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Measurement of HIV Prevention Indicators: A Comparison of the PLACE Method and a Household Survey in Zambia

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INTRODUCTION

The body of knowledge surrounding the HIV/AIDS epidemic has expanded dramatically in the last decade, as has programmatic response to the HIV/AIDS epidemic. Both have led to an intense focus on monitoring and evaluation of HIV/AIDS prevention, care and treatment programs, a proliferation of indicators, and innovations in the data collection approaches that underlie indicator measurement. This study examines results produced using two different approaches to measuring trends in sexual behavior and related HIV prevention program indicators – a national household survey and a local venue-based survey called the Priorities for Local AIDS Control Efforts (PLACE) method.

In countries where HIV has spread beyond the subgroups at highest risk (e.g., sex workers, injecting drug users, truck drivers, migrant laborers, military recruits), survey data on national trends in HIV/AIDS prevention indicators can be obtained from a household survey of the general population. In many countries, household surveys are the main source of information on HIV/AIDS risk factors and program exposure. These survey-based indicators can play an important role in tracking overall trends in behavior, documenting overall performance of a national AIDS program. The PLACE method, a relatively recent innovation in data collection techniques, was developed in part as a response to gaps in the information provided by other survey approaches with respect to data needed for program planning and monitoring at the district or local level. For example, nationally representative surveys are not cost-efficient for obtaining detailed information on small but important subpopulations, or for tracking local trends in geographic areas where incidence of HIV infection is known or believed to be higher than average. PLACE obtains many of the same sexual behavior and HIV prevention program indicators as a household survey, but targets a different population and has a different goal. The purpose of the PLACE method is to provide information useful for targeting interventions at local venues known to the community as places where new sexual partnerships are formed – in other words, to reach those in a community whose behavior is likely to put them at high risk of HIV infection and transmission.

A considerable body of knowledge and experience has accumulated on the strengths, limitations, and programmatic utility of obtaining data on HIV/AIDS prevention indicators from nationally representative household surveys. To date, at least 40 applications of the PLACE method have been documented and knowledge about its potential utility continues to build. This study reports on the first of several efforts to compare information on HIV/AIDS prevention indicators obtained from PLACE with information on the same indicators based on a representative household survey carried out in the same district. To what extent do the household survey and PLACE populations overlap? How and to what extent do HIV prevention indicators measured in a household survey differ from those obtained using the PLACE method? Does the PLACE method suc-

ceed in capturing a population at high risk that is likely to be missed in a household survey? Is it programmatically useful to have information from both sources, or is this an inefficient use of resources? Insight into questions such as these can assist policymakers and program managers in planning for comprehensive data collection strategies in the context of a country's overall HIV-related monitoring and evaluation strategy.

This analysis compares data from three studies carried out in Zambia in 2005, where it was possible to coordinate instrument design, sampling, and timing of fieldwork for a biannual household survey with two PLACE studies. Taking advantage of this opportunity, we are able to compare district-level data from the household survey measuring HIV/AIDS prevention indicators with data from two PLACE studies carried out in the same districts. In the two districts compared, all household and PLACE method interviews were completed during the period of May 2005 to October 2005.

The PLACE method “identifies, maps, and characterizes public venues where people meet new sexual partners, and estimates the extent of new partnership formation, concurrent partnerships, sexual mixing, and condom use among the population socializing at these venues” (Weir, Morroni, Coetzee, Spencer & Boerma, 2002).

METHODS

Study Setting — The towns of Mongu and Kapiri Mposhi were selected for the comparison of the PLACE studies and Zambia Sexual Behavior Survey 2005 (ZSBS) results. These towns were chosen so that a better understanding of their local HIV epidemics could be obtained. In both Mongu and Kapiri Mposhi, data from antenatal clinics and official projections suggest that the level of HIV prevalence is high. In 2004, HIV prevalence among pregnant women attending antenatal care was 28.2% in Mongu and 20.2% in Kapiri Mposhi. Official projections estimate an overall prevalence in 2006 in Mongu District around 21.0% and in Kapiri Mposhi District 17.4% (CSO, 2005).

Urban Mongu, a provincial capital, serves as a crossroads for commerce and trade. Increasingly large numbers of people from other parts of Zambia and neighboring countries, as well as international tourists, pass through Mongu. The tradesmen and visitors meet and socialize with each other and with the local population, and this social mixing can create opportunities for HIV transmission. The PLACE study in Mongu was conducted in June and July 2005 (Frontiers Development and Research Group & MEASURE Evaluation, 2006b) and the ZSBS in February and March 2005 (CSO and MEASURE Evaluation, 2006).

Kapiri Mposhi is a major transportation hub, located along the Great North Road in Zambia. The TAZARA rail line that links Zambia and Tanzania terminates in Kapiri Mposhi. At a junction just north of the town, the Lusaka-Ndola road to the Copperbelt merges with the Great North Road leading to neighboring Tanzania. A large number of people from all parts of Zambia and from many other countries pass through the town of Kapiri Mposhi over the course of a year, and many spend at least one night in or near the town. The PLACE study in Kapiri Mposhi was conducted in September and October 2005 (Frontiers Development and Research Group & MEASURE Evaluation, 2006a).

In each study setting, a PLACE study was conducted as well as interviews for the ZSBS 2005. Survey clusters for the ZSBS included clusters that were in Mongu District and Kapiri Mposhi District. These districts were also oversampled for the purpose of this comparison, although the oversampled clusters were not included in the national ZSBS analysis.

The PLACE Method — The PLACE method consists of three phases of fieldwork. In the first phase, interviewers asked 300 to 400 community informants in each town to name local public venues where people meet new sexual partners. Community informants who live and work in each study area and represent a range of experience and information were selected, by convenience, in public places located in the study area. An exhaustive list of public venues in the study area where people meet new sexual partners was produced.

In the second phase of fieldwork, interviewers visited all venues located in the study area that were reported by community informants in the previous phase. A venue representative, such as a manager or owner of a business, was interviewed to obtain characteristics of the venue and of the people who socialize there.

During the third and final phase of fieldwork, in brief face-to-face interviews, individuals socializing at a sample of the venues were asked about their sociodemographic characteristics, as well as their rate of new sexual partner acquisition, condom use, and venue attendance. Venues were selected for interviews with patrons using a systematic fixed interval sampling strategy with the probability of selection proportional to the size of the venue. The size of a venue was defined by the number of people socializing at the venue during a busy time as reported by the venue representative. This strategy produced a self-weighted sample in which every individual socializing at eligible venues had an equal probability of being selected for an interview. The interval sampling strategy also ensured that the selected venues were geographically distributed throughout the study area. Forty clusters of 24 individuals each were selected. Most of the selected venues had one cluster of 24 interviews, although several large venues had multiple clusters. At venues where there were fewer than 24 socializing patrons, all individuals at the venue were interviewed. To reach the target number of 960 interviews, additional venues were selected randomly with probability of selection proportional to the size of the venue. At the selected venues, potential respondents were sampled with an interval selection strategy designed to minimize interviewer bias when selecting respondents.

All interviews were anonymous and consent was obtained verbally. Individuals aged 18 years and older were eligible to participate in all three phases of the study. Individuals aged 15 to 17 years who were socializing at the venues were eligible to be interviewed in the third phase if they were voluntarily at the venue and acting in the capacity of an adult.

ZSBS Sampling — The sample design for the ZSBS called for a probability sample of about 2,500 households in which all eligible women 15-49 years of age and men 15-59 years of age were to be interviewed. The cluster-based household sample of 105 clusters was designed to be nationally representative. In urban clusters, the sample taken was about 20 persons from 16 households per cluster. In rural areas, the sample taken was about 20 persons from 34 households per cluster. A total of 2,465 households were sampled of which 2,444 households were located and found to be occupied. Interviews were completed for a total of 2,330 households, 2,174 women, and 2,046 men.

The ZSBS had three types of instruments — a household questionnaire, an individual questionnaire, and a community questionnaire. The comparison of the ZSBS and PLACE studies utilizes only information collected via the individual questionnaires. The individual questionnaires were administered to eligible men and women in each household. The individual questionnaire contained information regarding demographic characteristics, marital history, sexual behavior and partnerships, condom use, forced sex, circumcision, knowledge concerning HIV/AIDS and sexually transmitted infections (STIs), stigma towards persons living with HIV/AIDS, and voluntary testing and counseling (VCT).

To facilitate comparison of the populations from the two different studies, identical questions about the number of sexual partners in the past four weeks and past year were included in both the ZSBS individual questionnaire and PLACE individual informant questionnaire.

RESULTS

In the Mongu PLACE study, 149 venues were identified as places where people meet new sexual partners and an interview was conducted with a knowledgeable person at these venues. Interviews were completed with 636 men and 343 women who were socializing at 39 of the venues in Mongu. Only 2% of individuals approached for an interview declined to participate. In the Kapiri Mposhi PLACE study, 101 venues were identified as places where people meet new sexual partners and an interview was conducted with a venue representative. At 38 of these venues, 742 men and 286 women socializing there were interviewed. Only 1% of individuals approached for an interview declined to participate.

For the ZSBS, 11 clusters were selected in Mongu and interviews were completed with 123 men and 202 women living in 136 households. In Kapiri Mposhi, eight clusters were selected and interviews were completed with 122 men and 140 women living in 114 households. There were five refusals in Mongu and one in Kapiri Mposhi for the ZSBS.

Sociodemographic Characteristics — In Mongu, the mean ages of men included in the PLACE study and the ZSBS were similar and the median ages differed by one year. However, the distribution of ages was quite different. In the ZSBS survey in Mongu, the largest age category was 15-19 followed by a smaller proportion of male respondents in each successive age category. In the PLACE study in Mongu, the bulk of male respondents were 20 to 29 years old. Men interviewed for the Mongu PLACE study who were not currently employed were more likely to be looking for work than unemployed men interviewed for the ZSBS. Men interviewed for the two surveys did not differ substantially in marital status with the majority of men reporting having never been married. Also, there was no difference in the length of time that they had lived in their current location. Men interviewed in Mongu as part of the PLACE study were substantially more likely to have consumed alcohol at least once in the past 30 days compared to men interviewed for the ZSBS. The median number of days during which male PLACE respondents consumed alcohol was 3.0 compared to zero days among male ZSBS respondents (Table 1a).

Table 1a. MEN: Sociodemographic Characteristics (%)

	Mongu		Kapiri Mposhi		National
	PLACE (N=636)	ZSBS (N=123)	PLACE (N=742)	ZSBS (N=122)	ZSBS (N=2046)
Age of Respondent					
15-19	9.9	28.5	7.1	13.1	18.6
20-24	26.7	19.5	22.6	9.8	18.3
25-29	29.9	13.8	27.1	23.0	16.5
30-34	14.8	9.8	19.1	15.6	14.1
35-39	8.3	10.6	12.0	12.3	9.8
40-44	3.6	8.9	5.1	10.7	8.9
45+	6.6	8.9	6.6	15.6	13.7
Missing	0.2	0.0	0.3	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0
Mean age	28.3	28.0	29.8	32.1	30.4
Median age	27.0	26.0	28.0	30.0	28.0
Currently Working					
Yes*	48.6	41.5	65.4	79.5	56.6
No but looking for work	29.7	12.2	16.7	2.5	3.2
No, and not looking for work	19.5	29.3	16.7	13.9	25.2
Missing**	2.2	17.1	1.2	4.1	15.1
Total	100.0	100.0	100.0	100.0	100.0
Marital Status					
Never Married	62.4	57.7	42.0	20.5	36.6
Currently Married	30.8	36.6	28.3	75.4	59.3
Previously Married	5.0	5.7	28.0	4.1	4.1
Missing	1.7	0.0	1.7	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0
Years Lived in Current Location					
<1 year	16.8	15.5	17.3	5.7	7.5
1 year	6.6	13.0	4.0	8.2	4.5
2-4 years	23.3	26.8	20.9	11.5	17.1
5-10 years	22.8	22.8	28.2	35.3	21.8
>10 years	29.6	22.0	29.0	39.3	49.1
Missing	0.9	0.0	0.7	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0
Number of Days Drank a Beverage Containing Alcohol in Past 30 Days					
None	32.5	86.2	24.4	63.9	70.5
1-2 Days	14.3	7.3	12.7	11.5	10.3
3-9 Days	36.3	6.5	29.0	23.8	14.0
10-19 Days	6.4	0.0	11.2	0.8	2.8
20-29 Days	4.9	0.0	12.0	0.0	1.5
Everyday	3.8	0.0	9.8	0.0	0.9
Missing	1.7	0.0	0.9	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0
Mean number of days	5.3	0.5	9.3	1.3	1.9
Median number of days	3.0	0.0	5.0	0.0	0.0

*PLACE: Employed full or part-time.

**ZSBS: Missing if person worked in the past 12 months but is not currently working.

In Kapiri Mposhi, the male ZSBS population was older than the male PLACE population. The mean age of male respondents for ZSBS in Kapiri Mposhi was 32.1 years and the median age was 30 years. In the Kapiri Mposhi PLACE study, the mean age of males was 29.8 years and the median age was 28 years. Almost two thirds of men in the PLACE study and 80% of men interviewed for the ZSBS in Kapiri Mposhi were currently employed. Of those not employed, equal proportions of men interviewed for the PLACE study were looking for work as not looking for work. In the ZSBS, the majority of men who were not employed were also not looking for work. The proportion of men in the Kapiri Mposhi PLACE study who were never married was almost twice the proportion of men in the Kapiri Mposhi ZSBS who reported having never married. Almost three quarters of men in the Kapiri Mposhi ZSBS sample were married and only 4% were not currently married but previously had been. In the PLACE study, equal proportions of men were currently married as were previously married. The PLACE study interviewed a higher proportion of men in Kapiri Mposhi who had lived in their current location for less than one year compared to the men in the ZSBS sample. Men interviewed in Kapiri Mposhi as part of the PLACE study were substantially more likely to have consumed alcohol in the past 30 days compared to men interviewed for the ZSBS. The median number of days during which male PLACE respondents consumed alcohol was 5.0 compared to zero days among male ZSBS respondents (Table 1a).

Women interviewed for the PLACE study in Mongu were younger, less likely to be employed and more likely to be looking for work, more likely to have never been married, more likely to have lived in their current location for under a year, and more likely to have consumed alcohol in the past 30 days compared to women interviewed as part of the ZSBS in Mongu. In Kapiri Mposhi, there was little difference in the age distribution of the women interviewed as part of the two studies, but women interviewed for the PLACE study were slightly less likely to be employed, more likely to be looking for work, more likely to have never been married or to have been previously married, more likely to have lived in the current location for less than a year, and more likely to have consumed an alcoholic beverage in the past 30 days compared to women interviewed as part of the ZSBS in Kapiri Mposhi (Table 1b).

Table 1b. WOMEN: Sociodemographic Characteristics (%)

	Mongu		Kapiri Mposhi		National
	PLACE (N=343)	ZSBS (N=202)	PLACE (N=286)	ZSBS (N=140)	ZSBS (N=2174)
Age of Respondent					
15-19	26.5	28.2	10.5	15.7	21.6
20-24	36.4	18.3	34.6	30.0	21.7
25-29	20.4	17.8	25.9	21.4	17.0
30-34	10.2	9.4	15.0	10.7	14.0
35-39	2.3	11.9	6.3	7.9	10.7
40-44	1.7	9.4	3.1	9.3	8.3
45+	2.0	5.0	4.5	5.0	6.8
Missing	0.3	0.0	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0
Mean age	24.1	27.2	26.9	27.7	28.0
Median age	22.0	25.0	25.0	25.5	26.0
Currently Working					
Yes*	28.9	45.5	42.0	54.3	51.8
No but looking for work	39.7	3.5	28.3	0.7	1.2
No, and not looking for work	28.9	46.0	28.0	38.6	36.3
Missing**	2.6	5.0	1.7	6.4	10.8
Total	100.0	100.0	100.0	100.0	100.0
Marital Status					
Never Married	74.9	44.1	46.9	15.0	24.4
Currently Married	16.3	37.1	30.4	75.0	61.1
Previously Married	5.5	18.8	21.3	10.0	14.2
Missing	3.2	0.0	1.4	0.0	0.3
Total	100.0	100.0	100.0	100.0	100.0
Years Lived in Current Location					
<1 year	18.7	10.9	20.3	5.0	8.6
1 year	7.9	15.4	7.7	11.4	6.4
2-4 years	23.6	28.7	21.3	18.6	18.8
5-10 years	19.8	22.8	23.4	29.3	24.2
>10 years	28.0	21.8	26.9	35.7	41.9
Missing	2.0	0.5	0.3	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0
Number of Days Drank a Beverage Containing Alcohol in Past 30 Days					
None	45.8	94.6	51.0	92.9	94.4
1-2 Days	15.5	3.0	10.1	0.7	2.7
3-9 Days	30.0	1.0	13.6	3.6	2.4
10-19 Days	4.7	1.0	5.9	1.4	0.1
20-29 Days	1.5	0.0	10.8	0.7	0.1
Everyday	0.6	0.5	7.3	0.7	0.2
Missing	2.0	0.0	1.0	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0
Mean	3.0	0.4	6.6	1.3	0.4
Median	1.0	0.0	0.0	0.0	0.0

*PLACE: Employed full or part-time.

**ZSBS: Missing if person worked in the past 12 months but is not currently working.

Sexual Activity — A higher proportion of men who participated in the PLACE study were sexually active compared to men interviewed for the ZSBS. The median age at first sex among male PLACE respondents was two years younger than male ZSBS respondents. In Mongu, the median age at first sex was 15 years for male PLACE respondents and 17 years for male ZSBS respondents. In Kapiri Mposhi, the median age at first sex was 17 years for male PLACE respondents and 19 years for male ZSBS respondents (Table 2a).

Table 2a. MEN: Ever Had Sex and Age at First Sex (%)

	Mongu		Kapiri Mposhi		National
	PLACE (N=636)	ZSBS (N=123)	PLACE (N=742)	ZSBS (N=122)	ZSBS (N=2046)
Ever Had Sex					
Yes	98.7	82.9	95.2	89.3	84.9
No	1.1	17.1	4.0	10.7	15.2
Missing	0.2	0.0	0.8	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0
Age at First Sex					
<13	23.0	0.0	7.5	0.0	0.0
13	5.3	0.0	3.2	0.0	0.0
14	7.4	0.0	7.7	0.0	0.0
15	13.1	23.6	13.9	7.4	11.8
16	8.3	8.9	9.7	13.9	9.6
17	7.9	13.8	10.9	17.2	8.9
18-21	23.4	30.9	28.4	29.5	41.2
22-24	4.1	3.3	6.5	8.2	8.6
25+	3.0	2.4	5.7	13.1	4.9
Never had sex and younger than 18	2.4	8.9	0.1	4.1	8.5
Never had sex and 18 or older	0.9	8.1	3.9	6.6	6.7
Missing	1.3	0.0	2.4	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0
Mean age	15.7	17.5	17.4	19.2	18.8
Median age	15.0	17.0	17.0	19.0	19.0

Among women in Mongu, a higher proportion interviewed for the PLACE study reported being sexually active compared to women interviewed by the ZSBS and median age at first sex was younger among female PLACE respondents compared to female ZSBS respondents (16 vs. 18 years respectively). In Kapiri Mposhi, there was no difference in the proportion of sexually active respondents or median age at first sex among female respondents for the two surveys. The median age at first sex for women in Kapiri Mposhi was 17 years for both surveys (Table 2b).

Table 2b. WOMEN: Ever Had Sex and Age at First Sex (%)

	Mongu		Kapiri Mposhi		National
	PLACE (N=343)	ZSBS (N=202)	PLACE (N=286)	ZSBS (N=140)	ZSBS (N=2174)
Ever Had Sex					
Yes	97.7	87.6	90.2	92.1	86.7
No	1.2	12.4	9.1	7.9	13.2
Missing	1.2	0.0	0.7	0.0	0.2
Total	100.0	100.0	100.0	100.0	100.0
Age at First Sex					
<13	19.0	0.0	3.8	0.0	0.0
13	5.5	0.0	3.8	0.0	0.0
14	6.7	0.0	4.9	0.0	0.0
15	15.2	14.9	16.4	17.1	14.9
16	12.0	11.4	12.2	15.0	11.6
17	5.8	14.4	10.1	16.4	11.7
18-21	26.8	42.1	33.2	37.1	39.9
22-24	2.9	2.5	3.1	5.0	4.1
25+	0.6	2.5	1.4	1.4	4.5
Never had sex and younger than 18	2.6	7.4	1.4	5.0	8.4
Never had sex and 18 or older	0.6	5.0	7.7	2.9	4.7
Missing	2.3	0.0	1.7	0.0	0.2
Total	100.0	100.0	100.0	100.0	100.0
Mean age	15.6	18.0	17.0	17.8	18.4
Median age	16.0	18.0	17.0	17.0	18.0

PLACE respondents reported substantially more total partners as well as more new partners than ZSBS respondents. Only 6% of male ZSBS respondents in Mongu and 1% of male ZSBS respondents in Kapiri Mposhi reported a new sexual partner in the past four weeks. Among male PLACE respondents, 48% of male respondents in Mongu and 20% in Kapiri Mposhi reported a new partner in the past four weeks and 60% of male respondents in Mongu and 38% in Kapiri Mposhi reported more than one partner in the past 12 months (Table 3a).

Table 3a. MEN: Sexual Partnerships (%)

	Mongu		Kapiri Mposhi		National
	PLACE (N=636)	ZSBS (N=123)	PLACE (N=742)	ZSBS (N=122)	ZSBS (N=2046)
Number of Partners in Past 4 Weeks					
0	29.9	50.4	29.4	35.3	37.9
1	34.3	44.7	51.2	63.9	54.9
2	12.7	4.1	11.6	0.8	5.9
3-9	21.9	0.0	7.0	0.0	1.0
10+	1.1	0.8	0.1	0.0	0.2
Missing	0.2	0.0	0.7	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0
Mean number	1.8	0.6	1.1	0.7	0.7
Median number	1.0	0.0	1.0	1.0	1.0
Number of New Partners in Past 4 Weeks					
0	52.0	94.3	79.2	99.2	95.0
1	24.1	4.9	14.6	0.8	4.0
2	9.3	0.0	3.5	0.0	0.6
3-9	13.8	0.0	1.9	0.0	0.2
10+	0.5	0.8	0.0	0.0	0.2
Missing	0.3	0.0	0.8	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0
Mean number	1.1	0.1	0.3	0.0	0.2
Median number	0.0	0.0	0.0	0.0	0.0
Total Number of Partners in Last 12 Months					
0	8.5	37.4	13.9	20.5	26.8
1	31.4	52.0	47.4	77.9	59.6
2	14.6	6.5	17.0	0.8	10.8
3-9	32.5	2.4	17.4	0.8	2.4
10+	12.7	1.6	3.6	0.0	0.4
Missing	0.2	0.0	0.7	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0
Mean number	4.5	0.8	2.4	0.7	1.0
Median number	2.0	0.0	1.0	1.0	1.0
Number of New Partners in Past 12 Months					
0	31.1	82.1	63.2	95.9	85.0
1	28.0	11.4	19.5	3.3	11.4
2	10.5	2.4	7.4	0.8	2.0
3-9	23.7	1.6	7.5	0.0	0.8
10+	6.1	2.4	1.6	0.0	0.4
Missing	0.5	0.0	0.7	0.0	0.2
Total	100.0	100.0	100.0	100.0	100.0
Mean number	2.7	1.1	0.9	0.0	0.5
Median number	1.0	0.0	0.0	0.0	0.0

Among female ZSBS respondents, only 1% of respondents in Mongu and Kapiri Mposhi reported a new sexual partner in the past four weeks and only 2% in Mongu and Kapiri Mposhi reported more than one partner in the past 12 months. Among female PLACE respondents, 47% of respondents in Mongu and 24% in Kapiri Mposhi reported a new partner in the past four weeks, and 51% of female respondents in Mongu and 34% in Kapiri Mposhi reported more than one partner in the past 12 months (Table 3b).

Table 3b. WOMEN: Sexual Partnerships (%)

	Mongu		Kapiri Mposhi		National
	PLACE (N=343)	ZSBS (N=202)	PLACE (N=286)	ZSBS (N=140)	ZSBS (N=2174)
Number of Partners in Past 4 Weeks					
0	28.6	62.4	28.0	35.0	42.0
1	36.7	37.6	47.6	64.3	57.3
2	12.5	0.0	11.9	0.0	0.4
3-9	20.7	0.0	9.1	0.0	0.1
10+	1.2	0.0	3.1	0.7	0.1
Missing	0.3	0.0	0.3	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0
Mean number	1.8	0.4	2.3	0.7	0.7
Median number	1.0	0.0	1.0	1.0	1.0
Number of New Partners in Past 4 Weeks					
0	52.8	99.5	76.2	99.3	97.5
1	19.8	0.5	10.5	0.7	2.2
2	11.4	0.0	3.1	0.0	0.1
3-9	14.9	0.0	7.7	0.0	0.0
10+	0.9	0.0	2.1	0.0	0.2
Missing	0.3	0.0	0.3	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0
Mean number	1.2	0.0	1.3	0.0	0.2
Median number	0.0	0.0	0.0	0.0	0.0
Total Number of Partners in Last 12 Months					
0	9.3	36.6	19.9	20.7	29.4
1	39.1	61.9	45.8	77.1	67.8
2	9.3	0.5	8.7	1.4	2.0
3-9	30.9	1.0	16.1	0.0	0.4
10+	11.1	0.0	9.1	0.7	0.3
Missing	0.3	0.0	0.3	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0
Mean number	4.2	0.4	5.4	0.7	0.8
Median number	2.0	0.0	1.0	1.0	1.0
Number of New Partners in Past 12 Months					
0	35.3	92.6	66.4	96.4	91.8
1	25.1	6.9	14.0	2.9	6.9
2	7.6	0.0	4.5	0.7	0.5
3-9	25.9	0.5	8.7	0.0	0.3
10+	5.8	0.0	5.6	0.0	0.5
Missing	0.3	0.0	0.7	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0
Mean number	2.8	0.0	3.2	0.0	0.3
Median number	1.0	0.0	0.0	0.0	0.0

Half of male PLACE respondents in Mongu and 26% in Kapiri Mposhi reported a high rate of sexual partnership. For this analysis, a high rate of sexual partnership is defined as one or more new partners in the past four weeks or two or more total partners during this time period. Only 7% of male ZSBS respondents in Mongu and 2% of male ZSBS respondents in Kapiri Mposhi reported a high rate of partnership. The majority of male ZSBS respondents reported a low sexual partnership rate defined, in this analysis, as not being sexually active or having one, non-new partner in the past 12 months. A low level of sexual partnership was reported by 86% of male ZSBS respondents in Mongu and 96% of male ZSBS respondents in Kapiri Mposhi. Among male PLACE respondents, 27% in Mongu and 56% in Kapiri Mposhi reported a low sexual partnership rate (Table 4a).

Table 4a. MEN: Rate of Sexual Partnership (%)

	Mongu		Kapiri Mposhi		National
	PLACE (N=636)	ZSBS (N=123)	PLACE (N=742)	ZSBS (N=122)	ZSBS (N=2046)
Rate of Sexual Partnerships					
High: 1+ new partners or 2+ partners past 4 weeks	49.8	7.3	26.0	1.6	10.1
Moderate: 1+ new or 2+ partners past 12 months	23.0	6.5	17.0	2.5	6.6
Low: Not sexually active or 1 non-new sexual partner in the past 12 months	26.9	86.2	56.2	95.9	83.2
Missing	0.3	0.0	0.8	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0

Almost half of female PLACE respondents in Mongu and 28% in Kapiri Mposhi reported a high rate of sexual partnership compared to only 1% of female ZSBS respondents in Mongu and Kapiri Mposhi who reported a high rate of partnership. The majority of female ZSBS respondents reported a low partnership rate. A low level of sexual partnership was reported by 97% of female ZSBS respondents in both Mongu and Kapiri Mposhi. Among female PLACE respondents, 32% in Mongu and 62% in Kapiri Mposhi reported a low sexual partnership rate (Table 4b).

Table 4b. WOMEN: Rate of Sexual Partnership (%)

	Mongu		Kapiri Mposhi		National
	PLACE (N=343)	ZSBS (N=202)	PLACE (N=286)	ZSBS (N=140)	ZSBS (N=2174)
Rate of Sexual Partnerships					
High: 1+ new partners or 2+ partners past 4 weeks	48.1	0.5	27.6	1.4	2.8
Moderate: 1+ new or 2+ partners past 12 months	19.8	3.0	10.1	1.4	3.4
Low: Not sexually active or 1 non-new sexual partner in the past 12 months	31.8	96.5	61.9	97.1	93.8
Missing	0.3	0.0	0.3	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0

Condom use was higher among PLACE respondents compared to ZSBS respondents. Among males, condom use at last sex was 41% for PLACE Mongu but only 15% for ZSBS Mongu. In Kapiri Mposhi, condom use was 28% for PLACE but only 12% for ZSBS respondents (Table 5a).

Table 5a: MEN: Condom Use (%)

	Mongu		Kapiri Mposhi		National
	PLACE (N=636)	ZSBS (N=123)	PLACE (N=742)	ZSBS (N=122)	ZSBS (N=2046)
Used a Condom Last Time Had Sex					
Yes	41.0	14.6	27.9	12.3	9.8
No	48.0	52.0	56.6	62.3	64.7
No Partners in Past 12 Months	8.5	33.3	13.9	20.5	24.6
Missing	2.5	0.0	1.6	4.9	0.8
Total	100.0	100.0	100.0	100.0	100.0
Used a Condom at First Sex with Last New Partner in Past 12 Months					
Yes	38.8	9.8	20.8	1.6	6.0
No	24.4	6.5	14.3	1.6	8.3
No New Partners in Past 12 Months	31.1	83.7	63.2	96.7	85.6
Missing	5.7	0.0	1.8	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0
Frequency of Condom Use with Spouse					
Always	0.6	0.8	1.8	0.0	1.0
Sometimes	11.8	5.7	21.2	11.5	11.4
Never	20.4	25.2	26.5	57.4	40.4
Do not know / Missing	4.4	4.9	4.2	6.6	6.6
No Spouse or Live-In Partner	62.7	63.4	46.4	24.6	40.7
Total	100.0	100.0	100.0	100.0	100.0

Condom use at last sex for females was also higher among PLACE Mongu respondents (46%) and PLACE Kapiri Mposhi respondents (28%) than for ZSBS Mongu (9.4%) and ZSBS Kapiri Mposhi (12%) respondents (Table 5b). Condom use at first sex with last new partner was also higher for PLACE than ZSBS respondents. Frequency of condom use with spouses was low for all respondents.

Table 5b: WOMEN: Condom Use (%)

	Mongu		Kapiri Mposhi		National
	PLACE (N=343)	ZSBS (N=202)	PLACE (N=286)	ZSBS (N=140)	ZSBS (N=2174)
Used a Condom Last Time Had Sex					
Yes	45.5	9.4	28.3	12.1	6.0
No	44.0	54.0	49.7	64.3	65.5
No Partners in Past 12 Months	9.3	35.6	19.9	19.3	27.5
Missing	1.2	1.0	2.1	4.3	1.1
Total	100.0	100.0	100.0	100.0	100.0
Used a Condom at First Sex with Last New Partner in Past 12 Months					
Yes	37.6	5.0	24.8	2.1	2.4
No	22.4	5.5	7.7	0.7	4.5
No New Partners in Past 12 Months	35.3	89.6	66.4	97.1	93.1
Missing	4.7	0.0	1.0	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0
Frequency of Condom Use with Spouse					
Always	1.2	0.0	1.4	0.7	0.6
Sometimes	8.7	11.4	10.1	9.3	11.6
Never	9.9	21.8	18.5	60.0	46.1
Do not know / Missing	2.6	4.0	2.8	5.0	3.0
No Spouse or Live-In Partner	77.6	62.9	67.1	25.0	38.7
Total	100.0	100.0	100.0	100.0	100.0

Commercial sex was more frequently reported among PLACE study participants than ZSBS participants. Among male PLACE study respondents, 42% in Mongu and 24% in Kapiri Mposhi reported exchanging money for sex in the past 12 months, compared to 8% of male ZSBS respondents in Mongu and no male respondents in Kapiri Mposhi who reported exchanging money for sex (Table 6a). Similarly, among women, 46% of female PLACE respondents in Mongu and 28% in Kapiri Mposhi reported exchanging sex for money in the past 12 months. Only 2% of female ZSBS respondents in Mongu and 1% in Kapiri Mposhi reported doing so (Table 6b).

Table 6a: MEN: Paid Sex Use (%)

	Mongu		Kapiri Mposhi		National
	PLACE (N=636)	ZSBS (N=123)	PLACE (N=742)	ZSBS (N=122)	ZSBS (N=2046)
Given or Received Money in Exchange for Sex in Past 12 Months					
Yes	41.8	8.1	23.5	0.0	6.3
No	57.5	91.9	75.6	100.0	93.7
Missing	0.6	0.0	0.9	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0
Used a Condom Last Time Gave or Received Money in Exchange for Sex in Past 12 Months					
Yes	24.7	5.7	15.9	0.0	3.3
No	15.9	2.4	7.3	0.0	2.8
No Commercial Sex in Past 12 Months	57.7	91.9	75.7	100.0	93.7
Missing	1.7	0.0	1.1	0.0	0.1
Total	100.0	100.0	100.0	100.0	100.0

Table 6b: WOMEN: Paid Sex Use (%)

	Mongu		Kapiri Mposhi		National
	PLACE (N=343)	ZSBS (N=202)	PLACE (N=286)	ZSBS (N=140)	ZSBS (N=2174)
Given or Received Money in Exchange for Sex in Past 12 Months					
Yes	46.4	1.5	28.0	0.7	2.3
No	51.3	98.5	71.0	99.3	97.3
Missing	2.3	0.0	1.0	0.0	0.4
Total	100.0	100.0	100.0	100.0	100.0
Used a Condom Last Time Gave or Received Money in Exchange for Sex in Past 12 Months					
Yes	24.2	1.0	19.9	0.7	1.0
No	21.6	0.5	8.0	0.0	1.4
No Commercial Sex in Past 12 Months	51.3	98.5	71.0	99.3	97.6
Missing	2.9	0.0	1.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0

PLACE respondents were asked about meeting a new partner at the venue where interviewed. Approximately 26% of male PLACE respondents in Mongu and 15% of male respondents in Kapiri Mposhi reported meeting a new sexual partner in the past 12 months at the venue where they were interviewed. Among female PLACE respondents, a third of women in Mongu and a quarter in Kapiri Mposhi reported meeting a new sexual partner at the venue in the past 12 months. ZSBS respondents were asked where they first talked to or got to know the last three partners they had sex with in the past 12 months. Only 4% of men interviewed in Mongu and 2% of women interviewed in Kapiri Mposhi reported meeting a partner in a bar or nightclub. No women in Mongu or men in Kapiri Mposhi reported meeting a partner in a bar or nightclub (Table 7).

Table 7. Where ZSBS Respondents Met Their Last Three Partners, among Those Who Were Sexually Active in the Past Year (%)

	Mongu		Kapiri Mposhi		National	
	Men (N=82)	Women (N=130)	Men (N=97)	Women (N=113)	Men (N=1542)	Women (N=1576)
Place or Event Where First Talked to or Got to Know Partner						
Own or friend's house	43.9	56.9	76.3	76.1	49.4	52.6
Church	11.0	13.9	6.2	5.3	11.2	9.8
School	22.0	13.9	1.0	0.9	11.2	7.7
Work	6.1	6.2	1.0	1.8	4.0	3.9
Wedding, funeral, or other family event	3.7	0.8	2.1	0.9	3.8	3.1
Sporting event	1.2	0.0	0.0	0.0	2.4	1.1
Bar/nightclub	3.7	0.0	0.0	1.8	2.1	0.5
Brothel	0.0	0.0	0.0	0.0	0.1	0.1
Hotel	0.0	0.0	0.0	0.0	0.1	0.1
Road or street	18.3	9.2	6.2	6.2	12.1	9.6
Other	1.2	0.8	3.1	2.7	13.1	13.0

The majority of both male and female respondents in the ZSBS reported not having gone to a bar, disco, or nightclub during the past seven days. The opposite was found for PLACE respondents, where none of the respondents in Mongu or Kapiri Mposhi had not visited a bar, disco, or nightclub during the past seven days (Tables 8a and 8b).

Table 8a: MEN: Venue (Bar/Disco/Nightclub) Visiting (%)

	Mongu		Kapiri Mposhi		National
	PLACE (N=370*)	ZSBS (N=123)	PLACE (N=503*)	ZSBS (N=122)	ZSBS (N=2046)
Numbers of Days Visited a Bar/Disco/Nightclub in the Past Seven Days and Nights					
0	0.0	85.4	0.0	98.4	78.9
1	30.3	4.9	26.1	0.8	7.0
2	14.9	3.3	12.9	0.8	4.3
3	11.6	2.4	11.9	0.0	2.9
4	8.1	0.0	8.4	0.0	2.0
5	1.4	0.0	6.0	0.0	1.1
6	6.8	0.0	6.4	0.0	0.6
7	24.3	3.3	27.6	0.0	3.0
Missing	2.7	0.8	0.8	0.0	0.2
Total	100.0	100.0	100.0	100.0	100.0
Mean	3.5	0.4	3.9	0.0	0.6
Median	3.0	0.0	3.0	0.0	0.0

Table 8b: WOMEN: Venue (Bar/Disco/Nightclub) Visiting (%)

	Mongu		Kapiri Mposhi		National
	PLACE (N=187*)	ZSBS (N=202)	PLACE (N=146*)	ZSBS (N=140)	ZSBS (N=2174)
Numbers of Days Visited a Bar/Disco/Nightclub in the Past Seven Days and Nights					
0	0.0	90.6	0.0	97.9	95.7
1	24.1	0.5	28.1	0.0	1.3
2	9.6	0.5	14.4	1.4	1.0
3	11.2	0.5	13.7	0.0	0.3
4	10.7	0.0	8.2	0.0	0.5
5	3.7	1.0	2.1	0.0	0.2
6	9.1	0.5	5.5	0.0	0.1
7	30.0	5.0	27.4	0.0	0.4
Missing	1.6	1.5	0.7	0.7	0.5
Total	100.0	100.0	100.0	100.0	100.0
Mean	4.1	0.5	3.7	0.0	0.1
Median	4.0	0.0	3.0	0.0	0.0

* PLACE samples restricted to those individuals who were interviewed at a bar, disco, or nightclub and these respondents were asked the frequency with which they visited the site where they were interviewed.

The proportion of respondents that reported STI symptoms was also much higher in the PLACE study compared to the ZSBS. Among male PLACE respondents, 17% in Mongu and 9% in Kapiri Mposhi reported unusual discharge in the past 12 months and 17% in Mongu and 11% in Kapiri Mposhi reported an ulcer or sore during this time period. Comparatively, 2% of male ZSBS respondents in Mongu and Kapiri Mposhi reported unusual discharge in the past 12 months and 5% in Mongu and 2% in Kapiri Mposhi reported an ulcer or sore in the past 12 months (Table 9a). Among women, 20% of PLACE respondents in Mongu and 11% in Kapiri Mposhi reported unusual discharge in the past 12 months and 17% of female PLACE respondents in Mongu and 9% in Kapiri Mposhi reported an ulcer or sore in the past 12 months. Only 2% of female ZSBS participants in Mongu and 1% in Kapiri Mposhi reported unusual discharge in the past 12 months and only 1% in Mongu and Kapiri Mposhi reported an ulcer or sore in the past 12 months (Table 9b).

Table 9a: MEN: STI Symptoms (%)

	Mongu		Kapiri Mposhi		National
	PLACE (N=636)	ZSBS (N=123)	PLACE (N=742)	ZSBS (N=122)	ZSBS (N=2046)
Unusual Discharge in Past 12 Months					
Yes	16.8	2.4	8.8	1.6	5.4
No	80.8	96.8	90.6	97.5	92.5
Missing	2.4	0.8	0.7	0.8	2.1
Total	100.0	100.0	100.0	100.0	100.0
Ulcer or Sore in Past 12 Months					
Yes	17.3	4.9	10.7	1.6	2.4
No	79.7	94.3	88.7	97.5	80.4
Missing	3.0	0.8	0.7	0.8	17.2
Total	100.0	100.0	100.0	100.0	100.0

Table 9b: WOMEN: STI Symptoms (%)

	Mongu		Kapiri Mposhi		National
	PLACE (N=343)	ZSBS (N=202)	PLACE (N=286)	ZSBS (N=140)	ZSBS (N=2174)
Unusual Discharge in Past 12 Months					
Yes	20.1	1.5	10.5	0.7	3.9
No	76.7	97.5	88.8	97.9	93.3
Missing	3.2	1.0	0.7	1.4	2.9
Total	100.0	100.0	100.0	100.0	100.0
Ulcer or Sore in Past 12 Months					
Yes	16.6	0.5	8.7	0.7	1.3
No	79.6	98.5	90.6	97.9	82.7
Missing	3.8	1.0	0.7	1.4	16.0
Total	100.0	100.0	100.0	100.0	100.0

DISCUSSION

The comparison of the populations identified by the PLACE method with a representative sample of the population from the ZSBS offers insight into whether or not the PLACE study is indeed identifying those individuals at higher risk of acquiring and transmitting HIV. The objective of a PLACE study is to identify venues where people at high risk of acquiring and transmitting HIV can be reached by intervention programs. The PLACE method does not take a risk group-based approach and focus on traditionally defined risk groups, such as commercial sex workers, truck drivers, or military, nor does it seek to identify and characterize a representative sample of people living in the study area. Rather, the goal is to identify those individuals in the study area with a high rate of new sexual partnerships. New partnerships are a focus of the PLACE method because individuals with high rates of new partner acquisition are more likely to transmit infection and because individuals with newly acquired infections are more infectious. While many of the venues identified by a PLACE study are traditional hotspots such as bars, nightclubs, and informal drinking places, public meeting points such as markets, bus and train stations, and shops may also be included in a PLACE study as places where people meet new sexual partners.

Conversely, the ZSBS is a household survey with the goal of providing national, population-based estimates of a number of key indicators important to monitoring progress of the national HIV/AIDS/STD program. Respondents from a representative sample of people living in the study area were interviewed about personal sexual behaviors.

The PLACE population reported much higher rates of partner acquisition than the population included in the ZSBS, suggesting that the PLACE population is indeed at a greater risk of acquiring and transmitting HIV. Almost half of the men and women included in the Mongu PLACE population reported a high rate of partnership formation, defined as one new partner or two or more total partners in the past four weeks. Comparatively, only 7% of men and 1% of women interviewed as part of the ZSBS survey in Mongu reported a similar high partnership rate. In Kapiri Mposhi, just over one quarter of men and women in the PLACE population reported a high partnership rate whereas less than 2% of men and women in the ZSBS population did so.

Self-presentation bias is likely to account for some of this difference in reported partnership rates between the two surveys. In the context of household surveys, sexual partnerships are believed to be underreported. Conversely, in the more relaxed setting of bars, nightclubs, and other PLACE venues, respondents might tend to over report their sexual partnerships. The extent to which partnership rates were under or over reported is probably impossible to determine but it is unlikely that these reporting biases account for the entire difference in partnership rates reported on the two surveys.

Only a very small subset of the ZSBS population is likely to be included in the PLACE study. ZSBS respondents were asked how many times in the past seven days they visited a bar, disco, or nightclub. Only 15% of men interviewed for the ZSBS in Mongu and 2% of men in Kapiri Mposhi had visited such an establishment in the past seven days, and 9% of women in Mongu and 2% in Kapiri Mposhi visited such venues in the past seven days. However, while many of the venues identified by the PLACE method are bars, nightclubs, or discos (41% of venues in Mongu and 51% of venues in Kapiri Mposhi), many other types of venues were identified by the PLACE study and thus these individuals potentially had the opportunity to be interviewed for the

PLACE study at one of these other locations. It is still likely though that some ZSBS respondents would not frequent any of the venues identified by the PLACE study and therefore not be potential respondents in the study. Very few ZSBS respondents reported meeting one of their last three partners in the past 12 months at a bar or nightclub.

Similarly, the PLACE population is not a complete subset of the population included in the ZSBS. PLACE respondents were asked where they spent the previous night. While the majority of respondents spent the night at their family home, the home of a relative, or other household, many PLACE respondents spent the night in a commercial hotel, dormitory, or other location that would not have been included in a household survey. A quarter of men and 16% of the women in the Mongu PLACE study did not spend the previous night in a household and therefore would have been missed by a household survey. In the Kapiri Mposhi PLACE study, 10% of men and 9% of women did not spend the previous night in a household. While these individuals did not spend the previous night in a household, they still play a potentially important role in facilitating the transmission of HIV through the local sexual network.

Conclusion — Both Mongu and Kapiri Mposhi have dynamic populations with many people from other areas passing through these towns. This mixing of populations could help facilitate the HIV epidemic. The high partnership rates identified by the PLACE study could help drive the epidemic. However, these high rates are limited to a small portion of the total population and are masked by the larger, general population.

High-risk behaviors were reported more frequently by PLACE respondents than by ZSBS respondents. Thus, targeting of prevention efforts at venues identified by the PLACE study will reach those individuals most contributing to the ongoing propagation of the HIV/AIDS epidemic. However, the behaviors reported by these individuals represent only a small subset of the population and cannot be generalized to the larger population. While not the most efficient method to identify those at high risk for HIV/AIDS since high risk behaviors are not prevalent in the general population, the ZSBS does provide valuable insight into national trends in knowledge, attitudes, and behaviors. Thus, taken in concert with one another, the ZSBS and PLACE method provide a more complete picture of the behaviors contributing to the HIV epidemic at the micro and macro levels.

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