MEASURE Evaluation

Working Paper Series

Measurement of HIV Prevention Indicators:

A Comparison of the PLACE Method and a Demographic Health Survey in Rwanda

Commission Nationale de Lutte contre le SIDA

MEASURE Evaluation

June 2008

WP-08-105

MEASURE Evaluation is funded by the U.S. Agency for International Development (USAID) under terms of Cooperative Agreement GPO-A-00-03-00003-00 and is implemented by the Carolina Population Center at the University of North Carolina in partnership with Constella Futures, John Snow, Inc., Macro International Inc., and Tulane University.

Carolina Population Center
University of North Carolina at Chapel Hill
206 W. Franklin Street
Chapel Hill, NC 27516
Phone: 919-966-7482
Fax: 919-966-2391
measure@unc.edu
www.cpc.unc.edu/measure

Printed on recycled paper

Acknowledgements

The Priorities for Local AIDS Control (PLACE) survey described in this document was funded by U.S. Agency for International Development (USAID) through the Commission Nationale de Lutte contre le SIDA (CNLS) and the MEASURE Evaluation project. Though all of the members of the original Rwanda PLACE team are too numerous to mention, special thanks goes to Renée Fiorentino, Joseph Ntaganira, François Katangulia, Jacquelyn Tate, and Stephanie Mullen for their participation in the original survey. Additional thanks go to Maria Borda, Agnes Binagwaho, Sharon Weir, Scott Moreland, Kavita Singh, Erin Luben, and Stirling Cummings for their contributions to this working paper.

This working paper series is made possible by support from USAID under Cooperative Agreement No. GPO-A-00-03-00003-00. The opinions expressed are those of the authors and do not necessarily reflect the views of USAID or the U.S. government.

The working papers in this series are produced by MEASURE Evaluation in order to speed the dissemination of information from research studies. Most working papers currently are under review or are awaiting journal publication at a later date. Reprints of published papers are substituted for preliminary versions as they become available. The working papers are distributed as received from the authors. Adjustments are made to a standard format with little further editing.

This and previous working papers are available, free of charge, from the MEASURE Evaluation Web site, http://www.cpc.unc.edu/measure.

Measurement of HIV Prevention Indicators: A Comparison of the PLACE Method and a Demographic Health Survey in Rwanda

INTRODUCTION

Rwanda, like many sub-Saharan African countries, has long struggled with the HIV/AIDS epidemic. In 1986, the first national-level survey conducted estimated HIV prevalence rates of 17.8 percent in urban areas and 1.3 percent in rural areas. In 1988, an HIV sentinel surveillance system among pregnant women attending antenatal clinics and patients attending clinics for sexually transmitted infections (STI) was established to collect data on the epidemic. Throughout the 1990s, urban estimates for HIV prevalence hovered around 27 percent, 10 percent among semi-urban areas, and 4 percent in rural areas. After the April 1994 genocide, prevalence rates among semi-urban and rural populations reached 13 percent and 6.9 percent, respectively. In 2002, the national surveillance system was expanded from 10 sentinel sites to 24 sites, allowing for the collection of more precise data in order to estimate HIV prevalence at a sub-national level. The new data showed that HIV prevalence varied between 7 percent and 8.5 percent in urban areas, and between 2.6 percent and 3.6 percent in rural areas. In 2005, a Demographic and Health Survey (DHS) estimated the prevalence at 2.2 in rural areas and 7.3 in urban areas (Institute National de la Statistique du Rwanda and ORC Macro, 2006).

In response to the HIV epidemic in Rwanda, the government of Rwanda in 2001 created the Treatment and Research AIDS Center (TRAC) and the Commission Nationale de Lutte contre le SIDA (CNLS). In Rwanda, HIV is most commonly transmitted through sexual contact and it affects both the general population and specific subgroups. This "generalized epidemic" calls for the national surveillance system to monitor HIV infection and high-risk behavior in both the general and specific subgroups. Knowing the pace and magnitude of the spread of disease allows the Rwandan government to measure prevention efforts. However, implementing effective prevention efforts requires additional information that can influence the spread of HIV, such as individuals' knowledge and attitudes, behaviors, and socioeconomic and cultural factors.

The 2005 Rwandan DHS found that nearly 90 percent of the general population knew about HIV and prevention methods; however, it also found that condom use is very low (only 20 percent of people used a condom with a non-cohabiting partner). To respond better to the large gap between knowledge and safe sexual behavior, and to coordinate local efforts better in the fight against AIDS, CNLS, with technical assistance from MEASURE Evaluation, implemented the Priorities for Local AIDS Control Efforts (PLACE) protocol in 12 provinces[1]. The 2005 PLACE and Rwandan DHS results are useful tools for program managers wishing to focus scarce resources in effective HIV prevention. The DHS results provide information concerning the general population and provide a global picture of people's HIV knowledge, attitudes, and behaviors. The PLACE results provide information about populations who exhibit riskier sexual

[1] The PLACE study was based upon 2005 administrative boundaries. In 2006, the Rwandan administrative boundaries were changed.

behavior than the general population. Together, the survey results from PLACE and DHS can provide program managers and other stakeholders working in HIV/AIDS comprehensive information on knowledge, attitudes, and practices in both the general population and specific subgroups.

The aim of this report is to compare results between the two surveys and illustrate how both surveys can be used together, giving HIV/AIDS program managers and policymakers a better picture of certain determinates of the generalized epidemic in Rwanda. Following this introduction, the report is divided into four other sections — methodology, results, discussion, and conclusion. The methodology section describes how DHS and PLACE samples where selected. The results section describes data compiled by DHS and PLACE, and explores the aspects of each survey that complement the other. The discussion section analyses how the information from the Rwanda PLACE survey can complement the DHS data to guide prevention efforts in specific venues where the risk of HIV transmission is high.

METHODOLOGY

The PLACE method looks to the community to identify priority prevention areas (PPAs), areas that are likely to have a higher incidence of HIV. A steering committee comprised of representatives from organizations working in HIV/AIDS determines the criteria to identify PPAs. The principal criteria for a PPA is transmission risk, taking into consideration factors such as highly traveled highways, tourism, migration to mine fields, level of urbanization, unemployment, poor housing, crime rates, alcohol abuse, limited healthcare for the treatment of STIs, and immigration from border countries. Key informants within PPA communities are asked to identify venues where people are most likely to find new sexual partners. The Rwanda PLACE survey finds that the type of venue differs depending on the PPA, but in general the most common type of venue in urban areas is a bar or a night club and in rural areas is an informal or formal bar. The main difference between PLACE and the DHS is that PLACE methodology is based on specific sites where people meet sexual partners or HIV transmission is more likely to occur, and is not based on targeting specific risk groups. Prevention programs based in venues and places reach a great number of groups with different levels of risk who frequent one particular place. Additionally, the PLACE data provide information on the reach and impact of HIV prevention efforts, as well as possible gaps.

The PLACE survey was implemented in all 12 provinces in Rwanda, from which 23 PPAs were selected (Figure 1). In each PPA, interviewers solicited from informants the name and location of public venues where people meet new sexual partners. These venues were verified by the interviewers and further information about the venue was collected from a knowledgeable informant at each venue (for example, the manager of a bar identified as a venue). PLACE venues were selected from the exhaustive list with the probability of selection of a venue being proportional to its size (PPS). The “size” of each venue corresponds to the number of people at the venue at its busiest time, based upon information gathered during the venue verification process. Once PLACE venues are selected, people congregating at these sites are interviewed using a questionnaire derived from standard PLACE forms. During the Rwanda PLACE survey, nearly 14,000 interviews were completed at more than 550 venues. Owing to marked differences in key factors across urban and rural areas, the PLACE data were divided into three strata for analysis: urban (Kigali), semi-urban, and rural.

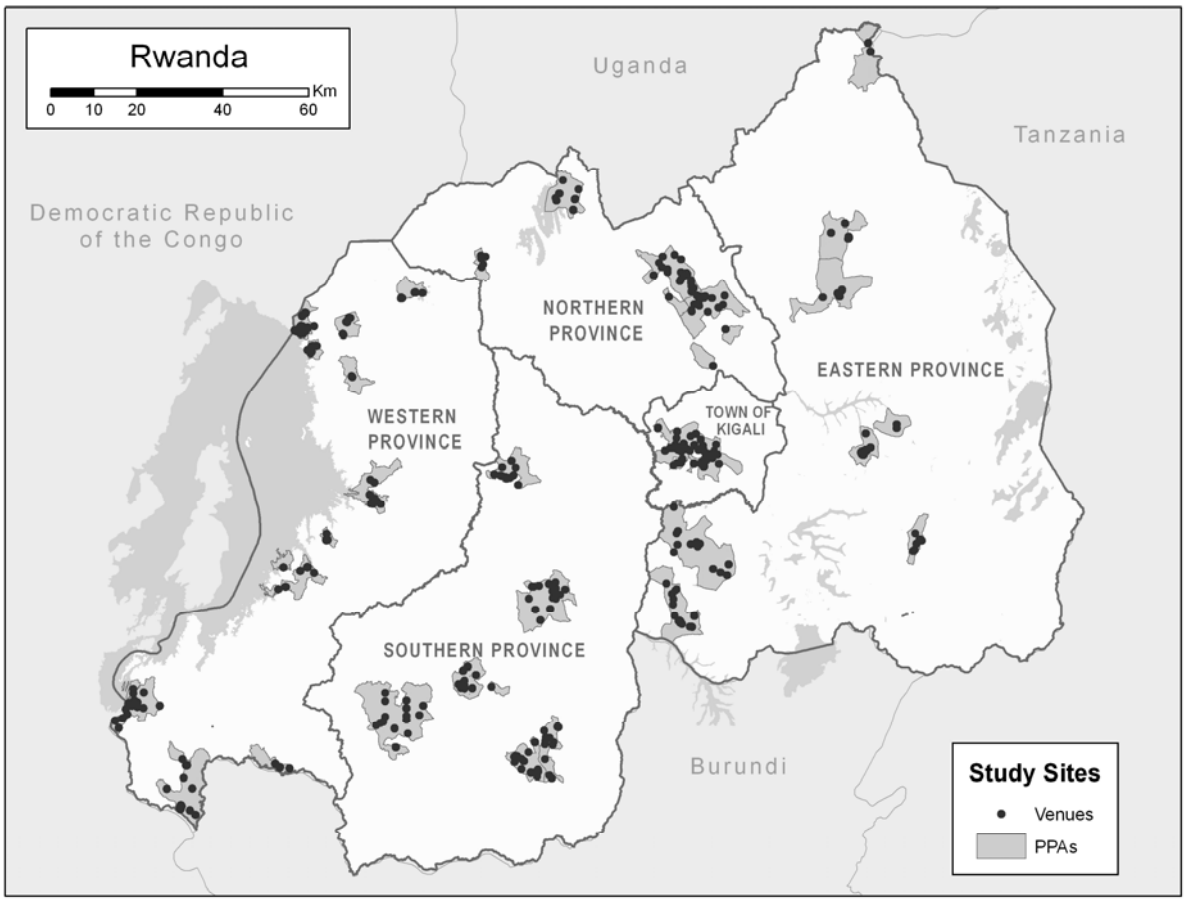

Figure 1. Rwanda PLACE priority prevention areas (PPAs) and venues.

The Rwandan DHS collected data on a variety of topics, such as fertility rates, breastfeeding practices, and knowledge, attitudes, and behaviors around HIV/AIDS. Blood samples were also collected in order to estimate HIV prevalence in the adult population of reproductive age. The DHS is a two-stage cluster survey in which each household respondent has a probability of selection, and therefore a weight is associated with each individual's data. A national sample of households was selected after stratification, resulting in adequate representation of urban (including the city of Kigali) and rural areas, as well as all 12 provinces. Of the 10,272 households surveyed, 11,321 women aged 15-49 years old were interviewed. Male interviews were conducted in every other household, resulting in 4,820 completed interviews (Institute National de la Statistique du Rwanda and ORC Macro, 2006). Prior to comparison with PLACE data, the DHS data were stratified in the same manner as the PLACE data.

RESULTS

Demographics — This report focuses on demographic characteristics, sexual behavior, health outcomes, and exposure to information on HIV/AIDS. The male populations for both PLACE and DHS are looked at separately from the female populations. Similarly, the report looks at rural, semi-urban, and urban locations separately. Table 1a lists demographic characteristics of the male PLACE and DHS survey populations. Male DHS respondents in all settings have a greater mean and median age than the corresponding PLACE male population. In the rural setting, the mean age of the PLACE respondents is 26.9 years, while the DHS male respondents have a mean age of 30.2 years. Semi-urban PLACE and DHS male respondents have mean ages of 27.0 and. 30.2 years, respectively; while respondents in the urban setting have mean ages of 27.6 and 29.2 years, respectively. Median ages are 25 years for PLACE vs 27 years for DHS in the rural and semi-urban settings, and 26 years for PLACE vs 27 years for RDHS in the urban setting. A look at males in rural and semi-urban settings indicates younger age distributions in the PLACE populations. There is a proportionally larger age group of 40 years of age or older in the DHS population, while the 20-24 years of age group is greater for the PLACE populations. In the urban areas, the 20-24 year age group is the largest percentage age group in both the PLACE and DHS populations.

DHS male respondents are more likely to have more education than male PLACE respondents. This difference is most pronounced in the rural settings: 19 percent of the DHS male population possesses no formal education, while 37 percent of the PLACE population posses no formal education. Even though a higher proportion of PLACE respondents than DHS respondents had less education, a higher percentage of PLACE respondents were employed. Seventy percent, 71 percent, and 81 percent of the PLACE respondents in the rural, semi-urban and urban settings, respectively, were more likely to be employed than DHS respondents (50 percent, 60 percent, and 62 percent respectively).

The DHS male population is more likely to be married and to lead a less migratory lifestyle than PLACE males. In part, this is due to the fact that the PLACE survey interviews men who are frequenting social venues (bars and nightclubs) and who are more likely to be young, while the DHS interviews men in their homes. In the rural and semi-urban settings, PLACE respondents are less likely than DHS respondent to “reside for their whole life” at the current location (51 percent and 63 percent, respectively, for PLACE males; 29 percent and 46 percent, respectively, for DHS males).

Table 1a. Males: Sociodemographic Characteristics

	Rural		Semi-urban		Urban (Kigali)	
	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)
N	4458	3690	2783	619	943	511
Age (% of total)						
15 to 19 yrs	20.8	23.8	17.0	22.7	9.9	14.5
20 to 24 yrs	26.4	19.0	29.6	19.5	28.5	25.5
25 to 29 yrs	19.7	12.7	21.6	11.3	27.9	19.0
30 to 34 yrs	12.5	10.0	12.8	11.1	14.0	15.0
35 to 39 yrs	9.5	9.0	8.3	11.1	11.8	8.5
40+ yrs	11.0	25.5	10.7	24.2	8.0	17.5
Mean age (years)	26.9	30.2	27.0	30.2	27.6	29.2
Median age (years)	25.0	27.0	25.0	27.0	26.0	27.0
Level of education (% of total)						
None	36.6	19.1	17.3	10.0	10.6	8.9
Primary	50.5	72.6	60.1	67.0	58.0	52.2
Secondary	11.5	8.0	19.2	19.6	29.9	29.9
Higher (13+)	1.1	0.4	3.4	3.4	1.3	8.9
Missing	0.3	0.0	0.1	0.0	0.2	0.0
Married or living with partner (% of total)						
Missing	0.2	0.0	0.1	0.0	0.2	0.0
Yes	37.5	55.1	33.1	49.6	32.2	38.2
No	62.3	44.9	66.8	50.4	67.6	61.8
Residency at current location (% of total)						
Less than whole life or other	51.0	29.1	62.8	46.1	83.6	85.5
Whole life	49.0	70.9	37.2	53.9	16.4	14.5
Employed full-time or part-time (% of total)						
Missing	0.3	0.2	0.5	0.6	0.2	0.4
No	29.7	50.1	28.5	39.8	19.1	37.5
Yes	70.0	49.7	71.0	59.6	80.7	62.1

For the DHS, women of reproductive age were interviewed (15-49 years old). The female respondents have similar age distributions as males (Table 1b). A higher proportion of both the PLACE and DHS female respondents are in the younger age groups (15-19 years, 20-24 years). The DHS respondents have a higher mean and median age than the PLACE respondents. Women from the DHS sample are more likely to possess any formal education than those from the PLACE sample. Over 40 percent of the female rural population reached by PLACE has no primary education compared to 25 percent of the female rural DHS population.

Table 1b: Females: Sociodemographic Characteristics

	Rural		Semi-urban		Urban (Kigali)	
	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)
N	2761	8705	1419	1531	469	1085
Age (% of total)						
15 to 19 yrs	30.1	22.5	23.0	24.1	18.1	25.1
20 to 24 yrs	27.6	20.4	31.1	20.6	39.7	25.2
25 to 29 yrs	15.2	15.2	16.7	14.9	22.0	18.0
30 to 34 yrs	10.4	13.0	12.1	13.7	10.4	11.2
35 to 39 yrs	7.7	10.0	7.0	10.5	5.5	9.5
40+ yrs	9.1	18.9	9.9	16.2	4.3	10.9
Mean age (years)	25.3	28.6	26.1	27.9	24.9	26.5
Median age (years)	23.0	27.0	23.0	26.0	24.0	24.0
Level of education (% of total)						
None	42.8	25.4	31.8	17.6	16.0	8.8
Primary	48.5	68.7	55.1	61.9	53.3	55.5
Secondary	7.7	5.9	11.0	18.7	29.2	30.6
Higher (13+)	0.4	0.0	2.0	1.9	1.3	5.1
Missing	0.6	0.0	0.1	0.0	0.2	0.0
Married or living with partner (% of total)						
Missing	0.4	0.0	0.1	0.0	0.0	0.0
Yes	32.4	59.1	32.6	51.2	21.3	43.1
No	67.2	40.9	67.4	48.8	78.7	56.9
Residency at current location						
Less than whole life or other	53.3	59.6	65.5	68.1	83.2	84.5
Whole life	46.7	40.4	34.5	31.9	16.8	15.5
Employed full-time or part-time (% of total)						
Missing	0.6	0.1	0.1	0.2	0.2	0.4
No	34.5	33.6	35.7	39.3	41.2	54.0
Yes	64.9	66.3	64.1	60.5	58.6	45.5

The female population reached by PLACE is just as likely or slightly more likely to have full-time or part-time employment regardless of where they live. Employment rates for both surveys range from 61 percent to 66 percent in the rural and semi-urban settings, while the female PLACE population in Kigali has a higher rate of employment than the female DHS population (59 percent vs 46 percent, respectively). Migration is just as common among Rwandan women as it is for Rwandan men. "Residency at current location" is greater for women in the PLACE sample in rural and semi-urban settings (47 percent and 35 percent, respectively, for PLACE vs 40 percent and 32 percent, respectively, for DHS). The DHS female population is more likely to be married than the female population reached by PLACE.

Sexual Behavior — This section compares sexual behavior of the DHS and PLACE populations. This section also looks at a subset of youth. Table 2a relates to the sexual experience and sexual debut of the male PLACE and DHS populations. These data do not reveal any trends that would allow a conclusion that either PLACE or DHS populations have higher rates of previous sex across rural, semi-urban, and urban settings; although there is a general increase in having had sex from the rural to semi-urban to urban populations. Nor is there a definitive difference for age at first sex. Mean and median age at first sex does not reveal a substantial difference between the PLACE and DHS populations.

Table 2a. Males: Ever Had Sex and Age at First Sex

	Rural		Semi-urban		Urban (Kigali)	
	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)
N	4458	3690	2783	619	943	511
Has had sex previously (%)						
Missing	0.5	0.0	0.0	0.0	4.3	0.2
Yes	70.2	71.1	74.9	71.5	81.4	77.6
No	29.3	28.8	25.1	28.5	14.2	22.2
Age at first sex (%)						
Have not had sex/missing	29.7	30.2	25.3	29.0	14.4	22.7
<13 yrs	6.3	5.4	6.8	5.4	2.3	5.0
13 to 17 yrs	19.6	16.2	20.9	18.5	28.5	17.9
18 to 21 yrs	26.4	27.7	32.2	28.0	41.8	33.5
22 to 24 yrs	8.5	10.5	7.5	9.2	8.7	12.4
>24 yrs	9.4	9.9	7.2	9.9	4.2	8.5
Mean age (years)	18.9	19.4	18.4	19.0	18.5	19.2
Median age (years)	19.0	19.0	18.0	18.0	18.0	19.0

Lower percentages of female PLACE respondents have had sex than their DHS counterparts in rural and semi-urban settings (57 percent vs 70 percent, 62 percent vs 67 percent, respectively), while a greater percentage of the PLACE population has had sex in the urban setting (70 percent vs 64 percent) (Table 2b). Also, the increase in percentages from the rural to a more urban setting is not evident in the female population as it was in the male population. Mean age at first sex is slightly less for the female PLACE respondents in all three settings, but by a

narrow margin in rural (18.7 years of age vs 19.3 years for female PLACE and DHS, respectively), semi-urban (18.7 years vs 19.3 years) and urban settings (18.0 years vs 19.3 years). Median age is less as well, with a median age of 18 years for the female PLACE respondents in all three settings, and a median age of 19 years DHS respondents in all three settings.

Table 2b. Females: Ever Had Sex and Age at First Sex

	Rural		Semi-urban		Urban (Kigali)	
	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)
N	2761	8705	1419	1531	469	1085
Has had sex previously (%)						
Missing	0.4	0.0	0.0	0.0	3.2	0.0
Yes	57.1	69.7	61.7	67.2	69.9	64.3
No	42.4	30.3	38.3	32.8	26.9	35.7
Age at first sex (%)						
Have not had sex/Missing	42.9	32.1	38.4	34.2	27.3	39.9
<13 yrs	2.8	1.7	3.1	2.1	1.3	1.2
13 to 17 yrs	17.7	17.6	19.5	18.1	34.5	17.2
18 to 21 yrs	25.7	33.0	27.1	30.1	26.7	26.6
22 to 24 yrs	6.5	11.2	6.0	9.6	6.2	9.5
>24 yrs	4.4	4.5	5.9	5.8	4.1	5.7
Mean age (years)	18.7	19.3	18.7	19.3	18.0	19.3
Median age (years)	18.0	19.0	18.0	19.0	18.0	19.0

Further analysis of the sexual experience data of the youth subset reveals a substantial difference among PLACE and DHS populations. The youth subset is comprised of all males and females between the ages of 15 and 24 years old, and who are not married or living with a partner. The male youth exhibit much lower rates of "having had sex previously," as one would expect. However, there is a discernable trend of higher rates across the rural, semi-urban, and urban settings among the male youth in the PLACE population when compared to the same population from the DHS; 45percent vs 31percent, 57percent vs 35percent, and 67 percent vs 51percent in the rural, semi-urban, and urban settings, respectively (Table 2c). Also noteworthy is the slightly older mean ages at first sex for the PLACE male youth across the three settings. Since this statistic is derived only from those who have had sex, it appears that the PLACE male youth population is not having sex any earlier than the DHS male youth population, but a larger percentage in this group is having sex.

Table 2c. Male Youth (15-24 Years Old): Ever Had Sex and Age at First Sex

	Rural		Semi-urban		Urban (Kigali)	
	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)
N	1946	1406	1230	250	340	194
Has had sex previously (%)						
Missing	0.3	0.1	0.0	0.0	2.1	0.0
Yes	45.1	30.9	56.9	35.1	66.8	50.5
No	54.6	69.1	43.1	64.9	31.2	49.5
Mean age (years)	15.4	14.3	15.5	15.1	16.9	16.5
Median age (years)	16.0	15.0	17.0	15.0	17.0	18.0

As with the male youth subset, there is a similar trend evident in the female youth subset (Table 2d). The PLACE respondents in all three settings exhibit greater percentages of having had sex previously when compared to their corresponding DHS populations. In the rural setting, 27 percent of the PLACE youth reported having had sex compared to 12 percent of the DHS youth. In the semi-urban setting, it was 35percent vs 20percent for PLACE and DHS samples, respectively. The largest difference was found to be in the urban setting where 58 percent of the female youth in the PLACE sample reported having previously had sex, while only 25 percent in the DHS sample. As was the case with the data for male youth, another characteristic of these PLACE and DHS female youth data is an increase in values as the setting becomes more urbanized.

Table 2d. Female Youth (15-24 Years Old): Ever Had Sex and Age at First Sex

	Rural		Semi-urban		Urban (Kigali)	
	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)
N	1402	2775	691	575	263	469
Has had sex previously (%)						
Missing	0.1	0.0	0.0	0.0	3.0	0.0
Yes	27.3	11.9	35.3	20.3	57.8	24.9
No	72.5	88.0	64.7	79.7	39.2	75.1
Mean age (years)	15.7	15.4	15.9	15.8	16.6	16.8
Median age (years)	16.0	16.0	17.0	16.0	17.0	17.0

Risky Sexual Behavior — Having many sexual partners and sexual relationships with someone other than a marital or cohabitating partner constitute risk factors for exposure to HIV and sexually transmitted infections (Boerma & Weir, 2005). For males, the higher percentage of PLACE respondents compared to DHS respondents who have not had sex or no partners in the last 12 months (Table 3a) is consistent with PLACE respondents being less likely to be married or live with a partner (Tables 1a, 1b). However, PLACE respondents also have much higher percentages of two or more partners in the past 12 months. In the rural settings. 16 percent of the PLACE respondents and 3 percent of the DHS respondents claim to have had two or more partners in the past 12 months. In the semi-urban settings, 22 percent of PLACE respondents and 2 percent of DHS respondents claim to have had multiple partners. The highest levels of multiple partners were reported in the urban setting: 33 percent and 4 percent for PLACE and DHS respondents, respectively. Mean numbers of partners are consistently higher for the PLACE respondents across all settings, yet the median numbers of partners are lower, as over 50 percent of all PLACE respondents report no partners in the last 12 months. Another risk factor for HIV/STI is sex with a person who is not a spouse or live-in partner. Twenty-three percent of the rural PLACE respondents report sex with a non-spouse or non-cohabitating partner, while 7 percent of the DHS, rural respondents report this. In the semi-urban setting, 31 percent and 12 percent of the PLACE and DHS respondents, respectively, report sex with a non-marital or cohabitating partner, as do 42 percent and 19 percent of PLACE and DHS respondents in the urban setting.

Table 3a. Males: Sexual Partnerships

	Rural		Semi-urban		Urban (Kigali)	
	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)
N	4458	3690	2783	619	943	511
Number sexual partners in past 12 months (%)						
Missing	0.2	0.0	0.0	0.0	0.3	0.2
0	58.0	41.6	51.2	44.7	53.4	47.9
1	25.5	55.5	26.7	53.6	13.1	48.4
2	6.0	2.9	8.3	1.7	9.5	3.5
3 to 9	9.3	0.0	12.3	0.0	20.3	0.0
>9	1.0	0.0	1.5	0.0	3.3	0.0
Mean number	1.0	0.6	1.2	0.6	2.0	0.6
Median number	0.0	1.0	0.0	1.0	0.0	1.0
Sex with 2+ partners in past 12 months (%)						
Missing	0.2	0.0	0.0	0.0	0.3	0.2
Never had sex	29.3	28.8	25.1	28.5	14.2	22.2
No	54.2	68.2	52.8	69.8	52.4	74.1
Yes	16.3	2.9	22.1	1.7	33.1	3.5
Sex with non-marital/non-cohabiting partner in past 12 months (%)						
Never had sex	29.3	28.8	25.1	28.5	14.2	22.2
No	48.0	64.1	44.2	60.0	43.6	58.4
Yes	22.7	7.1	30.8	11.5	42.2	19.4

For females, a higher percentage of PLACE respondents have not had sex in the last 12 months than in the corresponding DHS population, yet there is a higher percentage of PLACE respondents who have had two or more partners in the last 12 months. In the rural settings, 9 percent or the PLACE respondents and less than 1 percent of the DHS respondents claim to have had two or more partners in the past 12 months. In the semi-urban settings, 9 percent of PLACE respondents and almost 1 percent of DHS respondents claim to have had multiple partners (Table 3b). In the urban setting 36 percent and 1 percent of PLACE and DHS respondents, respectively, report two or more partners in the past 12 months. Female PLACE respondents report consistently higher mean numbers of partners in the last 12 months in all settings, but since over half of the respondents have not had sex in the past year the median numbers of partners are lower (0.0) than what is reported by DHS respondents. Fourteen percent of the rural female PLACE respondents report sex with a non-spouse or non-cohabitating partner compared to 4 percent of the comparable DHS population. In the semi-urban setting, 17 percent and 6 percent of the PLACE and DHS respondents, respectively, report sex with a non-marital or cohabitating partner; as do 43 percent and 8 percent of PLACE and DHS respondents in the urban setting.

Table 3b. Females: Sexual Partnerships

	Rural		Semi-urban		Urban (Kigali)	
	PLACE (2005)	RDHS (2005)	PLACE (2005)	RDHS (2005)	PLACE (2005)	RDHS (2005)
N	2761	8705	1419	1531	469	1085
Number of sexual partners in past 12 months (%)						
Missing	0.1	0.0	0.1	0.0	1.5	0.0
0	69.8	46.4	63.8	52.9	53.3	58.5
1	21.0	53.3	26.7	46.6	9.6	40.7
2	3.8	0.2	2.9	0.5	6.0	0.9
3 to 9	4.4	0.0	4.1	0.0	16.0	0.0
>9	0.9	0.0	2.4	0.0	13.6	0.0
Mean number	0.6	0.5	1.1	0.5	4.2	0.4
Median number	0.0	1.0	0.0	0.0	0.0	0.0
Sex with 2+ partners in past 12 months (%)						
Missing	0.1	0.0	0.1	0.0	1.5	0.0
Never had sex	42.4	30.3	38.3	32.8	26.9	35.7
No	48.4	69.4	52.3	66.7	36.0	63.4
Yes	9.1	0.2	9.4	0.5	35.6	0.9
Sex with non-marital/non-cohabiting partner in past 12 months (%)						
Never had sex	42.4	30.3	38.3	32.8	26.9	35.7
No	43.2	66.0	44.9	61.1	30.3	56.2
Yes	14.4	3.7	16.8	6.1	42.9	8.1

In general, male condom use at last sex is higher for the PLACE respondents and there is an increase of condom use from rural to urban (Table 4a). In the rural setting, 13 percent of the PLACE sample and 2 percent of the DHS sample claimed to have used condoms the last time they had sex. In the semi-urban areas, a higher percentage of the PLACE sample (24 percent vs 6 percent of the DHS) used condoms, as well as in an urban setting (33 percent PLACE vs 14 percent DHS). Use of condoms (male or female condoms) by female respondents follows similar patterns as the males: greater reported use by the PLACE population and an increase in their use from rural to urban settings (Table 4b). In the rural setting, 7 percent of the PLACE female respondents used a condom at last sex while less than 1 percent used condoms among the DHS respondents. In the semi-urban setting, 11 percent and 3 percent of PLACE and DHS respondents, respectively, report condom use at last sex. In the urban setting 28 percent of the PLACE population and 6 percent of the RDHS population used condoms.

Table 4a. Males: Condom Use

	Rural		Semi-urban		Urban (Kigali)	
	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)
N	4458	3690	2783	619	943	511
Used condom at last sex in past 12 months (%)						
Missing	0.5	0.0	0.0	0.0	4.3	0.2
Never had sex	29.3	28.8	25.1	28.5	14.2	22.2
No sex in last 12 months	28.6	12.7	26.1	16.2	37.8	25.7
Had sex in last 12 months but no condom	29.0	56.8	24.6	49.9	11.1	38.1
Had sex in last 12 months and used condom	12.6	1.6	24.1	5.5	32.6	13.8

Table 4b. Females: Condom Use

	Rural		Semi-urban		Urban (Kigali)	
	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)
N	2761	8705	1419	1531	469	1085
Used condom at last sex in past 12 months (%)						
Missing	0.4	0.0	0.0	0.0	3.2	0.0
Never had sex	42.4	30.3	38.3	32.8	26.9	35.7
No sex in last 12 months	27.2	16.1	25.7	20.1	26.4	22.8
Had sex in last 12 months but no condom	22.9	52.7	24.7	44.4	15.4	35.5
Had sex in last 12 months and used condom	7.1	0.8	11.4	2.7	28.1	6.0

Health Outcomes — Symptoms of sexually transmitted infections in the last 12 months were higher among PLACE respondents. In Table 5a, males in rural, semi-urban and urban settings, PLACE respondents reported 4 percent, 4 percent and 5 percent, respectively, a genital ulcer or sore in the last 12 months, while the DHS percentages ranged from less than a percent to almost 2 percent. Genital discharge percentages ranged from 2 percent to nearly 3 percent for the PLACE respondents, and were about 1 percent for the DHS respondents. The percentage that had either symptom was higher for the PLACE sample, ranging from 4 percent to about 5 percent, compared to about 2 percent for the DHS sample.

Table 5a. Male: STI Symptoms

	Rural		Semi-Urban		Urban (Kigali)	
	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)
N	4458	3690	2783	619	943	511
Ulcer or Sore in Last 12 Months						
Do not know/missing	0.0	0.4	0.0	0.0	0.0	0.4
Never Had Sex	29.3	28.8	25.1	28.5	14.2	22.2
No	66.4	69.9	71.2	70.1	80.6	75.7
Yes	4.3	0.9	3.7	1.5	5.2	1.7
Genital Discharge in Last 12 Months						
Do not know/missing	0.0	0.4	0.0	0.0	0.0	0.4
Never Had Sex	29.3	28.8	25.1	28.5	14.2	22.2
No	67.9	69.9	72.9	70.6	83.6	76.3
Yes	2.8	0.8	2.0	0.9	2.2	1.1
Either Discharge or Sore in Last 12 Months						
Never Had Sex	29.3	28.8	25.1	28.5	14.2	22.2
No	65.9	69.7	70.9	69.8	80.4	75.4
Yes	4.9	1.5	4.1	1.7	5.4	2.4

In Table 5b, female PLACE respondents show a higher percentage of STI symptoms than the DHS respondents, similar to the trend among male PLACE respondents. The percentages of genital ulcers and sores for PLACE and DHS respondents were 4 percent vs 2 percent in the rural setting, 5 percent vs 2 percent in the semi-urban setting, and 8 percent vs 2 percent in the urban setting. Genital discharge percentages were 4 percent vs 2 percent for rural and 4 percent vs 3 percent for semi-urban. The only exception to the trend of PLACE female respondents having higher percentages occurred in the urban setting, where about 4 percent of both PLACE and DHS populations reported having had a genital discharge in the last 12 months. Greater percentages of female PLACE respondents reported having had either symptom in all three settings than their DHS counterparts.

Table 5b. Females: STI Symptoms

	Rural		Semi-urban		Urban (Kigali)	
	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)
N	2761	8705	1419	1531	469	1085
Ulcer or sore in last 12 months						
Do not know/missing	0.0	0.4	0.0	0.5	0.0	0.2
Never had sex	42.4	30.3	38.3	32.8	26.9	35.7
No	53.2	67.6	56.7	64.4	65.7	62.1
Yes	4.3	1.8	5.1	2.3	7.5	2.0
Genital discharge in last 12 months						
Do not know/missing	0.0	0.3	0.0	0.3	0.0	0.1
Never had sex	42.4	30.3	38.3	32.8	26.9	35.7
No	53.4	67.1	57.8	63.9	69.1	60.0
Yes	4.2	2.3	3.9	3.0	4.1	4.2
Either discharge or sore in last 12 months						
Never had sex	42.4	30.3	38.3	32.8	26.9	35.7
No	51.9	66.6	55.5	63.4	64.4	59.0
Yes	5.7	3.1	6.2	3.8	8.7	5.3

Perceptions, Media Exposure, Behavior and HIV Testing — Table 6a relates to selected perceptions, media exposures, and behaviors relating to HIV/AIDS among males. Generally, there are high percentages of believing that "a healthy-looking person can have AIDS" and there are "drugs available to avoid transmission (of virus) to baby during pregnancy" for both PLACE and DHS surveys, although there was slightly higher awareness among the DHS respondents. High percentages of both PLACE and DHS respondents report having heard something unspecified about AIDS in the media within the last three months. When respondents were asked from what source they have heard about AIDS, greater percentages of PLACE than DHS respondents reported exposure to an AIDS message through radio, television, newspaper, or poster in all three settings, with the exception of newspapers in the urban setting (45 percent for PLACE vs 48 percent for DHS) and posters in the urban setting (59 percent vs 59 percent).

Male respondents were also asked whether they had changed their behaviors in some unspecified way after learning something about AIDS. Ninety percent, 96 percent, and 95 percent of the rural, semi-urban, and urban PLACE respondents, respectively, reported a change in their behavior; while 66 percent, 77 percent, and 76 percent of the DHS respondents in the rural, semi-urban, and urban settings, respectively, reported a change. When asked if the respondent had made certain changes in their behavior, PLACE respondents were more likely than DHS respondents to report they had limited themselves to a single sex partner, avoided sex with casual acquaintances, avoided sex with persons with many sex partners, used condoms with casual acquaintances, or abstained from sex. Limiting sex partners as a behavior change was similar for both sets of survey respondents, with the exception of the urban DHS respondents who where more likely to limit their number of partners (58 percent of urban DHS vs 44 percent of the urban PLACE respondents).

In all settings, male PLACE respondents were more likely than DHS respondents to have ever had an HIV test; and male PLACE respondents were more likely to have had the test within the last 12 months in the rural settings (18 percent of PLACE respondents vs 10 percent of DHS respondents) and semi-urban settings (29 percent of PLACE respondents vs of DHS respondents 16 percent). Responses in the urban setting were similar between the PLACE survey and DHS (26 percent vs 27 percent, respectively).

Table 6a. Males: AIDS/HIV Perceptions, Media Exposure, Behavior and HIV Testing

	Rural		Semi-urban		Urban (Kigali)	
	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)
N	4458	3690	2783	619	943	511
Believes healthy-looking person can have AIDS						
Do not know/missing	11.6	2.8	3.7	1.5	2.1	1.1
No	7.4	6.5	5.7	3.5	3.4	1.8
Yes	81.0	90.7	90.6	95.1	94.5	97.1
Believes drugs available to avoid AIDS transmission to baby during pregnancy						
Do not know/missing	27.0	14.5	15.7	8.1	18.5	9.9
No	5.4	7.1	5.6	4.0	6.6	2.3
Yes	67.6	78.3	78.7	87.9	75.0	87.9
Seen something about AIDS in media in last 3 months						
Do not know/missing	0.3	0.2	0.0	0.1	0.2	0.0
No	26.6	23.7	18.9	12.0	9.1	18.9
Yes	73.1	76.2	81.1	87.9	90.7	81.1
Heard something about AIDS on radio						
Do not know/missing	0.2	0.2	0.0	0.1	0.2	0.2
No	10.3	25.0	13.1	14.3	10.9	21.0
Yes	89.5	74.8	86.8	85.6	88.9	78.8
Saw something about AIDS on TV						
Do not know/missing	0.2	0.5	0.1	0.2	0.2	0.2
No	72.5	94.0	58.4	83.3	42.1	47.9
Yes	27.4	5.4	41.5	16.5	57.7	51.9
Saw something about AIDS in newspaper						
Do not know/missing	0.2	0.5	0.0	0.1	0.2	0.6
No	58.8	85.9	47.7	75.7	55.1	51.0
Yes	41.0	13.5	52.3	24.3	44.6	48.4
Saw something about AIDS on poster						
Do not know/missing	0.2	0.5	0.1	0.1	0.3	0.4
No	36.9	63.8	29.1	47.1	40.6	40.5
Yes	62.9	35.7	70.8	52.8	59.1	59.1
Changed behavior in unspecified way after learning something about AIDS						
Do not know/missing	0.2	0.5	0.0	0.5	0.2	0.2
No	9.5	33.2	4.1	22.6	4.7	24.2
Yes	90.4	66.3	95.9	76.9	95.1	75.6

	Rural		Semi-urban		Urban (Kigali)	
	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)	PLACE (2005)	DHS (2005)
Changed behavior by limiting sex partners						
Do not know/missing	0.2	0.4	0.0	0.4	0.2	0.2
No	76.4	75.3	71.4	70.8	55.8	42.1
Yes	23.5	24.3	28.6	28.8	44.0	57.7
Changed behavior by limiting to 1 sex partner	0.2	0.4	0.0	0.4	0.2	0.2
Do not know/missing						
No	61.2	82.6	52.7	75.3	42.7	94.2
Yes	38.6	17.1	47.3	24.2	57.1	5.6
Changed behavior by avoiding sex with casual acquaintance						
Do not know/missing	0.2	0.4	0.0	0.4	0.2	0.2
No	70.1	96.8	60.0	96.4	55.4	97.0
Yes	29.7	2.8	40.0	3.1	44.4	2.8
Changed behavior by avoiding sex with persons w/multiple partners						
Do not know/missing	0.2	0.4	0.1	0.4	0.2	0.2
No	73.1	99.2	65.8	98.5	57.5	98.0
Yes	26.6	0.4	34.2	1.0	42.3	1.8
Changed behavior by using condom with casual acquaintance						
Do not know/missing	0.3	0.4	0.1	0.4	0.2	0.2
No	70.4	96.4	53.2	93.9	42.9	80.7
Yes	29.3	3.2	46.7	5.7	56.8	19.1
Changed behavior by abstaining from sex						
Do not know/missing	0.2	0.4	0.0	0.4	0.2	0.2
No	41.4	61.9	30.1	58.7	34.5	39.8
Yes	58.5	37.8	69.9	40.9	65.3	60.0
Last time had HIV test						
Do not know/missing	0.3	0.1	0.1	0.2	0.2	0.0
Not tested	73.3	82.5	60.0	71.7	51.7	54.3
Less than 12 months ago	17.6	9.6	28.7	16.4	25.8	26.9
Over 12 months ago	8.8	7.8	11.1	11.7	22.3	18.8

For both survey groups, female respondents reported high percentages of believing that "a healthy-looking person can have AIDS" and that there are "drugs available to avoid transmission (of virus) to baby during pregnancy" (Table 6b). PLACE respondents were more likely than DHS respondents to have heard about AIDS through various types of media within the last three months: in rural settings 67 percent of PLACE respondents vs 48 percent of DHS respondents; in a semi-urban settings 76 percent vs 58 percent; and in an urban settings 92 percent vs. 76 percent. The female PLACE population was more likely than the female DHS population to have been exposed to AIDS content via radio, TV, newspaper, and posters in rural, semi-urban, and urban settings.

Behavior change was more likely in the female PLACE population than the corresponding DHS population. Ninety percent of the rural PLACE respondents and 31 percent of the rural DHS respondents indicated they had changed their behavior in an unspecified way after learning something about AIDS. Similarly, 93 percent and 39 percent of the semi-urban PLACE and DHS respondents, respectively, stated they had changed their behavior; as did 91 percent of the urban PLACE and 57 percent of the urban DHS respondents. When asked if certain changes had been made in their behavior, female PLACE respondents indicated higher percentages of change in all settings by limiting the number of sex partners, limiting to one sex partner, avoiding sex with casual acquaintances, avoiding sex with persons with multiple partners, using condoms with casual sex partners, and by abstaining from sex.

For females, HIV tests were reported by 23 percent of the rural PLACE respondents and 19 percent of the corresponding DHS respondents. Thirty-five percent of PLACE and 41 percent of DHS respondents in the semi-urban settings had an HIV test, while 50 percent and 52 percent of the PLACE and DHS respondents, respectively, had the test in the urban setting.

Table 6b. Females: AIDS/HIV Perceptions, Media Exposure, Behavior and HIV Testing

	Rural		Semi-urban		Urban (Kigali)	
	PLACE (2005)	RDHS (2005)	PLACE (2005)	RDHS (2005)	PLACE (2005)	RDHS (2005)
N	2761	8705	1419	1531	469	1085
Believes healthy-looking person can have AIDS						
Do not know/missing	14.5	7.6	6.2	2.8	3.4	1.2
No	9.3	10.6	4.4	5.0	1.7	2.6
Yes	76.1	81.7	89.4	92.1	94.9	96.2
Believes drugs available to avoid AIDS transmission to baby during pregnancy						
Do not know/missing	23.7	22.8	14.4	12.5	17.1	7.7
No	6.2	7.2	3.3	3.3	6.2	1.6
Yes	70.1	70.1	82.2	84.3	76.8	90.8
Seen something about AIDS in media in last 3 months						
Do not know/missing	0.5	0.5	0.2	0.2	0.4	0.2
No	32.3	51.9	23.5	41.9	7.2	23.6
Yes	67.1	47.6	76.3	57.9	92.3	76.2
Heard something about AIDS on radio						
Do not know/missing	0.4	0.5	0.1	0.3	0.2	0.2
No	16.8	52.9	17.0	43.3	13.9	26.0
Yes	82.9	46.6	82.9	56.4	85.9	73.7
Saw something about AIDS on TV						
Do not know/missing	0.4	0.7	0.1	0.3	0.2	0.7
No	79.7	97.9	70.8	90.8	53.3	70.0
Yes	19.9	1.4	29.0	9.0	46.5	29.3
Saw something about AIDS in newspaper						
Do not know/missing	0.4	0.7	0.1	0.3	0.2	0.5
No	65.7	95.1	57.6	88.9	65.2	78.4
Yes	33.9	4.3	42.4	10.9	34.5	21.0
Saw something about AIDS on poster						
Do not know/missing	0.4	0.7	0.1	0.3	0.2	0.6
No	44.7	89.9	39.1	75.4	36.0	56.7
Yes	54.9	9.3	60.7	24.3	63.8	42.7
Changed behavior in unspecified way after learning something about AIDS						
Do not know/missing	0.3	0.8	0.1	0.9	0.2	0.8
No	10.1	68.5	7.0	60.4	9.0	42.0
Yes	89.6	30.7	93.0	38.8	90.8	57.2

	Rural		Semi-urban		Urban (Kigali)	
	PLACE (2005)	RDHS (2005)	PLACE (2005)	RDHS (2005)	PLACE (2005)	RDHS (2005)
Changed behavior by limiting sex partners						
Do not know/missing	0.3	0.3	0.1	0.7	0.2	0.6
No	82.1	99.3	81.8	98.8	72.9	96.1
Yes	17.6	0.4	18.1	0.5	26.9	3.3
Changed behavior by limiting to 1 sex partner						
Do not know/missing	0.3	0.3	0.1	0.7	0.2	0.6
No	65.4	90.1	56.2	90.3	55.4	82.9
Yes	34.2	9.6	43.7	9.0	44.3	16.5
Changed behavior by avoiding sex with casual acquaintances						
Do not know/missing	0.3	0.3	0.1	0.7	0.2	0.6
No	73.2	96.3	64.4	94.0	74.0	92.7
Yes	26.4	3.3	35.5	5.3	25.8	6.7
Changed behavior by avoiding sex with persons w/multiple partners						
Do not know/missing	0.4	0.3	0.1	0.7	0.2	0.6
No	77.3	99.4	72.9	99.0	75.9	98.7
Yes	22.4	0.3	27.0	0.4	23.9	0.7
Changed behavior by using condom with casual aquaintance						
Do not know/missing	0.3	0.3	0.1	0.7	0.2	0.6
No	78.8	98.9	68.0	97.7	55.7	95.9
Yes	20.9	0.8	31.9	1.7	44.1	3.5
Changed behavior by abstaining from sex						
Do not know/missing	0.3	0.3	0.1	0.7	0.2	0.6
No	35.0	79.3	26.2	73.7	40.1	57.1
Yes	64.7	20.3	73.7	25.6	59.7	42.3
Last time had HIV test						
Do not know/missing	0.5	0.5	0.1	1.0	0.2	0.9
Not tested	76.6	80.5	64.7	58.1	49.7	46.7
Less than 12 months ago	14.9	10.4	24.9	20.8	27.5	29.3
Over 12 months ago	8.0	8.6	10.3	20.1	22.6	23.1

Multivariate Results — Multivariate analyses were performed by using Generalized Estimating Equations (GEE) available in the GENMOD procedure in SAS (Zeger & Liang, 1986). This multivariate method permits estimation of standard errors when dealing with correlated responses within the PLACE PPAs and DHS sampling clusters. This modeling approach corrects the estimated standard errors while assessing the differences between PLACE and DHS populations, and controlling for individual characteristics such as age, sex, marital/cohabitation status, and residing in a rural, semi-urban, or urban setting. As the PLACE data are unweighted, the DHS sampling weights were not used in this analysis.

The primary motivation for this approach is the ability to control for individual characteristics and statistically test for a difference between the PLACE and DHS populations. Another reason is to generate model-based predicted probabilities of the indicators for each respondent and plot them. Four different predicted probabilities are reported in this section: the probability of using a condom at last sex; the probability of having had an HIV test; the probability of reporting an STI symptom; and the probability of having has two or more partners in the past 12 months.

Table 7 contains information on the odds ratios and 95% confidence intervals of the multivariate analyses. The trends in the multivariate analyses agree with the bivariate analyses in the preceding section, even when individual-level factors are controlled for. For condom use, a PLACE respondent is over 5.4 times ($p < 0.001$) more likely to use a condom than a DHS respondent. The PLACE population is 1.3 times ($p < .05$) more likely to have had an HIV test in the past. Additionally, the PLACE respondents are over 2.2 times ($p < 0.001$) more likely to report STI symptoms than DHS respondents. Most interesting, however, is the large difference in the number of sexual partnerships between the two populations. The PLACE population is 13.4 times ($p < 0.001$) more likely to report two or more partners in the last 12 months. This high odds ratio can be explained by the extremely low rates of multiple partnerships in DHS respondents and moderately high rates of multiple partnerships among PLACE respondents (0.99 percent vs 17.19 percent,[2] respectively).

Table 7. Odds Ratios and 95% Confidence Intervals

	Model 1: Condom at Last Sex	Model 2: Had an HIV Test	Model 3: STI Symptom	Model 4: 2+ Partners in Past 12 Months
PLACE population (reference=DHS)	5.42*** (4.39,6.68)	1.26* (1.01,1.57)	2.21*** (1.68,2.92)	13.43*** (9.44,19.11)
Age	1.12** (1.04,1.2)	1.53** (1.47,1.59)	1.31*** (1.22,1.41)	1.55*** (1.43,1.67)
Married/cohabitating	0.16*** (0.11,0.23)	1.71*** (1.49,1.95)	0.98 (0.77,1.26)	0.45*** (0.35,0.57)
Female (reference = male)	0.53*** (0.44,0.63)	1.03 (0.93,1.14)	1.62*** (1.34,1.95)	0.50*** (0.35,0.71)
Rural (reference = urban)	0.19*** (0.14,0.25)	0.26*** (0.2,0.34)	0.72* (0.54,0.96)	0.39*** (0.27,0.59)
Semi-urban (reference = urban)	0.43*** (0.32,0.6)	0.61*** (0.42,0.87)	0.72 (0.44,1.19)	0.48† (0.21,1.09)

[2] Unadjusted percents are reported. DHS data are weighted.

Figures 2 through 5 illustrate probabilities predicted by the four models. Figure 2 illustrates the predicted probabilities of condom use by age, revealing that the highest levels of protected sex occur in youth and young adults, with the highest overall likelihood of condom use being in the PLACE population.

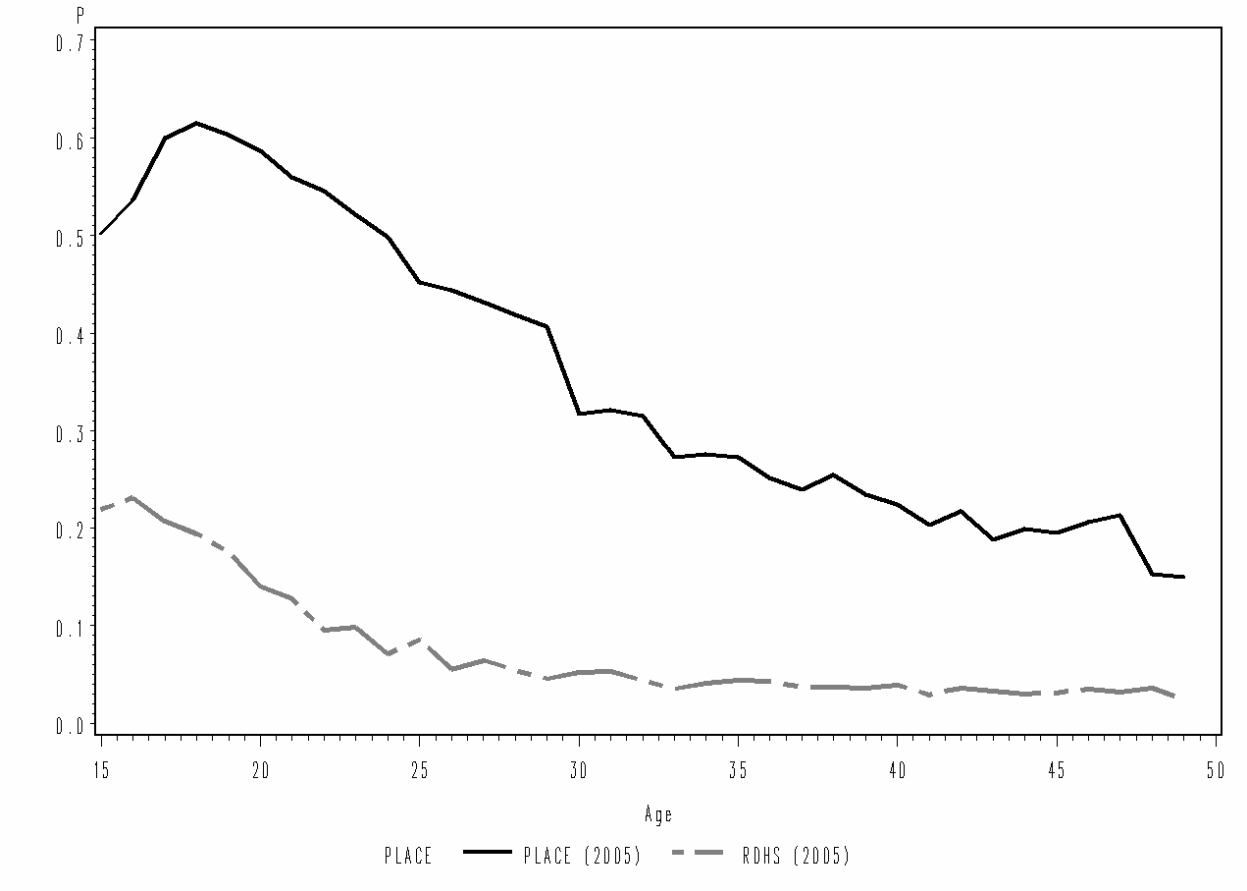

Figure 2. Probability of using condom at last sex.*

*Notes: Controlling for age, sex, and marital/cohabitation status.
Only respondents who have had sex are included.

Figure 3 shows PLACE respondents are more likely to have had an HIV test, but by a narrow margin, than DHS respondents. The highest probabilities of reported HIV tests occur in respondents in their early 30s.

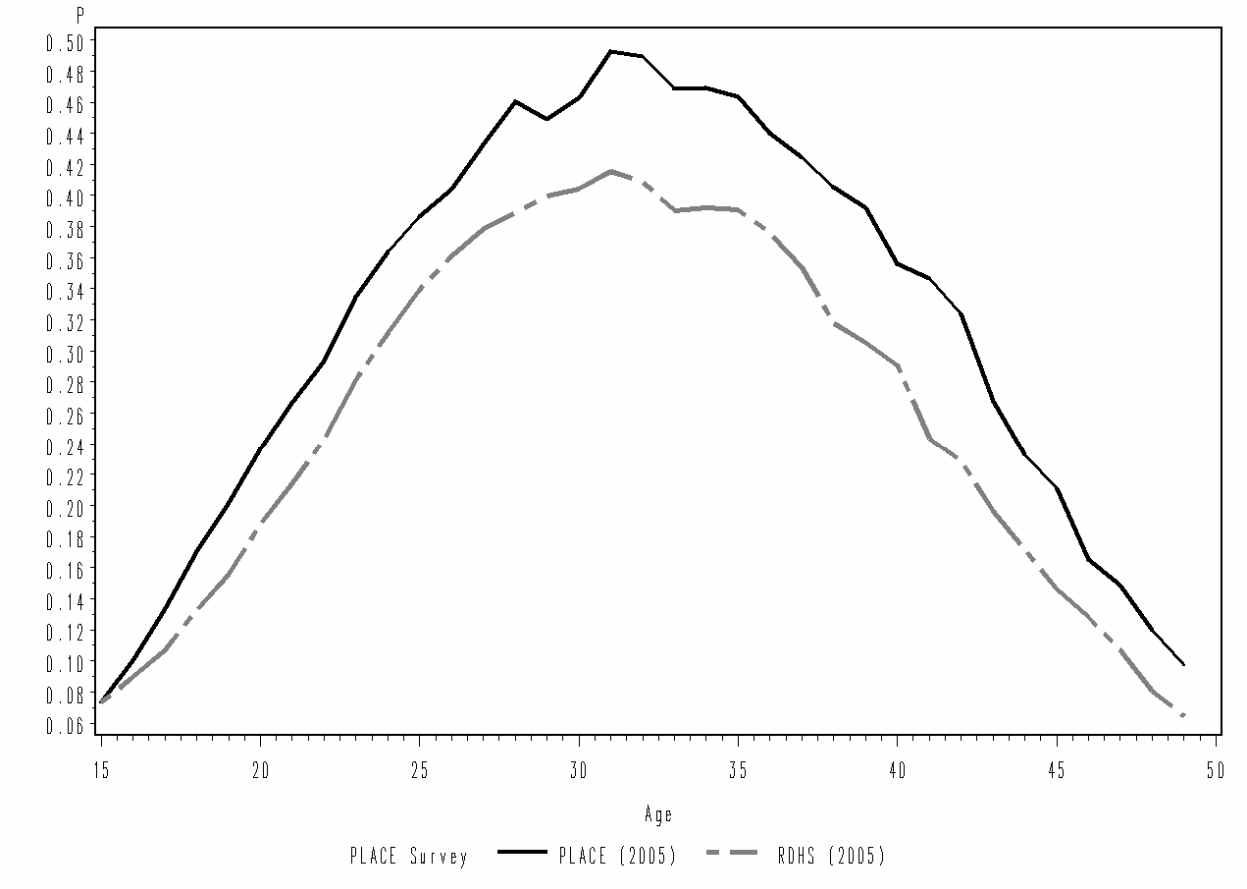

Figure 3. Probability of ever having had an HIV test.*

*Notes: Controlling for age, sex, and marital/cohabitation status.
All respondents.

Figure 4 shows the probabilities of respondents reporting having had an STI symptom in the last four weeks. Overall, the PLACE survey captured respondents with a higher probability of having had an STI symptom. Of note are the higher probabilities in the older population, ranging from the late 20s to late 40s.

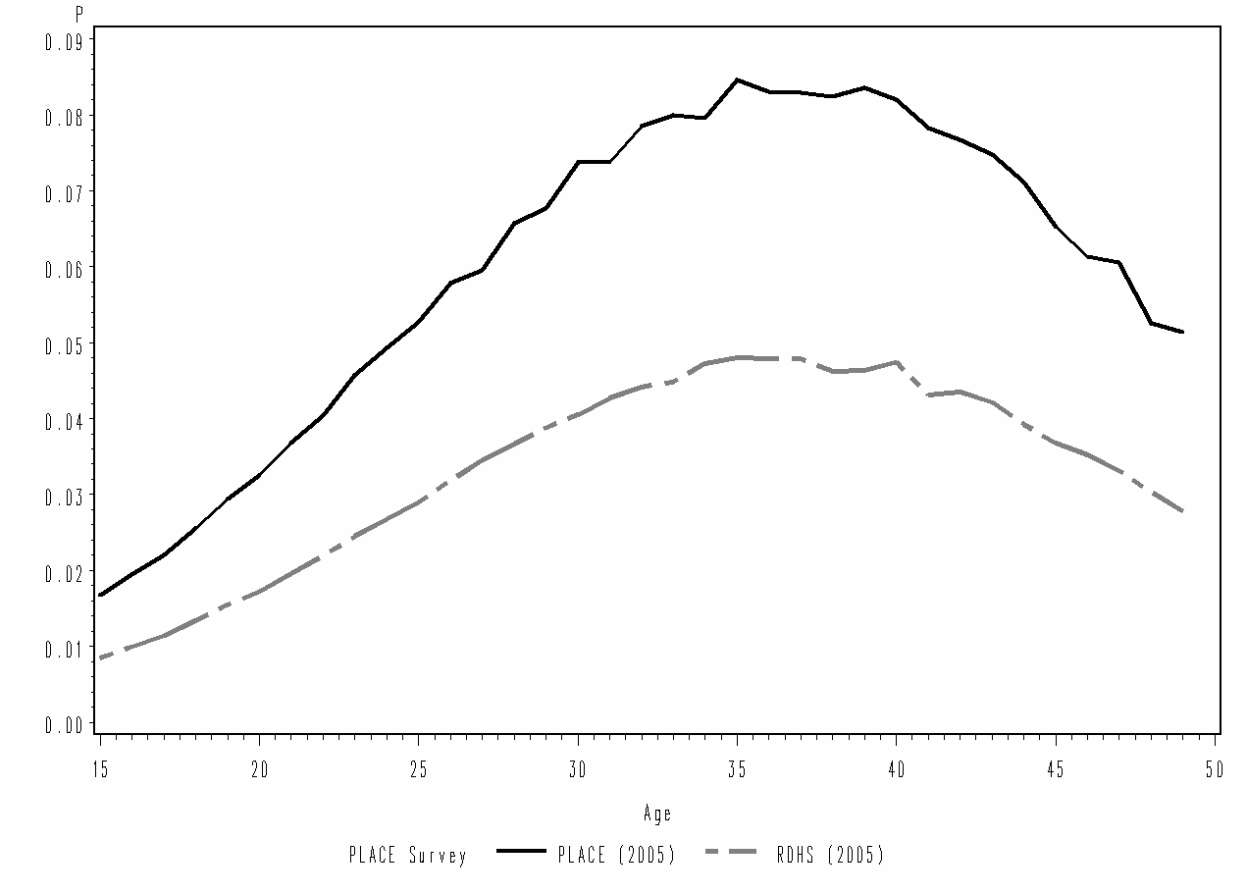

Figure 4. Probability of experiencing an STI symptom in last four weeks.*

*Notes: Controlling for age, sex, and marital/cohabitation status.
All respondents.

Figure 5 shows the probabilities of respondents reporting having had two or more partners in the past 12 months. The DHS respondents have a very low probability of having had multiple sexual partners, while it is high for PLACE respondents. The highest probabilities are seen in PLACE respondents in their late 20s to early 30s.

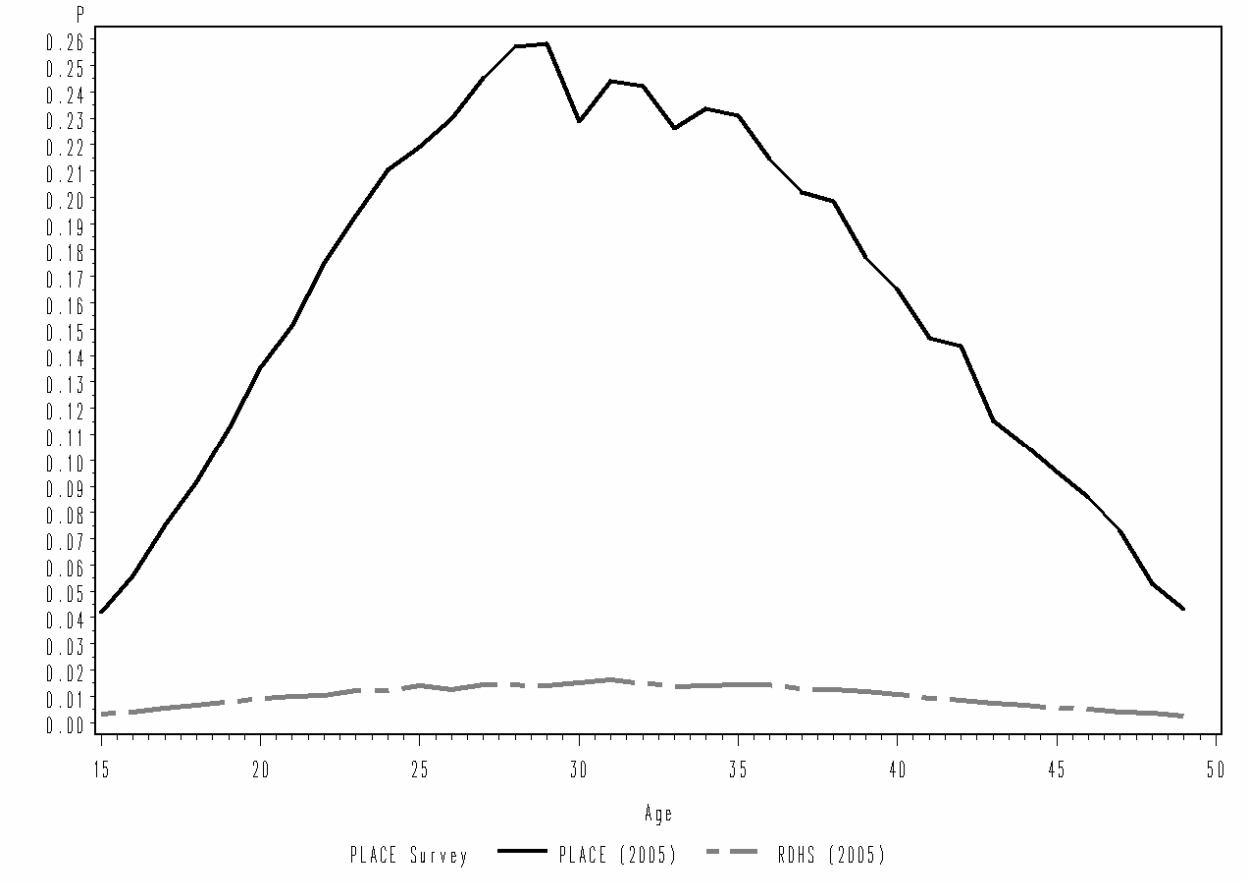

Figure 5. Probability of sex with two or more partners in the past 12 months.*

*Notes: Controlling for age, sex, and marital/cohabitation status.
All respondents.

DISCUSSION

The DHS is a household-based survey that is designed to produce national and sub-national population estimates. Theoretically, every household in the country has a chance of being selected. As a consequence of the sample design, population estimates are not valid at the level of the community or cluster. Although information related to risk factors to acquiring and transmitting HIV is collected, this aspect is a small part of the DHS panel of questions.

On the other hand, where PLACE surveys are conducted is directed by where local stakeholders perceive the highest acquisition and transmission of HIV is likely to occur (the PPA), and these data are best used when summarized at this level. As PLACE is a *venue-based* approach, rather than a *risk-group* approach, groups such as commercial sex workers, truck drivers, intravenous drug users, or military are not specifically targeted. Instead, venues with high levels of partner acquisition are targeted by the PLACE protocol and individuals who frequent these sites are interviewed as they are more likely to have multiple sex partners, and therefore are more likely to transmit or acquire HIV. Since individuals with many partners in a larger population contribute to a generalized AIDS epidemic, these individuals are the focus of the PLACE survey.

Although PLACE respondents report greater percentages of multiple partners and sex with other than a main partner, both surveys demonstrate higher percentages of these behaviors in the urban settings. However, the urban PLACE data can be disaggregated even further and analyzed at the venue level, resulting in information that can be used to target prevention activities to specific venues, which is impossible with DHS data as they lose validity at the local level.

The Rwanda PLACE population is more likely to have higher rates of partner acquisition than the Rwanda DHS population, and is more likely to have sex with non-marital or non-cohabiting partners, suggesting that the PLACE population is more likely to acquire and transmit HIV. This is useful information at the program level and can be used to target locations for prevention and testing activities. Twenty percent of the full sample of male PLACE respondents reported sex with two or more partners, compared to 3 percent for DHS males. Twenty-eight percent of male PLACE respondents indicated they had had sex with a partner who they were not married to or did not live with, while only 9 percent of the male DHS population reported this. Of the females surveyed, 12 percent of the PLACE respondents had two or more partners, compared to less than 1 percent of the DHS respondents. Similarly, the percentage of females reporting having sex with a non-marital/non-cohabiting partner was greater for PLACE respondents than DHS respondents (18 percent vs 4 percent, respectively).

It is not possible to determine the likelihood of overlap between the two survey populations. However, there is evidence that many of the PLACE respondents would not have been interviewed in a national household survey such as the Rwandan DHS. Eighty-four percent of male PLACE respondents reported spending the previous night at their residence, while 86 percent of the female PLACE respondent slept at their residence. Of those who spent the previous night outside of their residence, the majority stayed in an institution, such as university dormitory or employee housing (10 percent of males and 9 percent of females), followed by

hotels and guest houses (4 percent for both males and females), and followed by the "street or elsewhere" (about 2 percent for both males and females).

CONCLUSION

The intention of this document is not simply to illustrate that PLACE respondents typically exhibit riskier sexual behaviors than DHS respondents. Rather, it enables one to explore the differences between the populations captured by each method and to make recommendations for use of each type of data for program planners and policy makers. National surveys mask the diversity in local epidemic contexts and provide limited insight into where high levels of sexual partnership occur. PLACE identifies sites where people are likely to meet new sex partners and therefore are logical targets for prevention efforts. HIV prevention programs could benefit from greater understanding of the determinants of local epidemics in high transmission areas. DHS and PLACE offer views on knowledge, attitudes and practices at different levels of resolution: DHS at the national and regional level, PLACE at the local level.

References

Boerma JT, Weir SS. Integrating demographic and epidemiological approaches to research on HIV/AIDS: the proximate-determinants framework. *J Infect Dis* 2005. 191(Suppl 1):S61-S67.

Institute National de la Statistique du Rwanda (INSR) and ORC Macro. *Rwanda Demographic and Health Survey 2005*. Calverton, MD, U.S.A.: INSR and ORC Macro; 2006.

Zeger SL, Liang KY. Longitudinal data analysis for discrete and continuous outcomes. *Biometrics* 1986. 42(1):121-130.