Source: Demographic and Health Surveys (Burkina Faso 2003, Cameroon 2004, Ghana 2003, Kenya 2003 and Tanzania AIS 2004).