Where the action is: monitoring local trends in sexual behaviour

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Objectives: To assess the role in an overall monitoring strategy of the PLACE method of estimating local trends in sexual behaviour among individuals at social venues in areas at increased risk of HIV transmission.

Methods: Public venues identified by community informants as places where people meet new sexual partners were visited and characterised in Karaganda, Kazakhstan, in 2002 and 2003, and in a township in South Africa in 2000 and 2003. At a subset of venues, a representative sample of individuals socialising at the venue were interviewed about their sexual behaviour. The age distribution and partnerships rates of those socialising at these venues were compared by year and with national data from Kazakhstan and South Africa obtained via household surveys.

Results: Women and men socialising at venues were younger and had higher rates of new and concurrent partnerships than men and women interviewed in national household surveys. There was little apparent change in sexual behaviour between 2002 and 2003 in Karaganda. In the South African township, there was a reduction in sexual partnerships and an increase in condom use, possibly due to a local AIDS prevention programme.

Conclusion: Findings from the PLACE method supplement national data on sexual behaviours with data from key populations in high transmission areas, inform local targeting of interventions, and, when subsequent rounds of PLACE are implemented, can evaluate change in target populations.

With the promise of increased global resources for HIV prevention and care, increasing attention is focused on measuring national trends in sexual behaviour.[1] Monitoring trends in sexual behaviour in countries where HIV has spread beyond the high risk populations has generally been based on data from repeated household surveys of the general population[2–5] of reproductive ages 15–49 years, often using data from Demographic and Health Surveys (DHS). Although national indicators serve a useful purpose, local trends in sexual behaviour in areas of the country likely to have the highest incidence of HIV infection have considerable pragmatic value for programme planning. This is because there is often a large geographical variation in the prevalence of infection within a country, suggesting that the HIV epidemic in a country is more accurately conceptualised for prevention planning as a collection of local epidemics at different epidemic stages,[6] rather than as a single national epidemic. Indeed, some have argued that programmes to prevent HIV transmission should be guided by local epidemiological and socioeconomic conditions.[7]

OBJECTIVES

The purpose of this paper is to assess the strengths and limitations of a method developed to monitor local trends in sexual behaviour, with illustrative results from two sites. The method was designed for implementation in critical geographical areas where available contextual and epidemiological surveillance suggest HIV incidence is likely to be high. Within these areas, the Priorities for Local AIDS Control Efforts (PLACE) method identifies, maps, and characterises public venues where people meet new sexual partners, and estimates the extent of new partnership formation, concurrent partnerships, sexual mixing, and condom use among the population socialising at these venues.[8] Subsequently, it provides information to local intervention groups about where to reach individuals most likely to acquire and transmit HIV. This approach differs from a national approach by limiting the geographical scope of the indicator to focus on areas where the impact of prevention efforts is likely to be greatest. It differs from other targeted behavioural surveillance surveys[9] by defining the study population based on attendance at sexual network venues within these ''high transmission areas'' rather than based on membership in a risk group defined by sexual behaviour (for example, men who have sex with men, sex workers, clients of sex workers), occupation (truck drivers, military personnel) or school status (in-school youth, out-of-school youth).

In this analysis, we present local trends in sociodemographic characteristics, sexual partnerships, and condom use among the target population identified by the PLACE method in two very different urban areas, and note the differences between the characteristics of these target populations and the characteristics of the general population as estimated by recent national household surveys. PLACE assessments were conducted in Karaganda, Kazakhstan, in 2002 and 2003. Karaganda (population 440 000) was selected for a PLACE assessment because of its location along a heroin drug trafficking route and concern over sexual mixing between injecting drug users and commercial sex workers. Basic information was obtained in the 2002 baseline PLACE assessment, but another round of PLACE assessments were conducted in 2003 in order to obtain additional information about the characteristics of the populations and venues (not reported here) and to assess the reliability of the PLACE method.

PLACE assessments were also conducted in a township in East London, South Africa (population 100 000), in 2000 and 2003. South African townships are densely populated

Abbreviations: DHS, Demographic and Health Surveys; HSRC, Human Sciences Research Council; PLACE, Priorities for Local AIDS Control Efforts.

residential areas formerly restricted under apartheid to black South Africans, where housing, infrastructure, and employment—albeit improving—remain inadequate. In the Eastern Cape Province where East London is located, HIV prevalence among antenatal women increased from 6% in 1995 to 20.2% in 2000,[10] the year of the initial PLACE assessment. Findings from the baseline PLACE assessment[11] were used to focus a community based intervention under the direction of the East London municipal government. The intervention included outreach to venues identified by PLACE, peer education at venues using songs and drama, community meetings, and improved condom distribution to venues. The follow up PLACE assessment in 2003 sought to assess changes in the number of sexual partners and condom use.

METHODS

The PLACE method was implemented similarly in Karaganda, Kazakhstan, and an East London township in South Africa, although with some important differences. In both places, field work was implemented in three phases. Firstly, interviewers asked hundreds of community informants assumed to be knowledgeable about the area (for example, taxi drivers, police, unemployed men, bar workers, security guards) to provide the name and location of local public venues where they believed people meet new sexual partners. In Karaganda, given the importance of transmission among injecting drug users, community informants were also asked to identify public venues where injecting drug users could be found by outreach workers. A complete list of venues was compiled from the venues reported by the community informants. Secondly, interviewers visited each venue to verify its existence and to obtain information about the venue from a knowledgeable person on site, such as the manager or a regular patron. These people were asked about condom availability at the venue, the number of people socialising at the venue during a busy time, and what activities occur at the venue. In Karaganda, all public venues were visited except venues that were abandoned rooftops, basements, or stairwells, and venues that were reported by only one community informant. A primary purpose of the PLACE assessments was to identify public venues where outreach workers could access target populations. Stairwells, basements, and rooftops were excluded because it was unlikely that effective prevention programmes could be fielded at those locations. In East London, all public venues reported were visited except schools and churches.

In the third phase of field work, brief, structured face to face interviews with people socialising at a sample of venues were conducted at busy times, typically Friday and Saturday nights. Verbal informed consent was obtained prior to interview. In Karaganda, interviews were conducted each year among men and women aged 18 years and older at a random sample of the venues that were successfully located and at all venues reported by 15 or more community informants. The number of interviews conducted at a venue was based on the expected number socialising at a busy time as reported by the knowledgeable person at the venue. Ten people were interviewed at venues expected to have fewer than 20 men at the site; 20 people at venues with 20–49 men; and 30 people at venues where more than 50 were expected during a busy time. The number of male and female respondents was determined at each venue based on the male:female ratio at the venue. Each year, an independent sample of venues was taken from the list of venues identified that year.

In South Africa, PLACE interviews were conducted in 2000 and 2003 with men and women aged 15 years and older at busy times at venues that were the most frequently reported by community informants and at a stratified random sample of the remaining venues. Venues selected randomly were selected with the probability of selection roughly proportional to the expected number of people socialising at the venue. At each site, approximately 16 men and eight women were interviewed, reflecting the overall expected male:female ratio of 2:1. In both South Africa and Kazakhstan, interviewers were trained to identify potential respondents according to a strategy that sought to recruit respondents from throughout the venue and minimise interviewer discretion in selecting respondents by convenience. When venues were deemed unsafe at busy times (for example, a crowded bar at night in a high crime area), interviewers completed the field work earlier in the day.

The PLACE protocols were approved by the Institutional Review Board at the University of North Carolina. PLACE data were collected and keyed locally. In this analysis, survey commands in Stata were used to estimate the sociodemographic and behavioural characteristics of the socialising population controlling for the venue at which the interview was conducted. Data from venues selected randomly are combined with data from venues whose selection was based on the number of times the venue was reported, using appropriate weights. The methods used within a city at the two time periods to identify respondents within a venue were similar and the same interviewing teams were used each year in both cities.

We compared the age distribution and rate of sexual partnerships obtained from the PLACE assessment with national partnership rates as estimated by the 1999 Kazakhstan DHS[12] of men and women, the 1998 South Africa DHS of women,[13] and the 2001 Nelson Mandela Human Sciences Research Council household survey (HSRC)[14] of men and women. These household surveys share the following important features of study design: respondents are selected from a national probability sample of households; questionnaires cover a wide range of health topics including family planning, nutrition, and pregnancy history; interviews are conducted in or near household residences, and identifying information is obtained from the head of household about all usual household members. Comparable measures include sexual abstinence in the past year, the number of sexual partners in the past year, and the proportion reporting a new sexual partner in the past four weeks and past year. The purpose of the comparison is to show the extent to which the population socialising at venues in high transmission areas differs in demographic characteristics and sexual behaviours from the general population reached in household surveys.

RESULTS

Karaganda, Kazakhstan

In 2002, 28 interviewers completed the PLACE assessment in 24 days at a local cost of $25 000. In 2003, 23 interviewers completed the assessment in 19 days at a cost of $17 000. The 900 community informants interviewed in 2002 identified 284 venues that met the criteria for a site visit and were subsequently visited (table 1). In 2003, approximately 700 community informants identified 289 venues that were visited. Approximately a quarter of venues in both years were bars, cafes, and restaurants. Between the two assessments there was an increase in the proportion of venues where sex work was reported and an increase in the proportion of venues where condoms were available on the day of the visit.

In 2002, 897 men and 752 women socialising at 107 different venues were interviewed about their sociodemographic characteristics, sexual behaviour, and injecting drug use (table 2). In 2003, 458 men and 420 women were interviewed at 60 venues. The sociodemographic characteristics of

Table 1 Results from PLACE assessments in Karaganda, Kazakhstan in 2002 and 2003: characteristics of venues recorded during interviewer visits to venues (Phase 2)

	Venues (%)	
Reported by knowledgeable person	2002 (n = 284)	2003 (n = 289)
Men meet men at the venue	8.8	7.3
Sex workers solicit clients at the venue	26.8	45.7
IDUs socialise at the venue	50.4	64.0
IDUs socialise and sex workers solicit clients	15.9	35.3
Condoms were currently available at the venue	19.4	35.0
AIDS prevention activities had occurred at the site	7.0	10.0
Discarded used syringes had been observed at the venue in past 3 months	33.5	42.9

the men and women were similar in 2002 and 2003. Over one third were 18–24 years of age; fewer than half were married or cohabiting; over 10% were students; and almost a third reported visiting the venue daily. Slightly more men than women were employed full time.

New and multiple sexual partnerships were common. Approximately a third of men and women in both years reported having ever met a new sexual partner at the venue. About 40% of men and women in 2002 and about 50% of men and women in 2003 reported having had a new sexual partner in the past four weeks. This increase was highest among women aged 18–24 years where the proportion reporting a new sexual partner in the past four weeks increased from 48% to 71% (data not shown). Of those with two or more new partners in the past four weeks, most of the women (86%) and half of the men reported engaging in commercial sex at least once within the past three months.

In spite of the fact that condoms were more available on-site in 2003 and more respondents socialising at venues could show the interviewer a condom when asked, ever use of condoms apparently did not increase between 2002 and 2003. The proportion of men reporting injection drug use in the past six months, however, increased from 21% of respondents to 37%; over 15% of all men interviewed while socialising at venues reported both recent injection drug use and a recent new sexual partnership.

The rate of new and multiple partnerships reported in the Kazakhstan national household survey is much lower than that reported in the PLACE assessment (table 3). According to DHS data from Kazakhstan, 10% of men in the national household survey reported sexual abstinence in the past year including almost 30% of men age 18–24 years; 15% of men reported having more than two sexual partners in the past year; and 21% reported having a new sexual partner in the past year.

East London, South Africa

In East London, field work was conducted by a team of 14 interviewers in 2000 and 10 interviewers in 2003 over a period of four weeks at a local cost of approximately $25 000 each year. Approximately 300 community informants identified 235 venues in 2000 and 398 community informants identified 195 venues in 2003. Most were small local bars known as ''shebeens''. On-site condom availability increased fourfold from 10% to 40% of all venues (table 4). The proportion of venues reporting participation in an on-site AIDS prevention activity increased from 23% to 67%.

In East London, the characteristics of the men and women interviewed at venues in 2000 were similar in age, student status, and employment status to those interviewed in 2003 (table 5) except that women in 2003 were slightly younger. The median age of women attending venues decreased from 28 to 25 years. The overall reported number of partners and rate of new partner acquisition decreased somewhat between 2000 and 2003, with a large decrease reported by men and women aged 15–24 years. Among men aged 15–24 years, the proportion with two or more partners in the past four weeks decreased from 67% to 48%; the proportion reporting a new partner in the past year decreased from 65% to 45%; the proportion reporting a new partner in the past four weeks decreased from 40% to 23%. Among women aged 15–24 years, the proportion with a new partner in the last four weeks decreased from 45% to 24%. Commercial sex was infrequently reported. Among men who reported having two or more sexual partners in the past week, 93% denied exchanging money for sex; among the 16% of women who reported two or more partners in the past four weeks, 78% denied receiving money in exchange for sex. Ever use of

Table 2 Results from PLACE assessments in Karaganda, Kazakhstan in 2002 and 2003: characteristics of individuals socialising at venues at busy times (Phase 3)

	2002		2003	
	Men, % (n = 897)	Women, % (n = 752)	Men, % (n = 458)	Women, % (n = 420)
18–24 years old	42.3	56.4	45.6	47.4
Married or cohabiting	41.7	32.0	42.7	39.9
Employed full time	51.6	36.1	49.8	41.9
Students	18.0	20.8	15.7	13.3
Visit the site every day	31.2	29.4	32.9	32.8
Ever met a new partner at the venue	28.5	36.2	33.0	40.8
New sex partner in past 4 weeks	41.8	42.3	50.7	51.1
Two or more partners in past 4 weeks	40.3	42.2	49.3	52.7
New sex partner in past year	70.8	59.2	78.4	65.3
Gay sex in past 4 weeks	1.1	NA	2.9	NA
Commercial sex in past 3 months	26.9	30.1	24.0	36.0
Ever used a condom	18.4	22.4	16.9	14.7
Had a condom at the time of interview	9.8	14.4	25.2	26.2
Injected drugs in past 6 months	20.6	6.2	36.9	8.3
Injected drugs in past 6 months and had a new partner in past 4 weeks	16.0	5.7	19.2	4.9
Injected drugs in past 6 months and had commercial sex in past 3 months	5.9	4.0	4.3	3.0

NA, not applicable (question not asked of respondents).

condoms almost doubled between 2000 and 2003 for men and women.

In South Africa, the number of partners reported by women in the DHS household survey was very similar to that reported in the HSRC household study and much lower than the number reported by women interviewed at social venues in the East London township (table 6). According to the national household survey data, approximately half of the women aged 15–24 years denied having any sexual partner in the past year and fewer than 5% in any age group reported more than one partner. Among women socialising at venues in East London, approximately 40% reported having two or more partners in the past 12 months and about a quarter reported having a new partner in the past four weeks. More than half of the men aged 15–24 years interviewed in the HSRC survey reported no sexual partnerships in the past year; only 10% of all ages reported more than one sexual partner in the past year. In contrast over half of men aged 15–24 years interviewed while socialising at PLACE venues reported more than one partnership in the past year and 40% in 2000 and 23% in 2003 reported a new partnership in the past four weeks.

DISCUSSION

Current evidence suggests that national household survey data have only limited value for estimating and comparing trends among important subgroups of the population, targeting local intervention response, and assessing the impact of interventions.[5] This may be partly related to measurement issues such as bias due to underreporting of risky sexual behaviour in household settings and partly due to design issues such as failing to adequately oversample subgroups of greatest interest. Models of HIV epidemics illustrate the importance of changes in behaviour of the small proportion of people with the highest rates of new sexual partnerships most likely to transmit HIV infection.[15] Unfortunately, members of these ''core groups'' are often underrepresented in household surveys. The PLACE protocol offers a cost effective method to supplement national data on sexual behaviour with data from key populations.

The target population in a PLACE assessment is the population of individuals socialising at social venues identified in an area judged to have an increased incidence of HIV infection based on surveillance and contextual data. As expected, a comparison with national household data shows that this socialising population is younger and more sexually active. Because the PLACE target population includes members of the locally important core groups—sex workers, men who have sex with men, clients of sex workers, mobile populations, out of school youth, or people not easily categorised who have many sexual partners—estimates of the behaviour of particular key populations can be obtained from the data as well as estimates of the extent of overlap in key population membership (for example, the proportion of injecting drug users who engage in commercial sex). Defining the target population based on venue patronage rather than risk group membership frees the investigation from having to pre-define risk group membership—an exercise that usually proves somewhat difficult (for example, definitions of sex workers, out-of-school youth, transport workers). Some of the individuals captured in a PLACE assessment clearly are not at risk of either acquiring or transmitting infection; however, over a third of those socialising at the venues reported meeting a new sexual partner at the site or having had a recent new partner. Commercial sex is clearly important in Karaganda and much less so in the township.

The PLACE target population is also an appropriate population for providing insight into the coverage and effectiveness of local AIDS prevention programmes. In a city without any apparent new AIDS prevention programmes, the PLACE method found little positive behaviour change in the sexual and injecting drug use populations socialising at venues identified as places where people meet new sexual partners or places where injecting drug users socialise. In fact, the proportion of women aged 18–24 years reporting recent new sexual partnerships and the proportion of men

Table 4 Results from PLACE Assessments in East London, South Africa in 2000 and 2003: characteristics of venues recorded during interviewer visits to venues (Phase 2)

	Venues (%)	
	2000 (n = 235)	2003 (n = 195)
Men meet men	2.6	5.1
Sex workers solicit clients	1.7	10.3
Condoms available on day of interview	9.8	39.5
AIDS prevention ever occurred	23.4	67.2

Table 3 Age and sexual partnerships reported by men and women socialising at PLACE venues in Karaganda in 2002 and 2003 compared with those reported by a nationally representative DHS sample in Kazakhstan in 1999

	Men			Women		
	Karaganda City		Kazakhstan	Karaganda City		Kazakhstan
	PLACE 2002 (n = 897)	PLACE 2003 (n = 458)	DHS 1999 (n = 1297)	PLACE 2002 (n = 752)	PLACE 2003 (n = 420)	DHS 1999 (n = 4318)
Age (% distribution)						
18–24	42.3	45.6	19.9	56.4	47.4	22.4
25–39	48.4	43.0	44.8	34.0	45.6	49.7
40+	9.3	11.4	35.3	9.6	7.6	27.9
Not sexually active in past 12 months (%)						
18–24 years	3.6	0.0	29.2	7.7	2.3	44.2
All ages	3.2	1.7	10.6	6.9	3.0	20.0
2+ partners in past 12 months (%)						
18–24 years	71.8	82.0	25.3	62.9	82.5	3.1
All ages	67.6	75.7	14.6	56.4	63.4	2.1
New partner in past 12 months (%)						
18–24 years	76.0	87.0	45.3	65.7	84.1	8.4
All ages	70.8	78.4	20.6	59.2	65.3	4.7

Table 5 Results from PLACE Assessments in East London, South Africa in 2000 and 2003: characteristics of individuals socialising at venues at busy times (Phase 3)

	2000		2003	
	Men, % (n = 1434)	Women, % (n = 641)	Men, % (n = 632)	Women, % (n = 424)
15–24 years old	30.0	29.8	34.5	48.4
Employed full or part time	48.2	35.5	58.5	32.7
Students	20.4	17.7	21.5	25.8
Visit the site every day	13.0	18.6	24.8	20.8
Ever met a new partner at the venue	21.8	18.9	24.7	22.4
New sex partner in past 4 weeks	32.5	27.2	22.9	18.7
New sexual partner in past year	53.8	43.0	40.1	38.3
Two or more partners in the past 4 weeks	27.5	20.9	21.4	15.8
Two or more partners in the past year	55.6	42.1	47.1	36.2
Commercial sex in past 3 months	NA	NA	3.6	6.7
Ever used a condom	33.7	31.8	60.0	57.6
Had a condom at the time of interview	4.0	1.7	10.9	8.5

NA, not applicable (question not asked of respondents).

reporting recent injecting drug use increased in Karaganda. In contrast, at venues in the East London township where a community based intervention has focused on reducing risk behaviours among patrons at these venues, the PLACE method revealed a welcome reduction in reported partnerships and increase in condom use. In both cases, the PLACE assessment provided maps to local AIDS prevention efforts on where prevention programmes are needed to reach those most likely to be members of spread networks.

The PLACE method has several weaknesses, however, that limit its usefulness. Firstly, although the aim of the method is to identify all public locations where people most likely to be members of spread networks can be reached for intervention, there is not yet strong epidemiological evidence that intervening in this population changes the course of the HIV epidemic in a community. Although there is some evidence that environmental structural factors can influence condom use,[16] it is unknown whether interventions promoting condom use in social venues will increase condom use sufficiently to decrease HIV transmission in the community.

Secondly, although great effort is taken to identify all public venues in a defined study area where people meet new sexual partners, it is likely that some public venues are missed and that some members of spread networks do not patronise the venues that are mapped and characterised for prevention programmes. Rooftops and stairwells identified in Karaganda were excluded as potential intervention locations even though it is likely that the people who patronise such remote places may not be reached at other venues. It is also true that people who want to avoid being interviewed can dodge an interviewer in public settings such as the venues where PLACE assessments are conducted and their non-participation could bias the findings.

Thirdly, trend data are difficult to interpret in any comparison of cross sectional data. Changes in the characteristics of those attending venues and changes in the behaviour of individuals are not easily detected without following a prospective cohort of individuals. People confronted with an intervention promoting reduction in new sexual partnerships may change their pattern of visiting a

Table 6 Age and sexual partnerships reported by men and women socialising at PLACE venues in a South African township in 2000 and 2003 compared with those reported by nationally representative DHS and HSRC samples

	Men			Women			
	East London township		South Africa	East London township		South Africa	
	PLACE 2000 (n = 1410)	PLACE 2003 (n = 632)	HSRC 2002 (n = 3028)	PLACE 2000 (n = 628)	PLACE 2003 (n = 424)	HSRC 2002 (n = 4061)	DHS 1998 (n = 11735)
Age							
15–24	30.3	34.6	37.9	30.0	48.4	31.6	38.0
25–49	62.2	60.0	42.4	64.8	46.3	45.7	62.0
50+	7.4	5.4	19.6	5.2	5.3	22.7	NA
Not sexually active in past 12 months (%)							
15–24 years	4.5	11.1	55.0	4.6	11.3	50.6	45.8
All ages	5.5	6.5	30.5	5.6	9.5	39.7	NA
Two or more partners in past 12 months (%)							
15–24 years	67.2	47.7	10.4	56.6	42.8	4.3	3.5
All ages	56.3	47.0	9.3	42.1	36.2	2.3	NA
New partner in past 12 months (%)							
15–24 years	65.0	44.6	NA	56.7	45.7	NA	NA
All ages	54.5	40.2	NA	43.1	38.3	NA	NA
New partner in past 4 weeks (%)							
15–24 years	40.4	23.3	NA	44.8	23.5	NA	NA
All ages	32.9	22.8	NA	27.3	18.7	NA	NA

NA, not applicable (question not asked of all respondents).

venue. This could result in misinterpretation of trend data if those who choose to stay home have a different rate of new sexual partnerships than the smaller group who stay.

Fourthly, self-reported sexual behaviour data are subject to self-presentation bias. Because venue based surveys may reduce the self-presentation bias[17] among respondents that may be more likely to occur when an individual is interviewed within his or her own household, venue based reporting may not suffer as much from underreporting of sexual behaviour as household surveys apparently do. However, although people in some settings may be reluctant to report new sexual partnerships, people in social settings, particularly men, may be overreporting sexual partnerships.

In spite of these limitations, PLACE method provides immediate pragmatic information to local prevention programmes on where to reach spread networks for HIV transmission.[18] The method provides a map of all venues indicating whether each venue has condoms available or not, a description of the characteristics and behaviours of the people at these venues, and a plan for prioritising venues for outreach efforts. Repeat assessments can monitor over time not only risk behaviours, but the availability of condoms, programme coverage and the association between on-site prevention and risk behaviour.

In conclusion, there are many challenges in monitoring sexual behaviour. The validity of the measures reported here cannot be rigorously assessed. It is unlikely that the effect of bias remains constant over time or within age groups. Much future work is required to improve our methods of measuring sexual behaviour and to improve our interpretation of trends. This work should be done not only at the national level with national indicators of sexual behaviour but at the local level as well.

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