

HIV PREVALENCE AND ASSOCIATED FACTORS

Lawrence Marum, James N. Muttunga, Francis M. Munene, and Boaz K. Cheluget

This chapter presents information on the coverage of HIV testing among those eligible, the prevalence of HIV in the respondents, and the factors associated with HIV infection in the population. As described in Chapter 1, the 2003 KDHS is the fourth survey in the international DHS program to include HIV testing, and the first to anonymously link the HIV results with key behavioural, social and demographic factors. The HIV prevalence data provide important information to plan the national response, to evaluate programme impact, and to measure progress on the National HIV/AIDS Strategic Plan 2000-2005. The understanding of the distribution of HIV within the population and the analysis of social, biological and behavioural factors associated with HIV infection offer new insights about the HIV epidemic in Kenya that may lead to more precisely targeted messages and interventions.

In Kenya, as in most of sub-Saharan Africa, national HIV prevalence estimates have been derived primarily from sentinel surveillance in pregnant women. Currently, the national sentinel surveillance system consists of 42 sites in government and mission health facilities selected to represent the different groups, regions, and rural and urban populations in the country. For three months each year since 1990, pregnant women registering their first visit to these antenatal clinics (ANCs) and patients with sexually transmitted diseases in the sentinel sites have been anonymously tested for HIV and the results entered, analysed and reported by the National AIDS/STD Control Programme (NAS COP) (Ministry of Health, 2001). The latest round of sentinel surveillance was conducted between May and August 2003, during the same time period as the KDHS.

While the rate of HIV infection in pregnant women has been shown to be a reasonable proxy for the level in the combined male and female adult population in a number of settings (WHO and UNAIDS, 2000), there are several well recognized limitations in estimating the HIV rate in the general adult population from data derived exclusively from pregnant women attending selected antenatal clinics. First, the ANC data do not capture any information on HIV prevalence in non-pregnant women, nor in women who either do not attend a clinic for pregnancy care or receive antenatal care at facilities not represented in the surveillance system.¹ Pregnant women also are more at risk for HIV infection than women who may be avoiding both HIV and pregnancy through the use of condoms or women who are less sexually active and are therefore less likely to become pregnant or expose themselves to HIV. In addition, there may be biases in the ANC surveillance data because HIV infection reduces fertility and because knowledge of HIV status may influence fertility choices. Finally, the rates among pregnant women are not a good proxy for male HIV rates. For example, a WHO study of four cities in sub-Saharan Africa, including Kisumu in Kenya, demonstrated higher risk overall in women compared to men (Buve et al., 2001).

Thus, although the information from the ANC surveillance system has been very useful for monitoring trends in HIV levels in Kenya, the inclusion of HIV testing in the KDHS offers the opportunity to better understand the magnitude and patterns in the infection level in the general reproductive age population in Kenya. The KDHS results are in turn expected to improve the calibration of annual sentinel surveillance data, so that trends in HIV infection can be more accurately measured in the intervals between general population surveys.

¹ Nearly 90 percent of pregnant women in Kenya receive antenatal care; however, 21 percent attend dispensaries, which are not covered in the ANC surveillance system (Chapter 9).

13.1 COVERAGE OF HIV TESTING

Table 13.1 presents the coverage rates for HIV testing by the reason for not being tested according to gender and residence. HIV tests were conducted for 76 percent of the 4,303 eligible women and 70 percent of the 4,183 eligible men. For both sexes combined, coverage was 73 percent, with rural residents more likely to be tested than their urban counterparts (79 percent and 62 percent, respectively). There also were strong differences in HIV testing coverage rates by province. Among both sexes, Nyanza Province, which as discussed later in the chapter has the highest HIV rate among Kenya's provinces, had the highest rate of testing (89 percent), followed by Western (85 percent) and Rift Valley Province (78 percent). Central Province (67 percent) and Nairobi (52 percent) had the lowest testing rates. In every province, women were more likely to be tested than men.

Table 13.1 Coverage of HIV testing by sex and urban-rural residence

Percent distribution of women and men eligible for testing by testing status, according to sex and urban-rural residence, Kenya 2003 (unweighted)

Testing status	Residence		Province								Total
	Urban	Rural	Nairobi	Central	Coast	Eastern	Nyanza	Rift Valley	Western	North Eastern	
WOMEN											
Tested	66.2	81.7	54.5	70.7	80.1	76.1	91.1	81.1	88.0	75.6	76.3
Refused	19.2	11.9	21.5	18.8	14.5	15.1	5.4	11.7	8.7	19.9	14.4
Absent for testing	10.6	3.5	19.5	5.1	3.3	4.6	1.9	3.1	2.4	4.5	6.0
Interviewed in survey	5.9	1.7	11.8	3.0	0.8	2.2	1.4	1.3	1.0	0.0	3.1
Not interviewed	4.7	1.8	7.7	2.2	2.5	2.4	0.6	1.9	1.4	4.5	2.8
Other/missing	4.0	2.9	4.5	5.3	2.0	4.2	1.6	4.1	1.0	0.0	3.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	1,488	2,815	651	738	488	502	514	702	507	201	4,303
MEN											
Tested	58.4	76.7	50.2	62.9	66.2	74.5	87.1	75.7	82.7	74.9	70.3
Refused	16.5	11.2	15.3	16.2	21.4	14.0	3.3	10.0	9.9	13.8	13.0
Absent for testing	20.3	7.9	30.8	13.0	8.8	6.1	6.6	9.4	4.9	11.3	12.2
Interviewed in survey	5.8	2.6	9.8	5.4	3.8	2.8	0.8	1.5	1.1	0.5	3.7
Not interviewed	14.5	5.3	21.1	7.6	5.0	3.4	5.7	8.0	3.9	10.8	8.5
Other/missing	4.8	4.2	3.6	7.8	3.6	5.3	3.1	4.9	2.6	0.0	4.4
Total percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	1,466	2,717	665	739	444	506	488	679	467	195	4,183
TOTAL											
Tested	62.3	79.3	52.4	66.8	73.5	75.3	89.1	78.4	85.4	75.3	73.4
Refused	17.8	11.5	18.4	17.5	17.8	14.6	4.4	10.9	9.2	16.9	13.7
Absent for testing	15.4	5.7	25.2	9.1	5.9	5.4	4.2	6.2	3.6	7.8	9.1
Interviewed in survey	5.9	2.1	10.8	4.2	2.3	2.5	1.1	1.4	1.0	0.3	3.4
Not interviewed	9.6	3.5	14.4	4.9	3.6	2.9	3.1	4.9	2.6	7.6	5.6
Other/missing	4.4	3.5	4.0	6.6	2.8	4.8	2.3	4.5	1.7	0.0	3.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	2,954	5,532	1,316	1,477	932	1,008	1,002	1,381	974	396	8,486

Based on the reason for nonresponse, individuals who were not tested are divided into four categories in Table 13.1:

- those who refused testing when asked for informed consent by the health worker (14 percent overall)

- those who were interviewed in the survey, but who were not at home when the health worker arrived for testing and were not found on callbacks (3 percent)
- those who were not at home for the testing and were never interviewed (6 percent), and
- those who were missing test results for some other reason, such as they were incapable of giving consent for testing, there was a mismatch between the questionnaire and the blood sample, or there was a technical problem in taking blood (4 percent).

Refusal is the most important reason for non-response on the HIV testing component among both women and men. Among men, absence accounts for almost as much non-response as refusal, while it is less important among women. The fact that some respondents were interviewed but not subsequently contacted by the health worker is partly due to having only one health worker per team, which contributed to delays in the time of arrival of the health worker after the interview.

The proportions falling into the four non-response categories vary markedly by urban-rural residence. Refusal rates are higher among urban women and men (19 percent for women and 17 percent for men) than among their rural counterparts (12 percent for women and 11 percent for men). Absence was the main reason for non-response among urban men. Fifteen percent of urban men were not interviewed nor tested, compared with 5 percent of urban women, while in rural areas, only 5 percent of men and 2 percent of women were neither interviewed nor tested. Similarly, higher proportions of urban women and men (6 percent among both sexes) were interviewed but were not at home when the health worker visited to collect the blood sample, compared to rural residents (2 percent of women and 3 percent of men).

Looking at the provincial patterns, Nairobi had the highest rate of refusal in women (22 percent), the highest proportions absent for the interview (8 percent of women and 21 percent of men), and the highest level of those interviewed but absent for testing (12 percent of women and 10 percent of men). Nyanza had the lowest rates of refusal among both women (5 percent) and men (3 percent). Nyanza also had the lowest proportions of women absent for testing (under 2 percent), while men were least likely to be absent in Western (5 percent) and Eastern (6 percent) provinces.

Table 13.2 shows coverage rates for HIV testing by age group, education and wealth. If HIV status influenced participation in the testing, coverage would be expected to rise with age since HIV levels increase sharply with age before leveling off or declining at the older ages. In fact, the coverage rate for testing among women is consistent across all age groups (range 74 percent to 79 percent). Response rates are somewhat more variable by age among men (range between 64 percent and 76 percent), but again they do not rise with age as would be expected if they were influenced by HIV status.

Those with an incomplete primary education are the most likely to have been tested, while men and women with at least some secondary education were least likely to be tested. Similarly, those in the highest quintile of the wealth index were the least likely to be tested and had the highest levels of refusal (18 percent of women and 13 percent of men), absent after interview (6 percent for both men and women), and absent and not interviewed (5 percent of women and 15 percent of men).

In order to further explore whether nonresponse might have an impact on the HIV seroprevalence results, an analysis also was undertaken of the relationships between participation in the HIV testing and a number of other characteristics related to HIV risk. The descriptive tables which were examined in that analysis are included in Appendix A.

Table 13.2 Coverage of HIV testing by age, education, and wealth quintile

Percent distribution of women and men eligible for HIV testing by testing status, by age, education, and wealth quintile, Kenya 2003 (un-weighted)

Age, education, and wealth quintile	Testing status								Total	Number
	Tested		Refused		Absent		Other/missing			
	Inter-viewed	Not inter-viewed	Inter-viewed	Not inter-viewed	Inter-viewed	Not inter-viewed	Inter-viewed	Not inter-viewed		
WOMEN										
Age										
15-19	75.1	0.2	13.4	1.2	3.8	3.4	1.6	1.2	100.0	975
20-24	77.2	0.5	11.7	1.7	2.4	2.3	2.4	1.9	100.0	886
25-29	76.1	0.3	11.2	1.7	3.4	3.3	2.4	1.6	100.0	704
30-34	76.1	0.5	13.3	0.8	4.0	1.3	2.1	1.9	100.0	618
35-39	78.9	0.0	11.8	1.8	1.8	3.5	1.3	0.9	100.0	451
40-44	74.2	0.0	15.7	1.5	2.8	3.5	1.0	1.3	100.0	395
45-49	73.7	0.4	16.8	1.8	3.3	2.9	0.4	0.7	100.0	274
Education										
No education	74.5	1.0	15.1	1.6	1.6	2.6	1.0	2.6	100.0	689
Primary incomplete	81.4	0.2	10.8	1.2	2.1	1.4	1.7	1.1	100.0	1,259
Primary complete	76.7	0.2	13.7	1.3	3.7	1.7	1.5	1.1	100.0	993
Secondary+	72.0	0.0	13.4	1.5	4.4	5.0	2.5	1.3	100.0	1,352
Wealth quintile										
Lowest	84.3	0.6	10.0	0.2	0.9	2.1	0.9	1.1	100.0	661
Second	86.6	0.4	8.7	0.4	0.4	1.0	0.7	1.6	100.0	677
Middle	81.7	0.5	10.2	0.7	1.9	1.6	1.6	1.6	100.0	732
Fourth	77.9	0.1	12.4	1.6	3.2	1.6	2.1	1.2	100.0	822
Highest	63.2	0.0	18.1	2.9	6.1	5.4	2.7	1.6	100.0	1,411
Total	76.1	0.3	12.9	1.5	3.1	2.8	1.8	1.5	100.0	4,303
MEN										
Age										
15-19	75.5	0.4	8.2	1.8	3.8	6.0	1.8	2.4	100.0	928
20-24	67.4	0.1	12.0	3.2	3.7	8.0	2.1	3.5	100.0	791
25-29	64.2	0.6	11.5	3.0	3.3	11.9	1.7	3.8	100.0	637
30-34	68.8	1.4	8.8	2.9	3.5	11.7	1.0	1.9	100.0	513
35-39	68.3	0.7	10.9	2.7	5.8	7.8	1.6	2.4	100.0	451
40-44	69.9	0.8	13.8	1.4	2.2	8.0	0.8	3.0	100.0	362
45-49	68.9	0.4	12.0	2.5	3.3	10.4	1.2	1.2	100.0	241
50-54	74.6	0.4	8.5	2.7	4.2	4.6	1.2	3.8	100.0	260
Education										
No education	69.3	0.8	10.7	2.5	2.0	7.3	1.4	5.9	100.0	355
Primary incomplete	75.1	0.7	8.9	2.1	3.0	6.2	1.8	2.2	100.0	1,250
Primary complete	70.2	0.2	10.9	3.5	3.9	7.5	1.6	2.2	100.0	939
Secondary+	65.9	0.6	11.6	2.0	4.5	10.9	1.5	2.9	100.0	1,627
Wealth quintile										
Lowest	79.5	0.8	9.1	2.2	1.2	4.7	0.8	1.7	100.0	596
Second	79.3	1.1	7.1	1.0	1.4	5.6	1.3	3.2	100.0	624
Middle	74.1	0.3	9.0	3.0	3.1	6.4	1.3	2.8	100.0	703
Fourth	72.9	0.4	11.0	1.9	3.8	4.9	2.0	3.1	100.0	838
Highest	57.4	0.5	13.1	3.5	6.0	14.6	1.9	3.0	100.0	1,422
Total	69.7	0.6	10.5	2.5	3.7	8.5	1.6	2.8	100.0	4,183

Note: Total includes 10 women and 8 men not stated as to education.

The variation in response rates with these measures is again reassuring as coverage rates are frequently but not uniformly higher among those groups considered to be at higher risk for HIV (Tables A.3-A.6). For example, response rates are slightly higher among those who have ever had sex than among those who have not. Similarly, rates are higher among those in polygynous unions and lowest among those who are not currently in union. Among women, response rates are highest among those who are widowed, while among men they are highest among those who are divorced or separated. Coverage is higher among those who reported having had higher risk sex in the 12 months preceding the survey than among those who had sex but not higher risk sex and those who did not have sex at all in the prior 12 months. Among women, response rates are higher for the small number who report having multiple partners; however, coverage is lower among men with multiple partners.

Among men, the coverage rate for HIV testing is higher among uncircumcised than circumcised men. Since HIV prevalence is higher among uncircumcised men (see next section), the higher response rates in the former group again are reassuring. However, men who sleep away from home—a characteristic assumed to be related to higher HIV risk—have lower rates of testing: 75 percent in those who sleep away more than 5 times a month and 77 percent for those who stay away for more than one month at a time compared to 81 percent or more among who were never absent or absent less frequently.

Finally, in addition to the examination of the descriptive tables, a multivariate analysis of the determinants of non-response was conducted (ORC Macro, 2004). The results of that analysis confirm that eligible respondents who were not tested for HIV did not differ in meaningful ways from those tested. In fact, adjusted prevalence based on the regression analysis would lower prevalence among both women and men by a fraction of one percent because those not tested have slightly lower behavioural and socio-demographic risks for HIV.

In summary, the initial descriptive and multivariate examinations of the HIV testing coverage levels provided no evidence of a consistent relationship between non-response rate and variables associated with higher HIV risk. Although further analysis is required, this analysis supports the conclusion that the KDHS prevalence rates are a reasonable measure of the actual levels of HIV prevalence in the population.

13.2 HIV PREVALENCE

HIV Prevalence by Socioeconomic Characteristics

Results from the 2003 KDHS indicate that 7 percent of Kenyan adults are infected with HIV. (Table 13.3). HIV prevalence in women age 15-49 is nearly 9 percent, while for men 15-54, it is under 5 percent. This female-to-male ratio of 1.9 to 1 is higher than that found in most population-based studies in Africa and implies that young women are particularly vulnerable to HIV infection compared with young men. Figure 13.1 shows, for example, that 3 percent of women age 15-19 are HIV infected, compared with less than half of one percent of men 15-19, while HIV prevalence among women 20-24 is over three times that of men in the same age group (9 percent and 2 percent, respectively). The peak prevalence among women is at age 25-29 (13 percent), while prevalence rises gradually with age among men to peak at age 40-44 (9 percent). Only in the 45-49 year age group is HIV prevalence among men (5 percent) higher than that for women (4 percent).

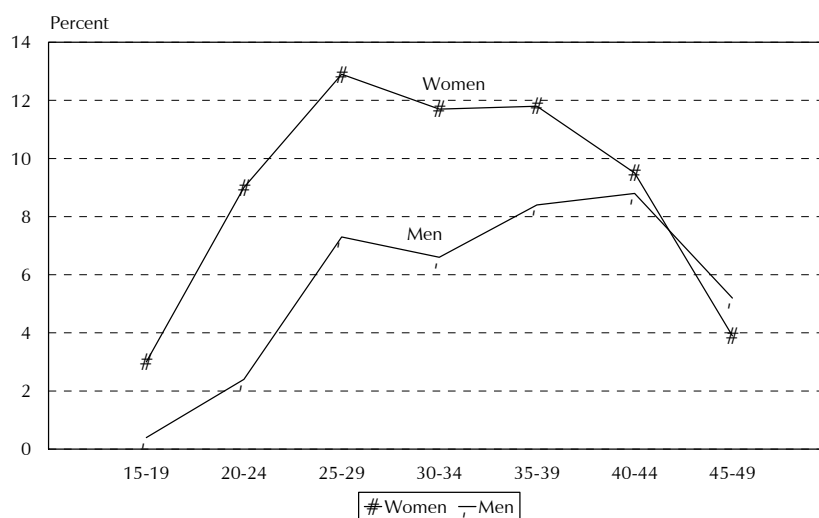
Since few HIV infected children survive into their teenage years, infected youth represent more recent cases of HIV infection and serve as an important indicator for detecting trends in both prevalence and incidence. Overall, prevalence among women age 15-24 in the KDHS is 6 percent, compared with slightly over 1 percent among men, for an overall prevalence in youth of under 4 percent. These prevalence levels will provide a baseline for measuring progress toward the goals of the National HIV/AIDS Strategic Plan in future surveys.

Table 13.3 HIV prevalence by age
Percentage HIV positive among women age 15-49 and men age 15-54 who were tested, by age, Kenya 2003

Age	Women		Men		Total	
	Percent HIV positive	Number	Percent HIV positive	Number	Percent HIV positive	Number
15-19	3.0	711	0.4	745	1.6	1,456
20-24	9.0	658	2.4	566	6.0	1,224
25-29	12.9	522	7.3	428	10.4	950
30-34	11.7	438	6.6	368	9.4	806
35-39	11.8	345	8.4	321	10.1	666
40-44	9.5	276	8.8	260	9.1	535
45-49	3.9	202	5.2	163	4.4	364
50-54	na	na	5.7	193	na	na
Total age 15-49	8.7	3,151	4.6	2,851	6.7	6,001
Total age 15-54	na	na	4.6	3,043	na	na

na = Not applicable

Figure 13.1 HIV Prevalence by Age Group and Sex



KDHS 2003

As Table 13.4 shows, urban residents have a significantly higher risk of HIV infection (10 percent) than rural residents (6 percent). Prevalence in urban women is 12 percent compared with less than 8 percent for rural women, for a 1.6 urban-rural relative risk of HIV infection. For men, the risk associated with urban residence is even greater; urban men are twice as likely to be infected as rural men (8 percent and 4 percent, respectively). Since 80 percent of Kenya's population is categorised as rural, however, the greatest burden of HIV infection is in the rural population.

The HIV epidemic shows regional heterogeneity. Nyanza Province has an overall prevalence of 15 percent, followed by Nairobi with 10 percent. All other provinces have levels between 4 percent and 6 percent overall, except North Eastern where no respondent tested positive, indicating that the rate is very low in this province. Gender differences persist in all the regions.

Table 13.4 HIV prevalence by selected socioeconomic characteristics

Percentage HIV positive among women and men age 15-49 who were tested, by socioeconomic characteristics, Kenya 2003

Socioeconomic characteristic	Women		Men		Total	
	Percent HIV positive	Number	Percent HIV positive	Number	Percent HIV positive	Number
Residence						
Urban	12.3	779	7.5	716	10.0	1,495
Rural	7.5	2,372	3.6	2,135	5.6	4,507
Province						
Nairobi	11.9	332	7.8	314	9.9	646
Central	7.6	462	2.0	438	4.9	900
Coast	6.6	236	4.8	197	5.8	433
Eastern	6.1	514	1.5	464	4.0	978
Nyanza	18.3	432	11.6	376	15.1	808
Rift Valley	6.9	747	3.6	691	5.3	1,438
Western	5.8	368	3.8	323	4.9	690
North Eastern	0.0	60	0.0	48	0.0	108
Education						
No education	4.4	396	2.7	156	3.9	552
Primary incomplete	9.3	1,052	3.4	982	6.4	2,034
Primary complete	10.6	784	5.9	660	8.5	1,444
Secondary+	8.2	918	5.2	1,053	6.6	1,972
Employment						
Currently working	9.6	1,844	5.9	2,007	7.6	3,851
Not currently working	7.4	1,307	1.5	844	5.1	2,151
Wealth quintile						
Lowest	3.9	505	3.4	431	3.6	937
Second	8.5	580	4.2	501	6.5	1,082
Middle	7.1	597	2.2	528	4.8	1,125
Fourth	9.7	663	4.3	624	7.1	1,287
Highest	12.2	806	7.3	765	9.8	1,571
Ethnicity						
Embu	(2.8)	37	(3.7)	37	3.3	73
Kalenjin	4.9	346	2.0	366	3.4	712
Kamba	8.6	392	1.6	334	5.4	726
Kikuyu	6.6	742	2.8	621	4.9	1,363
Kisii	7.4	171	0.5	163	4.0	334
Luhya	7.9	481	5.1	438	6.6	919
Luo	25.8	361	17.5	341	21.8	702
Maasai	2.8	76	2.2	56	2.5	132
Meru	6.1	172	1.2	165	3.7	337
Mijikenda/Swahili	3.8	137	3.0	116	3.5	254
Somali	0.9	100	1.8	77	1.3	177
Taita/Taveta	11.7	41	7.1	30	9.7	71
Turkana	6.5	39	5.1	45	5.7	84
Kuria	*	19	(5.2)	21	2.7	40
Other	6.7	38	5.6	41	6.1	79
Religion						
Roman Catholic	8.9	800	4.9	756	6.9	1,556
Protestant/Other Christian	9.2	2,087	4.5	1,729	7.0	3,816
Muslim	2.7	204	3.1	175	2.9	378
No religion	11.1	52	5.5	185	6.7	237
Total	8.7	3,151	4.6	2,851	6.7	6,001

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.
na = Not applicable

Those who have completed primary school have higher infection levels than those with either less or more education. Work status is related to the HIV rate among both women and men. Ten percent of currently working women and 6 percent of currently working men are HIV infected, compared with 7 percent of women and 2 percent of men currently not working. Those in the highest quintile of the wealth index have the highest rates of HIV infection.

HIV prevalence is substantially higher among the Luo ethnic group than other groups. More than one in four Luo women and 18 percent of men are HIV positive. The only other group with higher than average prevalence levels is Taita/Taveta. Women and men who identify themselves as Christian have rates similar to the national average for each gender, while Muslim women and men both have rates of 3 percent.

HIV Prevalence by Other Sociodemographic Characteristics

As expected, marital status is related to HIV prevalence (Table 13.5). Women currently in a marital union have a prevalence of 8 percent, only slightly higher than the rate among men who are currently in union (7 percent). Women who are widowed, divorced, or separated have significantly higher rates (30 percent and 21 percent, respectively) than married women (8 percent).

Sociodemographic characteristic	Women		Men		Total	
	Percent HIV positive	Number	Percent HIV positive	Number	Percent HIV positive	Number
Marital status						
Currently in union	8.0	1,897	7.0	1,353	7.6	3,250
Widowed	30.2	133	*	18	31.8	151
Divorced/separated	20.9	126	6.4	96	14.6	222
Never in union	5.6	995	1.6	1,384	3.2	2,378
Ever had sex	9.9	480	1.9	932	4.6	1,413
Never had sex	1.6	515	0.9	451	1.3	966
Type of union						
In polygynous union	11.4	326	11.9	126	11.6	452
Not in polygynous union	7.2	1,571	6.5	1,227	6.9	2,798
Not currently in union	9.8	1,254	2.4	1,498	5.7	2,752
Currently pregnant						
Pregnant	7.3	260	na	na	na	na
Not pregnant/not sure	8.8	2,891	na	na	na	na
Numbers of times slept away						
None	na	na	3.2	1,421	na	na
1-2	na	na	4.2	655	na	na
3-5	na	na	5.1	386	na	na
5+	na	na	9.3	373	na	na
Away for more than one month						
Away for more than 1 month	na	na	3.4	470	na	na
Away always less than 1 month	na	na	7.3	944	na	na
Never away	na	na	3.2	1,421	na	na
Total	8.7	3,151	4.6	2,851	6.7	6,001

Note: Total includes cases missing data on number of times slept away and whether away for more than one month. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed. na = Not applicable

Women who report they ever had sex but have never been in a union have a higher risk than men in the same category (10 percent and 2 percent, respectively); this and the higher proportion of men who have never been in a union compared to women accounts for much of the overall female-male difference in prevalence. Around one percent of individuals who report they have never been in a union and have never had sex are also HIV-infected, suggesting either reporting errors in the sexual behaviour or non-sexual transmission of HIV.

Considering the type of current union, women in a polygynous union have a higher prevalence (11 percent) than those in non-polygynous unions (7 percent). Again the rates for men are similar (12 percent in polygynous unions and 7 percent for non-polygynous unions).

HIV prevalence among women who are currently pregnant is 7 percent, providing a useful benchmark to compare with rates in pregnant women tested during sentinel surveillance.

The survey results show that men who sleep away from home more frequently have higher HIV prevalence, 9 percent for those who slept away from home five or more times in the previous 12 months compared with 3 percent for those who did not sleep away from home. Those who are away from home for short periods of time (always less than one month) have double the risk of HIV infection (7 percent) than those who are never away and those who are away for more than one month at a time (3 percent for both groups).

HIV Prevalence by Sexual Risk Behaviour

Table 13.6 examines the prevalence of HIV infection by sexual behaviour indicators among respondents who have ever had sexual intercourse. In reviewing these results, it is important to remember that responses about sexual risk behaviours may be subject to reporting bias. Also, sexual behaviour in the 12 months preceding the survey may not adequately reflect lifetime sexual risk.

For women, there is a clear pattern of higher HIV prevalence with earlier sexual debut. This pattern is not evident among men, who have a prevalence of 5 to 6 percent regardless of age at first sex.

Young women (15-24 years) whose first sex was with a man ten or more years older have a higher prevalence of HIV (10 percent) compared with those whose first partner was less than ten years older (8 percent). Women who said that a condom was used during their first sexual encounter have a higher prevalence of HIV (11 percent) than those who did not use a condom (8 percent). Among men, no significant difference in prevalence can be detected between those who used a condom at first sex and those who did not.

Seventeen percent of women who had a higher-risk sexual partner (a non-marital, non-cohabiting partner) are HIV-infected, compared with 8 percent of those who were sexually active but did not have a higher risk partner. In contrast, men reporting a higher-risk partner in the last year have a lower HIV prevalence, compared with sexually active men who did not have a higher-risk partner (5 percent and 7 percent, respectively). Among women reporting no sex in the last year, 11 percent are HIV-positive, compared with 2 percent of men reporting no sex in the last 12 months.

Among women, having more than one partner and having more than one higher-risk partner in the preceding 12 months are associated with higher HIV prevalence. Among men, however, these variables are not consistently related to HIV prevalence. Women who exchanged sex for money, gifts, or favours in the last 12 months have a slightly higher HIV infection level than those who have not (11 percent and 10 percent, respectively). Among men, those who paid for sex prior to the 12 months preceding the survey have higher HIV prevalence (8 percent) than either those who have never paid for sex (5 percent) and, surprisingly, those who paid for sex in the preceding 12 months (4 percent).

Table 13.6 HIV prevalence by sexual behaviour characteristics

Percentage HIV positive among women and men age 15-49 who ever had sex and were tested, by sexual behaviour characteristics, Kenya 2003

Sexual behaviour characteristic	Women		Men		Total	
	Percent HIV positive	Number	Percent HIV positive	Number	Percent HIV positive	Number
Age at first sex						
<15	12.4	940	5.1	1,143	8.4	2,083
16-17	9.3	648	5.2	457	7.6	1,106
18-19	9.7	515	4.8	436	7.5	951
20+	6.0	392	6.0	355	6.0	747
First sexual partner was:¹						
10 or more years older	10.4	66	na	na	na	na
Other/Doesn't know	7.7	681	na	na	na	na
Condom use at first sex¹						
Used at first sexual sex	10.7	93	0.0	108	4.9	201
Did not use at first sex	7.5	654	1.0	674	4.2	1,328
Higher-risk sex in past 12 months						
Had higher-risk sex	17.2	392	4.7	812	8.7	1,204
Had sex, not higher risk	8.3	1,833	6.7	1,213	7.7	3,046
No sex in past 12 months	11.1	411	1.9	374	6.7	785
Number of partners in past 12 months						
1	9.6	2,166	5.4	1,700	7.7	3,866
2	20.4	53	9.7	262	11.5	315
3+	*	6	3.3	64	5.3	70
Number of higher-risk partners in past 12 months						
1	15.7	361	4.8	632	8.7	993
2+	34.0	32	4.4	181	8.8	211
Received money/gifts/favours for sex in past 12 months						
Exchanged for sex	11.2	119	na	na	na	na
No exchange	9.8	2,106	na	na	na	na
Paid for sex						
In past 12 months	na	na	4.3	86	na	na
Prior to past 12 months	na	na	8.1	269	na	na
Never	na	na	4.9	2,045	na	na
Condom use at last paid sex						
Used	na	na	8.0	173	na	na
Did not use	na	na	6.4	181	na	na
Any condom use						
Ever used condom	12.9	410	5.0	1,230	7.0	1,640
Never used condom	9.5	2,226	5.5	1,170	8.1	3,396
Condom use at last sex in past 12 months						
Used condom at last sex	15.3	124	4.1	357	6.9	481
No condom at last sex	9.6	2,101	6.3	1,668	8.1	3,769
Total	10.1	2,636	5.2	2,399	7.8	5,036

Note: Totals include those with missing or inconsistent information on age at first sex. An asterisk indicates that a figure is based on fewer than 25 unweighted cases and has been suppressed.

¹ Refers to those age 15-24 only.

na = Not applicable

The relationship between condom use and HIV infection is not uniform. Among women, any condom use and condom use at the most recent sexual encounter are associated with higher levels of HIV infection, while for men, condom use is associated with a lower level of infection. Women who know or suspect they or their partner might be infected would be more likely to use condoms, thus reversing the expected direction of the relationship of lower HIV prevalence among those who use condoms.

None of the results discussed above demonstrate a consistent relationship between HIV prevalence and sexual behavioural risk, particularly among men. However, more detailed analysis will be required to thoroughly examine these relationships since they may be complicated by other factors such as age, residence, and educational status that are associated with both the behavioral measures and HIV prevalence.

HIV Prevalence by Other Characteristics Related to HIV Risk

Table 13.7 presents the variation in HIV prevalence with a number of other characteristics related to HIV risk among men and women who have ever had sex. As expected, women and men with a history of a sexually transmitted infection (STI) or STI symptoms have higher rates of HIV infection than those with none. Among women who reported ever drinking alcohol, HIV prevalence is 19 percent, compared with 9 percent among those who have never drunk alcohol. Differences for men are much smaller, with a prevalence of HIV of 6 percent among those who have drunk alcohol compared with 4 percent for those who have never drunk alcohol.

Table 13.7 HIV prevalence by selected other characteristics						
Percentage HIV positive among women and men age 15-49 who ever had sex and who were tested, by whether had a sexually transmitted infection, drank alcohol, had an HIV test, and perceived risk of getting AIDS, Kenya 2003						
Characteristic	Women		Men		Total	
	Percent HIV positive	Number	Percent HIV positive	Number	Percent HIV positive	Number
Sexually transmitted infection in past 12 months						
Had STI or STI symptom	19.0	108	14.8	78	17.2	186
No STI, no symptoms	9.7	2,529	4.9	2,322	7.4	4,850
Use of alcohol						
Drank alcohol	18.8	334	6.1	1,353	8.6	1,687
Last month	18.5	145	6.4	808	8.2	953
Ever, not in past month	18.9	189	5.7	545	9.1	734
Never drank alcohol	8.8	2,301	4.2	1,046	7.4	3,348
Perceived risk of getting AIDS						
No risk at all	7.0	764	4.3	728	5.7	1,492
Small risk	11.0	1,077	5.8	1,261	8.2	2,338
Moderate risk	11.0	487	4.6	284	8.6	771
Great risk	14.6	267	7.5	118	12.4	385
HIV testing status						
Ever tested	12.5	446	7.6	428	10.1	875
Never tested	9.7	2,155	4.8	1,965	7.4	4,119
Total	10.1	2,636	5.2	2,399	7.8	5,036

Note: Total includes 40 women and 6 men missing data on risk of getting AIDS

The relationship between perception of the risk of getting AIDS and actual HIV infection is not straightforward, especially among men. It is disconcerting to note that 7 percent of women and 4 percent of men who say they have no risk of getting AIDS are actually HIV positive.

Both women and men who have been tested for HIV in the past are more likely to be HIV infected than those who have never been tested. Among women who have ever had sex, the level of HIV infection is 13 percent among those who have ever been tested for HIV in the past, compared with 10 percent among those who have never been tested. Among men, 8 percent of those previously tested are HIV positive, compared with 5 percent of those who have never been tested.

Although the individual's HIV status is associated with prior HIV testing, the above results indicate that many individuals who are HIV positive have not been tested. Overall, four out of five of those infected with HIV (82 percent of infected women and 77 percent of infected men) do not know their HIV status, either because they were never tested or because they were tested and did not receive their results (Table 13.8). For women, 18 percent of those who are HIV infected have been tested and know their results for their last test, compared to 13 percent of those who are HIV-negative. For men, there is a similar pattern; 23 percent of those who are HIV-infected know their results for their last test, compared with 14 percent of those who are HIV negative.

Table 13.8 HIV prevalence by prior HIV testing

Percent distribution of HIV positive and negative women and men age 15-49 by HIV testing status prior to the survey, Kenya 2003

HIV testing status	Women		Men	
	HIV positive	HIV negative	HIV positive	HIV negative
Ever tested and know results of last test	18.2	12.9	22.8	13.9
Ever tested, does not know results	2.6	1.4	2.2	1.5
Never tested	79.2	85.7	75.0	84.7
Total	100.0	100.0	100.0	100.0
Number	274	2,877	130	2,720

HIV Prevalence and Male Circumcision

Lack of circumcision is considered a risk factor for HIV infection, in part because of physiological differences that increase the susceptibility to HIV infection among uncircumcised men. Several prior studies in Kenya have shown a significant relationship between male circumcision and HIV risk (Agot et al., 2004; Auvert et al., 2002; Baeten et al., 2002). The KDHS obtained information on male circumcision status, and these results can be used to examine the relationship between HIV prevalence and male circumcision status.

As Table 13.9 shows, the majority of Kenyan men (83 percent) are circumcised. However, the proportion circumcised varies with province and ethnicity, being markedly lower among men in Nyanza Province (46 percent), and among the Luo (17 percent).

Table 13.9 HIV prevalence by male circumcision

Among men age 15-54 who were tested for HIV, percentage who are circumcised and percentage HIV positive among circumcised and uncircumcised men, according to background characteristics, Kenya 2003

Background characteristic	All men tested for HIV		Circumcised men		Uncircumcised men	
	Percentage circumcised	Number of men tested	Percentage HIV positive	Number of circumcised men	Percentage HIV positive	Number of uncircumcised men
Age						
15-19	70.3	745	0.5	524	0.0	221
20-24	89.4	566	1.0	506	14.1	60
25-29	87.3	428	5.2	374	21.7	54
30-34	89.3	368	5.5	329	(16.1)	39
35-39	89.4	321	5.4	287	(33.7)	34
40-44	84.3	260	4.2	219	(33.2)	41
45-49	81.9	163	2.9	133	(15.2)	29
50-54	86.4	193	1.9	167	(29.5)	26
Residence						
Urban	82.2	763	5.4	627	16.9	136
Rural	83.8	2,280	2.3	1,911	11.0	369
Province						
Nairobi	80.0	336	6.6	269	13.5	67
Central	89.4	476	2.4	425	*	50
Coast	95.6	210	4.1	201	13.4	9
Eastern	96.1	502	1.6	482	*	20
Nyanza	46.4	408	2.1	189	21.1	218
Rift Valley	86.7	718	2.9	623	6.8	95
Western	86.8	339	3.9	295	1.9	45
North Eastern	100.0	55	0.0	55	*	0
Education						
No education	86.2	187	2.6	162	(0.0)	26
Primary incomplete	75.7	1,038	2.6	785	7.2	252
Primary complete	84.2	706	3.0	594	21.1	111
Secondary+	89.6	1,113	3.5	997	19.1	116
Wealth quintile						
Lowest	73.9	463	1.3	342	11.4	121
Second	82.9	531	2.8	440	9.6	91
Middle	88.9	558	1.3	496	11.8	62
Fourth	86.9	673	3.5	584	8.3	88
Highest	82.5	819	5.0	676	18.6	144
Ethnicity						
Embu	100.0	41	3.3	41	*	0
Kalenjin	90.3	379	2.1	342	(0.0)	37
Kamba	99.4	353	1.7	351	*	2
Kikuyu	92.7	669	3.0	620	0.0	49
Kisii	99.5	172	0.5	171	*	1
Luhya	92.8	460	5.6	427	(0.0)	33
Luo	16.9	367	9.8	62	20.1	305
Maasai	82.5	59	2.2	49	1.4	10
Meru	91.0	187	1.2	170	*	17
Mijikenda/Swahili	100.0	124	2.8	124	*	0
Somali	100.0	86	1.7	86	*	0
Taita/Taveta	96.9	30	7.3	29	*	1
Turkana	44.4	51	0.0	23	(8.1)	28
Kuria	77.3	22	6.2	17	*	5
Religion						
Roman Catholic	81.7	821	2.6	670	14.2	150
Protestant/other Christian	82.2	1,836	3.0	1,510	12.7	326
Muslim	100.0	188	2.9	188	*	0
No religion	86.4	192	5.6	166	(3.6)	26
Total	83.4	3,043	3.0	2,538	12.6	505

Note: Total includes cases with "other" and missing religion and ethnicity. 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.

Looking at HIV prevalence levels by circumcision status, 13 percent of Kenyan men who are uncircumcised are HIV infected, compared with 3 percent of those who are circumcised. In Nyanza Province, men who are uncircumcised are ten times more likely to be HIV positive than men who are circumcised (21 and 2 percent, respectively). Multivariate analysis of these patterns is needed to obtain a better understanding of the role that the lack of male circumcision may be playing in the susceptibility to HIV infection in Kenya.

HIV Prevalence among Couples

Over 1,000 cohabiting couples were both tested for HIV in the 2003 KDHS. Results shown in Table 13.10 indicate that, for 89 percent of cohabiting couples, both partners are HIV-negative while in 4 percent of couples, both partners are HIV positive. Seven percent of couples are discordant, that is, one partner is infected and the other not. The variation in the level of couple HIV infection by background characteristics generally conforms to the patterns observed with respect to the variation in individual seroprevalence rates, e.g., the infection rate is highest among couples in Nyanza Province.

Looking more specifically at discordant couples, among 3 percent of couples, the man is infected and the woman uninfected, while in 5 percent of couples, the woman is infected and the man is not. Discordance is more common among couples in which the woman is age 20-29 or the man age 20-39, couples whose union is polygynous, urban couples, and couples in Nyanza. The fact that there are twice as many couples that are discordant for HIV as couples that are both infected represents an unmet HIV prevention need for the country, since the vast majority of these couples do not mutually know their HIV status. Couple-oriented voluntary counselling and testing (VCT) services, where partners (including those in polygynous marriages) go together and receive results together, is available throughout the country, but few VCT clients attend as a couple.

HIV Prevalence among KDHS VCT Clients

As described in the introductory chapter, voluntary counselling and testing (VCT) for HIV was provided to participants in the KDHS and others in the neighborhood (see Chapter 1). In all, 10,644 clients came voluntarily for information or counselling and 10,089 chose to be tested for HIV. Those who came for VCT were self-selected and are not, therefore, representative of the adult population as a whole. For example, two-thirds of those tested in the VCT component were men.

Among the 3,472 women who were part of the VCT component, 13 percent were HIV infected, compared with the national rate of 9 percent obtained for women 15-49 in the survey. The higher prevalence among the women who came for VCT compared with those tested in the KDHS is consistent with the KDHS finding that those who are HIV infected are more likely to learn their HIV status than those who are negative. Five percent of the 6,617 men who were tested in the VCT component were HIV positive, which is identical to the rate for men tested in the KDHS. The large number who came for the mobile VCT services is testimony to the desire for HIV testing and counselling, especially since the VCT component was mainly confined to rural areas, and for the importance of offering participants in surveys an opportunity to learn their HIV status.

Table 13.10 HIV prevalence among couples

Among cohabiting couples both of whom were tested, percent distribution by HIV test results, according to background characteristics, Kenya 2003

Background characteristic	Both partners HIV positive	Male partner positive, female partner negative	Female partner positive, male partner negative	Both partners HIV negative	Total	Number
Woman's age						
15-19	2.1	0.0	4.4	93.5	100.0	76
20-29	3.9	3.8	6.4	85.9	100.0	457
30-39	4.1	2.6	3.5	89.8	100.0	353
40-49	2.7	2.0	1.6	93.8	100.0	155
Man's age						
15-19	*	*	*	*	100.0	7
20-29	3.7	3.5	5.3	87.5	100.0	244
30-39	3.8	3.3	5.5	87.4	100.0	403
40-54	3.5	2.0	3.2	91.3	100.0	386
Marital status						
Married	3.3	3.1	4.4	89.2	100.0	948
Living together	7.7	0.5	6.0	85.8	100.0	92
Type of union						
Monogamous	3.1	3.1	3.9	89.9	100.0	913
Polygynous	7.5	1.4	9.0	82.1	100.0	128
Residence						
Urban	4.8	3.9	6.4	84.9	100.0	207
Rural	3.4	2.6	4.1	89.9	100.0	833
Province						
Nairobi	5.2	4.7	9.4	80.7	100.0	89
Central	1.6	2.1	1.4	94.9	100.0	134
Coast	1.1	3.5	8.8	86.6	100.0	71
Eastern	2.3	0.0	3.5	94.3	100.0	159
Nyanza	9.8	8.7	8.4	73.2	100.0	169
Rift Valley	2.8	0.6	2.8	93.8	100.0	275
Western	2.2	3.3	3.0	91.5	100.0	121
North Eastern	0.0	0.0	0.0	100.0	100.0	25
Woman's education						
No education	1.8	1.2	0.9	96.1	100.0	143
Primary incomplete	4.5	4.7	7.2	83.6	100.0	373
Primary complete	4.3	0.9	2.9	91.8	100.0	273
Secondary+	2.7	3.1	4.5	89.6	100.0	251
Man's education						
No education	1.7	1.0	1.4	95.9	100.0	94
Primary incomplete	2.7	2.4	4.8	90.1	100.0	289
Primary complete	5.4	2.7	4.4	87.6	100.0	261
Secondary+	3.7	3.8	5.3	87.3	100.0	397
Wealth quintile						
Lowest	2.3	2.2	3.5	91.9	100.0	210
Second	4.0	2.8	4.3	88.9	100.0	211
Middle	2.4	3.3	4.0	90.3	100.0	208
Fourth	2.8	1.5	5.7	90.0	100.0	203
Highest	6.6	4.4	5.3	83.6	100.0	209
Total	3.7	2.8	4.6	88.9	100.0	1,041

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

13.3 DISTRIBUTION OF THE HIV BURDEN IN KENYA

The inclusion of HIV testing in the KDHS provides the basis for a more precise estimate of the burden of HIV in Kenya and permits the calibration of estimates of HIV prevalence based on sentinel surveillance in pregnant women. Kenya has a heterogeneous HIV epidemic, with significant differences by region. Three provinces, containing half of Kenya's population, have 65 percent of the HIV infections: Nyanza Province with nearly one-third, Rift Valley with around one-fifth, and Nairobi with one-sixth of HIV infections in Kenya. Urban residents represent 25 percent of the population age 15-49, but nearly 40 percent of those HIV infected are urban residents. Higher educational level does not protect one from HIV infection in Kenya; HIV has spread through all regions and strata of society.

The linkage of biological and behavioural data in this survey has strengthened the validity of this survey by making multivariate analysis possible. The measurement of HIV prevalence in the KDHS has proven useful in calibrating HIV prevalence estimates of the general population from sentinel surveillance in pregnant women and has resulted in downward projections of the severity of the epidemic in Kenya. These adjustments arise from a better understanding of rural-urban population distribution, from a recognition that rural pregnant women who do not seek ANC care have lower rates than those who do, and, most importantly, from acknowledgement of the high ratio of 1.9 women infected for every man.

This linkage between HIV test results and demographic and behavioural data also enhances the understanding of the distribution, patterns, risk factors for HIV in Kenya, with the potential for improved planning and implementation of programs as a result of this information. The higher rate of HIV in uncircumcised men supports the need to evaluate possible causal links between male circumcision and HIV. Finally, the prevalence of couples that are discordant for HIV underscores the need for knowledge of both one's own HIV status and that of one's partner in order to prevent the continued spread of the HIV epidemic.