PLACE: Priorities for Local AIDS Control Efforts

A Pilot Study of the PLACE Method in a Township in Cape Town, South Africa

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1. INTRODUCTION

Preventing sexually transmitted infections remains a major public health challenge. At the individual level, sexually transmitted disease is dependent on the health and behavior of both the susceptible individual and those with whom he or she is sexually linked. At the population level, sexually transmitted disease is a function of the level of sexual activity in the population, the use of STD prevention methods, and the pattern of sexual partnering.

New sexual partnerships hold a strategic position in the epidemiology of HIV/STD transmission. Mathematical models of the STD/HIV epidemics characterize the spread of sexually transmitted disease in a population as a function of the probability of transmission per sexual contact (β), the rate of partner acquisition (C), and the duration of infectiousness (D)[1]. According to these models, individuals with high rates of partner acquisition are at increased risk of acquiring infection and subsequently transmitting infection to partners with lower rates of sexual partner acquisition.

This "core group" concept has been described as the "central pillar of the conceptual framework for the epidemiology of STD transmission"[2] and core group interventions have been advocated as a cost-effective strategy to reduce transmission of sexually transmitted infections. However, there is still confusion about how to define and identify membership in a core group,[3] particularly in countries with generalized epidemics. In the 16 countries in Africa where more than one-tenth of the adult population aged 15-49 is infected with HIV,[4] a local district AIDS committee would find it challenging to determine core group membership.

In addition, although many core group interventions have been undertaken, there is little empiric evidence that core group interventions effectively reduce STD/HIV incidence among the non-core. Two interventions that reduced HIV incidence among the non-core (the condom-only policy among sex workers in Thailand[5] and presumptive mass treatment among sex workers servicing miners in Carletonville, South Africa[6]) were implemented in atypical sexual networks where male exposure to STD/HIV was mainly from contact with identifiable sex workers.

Mathematical modeling has identified other features of a population's sexual networks that play key roles in the STD/HIV epidemic in a community.[7] These features include: (1) behavioral heterogeneity[8] – the extent to which the rate of partner acquisition and acts per partner vary within the population; (2) partner concurrency[9] – the extent to which partnerships overlap or are sequential; (3) sexual mixing patterns – the extent to which new partner selection is random; and (4) partnership timing[10] – the extent to which partnerships are formed during the period of increased host infectiousness. Unfortunately, empiric data describing these features in a specific population also lag behind the mathematical models and successful use of these features for STD prevention has also been limited.

The most important barrier to developing sexual network-informed interventions has been the lack of rapid, reliable and valid field methods for describing the features of a population's complex and dynamic web of sexual partnering in a way that is useful for intervention planning. Traditional methods and tools for obtaining information on the sexual behavior of a population, such as general population surveys with reproductive health modules, have an individual level focus and generally do not characterize the sexual links between individuals in a population. Recent efforts to include sexual partnership modules in these surveys may prove useful in characterizing the structure of sexual networks, but are not likely to provide footholds for intervention development.

Full network specification theoretically would identify where to intervene most effectively, but would require an immense data collection effort that is vulnerable to significant bias. Individuals with many sexual partners may not be able to name their sexual contacts or may be unwilling

to do so.[11, 12] For example, in Colorado Springs, only half of a group of 1078 high risk individuals (female sex workers, injection drug users, and partners of female sex workers and injection drug users) named their sexual partners[11] when asked to do so in an intervention study. Experience with tracing sexual contacts of infected STD patients has shown that individuals are more willing to identify their low-risk sexual contacts than their high-risk sexual contacts, thereby increasing the likelihood that limited resources do not reach individuals most likely to transmit infection.

Methods using clinic-based partner notification approaches miss the majority of infected individuals who do not present for STD care. Those who do visit the clinic are more likely to report their stable partners than their casual contacts.[13, 14] Thus, there is a tremendous gap between our theoretical understanding of the types of sexual networks capable of sustaining an epidemic and our success in measuring sexual network parameters among real individuals in a population.[1]

One assessment of the bias likely from the three commonly used methods for identifying sexual networks (individual reports, snowball sampling, and contact tracing) suggests that much of the bias is due to the under-representation of the high sexual activity group.[12] Partner notification approaches reach only a portion of the community that is infected and are also more likely to reach stable partners of the infected case less likely to transmit the infection than the unreported casual sexual contacts.[13, 14]

Although empiric data to describe key features of a population's sexual network may be difficult to obtain from individuals, there may be characteristics at the community level associated with its capacity to sustain or spread STD/HIV. In sub-Saharan Africa, for example, there is a recognizable pattern of geographical clustering of HIV infection by level of urbanization.[15] HIV incidence rates are generally higher in urban areas, moderate in peri-urban areas, and much lower in rural areas. [16, 17, 18, 19, 20] Even within relatively small rural areas, large differences in prevalence by residence have been observed. In the United States, evidence of geographic clustering of infection has come from studies in New York,[21] Colorado[22] and Tennessee[23] where mapping of infected STD cases depicted clustering of cases in adjacent census tracts.

In sub-Saharan Africa, areas with higher incidence of HIV infection have been dubbed high transmission areas (HTAs).[24] These areas are places where increased social mixing intersects with increased commercial activity – for example: hotels for truck drivers at the intersection of major commercial routes, bars near trading centers, and migrant worker residences.[25] Patrons of such sites may have higher rates of new partnership formation. If true, then an intervention strategy for sub-Saharan Africa would be to focus interventions at sites where social mixing occurs in the context of increased urbanization and commercial activity.

This pilot study was designed to develop and test the PLACE method, a rapid field method to describe features of a community's sexual networks useful in developing targeted interventions. We wanted to know whether a place focus rather than an individual focus could take advantage of geographical clustering of STD/HIV transmission and maximize utility for fielding interventions. The following principles guided our approach:

1. A synthesis of available demographic and epidemiologic contextual data could provide sufficient information to identify areas most likely to have partnership formation patterns capable of spreading and maintaining infection;
2. Within these HTAs, a primary focus should be among those with highest rates of new partnership formation because they have a disproportionate role in the epidemic;
3. To minimize bias, the method should not primarily rely on self-reported behavior, contact tracing, naming of sexual partners, or require information about self-reported behavior except to validate information obtained in other ways;
4. The method should be feasibly implemented in a short period of time without on-site involvement of outside technical experts; and

5. The method should provide program indicators useful for intervention monitoring.

Based on these principles, we developed a rapid assessment method to identify and describe a high transmission area and indicators useful for AIDS prevention programming. This paper describes the application of the method in Cape Town, South Africa.

2. SPECIFIC AIMS AND OBJECTIVES OF THE PILOT TEST

2.1 Specific aim

The specific aim of the pilot test was to determine whether the PLACE method could accurately locate and classify sites where individuals with high rates of sexual partner acquisition meet to form new sexual partnerships.

2.2 Additional objectives

Secondary objectives were to determine

- Whether a typology of sites useful for fielding AIDS prevention interventions could be developed based on the characteristics of the sites.
- To what extent the rapid methods incorrectly identified or missed sites.
- Whether identifiable geographic clusters of sites emerged that might comprise several smaller high transmission areas or, alternatively, whether it was impossible to differentiate separate areas due to easy mobility throughout the township.
- Which potential indicators for intervention monitoring and evaluation (inputs, outputs, outcomes, and impact) emerged from a review of the characteristics of the sites, the clustering of sites into areas, and the typology of sites. This might include indicators at the site, area, and/or township level.
- The characteristics of the pattern of sexual networks in the defined community as revealed by the method.

3. METHODS

3.1 Overview

The methods are summarized in the Table 1. The rapid assessment method uses multidisciplinary methods to achieve its objectives including literature review, key informant interviews, mapping, and individual interviews.

3.2 Protection of human subjects

Prior to implementation, approval for the study was obtained from the Institutional Review Board of the Medical School at the University of North Carolina and from the University of Cape Town in Cape Town, Republic of South Africa.

Table 1 Summary of HTA Protocol: Steps, Methods, and Outputs

Steps	Methods	Outputs
1. Select a study area and describe the context of the STD/HIV epidemic in the area.	Synthesis of information from epidemiological reports, census data, health reports, maps, and discussions with STD experts	A township in Cape Town selected and described
2. Adapt protocol, obtain community support, and ethical approval.	Consultation with community groups and ethical review at University of Cape Town and University of North Carolina Translation and back-translation of questionnaires/ Field tests of instruments	Approved HTA protocol including methods, sampling strategy, data collection forms, interviewer manual, and table shells
3. Identify sites and events where people meet new partners.	Key informant interviews with 300+ community leaders, STD patients, migrants, youth, beer/alcohol sellers, officials, taxi drivers, township residents	A unique list of sites in the township where people go to meet new partners as reported by key informants
4. Conduct site visits to assess the validity of key informant reports and characterize sites.	Site visits to all sites to verify existence and location. Interview with knowledgeable person at the site	Tables characterizing the verified sites in terms whether new partners are met at site, characteristics of patrons, exposure to intervention, and condom availability
5. Estimate rate of new partner formation among individuals socializing at sites.	Brief individual interviews of sample of individuals socializing at selected sites	Tables that describe • Rate of new and total partnerships • Condom use • Frequency of site attendance • Sociodemographic characteristics • Pattern of new partner selection
6. Summarize findings, estimate monitoring indicators, and prepare a map useful for the intervention.	Appropriate data analysis Mapping of sites on air photo or map.	Report of findings including baseline indicators for monitoring interventions and maps

3.3 Selection of study area

We chose Cape Town for the study because the Western Cape had the lowest HIV prevalence in South Africa according to national sentinel surveillance data, but possibly the highest incidence (Figure1). HIV prevalence had increased 370 percent (from 1.6 to 6.3 percent) among antenatal patients between 1995 and 1997.

We selected the township within Cape Town based on heath care providers' perception of a large unmet need for STD services in the community. In addition, the township was small enough to be feasibly studied in a pilot study.

3.4 Methods to obtain contextual information

Contextual information describing the community is necessary to interpret the sexual network data obtained and to inform the development of AIDS prevention activities spawned by the identification of high transmission areas. Contextual information was obtained during the information meetings with community organizations, from reports already available at the University of Cape Town, from health care providers, and through email correspondence with the Census Office. Table 2 summarizes the information desired and the method used to obtain the data.

3.5 Study population

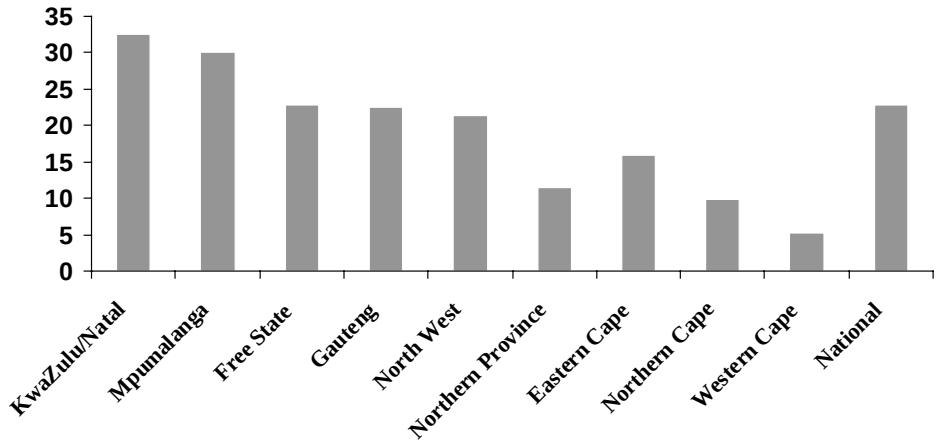
The study population was sexually active residents of one of the townships in Cape Town, South Africa. The study population included sexually active adults age 15 and older, temporary residents such as migrant workers, and individuals traveling through the area.

3.6 Methods to obtain access to the community and community approval

Study staff asked researchers from the University of Cape Town with experience working in the township to recommend organizations or individuals in the community that were either especially knowledgeable about where people go to meet new sexual partners or important civic groups. The research was presented to either a representative or a gathering of each organization. Permission to conduct the research was obtained and mechanisms identified for community feedback of research results. The organizations included the following:

- Taxi Association
- South African Police Service
- SANCO (South African National Civic Organization) and SANCO Street Committees
- Health committees in each section of the township and the nursing manager at the public health clinics

Figure 1
HIV Prevalence in South Africa 1998



- Policing Forum
- The African National Congress Youth League
- Non-governmental and community-based organizations working in the health field.

3.7 Definition of a sexual network site and high transmission area

A sexual network site is a place where residents of the township meet new sexual partners. A site could be a public place such as a bar, park, school, or shopping center or a private place such as a business. We expected that sites would cluster geographically and that a perimeter could be drawn around the sites to encompass a "high transmission area" or HTA. We expected that some sites might not have a fixed address, that some sites would be more easily identified than others, and that some sites would be extremely temporary such as one night "bashes" or "raves."

3.8 Method to identify sites: key informant interviews

We selected key informant interviews as the primary method to identify sites where people go to meet new partners. Key informant interviews are a rapid method for obtaining sensitive data not otherwise available. It is an especially reasonable approach for obtaining data such as a list of sites that can be verified by other sources. We attempted to minimize the reporting bias of any individual informant by developing a cumulative list of sites from many individual reports. In addition, because most key informants were not asked about their own sexual behavior, we expected to reduce bias arising from a desire to conceal personal sexual behavior.

A step-by-step description of the method is described in Table 3. The method for two types of key informants (STD patients and youth) was slightly different from the method for the other key informants. STD patients and youth were asked the same questions as the other key informants using the same questionnaires. However, at the end of the interview they were also asked questions about where they personally went to meet new partners, their rate of new partner acquisition and their use of condoms.

3.9 Method to train key informant interviewers

The study coordinator, her assistant, and a team of five female and two male interviewers conducted the key informant interviews. The interviewers were selected based on their social skills, street-wise knowledge of the layout of the township, willingness to visit sites such as *shebeens* (informal bars operating from a resident's home) during evening and weekend hours, and their capacity to interview professional people as well as street youth. Because the task of the interviewers was to ask key informants about where people meet new sexual partners, the interviewers were trained in the skills of probing and interviewing about sensitive issues. Through role playing, mock interviews and instrument question/answer sessions, interviewers were trained to help informants organize their knowledge of where people go to meet new sexual partners into a coherent description of sexual network sites.

3.10 Type and number of key informants

Prior to the study, we estimated that we would interview 55-75 key informants and identified seven types of key informants and a target range for the number of each type to interview:

- Government officials including police (3 to 5)
- Health officers and health care providers (3 to 5)
- Officials of community-based organizations (10 to 20)
- Taxi drivers and their assistants (10 to 15)
- Workers in bottle stores where bars/shebeens buy beer/alcohol (15 to 20)
- Sex workers or barmaids (10 to 20)
- STD clinic patients (5 to 10).

Table 2 Contextual Information Required and Methods to Obtain the Information

Contextual Information Required to Characterize Area	Method Used to Obtain Information
• A working map of the area including the location of health clinics, roads, schools, commercial centers, train stations, major employers and bus and taxi stops or routes	An air photo and a map of the township were obtained from local sources. The study team drove around the perimeter of the township and confirmed the boundaries shown on the map. The team also confirmed the location of informal settlements not shown on the map.
• The population structure of the defined geographic area (e.g., age, gender, ethnicity, population density, mobility, educational attainment, and income levels)	Information was requested and obtained from the Census Office for the township.
• The STD health care infrastructure in the defined geographic area including government clinics, private clinics, traditional healers, and pharmacies	Information on the STD health care infrastructure was obtained from the City of Cape Town Municipal Health Services and the Provincial Administration of the Western Cape (PAWC) Health Services. A list of public health facilities providing STD services was compiled. In addition, three semi-structured interviews were conducted with health service managers and facility staff providing STD services to gauge the availability, accessibility, quality and uptake of STD services in the township.
• Resources in the community for AIDS prevention programs including community based organizations, churches, and women's groups	A comprehensive list of organizations working in the township, recently compiled by the University of Cape Town Department of Community Health researchers, was used to identify AIDS prevention resources.
• Known information on the epidemiology of HIV and STD in the township, Cape Town and Western Cape	Review of the 1998 Annual South African Antenatal Survey, statistics compiled by the Western Cape Provincial HIV/AIDS Directorate, and semi-structured interviews with epidemiologists and health care providers.
• Information on where alcohol is sold and the location of registered bars, hotels, and bottle sellers.	This information was unavailable except by fieldwork.
• Known information on the transportation network in and through the township	The Taxi Driver's Association supplied taxi ranks and routes. Interviews with taxi drivers and residents provided qualitative insights into transportation networks. Public trains provide transport in and out of the township.

Table 3 Key Informant Interviewing Protocol

Activity		Step by Step Description of Method
Initial contact and recruitment	1.	Schedule appointments with public and community-based organization officials.
	2.	For STD patients, approach while they are waiting at the STD clinics. Interview in a private room and offer choice of a male or female interviewer.
	3.	For youth (aged 16 to 30), approach in the streets and at gathering places throughout the township. Offer choice of male or female interviewer.
	4.	For taxi drivers, ask drivers at taxi stands to recommend which available drivers are most knowledgeable about finding sexual partners and interview those drivers.
	5.	For all others, approach at a time that seems mutually convenient.
Informed consent	6.	Explain study purpose and show letter of introduction. Request verbal informed consent.
	7.	For those who do not consent, record reason for refusal, type and gender of key informant and terminate interview.
	8.	For those who consent, record characteristics of key informant (e.g., name of associated organization if any, gender, age, educational attainment, years living as a resident of the township, primary occupation) and continue.
Record sites reported by key informant & probe for additional sites.	9.	Ask where in the township people go to meet new sexual partners and where township residents go outside the township to meet new partners. Determine if the informant is reporting a general area or knows specific sites.
	10.	Record all sites and areas.
	11.	Specifically probe where the following find new partners: Residents of hostels and settlements Temporary residents such as migrant workers Adult men (business, unemployed, older) Youth (out of school and in-school) Gay men Divorced/widowed men and women Sports fans/players Market/street sellers
	12.	Probe for geographic coverage of the township.
Probe for when partners are met	13.	Probe for when residents meet new sexual partners (e.g., timing of paydays, major transport routes and large gathering places, raves).
Administer a site report form	14.	Administer a site report form for each site mentioned to obtain characteristics of each site, a specific address, and characteristics of the people who go to the site.
Youth and STD patients only	15.	Ask additional behavioral questions.
Concluding interview	16.	Review the interview quietly and quickly for obvious mistakes and thank the respondent.

The specific number and type of informants interviews was left to the discretion of the study coordinator who could best assess during the fieldwork whether some categories should be dropped or added. The only clear exclusion to the type of person considered as a key informant were people below age 15, the age of majority in South Africa.

3.11 Additional methods to identify sites

In addition to interviewing key informants to locate sites, members of the study team drove and walked through the community looking for social gatherings or sites where new partnerships may be negotiated. During the data collection period, incoming data was continuously monitored to ensure that all areas of the township were being covered. In addition, daily discussions with the fieldwork team enabled the identification of areas and key groups of people that were being missed. Early in the data collection period the informal settlements in the township (geographical areas) and hostel dwellers (a key group of people in the township) were identified as important groups that were being missed. Interviewers were sent to cover these two new categories of key informants.

3.12 Site verification and validation that new partners are met at the site

Each reported site was visited and its existence and location verified. During this visit, a person knowledgeable about the site (such as a bar manager or owner) and identified by a member of the study team was interviewed to determine

- whether he or she believed that people come to the site to meet new sexual partners
- the type of site (e.g. brothel or church)
- the extent of social mixing at the site among people from different sections of the township and from outside the township
- the presence of on-site AIDS prevention activities
- condom availability

In addition, at a sample of sites

- the number of men and women socializing at the time of the interviewer visit was estimated
- a knowledgeable person was asked additional questions to determine the characteristics of people socializing at the site and whether specific factors likely to facilitate increased risk of HIV transmission (e.g., consumption of beer or alcohol and sex work) were present
- men and women socializing at the sites were asked whether they believe people come to the site to meet new sexual partners and if they have ever met a new sexual partner at the site.

The interview with individuals socializing at the sites was designed to estimate

- the proportion of individuals who report meeting a new sexual partner at the site, area or event
- the rate of acquiring a new sexual partner at the site of the interview during the past month
- the proportion using a condom at the most recent coitus with the most recent new partner met at the site
- the proportion of sites with condoms available
- the rate of new partner acquisition in the past month (from anywhere, not just the site)
- the rate of partnerships (new, plus repeat partners) in the past month.

3.13 Selection of sites for interviews with individuals socializing at sites

Before the study began, a tentative sampling scheme was developed for selecting the sites for interviews with individuals socializing at the sites. The objective of the sampling strategy was to obtain a sufficiently precise estimate of the proportion of individuals socializing at the sites who report meeting a new sexual partner at the site. The final selection of sites could not occur

before the key informant interviews were conducted and the resulting list of reported sites compiled into a sampling frame of sites. We anticipated sampling sites by size of site and geographic location, but we did not know prior to obtaining the key informant reports how many sites would be identified, how many types of sites would emerge, or the geographic distribution of sites. Consequently, we estimated the expected level of precision for the proportion reporting having met a new partner at the site based on the following assumptions/expectations and field/budget constraints:

- Key informants would identify 100 sites.
- Individuals socializing at 30 percent of the expected sites would be interviewed.
- Sites would be selected from strata representing three different geographic areas with the probability of selection proportional to the size of the site.
- The expected true proportion of the population reporting meeting a new sexual partner at the site is 25 percent.
- The intraclass correlation among respondents at the same site is 0.1.
- 864 interviews could be conducted by 12 interviewers each conducting 12 interviews per night for 6 nights.

Under these assumptions, the estimated 95 percent confidence interval around the true proportion of 25 percent would be .19 to .31. This range was considered acceptable.

The actual sampling strategy differed slightly for two reasons. First, key informants reported four times as many sites as expected (n=363) in more distinct geographical areas in and outside the township. Second, information on the size of each site was incomplete and could not be used to stratify sites by size. We decided to increase the number of sites sampled from 30 to 50, and we used the number of times a site was reported as a proxy for the size of the site. Sites reported by five or more key informants were considered "large" sites and those reported by one to four key informants were considered "small" sites. We decided to interview individuals socializing at each of the 28 large sites and at 28 of the 374 small sites. The 28 small sites were selected from a list of sites arranged by geographical area (Table 4). The number of sites selected in each was proportional to the number of sites in the area. Random numbers obtained from the random number generating program in Epi-Info were used to identify which sites in each area were included in the sample of 28 small sites.

Table 4 Selection of Sites for Individual Interviews

Area	Number of Sites	Number of Sites Selected	Random Numbers
1	55	4	6, 20, 45, 49
2	52	4	1, 10, 21, 45
3	75	6	8, 30, 31, 56, 68, 73
4	8	1	8
5	19	1	12
6	20	2	4,8
7	37	3	9,18,30
8	33	2	7,32
9	13	1	8
10	28	2	22,23
11	34	2	17,28
Total	374	28	

3.14 Selection of individuals at selected sites

Our target number of interviews per site was 16 interviews with men and eight interviews with women. Selection of respondents was accomplished by the team of two interviewers who reviewed the layout of the site and identified four corners of the site including any spillover area outside. Two diagonal lines connecting opposite corners of the site making a large "X" were mentally drawn. Each interviewer selected respondents to interview along one of the diagonals beginning in one corner and equally spacing the interviews along the diagonal. This method was chosen because it distributed the interviews throughout the site and was always possible to administer regardless of the number of patrons at the site or the size of the site (Figure 2).

3.15 Development of monitoring and evaluation indicators for high transmission areas and sites

Indicators for program inputs, outputs, outcomes and impact at the site level and at the high transmission area level were developed based on the key informant interviews and site visits. The theoretical framework used for the indicators is the proximate determinates framework.[26] Output, outcome and impact indicators for monitoring AIDS prevention programs (condom distribution, educational campaigns, and improved STD services) were developed and baseline estimates made. In addition to estimates of the indicators, maps helpful in interpreting the indicators were generated. These include maps of all the sites, of site clustering, and of mixing between sites.

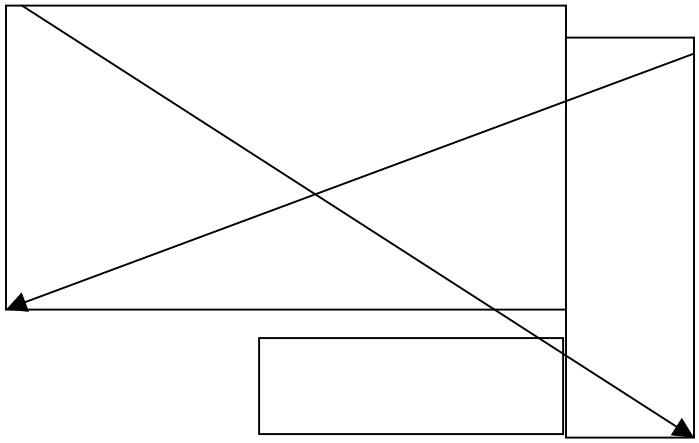
3.16 Study management, staffing, roles and responsibilities

The in-country principal investigator was responsible for the implementation of the study according to the study protocol, for obtaining all necessary in-country approvals, and for reporting to UNC how the funds were spent. She could delegate study management functions as long as she maintained ultimate responsibility. Her strong contribution to design, development, and interpretation of the study findings was sought, respected and honored by the local team as well as by MEASURE Evaluation staff.

The study coordinator reported to the principal investigator and had the following responsibilities:

- Assigned work to the team supervisors
- Visited teams during the day to assess workloads and identify problems
- Reviewed forms submitted by supervisors

Figure 2
Path used to identify respondents at a site



- Assisted in training of supervisors and interviewers
- Reported daily to the principal investigator on study progress
- Paid supervisors and interviewers
- Hired supervisors and interviewers
- Maintained a master list of sites and the number identified to date by category

4. RESULTS

4.1 Description of the context of the STD/HIV epidemic in the township

The township is located in Cape Town, South Africa in the Western Cape Province. About 10 percent of South Africa's population of 40 million live in the Western Cape province.[27] It is one of only two provinces in South Africa where African Blacks do not constitute the majority population. The most common home language in the province is Afrikaans (spoken by 59 percent of the population). Over 85 percent of the residents of the Western Cape live in an urban area, of which the largest is Cape Town, boasting a population of greater than 3 million. The township populations differ markedly from the rest of the residential areas in the Western Cape. According to the 1996 census, almost all residents of the study township are African Black, were born in South Africa, and speak Xhosa. Females slightly outnumber males. The 80,000 residents of the township live in an area smaller than 5 square kilometers.

According to the 1996 census, over 60 percent of men and women aged 20-60 in the township have never been married and are not currently living with a partner or in a civil, religious or traditional union.[28] This is much higher than the proportion of women nationally of similar age who report never having married. By age 25, fewer than 10 percent of the men and only 15 percent of the women are married; by age 35, two-thirds of both genders remain unmarried; by age 45 over a fourth of men and a third of women remain unmarried.

The 1996 South African census presents a picture of the township that is in sharp contrast to the more affluent population of Cape Town. Of the approximately 18,000 households in the township, 41 percent live in informal shacks and 650 households share a one-room house or shack with another household. In contrast, in the Western Cape as a whole only 7 percent of households live in shacks. Twice as many households in the township (47 percent) live in two rooms or fewer compared with the rest of the province. There are 46 hostel residences that previously were designated for black workers. Since the end of apartheid, men living in these hostels have been permitted to bring their families to live with them. Instead of two single men sharing a room in a hostel, one man and his family share a room, often including members of the extended family as well as the immediate family. Twenty percent of the households have no income. Among the population 15-60, 64 percent are economically active – that is they are either employed or looking for work. Of the economically active population, 41 percent are unemployed. This is approximately twice the unemployment rate for the rest of the Western Cape.

The township is divided into approximately nine sections, each with its own particular history and characteristics. Boundaries of the sections are well known to residents and reflect to some extent boundaries imposed during the apartheid era. The oldest section of the township is the most well established, has larger houses, and, since the end of apartheid, is undergoing renovation and improvement. Two sections of the township contain buildings that previously were single-sex, migrant-worker hostels. Several sections of the township on its perimeter have rapidly growing populations living in shacks. These divisions of the township were used in questions about sexual mixing between areas within the township.

In addition to substandard housing, cramped living conditions, and high unemployment, women living in the township may face high levels of sexual abuse. According to the 1998 Demographic and Health Survey in South Africa, among women aged 15-49 in the Western Cape province, 17 percent reported having ever been abused by a sexual partner; 8 percent reported that the abuse occurred within the past year; and 6.5 percent reported ever being raped.[29] Although this survey probably underestimates the extent of rape, the Western Cape had the second highest level of rape reported for

a province. We do not know if sexual abuse is higher in the townships than in other parts of the province.

There are six public health clinics in the township, one hospital, and very few private practitioners. The policy for treating patients who present with STD complaints is syndromic treatment according to the standard national guidelines. New cases of STDs can be seen in any of the clinics or the hospital, but individuals are only provided follow-up care in the clinic closest to their residence. STD service providers indicated that there is inadequate access to appropriate STD care in the township.

4.2 Key informant interview results

About three times more key informants were interviewed than the target number (Table 5). Additional categories of key informants (e.g., youth and hostel residents) were also added. About two-thirds of the key informants were youth, taxi drivers and patients at the STD clinic (Figure 3). The other third was comprised of residents from different areas of the township, as well as police, NGO officials, nurses, business owners, and others. Forty percent of the key informants were female (Table 6). Almost all had completed Grade 7. Over half had lived in the township all of his or her life; another 10 percent had lived in the township more than ten years (Figure 4). Only 12 percent were not residents of the township. Field workers could not locate any self-identified sex workers to interview.

The 318 key informants reported a mean of 2.7 sites each for a total of 852 site reports identifying 363 different sites (Table 7). This is more than three times the number of sites we expected. Only two key informants did not report any site. Most frequently, a key informant reported three sites. Only 31 informants reported five or more sites. The number of sites reported varied by type of key informant. Government officials, CBO and NGO officials, and residents from the Section J of the township each reported a mean of four or more sites per key informant. Over a third of all sites (320 of 852 sites) were reported by the youth.

Table 5 Number and Type of Key Informants

Type of Key Informant	Target Number	Actual Number
Government officials including police	3 to 5	32
Health officers and health care providers	3 to 5	2
Officials of community-based organizations	10 to 20	5
Taxi drivers and their assistants	10 to 15	45
Workers in bottle stores where bars/shebeens buy beer/alcohol	15 to 20	2
Sex workers or barmaids	10 to 20	0
STD clinic patients	5 to 10	38
Other key informant groups added during fieldwork:		
Youth	--	137
Hostel and informal settlement residents and their visitors	--	23
Other township residents	--	32
Township business owner	--	1
Manager of a reported site	--	1
Total	56-75	318

Figure 3
Types of Key Informants

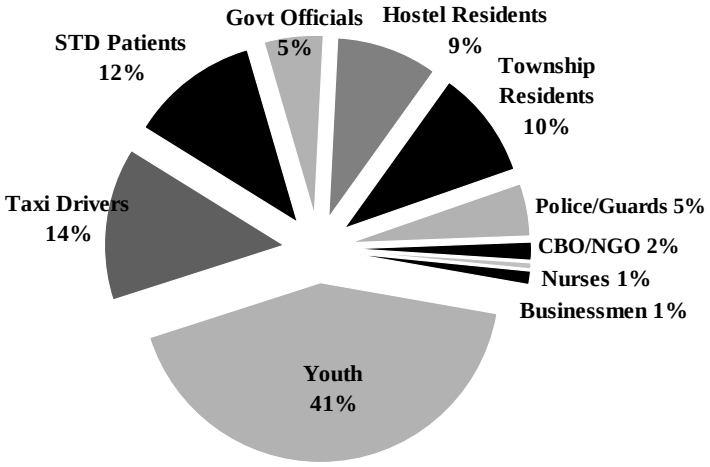


Figure 4
Number of Years Residing in Township

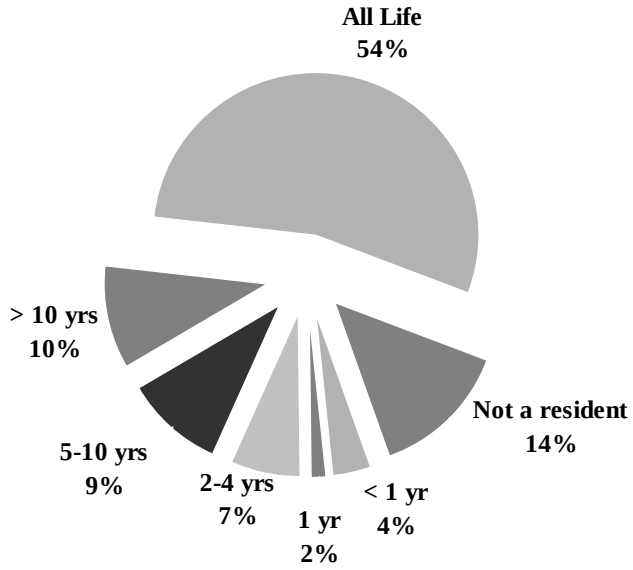


Table 6 Characteristics of Key Informants by Gender

	Male (n=177)	Female (n=118)	Total (n=318)
Type of Key Informant			
Youth	42.4	49.2	43.1
Taxi drivers	24.3	0.0	14.2
STD patients	4.5	22.9	12.0
Government Officials	5.6	5.9	5.4
Residents of hostels & informal settlements and visitors	9.6	6.8	9.4
Township residents	10.7	6.8	10.0
Police and 1 security guard	4.5	2.5	4.7
CBO and NGO officials	0.0	3.4	1.6
Nurses	0.0	0.8	0.6
Bottle store owners	0.0	0.8	0.6
Manager of a site	0.0	0.8	0.3
Businessman	0.6	0.0	0.3
Total	100.0	100.0	100.0
Age			
15-19	10.7	29.7	18.0
20-24	25.9	29.7	27.9
25-29	25.3	20.3	22.6
30-34	14.7	5.1	11.8
35-39	12.4	5.1	9.8
>=40	12.9	10.2	9.8
Total	100.0	100.0	100.00
Educational Attainment			
None	0.6	0	0.32
< Grade 7	0.6	0	0.32
Grade 7	6.3	1.7	5.81
Grades 8-11	58.9	52.6	54.8
Matric	30.3	43.1	36.1
Tertiary	2.9	2.6	2.6
Total	100.0	100.0	100.00
Residence in the Township			
No	12.4	11.0	12.3
Yes	87.6	89.0	87.7
Total	100.0	100.0	100.0

Table 6 Characteristics of Key Informants by Gender (continued)

	Male (n=177)	Female (n=118)	Total (n=318)
Years Residing in the Township			
<1 year	1.7	7.6	3.8
1 year	1.1	2.5	1.6
2-4 years	6.2	5.1	7.0
5-10 years	10.7	6.8	9.5
>10 years	16.9	0.8	10.4
All my life	48.0	67.0	54.1
Not a resident	15.2	10.2	13.6
Total	100.0	100.0	100.0
Sites Reported			
1	23.9	29.9	25.6
2	16.5	21.4	18.4
3	40.9	20.5	33.2
4	10.8	14.5	13.0
5	5.1	7.7	5.7
6	0.6	3.4	1.6
7	2.3	2.6	2.53
Total	100.0	100.0	100.0

Table 7 Number of Sites Reported by Type of Key Informant

	Frequency	Percent	Mean number of sites reported per key informant	Range	Total
Type of Key Informant					
Youth	137	43.08	2.3	1 - 7	320
Taxi drivers	45	14.15	2.9	1 - 7	131
STD patients	38	11.95	1.9	1 - 5	68
Government Officials	17	5.35	4.2	3 - 6	73
Residents of hostels & informal settlements	16	5.03	3.2	0 - 7	52
Section G residents	16	5.03	2.5	0 - 4	40
Police and 1 security guard	15	4.72	3.5	1 - 6	53
Section J resident	8	2.52	4.1	3 - 5	33
Hostel residents and visitors	7	2.2	2.7	1 - 4	19
CBO and NGO officials	5	1.57	4.2	3 - 5	21
Section H residents	5	1.57	3	3	9
Township residents	3	0.94	3.3	3 - 3	10
Nurses	2	0.63	2	1	2
Bottle store owners	2	0.63	3.5	3 - 4	7
Manager of a site	1	0.31	3	3	3
Township business owner	1	0.31	1	1	1
Total	318	100.00	2.7	0 - 7	852

Table 8 Number and Type of Sites Verified during Site Visits

	Sites mentioned by 5+ key informants and in sample for interviewing individuals	Sites mentioned by < 5 key informants and selected for interviewing individuals	Sites mentioned by < 5 key informants but not selected	All Sites
Number of unique sites on list	28	28	307	363
Outcome of site verification visit	%	%	%	%
Site found & address correct	82.14	82.14	80.46	80.72
Site found but address incorrect	10.71	0.00	5.54	5.51
Site found but manager refused	3.57	7.14	5.54	5.51
Site closed due to a funeral	0.00	7.14	8.47	7.71
No longer a site	3.57	0.00	0.00	0.28
Site not found	0.00	3.57	0.00	0.28
Total	100.0	100.0	100.0	100.0
Number (and %) of sites found, address verified, and manager interviewed	26 (92.85%)	23 (82.14%)	264 (86.0%)	313 (86.23%)

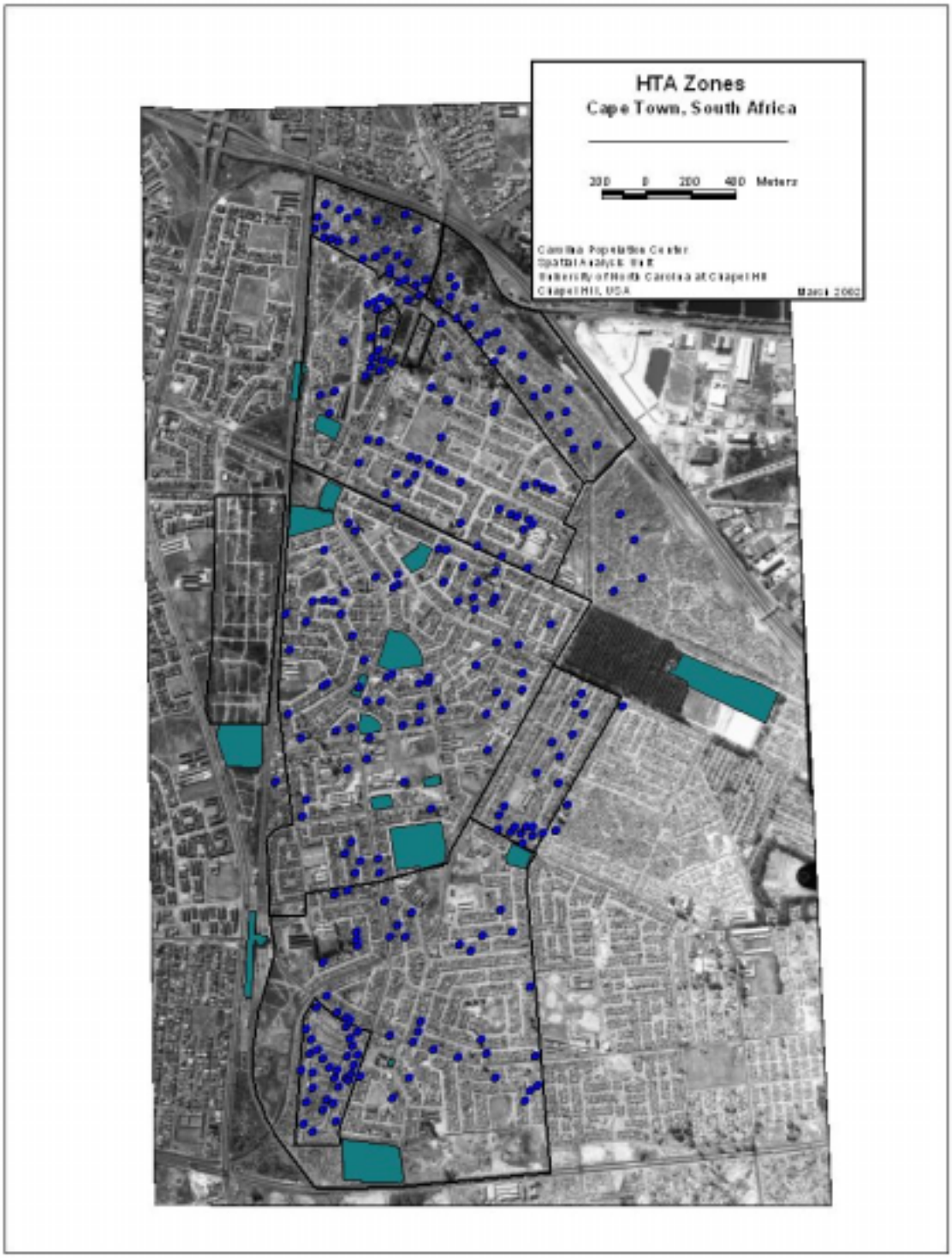
4.3 Site verification and mapping

Of the 363 sites reported, the field staff found 81 percent in operation at the reported address (Table 8) during eight days of intensive fieldwork. Fewer than one percent of the reported sites were not found. Some of the sites were temporarily closed due to a funeral or were found at a different address. Of the 363 sites, 86 percent were found, the address verified or corrected if necessary, the site characterized and a knowledgeable person at the site such as a bar manager interviewed.

The field staff supplied the verified or corrected addresses to the study coordinator who was born in the township and knew the community very well. She was able to identify the location of each site according to its address on a large air photo of the township. If she was not confident of the location from its address or if multiple sites converged in a densely populated area, she visited the site to confirm its location. Figure 5 is an air photo of the township.

Over three-fourths of the sites were shebeens. A shebeen is typically a four-room house in a residential area that has been converted to accommodate beer and alcohol sales and consumption. Shebeens are not legally registered to sell beer and alcohol. About 15 percent of the sites were taverns. Taverns are more likely to be legally registered to sell beer and alcohol and can serve a larger crowd. Besides shebeens and taverns, key informants reported a community hall, a church, a nightclub, a take-away food stand, a garage, a shack, and a hair salon. None of the key informants reported a brothel or anywhere characterized by the presence of commercial sex. Field staff could also not find any brothels in the township, escort services, or self-identified commercial sex workers. Tavern and shebeen owners who were asked about commercial sex denied that any existed in the township.

Figure 5
Sites in Cape Town Township by Zone



As already described in the methods section, we characterized the sites according to whether they were reported by five or more key informants and their location. Among the 28 sites reported by five or more key informants, almost half were taverns even though taverns represented only about 15 percent of the total number of sites reported.

4.4 Estimate of the number of people at the sites

We used census data and data from the study to estimate the proportion of the township population that regularly visits places where people meet new partners. Based on the median number counted at each site, we estimate 6,000 men and 2,400 women visited the 300+ sites on a single evening. This represents about 30% of male and 10% of female township residents age 15-39. These estimates may be overestimates if people were counted at several sites, but could be underestimates since the counting was done during off-peak hours. Additional work should be done to improve methods for estimating the proportion of residents in the township who visit sites.

4.5 Capture-recapture estimates of the number of missed sites

Over two-thirds of the key informants were categorized as residents (72 percent). Fifteen percent were categorized as workers in the community and 12 percent as officials. In all, these 318 individuals made 852 reports of 363 unique sites, a few of which were no longer sites or closed due to a funeral. For the capture-recapture estimate, we used 331 sites and solved the following equation. For three samples, the estimate of N was solved using the following equation.[30]

$$N^2 (m_2 + m_3) - N (n_1n_2 + n_1n_3 + n_2n_3) + n_1n_2n_3 = 0$$

where:

N = total number of sites = 654

n_1 = number of sites reported by the officials = 88

n_2 = number of sites reported by workers = 86

n_3 = number of sites reported by residents = 235

m_2 = number of sites reported by both officials and workers = 9

m_3 = number of sites reported by residents that had already been reported by officials or workers = 69

According to this capture-recapture estimate, 323 sites were missed by key informants. This is undoubtedly an overestimate, however, as officials and residents were more likely to report the same sites. If the lists were unbiased, the proportional overlap between any two lists would be similar. In this case, a greater percentage of sites reported by residents was not reported by officials and workers than for the other two groups.

4.6 Sexual partnerships, AIDS prevention, condom availability and sexual mixing at sites

A knowledgeable person at the site was interviewed at the 313 sites in operation during the site visit (Table 9). Typically this was a shebeen owner or tavern manager. About three-fourths of these individuals reported that people come to the site to meet new sexual partners. Fewer than two percent of the sites had any on-site AIDS prevention activities such as educational materials, peer education programs or regular visits from health outreach workers. Over ninety percent of those interviewed reported that condoms were never available at the site, although 22 percent reported that condoms were available nearby. Figure 6 shows that most of the sites where the site managers reported that people come to meet new partners did not have condoms at the site or nearby. Almost 60 percent of those interviewed reported that they would be personally willing to sell condoms.

Figure 6
Patrons Meet New Partners and No Condoms Available

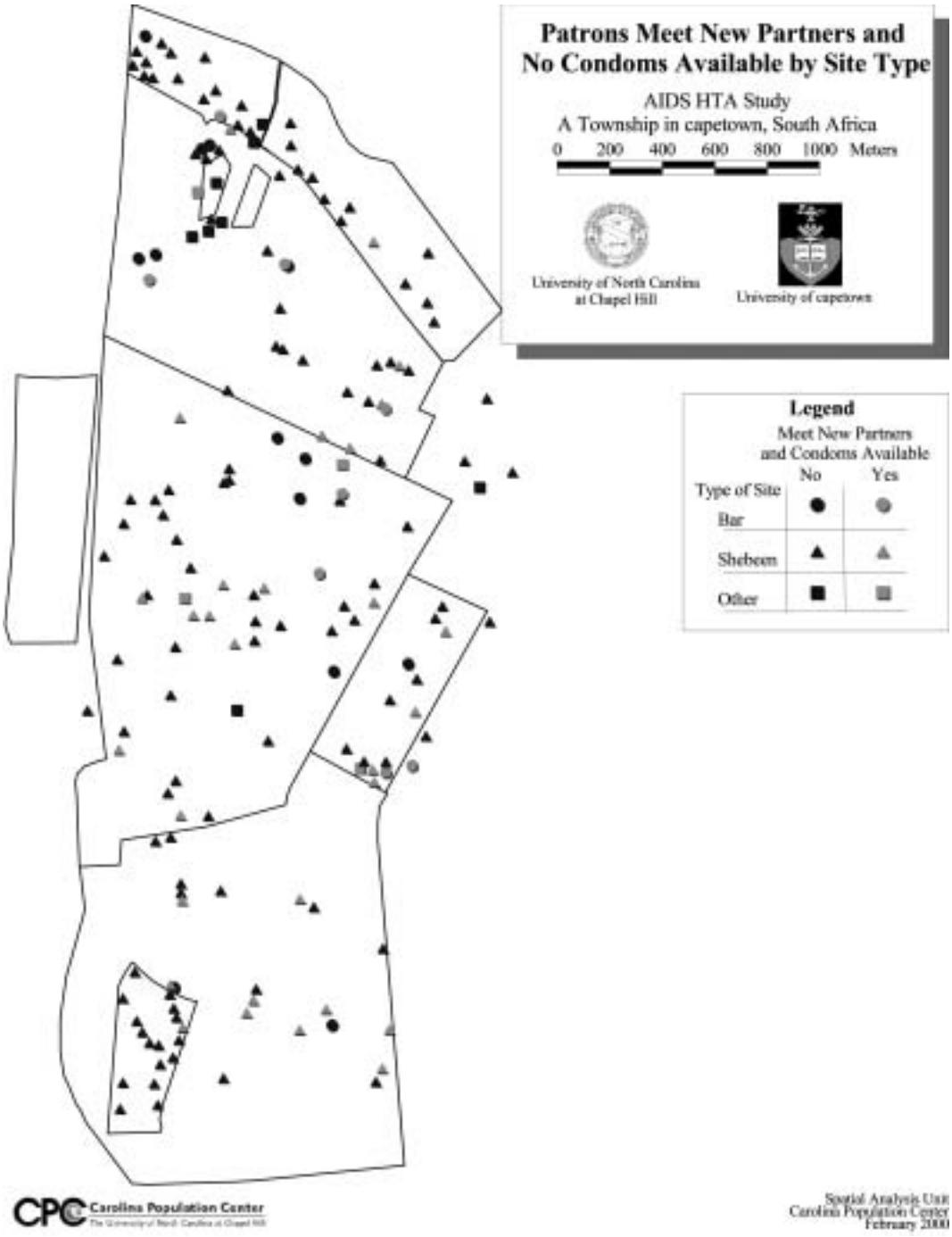
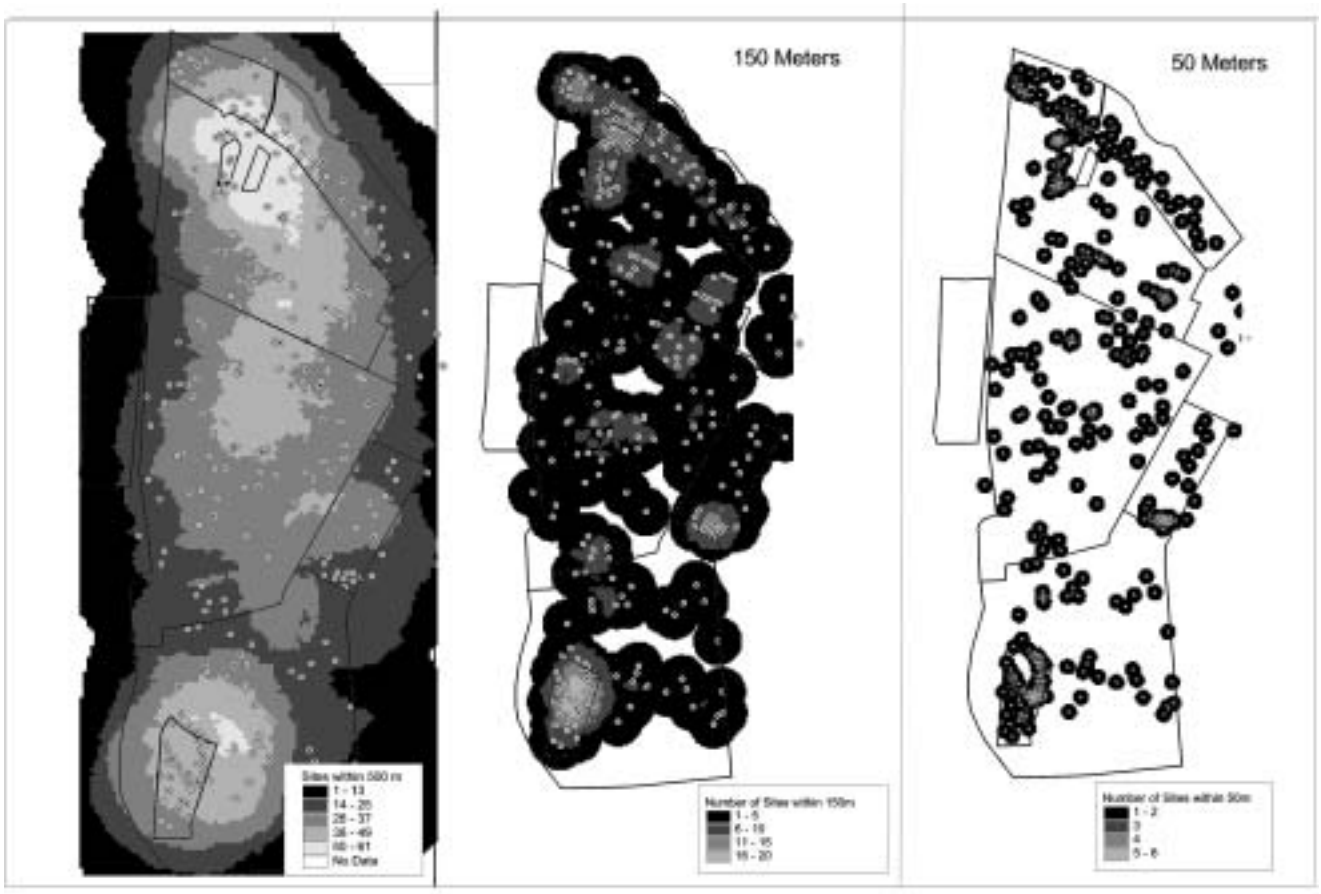


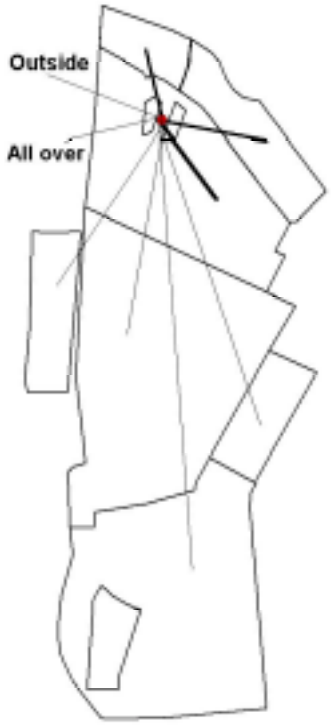
Figure 7
Neighborhood Statistics



About 40 percent of those interviewed reported that people only come to the site from one area in the township. About 20 percent reported that people come from all over the township to the site. People from outside the township and from all over the township were more likely to go to the sites reported by five or more key informants than the less frequently reported sites where people were more likely to come from just one area.

Interviewers obtained additional information at the sites reported by five or more key informants and the sample of sites reported by four or fewer key informants (Table 10). Interviewers counted the number of individuals socializing. A few of the more frequently reported sites were very large compared with the other sites. The median number of men and women at the more frequently reported sites was 32 and 19 respectively compared with 24 and 10 at the less frequently reported sites. Over three-fourths of those interviewed at the less frequently reported sites and over 85 percent of those interviewed at the more frequently reported sites responded that men and women "fish" for new partners at the site. In Xhosa, the term "fishing" in this context implies an intentional search for a sexual partner. A facilitator was reportedly available to help individuals find a new sexual partner at over a third of the sites. At two sites, sex workers were reported to solicit clients and at two other sites sex was reported to occur on the premises.

Figure 8
Neighborhood Statistics



Individuals came from all over the township and from outside the township to meet sexual partners at sites clustering in the north of the township. The thickness of the line indicates the proportion from each zone.

When asked to characterize the type of people who visit the site, those interviewed most frequently responded "Everybody." Over a third of those interviewed spontaneously responded either "students" or "youth." Migrants were more likely to be named by those interviewed at the less frequently named sites. When asked to describe those who visit in terms of age and gender, the most frequently reported groups were men 25-30 and women 16-24. Over 40 percent of those interviewed reported that youth younger than 16 visit the site. Over 10 percent reported that girls younger than 16 visit the site.

We used the neighborhood statistics from ARC-View to determine whether the sites cluster in the township. Sites clustered somewhat in the north and south of the township (Figure 7). These are the areas of the township with migrant worker hostels. We selected the sites in the north of the township and determined where the site manager reported that people come from to visit those sites. The responses from the site managers indicate that people come from outside the township and from inside the township to visit sites in the north of the township. Most of the patrons come from close by the sites (Figure 8).

Table 9 Characteristics of Found and Verified Sites Where a Knowledgeable Person Was Interviewed

	Sites mentioned by 5+ key informants and in sample for interviewing individuals	Sites mentioned by < 5 key informants and selected for interviewing individuals	Sites mentioned by < 5 key informants but not selected	All Sites
Number of sites	**26**	**23**	**264**	**313**
Key Question Asked Managers: Do people meet new sexual partners here? (% Yes)	92.00	78.26	72.03	74.11
Type of Site				
Tavern	46.15	4.35	12.26	14.52
Shebeen	38.46	86.96	81.23	78.06
Community Hall	7.69	0.00	0.00	0.65
Church	0.00	4.35	0.38	0.65
Night Club	3.85	4.35	0.00	0.65
Takeaway	3.85	0.00	1.53	1.61
Garage	0.00	0.00	0.38	0.32
Shack	0.00	0.00	0.38	0.32
Salon	0.00	0.00	0.38	0.32
Total	100.0	100.0	100.0	100.0
AIDS Activities at Sites (% with)				
Any educational materials	4.17	0	1.18	1.32
Any AIDS prevention activities	3.85	0	1.55	1.63
Any AIDS talks	3.85	0	0.78	0.98
Any peer education	0.00	0	0.00	0.00
Any health outreach worker visits	3.85	0.00	0.00	0.33
Condom availability (% Yes)				
Any condoms at site at visit	0.00	0	3.46	2.91
Any condoms nearby	19.23	17.39	23.08	22.33
Condoms always available here	0.00	0.00	0.78	0.65
Condoms sometimes available here	15.38	8.7	5.04	6.19
Condoms never available here	84.62	91.3	94.19	93.16
Respondent willing to sell condoms at site	65.38	60.87	57.85	58.71

Table 9 Characteristics of Found and Verified Sites Where A Knowledgeable Person Was Interviewed (continued)

	Sites mentioned by 5+ key informants and in sample for interviewing individuals	Sites mentioned by < 5 key informants and selected for interviewing individuals	Sites mentioned by < 5 key informants but not selected	All Sites
Sexual Mixing				
Where do people come from who come to this site?				
From outside the township & from				
All over the township	7.69	0.00	4.17	4.15
From 3-4 township zones	11.54	0.00	0.76	1.60
From 0-2 township zones	0.00	4.35	6.06	5.43
Not from outside the township but:				
From all over the township	19.23	13.04	17.80	17.57
From 3-4 township zones	19.23	13.04	15.91	15.97
From 2 township zones	3.85	13.04	15.15	14.06
From 1 township zone	34.62	56.52	39.02	39.94
No specific areas mentioned	3.85	0.00	1.14	1.28
Total	100.0	100.0	100.0	100.0
Percent of managers spontaneously mentioning people come:				
From Zone A	23.08	17.39	12.88	14.06
From Zone B	19.23	39.13	24.62	25.24
From Zone C	26.92	21.74	31.44	30.35
From Zone D	7.69	4.35	11.74	10.86
From Zone E	7.69	4.35	7.58	7.35
From Zone F	7.69	8.7	9.09	8.95
From Zone G	26.92	21.74	12.50	14.38
From Zone H	15.38	4.35	10.61	10.54
From Zone I	11.54	8.7	6.06	6.71
From Zone J	23.08	8.7	13.64	14.06
From outside the township	19.23	4.35	10.98	11.18
From all over the township	26.92	13.04	21.97	21.73

Table 10 Additional Characteristics of Sites Where Individuals Socializing at the Site Were Interviewed

	Sites Mentioned by 5+ Key Informants	Sites Mentioned by Fewer than 5 Key Informants
Number of sites that were found, address verified and manager did not refuse	**26**	**23**
Number of people counted at the site		
Men:		
Mean	49	43
Median	32	24
Range	10-300	10-200
Sum over all sites	1186	948
Number of sites where men were counted	24	22
Women:		
Mean	25	20
Median	19	10
Range	2-100	7-110
Sum over all sites	546	429
Number of sites where women were counted	22	21
Activities at site reported by knowledge-able person (% answering yes)		
Men fish at the site?	88.00	77.27
Women fish at the site?	88.00	77.27
Facilitator available for finding sex partner?	37.50	38.10
Beer consumed?	88.46	100.00
Alcohol consumed?	88.46	100.00
TV or Video at the site?	64.00	40.91
Sex workers solicit at the site?	0.00	9.09
Sex occurs at the site?	8.70	0.00
Characteristics spontaneously mentioned when asked to describe patrons of site		
Everybody	42.31	34.78
Students	26.92	21.74
Youth	11.54	26.09
Non residents of the township	19.23	17.39
Residents of the township	15.38	13.04
Business men	15.38	13.04
Professional people	11.54	8.70
Unemployed	7.69	13.04
Older people	7.69	4.35
Men only	7.69	4.35
People of all ages	3.85	8.70
People from outside township	3.85	0.00
Migrant workers	0.00	8.70
People with low education	3.85	0.00

Table 10 Additional characteristics of sites where individuals socializing at the site were interviewed (continued)

	Sites Mentioned by 5+ Key Informants	Sites Mentioned by Fewer than 5 Key Informants
Percent of managers reporting the following predominant age groups at site		
Women under 16	11.54	13.04
Women 16-24	65.38	60.87
Women 25-30	53.85	60.87
Women 31-40	34.62	30.43
Women 40+	30.77	21.74
Men under 16	50.00	43.48
Men 16-24	65.38	60.87
Men 25-30	76.92	78.26
Men 31-40	61.54	65.22
Men 40 plus	42.31	47.83

4.7 Self-reported sociodemographic and behavioral characteristics of individuals socializing at sites

Interviews with individuals socializing at the sites were conducted at 26 of the 28 sites most frequently reported by key informants and at 23 of the remaining sites (Table 11). (As described in the methods section, these 23 sites were selected to provide a geographically representative sample of the less frequently reported sites.) A total of 1,116 individuals were interviewed at these sites, a sum just 60 fewer than the target number of 1,176 (i.e., 24 interviews at each of the 49 sites). Where the target number of interviews was not reached in a site, it was usually because there were fewer than 16 men and 8 women at the site at the time of the interview.

We did not interview individuals younger than age 15 in compliance with our Protection of Human Subjects agreement. Among those interviewed, however, the mean age for men was 30.1 and for women was 29.1 (Figure 9). Over 85 percent of respondents were residents of the township and about half had lived in the township all their lives. At the most frequently mentioned sites, almost a fourth of both men and women were from Section 3 of the township, but there were at least a few respondents from every area of the township. About a third of the respondents had not completed Standard 8 level of schooling, but there were not marked differences in educational attainment by gender. About 40 percent of the respondents were unemployed (Figure 10).

Figure 9
Age Distribution of Men and Women Socializing at Sites

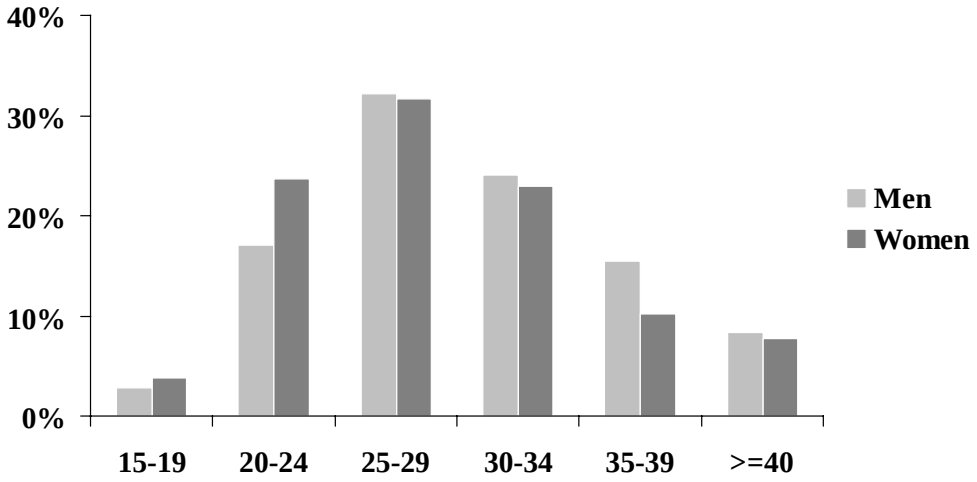


Figure 10
Proportion Unemployed by Age among Men and Women Socializing at Sites

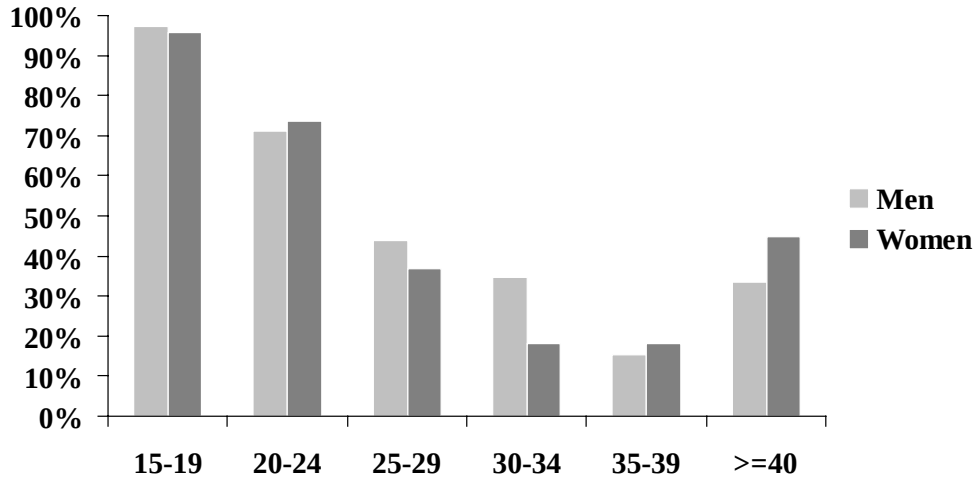


Figure 11
New Partners in the Past 4 Weeks among Men and Women at Sites
Percentage Distribution

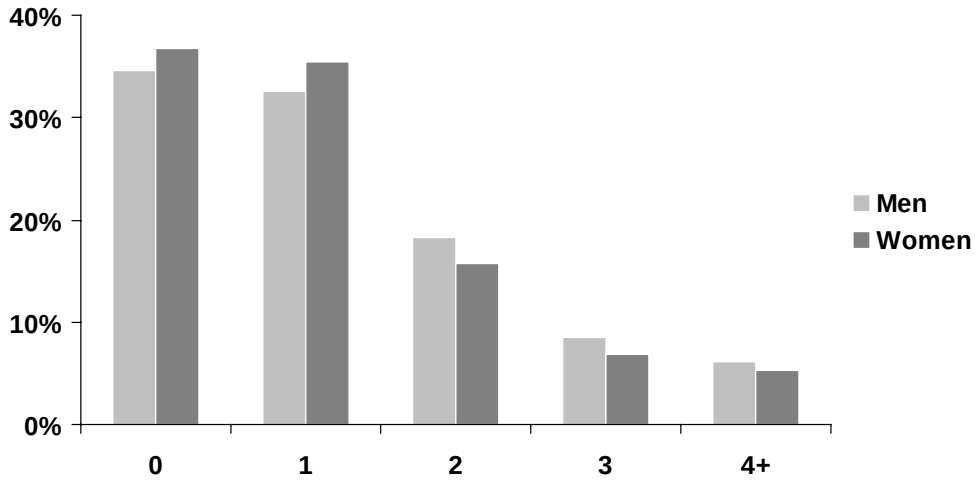
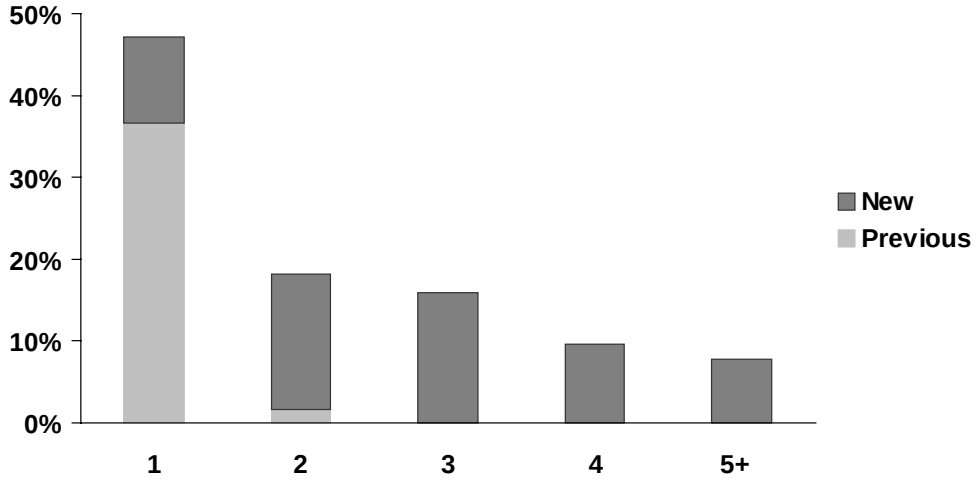


Figure 12
Proportion of New Partnerships
by Total Number of Partners in the Past 4 Weeks Men, Township



Respondents were asked how many different sexual partners they had had in the past four weeks, how many new sexual partners in the past four weeks, how many different sexual partners in the past year and how many new sexual partners in the past year (Table 12). Self-reported rates of partnership formation were higher for men than for women. Men reported a mean of 2.3 total partners and 1.2 new partners in the past four weeks. Women reported a mean of 1.8 total partners and 0.9 new partners in the past four weeks (Table 12). About 20 percent of the men reported four or more partners in the past four weeks; a third reported two or more new partners in the past four weeks (Figure 11). About twice as many women interviewed at sites more frequently named by key informants reported four or more partners in the past four weeks than less frequently named sites (12 versus 6 percent). About 20 percent of women at the frequently named sites reported two or more new partners in the past four weeks compared to 15 percent at the less frequently named sites.

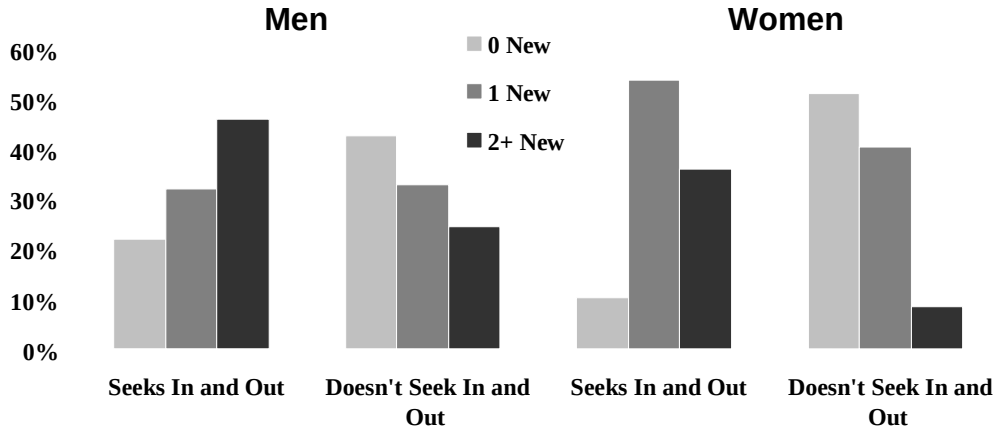
For men and women with more than one partner in the past four weeks, almost all of the partnerships in the past four weeks were new partnerships (Figure 12).

Between 40 and 50 percent of all respondents had never used a condom and less than a third reported using a condom at the most recent coitus. Self-reported condom use did not vary significantly by gender or by whether the site of the interview was identified by five or more key informants.

4.8 Self-reported behavior regarding meeting new partners at the site and partner mixing

Very few people reported that the evening of the interview was their first time to visit the site (Table 13). Over a fourth of those interviewed reported visiting the site more than ten times per month. More than half of those interviewed visited the site more than three times per month. When asked if people come to the site to meet new sexual partners, over 80 percent of those responding replied in the affirmative. There was no difference by gender or site group (whether sites were reported by five or more key informants) in the proportion reporting that they believed people come to the site to meet new sexual partners (range 80 to 86 percent). The highest proportion was reported by women at the most frequently mentioned sites (86 percent).

Figure 13
Partners in Past 4 Weeks by Whether Seeks Partners Inside & Outside Township



However, when asked directly if the respondent had ever met a new partner at the site, fewer than half of the men or women at either type of site reported they did. Men were more likely to report having met a new sexual partner than women (40 percent compared with 30 percent). Respondents at sites reported by more than five key informants were more likely to have met a partner at the site in the past month or past 2-3 months than men and women at the less well known sites, but the proportion reporting having met one of their most recent three partners at the site was similar for both types of sites among both men and women (range 31 to 38 percent). Condom use with the most recent sexual partner met at the site was not common. Only about a third of those who reported having met a new partner at the site reported using a condom with that partner.

Even though fewer than half of the respondents reported meeting a partner at the site of the interview, half reported going somewhere in the township to meet new sexual partners. Sixty percent of the men and 53 percent of the women reported going outside the township to meet new sexual partners. Men at the more well-known sites were most likely to report going both inside and outside the township to meet new sexual partners (41 percent); but even where the proportion was the lowest (among women at less frequently mentioned sites), almost 30 percent reported going both inside and outside the township to meet new sexual partners (Figure 13).

Men and women who seek partners both inside and outside the township had more new partners than those who did not seek new partners both inside and outside the township.

Table 11 Sociodemographic Characteristics of Individuals Interviewed at Sites

	Men			Women		
	Unweighted		Weighted	Unweighted		Weighted
	Frequently Mentioned Sites (N=381)	Less Frequently Mentioned Sites (N=357)	Total (N=738)	Frequently Mentioned Sites (N=199)	Less Frequently Mentioned Sites (N=179)	Total (N=378)
Age						
15-19	4.6	2.6	2.8	9.1	3.5	3.8
20-24	18.6	16.7	17.1	21.6	24.1	23.7
25-29	31.7	32.6	32.2	31.7	31.6	31.7
30-34	23.4	23.8	24.0	21.6	23.0	22.9
35-39	15.6	15.6	15.4	8.0	9.8	10.2
>=40	6.2	8.5	8.4	8.0	7.5	7.7
Total	100.0	100.0	100.0	100.0	100.0	100.0
Mean Age			30.1			29.1
Current residence						
The township	87.1	91.9	91.6	85.4	82.1	81.8
Cape Town	12.3	7.9	8.0	14.6	16.8	17.2
Elsewhere South Africa	0.5	0.3	0.3	0.0	0.6	0.5
Outside South Africa	0.0	0.0	0.0	0.0	0.6	0.5
Total	100.0	100.0	100.0	100.0	100.0	100.0
Years residing in the township						
<1 year	6.7	2.0	2.4	8.6	4.0	4.4
1 year	0.8	1.4	1.6	0.0	1.1	1.1
2-4 yrs	6.4	9.4	8.9	3.6	5.7	5.7
5-10 yrs	13.6	12.5	13.5	7.6	9.1	8.1
>10 yrs	9.3	12.2	11.7	11.7	11.9	11.0
All life	50.3	54.3	53.5	53.8	50.0	51.2
Does not reside in the township	13.0	8.2	8.4	14.7	18.2	18.5
Educational attainment						
None	0.0	0.6	0.0	0.0	0.6	0.6
< Standard 5	5.1	5.8	5.8	4.1	5.2	4.9
Standard 6-8	23.7	25.8	26.0	30.1	28.7	28.9
Standard 9-10	47.2	49.0	49.8	50.0	48.9	49.8
Tertiary	24.0	18.8	18.0	15.8	16.7	15.7
Total	100.0	100.0	100.0	100.0	100.0	100.0
Employment status						
Yes	57.3	55.8	55.0	52.6	61.5	61.0
No	42.7	44.2	45.0	47.5	38.5	39.0
	100.0	100.0	100.0	100.0	100.0	100.0

Table 12 Condom Use and Rates of Partnership Formation

	Men			Women		
	Frequently Mentioned Sites (N=381)	**Less Frequently Mentioned Sites (N=357)**	**Total (N=738)**	**Frequently Mentioned Sites (N=199)**	**Less Frequently Mentioned Sites (N=179)**	**Total (N=378)**
Ever used a condom?						
Yes	54.3	51.7	50.9	51.1	59.2	56.8
No	45.7	48.4	49.1	48.9	40.9	43.2
Total	100.0	100.0	100.0	100.0	100.0	100.0
Condom used most recent sex?						
Yes	32.5	29.2	29.0	26.9	35.9	34.2
No	22.9	23.5	22.9	24.7	25.8	24.9
Never used a condom	44.6	47.3	48.1	48.4	38.4	40.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number of partners in past 4 weeks						
0	3.5	1.4	1.6	7.1	2.3	2.8
1	41.1	45.6	47.0	52.0	55.4	56.2
2	21.2	18.0	17.8	21.7	21.7	21.3
3	14.3	15.7	15.1	7.1	14.3	13.1
4 – 9	18.8	18.2	17.3	11.6	5.7	6.0
10 – 15	1.1	0.9	0.8	0.5	0.6	0.6
>15	0.0	0.3	0.3	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Mean	2.3	2.3	2.3	1.8	1.8	1.7
Median	2	2	2	1	1	1
Range	0-13	0-16	0-16	0-12	0-12	0-12
Number of new partners in past 4 weeks						
0	33.5	36.2	38.0	42.4	38.4	38.3
1	32.7	32.2	31.2	38.3	44.8	35.6
2	19.4	17.2	19.9	9.7	12.8	15.3
3	7.4	9.2	8.8	4.6	2.3	6.8
4 – 9	7.1	5.2	5.1	5.1	1.7	4.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Mean	1.3	1.2	1.2	1.0	0.9	0.9
Median	1	1	1	1	1	1
Range	0-8	0-9	0-9	0-8	0-7	0-8

Table 12 Condom Use and Rates of Partnership Formation (continued)

	Men			Women		
	Frequently Mentioned Sites (N=381)	**Less Frequently Mentioned Sites (N=357)**	**Total (N=738)**	**Frequently Mentioned Sites (N=199)**	**Less Frequently Mentioned Sites (N=179)**	**Total (N=378)**
Number of partners in past year						
0	1.1	0.6	0.6	7.1	2.3	2.7
1	21.9	23.5	23.1	34.0	37.9	37.9
2	11.8	10.2	10.7	12.7	14.7	15.0
3	14.2	20.6	20.2	18.3	14.7	15.5
4 – 9	34.8	31.9	31.8	23.4	23.7	22.0
10 – 15	12.0	8.5	8.9	3.1	3.4	3.6
>15	4.3	4.8	4.6	1.5	3.4	3.2
Total	100.0	100.0	100.0	100.0	100.0	100.0
Mean	5.2	5.0	5.0	3.2	3.5	3.5
Median	4.0	3	3	2	2	2
Range	0-48	0-36	0-48	0-28	0-27	0-28
Number of new partners in past year						
0	13.1	11.4		27.9	17.8	19.9
1	24.9	25.4		30.0	38.5	37.4
2	17.4	23.1		19.8	19.5	19.4
3	12.9	12.3		8.1	10.3	10.1
4 – 9	27.1	24.3		13.7	12.6	12.2
10 – 14	4.0	2.9		0.5	1.2	1.2
>15	0.5	0.6		0.0	0.0	0.0
Total	100.0	100.0		100.0	100.0	100.0
Mean	3.0	2.8		1.7	1.9	1.9
Median	2.0	2		1	1	1
Range	0-16	0-24		0-10	0-12	0-12

Table 13 Partner Selection Reported by Individuals Interviewed at Sites

	Men			Women		
	Frequently Mentioned Sites (N=381)	**Less Frequently Mentioned Sites (N=357)**	**Total (N=738)**	**Frequently Mentioned Sites (N=199)**	**Less Frequently Mentioned Sites (N=179)**	**Total (N=378)**
Frequency of attendance at site						
First time	4.0	3.5	3.2	5.1	8.2	6.5
<1 time per month	8.2	7.2	6.7	13.6	11.8	12.7
1-2 times per month	18.4	17.8	18.2	26.8	21.8	24.4
3-5 times per month	24.5	21.6	22.9	19.7	18.8	19.5
6-10 times per month	13.6	18.4	18.4	7.1	14.7	10.6
>10 times per month	31.4	31.6	30.5	27.8	24.7	26.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
Do you believe people come here to meet new partners?						
Yes	82.8	80.4	80.8	85.8	81.6	83.8
No	17.3	19.7	19.2	14.2	18.5	16.2
Total	100.0	100.0	100.0	100.0	100.0	100.0
Have you ever attracted a partner at this site?						
Yes	40.6	39.2	41.0	32.0	29.5	29.4
No	59.4	60.9	59.0	68.0	70.5	70.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
When did you last attract a partner at this site?						
Past month	17.9	11.7	11.8	13.9	9.0	8.9
2-3 months ago	14.3	11.1	11.5	13.4	9.0	10.0
4-6 months ago	4.1	6.6	6.8	3.1	5.4	4.6
7-12 months ago	3.3	8.6	9.6	2.6	1.8	1.8
Over a year ago	3.6	1.1	1.4	2.1	3.6	3.5
Never	56.9	60.9	58.8	65.0	71.3	71.2
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 13 Partner Selection Reported by Individuals Interviewed at Sites (continued)

	Men			Women		
	Frequently Mentioned Sites (N=381)	Less Frequently Mentioned Sites (N=357)	Total (N=738)	Frequently Mentioned Sites (N=199)	Less Frequently Mentioned Sites (N=179)	Total (N=378)
Condom use with your most recent partner from here?						
Yes	17.4	19.9	19.7	16.4	17.4	16.8
No	43.6	33.8	36.7	34.9	25.6	27.5
No partner from here	39.0	46.3	43.7	48.7	57.0	55.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
Any most recent 3 partners attracted at site						
Yes	35.4	37.5	37.5	30.7	29.6	29.6
No	64.6	62.5	62.5	69.4	70.4	70.4
Total	100.0	100.0	100.0	100.0	100.0	100.0
Whether goes to any area in the township to meet new partners						
Yes	58.2	55.8	57.0	52.3	48.0	50.4
No	41.8	44.2	43.0	47.7	52.0	49.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
Whether goes outside the township to meet new partners						
Yes	62.4	60.0	60.3	53.3	53.7	53.8
No	37.6	40.0	39.7	46.7	46.3	46.2
Total	100.0	100.0	100.0	100.0	100.0	100.0
Whether goes in and outside the township to meet new partners						
Yes	40.8	36.9	37.1	33.7	28.8	30.1
No	59.2	63.1	62.9	66.3	71.2	69.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

5. DISCUSSION

5.1 Usefulness for intervention planning

The picture that emerges from this rapid assessment is that immediate action should be taken to thwart the HIV epidemic in the Western Cape province and that the focus of the interventions should be in the townships, among people who socialize at bars and shebeens. Although we do not have biomedical evidence that the incidence of HIV infection is any higher in the township than elsewhere, this study suggests that the sexual network in the township could easily support an epidemic of HIV infection. The rates of new partner acquisition in the past four weeks reported from individuals socializing at the sites are more than double the rate of partner change estimated necessary to sustain transmission of HIV, gonorrhea, chlamydia, or syphilis.[31] In addition, these reported rates of partner acquisition are much higher than those reported nationally in South Africa.[32] In our study women reported a mean of 1.8 total partners and 0.9 new partners in the past four weeks; in the national survey women aged 15-49 reported a mean of 0.8 total partners in the past 12 months. Finally, key factors that might mitigate the epidemic are missing. Treatment of other sexually transmitted disease is inadequate. Condom use is low and they are not available.

The assessment suggests that place-based assessments may be able to circumvent the need for full sexual network specification and may also be able to identify general areas for intervention (such as the township) and specific sites within the township (such as the sites with the highest rates of new partner acquisition). It seems more efficient to use available sociodemographic and epidemiologic data to identify areas likely to have sexual networks capable of sustaining infection in a community than to attempt to build up a picture of a community's sexual network from individual self-reports or from large and expensive household surveys. We identified the township based on available epidemiologic and sociodemographic data and the opinion of health care service providers with experience in the community. More research could be done to identify community-level factors associated with increased transmission of sexually transmitted infections. Especially in sub-Saharan Africa where the core group membership is not easy to define or measure in a population and where epidemics may be geographically clustered, targeting areas for intervention may be a reasonable prevention strategy.

In addition to identifying footholds for intervention, a place-based approach is very compatible with the population perspective that focuses on preventing transmission at the population level rather than acquisition at the individual level.[33] Rather than applying risk factor assessments at the individual level, the focus shifts to identifying strategic access points for the subgroups of the population linked together by a sexual network capable of spreading infection. In sub-Saharan Africa where there are generalized epidemics, the classic "core group" concept may not be very applicable. Prevention efforts targeting sex workers (male or female), transport workers, the military, or drug abusing populations (except alcohol abusers) would have missed the township entirely.

5.2 Method acceptability

The method appears to be very acceptable to the local community. There were few refusals. Identifying where people go to meet sexual partners may be a more acceptable approach than asking about the behavior of groups that may carry some stigma (e.g., commercial sex workers, drug abusers, gay and bisexual populations). We found that key informants did not object to identifying where people go to meet new sexual partners, whereas they denied that commercial sex existed in the township. We focused on asking where people go to meet new sexual partners, primarily, however, because within a sexual network, new sexual partnerships hold a strategic position in the epidemiology of HIV/STD transmission. It is also possible that preventing a case of HIV infection among the sub-population with high rates of new partner

acquisition may reduce the number of individuals exposed to HIV during the period of primary infection.

5.3 Subsequent applications of the method

This was the first application of the method in a community. Since October 1999 when the study was conducted in Cape Town, we have improved and replicated the protocol in Bhubaneswar, India; two more townships in South Africa; a central business district of a large city in South Africa; and a rural district in Tanzania. We did not link this assessment with the development of an intervention in Cape Town. In three other sites in South Africa, however, the assessments are being linked from the outset with place-based interventions. The components of the intervention include peer health education at key sites, condom promotion at sites, and recruitment of vulnerable women identified at sites to "fast lanes" for STD screening and treatment. For these interventions, indicators for program inputs, outputs, and outcomes at the site level and at the area level are being developed.

5.4 Further development of the method

Several areas for improvement of the protocol have emerged. We need better information about site dynamics, including changes in the characteristics of patrons of the sites, site closings and mixing among sites. Although we tried to locate every site in the township where people meet new partners, we undoubtedly missed some sites. Further research must be done to quantify the extent to which sites are missed. Undoubtedly there are high transmission "times" as well as high transmission areas. We interviewed people at the end of the month during a 10-day period that included two weekends, the usual monthly payday, and a holiday. We do not know to what extent the population fluctuates during the month. People were not reluctant to answer questions about how many sexual partners they had, but we do not know the extent or direction of bias in their responses.

The frequency of attendance at the sites was very high. About a third of respondents reported visiting the site more than ten times per month. This suggests that visiting shebeens and taverns is part of the lifestyle of the community for some. Our estimates of the number of people visiting a site may be overestimates if people were counted at several sites, but could be underestimates since the counting was done during off-peak hours. Additional work should be done to improve methods for estimating the proportion of residents in the township who visit sites.

Other questions to assess and improve the method could be addressed:

- What contextual information was obtained from what sources at what cost?
- How did the information contribute to understanding the pattern of sexual networks?
- Were key informants equally informative? If not, what are the characteristics of the most informative key informants? Based on this, what is the most efficient combination of type and number of key informants? Could the key informant interview be shortened without losing important information?
- How efficient was the process for obtaining a verified list of sites?
- What additional characteristics of sites would be useful?
- How could the process for identifying individuals to interview at sites be improved? Were a sufficient number of individuals interviewed at sites? Were there gaps in the type of individuals interviewed? To what extent were the data biased because interviews occurred in the late afternoon and early evening?
- What strengths and weaknesses emerged in terms of staffing and management? What changes in staffing and management are indicated by the pilot test?

5.5 Conclusion

In summary, this method appears promising for focusing interventions. The method involves quantitative and qualitative methods and reflects a multidisciplinary approach including spatial analysis. Each step in the method requires judgment based on the interpretation of contextual

information. Research to validate the method using biomedical outcomes should be conducted as well as additional demographic and epidemiologic research to further improve the method.

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