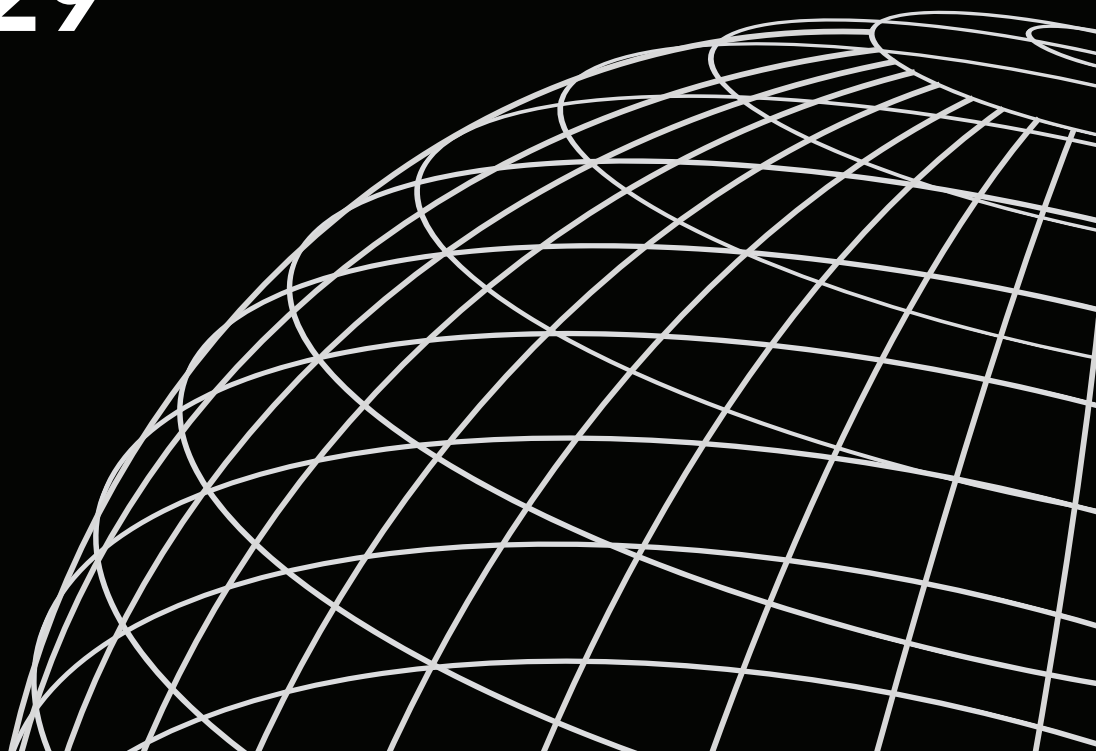




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HIV-RELATED KNOWLEDGE AND BEHAVIORS AMONG PEOPLE LIVING WITH HIV IN EIGHT HIGH HIV PREVALENCE COUNTRIES IN SUB-SAHARAN AFRICA

DHS ANALYTICAL STUDIES 29



SEPTEMBER 2012

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MEASURE DHS assists countries worldwide in the collection and use of data to monitor and evaluate population, health, and nutrition programs. Additional information about the MEASURE DHS project can be obtained by contacting MEASURE DHS, ICF International, 11785 Beltsville Drive, Suite 300, Calverton, MD 20705 (telephone: 301-572-0200; fax: 301-572-0999; e-mail: reports@measuredhs.com; internet: www.measuredhs.com).

The main objectives of the MEASURE DHS project are:

- to provide decision makers in survey countries with information useful for informed policy choices;
- to expand the international population and health database;
- to advance survey methodology; and
- to develop in participating countries the skills and resources necessary to conduct high-quality demographic and health surveys.

DHS Analytical Studies No. 29

**HIV-Related Knowledge and Behaviors among
People Living with HIV in Eight High HIV Prevalence
Countries in Sub-Saharan Africa**

Wenjuan Wang

Soumya Alva

Shanxiao Wang

ICF International
Calverton, Maryland, USA

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Corresponding author: Wenjuan Wang, International Health and Development, ICF International, 11785 Beltsville Drive, Calverton, Maryland 20705, USA; Phone 301-572-0200; Fax 301-572-0999; Email: wenjuan.wang@icfi.com

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Contents

List of Tables	v
List of Figures.....	vi
Preface.....	vii
Executive Summary	viii
1 Background and Objectives	1
1.1 Introduction	1
1.2 Background.....	1
1.3 Aims and Hypotheses.....	3
1.4 Organization of the Report	4
2 Data and Analysis	5
2.1 Data	5
2.2 Measurement	9
2.3 Analysis Method	10
3 Knowledge about HIV/AIDS	11
3.1 Knowledge of HIV Transmission and Prevention Methods.....	11
3.2 Knowledge about AIDS by Background Characteristics.....	13
3.3 Results of Multivariate Analysis	19
4 Sexual Risk Behaviors.....	21
4.1 Recent Sexual Activity and Risk Behaviors among People Living with HIV.....	21
4.2 Condom Use by Background Characteristics.....	25
4.3 Results of Multivariate Analysis	25
5 Prior HIV Testing Experience.....	27
5.1 Prior HIV Testing among People Living with HIV.....	27
5.2 Prior HIV Testing by Background Characteristics	29
5.3 Results of Multivariate Analysis	33
6 Changes Over Time.....	35
Kenya.....	35
Lesotho	37
Malawi.....	38
Tanzania.....	40

7	Summary and Discussion	43
7.1	<i>Knowledge about HIV/AIDS</i>	43
7.2	<i>Sexual Risk Behaviors</i>	44
7.3	<i>Prior HIV Testing Experience</i>	45
	References	47

List of Tables

Table 1.	Characteristics of surveys included in the analysis.....	5
Table 2.	Background characteristics of HIV-positive women age 15-49 who have ever had sex	7
Table 3.	Characteristics of HIV-positive men age 15-49 who have ever had sex.....	8
Table 4.	Among HIV-positive women and men age 15-49 who have ever had sex, percentage who had knowledge of HIV prevention methods, comprehensive knowledge about AIDS and knowledge of PMTCT	12
Table 5.	Among HIV-positive women age 15-49 who have ever had sex, percentage who had comprehensive knowledge about AIDS by selected characteristics	14
Table 6.	Among HIV-positive men age 15-49 who have ever had sex, percentage who had comprehensive knowledge about AIDS by selected characteristics	15
Table 7.	Among HIV-positive women age 15-49 who have ever had sex, percentage who had knowledge of PMTCT by selected characteristics.....	17
Table 8.	Among HIV-positive men age 15-49 who have ever had sex, percentage who had knowledge of PMTCT by selected characteristics.....	18
Table 9.	Results of logistic regression on having comprehensive knowledge about AIDS.....	20
Table 10.	Results of logistic regression on having knowledge of PMTCT	20
Table 11.	Percentage of HIV-positive women and men who engaged in selected sexual risk behaviors	22
Table 12.	Among HIV-positive women age 15-49 who had sex in the last 12 months, percentage who used a condom at last sex by selected characteristics	23
Table 13.	Among HIV-positive men age 15-49 who had sex in the last 12 months, percentage who used condom at last sex by selected characteristics	24
Table 14.	Results of logistic regression on using a condom at last sex in the last 12 months	26
Table 15.	Among HIV-positive women and men age 15-49 who have ever had sex, percentage who had tested for HIV and received results	28
Table 16.	Among HIV-positive women age 15-49 who have ever had sex, percentage who had tested for HIV and received results in the last 12 months by selected characteristics	30
Table 17.	Among HIV-positive men age 15-49 who have ever had sex, percentage who had tested for HIV and received results in the last 12 months by selected characteristics	32
Table 18.	Results of logistic regression on being tested and received results in the last 12 months	34

List of Figures

Figure 1.	Changes over time in percentages of HIV-positive women who have HIV-related knowledge, behaviors and prior testing, Kenya	36
Figure 2.	Changes over time in percentages of HIV-positive men who have HIV-related knowledge, behaviors and prior testing, Kenya	36
Figure 3.	Changes over time in percentages of HIV-positive women who have HIV-related knowledge, behaviors and prior testing, Lesotho	37
Figure 4.	Changes over time in percentages of HIV-positive men who have HIV-related knowledge, behaviors and prior testing, Lesotho	38
Figure 5.	Changes over time in percentages of HIV-positive women who have HIV-related knowledge, behaviors and prior testing, Malawi.....	39
Figure 6.	Changes over time in percentages of HIV-positive men who have HIV-related knowledge, behaviors and prior testing, Malawi.....	39
Figure 7.	Changes over time in percentages of HIV-positive women who have HIV-related knowledge, behaviors and prior testing, Tanzania	40
Figure 8.	Changes over time in percentages of HIV-positive men who have HIV-related knowledge, behaviors and prior testing, Tanzania	41
Figure 9.	Changes over time in percentages of HIV-positive women who have HIV-related knowledge, behaviors and prior testing, Zimbabwe.....	42
Figure 10.	Changes over time in percentages of HIV-positive men who have HIV-related knowledge, behaviors and prior testing, Zimbabwe.....	42

Preface

One of the most significant contributions of the MEASURE DHS program is the creation of an internationally comparable body of data on the demographic and health characteristics of populations in developing countries.

The *DHS Comparative Reports* series examines these data across countries in a comparative framework. The *DHS Analytical Studies* series focuses on analysis of specific topics. The principal objectives of both series are to provide information for policy formulation at the international level and to examine individual country results in an international context.

While *Comparative Reports* are primarily descriptive, *Analytical Studies* comprise in-depth, focused studies on a variety of substantive topics. The studies are based on a variable number of data sets, depending on the topic being examined. A range of methodologies is used in these studies, including multivariate statistical techniques.

The topics covered in *Analytical Studies* are selected by MEASURE DHS staff in conjunction with the U.S. Agency for International Development.

It is anticipated that the *DHS Analytical Studies* will enhance the understanding of analysts and policymakers regarding significant issues in the fields of international population and health.

Sunita Kishor
Project Director

Executive Summary

This study uses data from the Demographic and Health Surveys (DHS) and AIDS Indicator Surveys (AIS) in eight high HIV prevalence countries in sub-Saharan Africa (Kenya, Lesotho, Malawi, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe) to assess HIV-related knowledge and behaviors among people living with HIV (PLHIV). HIV/AIDS has become the leading cause of death in sub-Saharan Africa. UNAIDS has recommended that comprehensive HIV-prevention programs should include a focus on PLHIV as a primary source of HIV infection. In order to design effective prevention strategies focusing on PLHIV, it is essential to understand their HIV-related knowledge and behaviors.

Knowledge about HIV/AIDS

The study results show that among three areas of knowledge of HIV/AIDS—comprehensive knowledge about AIDS, knowledge of preventing mother-to-child transmission (PMTCT) and knowledge of HIV-prevention methods—the largest percentage of HIV-positive men and women are aware of HIV-prevention methods, particularly “abstinence” and “being faithful.” The lowest percentage by far is for comprehensive knowledge about AIDS. There has been significant improvement, however, in comprehensive knowledge about AIDS and knowledge of PMTCT in countries studied with recent trend data.

Prior HIV testing is positively associated with comprehensive knowledge about HIV/AIDS in only half the countries, for both men and women. A positive association between prior HIV testing and knowledge of PMTCT is observed among HIV-positive women in most countries, and among men in a handful of countries, possibly because of widespread government and donor efforts toward universal access to PMTCT services, including HIV testing and counseling during pregnancy.

Overall, there is a strong association between educational attainment and comprehensive knowledge about AIDS among HIV-positive men and women. Women’s education is also positively associated with their knowledge of PMTCT in most countries studied, but not so for men.

Sexual Risk Behaviors

Among HIV-positive men and women a greater percentage of men than women report having multiple sexual partners. Also, a higher percentage of men than women report higher-risk sex (sex with non-spousal or non-cohabiting partners) in the past 12 months, and condom use at last sex. Lesotho and Swaziland, where HIV prevalence rates are particularly high, have the highest levels of condom use, for both women and men. However, in four countries (Malawi, Tanzania, Uganda and Zambia) more than 75 percent of men report that their most recent sex was unprotected.

Over time, prevalence of multiple partnership and higher-risk sex has remained about the same in all five countries studied with data from two surveys. While condom use at last sex has more than doubled in most cases, a large proportion of PLHIV are sexually active and have unprotected sex.

The results also show that being married or in a cohabitating relationship is significantly associated with lower levels of condom use for both women and men, as within marriage condom use is more for protection from pregnancy than for protection against sexually transmitted infections. Increasing people’s awareness of their own HIV status as well as their partner’s status could increase condom use within marriage or cohabitation.

Prior HIV Testing Experience

Prior HIV testing is common in all countries studied with data from the last five years. Testing rates are higher for women than men, probably because of testing during antenatal care. However, not all PLHIV who tested for HIV received results. Rates of testing and receiving results have increased substantially for both women and men, possibly reflecting recent policy and program efforts. In Swaziland, however, only half of HIV-infected women and one-third of HIV-infected men have ever tested for HIV. Contrary to expectations, the study found that engaging in sexual risk behaviors, such as having multiple sexual partners, is not associated with HIV testing uptake.

The study found a positive association between receiving STI care and testing for HIV in the last 12 months, although only for women and only in three of the eight countries examined. Integrating HIV testing into STI clinics could be an effective approach for scaling up HIV testing, as many people are reluctant to go for testing to a health facility serving HIV patients.

Overall, the findings from this analysis can help inform policies and programs in sub-Saharan Africa to develop comprehensive HIV-prevention strategies that include a stronger focus on HIV prevention among men and women living with HIV.

1 Background and Objectives

1.1 Introduction

As the region that has been hardest hit by the HIV epidemic, sub-Saharan Africa continues to suffer from the largest share of the global HIV burden. At the end of 2010, of the estimated 34 million people worldwide living with HIV, 68 percent resided in sub-Saharan Africa, a region with 12 percent of the world's population (UNAIDS 2011). One-third of the global population living with HIV in 2009 resided in ten countries in Southern Africa (WHO, UNICEF et al. 2011). Also, 70 percent of new infections were in sub-Saharan Africa.

With an average adult HIV prevalence rate of 5 percent, HIV/AIDS has become the leading cause of death in sub-Saharan Africa, accounting for at least one million lives lost every year since 1998. With greater availability of anti-retroviral therapy, however, the number of AIDS-related deaths has been decreasing annually (UNAIDS 2011).

Despite a decrease in the incidence of new HIV infections, the numbers are still quite high. Most HIV prevention programs have focused on the general population or people at high risk of HIV, paying little attention to those who are already infected with the virus. However, to limit the spread of the epidemic, it is necessary also to focus on the infectious source—people living with HIV (PLHIV). UNAIDS has recommended that comprehensive HIV prevention should include prevention programs focusing on PLHIV (UNAIDS 2006). In order to design effective prevention strategies, it is essential to understand HIV-related knowledge and behaviors among PLHIV and to assess their risk of HIV transmission to people who are not infected.

This study uses data from the Demographic and Health Surveys (DHS) and AIDS Indicator Surveys (AIS) in eight high HIV prevalence African countries (Kenya, Lesotho, Malawi, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe). The analysis identifies HIV-related knowledge and behavioral patterns of PLHIV across the eight countries, evaluates the trends over time in the five countries with multiple surveys, and examines factors associated with selected outcomes.

1.2 Background

Correct knowledge on HIV transmission and prevention is important for avoiding infection. It is particularly crucial for HIV-positive people to have an accurate understanding of how HIV is transmitted and prevented in order to avoid or reduce risk of transmitting the infection to their sexual partners. Comprehensive knowledge about AIDS is an indicator commonly used to measure knowledge of the essential facts about HIV transmission and prevention. The indicator is defined as a person who knows the two major methods of HIV prevention (consistent use of condoms during sexual intercourse and having just one faithful partner who is uninfected), knows that a healthy-looking person can have HIV, and rejects the two most common local misconceptions about HIV transmission or prevention.

Despite efforts to improve knowledge about HIV, comprehensive knowledge remains low in sub-Saharan Africa. Among over 30 countries in this region with DHS data available, only in three countries—Kenya, Namibia and Swaziland—half the young people age 15-24 have comprehensive knowledge about AIDS (Central Statistical Office (CSO) [Swaziland] and Macro International Inc. 2008; Ministry of Health and Social Sciences (MoHSS) [Namibia] and Macro International Inc. 2008; Kenya National Bureau of Statistics and ICF Macro 2010). These levels are far below the target level for comprehensive knowledge of AIDS set by the United Nations General Assembly Special Session (UNGASS), at 95 percent of young people age 15-24 worldwide.

Few studies have examined comprehensive knowledge about AIDS among PLHIV. In one study, a clinical trial with postpartum women in urban Zambia, about a quarter of HIV-infected women reported that they could tell whether a person had HIV by looking at them, and 57 percent said that HIV could be transmitted through kissing (Stringer 2004). A study in Nigeria based on more than 200 AIDS patients coming to an antiretroviral clinic showed that people had good knowledge of preventing mother to child transmission (PMTCT) of HIV (Chama, Morrupa et al. 2007).

Heterosexual sex is the primary mode of HIV transmission in Africa (UNAIDS 2006). For instance, an analysis of survey and clinical data in Zambia and Rwanda showed that 55 percent or more of new HIV cases are attributed to heterosexual transmission within marriage or cohabitation (Dunkle, Stephenson et al. 2008).

Condom use has been universally accepted as one of the most effective means of protection against HIV and other sexually transmitted infections (STIs), if used correctly and consistently (Ahmed, Lutalo et al. 2001; Cayley 2004; Paz-Bailey, Koumans et al. 2005). For HIV-positive people, condom use is even more critical to protect their sexual partners than for the general population. While many studies have examined condom use in the general population, research on HIV-positive people's condom use is limited. Studies based on both clinic and convenience samples have found high rates of condom use among PLHIV, especially among those with high educational attainment, those living in urban areas, and those married or living together (Chama, Morrupa et al. 2007).

Two studies have used nationally representative survey data to examine unprotected sex among HIV-positive individuals. One study in Uganda using the Uganda 2004-2005 HIV/AIDS Sero-behavioral Survey involved 18,525 adults who were tested for HIV (Bunnell, Opio et al. 2008). In contrast to the findings from most clinic-based studies, the authors found that non-use of condoms at last sex encounter was common among HIV-positive people and that unprotected sex mainly occurred between spouses or steady partners. The other study, using the Kenya 2003 DHS and Malawi 2004-05 DHS, also found that condom use was rare among individuals who were tested and found to be HIV positive in the surveys, and especially among those married or cohabiting (Anand, Shiraishi et al. 2009). After controlling for other factors, being married or cohabiting was still significantly associated with lower likelihood of condom use. Other factors found to be associated with the lack of condom use include lower educational attainment and younger age, in studies based on national samples, and multiple partnership, perception of partner's negative HIV status, rural residence, lower educational attainment, forced sex, having an HIV-positive partner, and alcohol use, in studies based on selective samples (Kiene, Christie et al. 2006; Kalichman, Ntseane et al. 2007; Kiene, Simbayi et al. 2008; Lurie, Pronyk et al. 2008).

Another important factor in HIV prevention is people's awareness of their own HIV status. PLHIV who are aware of their status are more likely to adopt protective measures and to seek treatment, care and support. HIV counseling and testing provides an opportunity for people to learn their HIV serostatus and an opportunity for those who are infected to obtain referrals for treatment care and other support. The studies in Uganda, Kenya and Malawi mentioned earlier found little HIV testing uptake and little knowledge of their partners' HIV status among respondents (Bunnell, Opio et al. 2008; Anand, Shiraishi et al. 2009). Twenty-one percent of HIV-infected people in Uganda knew their HIV status and 9 percent knew their partners'. In Kenya and Malawi, 20 and 16 percent, respectively, of the population reported being tested for HIV and receiving results prior to the survey. A majority of the Kenyans perceived a small risk of HIV infection.

Most studies on HIV-positive people's behaviors have employed highly selective samples: convenient samples recruited in ART clinics, hospitals or other clinical sites or AIDS supporting groups (Stringer, Sinkala et al. 2004; Olley, Seedat et al. 2005; Kalichman, Ntseane et al. 2007). There are similarities and discrepancies in the results of studies conducted in clinical sites and those using nationally representative

samples. Both have found that HIV-infected people are highly sexually active. However, studies using convenient samples have found much higher levels of condom use compared with studies using national samples.

Studies using national samples also have found that respondents had little knowledge of their own HIV status (around or below 20 percent of the population), and one study also indicated lack of knowledge of their partners' status. In contrast, clinic-based studies have usually been based on HIV patients under treatment and found high disclosure of HIV status to partners, usually more than 70 percent (Lurie, Pronyk et al. 2008). The clinic-based studies also indicated high levels of HIV-related knowledge, such as knowledge of PMTCT. These discrepancies may result from the selection bias of convenient samples that include only ART patients who were already aware of their positive status, voluntarily seeking treatment, and exposed to counseling and support, and who therefore had better knowledge of HIV and were more likely to take protective measures such as condom use.

Some clinic studies also have found that support group interventions were associated with increased condom use (Jones, Weiss et al. 2006) and that HIV counseling was associated with positive health behaviors in general (Gaede, Majeke et al. 2006).

Most studies on HIV-infected people have been restricted to single-country analyses. Few have analyzed data from multiple countries with high HIV prevalence to identify knowledge or behavioral patterns across countries. Furthermore, no studies have assessed changes over time in HIV-related knowledge and behavior among PLHIV.

1.3 Aims and Hypotheses

This study is designed to fulfill the following specific aims and test hypotheses related to each aim, using DHS and AIS data from eight high HIV prevalence countries in sub-Saharan Africa.

Aim 1: To assess knowledge about HIV/AIDS among PLHIV and factors associated with improved knowledge.

Hypothesis 1: Prior HIV testing experience of PLHIV is positively associated with greater knowledge about HIV/AIDS.

Hypothesis 2: PLHIV who are better educated have greater knowledge about HIV/AIDS than PLHIV who are poorly educated.

Aim 2: To examine sexual risk behaviors among PLHIV and factors associated with condom use.

Hypothesis: PLHIV who are currently married are less likely to have used a condom at last sex in the last 12 months than those who are not currently married.

Aim 3: To determine uptake of HIV testing among PLHIV and factors associated with HIV testing behavior.

Hypothesis 1: PLHIV in multiple partnerships are more likely to have tested for HIV and received results in the 12 months prior to the survey compared with those with a single partner.

Hypothesis 2: PLHIV who received STI treatment and care are more likely to have tested for HIV and received results in the last 12 months.

Aim 4: To assess changes over time in HIV-related knowledge, behavior and testing uptake among PLHIV.

1.4 Organization of the Report

Chapter 2 provides details on sample sizes and characteristics, measurements and the methodological approach. Chapters 3, 4 and 5 present results addressing aims 1, 2 and 3, respectively. Each of these three chapters first presents levels of outcomes of interest, then outcomes by key characteristics and results of hypothesis testing. Chapter 6 addresses aim 4, presenting findings from the analysis of changes over time in countries with two surveys. Chapter 7 presents a summary and discussion of major findings.

2 Data and Analysis

2.1 Data

This study uses data from DHS and AIS conducted between 2003 and 2011 in eight sub-Saharan African countries. Five of the countries in the study, Kenya, Lesotho, Malawi, Tanzania and Zimbabwe, have two surveys conducted approximately five years apart. Only one survey is available in the remaining three countries studied—Swaziland, Uganda and Zambia. Except Uganda, where the AIS was conducted in 2004, the most recent surveys in the other countries were conducted between 2007 and 2011.

These countries were selected for the following two reasons. First, HIV biomarker data are available and can be linked to the individual and household information gathered in the same survey. Second, the HIV prevalence rate is relatively high (i.e. greater than 5 percent either among men or women), and therefore the sample of HIV-positive individuals should be sufficient to yield reliable estimates.

Since 2001, Measure DHS has included HIV testing in the DHS and AIS. HIV testing has been conducted anonymously in 39 DHS and 6 AIS. Among survey participants, usually all women age 15-49 and men age 15-54 who consented to be tested, blood specimens are collected and transported to a central lab where all samples are tested following a standard procedure to maximize the sensitivity and specificity of the test. Survey respondents are not provided with testing results but are given educational materials and offered referrals for free voluntary counseling and testing (VCT).

Table 1 shows the countries and surveys included in the analysis, as well as HIV testing response rates and HIV prevalence rates for women and men. Most countries have HIV biomarker data from DHS, except Tanzania and Uganda, where the data were obtained from AIS.

Table 1. Characteristics of surveys included in the analysis

Country	Survey Year	Survey type	Women			Men		
			HIV testing response rate (%)	Number of women tested and interviewed ¹	HIV prevalence (%)	HIV testing response rate (%)	Number of men tested and interviewed ¹	HIV prevalence (%)
Kenya	2003	DHS	76.3	3,151	8.7	70.3	2,851	4.6
	2008-09	DHS	86.4	3,641	8.0	79.4	3,066	6.3
Lesotho	2004	DHS	80.7	3,030	26.4	67.6	2,012	19.3
	2009	DHS	93.6	3,778	26.7	88.0	2,856	23.0
Malawi	2004	DHS	70.4	2,686	13.3	63.2	2,465	10.2
	2010	DHS	90.5	7,091	12.9	83.7	6,497	8.1
Swaziland	2006-07	DHS	87.2	4,424	31.1	77.6	3,763	19.7
Tanzania	2003-04	AIS	83.5	5,753	7.7	77.0	4,994	6.3
	2007-08	AIS	89.5	8,179	6.6	79.8	6,865	4.6
Uganda	2004-05	AIS	89.2	9,391	7.5	83.2	7,515	5.0
Zambia	2007	DHS	77.1	5,502	16.1	72.2	4,942	12.3
Zimbabwe	2005-06	DHS	75.9	6,947	21.1	63.4	5,848	14.5
	2010-11	DHS	79.9	7,313	17.7	69.3	6,250	12.3

¹only de facto women and men are included

Table 1 also shows the variation in HIV testing response rates among the selected countries. The percentage of respondents who agreed to be tested for HIV is lowest in the Malawi 2004 DHS (70 percent of women and 63 percent of men) and highest in the Lesotho 2009 DHS (94 percent of women and 88 percent of men). In all surveys women are more likely than men to agree to be tested. In all five countries with two surveys, there is an increase over time in the proportion agreeing to be tested.

HIV prevalence varies considerably by country. According to the most recent survey in each country, prevalence ranges from 7 percent in Tanzania to 31 percent in Swaziland among women, and from 5 percent in Uganda to 23 percent in Lesotho among men. In four countries—Lesotho, Swaziland, Zambia and Zimbabwe—HIV prevalence is over 10 percent among both women and men, and highest in Lesotho and Swaziland.

This analysis is restricted to women and men age 15-49 at the time of the survey who were successfully interviewed, tested HIV-positive, and have ever had sex. However, it is important to note that not all those who tested HIV-positive were aware of their HIV status. Tables 2 and 3 present the selected characteristics of the respondents.

Table 2. Background characteristics of HIV-positive women age 15-49 who have ever had sex

Background characteristics	Kenya		Lesotho		Malawi		Swaziland		Tanzania		Uganda		Zambia		Zimbabwe	
	2003	2008-09	2004	2009	2004	2010	2006-07	2003-04	2007-08	2004-05	2007	2005-06	2010-11			
Age																
15-24	27.3	21.1	23.9	21.4	23.9	21.4	32.4	20.0	20.9	23.8	19.3	21.4	14.6			
25-29	25.4	23.6	22.6	20.7	22.6	20.7	23.6	23.5	21.0	20.8	24.2	23.2	21.5			
30-34	19.3	19.7	19.8	19.7	19.8	19.7	18.1	23.7	22.7	23.8	24.8	23.9	23.3			
35-39	15.3	11.3	17.7	17.1	17.7	17.1	12.5	17.3	17.9	14.5	17.0	16.0	19.5			
40-49	12.8	24.2	16.1	21.1	16.1	21.1	13.4	15.5	17.5	17.1	14.7	15.5	21.1			
Education																
None or primary	72.8	70.5	59.8	54.7	59.8	54.7	46.6	90.1	93.3	80.3	59.2	39.3	36.3			
Secondary or higher	27.2	29.5	40.2	45.3	40.2	45.3	53.4	9.9	6.7	19.7	40.8	60.7	63.7			
Residence																
Urban	33.9	31.4	30.7	38.0	30.7	38.0	31.3	47.6	39.7	26.1	61.0	38.4	34.2			
Rural	66.1	68.6	69.3	62.0	69.3	62.0	68.7	52.4	60.3	73.9	39.0	61.6	65.8			
Marital status																
Never or formerly married	43.1	49.5	44.4	46.2	44.4	46.2	56.0	41.1	40.1	49.7	42.3	42.3	41.1			
Currently married	56.9	50.5	55.6	53.8	55.6	53.8	44.0	58.9	59.9	50.3	57.7	57.7	58.9			
Occupation																
Unemployed	28.5	23.1	42.7	43.6	33.7	21.8	49.2	12.4	14.6	21.6	42.5	53.1	50.5			
Agriculture	25.8	22.2	15.1	10.6	35.5	29.9	5.9	46.3	50.8	36.7	16.6	16.8	11.2			
Non-agriculture	45.7	54.8	42.2	45.7	30.9	48.4	44.9	41.2	34.6	41.7	40.9	30.1	38.3			
Wealth quintile																
Lowest	7.4	14.0	10.9	10.8	14.1	11.8	16.4	6.6	14.0	10.7	9.2	15.1	18.6			
Second	18.1	19.3	19.1	16.2	15.7	14.4	18.4	10.6	18.1	17.7	10.9	17.3	17.9			
Middle	16.0	13.2	17.1	18.5	20.4	16.1	20.0	16.6	15.0	16.9	14.1	19.5	22.5			
Fourth	23.7	20.5	22.6	29.5	24.6	20.8	22.6	28.1	18.2	18.8	31.3	28.7	23.0			
Highest	34.9	33.0	30.3	25.0	25.3	36.8	22.7	38.2	34.7	35.9	34.4	19.4	18.0			
Total number of women	266	283	763	954	351	894	1,337	432	533	691	859	1,413	1,251			

Table 3. Characteristics of HIV-positive men age 15-49 who have ever had sex

Background characteristics	Kenya		Lesotho		Malawi		Swaziland		Tanzania		Uganda		Zambia		Zimbabwe	
	2003	2008-09	2004	2009	2004	2010	2006-07	2007-08	2003-04	2007-08	2004-05	2007	2005-06	2010-11		
Age																
15-24	9.6	9.1	13.7	9.2	5.7	7.8	13.3	15.2	5.7	8.8	10.4	10.5	6.9			
25-29	24.9	22.9	19.8	16.3	20.2	14.0	21.4	19.6	16.4	17.6	15.7	14.7	15.2			
30-34	19.3	23.6	27.6	29.7	32.8	18.4	23.2	20.6	23.7	24.4	23.3	26.1	20.3			
35-39	21.5	23.4	19.2	19.2	19.6	26.7	20.1	19.6	28.6	21.3	23.5	21.4	25.1			
40-49	24.7	20.9	19.6	25.6	21.7	33.0	22.0	25.1	25.7	27.9	27.1	27.3	32.6			
Education																
None or primary	58.6	63.5	72.7	65.0	65.3	66.2	43.7	87.7	89.9	73.0	43.6	29.5	26.0			
Secondary or higher	41.4	36.5	27.3	35.0	34.7	33.8	56.3	12.3	10.1	27.0	56.4	70.5	74.0			
Residence																
Urban	42.1	22.4	23.1	33.5	30.5	31.3	37.6	44.7	31.7	19.4	56.0	43.0	31.8			
Rural	57.9	77.6	76.9	66.5	69.5	68.7	62.4	55.3	68.3	80.6	44.0	57.0	68.2			
Marital status																
Never or formerly married	24.8	31.7	33.7	32.6	9.1	17.3	46.3	29.5	26.9	28.2	27.4	25.8	22.4			
Currently married	75.2	68.3	66.3	67.4	90.9	82.7	53.7	70.5	73.1	71.8	72.6	74.2	77.6			
Work status																
Unemployed	3.3	3.7	39.0	15.2	12.0	1.7	20.8	6.1	6.1	6.0	5.6	15.5	19.6			
Agriculture	28.8	36.5	15.0	32.2	29.3	37.9	13.1	47.6	62.6	47.9	30.6	26.0	22.7			
Non-agriculture	67.9	59.8	46.0	52.6	58.6	60.4	66.2	46.3	31.3	46.1	63.8	58.5	57.7			
Wealth quintile																
Lowest	*	7.5	16.1	13.7	5.3	10.2	15.0	11.1	15.3	12.1	10.7	14.0	20.5			
Second	16.7	19.2	16.8	19.1	9.1	15.7	15.8	13.5	16.4	17.3	11.1	17.9	19.0			
Middle	9.1	17.0	25.3	22.2	27.5	19.0	17.9	13.4	16.9	18.9	16.1	15.0	19.6			
Fourth	20.1	31.1	25.1	21.5	26.8	20.8	24.5	24.3	20.6	24.5	34.2	32.9	21.0			
Highest	42.9	25.2	16.7	23.5	31.3	34.3	26.8	37.7	30.9	27.1	27.9	20.2	19.9			
Total number of men	126	128	363	479	247	514	716	293	298	374	579	808	713			

Note: An asterisk indicates that a percentage is based on fewer than 25 unweighted cases and has been suppressed

2.2 Measurement

The primary outcomes of interest include indicators of HIV-related knowledge, sexual risk behaviors and prior HIV testing experience. They are defined as follows:

HIV-related knowledge indicators

Comprehensive knowledge about HIV/AIDS: Knowing that consistent condom use during sexual intercourse and having just one uninfected faithful partner can reduce the chances of contracting HIV, knowing that a healthy-looking person can have HIV, and correctly rejecting the two most common local misconceptions about HIV transmission or prevention. (Such misconceptions usually include “AIDS transmitted by mosquito bites,” “AIDS can be transmitted by supernatural means,” and “A person can become infected by sharing food with a person who has AIDS”).

Knowledge on PMTCT: Knowing that HIV can be transmitted through breastfeeding, being aware that a special drug exists that prevents PMTCT.

Knowledge of HIV-prevention methods: Knowing the three common HIV-prevention methods (abstinence, being faithful and using a condom).

Sexual behavior indicators

Being sexually active: Had sex in the 12 months before the survey.

Among PLHIV reporting sexual activity in the last 12 months, the following four indicators are examined:

Multiple sex partners in the last 12 months: Had sexual intercourse with more than one partner in the 12 months before the survey.

Higher-risk sex in the last year: Had sex with a non-marital, non-cohabiting partner in the 12 months before the survey.

Condom use at last sex: Used a condom the last time had sex in the last 12 months.

Commercial sex: Had sex with a sex worker in the last 12 months. This indicator is only examined for men.

Prior HIV testing indicators

Previously tested for HIV: Ever tested and received results for HIV before the survey.

Tested and received results in the last 12 months: Tested and received results for HIV in the 12 months before the survey.

Independent variables include respondents’ socio-demographic characteristics: age, education, marital status, urban-rural residence, wealth status and employment status. Wealth status is a composite measure based on the household’s ownership of selected assets, housing construction materials, water sources and sanitation facilities (Rutstein and Johnson 2004). The variable is pre-calculated and included in DHS data files.

2.3 Analysis Method

Separate analyses are performed for women and men in each country. The analysis in chapters 3, 4 and 5 start with a univariate analysis of the outcomes of interest, followed by an examination of bivariate associations between key outcomes of interest and respondents' background characteristics in each country. Multivariate logistic regression analyses are then conducted to test the hypotheses for each country, taking into account all control variables.

In Kenya, Lesotho, Malawi, Tanzania and Zimbabwe, where survey data are available at two time points, data from both surveys are pooled for the regression analysis. In addition to the other control variables, a survey variable is included in the regression model to adjust for the effect of the time of the survey. For each of the five countries with two surveys, changes over time in key outcome variables are examined by performing a simple logistic regression with the survey variable as the only predictor in the model. The results are presented in Chapter 6.

All analyses are performed using Stata12 software. We apply sampling weights in all the analyses to enable us to generalize the results to the country's population. The weight variable is the pre-existing sampling weight in the DHS datasets. When two surveys from the same country are pooled together, we adjust the weights to obtain an equal weight between two surveys in order to avoid dominance of one survey with a larger sample size. The effect of stratification and clustering used in DHS sample design is also adjusted in the analysis.

3 Knowledge about HIV/AIDS

This chapter examines HIV-related knowledge and its correlates among people living with HIV in the eight countries studied, using three measures of knowledge about HIV/AIDS:

- Knowledge of prevention methods
- Comprehensive knowledge about AIDS
- Knowledge of PMTCT

3.1 Knowledge of HIV Transmission and Prevention Methods

Table 4 shows the levels of these indicators among HIV-positive women and men who ever had sex. This chapter focuses on reporting the results from the most recent survey in each country, while the table presents results from two surveys for countries where these data are available. Results on changes over time are separately presented in Chapter 6. Overall, for most indicators, the highest levels of knowledge among HIV-positive women are found in Zimbabwe in 2010-11 and in Kenya in 2008-09.

Among both men and women, knowledge of HIV-prevention methods is generally high. More than 90 percent of women in Swaziland and Uganda are aware of abstinence as a prevention method. In all countries except Lesotho, at least 80 percent of women know that abstinence is a prevention method. In all countries except Lesotho and Uganda, a larger percentage of men than women have this knowledge. In Kenya, Swaziland, Uganda, Zambia and Zimbabwe, more than 90 percent of men and women know that being faithful to one partner is a prevention method. In addition, 90 percent of men in Malawi also know about this method of prevention. In comparison, knowledge of condom use is slightly lower among both men and women, yet above 75 percent in all countries.

In three countries—Kenya, Swaziland and Zimbabwe—more than half of HIV-positive women have comprehensive knowledge about AIDS. In Kenya, Malawi, Tanzania and Zimbabwe, more than half the HIV-positive men have comprehensive knowledge. In contrast, the lowest levels of comprehensive knowledge are in Lesotho and Uganda, based on the most recent data, at around 35 percent for women and 29-37 percent for men. It is also important to note that Uganda ranks higher on comprehensive knowledge among countries with survey data around 2004-05.

With regard to knowledge of PMTCT, more HIV-positive women than HIV-positive men are aware of breastfeeding as a method of HIV transmission. The knowledge level is lowest in Uganda (63 percent for women and 57 percent for men). In most of the countries for both men and women awareness of a special drug preventing mother-to-child transmission is not as great as awareness of breastfeeding transmission. Overall, the level of knowledge of PMTCT—that is, knowing both that HIV can be transmitted through breastfeeding and that a special drug prevents PMTCT—is highest in Malawi (91 percent for women, 80 percent for men) and Zimbabwe (86 percent for women and 73 percent for men). The 2004-05 data from Uganda indicate that 45 percent of women and 41 percent of men have knowledge of PMTCT. Among countries with the most recent data point in the past five years, the lowest level is observed in Tanzania (64 percent for women and 42 percent for men).

Table 4. Among HIV-positive women and men age 15-49 who have ever had sex, percentage who had knowledge of HIV prevention methods, comprehensive knowledge about AIDS and knowledge of PMTCT

	Kenya		Lesotho		Malawi		Swaziland		Tanzania		Uganda		Zambia		Zimbabwe	
	2003	2008-09	2004	2009	2004	2010	2006-07	2003-04	2007-08	2004-05	2007	2005-06	2010-11			
Women																
Knowledge of HIV prevention methods																
Abstinence	84.9	89.5	82.7	77.3	72.6	82.0	94.3	90.2	87.1	91.6	87.1	81.8	81.8	82.6	92.3	87.2
Being faithful	91.0	95.7	88.3	89.0	70.2	86.5	92.7	88.0	81.5	92.7	92.4	81.8	81.8	82.6	92.3	87.2
Using condoms	75.4	86.2	84.2	88.5	58.0	76.3	93.4	76.7	77.4	81.8	78.2	81.8	81.8	82.6	92.3	87.2
Comprehensive knowledge about AIDS	42.3	56.3	21.2	35.4	21.8	46.3	50.3	43.5	42.3	35.1	42.0	45.8	45.8	60.5	60.5	60.5
Knowledge of PMTCT																
HIV virus can be transmitted through breastfeeding	77.1	86.5	80.4	82.3	79.0	95.1	85.2	74.9	84.0	62.9	87.5	83.1	83.1	90.9	90.9	90.9
Know of a special drug that prevents PMTCT	41.1	78.7	57.0	83.2	46.8	93.1	90.1	23.8	68.2	59.4	77.4	60.7	60.7	91.2	91.2	91.2
Knowing both above	35.6	74.7	49.2	74.6	44.6	91.2	79.9	21.3	64.4	45.3	72.2	55.1	55.1	86.3	86.3	86.3
Total number of women	266	283	763	954	351	894	1,337	432	533	691	859	1,413	1,413	1,251	1,251	1,251
Men																
Knowledge of HIV prevention methods																
Abstinence	90.7	93.8	80.8	75.8	92.0	83.7	93.7	92.8	90.4	85.1	88.1	89.6	89.6	94.3	94.3	89.6
Being faithful	92.7	95.9	81.0	87.3	84.8	90.4	91.1	91.0	89.2	92.8	91.3	87.2	87.2	94.3	94.3	89.6
Using condoms	78.0	89.0	74.1	86.8	75.2	79.8	89.4	80.8	84.5	82.1	78.6	83.0	83.0	89.6	89.6	89.6
Comprehensive knowledge about AIDS	58.5	63.4	16.7	28.8	47.4	54.7	48.1	49.3	50.8	37.2	47.1	42.8	42.8	55.9	55.9	55.9
Knowledge of PMTCT																
HIV virus can be transmitted through breastfeeding	65.8	81.8	74.6	75.6	79.7	90.3	78.5	68.7	69.8	57.3	79.4	82.6	82.6	83.0	83.0	83.0
Know of a special drug that prevents PMTCT	48.7	73.1	47.2	69.8	45.0	85.0	83.0	25.2	51.9	58.2	68.8	48.5	48.5	82.5	82.5	82.5
Knowing both above	37.1	65.3	41.4	58.5	40.2	80.4	69.4	19.2	42.1	40.9	58.7	42.9	42.9	72.5	72.5	72.5
Total number of men	126	128	363	479	247	514	716	293	298	374	579	808	808	713	713	713

NA=data not available

3.2 Knowledge about AIDS by Background Characteristics

Comprehensive knowledge about AIDS by background characteristics is presented in table 5 (women) and table 6 (men). Among HIV-positive women, there is no consistent pattern between comprehensive knowledge about AIDS and women's age. Only in Zimbabwe (2010-11) does comprehensive knowledge about AIDS increase steadily with respondents' age, from 54 percent of women age 15-24 to 63 percent of women age 45-49. In contrast, there is a positive association between education and comprehensive knowledge across countries. In Kenya and Tanzania educational differences are particularly important. In some countries, as in Kenya and Zimbabwe, close to half HIV-positive women with no education or primary education have comprehensive knowledge about AIDS. In all countries, urban women have greater knowledge than rural women; however, the urban-rural difference is only a few percentage points.

In all countries, HIV-positive women who are not currently married (including never-married and formerly married women) are more knowledgeable about AIDS than currently married women. The difference is most marked in Kenya and Malawi. Employment in non-agricultural activities tends to be associated with greater comprehensive knowledge about AIDS. However, in many countries women employed in agriculture are the least knowledgeable. Although not always consistent, wealth status is generally positively associated with comprehensive knowledge about AIDS. Among the richest group of women in Zimbabwe, 73 percent have comprehensive knowledge about AIDS, followed by 67 percent in Swaziland. In other countries as well, almost 50 percent of the richest group of women have such knowledge.

Table 5 also demonstrates a positive correlation across all countries between prior HIV testing and women's comprehensive knowledge about AIDS. In Kenya and Zimbabwe, 60 and 65 percent of women, respectively, who previously tested for HIV have comprehensive knowledge about AIDS. Even in Lesotho, which has the lowest level of such knowledge, 40 percent of HIV-positive women who previously tested have comprehensive knowledge about AIDS compared with only 25 percent of women who never tested.

Similar patterns are evident in Table 6 among HIV-positive men. While there is no clear relationship between men's age and comprehensive knowledge about AIDS, a positive association with education and prior HIV testing experience is evident in most countries with sufficient number of cases for analysis. In all countries except Kenya, comprehensive knowledge about AIDS is higher among urban than rural men, reaching 74 percent in Malawi in 2010. In most countries, comprehensive AIDS knowledge is also associated with non-agricultural employment. In most countries men in the highest two wealth quintiles have the greatest comprehensive knowledge about AIDS, although the pattern with wealth status is not linear.

Table 5. Among HIV-positive women age 15-49 who have ever had sex, percentage who had comprehensive knowledge about AIDS by selected characteristics

Characteristic	Kenya		Lesotho		Malawi		Swaziland		Tanzania		Uganda		Zambia		Zimbabwe	
	2003	2008-09	2004	2009	2004	2010	2006-07	2003-04	2007-08	2004-05	2007	2005-06	2010-11			
Age																
15-24	39.1	51.7	19.4	40.0	24.8	45.6	47.6	46.4	41.5	36.2	42.8	47.1	53.7			
25-29	48.9	52.9	24.8	32.0	26.5	46.4	56.7	46.8	49.8	38.2	44.6	47.0	59.2			
30-34	35.5	63.9	29.5	35.1	17.4	56.2	54.7	48.9	44.8	38.2	44.3	45.5	61.5			
35-39	37.1	38.3	27.6	39.4	30.0	38.7	56.4	41.4	35.3	34.4	34.8	48.7	62.8			
40-49	52.2	65.7	24.9	30.8	11.2	44.1	45.9	40.0	43.9	31.6	40.9	39.3	63.3			
Education																
None or primary	35.2	46.9	18.3	27.3	21.4	41.7	38.1	42.4	41.0	31.3	32.6	35.7	48.1			
Secondary or higher	61.0	78.6	34.9	45.1	24.0	60.2	64.0	71.0	74.5	55.6	55.5	52.2	67.6			
Residence																
Urban	53.8	58.1	28.1	39.8	21.1	49.8	61.8	48.2	50.9	40.0	45.4	52.7	66.6			
Rural	36.4	55.4	23.6	32.6	22.0	44.5	47.4	42.4	38.3	34.6	36.6	41.4	57.3			
Marital status																
Never or formerly married	49.5	61.6	29.2	36.5	19.8	53.5	55.0	53.2	44.0	38.3	42.7	48.1	62.5			
Currently married	36.8	51.0	21.6	34.4	22.7	41.9	48.0	39.6	42.8	33.8	41.4	44.0	59.1			
Work status																
Unemployed	36.9	54.2	21.4	35.2	23.2	44.3	49.3	39.8	59.6	36.6	42.2	43.8	56.9			
Agriculture	34.8	51.3	18.6	29.2	22.4	45.1	43.2	37.5	35.2	35.3	29.0	44.3	60.1			
Non-agriculture	49.8	59.1	30.9	36.9	19.6	47.9	55.9	55.5	48.3	36.4	47.0	50.0	65.4			
Wealth quintile																
Lowest	*	59.6	17.0	26.5	23.2	39.8	33.0	44.0	28.0	26.3	30.2	38.6	52.1			
Second	24.0	50.8	22.5	24.9	23.0	38.3	42.8	45.9	38.2	30.5	34.6	44.6	51.3			
Middle	42.3	59.1	25.0	29.7	21.3	39.4	52.4	35.9	44.0	36.6	32.3	39.6	60.0			
Fourth	39.8	48.1	27.4	36.2	28.5	51.5	57.9	46.5	45.5	31.1	37.2	47.8	64.8			
Highest	55.5	62.0	27.4	49.2	14.3	51.6	66.5	48.3	50.6	43.9	55.7	55.6	73.3			
Prior HIV testing experience																
No	39.3	45.6	22.8	25.0	20.8	31.8	47.9	41.4	40.3	33.9	41.0	44.9	48.9			
Yes	55.4	59.9	35.3	39.5	28.3	49.5	56.8	58.8	47.0	42.8	43.1	48.0	64.9			

Note: An asterisk indicates that a percentage is based on fewer than 25 unweighted cases and has been suppressed

Table 6. Among HIV-positive men age 15-49 who have ever had sex, percentage who had comprehensive knowledge about AIDS by selected characteristics

Characteristic	Kenya		Lesotho		Malawi		Swaziland		Tanzania		Uganda		Zambia		Zimbabwe	
	2003	2008-09	2004	2009	2004	2010	2006-07	2003-04	2007-08	2004-05	2007	2005-06	2010-11			
Age																
15-24	*	*	9.5	28.7	*	53.0	48.3	54.0	*	36.0	39.5	35.1	46.0			
25-29	56.6	*	26.3	31.7	50.8	55.8	48.8	55.7	33.7	42.4	53.6	43.6	59.7			
30-34	*	69.3	22.0	26.4	52.5	52.8	55.9	56.5	62.9	32.6	42.8	42.2	56.6			
35-39	*	63.2	17.5	28.2	46.1	56.0	45.8	48.8	45.0	39.3	47.7	49.0	57.8			
40-49	53.4	53.9	18.3	30.1	45.0	54.7	45.8	46.6	58.4	37.0	49.4	40.9	54.2			
Education																
None or primary	46.3	54.4	14.9	19.6	41.5	47.9	35.3	47.4	46.5	29.9	27.2	33.9	43.8			
Secondary or higher	75.6	79.2	31.9	45.8	58.5	68.1	59.9	84.7	*	57.6	62.5	46.5	60.1			
Residence																
Urban	56.1	51.8	20.6	43.1	54.4	74.3	58.5	59.4	55.3	51.1	55.8	43.5	62.7			
Rural	60.2	66.8	19.2	21.5	44.3	45.8	43.5	46.0	48.2	34.0	36.1	42.3	52.7			
Marital status																
Never or formerly married	59.9	73.9	14.6	34.9	*	57.1	45.5	53.2	43.0	37.2	48.1	44.2	58.7			
Currently married	58.0	58.6	22.0	25.8	48.7	54.2	52.2	51.5	53.2	37.4	46.7	42.3	55.1			
Work status																
Unemployed	*	*	17.8	21.4	*	*	44.3	*	*	*	53.1	49.3	48.7			
Agriculture	58.8	64.4	5.8	16.7	45.1	49.3	32.7	40.7	46.6	29.5	30.1	45.4	60.8			
Non-agriculture	57.8	62.0	25.5	38.3	51.3	58.1	53.9	60.4	58.6	44.7	54.7	39.9	56.4			
Wealth quintile																
Lowest	*	*	11.0	9.2	*	43.8	24.3	42.9	40.4	35.9	20.7	41.9	46.0			
Second	*	60.4	16.3	13.7	*	47.8	42.1	50.0	54.1	38.3	35.4	35.3	53.1			
Middle	*	*	23.2	32.8	49.5	38.7	39.5	42.6	34.4	25.5	33.1	47.1	52.3			
Fourth	*	68.9	20.1	32.4	52.8	64.7	58.7	46.7	58.4	33.2	50.7	47.2	56.1			
Highest	62.7	57.9	24.6	45.2	44.6	64.0	64.8	62.2	57.1	49.3	65.6	39.7	71.9			
Prior HIV testing experience																
No	53.7	48.0	18.4	26.4	45.5	44.5	44.6	50.0	50.1	36.5	47.8	42.1	50.6			
Yes	*	73.8	25.3	30.8	55.2	60.4	59.8	59.1	51.3	41.9	45.6	45.4	60.4			

Note: An asterisk indicates that a percentage is based on fewer than 25 unweighted cases and has been suppressed

With regard to knowledge of PMTCT, education again shows a strong positive relationship among HIV-positive women in all countries (Table 7). Although this relationship is also observed among men, it is not as strong as for women (Table 8). In a majority of countries, a greater percentage of urban women have accurate PMTCT knowledge compared with women in rural areas, but there is no clear pattern among men. In most countries, however, this knowledge does not seem to be associated with women's marital status.

In some countries, including Tanzania, Uganda and Zambia, knowledge of PMTCT is considerably higher among women employed in the non-agricultural sector than among those in agriculture. In other countries, such as Kenya, Lesotho and Malawi, PMTCT knowledge does not vary much by employment status. These patterns are similar among men. The association of PMTCT knowledge with wealth status is generally positive in all countries with sufficient data for women, with percentages greater than 90 percent for women in the richest quintile in Malawi and Zimbabwe. However, the pattern among men is not as consistent. In all countries except Kenya, men and women who previously tested for HIV have greater knowledge of PMTCT compared with those not tested.

Table 7. Among HIV-positive women age 15-49 who have ever had sex, percentage who had knowledge of PMTCT by selected characteristics

Characteristic	Kenya		Lesotho		Malawi		Swaziland		Tanzania		Uganda		Zambia		Zimbabwe	
	2003	2008-09	2004	2009	2004	2010	2006-07	2010	2003-04	2007-08	2004-05	2007	2005-06	2010-11		
Age																
15-24	26.7	77.6	46.3	72.4	44.0	89.7	79.3	89.7	21.0	64.8	43.8	71.2	52.3	84.3		
25-29	50.1	75.6	49.3	79.7	55.6	95.9	79.7	95.9	21.3	66.0	52.8	71.8	59.5	86.5		
30-34	38.0	85.2	53.5	76.5	47.6	91.0	81.6	91.0	24.0	69.6	47.5	79.9	53.1	85.4		
35-39	30.1	74.1	47.5	76.1	37.2	90.8	82.1	90.8	22.3	64.6	43.3	65.9	57.6	90.0		
40-49	28.5	63.1	49.9	69.0	34.6	88.2	77.4	88.2	16.5	55.2	38.9	68.6	52.5	85.2		
Education																
None or primary	32.4	68.2	45.4	69.2	40.4	89.0	75.9	89.0	17.1	63.3	40.8	68.7	46.6	79.0		
Secondary or higher	44.0	90.4	54.8	81.2	67.3	98.2	83.4	98.2	59.3	79.5	65.6	77.3	60.5	90.5		
Residence																
Urban	42.6	68.8	59.5	80.5	59.9	96.5	84.0	96.5	29.5	76.3	55.9	78.4	61.9	90.6		
Rural	32.0	77.4	44.6	71.0	40.7	88.5	78.0	88.5	13.8	56.6	42.0	62.5	50.8	84.1		
Marital status																
Never or formerly married	37.4	73.3	50.7	74.2	49.0	91.3	80.0	91.3	17.5	66.4	47.5	72.7	57.4	87.0		
Currently married	34.2	76.1	48.0	75.0	42.7	91.2	79.8	91.2	23.9	63.1	43.8	71.9	53.4	85.9		
Work status																
Unemployed	29.6	72.2	39.3	71.3	47.0	89.5	78.4	89.5	22.3	72.2	38.8	76.5	53.7	85.7		
Agriculture	28.4	74.3	49.3	74.1	39.2	88.7	85.3	88.7	14.4	55.0	41.3	53.8	45.0	82.3		
Non-agriculture	43.3	75.9	59.1	77.9	48.0	93.6	80.9	93.6	28.7	75.0	53.0	75.3	63.1	88.4		
Wealth quintile																
Lowest	*	74.4	32.5	60.0	30.0	82.5	74.9	82.5	20.2	46.8	28.4	54.7	39.8	78.5		
Second	35.2	75.1	42.6	68.9	38.7	87.3	77.7	87.3	7.7	50.5	40.4	64.7	50.7	85.9		
Middle	45.7	75.5	46.8	75.5	41.4	86.8	80.9	86.8	15.2	53.8	38.7	56.9	50.1	84.4		
Fourth	20.4	76.1	54.4	74.9	49.0	93.1	81.1	93.1	13.2	75.4	44.3	78.4	62.5	90.3		
Highest	46.7	73.5	56.7	83.6	54.4	96.5	83.2	96.5	33.8	77.6	57.2	80.0	64.8	92.2		
Prior HIV testing experience																
No	34.2	76.2	47.1	63.9	41.1	86.1	74.8	86.1	15.6	54.3	39.8	64.4	51.7	77.6		
Yes	41.7	74.2	59.3	78.8	66.2	92.4	86.1	92.4	41.9	77.3	64.6	81.4	64.3	89.7		

Note: An asterisk indicates that a percentage is based on fewer than 25 unweighted cases and has been suppressed

Table 8. Among HIV-positive men age 15-49 who have ever had sex, percentage who had knowledge of PMTCT by selected characteristics

Characteristic	Kenya		Lesotho		Malawi		Swaziland		Tanzania		Uganda		Zambia		Zimbabwe	
	2003	2008-09	2004	2009	2004	2010	2006-07	2003-04	2007-08	2004-05	2007	2005-06	2010-11			
Age																
15-24	*	*	41.0	55.0	*	70.7	65.1	13.4	*	41.1	47.2	40.9	55.7			
25-29	32.2	*	40.4	56.3	42.0	77.3	63.4	29.7	47.5	33.7	53.3	45.5	69.3			
30-34	*	72.4	34.9	60.1	33.2	66.1	76.2	18.2	42.5	42.0	55.7	41.3	76.6			
35-39	*	73.1	37.5	61.6	38.0	87.5	70.0	17.9	42.6	52.9	64.8	42.3	76.2			
40-49	36.9	60.6	55.4	56.9	50.6	86.3	70.2	16.2	42.6	37.0	63.4	44.1	72.2			
Education																
None or primary	32.6	60.4	38.2	55.8	37.3	80.2	66.6	19.4	42.3	37.3	54.4	45.5	65.9			
Secondary or higher	43.5	73.7	49.7	63.5	45.5	80.8	71.6	17.8	*	52.9	62.0	41.8	74.8			
Residence																
Urban	40.9	65.9	46.7	63.1	26.4	77.3	72.1	20.4	46.8	45.4	58.5	46.6	67.9			
Rural	34.4	65.1	39.7	56.2	46.2	81.8	67.7	18.1	39.9	40.4	58.9	40.0	74.7			
Marital status																
Never or formerly married	38.5	53.4	47.6	56.3	*	79.1	67.9	16.9	38.7	42.1	52.7	40.1	66.5			
Currently married	36.7	70.8	38.2	59.6	41.9	80.7	70.6	20.1	43.3	41.1	60.9	43.8	74.3			
Work status																
Unemployed	*	*	40.2	55.5	*	*	75.9	*	*	*	69.6	50.0	66.3			
Agriculture	23.3	68.1	39.0	57.0	37.1	82.2	63.5	20.4	36.3	36.6	53.8	33.9	79.8			
Non-agriculture	41.9	63.8	43.2	60.3	40.6	79.1	68.5	16.9	51.5	46.8	60.1	44.9	71.8			
Wealth quintile																
Lowest	*	*	32.1	44.7	*	74.4	71.9	4.9	41.0	37.6	52.9	38.2	70.5			
Second	*	65.7	49.0	53.0	*	68.4	63.9	23.1	32.6	31.3	66.3	43.2	78.2			
Middle	*	*	45.4	63.5	46.2	82.2	65.1	10.8	39.9	34.9	52.4	34.2	74.4			
Fourth	*	48.1	35.6	61.9	43.9	83.9	68.5	27.7	41.3	42.1	55.1	51.9	69.5			
Highest	45.4	78.1	45.1	63.2	39.2	84.6	74.9	19.4	49.3	53.4	65.9	37.5	70.5			
Prior HIV testing experience																
No	33.3	69.6	41.1	46.8	40.7	75.7	68.2	15.0	38.0	40.5	56.1	41.2	69.3			
Yes	49.4	62.4	42.5	68.8	38.1	83.1	72.1	34.3	50.7	46.6	64.9	49.7	75.3			

Note: An asterisk indicates that a percentage is based on fewer than 25 unweighted cases and has been suppressed

3.3 Results of Multivariate Analysis

The bivariate analysis results above indicate that education and prior HIV testing have a positive association with HIV-related knowledge. Multiple regression analysis for each country tests if this association remains after controlling for potential confounders including age, education, marital status, urban-rural residence, wealth status and employment status. Two hypotheses were tested through regression analysis.

Hypothesis 1: Prior HIV testing experience of PLHIV is positively associated with greater knowledge about HIV/AIDS.

Hypothesis 2: PLHIV who are better educated have greater knowledge about HIV/AIDS than PLHIV who are poorly educated.

To test the hypotheses, knowledge about HIV/AIDS is measured using both indicators presented in the descriptive tables, comprehensive knowledge about AIDS and knowledge of PMTCT. For countries with two sets of data, both sets are included in the analysis. Given the binary nature of the outcome variables, results of the logistic regressions are presented as odds ratios.

Results of the regression analysis presented in Table 9 show the odds of greater comprehensive knowledge about AIDS as a result of higher educational attainment and prior HIV testing. Table 10 presents the effects of the same two predictors on knowledge of PMTCT. Men and women with less than secondary education, and those with no prior HIV testing, are treated as the reference group in results presented in both tables.

Secondary education has a strong positive relationship with comprehensive knowledge about AIDS among HIV-positive women in all countries. The odds of having comprehensive knowledge are 3.2 times higher in Kenya and 3.0 times higher in Tanzania for women with secondary education compared with women with no education or primary education. The positive association is also consistent among men across the countries. The odds ratios range from 1.6 in Zimbabwe to 4.0 in Kenya, although some countries such as Kenya and Tanzania show wide 95 percent confidence intervals.

The results for prior HIV testing are more mixed. Only in half the countries (Lesotho, Malawi, Swaziland and Zimbabwe) is prior HIV testing significantly related to comprehensive knowledge about AIDS among HIV-positive women. The odds ratios range from 1.3 to 1.9, which means that HIV-positive women with prior HIV testing experience are 30 to 90 percent more likely to have comprehensive knowledge about AIDS than those who had never tested. A significant association between HIV testing and comprehensive knowledge among men is observed in Kenya, Malawi and Swaziland.

Education is also significantly associated with knowledge about PMTCT among women in all countries except Zambia (Table 10). The odds of having accurate knowledge of PMTCT among women with secondary education or higher is 3.2 times higher than that of uneducated women or women with primary education in Tanzania, and 2.7 times higher in Malawi. In contrast, men's education does not show a significant relationship with knowledge of PMTCT in any of the countries.

Except for Kenya, all countries display a significant relationship between prior HIV testing and knowledge about PMTCT among HIV-positive women. This relationship is statistically significant among men in only three of the eight countries—Lesotho, Tanzania and Zimbabwe. In Tanzania, men who had previously tested for HIV are twice as likely as other men to have knowledge of PMTCT. The odds are 1.9 times in Lesotho and 1.4 times in Zimbabwe.

Table 9. Results of logistic regression on having comprehensive knowledge about AIDS

Country	Women				Men				
	Education		Prior HIV testing		Education		Prior HIV testing		Total number of men
	Secondary or higher	95% CI	Tested before	95% CI	Secondary or higher	95% CI	Tested before	95% CI	
Kenya	3.2***	2.0 - 5.0	1.6	0.9 - 2.7	4.0***	2.0 - 8.2	2.8***	1.4 - 5.5	254
Lesotho	2.0***	1.5 - 2.6	1.8***	1.3 - 2.6	2.3***	1.5 - 3.6	1.1	0.7 - 1.7	822
Malawi	1.8**	1.1 - 3.0	1.9***	1.3 - 2.7	1.9***	1.2 - 3.1	1.7**	1.1 - 2.6	707
Swaziland	2.3***	1.8 - 3.0	1.3**	1.0 - 1.7	1.9***	1.3 - 2.7	1.8***	1.2 - 2.5	682
Tanzania	3.0***	1.5 - 6.2	1.3	0.9 - 1.9	5.7***	2.3 - 14.2	1.2	0.7 - 2.0	441
Uganda	2.5***	1.5 - 4.1	1.3	0.9 - 2.0	2.8***	1.6 - 5.0	1.1	0.5 - 2.1	348
Zambia	2.0***	1.4 - 2.9	1.0	0.7 - 1.3	3.4***	2.1 - 5.4	0.8	0.5 - 1.2	575
Zimbabwe	1.9***	1.6 - 2.3	1.3***	1.1 - 1.6	1.6***	1.2 - 2.1	1.2	0.9 - 1.6	1,387

***p<0.01 **p<0.05

Reference group for education is no education or primary education; reference group for prior HIV testing is no prior HIV testing
 Variables that are controlled in the regression are: age, urban/rural residence, marital status, occupation, and wealth quintile.
 For countries with two surveys available, the survey variable is also included in the regression

Table 10. Results of logistic regression on having knowledge of PMTCT

Country	Women				Men				
	Education		Prior HIV testing		Education		Prior HIV testing		Total number of men
	Secondary or higher	95% CI	Tested before	95% CI	Secondary or higher	95% CI	Tested before	95% CI	
Kenya	2.1***	1.2 - 3.8	0.8	0.5 - 1.5	1.4	0.6 - 3.1	1.0	0.5 - 2.0	254
Lesotho	1.3**	1.0 - 1.7	1.8***	1.3 - 2.4	1.3	0.9 - 2.0	1.9***	1.3 - 2.6	822
Malawi	2.7***	1.6 - 4.5	2.0***	1.3 - 3.2	1.4	0.8 - 2.3	1.2	0.7 - 2.0	707
Swaziland	1.5**	1.1 - 2.1	2.0***	1.5 - 2.8	1.2	0.8 - 1.8	1.2	0.8 - 1.8	682
Tanzania	3.2***	1.4 - 7.2	2.7***	1.8 - 4.0	0.6	0.3 - 1.5	2.0***	1.2 - 3.3	441
Uganda	2.2***	1.4 - 3.7	2.5***	1.7 - 3.7	1.6	0.9 - 2.8	1.1	0.7 - 1.8	384
Zambia	1.0	0.7 - 1.5	2.3***	1.6 - 3.3	1.3	0.8 - 1.9	1.4	0.9 - 2.2	575
Zimbabwe	1.6***	1.2 - 2.1	1.8***	1.4 - 2.3	1.1	0.8 - 1.5	1.4**	1.0 - 1.8	1,387

***p<0.01 **p<0.05

Reference group for education is no education or primary education; reference group for prior HIV testing is no prior HIV testing
 Variables that are controlled in the regression are: age, urban/rural residence, marital status, occupation, and wealth quintile.
 For countries with two surveys available, the survey variable is also included in the regression

4 Sexual Risk Behaviors

This chapter compiles information on sexual risk behaviors of men and women living with HIV in the selected countries. Prevalence of commercial sex in the last 12 months is also reported for men. Similar to Chapter 3, levels and patterns presented primarily refer to data from the most recent survey in each country.

4.1 Recent Sexual Activity and Risk Behaviors among People Living with HIV

Table 11 shows patterns in men and women's sexual behaviors, including the percentage who had sex in the 12 months preceding the survey and among this population the percentage who had multiple sex partners, the percentage who had higher-risk sex (had sex with a non-marital, non-cohabiting partner), and the percentage who used a condom at last sex.

The majority of HIV-positive women and men were sexually active in the 12 months before the surveys. In all countries studied, more than 70 percent of women had sex in the last 12 months, and more than 80 percent in three countries (Lesotho, Swaziland and Tanzania), with the highest percentage in Lesotho, at 86 percent. Generally, more men than women reported sexual activity in the last 12 months—over 80 percent in all eight countries, and over 90 percent in six (Kenya, Lesotho, Malawi, Tanzania, Zambia and Zimbabwe).

Among HIV-positive women who had sex in the 12 months before the survey, the percentage reporting multiple sex partners was between 2 to 4 percent in most countries. Exceptions are Lesotho (12 percent), Uganda (7 percent) and Tanzania (5 percent). The percentage of HIV-positive women who had higher-risk sex ranged from 15 percent in Malawi to 52 percent in Swaziland. Condom use at last sex is not common among women infected with HIV, ranging from 18 percent in Uganda to 47 percent in Lesotho. In three countries, Tanzania, Uganda and Zambia, more than 80 percent of women reported having unprotected last sex in the 12 months before the survey.

Men report multiple partners more frequently than women do. In all countries except Malawi and Zimbabwe, over 20 percent of HIV-positive men who had sex in the last 12 months had multiple sex partners. In Lesotho and Tanzania, this percentage is above 30 percent; and in Uganda close to 40 percent. The percentage of men who had higher-risk sex ranges from 18 percent in Malawi to over 50 percent in Lesotho and Swaziland. Condom use among HIV-positive men is generally higher than among HIV-positive women. Lesotho and Swaziland show the highest condom use at last sex, at 49 and 47 percent, respectively. The lowest rates are in Uganda (15 percent), from the 2004-05 survey. In all other countries, with a more recent survey year as the latest data point, more than 20 percent of HIV infected men who had sex in the last 12 months used a condom at last sex. With regard to commercial sex, in most countries very low percentages of HIV-positive men reported such behavior, with Tanzania (13 percent) as an exception.

Table 11. Percentage of HIV-positive women and men who engaged in selected sexual risk behaviors

	Kenya		Lesotho		Malawi		Swaziland		Tanzania		Uganda		Zambia		Zimbabwe	
	2003	2008-09	2004	2009	2004	2010	2006-07	2003-04	2007-08	2004-05	2007	2005-06	2010-11			
Women																
Among women who ever had sex																
Percentage who had sex in the last 12 months	82.7	74.7	85.1	85.8	83.0	77.1	83.1	80.9	83.4	75.9	77.9	74.4	72.8			
Total number of women	266	283	763	954	351	894	1,337	432	533	691	859	1,413	1,251			
Among women who had sex in the last 12 months																
Percentage who had multiple sex partners	5.6	2.1	13.9	12.0	2.7	2.8	3.5	8.6	4.7	6.9	3.5	3.1	2.9			
Percentage who had higher-risk sex	30.6	29.4	44.2	45.8	12.8	14.6	51.8	33.8	31.6	31.1	24.3	19.8	21.2			
Percentage who used a condom at last sex	8.6	28.5	22.3	47.0	8.4	21.5	45.9	18.8	19.9	17.8	19.6	14.0	31.8			
Total number of women	220	212	659	852	292	689	1,110	349	444	524	669	1,015	911			
Men																
Among men who ever had sex																
Percentage who had sex in the last 12 months	94.4	89.6	92.8	91.4	91.7	92.6	82.3	89.9	94.7	88.6	89.8	89.7	92.3			
Total number of men	126	128	363	479	247	514	716	293	298	374	579	808	713			
Among men who had sex in the last 12 months																
Percentage who had multiple sex partners	23.2	20.5	33.3	34.0	16.6	15.2	27.6	26.8	31.0	38.6	29.0	11.5	14.5			
Percentage who had higher-risk sex	32.1	28.2	59.6	55.1	19.0	18.4	52.8	43.6	33.7	37.1	37.8	23.8	26.5			
Percentage who used a condom at last sex	12.2	35.7	20.9	48.5	11.1	28.2	46.2	24.1	21.1	14.9	27.4	20.3	33.6			
Percentage who had commercial sex	3.1	2.3	3.4	5.2	7.4	5.8	0.1	2.1	13.2	2.4	8.0	4.2	4.1			
Total number of men	119	114	342	455	226	476	661	264	283	332	520	725	658			

Table 12. Among HIV-positive women age 15-49 who had sex in the last 12 months, percentage who used a condom at last sex by selected characteristics

Characteristic	Kenya		Lesotho		Malawi		Swaziland		Tanzania		Uganda		Zambia		Zimbabwe	
	2003	2008-09	2004	2009	2004	2010	2006-07	2003-04	2007-08	2004-05	2007	2005-06	2010-11			
Age groups																
15-24	4.7	16.2	22.3	44.7	17.0	19.7	46.4	29.9	11.9	16.2	29.9	11.7	20.5			
25-29	12.1	33.9	28.1	46.5	4.4	16.8	50.3	20.4	21.5	16.7	18.0	11.0	22.7			
30-34	0.6	24.7	21.3	46.8	1.0	19.6	44.5	15.3	17.6	16.6	16.0	15.3	35.4			
35-39	18.8	20.7	18.2	56.8	10.7	23.0	47.8	8.6	27.1	25.0	16.7	22.7	37.9			
40-49	9.2	43.6	19.2	41.6	4.2	31.1	34.2	15.1	25.0	17.8	16.0	12.4	47.2			
Education																
None or primary	5.7	24.9	14.4	41.4	7.0	19.3	36.2	16.3	19.7	14.2	14.9	11.0	27.3			
Secondary or higher	16.2	36.1	33.2	53.6	18.8	28.1	54.2	40.3	23.2	33.3	26.3	15.7	34.4			
Residence																
Urban	12.5	29.5	38.2	52.8	11.6	22.9	53.3	26.2	22.9	29.2	23.8	20.2	37.4			
Rural	6.6	28.1	15.2	43.4	7.6	20.8	42.4	11.2	17.8	13.6	12.7	9.9	29.0			
Marital status																
Never or formerly married	22.2	59.5	35.6	64.3	26.3	46.6	57.8	40.4	35.0	36.2	35.4	37.3	55.2			
Currently married	1.7	11.1	14.3	35.5	4.4	14.6	34.4	8.4	13.1	7.5	13.6	5.7	24.2			
Work status																
Unemployed	6.5	22.6	15.2	39.1	4.5	17.2	43.7	18.7	11.8	18.1	19.5	11.8	26.9			
Agriculture	0.0	23.3	14.9	43.3	6.8	18.8	36.4	11.4	16.6	7.4	5.6	10.2	26.5			
Non-agriculture	14.1	33.2	31.8	54.9	14.8	25.1	49.6	26.4	28.2	27.3	25.0	20.4	40.5			
Wealth quintile																
Lowest	*	20.9	10.1	31.2	9.8	13.2	30.4	0.0	8.0	20.9	4.6	5.9	25.8			
Second	3.4	23.0	12.3	36.5	2.5	22.1	39.8	17.0	17.2	12.1	14.7	6.9	33.3			
Middle	2.5	13.7	17.2	51.5	1.9	14.0	41.5	8.7	14.2	6.2	14.6	11.0	28.2			
Fourth	12.4	36.9	18.8	50.6	5.7	23.2	53.8	15.3	27.0	7.8	18.0	18.5	36.2			
Highest	13.6	34.7	38.0	52.4	19.7	26.0	57.5	29.3	24.6	29.7	28.1	21.9	35.6			

Note: An asterisk indicates that a percentage is based on fewer than 25 unweighted cases and has been suppressed

Table 13. Among HIV-positive men age 15-49 who had sex in the last 12 months, percentage who used condom at last sex by selected characteristics

Characteristic	Kenya		Lesotho		Malawi		Swaziland		Tanzania		Uganda		Zambia		Zimbabwe	
	2003	2008-09	2004	2009	2004	2010	2006-07	2003-04	2007-08	2004-05	2007	2005-06	2010-11			
Age groups																
15-24	*	*	36.4	61.3	*	30.0	57.1	42.7	*	10.0	39.2	39.7	44.1			
25-29	8.5	*	19.7	43.3	15.2	13.8	46.9	45.5	25.7	27.6	36.0	22.5	23.2			
30-34	*	25.8	27.7	50.2	13.3	26.2	47.3	15.2	30.7	11.8	21.1	16.0	26.8			
35-39	*	49.3	20.7	46.7	8.2	31.7	44.7	15.8	13.6	11.4	27.7	21.0	29.9			
40-49	4.1	16.4	1.0	46.7	4.7	31.7	39.4	11.6	17.0	13.2	23.5	16.4	43.6			
Education																
None or primary	6.5	39.5	11.9	40.0	8.4	24.2	34.7	22.7	21.4	12.6	20.2	15.6	28.7			
Secondary or higher	20.1	28.8	46.4	64.0	16.1	36.3	54.7	33.2	*	21.3	32.7	22.2	35.3			
Residence																
Urban	12.8	27.1	35.1	65.1	12.3	32.1	47.5	34.1	28.3	30.7	32.8	24.6	35.8			
Rural	11.8	38.5	16.5	40.1	10.5	26.4	45.3	15.8	17.7	11.1	20.7	17.1	32.6			
Marital status																
Never or formerly married	35.4	67.6	29.1	59.0	*	55.1	60.7	58.0	43.7	39.6	39.6	65.0	64.2			
Currently married	6.3	25.7	17.4	44.1	9.0	24.7	35.5	12.3	14.2	8.0	24.4	10.6	27.0			
Work status																
Unemployed	*	*	19.7	44.1	*	*	42.9	*	*	*	27.4	28.6	44.3			
Agriculture	9.6	30.6	2.5	38.5	8.6	34.5	44.5	17.6	15.2	10.2	18.2	14.3	30.8			
Non-agriculture	11.7	37.0	27.9	55.1	11.6	24.4	47.5	25.9	27.2	17.5	31.8	21.0	31.3			
Wealth quintile																
Lowest	*	*	6.3	25.6	9.5	27.3	42.2	16.7	5.3	16.8	18.4	13.6	33.8			
Second	*	32.7	18.7	35.7	5.8	30.4	38.4	6.5	13.0	5.6	16.7	16.2	33.8			
Middle	*	*	15.5	43.0	7.7	22.4	44.2	25.3	16.5	11.1	21.1	21.1	32.6			
Fourth	*	32.4	38.0	58.7	4.4	32.3	49.8	26.9	35.3	9.5	31.3	17.4	37.3			
Highest	15.4	39.1	20.5	66.6	20.9	28.2	50.7	30.0	25.7	27.1	34.4	33.5	30.4			

Note: An asterisk indicates that a percentage is based on fewer than 25 unweighted cases and has been suppressed

4.2 Condom Use by Background Characteristics

Tables 12 and 13 present the percentages among HIV-positive women and men who had sex in the 12 months before the survey and who used a condom at last sex, by selected background characteristics. Table 12 shows a strong positive association between condom use and education, urban residence, and non-agricultural employment for women in all countries studied. Women from the richest households use condoms more frequently compared with other wealth groups.

A consistent relationship across countries is observed between condom use and marital status, with currently married women far less likely to use a condom at last sex than never-married or formerly married women. The difference reaches 49 percentage points in Kenya. Only about 8 percent of currently married, HIV-positive Ugandan women in the 2004-05 survey reported condom use at last sex. The highest levels of condom use are in Lesotho and Swaziland, where about one-third of women used a condom at last sex.

Among HIV-positive men (Table 13), in Kenya and Tanzania cross-country comparisons are difficult for condom use at last sex due to the limited number of cases for some groups. In most of the other countries with sufficient data for comparison, the patterns are similar to those for women. There is a general positive association between education and urban residence and condom use. Currently married men are less likely than other men to use a condom at last sex, ranging from 8 percent in Uganda to 44 percent in Lesotho.

In several countries comparisons are hard to make for unemployed men, as the number of cases is too small. All the same, unlike the case of women, in countries with sufficient data unemployed HIV-positive men who had sex in the last 12 months reported high levels of condom use at last sex, up to 44 percent in Zimbabwe, and higher than the other two employment groups. With regard to wealth status, in almost all countries the percentage of men who used a condom at last sex is largest in the richest two quintiles. Comparisons by wealth status are not possible in Kenya, however, due to data constraints.

4.3 Results of Multivariate Analysis

Multiple regression analysis examines if being currently married is associated with condom use after controlling for other background variables—age, education, urban-rural residence, work status and household wealth status. Separate regressions are run for women and men. The following hypothesis is tested:

Hypothesis: PLHIV who are currently married are less likely to have used a condom at last sex in the last 12 months than those who are not currently married.

Table 14 shows the effect of current marital status in comparison to the reference group of never-married or formerly married women and men. The multivariate results agree with the descriptive results presented earlier in the chapter. Among HIV-positive women, the likelihood of condom use at last sex in the last 12 months is significantly smaller among currently married women compared with never-married or formerly married women in all countries. The odds ratios range from 0.1 to 0.4, which means that currently married women have 60 to 90 percent lower odds of using a condom at last sex compared with the reference group. As for men, the negative relationship between currently married status and condom use is also statistically significant in all countries, with odds ratios ranging from 0.1 to 0.6. The strongest association is found in Tanzania, Uganda and Zimbabwe, where currently married men have 90 percent lower odds of using a condom at last sex than the control group of men who are not currently married.

Table 14. Results of logistic regression on using a condom at last sex in the last 12 months

Country	Women			Men		
	Currently married		Total number of women	Currently married		Total number of men
	Odds ratio	95% CI		Odds ratio	95% CI	
Kenya	0.1***	0.0 - 0.1	459	0.2***	0.1 - 0.4	235
Lesotho	0.3***	0.2 - 0.4	1,491	0.5***	0.3 - 0.8	756
Malawi	0.2***	0.1 - 0.3	998	0.2***	0.1 - 0.4	656
Swaziland	0.4***	0.3 - 0.5	1,171	0.3***	0.2 - 0.5	634
Tanzania	0.2***	0.1 - 0.3	677	0.1***	0.1 - 0.3	408
Uganda	0.2***	0.1 - 0.3	486	0.1***	0.1 - 0.3	305
Zambia	0.3***	0.2 - 0.5	722	0.6**	0.3 - 1.0	518
Zimbabwe	0.2***	0.1 - 0.2	2,119	0.1***	0.1 - 0.2	1,260

***p<0.01 **p<0.05

Reference group is not currently married (never married or formerly married)

Variables that are controlled in the regression are: age, urban/rural residence, marital status, occupation, and wealth quintile.

For countries with two surveys available, the survey variable is also included in the regression

5 Prior HIV Testing Experience

The DHS and AIS collect information on respondents' HIV testing experience prior to the survey, including whether they received their test results. This chapter examines patterns of HIV testing experience among men and women who were identified to be HIV-positive during the survey and who ever had sex. The key indicators examined include whether persons who tested HIV-positive during the DHS ever tested for HIV before, ever tested and received results, tested for HIV in the past 12 months, and tested and received results in the past 12 months.

5.1 Prior HIV Testing among People Living with HIV

Table 15 shows that prior HIV testing is quite common in all countries except Uganda (26 percent), where the data are based on the 2004-05 survey. In four countries (Kenya, Lesotho, Malawi and Zimbabwe), at least three-fourths of HIV-positive women had previously tested, and more than 70 percent had tested and received results.

In terms of testing experience among HIV-positive women in the last 12 months, the range of testing and receipt of results is from 8 percent in Uganda to 43 percent in Lesotho. For survey implementation reasons, Malawi does not have data on testing in the last 12 months in the most recent survey. In most other countries, most people who tested for HIV in the 12 months before the survey also received results.

In all countries, fewer men than women had ever tested for HIV. This gender difference is at least 15 percentage points in most countries except in Tanzania and Uganda, which have the lowest percentages of testing for HIV among the eight countries. The results for Uganda (2004-05), however, are comparable to other countries with data from the same period. As with women, almost all men who previously tested for HIV also received results and were aware of their HIV status. In Kenya, Lesotho, Swaziland, Tanzania and Zimbabwe, more than half of the men who had ever tested for HIV were tested in the last 12 months.

Comparing the most recent data, prior HIV testing is lowest in Uganda among men and women. However, other countries with data from around 2004-05 (Tanzania, Kenya, Malawi and Lesotho) show lower percentages of prior testing than Uganda. In Uganda, almost all of those who tested for HIV received results. However, a much smaller percentage of people (10 percent among women and 5 percent among men) tested for HIV in the last 12 months. Even fewer (8 percent among men and 4 percent among women) received test results.

Table 15. Among HIV-positive women and men age 15-49 who have ever had sex, percentage who had tested for HIV and received results

	Kenya		Lesotho		Malawi		Swaziland		Tanzania		Uganda		Zambia		Zimbabwe	
	2003	2008-09	2004	2009	2004	2010	2006-07	2003-04	2007-08	2004-05	2007	2005-06	2010-11			
Women																
Ever tested for HIV	21.0	78.5	21.0	75.3	17.5	83.6	51.7	23.8	48.0	25.9	51.8	31.0	74.8			
Ever tested and received results	18.4	74.7	17.2	71.7	13.9	82.0	45.0	21.7	44.1	23.7	46.0	26.9	72.2			
Tested for HIV in the last 12 months	7.8	41.2	10.3	44.1	8.6	NA*	30.0	8.4	26.5	9.6	27.2	9.1	37.3			
Tested and received results in the last 12 months	5.9	38.5	8.9	42.5	8.1	NA*	27.5	7.6	23.9	8.4	23.8	8.3	35.8			
Total number of women	266	283	763	954	351	894	1,337	432	533	691	859	1,413	1,251			
Men																
Ever tested for HIV	25.9	62.6	18.2	57.8	21.7	65.3	33.4	23.6	38.6	17.1	32.0	22.6	57.0			
Ever tested and received results	23.6	59.8	16.7	53.1	19.8	64.1	29.7	21.5	32.3	15.1	29.2	19.9	53.7			
Tested for HIV in the last 12 months	12.5	38.1	9.5	39.2	13.2	31.7	19.1	13.3	26.8	4.7	14.7	8.8	30.4			
Tested and received results in the last 12 months	10.9	36.2	8.6	36.3	12.0	30.8	17.2	12.0	22.0	4.3	13.2	7.9	28.8			
Total number of men	126	128	363	479	247	514	716	293	298	374	579	808	713			

NA=data not available

*Due to a problem with the 2010 Malawi DHS Woman's Questionnaire, data on time since the last HIV test are not available for some women for whom such information should have been collected

5.2 Prior HIV Testing by Background Characteristics

The study also examined prior HIV testing and receipt of results in the last 12 months according to selected background characteristics of respondents and to two other factors: having multiple partners and receiving care for STIs. Table 16 presents results for women and Table 17, for men.

Although no clear pattern among women by age is evident in most countries, only in Zambia is prior testing and receipt of results in the last 12 months somewhat uniform across all age groups.

In most countries, education and urban residence are positively associated with the percentage of women who tested for HIV and received results in the last 12 months. The exception is Lesotho, where women with primary or no education have a higher percentage of testing and receipt of results. In all countries except Kenya and Swaziland, the positive association is stronger in urban areas. While the urban-rural difference is minimal in Swaziland, it is more substantial in Kenya, with a 9 percentage point difference. The association between prior HIV testing and marital status is not consistent across countries. In some countries a larger percentage of currently married women had tested for HIV and received results than those never-married or formerly married women. Some countries have the opposite association, while generally the difference is quite small. There is no clear linear relationship by wealth status.

The number of women who tested positive for HIV and had multiple partnerships is small. Therefore data are not reliable for this group except in Lesotho, Swaziland, Uganda and Zimbabwe. In three of these four countries, a smaller percentage of HIV-positive women who had multiple partners tested for HIV and received results in the last 12 months compared with women who had only one sex partner. Among women who reported multiple partners, in Lesotho as many as 39 percent tested and received results in the last 12 months. The lowest percentage is in Uganda, at 12 percent in 2004-05, followed by Swaziland, at 20 percent in 2006-07.

Table 16. Among HIV-positive women age 15-49 who have ever had sex, percentage who had tested for HIV and received results in the last 12 months by selected characteristics

Characteristic	Kenya		Lesotho		Malawi		Swaziland		Tanzania		Uganda		Zambia		Zimbabwe	
	2003	2008-09	2004	2009	2004	2010	2006-07	2003-04	2007-08	2004-05	2007	2005-06	2010-11			
Age groups																
15-24	9.4	44.2	7.5	40.6	8.6	NA	27.2	6.0	19.0	6.7	27.2	12.8	41.4			
25-29	7.7	43.8	8.5	38.2	6.7	NA	30.8	13.2	34.4	6.5	24.8	6.2	41.6			
30-34	6.2	41.4	12.0	36.6	14.2	NA	31.1	4.9	25.1	8.2	21.6	7.1	40.7			
35-39	0.0	31.3	7.3	45.4	6.7	NA	23.0	4.5	17.3	9.8	22.1	9.2	28.1			
40-49	1.4	29.5	9.3	51.6	3.4	NA	21.9	8.9	22.4	12.0	23.7	6.1	27.8			
Education																
None or primary	5.7	36.4	8.9	43.0	7.7	NA	25.2	6.5	22.7	7.6	21.2	5.2	32.7			
Secondary or higher	6.3	43.7	8.9	41.8	10.3	NA	29.5	17.5	40.3	11.6	27.7	10.3	37.6			
Residence																
Urban	3.0	32.2	11.7	42.6	11.0	NA	26.6	13.1	24.3	10.1	26.1	9.3	36.8			
Rural	7.4	41.4	7.6	42.4	7.4	NA	27.9	2.6	23.7	7.8	20.3	7.6	35.3			
Marital status																
Never or formerly married	5.0	38.2	8.9	43.4	7.7	NA	26.7	7.8	26.8	10.7	22.7	8.0	32.7			
Currently married	6.6	38.9	8.9	41.7	8.2	NA	28.6	7.5	22.0	6.1	24.7	8.5	38.0			
Work status																
Unemployed	4.8	36.4	6.2	43.7	9.4	NA	27.7	8.9	35.6	9.7	26.4	8.6	35.3			
Agriculture	5.2	42.8	6.9	40.7	7.3	NA	26.2	3.0	18.1	5.2	20.5	8.2	29.0			
Non-agriculture	7.0	37.7	12.3	41.7	7.6	NA	27.5	12.3	27.5	10.5	22.6	7.7	38.5			
Wealth quintile																
Lowest	*	46.7	8.2	38.3	13.6	NA	24.1	0.0	23.2	4.9	23.1	6.8	35.8			
Second	13.1	42.3	3.8	44.0	5.0	NA	25.8	1.5	17.4	6.7	19.5	6.6	40.0			
Middle	9.5	46.5	9.7	39.8	3.6	NA	32.3	2.6	22.0	6.0	19.7	7.0	31.9			
Fourth	6.5	35.4	7.1	44.3	6.5	NA	29.3	7.0	25.0	9.4	23.5	9.8	34.8			
Highest	1.4	31.6	13.2	43.2	12.2	NA	25.3	13.2	27.9	10.9	27.4	9.9	37.9			
Had multiple partnerships																
No	6.6	41.1	10.0	41.6	8.3	NA	28.1	8.6	22.2	7.5	24.4	7.5	37.1			
Yes	*	*	10.4	39.0	*	NA	20.1	10.3	*	12.2	*	21.2	27.7			
Received STI care																
No	6.0	38.0	8.5	42.1	7.2	NA	26.2	7.2	23.3	6.4	23.6	6.9	35.0			
Yes	*	43.7	11.0	44.4	18.2	NA	35.4	12.6	*	12.3	26.8	17.1	41.9			

Note: An asterisk indicates that a percentage is based on fewer than 25 unweighted cases and has been suppressed

Among men in most countries, education and urban residence are positively associated with the percentage who tested for HIV and received results in the last 12 months. Moreover, there are substantial increases over time in HIV testing and receipt of results among men across all education levels and in both urban and rural areas (table 17). Exceptions are Swaziland, where the percentage of HIV testing and receipt of results is comparable among men in urban and rural areas, and Tanzania, Zambia and Zimbabwe, where the percentages are higher among men in rural areas than in urban areas.

Unlike the case of women, men who are currently married are more likely than unmarried men to have tested for HIV and received results in the last 12 months, especially in Kenya, Lesotho, Swaziland and Zimbabwe, where more than 30 percent of married men tested and received results.

Patterns based on employment status are mixed. In Lesotho, Swaziland, Uganda and Zimbabwe the highest percentages are among men employed in the non-agricultural sector. But in Kenya, Malawi, Tanzania and Zambia HIV testing and receipt of results is higher among men employed in the agricultural sector than in the non-agricultural sectors. Due to small sample sizes, in Kenya, Malawi, Tanzania and Uganda it is not possible to compare unemployed men with those who are employed.

There is no clear relationship between HIV testing and receipt of results and wealth status or number of partnerships among HIV-positive men. Any differences observed are within 3-4 percentage points. Furthermore, unlike the case of women, where in a couple of countries HIV testing and receipt of results is as high as 40 percent among women who did not have multiple partners, the percentages are lower among men, highest in Kenya at 34 percent. In contrast, among men there is a clear association between HIV testing and STI care. Especially in Lesotho (2009) and Malawi (2010), the difference in testing and receipt of results between those who received STI care and those who did not is over 10 percentage points.

Table 17. Among HIV-positive men age 15-49 who have ever had sex, percentage who had tested for HIV and received results in the last 12 months by selected characteristics

Characteristic	Kenya		Lesotho		Malawi		Swaziland		Tanzania		Uganda		Zambia		Zimbabwe	
	2003	2008-09	2004	2009	2004	2010	2006-07	2003-04	2007-08	2004-05	2007	2005-06	2010-11			
Age groups																
15-24	*	*	0.0	34.7	*	28.1	11.5	9.4	*	2.1	12.5	7.7	15.3			
25-29	5.3	*	6.6	28.5	14.3	31.2	16.7	17.5	10.9	0.0	14.8	8.7	29.1			
30-34	*	31.8	14.4	38.8	12.4	23.2	15.4	11.8	15.4	8.2	13.4	6.4	26.4			
35-39	*	24.7	9.0	30.1	6.9	36.2	18.3	9.5	21.6	5.0	12.8	8.3	32.8			
40-49	10.4	38.9	8.1	43.7	11.9	31.2	21.8	11.5	35.5	3.6	12.5	8.7	30.0			
Education																
None or primary	12.1	35.4	8.8	34.1	10.5	31.1	16.3	11.0	22.1	3.9	12.7	2.5	19.8			
Secondary or higher	9.4	37.6	8.1	40.5	14.8	30.2	17.8	19.2	*	4.4	13.5	10.2	32.0			
Residence																
Urban	12.5	35.1	5.3	42.3	16.4	33.4	17.1	13.0	20.2	5.6	12.1	12.8	26.0			
Rural	9.8	36.5	9.6	33.3	10.0	29.7	17.1	11.3	22.8	3.9	14.5	4.3	30.1			
Marital status																
Never or formerly married	11.4	32.7	6.4	32.0	*	25.5	16.0	12.1	14.2	4.4	9.6	9.8	24.3			
Currently married	10.8	37.8	9.7	38.4	11.0	32.0	18.1	12.0	24.9	4.2	14.5	7.3	30.1			
Work status																
Unemployed	*	*	10.3	27.6	*	*	10.6	*	*	*	6.6	3.2	26.2			
Agriculture	1.3	40.3	5.9	33.4	4.7	34.4	16.2	11.2	20.9	4.2	15.9	3.9	24.0			
Non-agriculture	14.2	33.5	8.1	40.6	14.7	28.0	19.4	10.5	17.0	4.3	12.4	10.9	31.6			
Wealth quintile																
Lowest	*	*	8.0	37.9	*	32.8	11.8	6.0	12.2	2.8	22.3	0.6	24.4			
Second	*	20.6	11.1	31.8	*	29.1	20.4	14.8	16.2	2.8	8.2	7.5	24.1			
Middle	*	*	7.1	31.6	15.1	32.7	17.5	13.6	11.0	5.9	16.5	3.5	28.5			
Fourth	*	50.4	6.2	36.3	9.8	33.7	19.3	7.3	33.6	5.7	10.5	8.4	29.8			
Highest	10.4	40.8	12.5	43.5	14.8	28.2	16.0	15.3	28.2	3.4	13.0	15.9	37.1			
Had multiple partnerships																
No	9.2	33.6	9.6	34.8	9.0	30.3	16.8	11.5	24.3	4.6	13.7	7.7	28.6			
Yes	19.6	43.8	6.7	37.6	11.2	30.7	16.0	14.8	16.4	1.8	15.3	5.0	26.2			
Received STI care																
No	12.0	35.4	9.1	34.2	12.2	29.5	16.3	10.7	20.7	3.2	13.1	8.1	28.4			
Yes	*	*	5.3	45.4	*	40.9	20.9	*	*	6.5	13.8	6.2	33.4			

Note: An asterisk indicates that a percentage is based on fewer than 25 unweighted cases and has been suppressed

5.3 Results of Multivariate Analysis

Regression results are presented in Table 18. Two hypotheses are tested:

Hypothesis 1: HIV-positive men and women in multiple partnerships are more likely to have tested for HIV and received results in the last 12 months.

Hypothesis 2: HIV-positive men and women who received STI treatment and care are more likely to have tested for HIV and received results in the last 12 months.

The results do not show evidence of any association between multiple sex partnership and HIV testing and receipt of results in the last 12 months among women in any of the countries, and among men only in Malawi. Men in Malawi who reported multiple partners are 4.3 times as likely as other men to have tested for HIV and received results in the last 12 months. There is a statistically significant positive relationship with STI care only among women, and only in two countries (Swaziland and Zimbabwe). In Zimbabwe the odds of HIV testing in the last 12 months and receiving results for women who received STI care are twice the odds for women who did not receive STI care.

Table 18. Results of logistic regression on being tested and received results in the last 12 months

Country	Women				Men				
	Multiple partnerships		STI treatment		Multiple partnerships		STI treatment		
	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI	
Kenya	1.0	0.3 - 3.1	1.3	0.5 - 3.1	2.3	0.9 - 5.6	0.9	0.2 - 3.8	235
Lesotho	0.9	0.6 - 1.5	1.3	0.8 - 1.9	0.9	0.6 - 1.5	1.4	0.8 - 2.3	756
Malawi *	0.6	0.2 - 1.8	1.5	0.8 - 2.6	4.3***	2.2 - 8.7	1.8	0.9 - 3.7	656
Swaziland	0.6	0.3 - 1.2	1.5**	1.1 - 2.1	0.9	0.5 - 1.6	1.6	0.9 - 2.8	634
Tanzania	1.4	0.5 - 4.0	1.8	0.8 - 4.0	1.0	0.5 - 2.1	2.1	0.8 - 5.6	408
Uganda	1.2	0.4 - 3.8	1.7	0.9 - 3.6	0.5	0.1 - 2.1	2.1	0.6 - 7.3	305
Zambia	1.8	0.6 - 5.5	0.9	0.4 - 2.2	1.2	0.7 - 2.0	0.9	0.4 - 2.2	518
Zimbabwe	1.1	0.5 - 2.4	2.1***	1.4 - 3.2	0.8	0.5 - 1.4	1.2	0.7 - 2.2	1,260

***p<0.01 **p<0.05

Reference group for multiple partnership is no multiple partners; reference group for STI treatment is no treatment received in the last 12 months
Variables that are controlled in the regression are: age, urban/rural residence, marital status, occupation, and wealth quintile.

For countries with two surveys available, the survey variable is also included in the regression

* Due to unavailability of data on HIV testing in the last 12 months in the Malawi 2010 DHS, the regression is solely based on the 2004 DHS data

6 Changes Over Time

This chapter presents the changes over time in HIV-related knowledge, sexual behaviors and prior HIV testing among HIV-positive women and men. The chapter examines data from Kenya, Lesotho, Malawi, Tanzania and Zimbabwe, where two surveys are available for comparison. Significance of the difference between the two surveys in each country is tested at the 5 percent level. Figures 1-10 present results for Kenya, Lesotho, Malawi, Tanzania and Zimbabwe, respectively.

Kenya

In Kenya (figure 1 and 2) comprehensive knowledge about AIDS and knowledge of PMTCT increased among HIV-positive women between 2003 and 2008-09. The percentage of women who know that the HIV virus can transmit through breastfeeding and also are aware of a special drug that prevents PMTCT more than doubled, from 36 percent to 75 percent. HIV-positive men's knowledge of PMTCT also significantly improved, from 37 percent to 65 percent; while the change in men's comprehensive knowledge about AIDS was minimal (from 59 percent to 63 percent).

Among the three sexual behavioral indicators, only condom use at last sex has increased, from 9 percent to 29 percent among women and from 12 percent to 36 percent among men. Among HIV-positive women and men, the percentage with multiple sex partnerships in the last 12 months and the percentage who had sex with non-spousal, non-cohabiting partners decreased slightly, but the changes are not significant at the 5 percent level. Both the 2003 and 2008-09 surveys indicate that few HIV-positive women had multiple partners in the last 12 months. In contrast, in both surveys about one in every five HIV-positive men reported having multiple partners in the last 12 months. In both 2003 and 2008-09, about 30 percent of women and men reported having higher-risk sex in the last 12 months before the surveys.

Testing coverage significantly increased between 2003 and 2008-09, by 56 percentage points among women and 36 percentage points among men. As for the recent testing experience, only 6 percent of women and 11 percent of men in 2003 reported having tested and received results in the past 12 months, rising to 39 percent among women and 36 percent among men in 2008-09.

Figure 1. Changes over time in percentages of HIV-positive women who have HIV-related knowledge, behaviors and prior testing, Kenya

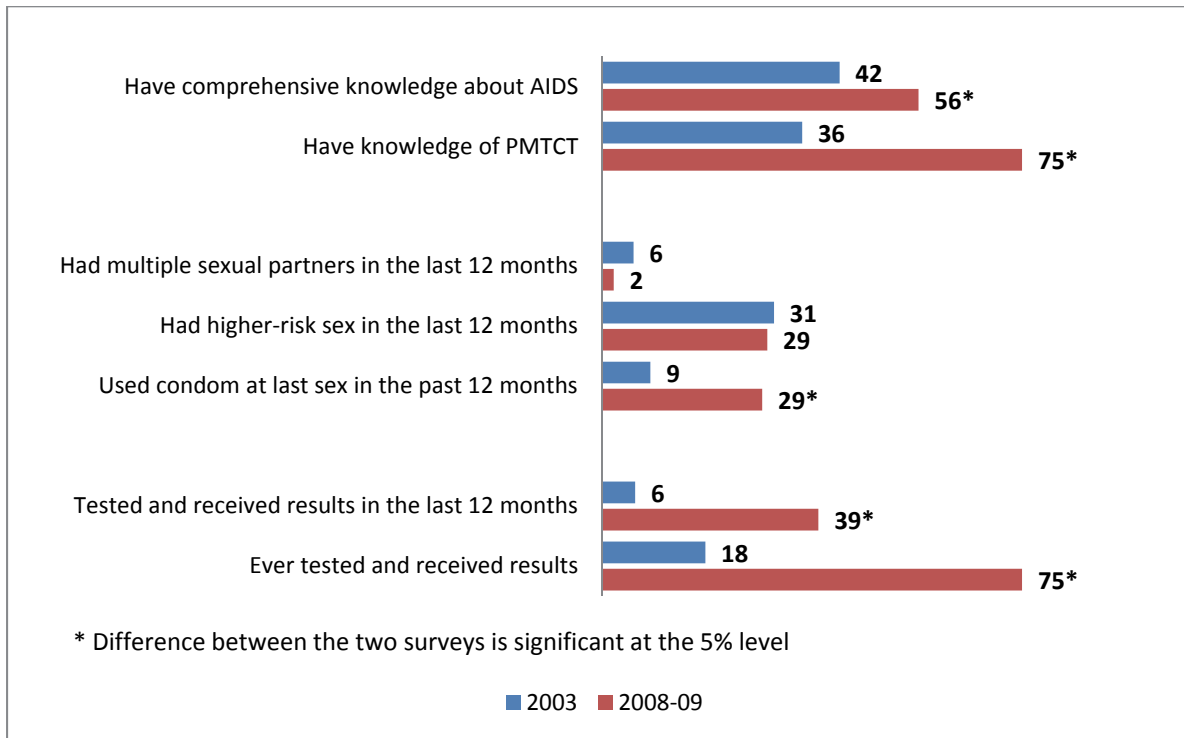
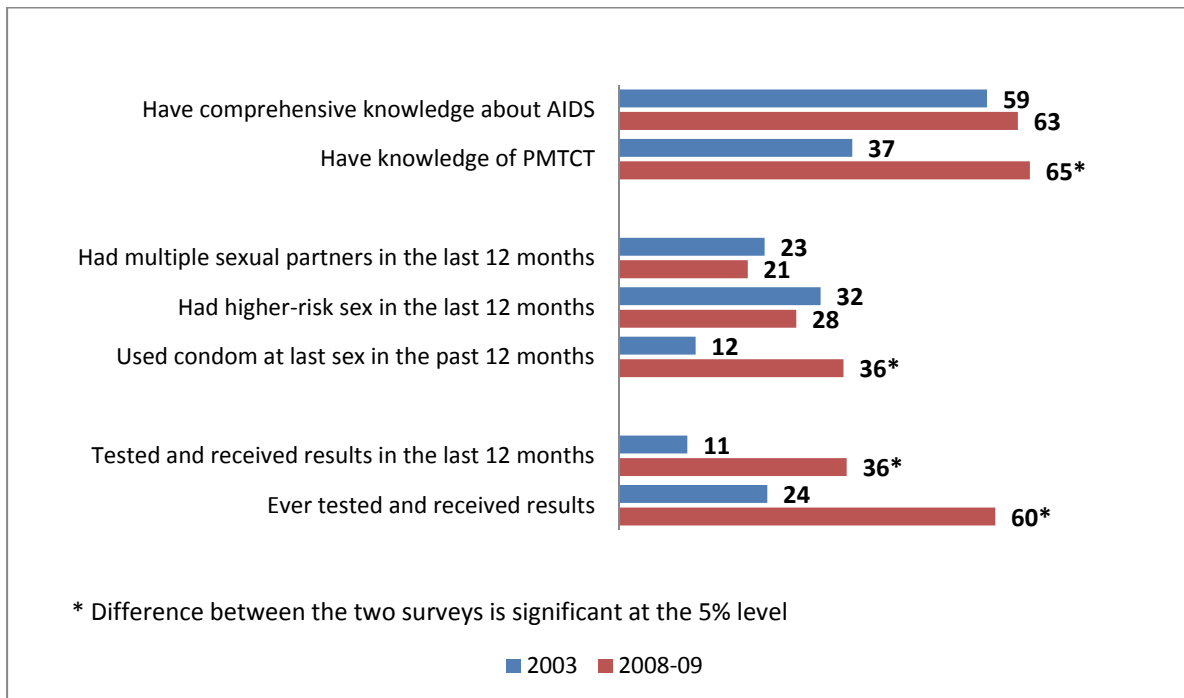


Figure 2. Changes over time in percentages of HIV-positive men who have HIV-related knowledge, behaviors and prior testing, Kenya



Lesotho

In Lesotho (figure 3 and 4), as in Kenya, the level of HIV-related knowledge among HIV-positive men and women significantly improved between 2004 and 2009. The proportion with knowledge of PMTCT increased from 36 percent to 75 percent among HIV-positive women and from 37 percent to 65 percent among HIV-positive men. The level of comprehensive knowledge about AIDS also increased substantially between 2004 and 2009 but remains much lower than knowledge of PMTCT.

There is little difference between the two surveys in the proportion of HIV-positive men and women having multiple sexual partners and higher-risk sex in the last 12 months. In 2009, 55 percent of HIV-positive men and 46 percent of women reported having higher-risk sex in the last 12 months, about the same levels as in 2004. Condom use at last sex doubled over the five-year period, with almost half of respondents in 2009 reporting condom use at last sex.

Both HIV testing coverage and recent testing uptake improved substantially in Lesotho between 2004 and 2009, particularly among women. In 2009, more than 70 percent of HIV-positive women had tested for HIV and received results, and more than half in the last 12 months. In 2004, 9 percent of men reported HIV testing in the 12 months before the survey, rising to 36 percent in the 2009 DHS.

Figure 3. Changes over time in percentages of HIV-positive women who have HIV-related knowledge, behaviors and prior testing, Lesotho

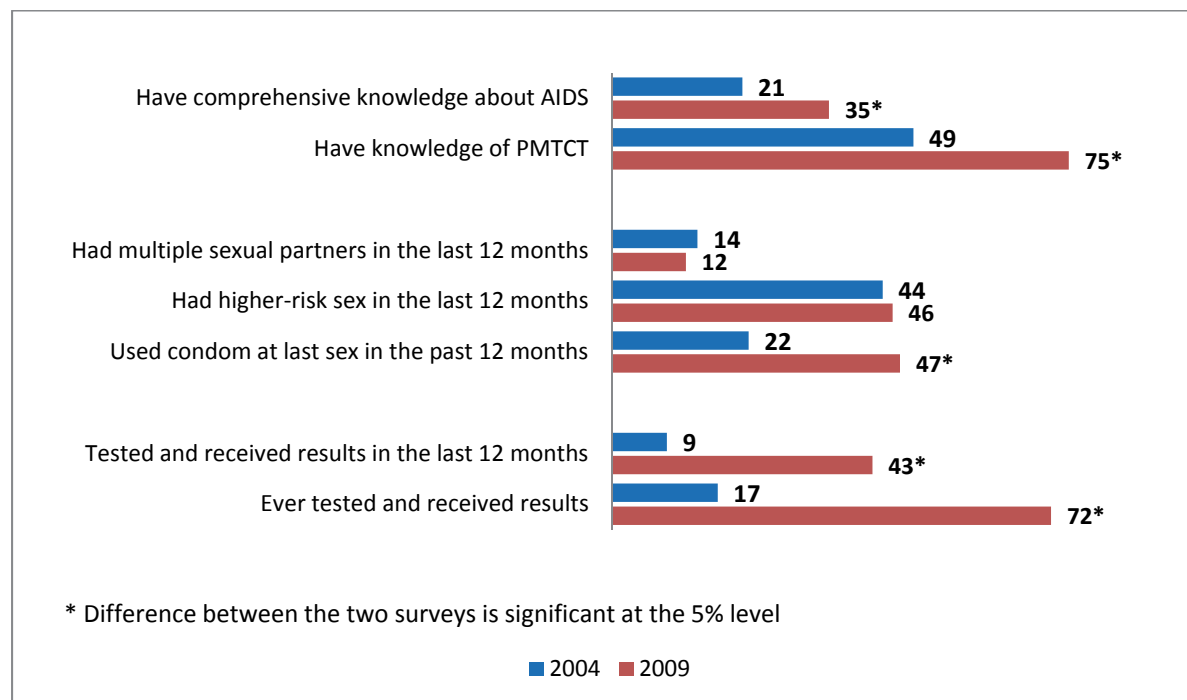
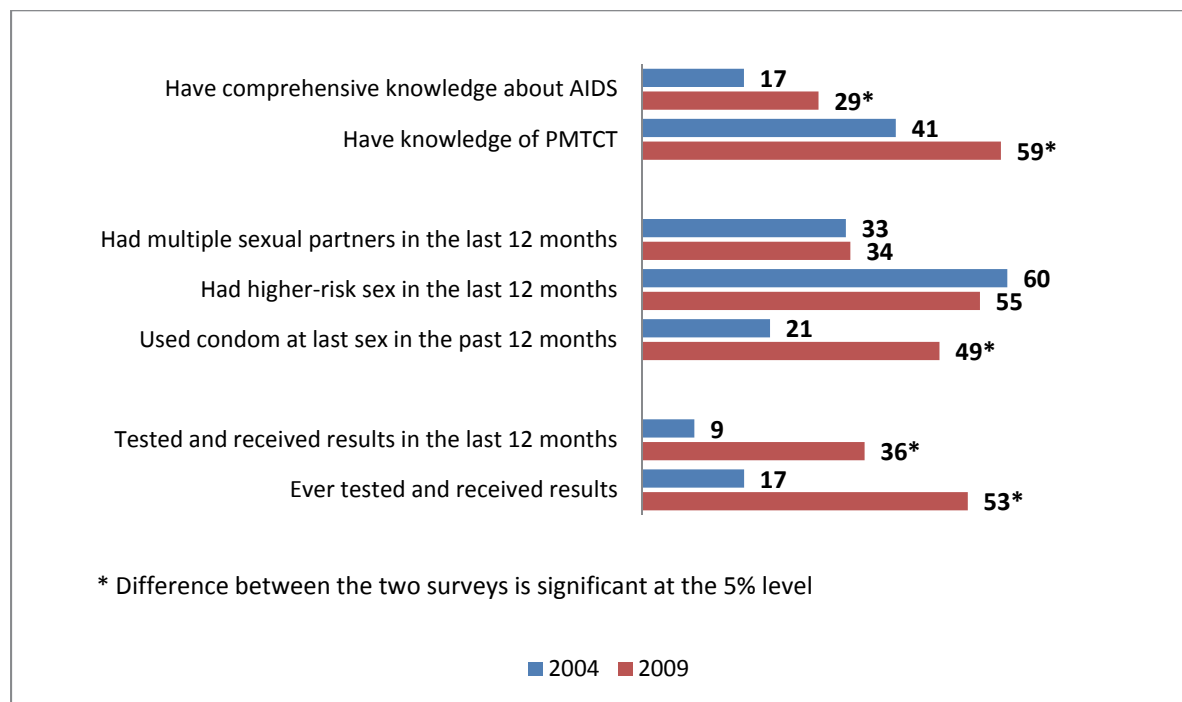


Figure 4. Changes over time in percentages of HIV-positive men who have HIV-related knowledge, behaviors and prior testing, Lesotho



Malawi

Data from Malawi (figure 5 and 6) show substantial improvement in the level of knowledge about HIV/AIDS between 2004 and 2010. In the 2010 survey, more than 90 percent of HIV-positive women and 80 percent of HIV-positive men know that HIV can be transmitted through breastfeeding and are aware of one drug for PMTCT. Compared with 2004, the increase is 47 percentage points among women and 40 percentage points among men.

Similar to Kenya and Lesotho, behavioral change related to sexual risk-taking was negligible between the 2004 and 2010 surveys, except for condom use. Condom use at last sex more than doubled, but in 2010, just 22 percent of women and 28 percent of men reported condom use at last sex. The level of involvement in multiple partnerships and higher-risk sex is relatively lower in Malawi than in the other two countries, for both men and women.

HIV test coverage rose between 2004 and 2010 in Malawi. In 2010, 82 percent of HIV-positive women and 64 of men reported previously testing for HIV and receiving results, 68 percentage points higher among women and 44 percentage points higher among men compared with 2004. The proportion of men who tested and received results in the last 12 months increased from 12 percent in 2004 to 31 percent in 2010. (Comparable data for women are not available in the 2010 DHS.)

Figure 5. Changes over time in percentages of HIV-positive women who have HIV-related knowledge, behaviors and prior testing, Malawi

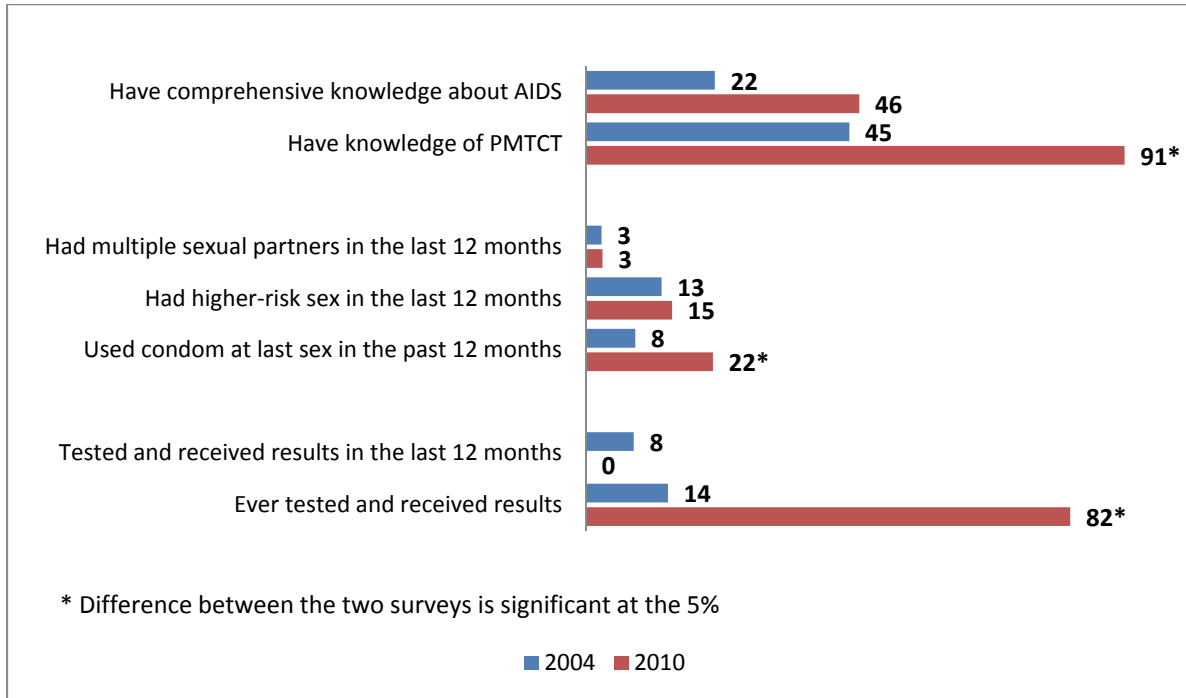
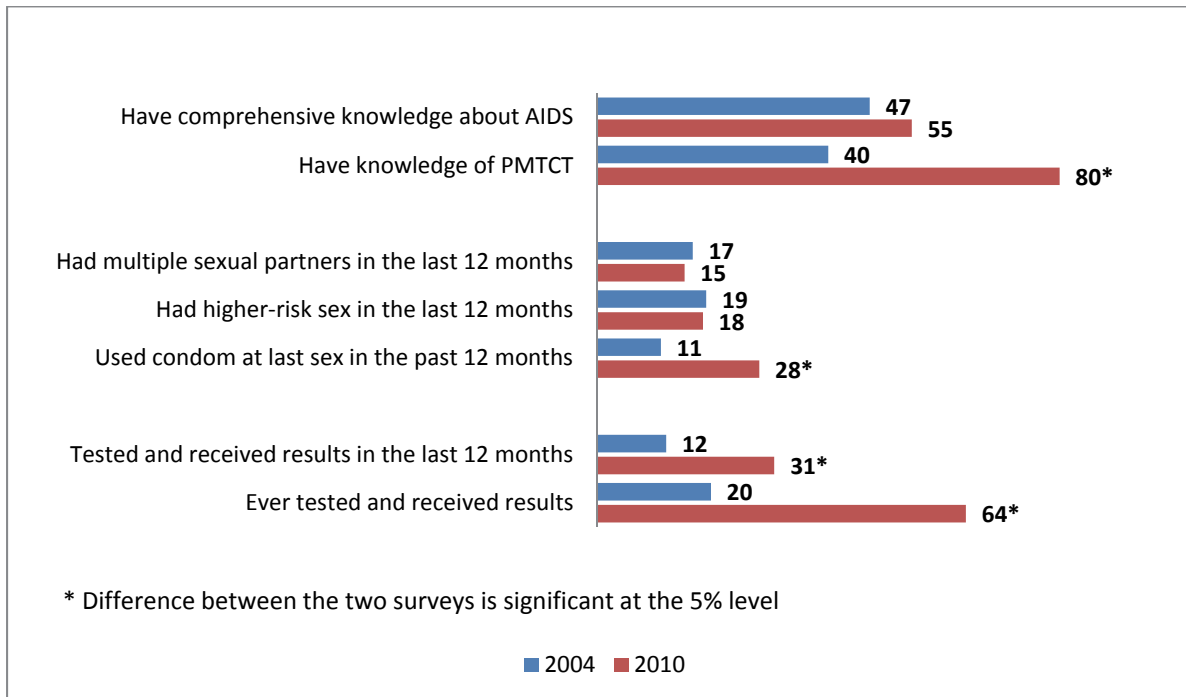


Figure 6. Changes over time in percentages of HIV-positive men who have HIV-related knowledge, behaviors and prior testing, Malawi



Tanzania

In Tanzania (figure 7 and 8), there was a significant increase in the level of knowledge of PMTCT between surveys in 2003-04 and 2007-08. In 2007-08, 64 percent of HIV-positive women and 42 percent of men had knowledge of PMTCT compared with 21 of women and 19 percent of men in the earlier survey. The change in level of comprehensive knowledge about AIDS was minimal between surveys; about half of men had comprehensive knowledge and just over 40 percent of women.

As in Kenya, Lesotho and Malawi, changes in the percentages of people with multiple sexual partners and higher-risk sex in the last 12 months are not significant between the two sets of surveys. Tanzania's pattern is different compared with the previous three countries, however, in that condom use at last sex remained similar between the two surveys, at around 20 percent of HIV-positive women, below the levels reported in the most recent surveys in Kenya, Lesotho and Malawi.

HIV testing uptake increased in Tanzania between surveys. The percentage of people in Tanzania who were tested in the last 12 months before the survey increased to a greater extent among women (16 percentage points) than men (10 percentage points).

Figure 7. Changes over time in percentages of HIV-positive women who have HIV-related knowledge, behaviors and prior testing, Tanzania

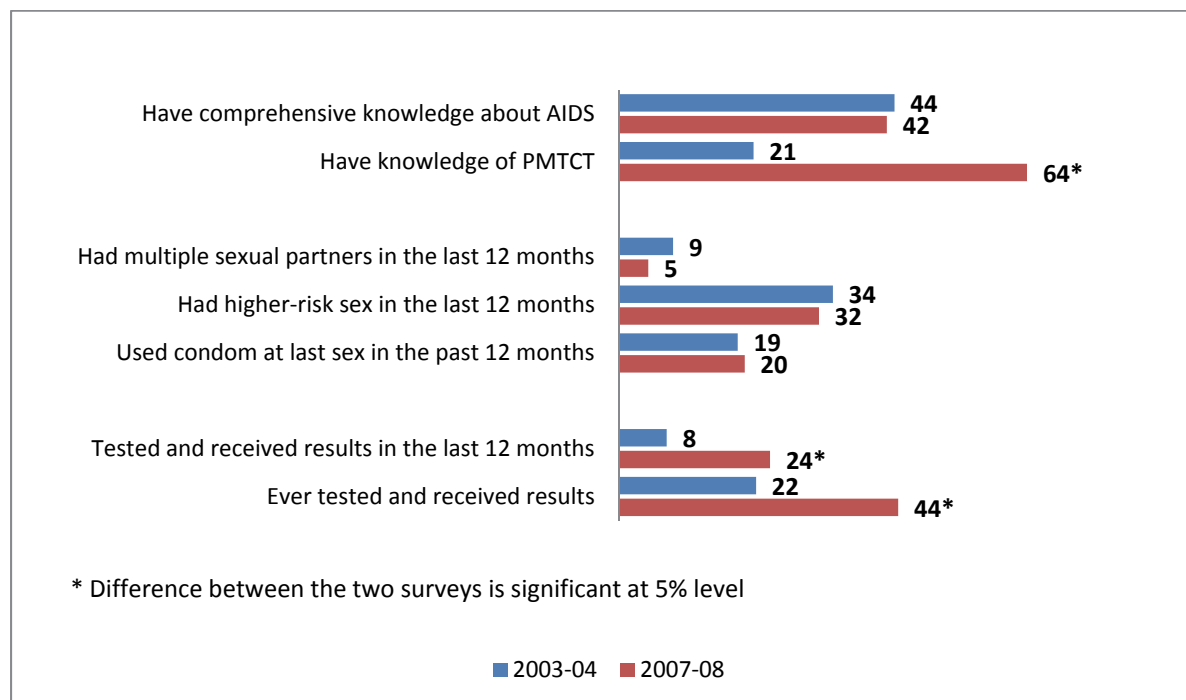
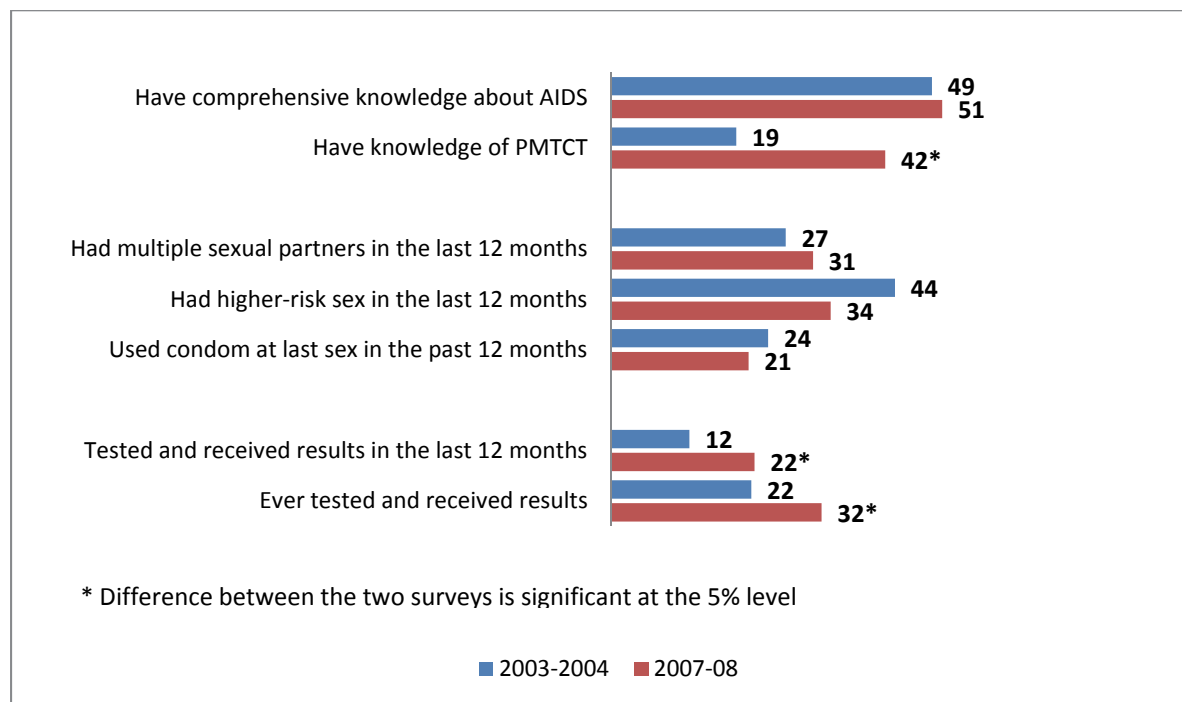


Figure 8. Changes over time in percentages of HIV-positive men who have HIV-related knowledge, behaviors and prior testing, Tanzania



Zimbabwe

In Zimbabwe (figure 9 and 10), both comprehensive knowledge about AIDS and knowledge of PMTCT improved significantly between the 2005-06 DHS and the 2010-11 DHS. Similar to the other four countries with two surveys, knowledge of PMTCT improved more than comprehensive knowledge about AIDS. Comprehensive knowledge about HIV/AIDS increased 13 percentage points more among Zimbabwean men between surveys compared with men in the other countries.

The prevalence of multiple sexual partnerships and higher-risk sex remained similar between the two surveys. Together with Malawi, Zimbabwe has the lowest proportion of men (15 percent) who reported multiple sex partnership in the 12 months before the most recent surveys. Condom use at last sex significantly increased from 14 percent in 2005-06 to 32 percent in 2010-11 among women and from 20 percent to 34 percent among men.

The proportion of HIV-positive people who previously tested for HIV and received results increased substantially in Zimbabwe between the 2005-06 and the 2010-2011 surveys, by 45 percentage points for women and 34 percentage points for men. While less than 10 percent of respondents reported being tested in the 12 months before the 2005-2006 DHS, the figure rose to 36 percent among women and 29 percent among men in the 2010-11 DHS.

Figure 9. Changes over time in percentages of HIV-positive women who have HIV-related knowledge, behaviors and prior testing, Zimbabwe

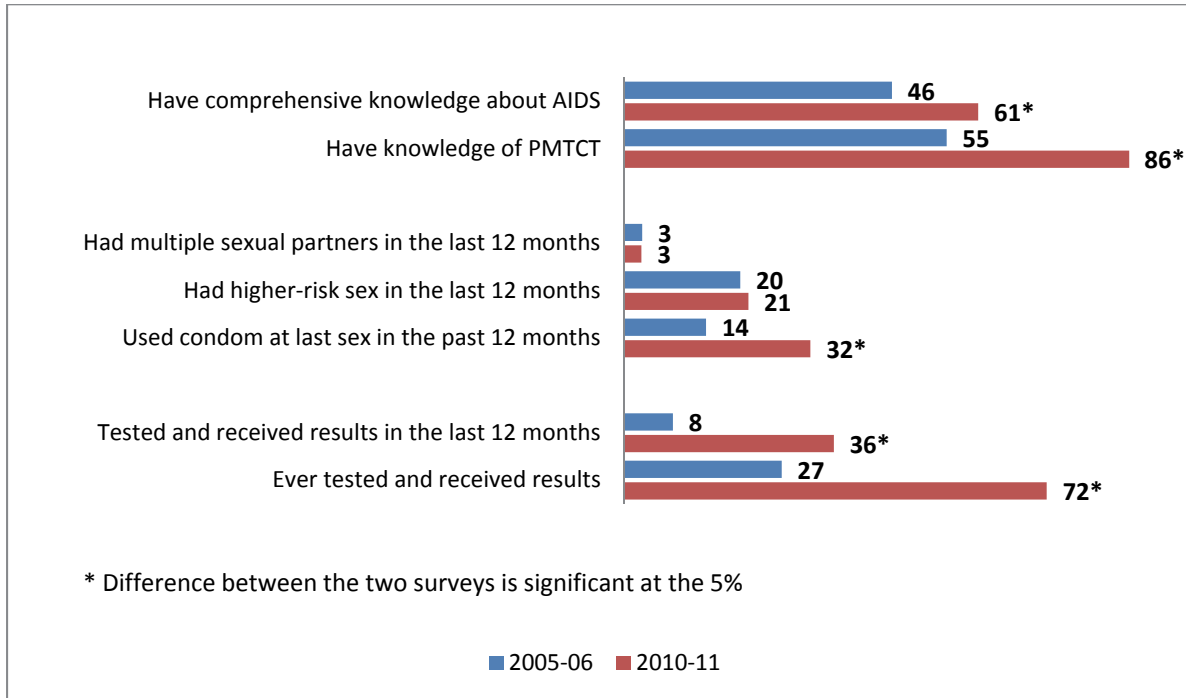
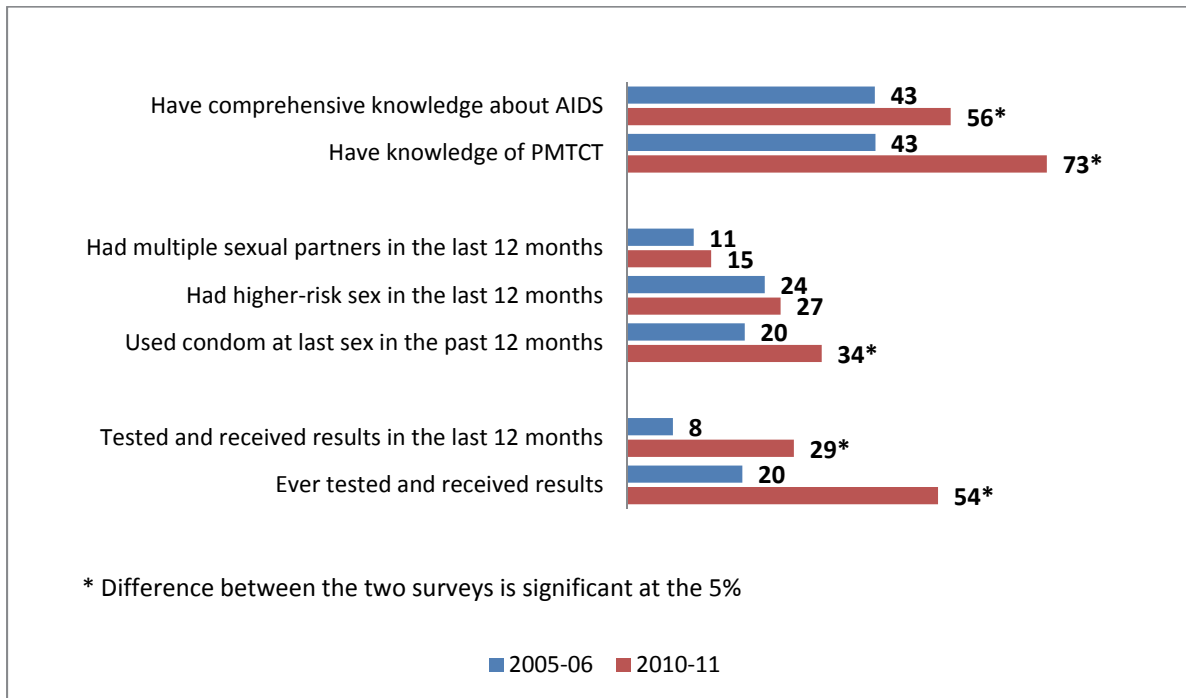


Figure 10. Changes over time in percentages of HIV-positive men who have HIV-related knowledge, behaviors and prior testing, Zimbabwe



7 Summary and Discussion

Using data from the DHS and AIS in eight high HIV prevalence African countries between 2003 and 2011, this study contributes to an understanding of HIV-related knowledge, sexual risk behaviors and previous HIV testing uptake among HIV-positive people. Although the study refers to PLHIV, it is important to note that not all these individuals were aware of their HIV status as survey respondents are not provided with testing results. The findings from this analysis are expected to inform policies and programs in sub-Saharan Africa to develop comprehensive HIV prevention strategies that include prevention with PLHIV.

7.1 Knowledge about HIV/AIDS

Among the three areas of HIV/AIDS knowledge—comprehensive knowledge about AIDS, knowledge of PMTCT and knowledge of prevention methods—the largest percentage of HIV-positive men and women are aware of prevention methods. Among the three prevention methods, PLHIV in all countries seem to have better knowledge of abstinence and being faithful than of using condoms as ways to prevent HIV infection. Comprehensive knowledge about AIDS is by far the lowest of the three types of HIV/AIDS knowledge in almost all countries, including Swaziland and Lesotho, which have the highest HIV prevalence rates in sub-Saharan Africa.

A greater percentage of HIV-positive men than women have comprehensive knowledge about AIDS. Knowledge of PMTCT is generally greater among women than among men. Fewer men and women are aware of a special drug to prevent PMTCT than know that HIV can be transmitted through breastfeeding.

There has been significant improvement in comprehensive knowledge about AIDS in Kenya, Malawi, Lesotho and Zimbabwe, with a greater increase among HIV-positive women than men. The increase in knowledge of PMTCT is even more remarkable for both women and men and has occurred in all five countries with more than one survey. The proportion of PLHIV who have knowledge of PMTCT doubled between the two surveys in Kenya (women only), Malawi (women and men) and Tanzania (women and men).

Despite the high level of knowledge on HIV prevention methods in all countries, in all countries only small percentages of PLHIV have comprehensive knowledge about AIDS, which is particularly worrisome for countries with high HIV prevalence, for example, Lesotho and Swaziland. However, it is encouraging that comprehensive knowledge has increased in most of the countries where trend data are available. This improvement could be the result of program efforts to disseminate necessary and accurate knowledge on HIV prevention and transmission. Research based on the general population has shown significant improvement in comprehensive knowledge about AIDS, for example, from 9 percent in 1993 to 54 percent in 2008-09 among young men in Kenya (Ochako, Ulwodi et al. 2011).

The significant increase in knowledge of PMTCT in all five countries studied here may be attributed to the global effort in scaling up PMTCT service towards universal coverage. In sub-Saharan Africa, 31 countries in 2009 reported a national plan for scaling up PMTCT coverage with population-based targets (UNAIDS 2010). Nevertheless, continued efforts are still needed to sustain the knowledge level, especially in countries with high HIV prevalence.

Overall, there is a strong association between higher education and comprehensive knowledge about AIDS among HIV-positive men and women. The odds of having comprehensive knowledge about AIDS are as high as 3.2 times for women and 4.0 times for men with secondary education compared with less educated women and men. Women's education is also positively associated with their knowledge of

PMTCT in most countries. After controlling for other background variables, however, education does not seem to play a significant role for men's knowledge of PMTCT.

The finding of the positive impact of education on HIV knowledge is consistent with previous studies based on the general population. A study using data from four DHS surveys in Kenya found that the level of schooling plays a significant role for young urban women's comprehensive knowledge about AIDS (Ochako, Ulwodi et al. 2011). The sample distribution presented earlier in the second chapter of this report shows that most PLHIV are educated below the secondary level. While it is important to improve the education level of the population, it is going to be a long-term effort. In the short term, our findings underscore the need to focus on men and women who have little formal education to increase their knowledge of HIV prevention and transmission and knowledge on PMTCT.

Prior HIV testing has a positive relationship with comprehensive knowledge about AIDS in only around half the countries studied, for both men and women. For knowledge of PMTCT, a positive association is observed among HIV-positive women in most countries studied and among men in some of the countries. Although it is impossible to determine the direction of the association due to the cross-sectional nature of the DHS data, this finding is promising for HIV prevention regardless of the direction of causality, whether HIV testing leads to better knowledge of HIV/AIDS or better knowledge results in HIV testing uptake. It is particularly encouraging to see that in almost all of the countries examined women's knowledge of PMTCT is significantly associated with prior HIV testing. Because of widespread government and donor efforts toward universal access to PMTCT service, which includes HIV testing and counseling during pregnancy, women likely obtained their PMTCT knowledge through prenatal HIV testing and counseling. For countries where the association is not significant, small sample size could be a reason.

7.2 Sexual Risk Behaviors

In all countries studied, a greater percentage of HIV-positive men than women had multiple sexual partners. While this percentage for women was below 10 percent in seven of the eight countries, for men it ranged from 14 percent to 34 percent. In all eight countries, higher-risk sex is more common than multiple partnerships. More men than women reported higher-risk sex in the past 12 months. It is possible that under-reporting could have contributed to the lower percentage among women.

In all countries, a larger percentage of men than women used a condom at last sex. Even so, in four countries (Malawi, Tanzania, Uganda and Zambia) more than 75 percent of men reported having unprotected last sex. The highest levels of condom use for both women and men were in Lesotho and Swaziland, where HIV prevalence rates are 26 percent and 31 percent, respectively. The percentage of HIV-positive men who reported having commercial sex is quite low, even among men with multiple sex partners.

Over time, prevalence of multiple partners and higher-risk sex has remained about the same in all five countries with two surveys, except for a marginally significant decrease in higher-risk sex among men in Tanzania. However, condom use at the last sex has more than doubled in Kenya, Lesotho, Malawi and Zimbabwe, although it did not increase in Tanzania between the two surveys.

Despite the increasing trend in condom use in most of the countries, a large proportion of PLHIV have unprotected sex, which brings a great risk of transmission to their partners. The transmission risk is even greater if the infected person also has multiple partners. Mathematical modeling shows that concurrent partnership exponentially increases the number of infected individuals and the growth rate of the HIV/AIDS epidemic (Morris and Kretzschmar 1997).

Being married or in a cohabitating relationship is significantly associated with less condom use for both women and men. A study based on the Kenya 2003 DHS and the Malawi 2004-05 DHS had a similar finding (Anand, Shiraishi et al. 2009). In the same study, researchers also found that half of the married or cohabiting HIV-infected people in Kenya and more than 40 percent in Malawi had HIV-negative spouses. The lack of condom use within marriage is not unique to PLHIV. Several studies in different cultural settings have found that people are less likely to use condoms with their spousal partners than with non-spousal partners (Macaluso, Demand et al. 2000; Chatterjee, Hosain et al. 2006; Lescano, Vazquez et al. 2006).

For married couples, condom use is more likely to serve as protection from pregnancy instead of protection from HIV/STI infections. If they are already using other contraceptive methods, married couples tend not to use condoms. Research has shown that women view non-use of condoms as a symbol of trust in sex partners, faith in their partner's monogamy, and commitment to the relationship (Sobo 1995; Sherman and Latkin 2001).

Lack of condom use among HIV-discordant couples (one partner HIV-positive, the other HIV-negative) is a serious problem because it exposes the HIV-negative partner to a high risk of HIV infection. A study based on data from 12 sites in Southern and Eastern Africa indicates that about half of couples with one HIV-positive partner were HIV-discordant (Lingappa, Lambdin et al. 2008). Research in Rwanda and Zambia has shown that the majority of new heterosexual HIV infections occur within marriage or cohabiting relationships (Dunkle, Stephenson et al. 2008).

In light of couples' needs for both family planning and HIV prevention, integrating family planning services with HIV services—for example, HIV testing and counseling—could be an effective way to increase condom use among HIV-discordant couples. Barrier contraceptive methods can be promoted for the purpose of dual protection from pregnancy and STIs, including HIV. Research has also suggested that intervention programs directed to couples are effective in changing risky behaviors and reducing HIV transmission (Wilkinson and Rutherford 2001; Allen, Meinzen-Derr et al. 2003).

Increasing individual awareness of own HIV status as well as partner's status could potentially lead to increased condom use within marriage or cohabitation. Our results based on the Malawi 2010 DHS show that awareness of HIV-positive status can increase the likelihood of condom use. (Similar analysis could not be done with other surveys because data on self-reported HIV status were unavailable).

7.3 Prior HIV Testing Experience

The extent of prior HIV testing is high in all countries analyzed except Uganda, where the survey was conducted in 2004-05. It is possible that more recent data from Uganda (when available) may show an increase in HIV testing. In Kenya, Lesotho, Malawi and Zimbabwe, three quarters of HIV-infected women or more had ever been tested for HIV. In Swaziland, Tanzania and Zambia about half the women had ever tested. Prior testing rates are generally higher for women than men. Not all people who tested for HIV received results. Testing for HIV in the last 12 months is considerably lower in all countries. Testing for PMTCT during antenatal care for women may contribute to higher HIV testing rates among women.

The trend data from the countries with two surveys show that in all five countries rates of ever testing and receiving results as well as testing in the last 12 months and receiving results have substantially increased for both women and men. The increase in ever-testing is almost four-fold between surveys in Kenya, Lesotho, and Malawi. The magnitude of the increase is also high in Tanzania and Zimbabwe, although to a lesser extent.

While rates of ever-testing inevitably increase over time due to the cumulative effect as more people are tested, it is likely that the recent boost in HIV testing uptake is the primary reason for this increase in the countries examined. For example, in Lesotho ever-testing among women increased by 56 percentage points between 2004 and 2009, of which 43 percentage points occurred during the 12 months prior to the 2009 survey.

This remarkable increase reflects recent policy and program efforts in improving HIV testing uptake. In 2010, 37 countries in sub-Saharan Africa reported having national guidelines on the implementation of provider-initiated testing and counseling in health facilities (WHO, UNICEF et al. 2011). More health facilities provide HIV testing and counseling. Among countries reporting data in 2010, the median number of facilities providing HIV testing was 12 per 100,000 population, an increase from 8.6 in 2009. In Kenya, Lesotho, and Zimbabwe the 2010 figures are much higher than the average, at 22.5, 19.4 and 19.2 per 100,000, respectively. Malawi is about at the average level of the region.

Continued program effort is needed to increase HIV testing uptake, particularly in high HIV prevalence countries. In Swaziland, about one-third of the population is HIV-positive, but only half the number of HIV-infected women and one-third of the HIV-infected men have ever been tested. For men and women alike, knowing their HIV status is a first and critical step to obtain appropriate care and support and to adopt safer-sex behaviors.

This study also attempts to identify factors that affect HIV testing uptake among HIV-positive individuals. Contrary to expectations, the study found that engaging in sexual risk behaviors, for example having multiple sex partners, does not appear to be associated with HIV testing uptake. Men and women with multiple partners are no different than others in levels of testing for HIV and receipt of results. It is possible that people do not perceive a higher risk of HIV even after engaging in risky behavior and therefore do not feel the need for HIV testing. Alternately, they may have been tested already and not see the need to be tested again.

Although a positive association between receiving STI care and HIV testing in the last 12 months was found only for women and only in three of the eight countries, it may suggest the need for another strategy to increase HIV testing, namely, integrating HIV testing into STI clinics. Partially due to the stigma associated with HIV, many people are reluctant to go to a health facility for HIV patients for testing. Thus integrating HIV testing service with STI service could be an effective approach for scaling up HIV testing. The integration of HIV testing into syphilis services in six STI clinics in Guangdong province in China is a good example of an approach that resulted in a high HIV testing rate, up to 80 percent (Tucker, Yang et al. 2010; Tucker, Yang et al. 2011).

In reviewing the results of this analysis, a number of limitations need to be considered. The sample sizes in some countries are small, especially for men. This influences the power of the study, reflected by the wide 95 percent confidence intervals and the limited ability to detect significance in the regression analysis. Although the DHS and AIS provide high-quality comparable information, under-reporting of respondents' sexual behaviors is quite possible due to the sensitive personal nature of the information. Finally, the use of cross-sectional data makes it impossible to infer causal relationships.

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