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MEDICAL INJECTION USE AND HIV IN SUB-SAHARAN AFRICA

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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 Macro International Inc., Demographic and Health Research Division, 11785 Beltsville Drive, Suite 300, Calverton, MD 20705 (telephone: 301-572-0200; fax: 301-572-0999; e-mail: reports@macrointernational.com; internet: www.measuredhs.com).

The main objectives of the MEASURE DHS project are:

- to provide decisionmakers 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 Comparative Reports No. 21

Medical Injection Use and HIV in Sub-Saharan Africa

Vinod Mishra[1]
Shane Khan[1]
Li Liu[2]
Benny Kottiri[3]

Macro International Inc.
Calverton, Maryland, USA

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Corresponding author: Vinod Mishra, Demographic and Health Research Division, Macro International Inc., 11785 Beltsville Drive, Suite 300, Calverton, MD 20705; Phone: 301-572-0220; Fax: 301-572-0999; Email: vinod.mishra@macrointernational.com.

[1] Macro International Inc., Calverton, Maryland, USA
[2] Johns Hopkins University, Baltimore, Maryland, USA
[3] United States Agency for International Development, Washington, DC, USA

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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 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. Whereas *Comparative Reports* are primarily descriptive, *Analytical Studies* have a more analytical approach.

The *Comparative Reports* series covers a variable number of countries, depending on the availability of data sets. Where possible, data from previous DHS surveys are used to evaluate trends over time. Each report provides detailed tables and graphs organized by region. Survey-related issues such as questionnaire comparability, survey procedures, data quality, and methodological approaches are addressed as needed.

The topics covered in *Comparative Reports* are selected by MEASURE DHS staff in conjunction with the U.S. Agency for International Development. Some reports are updates of previously published reports.

It is anticipated that the availability of comparable information for a large number of developing countries will enhance the understanding of important issues in the fields of international population and health by analysts and policymakers.

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Project Director

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Executive Summary

This report describes the extent of use of medical injections and blood transfusions, characteristics of medical injection users, and associated knowledge and perceptions about how to avoid HIV infection among adult women and men in 10 sub-Saharan African countries. It also examines the association between number of medical injections received and HIV serostatus. The analysis is based on data from eight Demographic and Health Surveys (DHS): Kenya, Ghana, Burkina Faso, Cameroon, Lesotho, Malawi, Ethiopia, and Zimbabwe, and two AIDS Indicator Surveys (AIS): Tanzania and Uganda, conducted between 2003 and 2006.

In most countries studied, receiving multiple medical injections is significantly positively associated with being HIV-infected, for both women and men. Ever having received a blood transfusion also tends to be positively associated with being HIV-infected.

The study also finds that knowledge that HIV infection can be avoided by avoiding injections, including medical injections, avoiding having sex with injecting drug users (IDUs), and avoiding blood transfusion remains low in most countries studied. Few adults perceive the risk of HIV infection from having medical injections or blood transfusion.

A considerable proportion of adults reported receiving medical injections. Among women, between 30 percent (in Malawi) and 50 percent (in Uganda) received medical injections in the 12 months preceding the survey. In all countries, men are less likely than women to receive medical injections. Men are also slightly less likely to receive medical injections from health professionals. Urban and more educated women are more likely to receive three or more recent medical injections, but these associations are weaker among men. As expected, adults who were chronically ill or reported having a sexually transmitted infection (STI) in the past year are more likely to have received medical injections.

In most countries a large majority of medical injections received by women and men are from new needles, with the notable exception of Lesotho where 27 percent of men did not receive their last medical injection from a new needle. In Uganda and Cameroon, 5 and 6 percent of women and 2 and 4 percent of men, respectively, reported having lifetime exposure to blood transfusions.

The study finds no clear association between HIV serostatus and knowledge about avoiding HIV infection by avoiding injections, or avoiding having sex with IDUs. In some of the countries studied, people who know about avoiding HIV infection by avoiding blood transfusions are more likely to be HIV-positive, but among women in Zimbabwe and men in Lesotho the reverse is true.

The study provides information on the extent of knowledge of injection-related risk of HIV transmission and presents characteristics of people receiving medical injections in selected countries in sub-Saharan Africa. The results show that the knowledge about the risk of HIV infection from unsafe injections and blood transfusions is low despite years of HIV/AIDS education efforts. The results showing a positive association between receiving either medical injections or blood transfusion and being HIV-infected suggest that unsafe medical injections and unsafe blood transfusions as potential modes of HIV transmission deserve continued research and programmatic attention. Program priorities in sub-Saharan Africa may focus on promoting knowledge of potential risks of HIV and other infections from unsafe injections and blood transfusions, rational use of medical injections, implementation of the national injection safety and blood safety guidelines, and further scale up of medical injection safety and blood safety programs.

1 Introduction

This report describes the extent of use of medical injections,[1] and associated knowledge and perceptions of HIV risks, and examines the association between number of medical injections received and HIV serostatus among adult women and men in 10 sub-Saharan African countries. The data come from the Demographic and Health Surveys (DHS) and AIDS Indicator Surveys (AIS), which provide a basis for cross-country comparisons. The key questions that we attempt to answer are: (1) what are the prevalence and patterns of medical injection use across these countries, and (2) what is the association between medical injections and HIV infection across the surveys?

In sub-Saharan Africa it is widely accepted that a large majority of HIV infections are attributable to sexual transmission, but the relative role of non-sexual transmission of HIV infection is less clear. Among the non-sexual routes of transmission, blood transfusion and injecting drug use are known risk factors for HIV infection (Mathers et al. 2008; Aceijas et al. 2004; Quigley et al. 1997; Mann et al. 1986; Kiwanuka et al. 2004; Corbett et al. 2002; Baggaley et al. 2006; Moore et al. 2001; Adejuyigbe et al. 2003). The role of unsafe[2] medical injections, however, is not fully understood, as studies have been limited in number and scope, and results have been inconsistent.

[1] The term "medical injection" is used to refer to injections received for health care needs. This is to differentiate from injections received for other purposes, such as intravenous drug use (IDU). A medical injection may be received from a health professional (such as a doctor, nurse, or paramedic), from another person who is not a health professional, or taken by the person himself/herself.

[2] Injections given with reused syringes and needles without proper sterilization are considered unsafe.

2 Background

Medical injections given with re-used, non-sterilized equipment may increase the risk of HIV and other infections (Kane et al. 1999). The World Health Organization (WHO) estimates that at least 16 billion medical injections are administered annually in developing and transitional countries. WHO categorizes up to 50 percent of medical injections in developing countries as unsafe, and considers over 70 percent of them unnecessary (WHO 2008). WHO also estimates that globally unsafe injections cause 33 percent of new infections with hepatitis B virus (HBV), 42 percent with hepatitis C virus (HCV), and 2 percent with HIV, accounting for up to 25 million annual new infections with these viruses.

A study in seven sub-Saharan African countries found that in five of the countries more than half of the medical injections were unsafe, defined as reusing syringe, needle, or both without sterilization (Simonsen et al. 1999). In another study in rural Cameroon where discarded syringes and needles used for HIV-positive patients were tested, 34 of 103 intravenous injection syringes and 2 of 88 intramuscular injection syringes were found to be positive on HIV-1 RNA (Apetrei et al. 2006). In experimental studies, HIV-1 has been shown to remain viable in syringes for more than six weeks, depending on the volume of blood remaining in the syringes and the storage temperature (Heimer and Abdala 2000).

Despite such safety concerns, the contribution of unsafe medical injections to HIV transmission in sub-Saharan African countries continues to be debated. A number of studies have claimed that the contribution of medical injections to HIV transmission is small, ranging from only 1 to 3 percent of all HIV transmissions (Baggaley et al. 2006; Hauri et al. 2004; Schmid et al. 2004; Gouws et al. 2006; Hutin et al. 2003; French et al. 2006). In the global burden of disease study, Hauri and colleagues (2004) estimated that unsafe medical injections and the use of other inadequately sterilized skin piercing instruments cause only about 2.5 percent of all HIV infections in sub-Saharan Africa. In Kenya medical injections are reported to cause only an estimated 0.6 percent of incident HIV infections, and blood transfusions an additional 0.2 percent (Gouws et al. 2006).

Several other studies have argued that unsafe medical injections cause a much greater share of HIV transmissions in sub-Saharan Africa (Brody 2004; Gisselquist 2002, 2007; Gisselquist et al. 2002a, 2002b; Gisselquist and Potterat 2004; Gisselquist et al. 2004; Gisselquist et al. 2006). Using data from percutaneous exposures among U.S. and European health care workers, Gisselquist (2002) estimated the average rate of HIV-1 transmission from unsafe medical injections at 2.3 per 100 exposure events, a figure that would imply a much higher proportion of HIV infections due to unsafe injections than previously estimated. Gisselquist and colleagues (2002c) estimated that 20 to 40 percent of HIV infections are due to unsafe injections, while 20 to 29 percent of HIV infections among women and 30 to 35 percent among men in Africa are due to sexual transmission. Schmid and colleagues (2004), however, have argued that Gisselquist and others may have overestimated HIV transmission efficiency due to unsafe medical injections.

Previous empirical studies analyzing the association between medical injections and risk of HIV infection also have found mixed results. A positive relationship between unsafe medical injections and HIV infection has been observed in some settings (Mann et al. 1986; Deuchert and Brody 2006; Barongo et al. 1992). In Kenya, for example, women who received a tetanus injection for their most recent birth in the past five years were about twice as likely to be HIV-positive as those who did not receive a tetanus injection (Deuchert and Brody 2006). Similarly in Mwanza region of Tanzania, receiving medical injections in last 12 months was found to be positively associated with HIV prevalence (Barongo et al. 1992). However, some other studies have failed to find such an association between medical injections and HIV infection (Bulterys et al. 1994; Lopman et al. 2005; Wawer et al. 1994). The lack of significant association was also documented in a cohort study in Uganda, where the rate ratio of HIV incidence

comparing individuals with and without medical injections was 1.05 (95% confidence interval: 0.75-1.46) (Kiwanuka et al. 2004).

Schmid and colleagues (2004) have argued that the relationship between medical injections and prevalent HIV infection may be the result of reverse causality, in that people living with HIV may be sick and hence need more medical injections, or confounding, in that, for example, a person might receive injections for a sexually transmitted infection (STI) which is a cofactor for HIV infection.

3 Methods

The data for this study are from the DHS and AIS surveys for 10 countries in sub-Saharan Africa. The surveys were conducted between 2003 and 2006. They include DHS surveys in Kenya 2003, Ghana 2003, Burkina Faso 2003, Cameroon 2004, Lesotho 2004, Malawi 2004, Ethiopia 2005, and Zimbabwe 2006, and AIS surveys in Tanzania 2003/2004 and Uganda 2004/2005. Both the DHS and AIS surveys share comparable survey methodology and questionnaires, allowing for comparisons across countries.

Surveys collect data from nationally-representative probability samples of households, interviewing adult women and men. In most surveys, nationally-representative samples of women age 15-49 and men age 15-59 were interviewed. Analysis in this study has been restricted to women and men age 15-49 in all 10 countries. The number of individuals who were eligible to be asked about knowledge to avoid HIV by avoiding injections, having sex with injecting drug users (IDUs), or blood transfusions ranged from 5,691 women in Ghana to 14,070 women in Ethiopia, and from 2,496 men in Lesotho to 8,010 men in Uganda.

The majority of these surveys use a two-stage cluster sampling design, often over-sampling certain categories of respondents. As samples are not self-weighting and response rates vary, sample weights are used to obtain nationally-representative estimates. In tables with HIV serostatus, the analysis uses the HIV weight, while in other tables, the individual weights for women and men are used. Details on the survey design and methodology can be found in main survey reports (www.measuredhs.com).

In general, these surveys gather the following information related to injections, including medical injections: knowledge to avoid AIDS by avoiding injections, having sex with IDUs, or blood transfusions; perceived risk of acquiring HIV because of a blood transfusion or injection; percentage of individuals who had an injection in the last 12 months; number of injections received in the past 12 months; percentage of individuals who received three or more injections in the recent past; percentage of individuals who received a recent injection from a health professional; percentage who received the last medical injection with a new needle; and percentage of women and men who received blood transfusion. Not all information is available in all 10 countries examined in this report.

We first apply descriptive analyses to present the distribution of variables related to injections among women and men in each country. We then perform cross tabulations between these variables and key socio-demographic variables, including age, education, wealth, residence, knowledge to avoid AIDS by avoiding injections, whether suffering from chronic disease, and whether having an STI or symptoms of an STI in the past 12 months.

Finally, we apply chi-square tests and the corresponding p-values to examine the association between HIV prevalence and several major injection variables, such as knowledge to avoid HIV by avoiding injections, having sex with IDUs, or blood transfusion; recent medical injection history; and blood transfusion history. Analyses involving HIV serostatus only include respondents tested for HIV in the surveys, while other analyses include all respondents (see individual tables for details).

4 Results

Table 1 shows the percentage of women and men age 15-49 who know that HIV infection can be prevented by avoiding injections, including medical injections, avoiding having sex with IDUs, or avoiding blood transfusions. Both women and men perform poorly on all three indicators. In the 10 countries studied, only 2-13 percent of women and 3-17 percent of men report having knowledge of any of these three means to avoid HIV. Among the three, knowledge of avoiding sex with IDUs is the lowest across all 10 countries.

Table 1. Knowledge of avoiding HIV infection

Percentage of women and men age 15-49 who know that HIV infection can be avoided by avoiding injections, avoiding sex with intravenous drug users (IDUs), and avoiding blood transfusions, DHS/AIS 2003-2006

	Women					Men				
	Knows to avoid HIV infection by avoiding:					Knows to avoid HIV infection by avoiding:				
Country/year	Injections	Sex with IDUs	Blood transfusions	Any of the three means	N	Injections	Sex with IDUs	Blood transfusions	Any of the three means	N
Kenya 2003	5.2	0.3	5.0	9.1	8,195	4.8	1.2	6.8	10.9	3,363
Ghana 2003	4.0	1.1	3.4	7.7	5,691	8.1	2.0	6.0	13.9	4,529
Burkina Faso 2003	0.7	0.2	1.6	2.1	12,477	1.0	1.1	3.2	4.3	3,209
Cameroon 2004	4.4	0.5	5.1	8.6	10,656	6.5	1.1	8.8	13.9	4,815
Tanzania 2003/04	11.1	0.5	4.6	13.0	6,863	14.1	1.2	5.5	17.1	5,659
Lesotho 2004	2.1	0.5	6.9	8.8	7,095	1.3	0.1	5.4	6.2	2,496
Malawi 2004	10.4	1.1	3.5	12.6	11,698	11.4	0.4	3.1	13.1	3,114
Uganda 2004/05	8.2	0.1	2.6	9.7	9,941	9.3	0.3	5.5	12.8	8,010
Ethiopia 2005	9.5	0.8	2.6	12.2	14,070	9.9	1.6	4.4	14.5	5,464
Zimbabwe 2006	2.5	0.4	1.7	4.2	8,907	1.1	0.5	1.2	2.5	6,863

Note: The responses to the three means to avoid HIV infection are not mututally exclusive.

Table 2 presents how perceived risk of acquiring HIV due to medical injection use or blood transfusion varies by selected background characteristics in Kenya. Overall, only 8 percent of Kenyan women and 13 percent of Kenyan men report that they have a moderate or high risk of getting HIV infection from injection or blood transfusion. Among both women and men, higher levels of education and greater media exposure are associated with greater perception of risk of HIV infection from injection or blood transfusion. Younger, urban women are more likely to perceive themselves at risk of infection due to injection or blood transfusion. In contrast, older, rural men are more likely to have this perception. Wealth status is positively associated with women's risk perception, but this association is less clear among men.

Table 2. Perceived risk of acquiring HIV from injections or blood transfusions

Percentage of women and men who think that they have a moderate/high risk of getting HIV from injection or blood transfusion, by selected background characteristics, Kenya DHS 2003

Characteristic	Women	Men
Age		
15-24	8.4	9.7
25-34	8.3	15.6
35-49	6.7	16.7
Education		
No education	0.4	*
Primary	6.0	10.5
Secondary +	14.1	18.3
Wealth status		
Lowest	2.8	10.7
Second	5.3	6.7
Middle	5.5	22.1
Fourth	10.0	13.5
Highest	12.9	13.6
Residence		
Urban	9.8	9.5
Rural	7.2	14.8
Regular exposure to media		
Yes	13.1	16.0
No	5.2	10.4
Total	7.8	13.4
Number	1,979	485

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

Table 3 shows the percentage of adult women and men in eight countries with available data who had an injection in the recent past (in the last 3 months for Burkina Faso, Cameroon, and Lesotho; in the last 6 months for Zimbabwe; and in the last 12 months for Tanzania, Malawi, Uganda, and Ethiopia). Injection use in the recent past was lower among men than women in all eight countries. In the four countries with information for either the last 3 or 6 months, injection use among women and men was below 20 percent in all cases. Among the four countries with information on injection use in the last 12 months, injection use was above 25 percent for women in all four, and for men in two of the countries (Tanzania and Uganda).

Table 3. Received medical injections in the recent past

Percentage of women and men age 15-49 who had a medical injection in the last 12 months, DHS/AIS 2003-2006

	Received a medical injection in last 12 months			
	Women		Men	
Country/year	Percent	N	Percent	N
Burkina Faso 2003[a]	11.6	12,477	n/a	n/a
Cameroon 2004[a]	19.7	10,656	17.4	4,815
Tanzania 2003/04	38.3	6,863	26.7	5,659
Lesotho 2004[a]	15.5	7,095	5.9	2,496
Malawi 2004	30.1	11,698	12.6	3,114
Uganda 2004/05[b]	49.6	9,941	37.4	8,010
Ethiopia 2005	26.1	14,070	19.6	5,464
Zimbabwe 2006[c]	14.2	8,907	6.5	6,863

[a]In the last 3 months

[b]By a health professional

[c]In the last 6 months

n/a: not available

Table 4 presents the distribution of number of medical injections received in the past 12 months, for adult women and men. The majority did not receive any injections in the recent past. In most of the seven countries with data, less than 13 percent of women and men had three or more medical injections in the recent past, with the exception of Uganda where 32 percent of women and 24 percent of men received three or more injections from a health professional in the last 12 months.[3]

Table 4. Number of medical injections received in the recent past

Percent distribution of women and men age 15-49 by number of medical injections received in the last 12 months, DHS/AIS 2003-2006

	Number of medical injections									
	Women					Men				
Country/year	0	1	2	3+	N	0	1	2	3+	N
Burkina Faso 2003[a]	88.4	5.7	2.9	3.0	12,472	n/a	n/a	n/a	n/a	n/a
Cameroon 2004[a]	80.7	8.5	4.1	6.7	10,656	83.1	7.1	3.4	6.4	4,815
Lesotho 2004[a]	84.5	11.3	2.8	1.4	7,095	94.1	3.6	0.8	1.4	2,496
Malawi 2004	70.0	10.6	8.5	11.0	11,698	87.4	5.9	3.5	3.2	3,114
Uganda 2004/05[b]	50.4	8.2	9.2	32.2	9,941	62.6	6.5	7.1	23.9	8,010
Ethiopia 2005	73.9	6.8	6.7	12.6	14,070	80.4	4.6	4.8	10.2	5,464
Zimbabwe 2006[c]	85.8	7.1	4.5	2.6	8,907	93.5	3.0	1.4	2.1	6,863

[a]In the last 3 months
[b]By a health professional
[c]In the last 6 months
n/a: not available

[3] The 2004/04 survey in Uganda only asked about medical injections received from a health professional. The numbers for Uganda are therefore not strictly comparable to other countries in Table 4.

Tables 5 and 6 show how the percentage of women and men who had three or more injections in the recent past (whether 3 months, 6 months, or 12 months) varies by selected characteristics. Among women (Table 5) in the seven countries with available data, those age 25-34 are more likely than other age groups to have multiple injections in the recent past. Women with more education are also more likely to have injections. In addition, recent multiple injection use is positively associated with wealth among women in Burkina Faso, Cameroon, Ethiopia, and Uganda, but less so in the other three countries. Urban women are also more likely to receive three or more recent injections. Women with knowledge about avoiding HIV by avoiding injections and women having an STI in the last 12 months are both more likely to have three or more recent injections. Also, in the four countries with data on chronic illness, women suffering from a chronic illness for at least 3 of the last 12 months are, as expected, more likely to have received three or more recent injections.

Table 5. Differentials in use of multiple medical injections among women

Percentage of women age 15-49 who received three or more medical injections in the recent past, by selected characteristics, DHS/AIS 2003-2006

	Received 3+ medical injections in the last:						
	3 months			6 months	12 months		
Characteristic	Burkina Faso	Cameroon	Lesotho	Zimbabwe[1]	Malawi	Ethiopia	Uganda[1,2]
Age							
15-24	2.6	5.3	1.0	2.5	10.1	10.1	28.2
25-34	3.6	7.6	1.9	2.7	13.7	14.5	35.3
35-49	2.9	8.5	1.6	2.7	9.1	14.3	34.7
Education							
No education	2.5	3.7	0.6	0.6	10.0	11.6	26.3
Primary	4.4	6.5	1.3	2.1	10.8	13.9	32.8
Secondary +	5.1	8.8	1.7	3.0	13.4	16.4	37.2
Wealth status							
Lowest	1.1	3.7	1.0	1.8	10.1	9.2	28.7
Second	2.5	5.1	1.4	2.3	10.8	9.0	29.4
Middle	2.9	5.9	1.3	3.0	10.3	11.7	30.3
Fourth	2.7	8.0	1.4	2.7	10.5	13.6	32.4
Highest	4.9	9.8	1.7	3.0	12.9	17.6	38.2
Residence							
Urban	4.3	8.3	1.6	3.0	13.2	16.6	37.2
Rural	2.6	4.9	1.4	2.3	10.5	11.8	31.3
Knows to avoid AIDS by avoiding injections							
Yes	3.4	10.6	3.7	7.6	11.5	13.9	35.4
No	3.0	6.6	1.4	2.5	10.9	12.5	31.9
Suffers from chronic illness							
Yes	n/a	18.8	n/a	10.7	15.6	n/a	42.8
No	n/a	6.2	n/a	2.5	10.7	n/a	31.2
Had STI in last 12 months							
Yes	9.1	12.3	2.5	4.5	12.5	25.4	40.8
No	2.7	6.1	1.3	2.4	10.9	12.4	28.8
Total	3.0	6.7	1.4	2.6	11.0	12.6	32.2
Number	12,477	10,656	7,095	8,907	11,698	14,070	9,941

[1]Chronic illness asked only for 18+

[2]By a health professional

n/a: not available

Among men (Table 6) in the six countries with available data, the associations between the percentage receiving three or more medical injections in the recent past and men's age and level of education are less clear. Uganda is the exception, where the percentage of men with three or more recent injections from a health professional increases with age and with education. There is no clear pattern in the percentage of men with three or more recent injections by men's wealth status or place of residence. In Cameroon, Lesotho, Ethiopia, and Uganda, men who know about avoiding HIV by avoiding injections are more likely to have three or more recent injections, but this association is not observed in Malawi and Zimbabwe. In all six countries, as expected, men with a chronic illness or an STI in the last 12 months are more likely to have had three or more recent injections.

Table 6. Differentials in use of multiple medical injections among men

Percentage of men age 15-49 who received three or more medical injections in the recent past, by selected characteristics, DHS/AIS 2003-2006

	Received 3+ medical injections in the last:					
	3 months		6 months	12 months		
Characteristic	Cameroon	Lesotho	Zimbabwe[1,2]	Malawi	Ethiopia	Uganda[1,2]
Age						
15-24	4.5	0.7	1.4	3.2	9.9	20.8
25-34	8.5	2.4	2.2	3.5	10.5	25.2
35-49	7.1	2.0	3.7	2.9	10.4	27.0
Education						
No education	5.2	1.0	1.0	1.9	7.9	19.5
Primary	6.3	1.9	2.2	3.6	12.4	23.0
Secondary +	6.6	0.8	2.1	2.9	10.4	26.7
Wealth status						
Lowest	3.3	1.8	1.5	3.3	9.4	20.7
Second	5.7	2.3	1.6	3.3	12.9	22.1
Middle	6.8	1.2	1.0	1.9	9.7	23.4
Fourth	8.0	0.8	2.4	3.2	9.5	24.4
Highest	6.6	1.3	3.5	4.3	9.6	27.1
Residence						
Urban	7.2	1.1	3.0	3.5	9.5	26.4
Rural	5.2	1.5	1.5	3.2	10.3	23.4
Knows to avoid AIDS by avoiding injections						
Yes	10.6	1.5	1.6	2.3	13.8	27.3
No	6.1	0.0	2.1	3.4	9.8	23.5
Suffers from chronic illness						
Yes	21.9	n/a	18.4	10.2	n/a	33.6
No	5.6	n/a	2.0	3.0	n/a	23.0
Had STI in last 12 months						
Yes	14.7	4.4	6.1	9.7	11.8	36.3
No	5.7	1.1	1.9	2.9	10.2	21.3
Total	6.4	1.4	2.1	3.2	10.2	23.9
Number	4,815	2,496	6,863	3,106	5,464	8,010

[1]Chronic illness asked only for 18+

[2]By a health professional

n/a: not available

Among women (Table 7) and men (Table 8) who received medical injections recently, nearly all of the injections are administered by a health professional. Men are slightly less likely than women to receive injections from a health professional, but in all cases at 90 percent or higher. The percentage receiving injections from health professionals varies little by respondents' characteristics, except in Malawi, where only 83 percent of men without education receive injections administered by a health professional.

Table 7. Medical injections from a health professional among women

Among women age 15-49 who received any medical injections in the recent past, percentage who received all injections from a health professional, by selected characteristics, DHS/AIS 2003-2006

	Percentage who received all medical injections from a health professional				
Characteristic	Burkina Faso[1]	Malawi[1]	Ethiopia	Zimbabwe[2]	Lesotho
Age					
15-24	98.6	95.3	97.6	98.5	96.6
25-34	98.7	95.6	96.5	99.7	97.3
35-49	98.4	93.3	96.6	98.1	95.3
Education					
No education	98.9	95.3	96.7	100.0	*
Primary	97.7	95.2	97.2	99.1	96.3
Secondary +	97.0	94.3	97.8	98.6	96.6
Wealth status					
Lowest	99.4	93.4	96.0	99.6	95.2
Second	98.2	95.4	96.3	100.0	95.4
Middle	98.9	95.4	97.0	99.1	98.2
Fourth	99.2	94.8	95.3	98.3	97.7
Highest	97.8	95.9	98.8	97.8	95.4
Residence					
Urban	97.5	98.9	98.7	97.5	96.7
Rural	99.0	94.3	96.5	99.6	96.4
Knows to avoid AIDS by avoiding injections					
Yes	*	93.6	97.9	95.4	(100.0)
No	98.6	95.2	96.8	98.9	96.5
Suffers from chronic illness					
Yes	n/a	94.7	n/a	95.5	n/a
No	n/a	95.1	n/a	98.9	n/a
Had STI in last 12 months					
Yes	100.0	94.8	92.2	98.8	98.2
No	98.5	95.1	97.1	98.8	96.1
Total	98.6	95.1	97.0	98.8	96.5
Number	1,452	3,518	3,672	1,271	1,098

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

[1]Most recent medical injection from a health professional

[2]Chronic illness asked only for 18+

n/a: not available

Table 8. Medical injections from a health professional among men

Among men age 15-49 who received any medical injections in the recent past, percentage who received all injections from a health professional, by selected characteristics, DHS/AIS 2003-2006

Characteristic	Percentage who received all medical injections from a health professional			
	Malawi[1]	Ethiopia	Zimbabwe[2]	Lesotho
Age				
15-24	90.9	92.5	96.6	91.1
25-34	89.7	90.6	94.1	87.4
35-49	96.5	93.2	95.1	(92.7)
Education				
No education	82.7	92.0	*	*
Primary	90.9	91.2	94.7	89.5
Secondary +	95.9	94.1	95.6	(92.9)
Wealth status				
Lowest	94.3	93.8	97.8	*
Second	90.4	91.9	95.7	(86.2)
Middle	90.2	87.0	94.7	(86.0)
Fourth	87.2	95.7	97.0	(93.2)
Highest	96.4	92.0	92.4	(97.9)
Residence				
Urban	99.4	91.4	94.6	(91.8)
Rural	89.6	92.3	96.0	89.8
Knows to avoid AIDS by avoiding injections				
Yes	90.5	87.0	*	*
No	91.8	93.0	95.3	90.1
Suffers from chronic illness				
Yes	(100.0)	n/a	97.3	n/a
No	91.0	n/a	96.4	n/a
Had STI in last 12 months				
Yes	97.6	*	96.7	(87.7)
No	90.9	92.4	95.1	90.9
Total	91.6	92.2	95.3	90.2
Number	397	1,077	458	155

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

[1]Most recent medical injection from a health professional

[2]Chronic illness asked only for 18+

n/a: not available

In Table 9 we examine the use of new needles at last medical injection in the three countries with data. Among women and men who had injections in the recent past, the percentage who received them with a new needle is above 90 percent, except for women in Ethiopia (89 percent) and men in Lesotho (73 percent) and Zimbabwe (86 percent). Differentials in the use of new needles by respondents' characteristics are generally small.

Table 9. Use of new needles

Among women and men age 15-49 who received any medical injections in the recent past, percentage who received the last injection with a new needle, by selected characteristics, DHS/AIS 2003-2006

	New needle at last injection					
	Women			Men		
Characteristic	Lesotho	Ethiopia[1]	Zimbabwe	Lesotho	Ethiopia[1]	Zimbabwe
Age						
15-24	94.6	91.3	95.5	73.2	92.0	91.9
25-34	93.5	88.5	95.8	71.5	88.7	75.3
35-49	89.8	86.7	94.4	(76.0)	92.0	91.7
Education						
No education	*	85.0	(89.7)	*	89.0	*
Primary	93.8	93.9	95.6	70.8	89.8	77.0
Secondary +	92.2	96.9	95.4	(87.1)	96.0	90.4
Wealth status						
Lowest	91.9	79.1	98.4	*	95.6	72.4
Second	89.6	89.0	96.6	(69.1)	84.9	85.5
Middle	94.8	83.2	95.0	(76.5)	87.0	89.7
Fourth	93.8	88.4	93.5	(72.7)	92.8	90.4
Highest	92.8	96.7	94.8	(83.2)	94.9	87.5
Residence						
Urban	91.9	98.0	93.8	(76.9)	98.0	89.0
Rural	93.2	86.7	96.3	72.5	89.8	84.0
Total	92.9	89.1	95.3	73.4	91.1	86.4
Number	1,098	3,672	1,271	155	1,077	458

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

[1]By a health professional

Table 10 presents the percentage of women and men in Cameroon and Uganda who have ever had a blood transfusion, and in Tanzania as well as Cameroon and Uganda, those who had a transfusion in the recent past. In Cameroon and Uganda less than 6 percent of women or men have had a blood transfusion at all. In all three countries, recent blood transfusions are even rarer.

Table 10. Blood transfusions

Percentage of women and men age 15-49 who received a blood transfusion, ever or in the last 12 months, DHS/AIS 2003-2006

	Received blood transfusion			
	Women		Men	
Country/year	Percent	N	Percent	N
Cameroon 2004				
Ever	5.6	10,656	4.3	4,815
In the last 5 years	3.7	10,656	2.9	4,815
Tanzania 2003/04				
Ever	n/a	n/a	n/a	n/a
In the last 12 months	1.2	6,863	0.4	5,659
Uganda 2004/05				
Ever	4.5	9,941	2.2	8,010
In the last 12 months	0.8	9,941	0.3	8,010

n/a: not available

Table 11 shows the association between a person's HIV serostatus and the person's knowledge of the ways to avoid HIV infection (by avoiding injections, avoiding having sex with IDUs, and avoiding blood transfusions). Women and men who know that avoiding injections can help avoid HIV infection are less likely to be HIV-positive, but this association is not statistically significant. In general, there is no clear association among either women or men between HIV serostatus and knowledge of how to avoid HIV by avoiding sex with IDUs.

With respect to the association between knowledge of avoiding blood transfusions to avoid HIV infection and a respondent's HIV status, the relationship is significant among men in Lesotho, and among women in Malawi, Uganda, and Zimbabwe. However, the direction of the association is not straightforward. Men in Lesotho and women in Zimbabwe who know about avoiding blood transfusions are less likely to be HIV-positive. But the relationship is reversed in Malawi and Uganda, where women who know about avoiding blood transfusions are more likely to be HIV-positive.

Table 11. HIV prevalence by knowledge of avoiding HIV infection

HIV prevalence among women and men age 15-49 by knowledge of avoiding HIV infection by avoiding injections, avoiding sex with IDUs, and blood transfusions, DHS/AIS 2003-2006

	Knowledge of avoiding HIV infection by avoiding:								
	Injections			Sex with IDUs			Blood transfusions		
Country/year/sex	Knows	Does not know	*p*-value	Knows	Does not know	*p*-value	Knows	Does not know	*p*-value
Kenya 2003									
Women	4.8	8.9	0.082	*	8.7	0.305	7.1	8.8	0.481
Men	4.9	4.5	0.828	(0.0)	4.7	0.190	4.7	4.6	0.940
Ghana 2003									
Women	1.5	2.8	0.281	3.6	2.7	0.667	2.4	2.7	0.795
Men	0.6	1.5	0.163	2.4	1.4	0.471	1.5	1.5	0.923
Burkina Faso 2003									
Women	(0.0)	1.9	0.423	*	1.8	0.002	4.5	1.8	0.099
Men	(0.0)	1.9	0.434	(0.0)	1.9	0.413	1.0	1.9	0.546
Cameroon 2004									
Women	8.2	6.7	0.361	14.3	6.7	0.168	6.8	6.6	0.941
Men	4.2	4.1	0.950	(13.0)	4.0	0.002	5.6	4.0	0.130
Tanzania 2003/04									
Women	6.6	7.8	0.270	3.2	7.7	0.348	7.4	7.7	0.876
Men	5.0	6.5	0.136	6.0	6.3	0.919	4.5	6.4	0.216
Lesotho 2004									
Women	23.9	26.5	0.637	*	26.4	0.979	23.7	26.6	0.362
Men	*	19.4	0.059	*	19.2	0.535	8.1	20.0	0.001
Malawi 2004									
Women	14.2	13.2	0.642	(16.7)	13.3	0.589	20.7	13.1	0.044
Men	8.9	10.4	0.443	*	10.3	0.310	11.7	10.1	0.658
Uganda 2004/05									
Women	6.7	7.5	0.381	*	7.5	0.288	11.8	7.3	0.008
Men	4.4	5.1	0.428	*	5.0	0.292	6.2	4.9	0.246
Ethiopia 2005									
Women	0.9	2.0	0.059	5.6	1.8	0.101	1.8	1.9	0.951
Men	0.8	0.9	0.791	0.0	0.9	0.426	0.0	1.0	0.137
Zimbabwe 2006									
Women	15.3	21.3	0.059	(36.0)	21.1	0.068	8.0	21.3	0.001
Men	12.7	14.6	0.678	(14.8)	14.5	0.969	17.5	14.5	0.505

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

We also analyze the relationships between several injection use variables and HIV serostatus among women and men. Table 12 shows that in all eight countries with data men who received one or more medical injections in the recent past are significantly more likely to be infected with HIV than those who did not receive any recent medical injections, with the exception of Ethiopia. The association is also positive for women in seven of the eight countries with data, but not statistically significant in Burkina Faso, Ethiopia, Malawi, and Tanzania. Similarly, women and men with three or more medical injections in the recent past are more likely to be infected with HIV, but the association is not statistically significant for women in Burkina Faso and Malawi, and for men in Cameroon, Malawi, and Ethiopia.

In addition, we examine the associations between HIV status and having all injections from a health professional and the use of a new needle at last injection. In most countries studied, these relationships are not statistically significant. But in Malawi men with injections all from a health professional are more likely to be HIV-positive. This relationship may occur because HIV-positive men are more likely to get treatment for HIV and opportunistic infections, and hence receive more medical injections. Additional care should be exercised when interpreting this statistic, as the sample size is small.

The relationship between HIV status and the use of a new needle is only significant among men in Zimbabwe, where those whose most recent injection was administered with a new needle are more likely to be HIV-positive. While this result is unexpected, the respondent's HIV status may be due to other behaviors, such as higher-risk sex, that preceded the use of a new needle.

Table 12. HIV prevalence by receipt of medical injections

HIV prevalence among women and men age 15-49 who received a medical injection in the recent past, who received 3+ medical injections in the recent past, who received all recent medical injections from a health professional, and who received their most recent medical injection using a new needle, DHS/AIS 2003-2006

	Recently received a medical injection			Recently received 3+ medical injections			All injections from a health care professional[1,2]			Most recent injection from a new needle[1]		
Country/year/sex	Yes	No	*p*-value	Yes	No	*p*-value	Yes	No	*p*-value	Yes	No	*p*-value
Burkina Faso 2003[a]												
Women	1.4	1.9	0.444	2.2	1.8	0.734	1.4	*	0.739	n/a	n/a	n/a
Men	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Cameroon 2004[a]												
Women	9.7	6.1	0.000	13.5	6.3	0.000	n/a	n/a	n/a	n/a	n/a	n/a
Men	6.2	3.7	0.001	6.3	4.0	0.053	n/a	n/a	n/a	n/a	n/a	n/a
Tanzania 2003/04												
Women	8.1	7.4	0.309	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Men	8.7	5.4	0.000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Lesotho 2004[a]												
Women	35.0	24.7	0.000	49.2	26.0	0.000	32.4	36.2	0.364	32.5	37.2	0.265
Men	44.5	17.6	0.000	(49.9)	18.8	0.000	45.6	*	0.366	44.8	(43.2)	0.859
Malawi 2004												
Women	15.1	12.6	0.075	14.5	13.2	0.540	15.4	10.3	0.386	n/a	n/a	n/a
Men	16.6	9.3	0.000	14.1	10.1	0.228	17.8	(0.0)	0.015	n/a	n/a	n/a
Uganda 2004/05[b]												
Women	8.5	6.4	0.000	10.2	6.1	0.000	8.5	6.4	0.000	n/a	n/a	n/a
Men	6.8	3.9	0.000	8.5	3.9	0.000	6.8	3.9	0.000	n/a	n/a	n/a
Ethiopia 2005												
Women	2.3	1.7	0.109	3.2	1.6	0.004	2.3	3.0	0.787	2.5	1.1	0.271
Men	0.8	1.0	0.730	1.4	0.9	0.247	0.9	0.0	0.411	0.9	0.0	0.372
Zimbabwe 2006[c]												
Women	27.5	20.0	0.000	33.9	20.8	0.000	27.6	30.8	0.799	27.8	23.4	0.509
Men	29.1	13.5	0.000	36.0	14.1	0.000	29.3	*	0.593	32.0	13.0	0.004

Note: Figures in parentheses are based on 25-49 unweighted cases. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

[1]Among those who received any injections in the recent past

[2]Burkina Faso and Malawi: Most recent medical injection from a health professional

[a]In the last 3 months

[b]By a health professional

[c]In the last 6 months

n/a: not available

Blood transfusions are another possible mechanism of HIV exposure. Table 13 shows that in two of the three countries with data available—Cameroon and Uganda—having ever received a blood transfusion is significantly and positively associated with being HIV-positive among women, but not among men. In addition, in Cameroon women who had a blood transfusion in the last five years also are significantly more likely to be HIV-positive.

Table 13. HIV prevalence by receipt of blood transfusions

HIV prevalence among women and men age 15-49 who ever received a blood transfusion, and among those who received a blood transfusion in the last 12 months, DHS/AIS 2003-2006

	Ever received a blood transfusion			Received a blood transfusion in the last 12 months[1]		
Country/year/sex	Yes	No	*p*-value	Yes	No	*p*-value
Cameroon 2004						
Women	12.5	6.4	0.000	13.5	6.5	0.000
Men	4.6	4.1	0.728	5.3	4.1	0.492
Tanzania 2003/04						
Women	n/a	n/a	n/a	7.5	7.7	0.940
Men	n/a	n/a	n/a	*	6.3	0.901
Uganda 2004/05						
Women	10.2	7.4	0.032	9.6	7.5	0.500
Men	3.2	5.1	0.268	*	5.1	0.341

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

[1]In the last 5 years for Cameroon

n/a: not available

5 Key Findings and Conclusions

In most of the sub-Saharan African countries studied, knowledge about avoiding HIV infection by avoiding injections, avoiding having sex with IDUs, and avoiding blood transfusions is low. Few adults perceive themselves to be at risk of HIV infection due to medical injections or blood transfusion.

A considerable proportion of adults report receiving medical injections in the recent past, while in all countries studied men are less likely than women to receive medical injections. Men are also slightly less likely to receive medical injections from health professionals. Women who live in urban areas and who are more educated are more likely to have received three or more medical injections in the recent past. Among men, the urban/rural and educational differentials are less obvious. Chronically ill adults and those who reported having an STI in the past year are, as expected, more likely to receive injections. In two of three countries with available data, a large majority of medical injections are from new needles, with the exception of Lesotho where 27 percent of men received their last injection from a previously used needle. In Uganda, 5 percent of women and 2 percent of men, and in Cameroon 6 percent of women and 4 percent of men, report ever having blood transfusions.

The study finds no clear association between HIV serostatus and knowledge about avoiding HIV infection by avoiding injections, including medical injections, or avoiding having sex with IDUs. However, people who know about avoiding HIV infection by avoiding blood transfusions are likely to be HIV-positive in some countries, with the clear exception of women in Zimbabwe and men in Lesotho, where the reverse holds.

In most countries among women and men, receiving multiple medical injections is significantly positively associated with being HIV-infected. In two countries with data, Cameroon and Uganda, ever having received a blood transfusion is significantly positively associated with being HIV-infected among women.

Several measurement constraints must be kept in mind when interpreting these findings. First, because of the cross-sectional feature of the DHS and AIS surveys, the reported associations may not imply causality. For many HIV-positive adults, the infection may have preceded their medical injections and other behaviors recorded for the 12 months preceding the survey. Second, some of the observed relationships may be due to reverse causality, or to confounding. Reverse causality could result if HIV-related illness leads to greater use of medical injections; and confounding could result if greater use of medical injections occurs due to another risk factor of HIV, such as genital herpes. Third, our analysis is based on self-reported numbers of medical injections and some self-reported behaviors. Thus the findings may be biased to the extent that men and women misreport information.

In addition, although the response rates are reasonably high in these surveys, selection bias due to non-response is still of concern. If HIV-infected individuals with frequent medical injections were less likely to participate in the surveys, then we may have underestimated the association between medical injections and HIV infection. However, previous research has found little evidence that chronically ill adults are less likely to participate in such surveys or that HIV prevalence levels are significantly downwardly biased due to non-response (Mishra et al. 2008).

Moreover, not all data are available for all 10 of the countries, and in some instances the questions asked are not consistent across countries and thus, for some variables, comparisons may not be easy to make. Also, because receiving multiple medical injections, blood transfusion, and HIV infection are relatively rare events, some of the cross-tabulations result in cells with small numbers of cases, which may make the resulting statistics less precise.

Despite these limitations, the study provides new and detailed comparative information on the extent of knowledge of injections-related risk of HIV transmission and presents characteristics of people receiving medical injections in several countries in sub-Saharan Africa, where HIV remains a serious public health problem. The results show that in most countries the knowledge about the risk of HIV infection from unsafe injections and blood transfusions remains low despite years of HIV/AIDS education efforts. In most cases the results also show a significant and positive association between receiving medical injections or blood transfusion and being HIV-infected.

The findings suggest that medical injections and blood transfusion as potential modes of HIV transmission deserve continued research and programmatic attention. Program priorities in sub-Saharan Africa may include focus on promoting knowledge of potential risks of HIV and other infections from unsafe injections and blood transfusion, rational use of medical injections, implementation of the national injection safety and blood safety guidelines, and further scale up of medical injection safety and blood safety programs.

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