

**A Pilot Study of a Rapid Assessment Method  
to Identify Areas for AIDS Prevention in  
Cape Town, South Africa**

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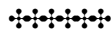
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## **A Pilot Study of a Rapid Assessment Method to Identify Areas for AIDS Prevention in Cape Town, South Africa**

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**Introduction**

Conceptual and mathematical models of epidemics of sexually transmitted infections (STIs) provide the framework for improving strategies to minimize STI transmission at the population level, but improved epidemiological methods are still needed to identify, characterize, and access for intervention the key sexual networks identified in the models. The initial “core group” concept introduced by Yorke in 1978,<sup>1</sup> the mathematical models<sup>2</sup> developed by Anderson and May, and the recent phase-specific model<sup>3</sup> described by Aral and Wasserheit all highlight the importance of sexual partnership patterns among and between groups. The phase-specific model argues that the optimal strategies for controlling STIs require a two-tiered approach for “spread” and “maintenance” networks. Mathematical models identify specific sexual network parameters that influence the spread of infection including: (1) behavioral heterogeneity<sup>4</sup> – the extent to which the rate of partner acquisition and acts per partner vary within the population; (2) partner concurrency<sup>5</sup> – 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<sup>6</sup> – the extent to which partnerships are formed during the period of increased host infectiousness. Unfortunately, empiric data describing sexual networks in a specific population lag behind the evolving conceptual framework. Consequently, successful use of these features for preventing transmission of STIs has been limited.

An important barrier to developing sexual network-informed interventions has been the lack of rapid, reliable and valid field methods for describing the complex and dynamic web of sexual partnering in a defined population in a way that is useful for intervention planning. By necessity, conceptual models reduce sexual behavior and transmission networks into

simple paradigms. The challenge is to translate key sexual network concepts and parameters into variables that can be validly measured in resource-poor settings and that provide indicators useful for phase-specific intervention programming. 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.<sup>7, 8</sup> Methods using clinic-based partner notification approaches miss the majority of infected individuals who do not present for STD care. They are also more likely to be informed about the stable partners of the infected case than the unreported casual sexual contacts.<sup>9, 10</sup> Thus, there is an acknowledged gap between theoretical understanding of the types of sexual networks most capable of sustaining an epidemic and our success in measuring sexual network parameters among real individuals in a population.<sup>1</sup>

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.<sup>11</sup> HIV incidence rates are generally higher in urban areas, moderate in peri-



urban areas, and much lower in rural areas<sup>12, 13, 14, 15, 16</sup>. Even within relatively small rural areas, large differences in prevalence by residence have been observed. In sub-Saharan Africa, areas with higher incidence of HIV infection have been dubbed high transmission areas (HTAs).<sup>17</sup> 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.<sup>18</sup> Patrons of such sites may have a higher rate 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.

We developed the rapid method described in this paper and pilot tested in a township in Cape Town to determine 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, or naming of sexual partners. Nor should it 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.

### **Methods**

The methods are summarized in Table 1. The first step is selection of the study area based on a synthesis of available contextual and epidemiologic information. We chose Cape Town for the study because Western Cape had the lowest HIV prevalence in South Africa according to national sentinel surveillance data, but possibly the highest incidence. HIV prevalence had increased 370 percent (from 1.6 to 6.3 percent) among antenatal patients between 1995 and 1997. Selection of the township within Cape Town was based on the perception of a significant unmet need for STD services in the community. In addition, the township was small enough to be feasibly studied in a pilot study.

Community approval for the study was obtained by meeting with key representatives of the principal community organizations, including political and civic organizations, health workers, the police, and community-based organizations. The protocol was approved by ethical review committees at both the University of North Carolina and the University of Cape Town.

<b>Table 1: Summary of HTA Protocol: Objectives, Methods, and Outputs</b>		
<i>Objectives</i>	<i>Methods</i>	<i>Outputs</i>
1. Identify an HTA based on contextual information	Synthesis of information from epidemiologic reports, census data, health reports, maps, and discussions with STD experts	A township in Cape Town selected and the context of the epidemic 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	Adapted approved HTA protocol including methods, sampling strategy, data collection forms, interviewer manual, table shells, lists of expected types of sites and target number of key informants by type
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 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 responsible person onsite	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: <ul style="list-style-type: none"> <li>• Rate of new &amp; total partnerships</li> <li>• Condom use</li> <li>• Frequency of site attendance</li> <li>• Sociodemographic characteristics</li> <li>• Pattern of new partner selection</li> </ul>
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.

Data from the community were collected in three waves of field work. In the first wave, interviewers identified and interviewed key informants in the community. The purpose of the key informant interviews was to identify sites where residents of the township go to meet new sexual partners. We asked where people go to meet new sexual partners to find sites where an intervention program could access people with the high rates of new partnership

formation. Asking key informants to only identify sites where sex workers solicited clients would exclude too many sites and require defining sex work. Asking key informants to identify sites where people meet any sexual partners would widen the scope to include sites where sexually active people socialize, including those without multiple partners.

Interviewers scheduled appointments with community leaders, approached STD patients waiting to see a health care provider, approached youth in the streets, asked drivers at taxi stands to point out knowledgeable taxi drivers, and approached other people at a time that seemed mutually convenient (e.g., bar workers during morning hours). Interviewers requested verbal informed consent for voluntary anonymous participation. No incentives for participation were offered. Those who consented were asked to name sites where township residents meet new sexual partners. Identification of all sites in the township was encouraged, not just “hot spots.”

The second wave of fieldwork occurred after a unique list of sites was compiled from the hundreds of site reports obtained during the key informant interviews. Interviewers visited each reported site to verify its existence and location. During this visit, an interviewer asked a person knowledgeable about the site (such as a bar manager or owner) whether he or she believed that people come to the site to meet new sexual partners and questions to characterize the site for AIDS prevention programming. These included questions about the type of site, patron characteristics, the extent of on-site AIDS prevention activities, and condom availability. The interviewer also asked for permission to return to the site and interview individuals socializing at the site. At sites reported by five or more key informants and a sample of the remaining sites, additional questions about the characteristics of the sites

were asked to estimate the number of people at the site and additional characteristics of patrons.

Verified sites were marked on an air photo of the township that was at sufficient resolution to discriminate key landmarks and buildings. The air photo was scanned into ARC-View and the site points linked to interview data. Estimates of the proportion of township residents aged 15-39 visiting the sites were made from counts of people at a sample of sites, the age, gender and residence of people interviewed at these sites, and census data from the township.

In the third wave of fieldwork, we conducted interviews with people socializing at sites that were reported by five or more key informants. We also interviewed people socializing at a geographically representative sample of sites less frequently reported. The target number of respondents per selected site was 16 men and eight women. Interviewers selected respondents according to where they were standing or sitting at the site using a method that distributed the interviews throughout the site and that could be feasibly administered by a team of two interviewers, regardless of the type of site.

Data were keyed at the University of Cape Town using Epi-Info.<sup>19</sup> Initial analysis and data management were done using SAS<sup>20</sup> at the University of North Carolina. We used STATA<sup>21</sup> to adjust individual-level data to take into account appropriate sampling weights. The air photo was scanned into ARC-View and the sites linked to interview data. Exploratory analysis to map mixing patterns among sites was done using ARC-View.

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**Results****1. Description of the Social Context of the STD/HIV Epidemic****a. Population Structure**

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.<sup>22</sup> 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 ceremony<sup>23</sup>. 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.

**b. Overview of the social/political economic situation**

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 seven 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 workers 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 report 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.<sup>24</sup> 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.

## **2. Public health infrastructure and STD services**

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.



### 3. Place-Based Description of Sexual Networks: Where people meet new sexual partners

We characterized sexual networks according to the type and location of sites reported by key informants where new partnerships are formed, mixing between the sites, and the rates of partner formation at the sites. A total of 313 key informants were interviewed over a ten-day period by a team of seven field workers. About two-thirds of the key informants were youth, taxi drivers and patients at the STD clinic. The others included the police, public officials, nurses, and business owners. Forty percent of the key informants were female. 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. Only 12 percent were not residents of the township. Field workers could not locate any self-identified sex workers to interview. Only two key informants did not report any site; the mean number of sites reported per key informant was 2.7.

The second wave of fieldwork required eight days of intensive fieldwork during which 12 field staff tried to locate the 363 sites reported by the key informants. Of the 363 sites, 86 percent were located, the address verified or corrected if necessary, the site characterized and a responsible person onsite such as a bar manager interviewed. Figure 1 shows the sites reported within the township identified on an air photo. Over three-fourths of the sites were *shebeens* (Table 2). A *shebeen* is typically a four-room house in a residential area that has been converted to accommodate illegal beer and alcohol sales and consumption. About 14 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 takeaway 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, escort services, or commercial sex in the township. Twenty-eight sites were reported by five or more key informants. Almost half of these were taverns even though taverns represented only about 15 percent of the total number of sites reported.

About three-fourths of those interviewed reported that people do come to the site to meet new sexual partners. About 40 percent reported that people only come to the site from one of the nine sections of the township. About 12 percent reported that people come from outside the township to the site. About 20 percent reported that people come from all over the township to the site.

When managers at a subset of sites were asked more qualitatively to characterize patrons, the most frequent response was “Everybody.” Almost half spontaneously responded either “students” or “youth.” 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. More than 40 percent of those interviewed reported that youth younger than 16 visit the site. Over 10 percent reported that women younger than 16 visit the site. Beer and alcohol were consumed at all of these sites.

Fewer than two percent of the 313 sites had any onsite AIDS prevention activities such as educational materials, peer education programs or regular visits from health outreach workers. Over ninety percent never had condoms available onsite, although 22 percent of

those interviewed reported that condoms were available nearby. Almost 60 percent of those interviewed reported that they would be willing to sell condoms.

In the third wave of field work, a total of 738 men and 378 women were interviewed at 26 of the 28 sites reported by five or more key informants and at a geographically representative sample of 23 of the remaining sites during eight late afternoons and evenings. (Where the target number of 24 interviews was not reached in a site, it was usually because there were fewer than 16 men and 8 women onsite at the time of the interview.) No important differences in behavior emerged between those interviewed at frequently reported sites and those interviewed at less frequently reported ones. Consequently, we merged the data using the appropriate sampling weights.

The mean age of men and women was approximately 30, although a greater proportion of women was younger than 25 (Table 3). Over 85 percent of respondents were residents of the township (Table 3), although women were more likely than men to be from outside the township. Over half had lived all their life in 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. Very few people reported that the evening of the interview was their first time to visit the site (Table 4). 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 men and women replied affirmatively (Table 4). About 40 percent of the men and 30 percent of the women reported personally having met a new partner at the site, and about half of these reported that they had met a new partner at the site within the past three months. 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 54 percent of the women reported going outside the township to meet new sexual partners.

Maps of the sites identify up to seven different areas (depending on the definition of clustering used) within the township where sites cluster. We explored the characteristics of the cluster of sites in the north of the township. In that area, there are more than 50 sites within a 500 meter radius of any point in the cluster (Figure 2). In the center of the cluster are two large former migrant worker hostels (the pentagon and rectangular shapes in the north on the air photo). Site managers at the sites in this cluster reported that people mostly come to the sites from the adjacent sections of the township, but that about five percent come from outside the township. Twenty percent of the managers in these sites reported that patrons come from all over the township (Figure 3).

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.

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 5). These self-reported rates were higher for men than for women. Men reported a mean of 2.3 different 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. 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.

About half of men reported having more than one partner in the past week, and among these men, almost all reported that at least one of these partners was new in the past four weeks. Over 40 percent of women reported having more than one sexual partner in the past four weeks and of these, almost all reported a new partnership in the past four weeks.

Key indicators useful for AIDS prevention programs identified from these data include:

- the number of sites identified in the township where people meet new sexual partners— 363 sites;
- the percentage of sites with condoms available – 3 percent;
- the mean rate of new partnership formation at sites in the past four weeks by gender – 1.2 for men and 0.9 for women;
- the proportion socializing at sites who have ever used a condom by gender – 52 percent for men and 59 percent for women;
- the proportion using condoms at most recent coitus – 29 percent for men and 36 percent for women; and

- the proportion using condoms with the most recent sexual partner from the site--35 percent of men and 38 percent of women.

## Discussion

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.<sup>25</sup> In addition, these reported rates of partner acquisition are much higher than those reported nationally in South Africa.<sup>26</sup> 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 by identifying general areas and specific sites within those areas for intervention. 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 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.<sup>27</sup> 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 sexworkers (male or female), transport workers, the military, or drug abusing populations (except alcohol abusers) would have missed the township entirely.

Identifying where people go to meet sexual partners rather than asking about groups which may carry some stigma (e.g., commercial sex workers, drug abusers, gay and bisexual populations) so far appears acceptable in a community. 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 primarily focused, however, on asking where people go to meet new sexual partners, 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.

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. 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 number of people counted at the sites, we estimated that 14,700 men and 7,200 women were present on a single evening at the 313 sites during site visits. Based on the proportion of individuals aged 15-39 socializing at sites who reported being residents of the township, approximately 12,500 of the men (85.3 percent) and 5,300 of the women (73.8 percent) were residents of the township and aged 15-39. Assuming a 3 percent growth rate since the 1996 census of the township, about two-thirds of men age 15-39 in the township and 30 percent of the women 15-39 socialize at the sites. 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.



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, another township in South Africa and a rural district in Tanzania. 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.

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.

In summary, this method appears promising for focusing interventions. The method involves quantitative and qualitative methods and reflects a multidisciplinary approach including

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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.

<b>Number of sites</b>	<b>313</b>		
<b>Percent reporting that people meet new sexual partners at the site</b>	74.1	<b>Condom availability (% Yes)</b>	
<b>Type of Site</b>		Any condoms onsite at time of visit	2.9
Tavern	14.5	Any condoms nearby	22.3
Shebeen	78.1	Condoms always available here	0.6
Community Hall	0.6	Condom sometimes available here	6.2
Church	0.6	Condoms never available here	93.2
Night Club	0.6	Respondent willing to sell condoms at site	58.7
Takeaway	1.6	<b>Sexual Mixing</b>	
Garage	0.3	Where do people come from who come to this site?	
Shack	0.3	From outside Township &	
Salon	0.3	From All over Township	4.2
Total	100.0	From 3-4 zones in Township	1.6
		From 0-2 zones in Township	5.4
<b>AIDS Activities on Site (% with )</b>		Not from outside Township but:	
Any educational materials	1.3	From all over Township	17.6
Any AIDS prevention activities	1.6	From 3-4 zones in Township	16.0
Any AIDS talks	1.0	From 2 zones in Township	14.1
Any peer education	0.0	From 1 zone in Township	39.9
Any health outreach worker visits	0.3	No specific areas mentioned	1.3
		Total	100.0
<b>Number of people counted at the site</b>	(n=46 sites)		(n=46 sites)
<b>Men:</b>		<b>Women</b>	
Mean	43	Mean	20
Median	24	Median	10
<b>Onsite Activities</b>	(n=46 sites)	<b>Characteristics spontaneously mentioned when asked to describe patrons of site</b>	(n=46 sites)
<b>(% answering yes)</b>			
Men "fish" onsite for sexual partners?	77.3	Everybody	34.8
Women "fish" onsite for sexual partners?	77.3	Students	21.7
Facilitator available for finding partner?	38.1	Youth	26.1
Beer consumed?	100.0	Non residents of Township	17.4
Alcohol consumed?	100.0	Residents of Township	13.0
TV or Video on site?	40.9	Business men	13.0
Sex workers solicit on site?	9.1	Professional people	8.7
Sex occurs on site?	0.0	Unemployed	13.0
		Older people	4.4
		Men only	4.4
		People of all ages	8.7
		Migrant workers	8.7
		People with low education	0.0

**Table 3 Characteristics of Men and Women Socializing at Sites**

	<b>Men (N=738)</b>	<b>Women (N= 378)</b>		<b>Men (N=738)</b>	<b>Women (N= 378)</b>
<b>Age</b>			<b>Years residing in Township</b>		
15-19	2.8	3.8	<1 year	2.4	4.4
20-24	17.1	23.7	1 year	1.6	1.1
25-29	32.2	31.7	2-4 yrs	8.9	5.7
30-34	24.0	22.9	5-10 yrs	13.5	8.1
35-39	15.4	10.2	>10 yrs	11.7	11.0
>= 40	<u>8.4</u>	<u>7.7</u>	all life	53.5	51.2
Total	100.0	100.0	Does not reside in Township	<u>8.4</u>	<u>18.5</u>
<b>Mean Age</b>	<b>30.1</b>	<b>29.1</b>	Total	100.0	100.0
<b>Current residence</b>			<b>Educational Attainment</b>		
Township	91.6	81.8	None	0.0	0.6
Elsewhere in Cape Town	8.0	17.2	< Standard 5	5.8	4.9
Elsewhere in South Africa	0.3	0.5	Standard 6-8	26.0	28.9
Outside South Africa	<u>0.0</u>	<u>0.5</u>	Standard 9-10	49.8	49.8
Total	100.0	100.0	Tertiary	<u>18.0</u>	<u>15.7</u>
<b>Employment Status</b>			Total	100.0	100.0
Employed	55.0	61.0			
Not Employed	<u>45.0</u>	<u>39.0</u>			
Total	100.0	100.0			

**Table 4 Sexual Partnerships at Sites According to Individuals Socializing at Sites**

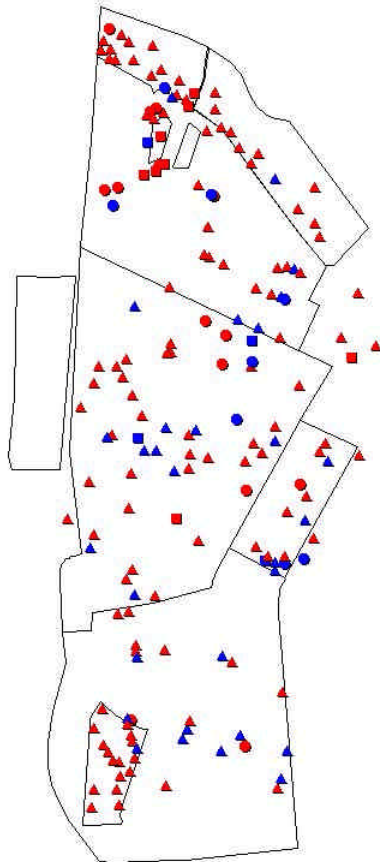
	<b>Men (n=738)</b>	<b>Women (n=378)</b>
Do you believe people come here to meet new partners?		
Yes	80.4	81.6
No	<u>19.7</u>	<u>18.5</u>
Total	100.0	100.0
Have you ever attracted a partner at this site?		
Yes	41.0	29.4
No	<u>59.0</u>	<u>70.6</u>
Total	100.0	100.0
Frequency of attendance at site		
First time	3.5	8.2
<1 time per month	7.2	11.8
1-2 times per month	17.8	21.8
3-5 times per month	21.6	18.8
6-10 times per month	18.4	14.7
>10 times per month	<u>31.6</u>	<u>24.7</u>
Total	100.0	100.0
When did you last attract a partner at this site?		
Past month	11.8	8.9
2-3 months ago	11.5	10.0
4-6 months ago	6.8	4.6
7-12 months ago	9.6	1.8
Over a year ago	1.4	3.5
Never	<u>58.8</u>	<u>71.2</u>
Total	100.0	100.0
Ever used a condom?		
Yes	51.7	59.2
No	<u>48.4</u>	<u>40.9</u>
Total	100.0	100.0
Condom used most recent sex?		
Yes	29.2	35.9
No	23.5	25.8
Never used a condom	<u>47.3</u>	<u>38.4</u>
Total	100.0	100.0
Condom use with your most recent partner from here?		
Yes	19.7	16.8
No	36.7	27.5
No partner from here	<u>43.7</u>	<u>55.6</u>
Total	100.0	100.0
Any most recent 3 partners attracted at site		
Yes	37.5	29.6
No	<u>62.5</u>	<u>70.4</u>
Total	100.0	100.0
Whether goes to any area in township to meet new partners		
Yes	57.0	50.4
No	<u>43.0</u>	<u>49.6</u>

	<b>Men (n=738)</b>	<b>Women (n=378)</b>
Total	100.0	100.0
Whether goes outside the township to meet new partners		
Yes	60.3	53.8
No	<u>39.7</u>	<u>46.2</u>
Total	100.0	100.0
Whether goes in and outside the township to meet new partners		
Yes	37.1	30.1
No	<u>62.9</u>	<u>69.9</u>
Total	100.0	100.0

Table 5 Rates of Partnership Formation

	Men (n=738)	Women (n=378)		Men (n=738)	Women (n=378)
<b>Number of Partners in past 4 weeks</b>			<b>Number of New partners in past 4 weeks</b>		
0	1.4	2.3	0	36.2	38.4
1	45.6	55.4	1	32.2	44.8
2	18.0	21.7	2	17.2	12.8
3	15.7	14.3	3	9.2	2.3
4 – 9	18.2	5.7	4 – 9	<u>5.2</u>	<u>1.7</u>
10 – 14	0.9	0.6	Total	100.0	100.0
>15	<u>0.3</u>	<u>0.0</u>			
Total	100.0	100.0			
<b>Mean</b>	<b>2.3</b>	<b>1.8</b>	<b>Mean</b>	<b>1.2</b>	<b>0.9</b>
<b>Median</b>	<b>2</b>	<b>1</b>	<b>Median</b>	<b>1</b>	<b>1</b>
<b>Range</b>	<b>0-16</b>	<b>0-12</b>	<b>Range</b>	<b>0-9</b>	<b>0-7</b>
<b>Number of Partners in past year</b>			<b>Number of New partners in past year</b>		
0	0.6	2.7	0	12.0	19.9
1	23.1	37.9	1	25.1	37.4
2	10.7	15.0	2	22.9	19.4
3	20.2	15.5	3	12.6	10.1
4 – 9	31.8	22.0	4 – 9	23.9	12.1
10 – 14	8.9	3.6	10 – 14	3.0	1.1
>15	<u>4.6</u>	<u>3.2</u>	>15	<u>0.5</u>	<u>0.0</u>
Total	100.0	100.0	Total	100.0	100.0
<b>Mean</b>	<b>5.0</b>	<b>3.5</b>	<b>Mean</b>	<b>2.8</b>	<b>1.9</b>
<b>Median</b>	<b>3</b>	<b>2</b>	<b>Median</b>	<b>2</b>	<b>1</b>

# Figure 1: Air Photo



**Patrons Meet New Partners and No Condoms Available by Site Type**  
 AIDS HTA Study  
 A Township in Cape Town, South Africa



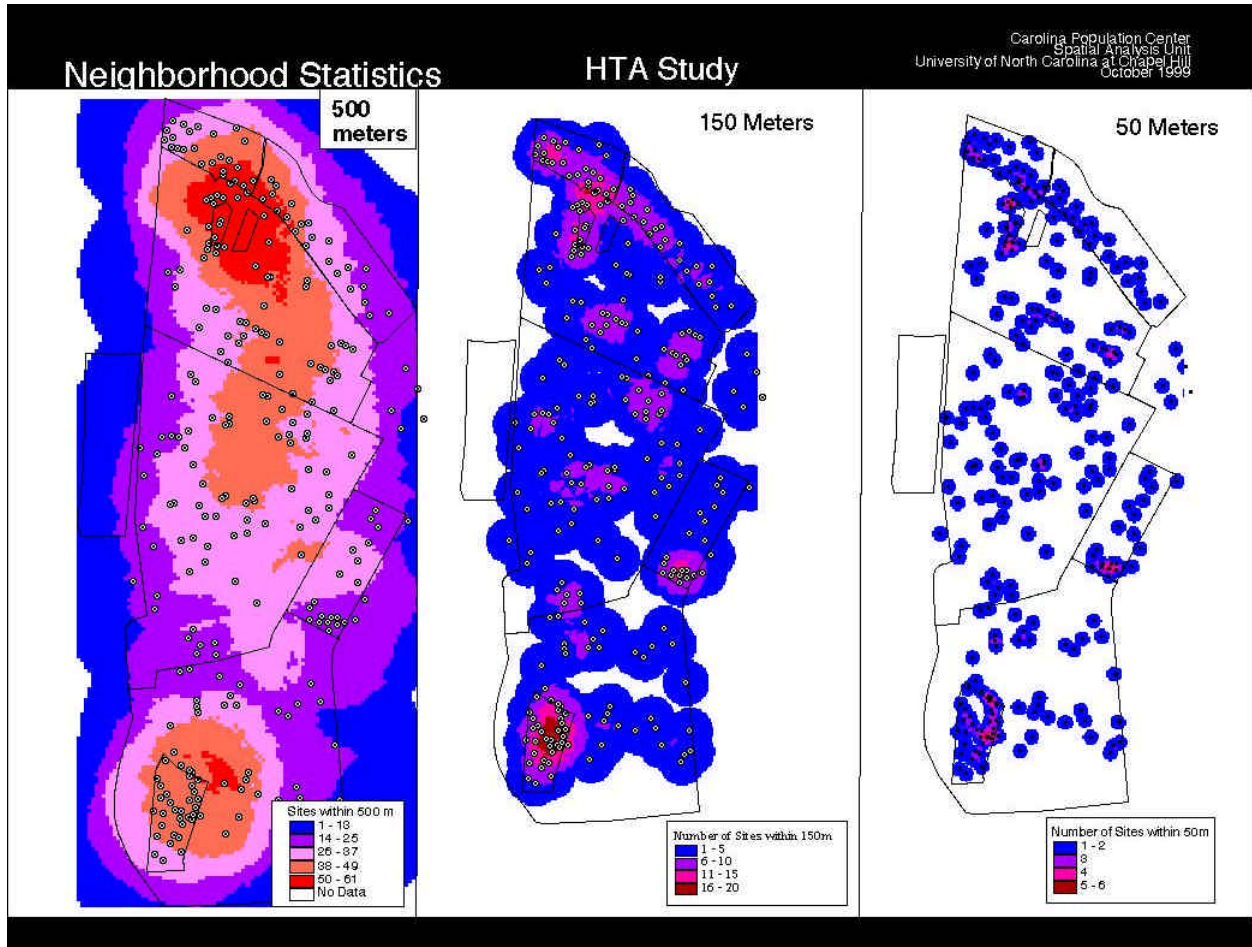

University of North Carolina at Chapel Hill      University of Cape Town

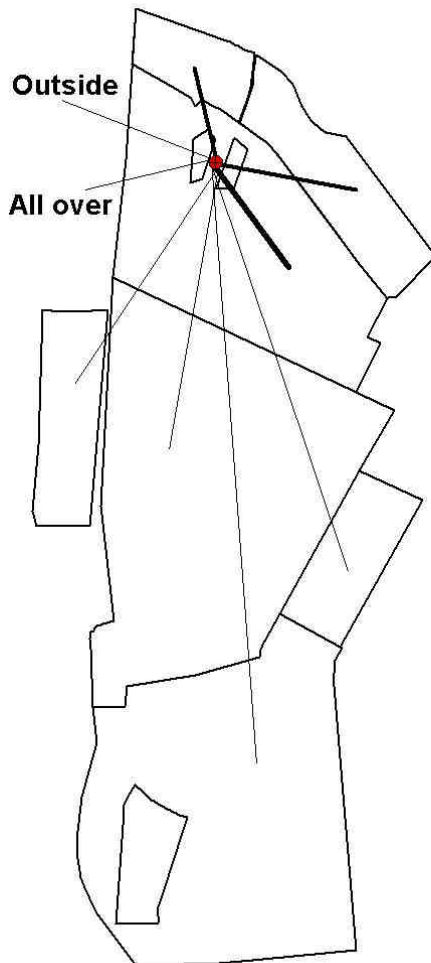
**Legend**  
 Meet New Partners and Condoms Available

Type of Site	No	Yes
Bar	●	●
Shebeen	▲	▲
Other	■	■



# Figure 2



**Figure 3**

**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.**

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**REFERENCES**

- <sup>1</sup> Yorke JA, Hethcote HW, Nold A. Dynamics and control of the transmission of gonorrhea. *Sex Transm Dis* 1978;5:51-7.
- <sup>2</sup> Garnett GP, Anderson RM. Sexually transmitted diseases and sexual behavior: insights from mathematical models. *JID* 1996;174 (Suppl 2) s150-s161.
- <sup>3</sup> Wasserheit JN, Aral SO. The dynamic topology of sexually transmitted disease epidemics: implications for prevention strategies. *J Infect Dis* 1996 Oct;174 Suppl 2:S201-13
- <sup>4</sup> Anderson R. Transmission dynamics of sexually transmitted infections. In: Holmes KK, Sparling PF, Mardh P-A, Lemon SM, Stamm WE, Piot P, Wasserheit J(eds). *Sexually Transmitted Diseases, Third Edition*. New York: McGraw Hill, 1999:25-37.
- <sup>5</sup> Morris M, Kretzschmar M. Concurrent partnerships and the spread of HIV. *AIDS* 1997; 11(5):641-8
- <sup>6</sup> Koopman JS, Jaquex JA, Welch GW, Simon CP, Foxman B, Pollock SM, Barth-Jones D, Adams AL, Lange K. The role of early HIV infection in the spread of HIV through populations. *Jour Acquired Immune Deficiency Syndrome and Human Retrovirology* 1997;14:249-258.
- <sup>7</sup> Woodhouse DE; Rothenberg RB; Potterat JJ; Darrow WW; Muth SQ; Klovdahl AS; Zimmerman HP; Rogers HL; Maldonado TS; Muth JB; et al. Mapping a social network of heterosexuals at high risk for HIV infection. *AIDS* 1994 Sep;8(9):1331-6
- <sup>8</sup> Ghani AC, Donnelly CA, Garnett GP. Sampling biases and missing data in explorations of sexual partner networks for the spread of sexually transmitted diseases. *Stat Med*. 1998 Sep 30;17(18):2079-97.
- <sup>9</sup> Coetzee N, Matthews C, McCoy D. Partner notification in the management of sexually transmitted diseases—options for South Africa. *SAMJ* 1996;86:1478-1479.
- <sup>10</sup> Coetzee N, Visser H, Mofokeng M, Hennink M. Missed opportunities for partner notification in sexually transmitted disease clinics in Cape Town. *Southern Afr Jour of Epi and Inf* 1996;11: 44-47.
- <sup>11</sup> Boerma JT, Urassa M, Klokke AH, Senkoro KP, Ng'weshemi JZL. Spread of HIV in a rural area in Tanzania. *AIDS*. 1999 Jul 9;13(10):1233-40.

- <sup>12</sup> Carael M. Urban-rural differentials in HIV/STDs and sexual behaviour. In: Herdt G (editor). *Sexual cultures and migration in the era of AIDS: anthropological and demographic perspectives*. Oxford: Oxford University Press. 1997: 107-126.
- <sup>13</sup> Barongo LR, Borgdorff MW, Mosha F et al. The epidemiology of HIV-1 infection in urban areas, roadside settlements and rural villages in Mwanza Regon, Tanzania. *AIDS* 1992, 6: 1521-8.
- <sup>14</sup> Wawer M, Serwadda D, Musgrave SD, Konde-Lule JK, Musagara M, Sewankambo NK: Dynamics of the spread of HIV-1 infection in a rural district of Uganda. *BMJ* 1991, 303: 1301-6.
- <sup>15</sup> Anderson RM, May RM, Boily MC, Garnett GP, Rowley JT. The spread of HIV1 in Africa: sexual contact patterns and the predicted demographic impact of AIDS. *Nature* 1991, 352: 581-589.
- <sup>16</sup> Kipp W, Kabwa P, Verback A et al. Prevalence and risk factors of HIV-1 infection in three parishes in western Uganda. *Trop Med Parasit* 1995, 46: 141-6.
- <sup>17</sup> Mwizarubi B, Hamelmann, Nyamuryekung'e K. Working in high transmission areas: truck routes. In: Ng'weshemi JZL et al. (eds.) *HIV prevention and AIDS care in Africa: a district level approach*. Royal Tropical Institute Press: Amsterdam. 1997: 137-149.
- <sup>18</sup> Boerma T, Urassa M. Situation analysis for a district HIV/AIDS programme. In: *HIV prevention and care in Africa: A district level approach*, 1997, Royal Tropical Institute, Amsterdam, p39-50.
- <sup>19</sup> Epi-Info, Version 6. Division of Surveillance and Epidemiology, Epidemiology Program Office, Centers for Disease Control, Atlanta, Georgia 30333.
- <sup>20</sup> SAS Version 7, SAS Institute, Cary North Carolina.
- <sup>21</sup> StataCorp. 1999. *Stata Statistical Software:Release 6.0*. College Station, TX:Stata Corporation.
- <sup>22</sup> Statistics South Africa. *The People of South Africa Population Census: Census in Brief*. Report No:03-01-11[1996].
- <sup>23</sup> Census data for the township were obtained from the Western Cape Provincial office of Statistics South Africa. Data were gathered in October, 1996.
- <sup>24</sup> South Africa Demographic and Health Survey, 1998. Preliminary Report, p 23.

- <sup>25</sup> Brunham RC, Plummer FA. A general model of sexually transmitted disease epidemiology and its implications for control. *Med Clin North Am* 1990;74:1339-52.
- <sup>26</sup> South Africa Demographic and Health Survey, 1998. Preliminary Report, p 15.
- <sup>27</sup> Aral SO, Holmes KK, Padian NS, Cates W Jr. Overview: individual and population approaches to the epidemiology and prevention of sexually transmitted diseases and human immunodeficiency virus infection. *Sex Transm Dis* 1996;154(Suppl 2):S127-S133.