SHORT REPORT

The feasibility of integrated STI prevalence and behaviour surveys in developing countries

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Background: In countries where STI/HIV prevalence data and behavioural data are scarce UNAIDS second generation HIV surveillance guidelines recommend measuring STI/HIV prevalence and risk behaviours in vulnerable populations but do not recommend conducting these surveys concurrently because of concerns about participation rates, cost, and provision of services.
Objectives: To assess the feasibility of conducting a national combined STD prevalence and behaviour survey in Mali among vulnerable populations with the intention of institutionalisation.
Methods: From March to June 2000 an integrated STI prevalence and behaviour survey was conducted using cluster sampling among five risk groups in four sites in Mali, west Africa. 2229 individuals in non-traditional settings such as taxi/bus stations, market areas, households, and brothels participated in any one or all components of the study: (1) behavioural questionnaire, (2) urine sample for *Neisseria gonorrhoeae* (GC)/*Chlamydia trachomatis* (CT) testing, (3) a fingerstick drop of blood for syphilis, and/or (4) HIV testing.
Results: High participation rates of 84%–100% were achieved despite specimen collection and HIV testing. Rates fell only slightly when participants were asked to provide biological samples and participants were more likely to provide urine than blood. Rates among the different groups for HIV and syphilis testing are similar and suggest that refusal was most probably because of a reluctance to give blood rather than because of HIV testing. The cost of the biological component added approximately $30 per participant. Included in the $30 are the costs of training, participant services, laboratory personnel and supplies, STI drugs, and STI testing costs. The total cost of the survey was $154 905. Biomarkers aided in validation of answers to behavioural questions. Consenting individuals received HIV pretest and post-test counselling and referral to a trained health provider for treatment of STI and the provision of services provided the framework for interventions in the groups following the survey.
Conclusion: This represents an effective methodology for collecting risk behaviour and STI/HIV prevalence information concurrently and should be considered by countries expanding STI/HIV surveillance as part of UNAIDS second generation HIV surveillance.

Lessons learned from the epidemiology of HIV thus far indicate that governments need to act quickly once HIV has entered a population to ensure prevention of infection among those populations most likely to contract and spread HIV.[1] To accomplish this requires reliable information about the risk behaviours and the level of infection with HIV and other sexually transmitted infections (STI) in the general population and in these high risk "core" groups.[2] Behavioural and biological surveys in these groups provide this information and can be repeated over time in order to follow trends in the evolution of an HIV epidemic and assess where intervention is most likely to have an impact. Surveys in core groups are an important part of a population based perspective in the control of STIs and HIV.[3 4] In countries where such data are scarce it is imperative to identify practical methods for measuring STI/HIV prevalence and risk behaviours in high risk groups and to institutionalise those methods within the public sector so they can be repeated.

The combined importance of behavioural surveys, biological surveys, and HIV sentinel surveillance has been highlighted in UNAIDS recommendations for second generation surveillance for HIV.[5] Although UNAIDS recommends conducting both behavioural and biological surveys it does not recommend conducting them concurrently. We believe this is because of concerns that collecting biological specimens will negatively impact participation rates for behavioural surveys, creating bias, increasing the survey cost, and complicating them with the difficulty of providing results and services to participants; in spite of evidence that integrated surveys provide much rich information.[6] Several innovative surveys that link behavioural information with STI or HIV biomarkers have been successfully implemented, though mostly on a small scale or in a research setting with no intention of institutionalisation.[7–9] In effect, the full integration of such surveys into public sector planning has not yet been accomplished. In this case study in Mali a linked survey was implemented at the national level and we show how it has provided the government with a feasible and practical tool for following trends in behaviours and STI/HIV rates in at-risk populations. A consideration for using this tool in other settings will be the stage of the HIV epidemic. In low HIV prevalence settings subgroup or site specific analysis can be a problem and STI/HIV testing is more prone to misclassification from false positive results. In high prevalence settings youth or general population samples should be considered.

In Mali there has been no HIV sentinel surveillance since 1995, the same year that the last cross sectional study of STI/HIV prevalence that included core groups was conducted. Few recent studies have investigated specific STI/HIV risk behaviours in vulnerable populations. To better understand the factors involved in the HIV epidemic and to test the feasibility of a combined survey we conducted the ISBS (Integrated STI Prevalence and Behavior Survey) in Mali from March to June of 2000 among a sample size of 2229 people in four urban sites. The survey was meant to complement reinvigoration of HIV sentinel surveillance in antenatal settings and thereby assist the national AIDS control programme to not only follow HIV trends in the general population, with pregnant women as a proxy, but to also collect STI/HIV and behavioural data in vulnerable populations as is recommended by second generation HIV surveillance.

Table 1 Participation rates for 2000 Mali integrated STI prevalence and behaviour survey

	No	Interview	Urine sample	Blood for syphilis test	Blood for HIV test
Sex workers	331	99.7%	95.8%	91.8%	92.7%
Truckers	400	100%	89.3%	84.0%	84.0%
Ticket touts	499	100%	91.8%	87.6%	87.6%
Ambulatory vendors	499	99.0%	92.2%	91.4%	91.4%
Maids	500	99.8%	97.4%	96.8%	96.8%

The survey collected biological specimens and behavioural information concurrently in non-traditional settings such as markets and taxi/bus stations. Sentinel groups were chosen following formative research that identified two high risk "core" groups (prostitutes and truck drivers) and three potential "bridging groups."[10–12] The bridging groups were (1) female ambulatory vendors working in taxi/bus stations, (2) "ticket touts" or young men who work in taxi/bus stations finding clients, and (3) young women who leave rural Mali to work in urban areas as maids. Random one stage cluster sampling was used. Participants could take part in any one or all four components of the study: (1) behaviour questionnaire, (2) a urine sample for GC and CT testing, (3) a fingerstick drop of blood for syphilis testing, and/or (4) HIV testing. For GC and CT testing PCR was used and for syphilis and HIV testing RPR/TPHA and Immunocomb/Genie II were used. Consenting individuals received HIV pretest and post-test counselling and referral to a trained health provider for treatment of STI.

High participation rates were achieved for all components of the study, as shown in table 1. Rates fell only slightly when participants were asked to provide biological samples and participants were more likely to provide urine than blood. Rates among the different groups for HIV and syphilis testing are similar and suggest that refusal was most probably because of a reluctance to give blood rather than because of HIV testing. Those who refused biological testing were similar to consenting individuals except in the following: maids who refused blood testing were more likely to have said that they had an STI in past 6 months (43.8% *v* 17.8%, p=0.02); ticket touts who refused blood testing were more likely to have said that they had been tested for HIV (16.1% *v* 7.6%, p=0.05); and truckers who refused urine testing were less likely to have had sex with a sex worker in the past 6 months (17.7% *v* 5.3%, p=0.06). With regard to cost, the total cost of the behavioural component of the survey was approximately $38 per participant and the cost of the biological component added approximately $30 per participant. Included in the $30 are the costs of training, participant services, laboratory personnel and supplies, STI drugs, and STI testing costs. The total cost of the survey was $154 905.

This study showed that the ISBS design is feasible and can be a powerful tool for monitoring an HIV epidemic. We found that high participation rates can be obtained even when biomarkers are added in non-traditional settings and groups. Participation in ISBS was most probably high because of the services provided or could have been because of the relatively low prevalence of HIV—lower societal awareness and experience with HIV/AIDS may have resulted in fewer participants feeling fear and trepidation about their HIV test results. We believe, however, that comprehensive preparation in the field and the provision of high quality services will most likely result in high participation rates in other settings. In addition, linked surveys such as ISBS may be more ethical in an era when more and more HIV related services are becoming available and blinded serosurveys are becoming controversial. Behavioural surveys with biomarkers also offer the important opportunity to validate individual answers to behavioural questions. For example, several maids who reported to be virgins tested positive for an STI. Finally, though we do not present data comparing the cost of a combined survey to separate behaviour and biological surveys in the same population, it seems clear that combining surveys can save on the costs incurred when the two surveys are conducted separately. The added cost of biomarkers can, in most cases, be justified in terms of the information provided—though rapid tests could play an important part in decreasing the cost.

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REFERENCES

1 **World Bank**. *Confronting AIDS: public priorities in a global epidemic*. New York: World Bank, 1997.
2 **Thomas JC**, Tucker MJ. The development and use of the concept of a sexually transmitted disease core. *J Infect Dis* 1996;**174**(Suppl 2):S134–43.
3 **Mills S**, Saidel T, Bennett A, *et al*. HIV risk behavioral surveillance: a methodology for monitoring behavioral trends. *AIDS* 1998;**12**(Suppl 2):S37–46.
4 **Aral O**, Holmes KK, Padian NS, *et al*. Overview: individual and population approaches to the epidemiology and prevention of sexually transmitted diseases and human immunodeficiency virus infection. *J Infect Dis* 1996;**174**(Suppl 2):S127–33.
5 **UNAIDS**. *Guidelines for 2nd generation HIV surveillance*. May 2000.
6 **Ku L**, Sonenstein FL, Turner CF, *et al*. The promise of integrated representative surveys about sexually transmitted diseases and behavior. (Review) (47 refs) *Sex Transm Dis* 1997; **24**:299–309.

7 **Lurie M**. *Migration and the spread of HIV/AIDS in South Africa*. Baltimore: Johns Hopkins University School of Hygiene and Public Health, Department of International Health, May 2001.
8 **Wawer MJ**, Gray RH, Sewankambo NK, *et al*. A randomized, community-based trial of intensive sexually transmitted disease control for AIDS prevention, Rakai, Uganda. *AIDS* 1998;**12**:1211–25.
9 **Sabin KM**, Rahman M, Hawkes S, *et al*. Prevalence of selected sexually transmitted infections and associated factors in slum communities of Dhaka, Bangladesh. *Int J STD AIDS* 2001;**12**(Suppl 2):92–3.
10 **Castle S**. Identification of medium risk groups for ISBS Study in Mali: a qualitative exploration of their sexual behavior and of the feasibility of listing clusters. Report to CDC, July 1999.
11 **Morris M**, Podhisita C, Wawer MJ, *et al*. Bridge populations in the spread of HIV/AIDS in Thailand. *AIDS* 1996;**10**:1265–71.
12 **Lowndes CM**, Alary M, Gnitoungbe CAB, *et al*. Role of core and bridging groups in the transmission dynamics of HIV in Cotonou, Benin, West Africa. *Int J STD AIDS* 2001;**12**(Suppl 2):156.

ECHO

Dangerous liaisons

Please visit the Sexually Transmitted Infections website [www.sextransinf.com] for a link to this full article.

A failure to appreciate the inherent dangers of unprotected oral sex with multiple partners may lie behind a rise in syphilis among gay men in the UK. The first case-control study of behaviours associated with the recent increase—seen also elsewhere in Europe and the United States—indicates that prevention strategies would best be targeted at venues where sexual partners are picked up and within the travel industry.

Unsurprisingly, perhaps, the study's findings showed that sexual partners were mostly anonymous; they tended to be picked up in specific venues—darkrooms, cruising areas, and saunas. They also disclosed a significant relation between incidence of infection with syphilis and HIV and a strong relation between both diseases and seeking sexual partners abroad and using gamma hydroxybutyrate (GHB).

The study comprised 27 individuals out of 58 in Greater Manchester with a diagnosis of syphilis between May 1999 and August 2000 who agreed to provide information in a structured interview on their social and sexual behaviour in the 12 months leading up to diagnosis. Most were male (96%), homosexual (85%), and a quarter had existing HIV infection. The controls, 62 in total, were recruited with help from voluntary groups to reflect overall similarity to the case group and were male, homosexual, and white, and were living in the same general postcode area. Comparisons were made between cases and controls overall and among four subgroups—cases with syphilis, with syphilis and HIV, and controls with HIV only or no infection.

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