HIV PREVALENCE AND ASSOCIATED FACTORS

15

Rwanda has long been considered one of the African countries most affected by the AIDS virus. In fact, the estimated prevalence rates derived from the first survey conducted on a national level in 1986 were 17.8 percent in urban areas and 1.3 percent in rural areas. In 1988, Rwanda established an HIV sentinel surveillance system among pregnant women attending antenatal clinics and among STI-clinic patients. In 1988 and 1991, the first sets of surveillance data were made available. The 1991 data indicated an HIV prevalence of 27 percent in urban areas, 8.5 percent in semi-urban areas, and 2.2 percent in rural areas.

After the April 1994 genocide, a new HIV surveillance system was set up in 1996 with ten sentinel sites. The data gathered that year indicated even higher infection rates: 27 percent among urban residents, 13 percent among semi-urban residents, and 6.9 percent among rural residents. A 1997 study sampled 4,800 people and provided an HIV prevalence rate of 11.1 percent (10.8 percent for men and 11.3 percent for women).

In 2002, the national sentinel surveillance system was expanded, increasing the number of sites to 24, thus providing more precise data than before. The 2002 data showed that prevalence varied between 2.6 percent and 3.6 percent in rural areas and between 7.0 percent and 8.5 percent in urban areas. These prevalence rates do not differ significantly from the 2003 rates, which were between 2.7 percent and 3.6 percent in rural areas and between 6.9 percent and 8.3 percent in urban areas.

HIV testing was included in the 2005 RDHS-III to estimate HIV prevalence using a nationally-representative sample of men and women. In addition, because the test results are linked to socio-demographic and behavioral data on the individuals interviewed, the RDHS-III allows the identification of factors associated with HIV prevalence.

15.1 HIV TESTING PROTOCOL

The third Rwandan Demographic and Health Survey (RDHS-III) was the first to include a blood test to determine HIV prevalence in the general population. Funded by the Ministry of Finance and Economic Planning, the survey was conducted by the *Direction de la Statistique* (currently, the *Institut National de la Statistique du Rwanda* or *INSR*) with the technical assistance of ORC Macro, the U.S. organization in charge of the international Demographic and Health Survey program. The purpose of including the HIV testing in a population-based survey was to estimate HIV prevalence among women age 15 to 49 and among men age 15 to 59.

The protocol for HIV testing was based on the "anonymous-linked" protocol developed by DHS and approved by the Institutional Review Board at ORC Macro, as well as the National Committee on Ethics of Rwanda.

Since the HIV tests were completely anonymous, it was not possible to inform the respondents of their results. However, a voucher listing the 77 voluntary testing facilities (VCTs) operating throughout the nation was distributed to all eligible respondents, whether or not they had agreed to be tested for HIV. The testing centers would offer free counseling and HIV testing to anyone presenting the card.

The blood drawing for the HIV test was conducted among the 5,322 households selected for the male survey. Blood was drawn from men age 15 to 59 and women 15 to 49 who had voluntarily accepted the testing.

Training of the survey interviewers

Those responsible for the survey at the INSR, in collaboration with the technical team, recruited 95 people to collect the data during the main survey. Among these, 63 were medically qualified to draw blood. A four-week training workshop covering all aspects of the survey was conducted from January 21 to February 21, 2005. The program included a detailed explanation of the survey questionnaire contents, a presentation of interviewing techniques, instructions on how to fill out the questionnaire form, and training in taking anthropometric measurements. The training included lectures and practice interviews, both in class and in the field. Each trainee conducted at least five interviews during the workshop.

A special one-week training session was organized for the people in charge of administering the tests for anemia and HIV. The training dealt with the procedure for obtaining voluntary consent, techniques used for blood drawing, the use of the HemoCue for anemia, referral procedures for those needing treatment for anemia, and referral procedures for VCT facilities. In addition, the session included procedures for handling and storing blood specimens on filter paper prior to their transport to the *Laboratoire National de Référence* (LNR), as well as the procedure for the disposal of bio-contaminated waste. The training also included a detailed presentation on the transfer of dried blood spots from the field to the laboratory. All the office and laboratory staff involved in testing participated in this phase of the training, as did all the field workers. The LNR agents were trained in how to record the test results and how to return these to the INSR once the survey activities were completed.

One-half day was devoted to informing the RDHS-III personnel about the AIDS epidemic, including the means of prevention and the reasons for including the HIV test in the survey. Issues of stigmatization, misconceptions, and confidentiality were touched on during the training. An additional day was devoted to training the team leaders and field editors how to observe field interviews, edit questionnaires that had been filled out, and monitor the blood draw. At the end of the workshop, the field workers were divided into 15 teams, each consisting of a team leader, a field editor, three female interviewers (one of whom was a health technician) and one male interviewer (also a health technician).

Data collection

The data collection began on February 28, 2005 in the districts of the city of Kigali. Starting in the capital city allowed close monitoring of the teams before they continued the survey in the other regions of the country. After two weeks, all the teams—with the exception of two assigned to work in Kigali—were sent out to their respective districts. The data collection was completed on July 13, 2005.

The blood used for HIV testing was obtained using the same finger prick as the anemia test and was collected on filter paper. A label with a bar code was attached to each paper. A second label with the same bar code was attached to the corresponding household questionnaire next to the line indicating the consent of the person tested. A third label with the same bar code was attached to the laboratory transmission slip. The specimens were dried for a minimum of 24 hours in a box containing humidity-absorbing desiccants. The next day each specimen was closed in a Ziploc bag with desiccants and a humidity indicator. The individual bags preserved the specimens until they could be transferred to the INSR in Kigali where they were verified and recorded before being transferred to the LNR.

HIV testing procedure

The LNR was responsible for testing the dried blood spot specimens for HIV antibodies and for the delivery of results to the INSR. The algorithm that was used consisted of testing the specimens with ELISA 1 (Vironostika HIV Uniform II Plus 0 Version 3.3 from Biomerieux BV). This ELISA is the third generation of Sandwich type, which allows the detection of HIV-1, HIV-2, and HIV-1 Group 0. As a highly sensitive detection system, it was used in the first round of testing. Any specimen that presented an optic density (OD) less than the threshold value (T) was considered negative; all above the threshold were considered positive.

The specimens found to be positive using ELISA 1 (Vironostika), as well as 10 percent of the negative samples, were subsequently analyzed with a second ELISA test: Enzygnost Anti-HIV ½ Plus from Dade Behring AG. This ELISA 2 test was used as confirmation because of its specificity in detecting HIV-1 and HIV-2. The antigens used were recombinant proteins. The results were automatically calculated using the ELISA program developed by Dynex Technologies.

All specimens that tested positive using both ELISA 1 and 2 were declared positive. Any discordant results underwent a third test: HIV Blot 2.2.

Data processing and delivery of results

The LNR was provided with the CSPro program developed by ORC Macro and designed especially for the HIV-testing algorithm. As data were entered, the program automatically calculated all entries (number of blood tests, number of positives and negatives according to the different test kits used). Throughout the survey, the LNR furnished the INSR and ORC Macro with aggregated results to monitor the testing process and to detect any abnormal results.

Each specimen transferred to the LNR was identified by a bar code and only this code was entered into the CSPro program with the test results. This confidential file remained the responsibility of the LNR until the end of the survey. Once data entry was complete, and the data files at the INSR had been cleaned and the data had been weighted, a data file was prepared at LNR containing only weighting factors of the respondents (gender, age, residence, marriage status) and was compared with the file at the INSR to verify coherence of the two data banks. to guarantee anonymity, any information allowing identification of the respondents (by cluster or household number) were deleted before merging the two files. The files were then merged to calculate the sociodemographic and behavioral indicators of HIV prevalence.

Internal quality control

Each blood test was recorded in the lab workers' notebooks. Each entry included the date, the name of the technician conducting the test, and the test used with its lot number and expiration date. The LNR used its usual internal control mechanism to monitor the testing: each slide was incorporated into an aliquot (HIV+ or HIV-) and frozen to -70 degrees centigrade. Of the 10 percent negative specimens that were tested, 100 percent proved negative.

External quality control

Since 2001 the LNR has participated in a program of external quality control. This consists of putting HIV antibodies on a coded panel that is sent to an external monitor. The monitoring for the

RDHS-III specimens was done by the Centers for Disease Control and Prevention (CDC) in Atlanta; 100 percent of the negative control samples tested negative.

15.2   COVERAGE OF HIV TESTING

Table 15.1 shows coverage rates for the HIV test among women age 15-49 and men age 15-59 grouped by residence (province and urban-rural), along with the reasons for which the blood draw was not conducted.

Overall, 96.5 percent of eligible respondents provided blood for the HIV test, 1.5 percent refused to have blood drawn, and 1.7 percent were absent, the great majority of whom (1.5 percent) were also absent during the interview. The results showed higher coverage in rural areas than in urban areas (97.4 percent versus 93.6 percent). The higher coverage level among rural residents holds true for both sexes: in rural areas 97.7 percent of women and 97.1 percent of men accepted being tested while in urban areas 95.8 percent of women and 91.0 percent of men were tested.

Table 15.1 Coverage of HIV testing by residence and province

Percent distribution of women age 15-49 and men age 15-59 eligible for HIV testing by testing status, according to residence and province (unweighted), Rwanda 2005

Testing status	Residence		Province					Total
	Urban	Rural	Kigali city	South	West	North	East	
Women 15-49								
Tested	95.8	97.7	94.2	98.4	96.2	96.7	99.4	97.3
Refused	2.3	0.7	3.1	0.5	1.6	1.0	0.1	1.1
Absent for testing	1.5	1.4	2.0	0.8	1.9	2.3	0.6	1.4
Interviewed in survey	0.2	0.1	0.3	0.1	0.0	0.2	0.3	0.2
Not interviewed	1.3	1.3	1.7	0.7	1.9	2.1	0.2	1.3
Other/missing	0.4	0.2	0.7	0.3	0.3	0.0	0.0	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Unweighted number	1,339	4,498	687	1,431	1,533	938	1,248	5,837
Men 15-59								
Tested	91.0	97.1	87.3	96.7	95.8	96.6	98.7	95.6
Refused	5.4	0.8	7.9	1.1	1.5	0.8	0.4	1.9
Absent for testing	2.8	1.8	3.8	1.6	2.4	2.5	0.7	2.1
Interviewed in survey	0.4	0.2	0.6	0.2	0.1	0.3	0.2	0.2
Not interviewed	2.4	1.7	3.2	1.4	2.4	2.2	0.6	1.8
Other/missing	0.8	0.3	1.1	0.6	0.3	0.1	0.2	0.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Unweighted number	1,183	3,776	659	1,180	1,274	769	1,077	4,959
Total								
Tested	93.6	97.4	90.8	97.6	96.0	96.7	99.1	96.5
Refused	3.8	0.7	5.4	0.8	1.6	0.9	0.2	1.5
Absent for testing	2.1	1.6	2.9	1.1	2.1	2.4	0.6	1.7
Interviewed in survey	0.3	0.1	0.4	0.1	0.0	0.2	0.3	0.2
Not interviewed	1.8	1.5	2.5	1.0	2.1	2.2	0.4	1.5
Other/missing	0.6	0.3	0.9	0.5	0.3	0.1	0.1	0.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Unweighted number	2,522	8,274	1,346	2,611	2,807	1,707	2,325	10,796

The following four categories explain the cases in which the blood draw for the test did not take place.

- Those who refused to have blood drawn (in total, 1.5 percent). Urban male residents account for the highest level of refusal (5.4 percent) while rural female residents account for the lowest level (0.7 percent).

- Those who responded to the survey but were not at home when blood was drawn: 0.3 percent of urban residents and 0.1 percent of rural residents. In all, 0.2 percent of respondents were absent during the blood draw.

- Those who were not at home for the survey interview or the blood test: 1.8 percent in urban areas and 1.5 percent in rural areas.

- Those who were not tested for other reasons (such as inability to give informed consent or technical difficulties in drawing blood): 0.6 percent among urban residents and 0.3 percent among rural residents.

Table 15.2 shows coverage rates of the HIV test according to age, education level, and household wealth quintile. Overall, these results show few significant differences in the HIV test coverage by sociodemographic characteristics, for either women or men. The proportion of women who participated in the HIV testing varied from 96.1 percent among those age 15 to 19 to 98.8 percent among those age 40 to 44. There were minimal differences according to household wealth; these varied from 94.5 percent among women in wealthier households to 98.1 percent among women in the second quintile. Education levels showed little difference in participation, varying from 96.3 percent among women having at least secondary education to 97.5 percent among those who attended only primary school.

The coverage rates among men ranged from 92.2 percent among those age 30-34 to 98.5 percent among those age 50-54. As with women, men in the wealthiest households have the lowest participation rates (90.9 percent) while men in the poorest households have the highest rates (97.9 percent). Distributed by the level of education, coverage among male respondents shows a clear difference from female respondents, although the difference is minimal (92.4 percent among those with secondary education or higher and 96.6 percent among those with only primary school).

Tables A.5 and A.6 in Appendix A show participation rates distributed according to background characteristics of the respondents. Overall, analysis of these rates shows no systematic relation between participation in the test and variables associated with higher risk of HIV infection. These results indicate that the estimated prevalence rates from the 2005 RDHS-III provide an unbiased measure of HIV prevalence in the general population.

Table 15.2 Coverage of HIV testing by background characteristics

Percent distribution of women age 15-49 and men age 15-59 eligible for HIV testing by testing status, according to background characteristics (unweighted), Rwanda 2005

Background characteristic	Tested Interviewed in survey	Tested Not interviewed	Refused Interviewed in survey	Refused Not interviewed	Absent for testing Interviewed in survey	Absent for testing Not interviewed	Other/missing Interviewed in survey	Other/missing Not interviewed	Total	Unweighted number
WOMEN										
Age										
15-19	96.1	0.1	1.2	0.1	0.1	2.2	0.1	0.1	100.0	1,372
20-24	96.4	0.2	0.7	0.3	0.4	1.6	0.2	0.3	100.0	1,178
25-29	96.3	0.7	1.4	0.5	0.1	0.7	0.2	0.1	100.0	870
30-34	98.5	0.1	0.7	0.2	0.0	0.1	0.0	0.2	100.0	824
35-39	96.7	0.2	1.6	0.2	0.2	1.2	0.0	0.0	100.0	570
40-44	98.8	0.2	0.0	0.2	0.0	0.9	0.0	0.0	100.0	561
45-49	98.1	0.4	0.0	0.0	0.0	1.3	0.0	0.2	100.0	462
Education										
No education	96.6	0.5	0.5	0.2	0.2	2.1	0.0	0.0	100.0	1,312
Primary	97.5	0.2	0.8	0.1	0.2	1.1	0.1	0.2	100.0	3,298
Secondary or higher	96.3	0.2	1.5	0.5	0.2	0.9	0.2	0.2	100.0	1,227
Wealth quintile										
Lowest	97.8	0.2	0.3	0.2	0.0	1.3	0.1	0.2	100.0	1,178
Second	98.1	0.4	0.2	0.0	0.1	1.1	0.1	0.1	100.0	1,138
Middle	97.5	0.1	0.7	0.3	0.2	1.3	0.0	0.0	100.0	1,031
Fourth	97.7	0.1	0.5	0.1	0.1	1.3	0.2	0.1	100.0	1,156
Highest	94.5	0.4	2.4	0.4	0.4	1.4	0.1	0.3	100.0	1,334
Total	97.0	0.2	0.9	0.2	0.2	1.3	0.1	0.1	100.0	5,837
MEN										
Age										
15-19	95.6	0.2	1.1	0.4	0.0	2.4	0.1	0.3	100.0	1,109
20-24	95.3	0.3	1.8	0.0	0.3	1.8	0.1	0.3	100.0	982
25-29	94.9	0.6	1.5	0.6	0.4	1.5	0.0	0.4	100.0	668
30-34	92.2	0.4	3.3	0.7	0.7	2.2	0.0	0.4	100.0	540
35-39	95.3	0.2	1.6	0.5	0.0	2.0	0.2	0.2	100.0	443
40-44	95.3	0.0	1.2	0.5	0.2	2.1	0.0	0.7	100.0	422
45-49	97.7	0.3	0.8	0.3	0.0	0.8	0.0	0.3	100.0	384
50-54	98.5	0.0	0.4	0.0	0.0	0.8	0.4	0.0	100.0	265
55-59	95.9	0.7	2.1	0.0	0.0	0.7	0.0	0.7	100.0	146
Education										
No education	95.1	0.5	1.1	0.1	0.0	2.8	0.0	0.5	100.0	852
Primary	96.6	0.2	1.1	0.2	0.2	1.4	0.0	0.3	100.0	2,963
Secondary or higher	92.4	0.4	3.0	0.9	0.4	2.3	0.3	0.3	100.0	1,144
Wealth quintile										
Lowest	97.9	0.0	0.5	0.1	0.0	1.3	0.2	0.0	100.0	838
Second	96.3	0.1	0.5	0.1	0.1	2.0	0.0	0.8	100.0	845
Middle	96.4	0.3	0.7	0.4	0.3	1.7	0.0	0.1	100.0	951
Fourth	97.1	0.3	1.1	0.1	0.0	1.1	0.0	0.4	100.0	1,031
Highest	90.9	0.5	3.9	0.8	0.5	2.8	0.2	0.4	100.0	1,294
Total	95.3	0.3	1.6	0.3	0.2	1.8	0.1	0.3	100.0	4,959

15.3 HIV PREVALENCE

15.3.1 HIV Prevalence Distribution According to Sociodemographic Variables

According to the 2005 RDHS-III, HIV prevalence in the Rwandan population age 15-49 is 3 percent (Table 15.3). HIV prevalence among women age 15-49 (3.6 percent) is higher than that of men in the same age group (2.3 percent). The infection ratio between women and men is therefore equal to 1.6, which means that 160 women are infected for every 100 men.

Table 15.3 HIV prevalence by age

Percentage HIV positive among women age 15-49 and men age 15-59 by age, Rwanda 2005

Age	Women 15-49		Men 15-59		Total	
	Percentage HIV positive	Number	Percentage HIV positive	Number	Percentage HIV positive	Number
15-19	0.6	1,316	0.4	1,087	0.5	2,403
20-24	2.5	1,142	0.5	939	1.6	2,080
25-29	3.4	833	2.1	628	2.9	1,461
30-34	5.9	806	4.2	497	5.2	1,303
35-39	6.9	540	2.3	432	4.8	972
40-44	6.3	554	7.1	401	6.6	955
45-49	4.1	464	5.3	378	4.6	842
50-54	na	na	1.7	259	na	na
55-59	na	na	0.8	143	na	na
Total 15-49	3.6	5,656	2.3	4,361	3.0	10,016
Total 15-59	na	na	2.2	4,763	na	na

na = Not applicable

Figure 15.1 shows that for both women and men, HIV prevalence increases with age. However, the highest prevalence among women is in the 35-39 age group (6.9 percent), whereas among men it is in the 40-44 age group (7.1 percent). Up until age 35-39, the proportion of infected women is higher than the proportion of infected men. Afterward, this pattern is reversed (at age 45-49, 5.3 percent of men are positive, compared with 4.1 percent of women).

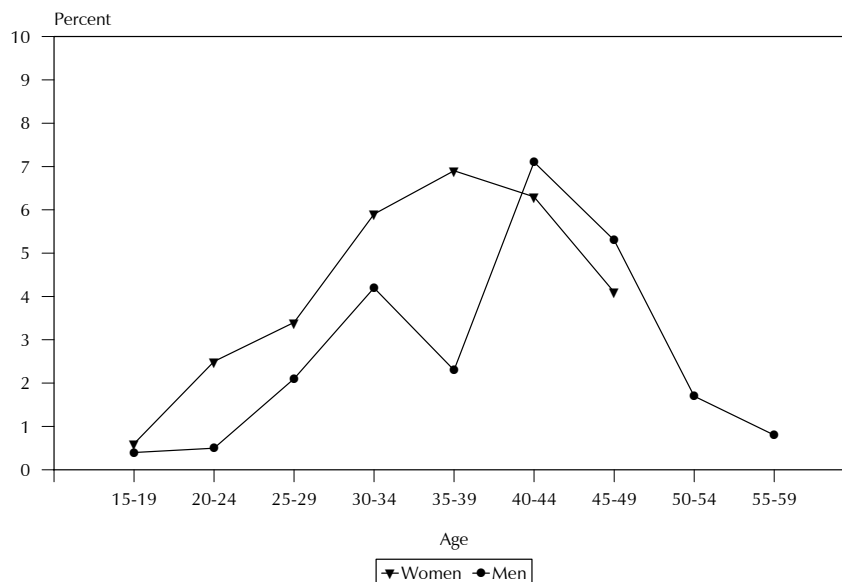### Figure 15.1 HIV Prevalence by Sex and Age

RDHS 2005

Table 15.4 shows HIV prevalence according to sociodemographic characteristics. The prevalence rate is higher in urban areas than in rural areas (7.3 percent versus 2.2 percent). The differential is seen for both women and men: 8.6 percent versus 2.6 percent for women and 5.8 percent versus 1.6 percent for men.

Table 15.4 HIV prevalence by background characteristics

Percentage HIV positive among women and men age 15-49 who were tested, by background characteristics, Rwanda 2005

Background characteristic	Women		Men		Total	
	Percentage HIV positive	Number	Percentage HIV positive	Number	Percentage HIV positive	Number
Residence						
Urban	8.6	946	5.8	774	7.3	1,720
Rural	2.6	4,710	1.6	3,587	2.2	8,297
Province						
Kigali city	8.0	556	5.2	487	6.7	1,043
South	3.1	1,501	2.0	1,126	2.7	2,627
West	3.7	1,406	2.4	1,051	3.2	2,458
North	2.6	1,019	1.1	773	2.0	1,792
East	2.9	1,173	2.1	923	2.5	2,096
Education						
No education	3.3	1,278	3.0	716	3.2	1,994
Primary	2.8	3,251	1.8	2,668	2.3	5,919
Secondary or higher	6.4	1,127	3.2	977	4.9	2,104
Employment						
Currently working	4.0	3,386	2.7	2,209	3.5	5,594
Not currently working	3.0	2,245	1.8	2,127	2.4	4,371
Wealth quintile						
Lowest	2.6	1,204	1.3	791	2.1	1,994
Second	2.2	1,193	1.7	788	2.0	1,981
Middle	3.6	1,042	2.0	881	2.9	1,923
Fourth	3.4	1,110	2.1	892	2.8	2,001
Highest	6.5	1,108	4.1	1,010	5.4	2,117
Religion						
Catholic	3.9	2,574	2.4	2,201	3.2	4,775
Protestant	3.3	2,123	2.3	1,423	2.9	3,546
Adventist	2.5	711	2.1	531	2.3	1,242
Muslim	11.4	102	1.6	87	6.9	188
Other/missing	3.2	146	2.9	119	3.1	265
Total	3.6	5,656	2.3	4,361	3.0	10,016

By province, HIV prevalence is higher in the city of Kigali than in the rest of the country. In Kigali, 8.0 percent of women are seropositive, while prevalence ranges from 2.6 percent in North province to 3.7 percent in West province. Among men, the prevalence in Kigali is estimated at 5.2 percent, while in the interior, it ranges from 1.1 percent in North province to 2.4 percent in West province.

Results by level of education show higher prevalence among women with at least secondary education (6.4 percent) compared with those with primary education (2.8 percent). Among men, as with women, the lowest prevalence is found among men who attended primary school (1.8 percent). However, the difference between men with no schooling and those with secondary or higher education is insignificant (3.0 percent versus 3.2 percent). HIV infection rates also vary by employment status. With women as with men, those who were employed at the time of the survey showed a slightly higher

prevalence than those who were not (4.0 percent versus 3.0 percent for women and 2.7 percent versus 1.8 percent for men).

Looking at household wealth, the highest HIV prevalence is found in the wealthiest quintile: 6.5 percent for women and 4.1 percent for men. By religion, prevalence ranges from 2.5 percent among Adventist women to 11.4 percent among Muslim women. For men, the differences are smaller, varying from 1.6 percent among Muslims to 2.4 percent among Catholics.

Table 15.5 shows HIV prevalence with 95 percent confidence intervals for certain background characteristics.

Table 15.5 HIV prevalence and confidence intervals

Percentage HIV positive among women and men age 15-49 and 95 % confidence intervals, by age and residence, Rwanda 2005

Background characteristic	Women			Men			Total		
	-2 SD	**Value**	+2 SD	-2 SD	**Value**	+2 SD	-2 SD	**Value**	+2 SD
Age									
15-19	0,2	**0,6**	1,1	0,0	**0,4**	0,8	0,2	**0,5**	0,9
20-24	1,6	**2,5**	3,4	0,0	**0,5**	0,9	1,0	**1,6**	2,1
25-29	2,1	**3,4**	4,7	1,0	**2,1**	3,3	2,0	**2,9**	3,7
30-34	4,3	**5,9**	7,5	2,2	**4,2**	6,2	3,9	**5,2**	6,5
35-39	4,8	**6,9**	9,0	0,9	**2,3**	3,7	3,4	**4,8**	6,3
40-44	4,3	**6,3**	8,4	4,4	**7,1**	9,7	5,0	**6,6**	8,2
45-49	2,1	**4,1**	6,1	3,0	**5,3**	7,6	3,1	**4,6**	6,2
Residence									
Urban	6,9	**8,6**	10,3	4,2	**5,8**	7,3	6,0	**7,3**	8,6
Rural	2,1	**2,6**	3,1	1,1	**1,6**	2,1	1,8	**2,2**	2,6
Total	3,1	**3,6**	4,1	1,8	**2,3**	2,8	2,6	**3,0**	3,5

15.3.2 HIV Prevalence by Demographic Variables

There are large variations in HIV prevalence by marriage status (Table 15.6). A total of 1.6 percent of never-married women are HIV positive, versus 2.8 percent of married women. Rates rise to 10.9 percent among divorced or separated women and 15.9 percent among widows. Similarly, divorced men show higher prevalence than married men (5.1 percent of divorced men versus 3.5 percent of married men and 0.9 percent of never-married men). Results by type of union indicate higher prevalence among women in polygamous unions (4.7 percent) than among those in monogamous unions (2.5 percent). Among men, HIV prevalence is higher in monogamous unions (3.5 percent) than polygamous unions (2.3 percent).

HIV prevalence is slightly higher among women who were not pregnant or were unsure at the time of the survey (3.7 percent) than among women who were pregnant (2.2 percent).

The data did not suggest a correlation between HIV prevalence and the number of times respondents slept away from home during the past 12 months.

Table 15.6 HIV prevalence by sociodemographic characteristics

Percentage HIV positive among women and men age 15-49 who were tested, by sociodemographic characteristics, Rwanda 2005.

Sociodemographic characteristic	Women Percentage HIV positive	Women Number	Men Percentage HIV positive	Men Number	Total Percentage HIV positive	Total Number
Marital status						
Never in union	1.6	2,179	0.9	2,164	1.2	4,343
Ever had sex	4.8	421	2.1	826	3.0	1,247
Never had sex	0.8	1,758	0.2	1,338	0.5	3,096
Currently in union	2.8	2,716	3.5	2,091	3.1	4,807
Widowed	15.9	227	*	21	15.8	248
Divorced/separated	10.9	519	5.1	73	10.2	592
Type of union						
In polygynous union	4.7	325	2.3	101	4.2	427
Not in polygynous union	2.5	2,368	3.5	1,987	3.0	4,355
Not currently in union	4.3	2,925	1.2	2,257	3.0	5,183
Currently pregnant						
Pregnant	2.2	431	na	na	na	na
Not pregnant/not sure	3.7	5,224	na	na	na	na
Circumcision status						
Circumcised	na	na	3.8	418	na	na
Not circumcised	na	na	2.1	3,909	na	na
Number of times slept away						
None	3.2	4,378	2.2	3,225	2.8	7,603
1-2	4.6	946	2.2	662	3.6	1,608
3-4	6.6	214	3.0	237	4.7	451
5+	3.3	97	2.4	208	2.7	305
Away for more than one month						
Away for more than 1 month	3.6	216	1.9	342	2.6	559
Away always for < 1 month	5.0	1,039	2.7	738	4.0	1,776
Never away	3.2	4,378	2.2	3,225	2.8	7,603
Birth in the past 3 years						
No birth	3.9	3,364	na	na	na	na
Birth and antenatal care	2.8	2,162	na	na	na	na
Birth, no antenatal care	8.8	130	na	na	na	na
Total[1]	3.6	5,656	2.3	4,361	3.0	10,016

Note: An asterisk indicates than a figure is based on fewer than 25 unweighted cases and has been suppressed.
na = Not applicable
[1] Includes women and men with missing information

15.3.3 HIV Prevalence by Sexual Behavior Characteristics

Overall, HIV prevalence among respondents who have ever had sexual intercourse is estimated at 4.2 percent; 3.3 percent among women and 4.9 percent among men (Table 15.7).

There is no clear correlation between HIV prevalence and age of first sexual intercourse, whether respondent is male or female. Those who had sex before age 16 have the lowest prevalence (4.2 percent for women and 1.4 percent for men) and those whose first intercourse was at age 16-17 have the highest prevalence (5.2 percent for women and 4.6 percent for men).

Table 15.7 HIV prevalence by sexual behavior characteristics

Percentage HIV positive among women and men age 15-49 who ever had sex and were tested for HIV, by sexual behavior characteristics, Rwanda 2005.

Sexual behavior characteristic	Women Percentage HIV positive	Women Number	Men Percentage HIV positive	Men Number	Total Percentage HIV positive	Total Number
Age at first sex						
< 15	4.2	423	1.4	549	2.6	973
15-17	5.2	680	4.6	400	5.0	1,080
18-19	4.7	991	3.9	608	4.4	1,600
20+	4.9	1,675	3.2	1,442	4.1	3,117
Missing	6.4	128	*	22	7.0	150
Higher-risk sex[1] in past 12 months						
Had higher-risk sex	8.2	251	2.7	379	4.9	630
Had sex, not higher-risk sex	3.0	2,650	3.5	1,980	3.2	4,630
No sex in past 12 months	8.9	997	2.9	663	6.5	1,660
Number of lifetime sexual partners						
1	3.0	2,694	1.2	1,154	2.4	3,848
2	8.1	835	2.9	768	5.6	1,603
3-4	12.1	302	4.2	750	6.4	1,052
5-9	9.1	39	7.8	233	8.0	272
10+	*	9	11.7	97	11.7	106
Number of partners in past 12 months						
0	8.9	997	2.9	663	6.5	1,660
1	3.5	2,882	3.3	2,238	3.4	5120
2+	*	19	4.1	121	4.6	140
Number of higher-risk sexual partners in past 12 months						
0	4.6	3,647	3.3	2,643	4.1	6,290
1	8.1	239	2.6	356	4.8	595
2+	*	13	*	22	(7.1)	35
Paid for sex in past 12 months						
Yes	na	na	(6.3)	38	na	na
No	na	na	3.2	2,984	na	na
Any condom use						
Ever used condom	15.5	157	7.5	543	9.3	700
Never used condom	4.4	3,741	2.3	2,479	3.6	6,220
Condom use at last sex in past 12 months						
Used a condom	23.4	88	12.8	140	16.9	228
Did not use a condom	2.9	2,813	2.8	2,219	2.8	5,032
Condom use at last higher-risk sex in past 12 months						
Used a condom	15.9	56	4.2	142	7.5	198
Did not use a condom	6.0	195	1.7	236	3.7	431
Total	4.9	3,898	3.3	3,022	4.2	6,920

Note: An asterisk indicates that an figure is based on fewer than 25 unweighted cases and has been suppressed. Figures in parentheses are based on 25-49 unweighted cases. Total includes respondents with missing information on sexual behavior.
na = Not applicable
[1] Sex with a person who is neither married to nor lives with the respondent

Table 15.7 also shows prevalence rates by whether the respondent engaged in higher-risk sexual intercourse. Paradoxically, it is not only women who have engaged in higher-risk sex, but also those who had no intercourse in the past 12 months that prevalence rates are the highest (8.2 percent and 8.9 percent, respectively). Among male respondents, prevalence is slightly higher among those who engaged in sex but not higher-risk sex (3.5 percent) in the past 12 months, compared with men who had higher-risk sex or no sex at all (less than 3 percent).

Generally, HIV prevalence increases with increasing number of lifetime sexual partners. Thus, prevalence varies from 1.2 percent for men who have had only one partner during their life to 4.2 percent for those who have had 3-4 partners, to 11.7 percent for those who have had at least 10 partners. For women, prevalence increases from 3.0 percent for those who have had one sexual partner during their life to 12.1 percent to those who have had 3-4 partners.

Paradoxically, HIV prevalence is 8.9 percent among women who have had no sexual partner in the past 12 months and 3.5 percent among those who have had only one partner. In contrast, the prevalence among men who have had two partners during the past 12 months is 4.1 percent, higher than among those who have had a single partner (3.3 percent) or those who have had no partners (2.9 percent). Women who engage in higher-risk sex tend to have higher HIV prevalence: 8.1 percent among women who have had a higher-risk partner during the past 12 months and 4.6 percent among those who have not.

Regarding condom use during the past year—whether at the last sexual intercourse or at the last higher-risk sexual intercourse—it can be seen that HIV prevalence is higher among male and female condom users than among those who have not used condoms. It is difficult to establish the exact relationship between condom use and HIV. Condoms could be used by those who are HIV negative to protect themselves from the disease, but they could also be used by those who are seropositive to protect their partners. It is the latter pattern that emerges from the RDHS-III data.

15.3.4 HIV Prevalence among Youth

Table 15.8 shows HIV prevalence among youth age 15-24 by sociodemographic and sexual behavioral characteristics. Prevalence among youth gives an indication of the level of recent infections and is an indirect estimate of the number of new cases.

HIV prevalence among youth age 15-24 is estimated at 1.0 percent. This figure varies from 1.5 percent among women to 0.4 percent among men, which gives a ratio of infection of 3.8 between women and men. In other words, 380 women in this age group are infected for every 100 men. This ratio is 2.4 times higher than that of the combined 15-49 age group.

Overall, the results in Table 15.8 indicate an increase in seroprevalence by age up through 20-22 years, the age group with the highest rate (1.7 percent). Subsequently, rates begin to decrease among the 23-24 age group (1.4 percent). Whatever the age group, prevalence among women is always higher than prevalence among men. It increases less rapidly among young men and never surpasses 1 percent; the highest level is among men age 18-19 (0.8 percent). Among women, prevalence is highest in the 20-22 age group (2.7 percent). The ratio is particularly high in this age group (6.8).

HIV prevalence is higher in urban areas than rural areas (2.7 percent versus 1.7 percent). The differences are seen for both sexes. Across regions, seroprevalence among young women ranges from 0.5 percent in the South province to 4.2 percent in the city of Kigali. For young men, HIV prevalence is the highest in the city of Kigali (1.4 percent). Note that in the North province, seroprevalence is higher among young men (1.1 percent) than young women in the same age group (0.8 percent).

By marital status, the highest prevalence is among women who are separated, divorced, or widowed (3.8 percent versus 1.2 percent for married women and 1.7 percent of never-married women). Noteworthy is the 1.6 percent of young never-married women who reported never having had sex but are nonetheless HIV positive. The finding indicates that they were infected by another means or they falsely reported not having had sex.

Table 15.8 HIV prevalence among young people

Percentage HIV positive among women and men age 15-24 who were tested for HIV, by background characteristics, Rwanda 2005

Background characteristic	Women		Men		Total	
	Percentage HIV positive	Number	Percentage HIV positive	Number	Percentage HIV positive	Number
Age						
15-17	0.3	826	0.2	691	0.3	1,517
18-19	1.2	490	0.8	396	1.0	887
20-22	2.7	720	0.4	611	1.7	1,331
23-24	2.2	421	0.5	328	1.4	749
Residence						
Urban	3.9	431	1.1	348	2.7	779
Rural	1.0	2,027	0.3	1,678	0.7	3,705
Province						
Kigali city	4.2	271	1.4	224	2.9	495
South	0.5	616	0.0	544	0.3	1,161
West	2.2	656	0.4	487	1.4	1,143
North	0.8	409	1.1	344	0.9	754
East	0.9	505	0.0	427	0.5	932
Marital status						
Never married	1.7	1,145	0.4	1,850	0.9	2,995
Ever had sex	1.9	429	0.9	621	1.3	1,050
Never had sex	1.6	716	0.2	1,229	0.7	1,946
Currently in union	1.2	1,251	0.5	166	1.1	1,418
Divorced/separated/widowed	3.8	61	*	10	3.8	71
Relative age of first sexual partner						
10+ years older	(10.4)	38	na	na	na	na
<10 years older/same age/younger/don't know	1.4	2,419	na	na	na	na
Higher-risk intercourse in past 12 months						
Had higher-risk intercourse	3.3	108	1.5	171	2.2	279
Had intercourse, not higher risk	2.9	514	0.5	164	2.3	679
No sexual intercourse in last 12 months	1.0	1,835	0.3	1,691	0.7	3,526
Number of sexual partners in past 12 months						
0	1.0	1,835	0.3	1,691	0.7	3,526
1	3.0	618	1.1	320	2.3	938
2+	*	5	*	15	*	20
Number of higher-risk partners in past 12 months						
0	1.4	2,349	0.3	1,855	0.9	4,204
1	3.4	105	1.6	160	2.3	265
2+	*	4	*	11	*	15
Condom use						
Ever used a condom	7.3	51	2.1	163	3.4	214
Never used a condom	1.4	2,407	0.3	1,863	0.9	4,270
Condom use at last sex in past 12 months						
Used condom at last sex	(11.7)	38	1.5	63	5.3	102
Did not use condom	2.4	584	0.9	272	1.9	856
Condom use at first sex						
Used a condom	5.9	54	1.4	92	3.0	146
Did not use a condom	1.4	2,403	0.4	1,934	1.0	4,338
Total	1.5	2,458	0.4	2,026	1.0	4,484

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

Seroprevalence is higher among respondents who engaged in higher-risk sex, especially women (3.3 percent versus 1.5 percent for men). At the same time, it should be noted that among both men and women, prevalence is higher for those using condoms than for those not using condoms; this difference is greater among young women (7.3 percent using condoms versus 1.4 percent not using condoms) than among young men (2.1 percent versus 0.3 percent).

15.3.5 HIV Prevalence and Other Risk Factors

Table 15.9 shows STI prevalence for women and men who have ever had and whether the respondent was tested for HIV before the survey. HIV prevalence is markedly higher among those who reported they already had an STI or symptoms of an STI. Among women who reported having an STI or symptoms of an STI in the past 12 months, HIV prevalence is 18.1 percent compared with 4.2 percent among those who reported that they did not have an STI or symptoms of an STI. For men who reported having an STI or symptoms of an STI in the past 12 months, prevalence is 9.9 percent versus 3.0 percent for those who have not had an STI or symptoms of an infection.

Table 15.9 HIV prevalence by other characteristics

Percentage HIV positive among women and men age 15-49 who ever had sex and who were tested, by other characteristics, Rwanda 2005

Characteristic	Women		Men		Total	
	Percentage HIV positive	Number	Percentage HIV positive	Number	Percentage HIV positive	Number
Sexually transmitted infection in past 12 months						
Had STI or STI symptom	18.1	204	9.9	83	15.7	287
No STI, no symptoms	4.2	3,646	3.0	2,907	3.7	6,554
HIV testing status						
Ever tested	9.5	665	4.3	826	6.6	1,492
Received results	10.0	603	4.2	759	6.8	1,362
Did not receive results	4.5	62	5.5	67	5.0	129
Never tested	3.9	2,690	2.8	2,183	3.4	4,873
Total[1]	4.9	3,898	3.3	3,022	4.2	6,920

[1] Includes men and women with missing information.

HIV prevalence among men who had never been tested previously for HIV is lower than among women (2.8 percent and 3.9 percent, respectively).

Table 15.10 provides additional information about the relation between a previous HIV test and the respondent's HIV status. This is useful for measuring infected respondents' knowledge of their HIV status prior to the HIV test done during the RDHS-III.

Among seropositive women, more than half (56.2 percent) did not know their status because they had never been tested for HIV before the survey. Among seropositive men, 66 percent did not know their status, either because they had never been tested (62 percent), or, if they had been, had never received their results (3.7 percent). Although the proportion of women and men who are aware of their HIV status is higher among seropositive respondents (31.3 percent and 31.6 percent, respectively) than among the HIV negative respondents (12.3 percent for women and 19.5 percent for men), a large proportion of those infected with HIV do not know they carry the virus and should therefore take the necessary measures to avoid transmitting the infection.

Table 15.10 Prior HIV testing by HIV status

Percent distribution of women and men age 15-49 who were tested for HIV by whether they were tested prior to the survey, and whether they received the test results, according to HIV status (positive or negative), Rwanda 2005

HIV testing prior to the survey	Women		Men		Total	
	HIV positive	HIV negative	HIV positive	HIV negative	HIV positive	HIV negative
Previously tested and received results of last test	31.3	12.3	31.6	19.5	31.4	15.4
Previously tested and did not receive results of last test	0.0	0.0	3.7	1.4	1.2	0.6
Not previously tested	56.2	76.8	62.4	78.5	58.3	77.5
Missing	12.5	11.0	2.3	0.6	9.1	6.4
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number	204	5,451	101	4,260	305	9,711

15.3.6 HIV Prevalence and Male Circumcision

The RDHS-III included questions on whether men had been circumcised. These data can be used to examine possible relationships between HIV prevalence and male circumcision. Among men age 15 to 59 who were tested for HIV, 9 percent had been circumcised.

Table 15.11 indicates higher prevalence of HIV among circumcised males (3.5 percent) than among uncircumcised males (2.1 percent). This pattern is found for all sociodemographic variables, except urban residence, where prevalence among circumcised men (5.0 percent) is slightly lower than among uncircumcised men (5.7 percent).

15.3.7 HIV Prevalence among Couples

Table 15.12 presents HIV prevalence rates for couples living together, and in which both partners were tested. HIV status was obtained of both partners in a total of 2,231 couples.

In 96.0 percent of couples both spouses were HIV negative and in 1.7 percent of couples both spouses were positive. The percentage of couples in which both partners tested positive is especially high in urban areas (5.2 percent), in Kigali (4.5 percent) among couples having at least a secondary education (5.0 percent), and among couples in the wealthiest quintile (4.4 percent).

Table 15.11 HIV prevalence by male circumcision

Among men age 15-59 who were tested for HIV, the percentage HIV positive by whether circumcised, according to background characteristics, Rwanda 2005

Background characteristic	Circumcised		Uncircumcised	
	Percentage HIV positive	Number	Percentage HIV positive	Number
Age				
15-19	2.1	82	0.1	994
20-24	0.0	82	0.5	849
25-29	4.9	76	1.8	548
30-34	3.1	61	4.2	432
35-39	(0.0)	39	2.5	391
40-44	(19.6)	39	5.7	359
45-49	(2.0)	39	5.7	336
50-54	*	20	1.9	238
55-59	*	10	0.9	132
Education				
No education	(5.6)	45	2.4	781
Primary	1.7	222	1.8	2,679
Secondary or higher	5.2	182	2.6	818
Religion				
Catholic	4.7	181	2.1	2,222
Protestant	4.3	142	2.1	1,406
Adventist	0.0	52	2.1	521
Muslim	2.2	65	(0.0)	25
Other/missing	*	7	1.1	105
Residence				
Urban	5.0	210	5.7	609
Rural	2.2	239	1.5	3,669
Total 15-59	3.5	449	2.1	4,278

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

Table 15.12 HIV prevalence among couples

Percent distribution of couples living in the same household, both of whom were tested for HIV, by HIV status, according to background characteristics, Rwanda 2005

Background characteristic	Both HIV positive	Man HIV positive, woman HIV negative	Woman HIV positive, man HIV negative	Both HIV negative	Total	Number
Woman's age						
15-19	(0.0)	(0.0)	(0.0)	(100.0)	(100.0)	25
20-29	1.7	1.1	0.7	96.6	100.0	908
30-39	2.2	1.7	0.9	95.3	100.0	800
40-49	1.3	1.7	1.1	95.9	100.0	498
Man's age						
15-19	*	*	*	*	*	2
20-29	1.3	0.4	0.5	97.8	100.0	538
30-39	1.3	1.1	0.5	97.1	100.0	792
40-49	3.2	2.7	0.6	93.5	100.0	681
50-59	0.0	0.8	3.8	95.3	100.0	218
Age difference between partners						
Woman older	2.0	1.8	0.8	95.4	100.0	278
Same age/man older by 0-4 years	1.3	0.9	0.5	97.2	100.0	992
Man older by 5-9 years	1.4	1.4	0.7	96.5	100.0	586
Man older by 10-14 years	3.4	2.5	0.4	93.8	100.0	225
Man older by 15+ years	2.8	2.2	4.3	90.6	100.0	149
Marital status						
Married	1.7	1.2	0.7	96.4	100.0	1,363
Living together	1.8	1.7	1.1	95.4	100.0	868
Type of union						
Monogamous	1.7	1.3	0.7	96.2	100.0	1,995
Polygynous	1.4	1.3	2.0	95.3	100.0	223
Residence						
Urban	5.2	3.7	2.5	88.7	100.0	285
Rural	1.2	1.1	0.6	97.1	100.0	1,946
Province						
Kigali city	4.5	3.9	1.9	89.7	100.0	145
South	2.0	1.3	0.4	96.3	100.0	569
West	2.2	1.5	0.7	95.7	100.0	597
North	0.8	0.2	0.2	98.8	100.0	426
East	0.9	1.8	1.7	95.5	100.0	493
Woman's education						
None	1.2	1.1	1.1	96.7	100.0	637
Primary	1.3	1.2	0.8	96.7	100.0	1,135
Secondary or higher	3.6	2.4	0.5	93.5	100.0	459
Man's education						
None	0.3	0.2	0.8	98.7	100.0	400
Primary	1.6	2.0	0.9	95.5	100.0	1,555
Secondary or higher	5.0	0.0	1.0	94.1	100.0	216
Wealth quintile						
Lowest	0.9	0.8	0.2	98.2	100.0	449
Second	1.7	0.4	0.2	97.6	100.0	465
Middle	1.0	1.4	0.7	97.0	100.0	459
Fourth	1.3	2.0	1.5	95.2	100.0	499
Highest	4.4	2.7	1.8	91.1	100.0	359
Total[1]	1.7	1.4	0.8	96.0	100.0	2,231

Note: An asterisk indicates that an figure is based on fewer than 25 unweighted cases and has been suppressed. Figures in parentheses are based on 25-49 unweighted cases.
[1] Includes men and women with missing information

In 2.2 percent of cases, only one of the partners was seropositive. In some of these discordant couples the woman was seropositive (0.8 percent), but in most cases it was the man who was seropositive (1.4 percent).

15.4 Sentinel Surveillance System and RDHS-III

In 2003, data from the national sentinel surveillance system indicated that HIV prevalence in Rwanda ranged from 6.9 percent to 8.3 percent in urban areas. This does not differ greatly from the rates observed in 2002, which ranged from 7.0 percent to 8.5 percent. These estimates are also close to the results found in the RDHS-III, where HIV prevalence in urban areas was 7.3 percent (with a 95 percent confidence interval between 6.0 and 8.6 percent).

According to the national sentinel surveillance system, HIV prevalence in rural areas ranged from 2.6 percent to 3.6 percent in 2002 and from 2.7 percent to 3.6 percent in 2003. The RDHS-III estimate for HIV prevalence in rural areas is lower at 2.2 percent (95 percent confidence interval between 1.8 and 2.6 percent). The difference between the sentinel surveillance data and the RDHS-III data for rural residents can be explained primarily by the distribution of the sentinel sites in rural areas.