



**PROTOCOL
FOR AN INTEGRATED BIO-BEHAVIORAL
SURVEILLANCE STUDY AMONG MOST AT-RISK
POPULATIONS IN LEBANON: SEX WORKERS,
INJECTING DRUG USERS, MEN WHO HAVE SEX
WITH MEN, AND PRISONERS;**

November 2008

ACKNOWLEDGEMENTS

This report has grown out of the collective experience of a number of people implementing an Integrated Bio-Behavioral Surveillance (IBBS) study among Most at Risk Populations in Lebanon: Female Sex Workers, Injecting Drug Users, Men who have Sex with Men, and Prisoners.

The National AIDS Control Programme, Ministry of Health, Lebanon, would like to acknowledge the World Bank Group, which funded the study through the IDF Grant for Strengthening the National HIV/AIDS Monitoring and Evaluation and Surveillance Systems in Lebanon. Without the financial and technical assistance of the World Bank Group, this study could not have materialized. NAP specifically thanks Dr. Francisca Ayo Akala (Senior Public Health Specialist WB), and Dr. David Wilson (Lead Health Specialist WB) for providing guidance required to implement the study. NAP also extends a special thanks to the World Bank consultant, Dr. Sarah Hersey (IBBS Specialist).

NAP is very grateful for the work of the IDF Project Coordinator, Miss Danielle El-Khoury (Study Coordinator).

NAP gratefully acknowledges the work of the American University of Beirut, Faculty of Health Sciences-Research Team who carried out the research and implemented the study. The research team includes: Dr. Kassem Kassak, Health Management and Policy Dept. (Team Leader); Dr. Jocelyn DeJong, Epidemiology and Population Health Dept. (AIDS expert); Dr. Ziyad Mahfoud, Epidemiology and Population Health Dept. (Biostatistician); Dr. Rima Afifi, Health Behavior and Education Dept. (Monitoring and Evaluation), Dr. Sawsan Abdurahim, Health Behavior and Education Dept. (Health Behavior); Dr. Sami Ramia, Medical Laboratory (Virologist and Medical Laboratory expert); Miss Farah El-Barbir (Research Assistant); Miss Maguy Ghanem (Research Assistant); Miss Sarah Shamra (Medical Laboratory Instructor); and, Mr. Khalil Kreidiyyeh (Medical Laboratory Technician).

NAP would like to thank the NGOs involved in the Study, including AJEM, Dar Al Amal, HELEM, SKOUN, and Oum El-Nour.

In addition, NAP would like to thank the World Health Organization, the different National Ministries, HepAttitude +, Roche and all those who helped in supporting the implementation of the research.

Sincerely,

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BACKGROUND and RATIONALE

1.1 Overview of HIV/AIDS in Lebanon

AIDS-related policies and programs in the Middle East and North Africa region are highly constrained by the lack of accurate information about the full scale of the epidemic¹. This is for a number of reasons including limitations of existing surveillance and intense stigma associated with the disease in the region which makes individuals reluctant to seek testing if they believe they may be at risk for HIV.

In Lebanon, NAP reports that 1056 people were living with HIV by 2007. There are several reasons why the reported number of cases constitutes an underestimate of the actual prevalence. Firstly, the level of voluntary testing in Lebanon is low, probably due to reluctance to seek testing for fear of stigma and discrimination, because people's risk perception is low and because the present cost of testing is high for many people. Moreover, voluntary testing and counseling centers are limited in the country. In addition, there is an absence of measures to ensure full case reporting. Thus, the reported cases are drawn mainly from patients presenting with HIV-related symptoms and from mandatory testing of about-to-wed couples and some immigrants, particularly those who come to Lebanon to work as domestic workers. Secondly, several private health care providers do not consistently report cases to the NAP. Many view reporting as an additional workload, and some are not convinced that their patients' information would be kept confidential if reported to other bodies. Finally, behavioral risk factor surveys in Lebanon suggest increasing engagement of youth in risky behaviors especially as related to sexual practices. Casual and commercial sex were found to be highest among young men in Beirut and Mount Lebanon in a KAP study in 2004².

According to the National AIDS Program of Lebanon, of the cases reported to date in Lebanon: 42.0% are asymptomatic and 40.9% living with AIDS and 17.1% unclassified; 81.7.5% are male; 56.0% were infected through heterosexual behavior, 6.4% through blood transfusion, 5.7% through injecting drug; 14.9% are below 31 years, 52.1% are between 31-51 years; 49.0% of infected individuals have not traveled abroad.

The level of the epidemic in Lebanon is currently low, with an estimated adult prevalence rate of 0.1%³. However, there are several reasons to be concerned about HIV/AIDS in Lebanon. Firstly, there is a high level of interaction between Lebanese and nationals of other countries and evidence that increasingly infection is occurring within Lebanon among individuals who have not traveled outside the country. Secondly, there is evidence of increasing rates of unprotected sex among young people and the median age

¹ World Bank (2005) *Preventing HIV/AIDS in the Middle East and North Africa: A Window of Opportunity to Act*. Washington, D.C.

² National AIDS Control Programme in Lebanon (2004) *Knowledge, Attitude, Beliefs and Practices of the Lebanese Population Concerning HIV/AIDS*. Ministry of Public Health and WHO. Beirut, Lebanon.

³ UNAIDS (2006) *Report on the Global AIDS Epidemic*

at infection is decreasing. These factors therefore call for increased surveillance, monitoring and evaluation in order to track HIV trends and to intervene early and effectively.

1.2 Justification of Study

There are a number of limitations in the existing methods for assessing the level and dynamics of the epidemic in Lebanon. Lebanon relies upon case reporting and estimation for its HIV data and has no HIV biological surveys whatsoever. It is vital to establish HIV and related behavioral trends among vulnerable groups in low prevalence epidemics, in order to develop informed, evidence-based HIV responses, in which priorities are based on objective biological and behavioral data. Lebanon's HIV resources are extremely limited and must be directed towards the most vulnerable communities and cost-effective interventions. In the absence of bio-behavioral surveillance, it is impossible for Lebanon to program rationally, to identify risk, to track trends, or to assess progress. Thus, the bio-behavioral surveys underpin the entire HIV strategy and monitoring and evaluation framework.

Therefore, Lebanon urgently requires greater understanding of its epidemic and high quality integrated bio-behavioral surveys of vulnerable populations are a prerequisite for greater understanding of low prevalence epidemics, such as Lebanon's. For Lebanon, the costs of continuing to respond without adequate data or insight greatly outweigh the cost and complexities of such a survey. A Lebanese survey will also contribute to a greater regional understanding of the magnitude and dynamics of the Middle East's epidemics.

2 OBJECTIVES

The study aims to:

- Provide an estimate of HIV prevalence among four major vulnerable groups in Lebanon, namely men who have sex with men (MSM), prisoners, commercial sex workers (FSWs) and intravenous drug users (IDUs).
- Provide an estimate of co-infection with Hepatitis B and C among HIV positive participants in the MSM population, FSW population, IVUDs, and the prisoners. The issue of co-infection has been inadequately researched in the international literature and there are no such studies to our knowledge in the Middle East region. Since HIV and Hepatitis B have a similar mode of transmission, it would be of value to study Hepatitis B infection in these groups, particularly since occult (silent) Hepatitis B infection has been reported to be high in individuals with HIV.
- Provide an estimate of level of infection of Hepatitis C among the entire intravenous drug user population. Hepatitis C virus is expected to be high among

intravenous drug users. The opportunity is therefore there to study co-infection among this group.

- Foster research collaboration for the project between NGOs involved with the vulnerable groups, the National AIDS Program and the American University of Beirut and contribute to building the research capacity of the NGOs involved.
- Estimate the population size of the four vulnerable groups using the multiplier method based on NGO sources and estimates.
- Use the above HIV prevalence data to better calibrate national HIV estimates in Lebanon.
- Enhance understanding of the geographic, age, gender and socio-economic distribution of HIV infection among the four vulnerable groups.
- Characterize sexual and injecting drug use practices and relevant HIV knowledge, attitudes and beliefs among individuals in the four vulnerable groups.
- Gain greater insight into major HIV transmission dynamics among the four vulnerable groups in Lebanon.
- Gain an indication of coverage of existing HIV prevention, testing, and treatment services among the four vulnerable groups.
- Develop a body of bio-behavioral data to inform intervention development and subsequent evaluation among vulnerable groups in Lebanon.
- Develop an operational manual for integrated bio-behavioral surveillance in Lebanon in English. These materials, if translated into Arabic, could serve as a regional resource for bio-behavioral surveillance in the Middle East region.

3 METHODS

3.1 Target Population and Sites

The study will be implemented in Lebanon. The eligible population will be four vulnerable groups: namely, men who have sex with men (MSM), prisoners, commercial sex workers (FSWs) and intravenous drug users (IDUs).

The characteristics of the populations from which we would sample are summarized in the following table:

Table 1: Inclusion Criteria

	MSM	Prisoners	FSW	IDU
Lebanese, Registered Palestinian, Foreign Residents	X	X	X	X
Gender	M	M	F	M+F
Age	16	16	16	16
Frequency of Risk Behavior	Last 12 months	All current prisoners	Last 12 months	Last 12 months
Knows HIV status	Yes + No	Yes + No	Yes + No	Yes + No
Geographic Location	Greater Beirut and Jounieh	All current adult prisoners in Roumyeh Prison and juveniles* in the Roumyeh's correctional facility	Greater Beirut and Jounieh	Greater Beirut and Jounieh

* Juveniles: 16-17 years old

Table 2: Exclusion criteria

MSM	Prisoners	FSW	IDU
MSM who do not comprehend English or Arabic language	Prisoners who do not comprehend English or Arabic language Prisoners in psychiatry unit Violent prisoners Mentally unstable prisoners in regular units Political prisoners	FSWs who do not comprehend English or Arabic language	Users who do not comprehend English or Arabic language Users who are not in a lucid state of mind to give informed consent during the time of the interview

The questionnaires will be available in colloquial Arabic as first option and the second option would be the English language.

There are several Beirut-based NGOs that AUB will be working with; the NGOs are established organizations working with the vulnerable groups in Lebanon, as follows:

- Dar Al Amal: FSW: Mrs. Hoda Kara (Director)
- SIDC: HIV/AIDS with all populations: Elie Aaraj (Director)
Nadia Badran (Coordinator)
- Oum El Nour: IDU Hoda Yazigi (Director)
- SKOUN: IDU Nadya Mekdashi (Director)
- HELEM: MSM Georges Azzi (Coordinator)
- AJEM: Prisoners Pere Hady Aya (Director)

SIDC: Soins Infirmiers et Development Communautaire; HELEM: Himaya Lubnaniya Lil Methleeyeen; AJEM: Association de Justice et Misericorde.

The NGOs have previously worked with the NAP on several occasions and some of them have been involved in research projects with the AUB. The NGOs have carried out several studies together and separately; however, none of the studies used Respondent Driven Sampling (RDS) as their sampling methodology.

3.2 Sample Size

Sample size estimates are obtained with the objective of being able to track prevalence as well as behavioral changes over time. Testing differences in prevalence and behavioral practices over time will be done with 80% power and a confidence level of 95%. The sample size required to perform these tests is based on the following formula

$$n = \frac{D \left[Z_{.95} \sqrt{2\bar{P}(1-\bar{P})} + Z_{.80} \sqrt{P_1(1-P_1) + P_2(1-P_2)} \right]^2}{(P_2 - P_1)^2}$$

where $Z_{.95}$ and $Z_{.80}$ are the 95th and 80th percentiles of the standard normal distribution, P_1 and P_2 are the estimated prevalence at time 1 and time 2 respectively, \bar{P} is the average of P_1 and P_2 , and D is the design effect (usually equals to 2 for RDS sampling).

The results are as follows:

For the FSWs, with 880 individuals we will be able to track a change from 0.5% to 3% in prevalence of HIV.

For the IDUs, with 388 individuals we will be able to track a change from 2% to 8% in prevalence of HIV.

For the MSM, with 620 individuals we will be able to track a change from 1% to 5% in prevalence of HIV.

Finally, for the prisoners, with 600 individuals we will be able to track a change from 0.5% to 2.5% in prevalence of HIV. (Note that for prisoners, $D = 1$ since we are not using RDS sampling).

The total proposed sample size is 2488 individuals. Note that in all the above computations we assume a 10% rate for refusal to participate. Moreover, for behavioral changes, the above sample sizes will be enough to detect changes of at least 10% (say from 10% to 20%).

3.3 Sampling Methods

Recruitment of interviewees in all vulnerable groups except prisoners will use a relatively new technique entitled respondent-driven sampling (RDS) which has been shown to be effective in reaching difficult to reach or invisible populations for which there is no sampling-frame⁴. This sampling method is a chain-referral method which was developed to avoid many of the problems and biases of such methods (e.g. snowballing). In the prison, the sampling methodology that will be used is simple random sampling.

3.3.1 Simple Random Sampling

In the prison, simple random sampling will be used to recruit the participants. A list containing codes corresponding to all the prisoners in the targeted cells will be generated to randomly sample from on daily basis. This list will be updated daily as inmates are sometimes introduced overnight. The NGO working with the prisoners, AJEM, in collaboration with the prison authorities, will eliminate individuals that fall under the exclusion criteria before generating the coded list. The rationale behind choosing simple random sampling over other methodologies, like cluster sampling, is that simple random sampling is feasible and the most precise sampling method. Also, the prisoners mingle at various periods of time making cluster sampling difficult.

3.3.2 RDS

Sampling would begin with “seeds” who would be selected on a non-randomized basis. Seed selection will take place from the population of the beneficiaries of the partner NGOs. In order to diversify the seeds, we will also be selecting active and motivated individuals from outside the NGOs to serve as seeds for the study. The sampling would then proceed in “waves” whereby the first wave would be those referred by the seeds, wave 2 would be those recruited by the first-wave participants and so on. Each seed is expected to generate at least four waves and will recruit only 3 peers which in turns will recruit a max of 3 other peers. In order for waves to propagate continuously, seeds can be added progressively throughout the data collection period if needed.

In each case, each seed (and subsequent “recruiter”) would be given a unique coupon (or a piece of paper with a colour and a number) so that there would be a finite number of recruiters from each wave and the study team will be able to identify the wave/recruitment pattern. There will be different color for each population and each

⁴ Heckathorn, D.D. (1997). Respondent-driven sampling: a new approach to the study of hidden populations. *Social Problems*, 44, 174-199

NGO will have a specific code number. Each coupon will include 8 numbers; the first number relates to the NGO code, the second relates to the seed the third and ahead of would be for the peers.

Example:

31230000

The number 3 describe the NGO code

The number 1 is for the first seed recruit at this NGO

The number 2 relates to the second peer recruited by the first seed

The number 3 relates to the third peer recruited by the second peer recruited by the first seed in the NGO that has the code 3

The advantage of RDS over alternative methodologies, such as TLS (time-location sampling) lies in the fact that less formative research on the population in question is needed prior to sampling. That is, in TLS, detailed knowledge is needed about both the places and times in which the populations interact. In general, the RDS method is preferred over that of TLS where the populations to be sampled are somewhat invisible or hidden, as the case is in Lebanon. For instance, there are no known shooting galleries in Lebanon where IDUs gather, and they are considered to be a hidden population with much closed network. For FSWs, while there are some known locations (super nightclubs, motels, or specific apartments), access to the FSWs in these locations would be made difficult because these places are very much controlled by the pimps who restrict the access to this population. Moreover, The FSWs who work on the street and pick up their clients from public places are less likely to accept participation in our study and they do not represent the entire FSW population. For MSM, there are around three known locations where MSM interact; however, these locations may not capture the entire populations. Combining TLS with RDS may not be recommended, even where the times and locations where the population gather are known, because it highly complicates the process of data analysis.

Potential Obstacles to Implementing RDS in Lebanon

The disadvantage of using RDS would be that it has not been tried in Lebanon; although it has successfully been used in Vietnam⁵, Papua New Guinea⁶ and a number of other countries among sex workers and drug users. The network density of the relevant population groups in Lebanon is unknown, and the viability of the method is untried in this setting. It is possible there may be difficulties in recruiting the required sample size.

⁵ Johnston, L.G. et al, 2006. Assessment of Respondent Driven Sampling for Recruiting Female Sex Workers in Two Vietnamese Cities: Reaching the Unseen Sex Worker. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, Vol. 83, No. 7, ppi16 – i28.

⁶ Yeka, W. et al. Application of Respondent Driven Sampling to Collect Baseline Data on FSWs and MSM for HIV Risk Reduction Interventions in Two Urban Centres in Papua New Guinea. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, Vol. 83, No. 7, pp i60 – i72.

In addition to the above mentioned technical difficulties, there are other social and structural factors that may impede the progress of RDS in Lebanon. Low risk perception of contracting HIV/AIDS among the general public may slow down the recruitment process. In fact, according to a 2004 KAP study done in Lebanon, 67.5% of the respondents perceived no chance of contracting HIV⁷. The taboo surrounding the topic of HIV/AIDS may be a major obstacle. Individuals' social relations and networks are highly jeopardized if he/she is suspected to have HIV/AIDS. This factor may cause reluctance and hesitancy in participating in the study and getting tested for HIV/AIDS. Also, all studied groups are considered to have illegal activities hence may be hesitant to be recruited and interviewed. The unstable political situation and the fact that some of the NGOs are located in areas that are remote may be another obstacle to the process of recruitment in RDS. Also, we anticipate that some potential study participants will refuse to go to the partner NGO centers to do the study. Reasons for this are mainly stigma and their wish not to be associated with activities of such NGOs. For that reason, the research team will allow for the interviews to take place outside the NGO centers, in a place that suits both the interviewer and the participant. We will also use the services of a mobile interviewer. This mobile interviewer will receive the same training as NGO staff members. S/he will be provided with a mobile phone, questionnaires, forms, and IEC material. The interviewer and the respondent can meet at a place of mutual convenience.

3.3.3 Eligibility and Criteria for Seeds

The study will begin with a maximum of 8 original seeds; these seeds will not be included in the sample size but they can complete the survey and for ethical reasons, they will be offered the choice for an HIV test and for Hepatitis C test if they are IDUs. The original seeds have to be strongly motivated and well connected with peers from their corresponding vulnerable groups. The original seeds will be selected to reflect the main strands of differentiation within the populations. Due to lack of literature that describes the vulnerable populations under study in the Lebanese context, the main criteria of the seeds will be determined after meeting with the NGO staff on the premises that the NGOs are most knowledgeable on their populations. Potential criteria for the seeds may include SES, educational level, marital status (especially for MSM), nationality, and place of work (especially for FSWs).

3.4 Study Procedures

3.4.1 Study Instrument

The questionnaires would be tailored to each group, but have core questions derived from the standard, internationally comparable Integrated Bio-Behavioural Surveillance questionnaires.⁸ In addition, questionnaires from other Bio-Behavioral Surveys conducted throughout the world would be reviewed, as well as the available relevant

⁷ National AIDS Control Programme in Lebanon (2004) Knowledge, Attitude, Beliefs and Practices of the Lebanese Population Concerning HIV/AIDS. Ministry of Public Health and WHO. Beirut, Lebanon.

⁸ USAID/Family Health International/Department for International Development (2006), Behavioral Surveillance Survey Guidelines

manuals. These questions would be adapted to local context. In addition a number of questions specific to the Lebanese context would be added. Issues of cross-over (where individuals belong to more than one group) will be addressed in the questionnaire.

The AUB research team will work on the design of the questionnaires and drafting them into English. These questionnaires will then be translated into Arabic and back-translated into English by professional translators. NGOs will be consulted about the adequate terminology usually used by the vulnerable groups. NGO staff will also be responsible for piloting the questionnaires for any additional feedback and comments. The AUB research team would later meet with the NGOs separately to take their comments on the questionnaires and make the necessary changes.

3.4.2 Training

Training will occur in several workshops hosted by AUB. Selected interviewers are going to be trained by the AUB team on the English and colloquial Arabic questionnaires. Professional counselors will handle the training sessions on pretest and post-test counseling. The NGOs will also be trained on RDS system and tracking the respondents and recruited individuals using the colour coded coupons. Moreover, a training session will cover the issues pertaining to the biological section of the study, namely finger pricking and extracting the blood sample and drying it on the filter paper. Last, the AUB team will train interviewers on the complex ethical issues involved, including importance of obtaining verbal informed consent.

3.4.3. Data Collection Flow

Each NGO will hire interviewers or have assigned staff members working on the research project on part-time basis. The personnel selection process will be vetted by AUB. Some of the members will be responsible for conducting the survey, pre-test counseling, taking the blood sample, labeling, transporting and storing the sample. Another person – suitably trained -- will be responsible for tracking the respondents, refusals, and the general recruitment procedure. The NGOs will assign one person from their staff or contacts to be a follow up worker. This individual will be responsible for supervising the RDS process and following up with the respondents and helping recruit them to the study. A non-response monitor system will be setup by the research team and used by the NGOs to keep track of refusals. Also, due to crossover of the population (one individuals belonging to two vulnerable groups), or the overlap of NGOs working with those individuals, duplication of data might take place. For that reason, AUB research team will closely monitor the data collection process with an emphasis on the validity and specificity of the recruiting coupons. The question “Have you ever done this study before?” will be added to help reduce duplication. The collaboration among the selected NGOs will be guided and supervised by the research team.

3.4.4. Interviews

Interviewers will be recruited by the NGOs who will be trained by the study team. All NGOs will use three interviewers. Having the relevant NGOs handle the data collection process might create certain biases because respondents might feel compelled to give invalid information and socially desirable answers. On the other hand, one might argue that individuals in vulnerable groups trust NGOs more than they would a university-based research team.

Each person recruited would be offered a choice of venue for the interview – either at the relevant NGO premises or an alternative venue. For safety purposes, the interviewers will not be allowed to visit the private homes of the participants to conduct the interview. The time would be agreed at mutual convenience to interviewer team and research subject. Designed as such, the methodology will ensure that we capture those individuals who might be reluctant to come to the centers of the NGOs for fear of the associated stigma.

All questionnaires will be kept at respective NGO offices and will be collected by AUB staff on daily basis. NGOs will report to AUB regarding recruitment on a weekly basis and then, as the number of interviewees approaches the sample size, NGOs will report to AUB on a daily basis.

3.4.5. Rapid Testing

HIV rapid tests will be offered after conducting the interview and taking the dry blood spots for the HIV, HBV, and HCV tests. This is because the team understands the anxiety that may occur in some participants while waiting a week for their HIV test results to come out. Rapid tests will be optional to participants, but participants who choose to do an HIV rapid test must give dry blood spots for HIV, HBV, and HCV tests that will be done in AUB laboratories and that will be providing prevalence data for HIV, HBV, and HCV. Participants with results that require confirmation will be referred to a contracted hospital, and the HIV confirmatory test will be done for free and the result will be issued after three days.

3.4.6. Counseling

Pre and post-test counseling will follow UNAIDS guidelines. As discussed in the section on ethics, the interviewer will use the responses from the behavioral survey to assess risk and counsel accordingly. Pre-test counseling will also cover Hepatitis B and Hepatitis C. Risk behaviors that are related to these diseases will be assessed and addressed appropriately. If the participant takes the HIV rapid test, proper post-test counseling will also take place. Specific tailored IEC material will be given to the respondents at the end of the counseling session. Full training on the importance of, approaches to and content of counseling will be given in the training of all interviewers prior to commencement of field work. Careful monitoring of the quality of counseling will be conducted by the AUB research team.

In the prison, a different scenario is taking place. Participants who choose to do a rapid test and the result is positive will be encouraged (but not forced) to attend the specific awareness sessions that will be held in the prison, in collaboration with AJEM. During these awareness campaigns, their confirmatory HIV results will be given out, in addition to HCV and HBV for the confirmed HIV positive cases. Appropriate post-test counseling will be done in total privacy. Relevant and tailored IEC material will be handed out to participants.

3.4.7. Sequence of Procedure

- Reading the Informed Consent (approximate duration 5 mins)
- Administration of Behavioral Survey (approximate duration 30 mins)
- Pre-Test Counseling (approximate duration 10 mins)
- Taking the Blood Sample (approximate duration 5 mins)
- Taking the HIV Rapid Test (approximate duration 5 mins)
- Post-test Counseling (approximate duration 15 mins)
- Entertaining questions/concerns and explaining where and how person can get result (10 mins.)
- Estimated duration of entire process (1 hour and 25 mins)

3.4.8. Compensation

Upon completing the survey, the participant will be compensated with \$10 in cash. Also, \$6.7 will be paid to recruiters for each referral. An individual can recruit a maximum of 3 individuals. It is important for each participant not to recruit more than 3 individuals to ensure that the network expands and propagates well into the entire population.

3.5. Clinical Procedures

3.5.1. Collecting, Processing, and Storing Blood Specimens

The research team will collect blood from the study subjects who have given consent at the site of the behavioral survey. Blood samples will be transported to the Faculty of Health Sciences Laboratory at the American University of Beirut. Any positive specimens for anti-HIV by Genetic Systems rLAV EIA (Bio Rad, USA) will then be subjected to confirmatory tests via ELISA. In addition, tests for Hepatitis B and Hepatitis C Viruses will be conducted on the confirmed HIV-positive specimens for co-infection rates. Hepatitis B and Hepatitis C will also be conducted on the entire IDUs' blood samples.

This protocol is now detailed below.

Dried Blood Spot (DBS) collection:

Whole blood specimens will be collected using DBS as mentioned below^{9,10,11, and 12}.

- 1- Label a filter paper S&S 903 (Schleicher & Scheull UK) with the appropriate identification. Handle it by the edges; avoid touching the areas where blood will be collected.
- 2- Prepare the finger for puncture by cleaning it with 70% alcohol pads. The puncture, done by a Lancet, must be performed with sufficient force and penetration to allow the collection of more than one drop of blood. Do not squeeze the wound to obtain more blood as this may cause hemolysis of the specimen or mixture of other body fluids with the specimen.
- 3- Collect blood onto filter paper either directly through gently touching the filter paper or indirectly through a capillary tube and expressing the drops onto the filter paper.
- 4- Collect each drop of blood in a separate area of the filter paper. Touch the filter paper to the edge of the drop. Take at least 4 blood spots from each patient. The first drop should be wiped away before collection since it is most likely to contain excess tissue fluid.
- 5- The specimens should then be dried in a horizontal position at room temperature for at least three hours. The filter paper may be allowed to dry at room temperature overnight.
- 6- Pack the filter paper in zip-lock plastic bags, with desiccant and transport it to the Virology laboratory, Faculty of Health Sciences, American University of Beirut. Each filter paper will be packed in a separate plastic bag to avoid any potential cross contamination
- 7- DBS may be stored refrigerated (2-8° C) or at room temperature (15-30°C) for 90 days as long as they are not exposed to elevated humidity. For longer storage, DBS may be frozen at -20°C or below at <50% humidity.

⁹ Approved Standard: Blood collection on filter paper for neonatal screening programs. National Committee for Clinical Laboratory Standards (NCCLS) publication LA-4A2. NCCLS, 1992; 12(13).

¹⁰ Kundsén R, Slazyk W, Richmond J et al. Guidelines from the Centers of Disease Control and Prevention for the shipment of dried blood spot specimens. Washington DC: US Department of Health and Human Services, 1993:1-4.

¹¹ Williamson J. The utility of blood spot technologies in low income technologies. In: Improved care of the disease of childhood. London: Center for International Child Health, 1997.

¹² Parker SP, Cubitt WD. The use of the dried blood spot sample in epidemiological studies. J Clin Pathol 1999; 52: 633-9.

3.5.2 Elution Procedure and HIV, Hepatitis B Virus (HBV), Hepatitis C Virus (HCV) testing

Elution Procedure:

- 1- Using a 1/4 or 1/8 inch paper punch, remove a disk of each DBS and place it in a separate well of an uncoated flat-bottomed microwell plate (Corning, USA).
- 2- Add 200ul of elution buffer which is either provided in the kit or prepared from phosphate buffered saline (PBS) containing 0.05% Tween 80 and 0.005% sodium azide.
- 3- The plate will be sealed and incubated at room temperature for 2 hours with agitation (400-600 rpm) or at 2-8°C overnight. The resultant plate contains the eluates from which dilutions can be made for ELISA testing.

HIV Testing:

- The eluate will be tested for anti-HIV type 1 using Genetic Systems rLAV EIA (Bio Rad, USA), licensed to be used on DBS, in accordance with manufacturer instructions. All anti-HIV positive samples will be retested using Calypte HIV-1 BED Incidence EIA test (Calypte Biomedical Corporation)¹³.

HBV Testing:

- HB surface-antigen and anti-HB core will be detected in samples tested positive for HIV and in IDUs' samples using modified protocols for Monolisa HBsAg and Monolisa anti-HBc (Bio Rad).

HCV Testing:

- *Anti-HCV detection:*

Anti-HCV will be detected in samples tested positive for HIV and in IDUs' samples using a modified protocol for Ortho HCV 3.0 SAve ELISA (Ortho Clinical Diagnostics, Johnson & Johnson).

- HCV-RNA Extraction and Qualitative Detection:

¹³ Page-Shafer K. Dried blood spot specimens for use in the determination of recent HIV-1 infection and incidence surveillance. US Infectious Diseases 2006

The anti-HCV positive DBS samples will then be subjected for RNA extraction using QIAamp MiniElute Virus Spin (QIAGEN). The resulting RNA extracts will then undergo qualitative in vitro diagnostic HCV detection using COBAS AMPLICOR Analyzer (Roche).

- HCV Genotyping:

Qualitatively positive HCV samples by COBAS AMPLICOR Analyzer will then be subjected to genotyping via LINEAR ARRAY Hepatitis C Virus Genotyping Test (Roche).

3.6. Data Entry, Cleaning and Processing

The AUB will be responsible for data entry and analysis, using existing bio-behavioral data management procedures. Data cleaning procedures (error checking, coding and skip patterns) will be used to avoid errors during data entry process. Data will be double-entered to identify remaining errors. The recorded data will be edited for accuracy, consistency, and completeness. Before the data analysis is initiated, the distribution of each variable will be described. Continuous variables will be grouped into categories based on quartile. Significance of association will be tested using Chi-square or linear regression. Inequality of population means will be compared by ANOVA. The data structure of each population will be developed using SPSS (version 15) software. Prior to the data entry, a team of two public health graduate assistants will be trained and briefed on the interview schedule and the data coding scheme. The data entry will be followed closely and cleaned by the quality control officer.

3.7 Analysis of Data

Data analysis will start two weeks after the field work commences and will continue concomitantly with data collection. The data will be analyzed and used to calculate frequencies. The possibility of exporting the dataset to software for multivariate analysis is still being explored.

4 ETHICAL CONSIDERATIONS

Possible risks to participants and researchers have been considered. The basic ethical principles of non malfeasance, autonomy and justice will be respected throughout the study. Regarding malfeasance, the involvement of NGOs who work with, have an in-depth understanding of, and are advocates of the target population will ensure that issues of concern to the community are addressed, and that all procedures employed in the study are appropriate and culturally acceptable and ethical. The academic team will also organize regular debriefing sessions with field staff to minimize unintended consequences of difficult field situations.

The anonymity of subjects will be protected. The data collected will be linked and anonymous. It is linked in that the blood test result and respective behavioral survey can be paired together. However, it is anonymous in that no identifiers are on either. In the prison setting, the list that will be used to randomly sample from our participants will include codes that correspond to the prisoners. For the other populations, the NGO will link the academic team to the 'seeds'. Seeds will be given a colored identification card with a number on it. Participants will come to the place of data collection to participate in the survey and to have blood collected.

The active verbal consent of all participants will be obtained prior to collecting any survey data. The two separate consents for each of the survey and the blood test will be explained before initiating the interview so that the participant would understand all what is expected of him/her during this visit. The consents are separate in a way that the participant can consent for the survey without necessarily accepting to undertake the blood test. The five elements of informed consent will be included: "competence, disclosure, understanding, voluntariness, and consent."¹⁴ The verbal consent will be given in the presence of the field worker after he/she has provided information about the objectives of the survey, the right of the subject not to participate or to refuse to answer any specific question, the anonymity of results, any risks or benefits from participating in the survey, compensation related to participating in the survey, and the institutional affiliation of the researchers^{15,16}. The colored numbered card will also be used to inform participants of blood test result if desired. Each participant will be asked to recruit 3 other participants. He/she will be given three other cards with the same color but different numbers on them to give to their recruits. Recruiters will receive \$6.7 for each referral. This is considered to be reasonable without being "impossible to refuse"¹⁷ and thus being coercive. The recruiters will not be paid any secondary compensation if the recruitee did not show to the center. Upon completion of the survey, each participant will get \$10 in cash. Giving cash money to participants will help reduce the risk of having them engaging in risky behavior in order to earn cash money.

Recruiters will present the colored card which will identify the recruiter. This new participant will then be given a different colored card with a number on it to present when seeking results of the blood test. The dried blood sample will be coded only by color and number.

¹⁴ eMedicine Health. Accessed at http://www.emedicinehealth.com/informed_consent/page2_em.htm

¹⁵ Family Health International. Ethical issues in data collection. Accessed at www.fhi.org/NR/Shared/enFHS/PrinterFriendly.asp

¹⁶ Graham Lindegger & Susan Bull (2002). Ensuring valid consent in a developing country context. Accessed at <http://www.scidev.net/dossiers/index.cfm?fuseaction=policybrief&policy=31§ion=99&dossier=5>

¹⁷ Ethical considerations for HIV and AIDS Clinical and Epidemiological Research, October 2000, accessed at www.doh.gov.za/aids/docs/ethical.html on January 19th 2007

The surveys will be kept in a locked cabinet at the partner NGO offices and collected by the academic research team on a daily basis. They will be also kept in a locked cabinet at the Faculty of Health Sciences.

A rapid blood test will be used. Results will be provided to participants who wish to know their results within a reasonable time frame.

There may be emotional risks to participants. The emotional risk is anxiety linked to getting tested and the emotional repercussions for those who test positive. The pre test and post test counseling will be of sufficient quality to minimize the risk as much as possible, but it is unlikely that we can remove the emotional response of an HIV positive result. Participants tested positive will be referred to health care resources. The training of field workers will emphasize the importance of anonymity; any fieldworkers found to be breaching confidentiality would be dismissed from the project.

There are several benefits of being a participant in the study as well. These include any benefits perceived from counseling, including access to information for behavior change; the benefit of knowing one's HIV status, particularly if negative. The NGOs will also benefit from participating in this study as it fosters capacity building and creates an opportunity for them to strengthen their services and outreach activities.

As for the principles of justice, any individuals who is identified as HIV positive and is Lebanese is entitled by law to receive health care services related to this condition free of charge. Discussion will be held with NGOs to identify alternative mechanisms for assisting with the cost of treatment for non-Lebanese HIV positive individuals. Regarding Hepatitis C, Roche, through the NGO, Skoun, will offer follow up tests and treatment to HCV positive participants. As for Hepatitis B, cases can be referred to the Ministry of Health for treatment. In addition, as part of the pre (or post) test counseling, all participants will receive health education information tailored to their risk status.

The safety of the interviewers should also be considered. For that purpose, interviewers will be advised against conducting the interviews at the respondents private homes. If they do so, they do it at their own risk. The research team also recognizes the risk that interviewers may be exposed to other diseases like Tuberculosis. Hence, proper masks and gloves will be provided to the NGO staff involved in the interviewing process.

In addition, to ensure that all ethical principles and steps are followed, all individuals involved in implementing the survey will be attending a training session which includes a discussion of the importance of these principles.

Results of the bio-behavioral survey will be shared in a timely manner with the National AIDS Program (NAP), the NGOs partners, and the World Bank. However, caution will be taken that results are not mis-interpreted or released to the media prematurely. The release of results will only be done in partnership between the academic institution and the NAP, and NGO partners must agree to this.

The methods of this bio-behavioral survey will be approved by the Research Board of the American University of Beirut prior to proceeding with implementation.

5 TIMELINE

Survey protocol: The first step to be taken will be the establishment of task force and advisory committee and recruitment of support staff for the research. The survey team, assisted by the World Bank, will prepare a detailed protocol, which specifies precisely how the survey will be executed, including sensitization of vulnerable communities, sampling, data collection, data management and dissemination. The protocol will include an explanation of the survey, HIV testing protocols, behavioral questionnaires, consenting procedures and forms and VCT and HIV care referral services.

Contract: FHS/AUB will submit a written agreement/contract with the NGO(s) working in the vulnerable population groups and undertake a period of NGO orientation, demonstration and testing. The agreement/contract between the academic institution and the NGO(s) will include a detailed scope of work and will need to be approved by NAP, before the field data collection begins.

Written ethical consent: The research team will obtain written ethical approval from the AUB IRB before the field data collection begins.

Field work: Given the sample sizes and taking into account the critical situation in Lebanon as well as difficulty experienced to date in Lebanon in recruiting subjects; the field work is projected to begin by August 1, 2007 and carry on for approximately 6 months for all the groups except prisoners. The data collection among prisoners is expected to close in 3 months time.

Mid-Term Progress report: The mid-term progress report will be prepared during July 2006.

Full draft report: The research team will prepare a simple, short, highly readable 30-50 page synthesis in English, including graphs and pictorial exhibits, with further annexes as required. The report will be prepared at the conclusion of the project; expected to be in February 2008

Final report: Based on feedback received, the research team will prepare a final version of the report at the conclusion of the project expected to be at the end of March 2008.

PowerPoint: The research team will also prepare a brief, not to exceed 30 slides, simple, accessible, readable PowerPoint summary of the final report at the conclusion of the project.

Manual: The research team will prepare an operational and training manual for the implementation of integrated bio-behavioral surveillance in English, which will be prepared at the conclusion of the project, expected to be at the end of March 2008.

Dissemination: An intensive national dissemination process will be undertaken by the AUB (which would provide human resources and technical component) and the NAP (which would provide financial resources), with national dissemination conducted over a minimum period of 4 days (1 day/area), and in the following areas: Sidon, Beirut, Zahle Tripoli and Bekaa.

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