NATIONAL STUDY OF REPRODUCTIVE TRACT AND SEXUALLY TRANSMITTED INFECTIONS

Survey of High Risk Groups in Lahore and Karachi, 2005

NACP

National AIDS Control Program
Ministry of Health
Government of Pakistan

fhi Family Health International

DFID Department for International Development

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ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
CBO	Community-Based Organization
DFID	Department for International Development
ELISA	Enzyme-Linked Immunosorbent Assay
FHI	Family Health International
FSW	Female Sex Worker
HIV	Human Immunodeficiency Virus
ICDDR	International Centre for Diarrhoeal Research
IDU	Injecting Drug User
MOH	Ministry of Health
MSM	Men Who Have Sex with Men
MSW	Male Sex Worker
N	Number
NACP	National AIDS Control Program
NGO	Non-Governmental Organization
PCR	Polymerase Chain Reaction
PHSC	Protection of Human Subjects Committee
PMRC	Pakistan Medical Research Council
RDS	Respondent Driven Sampling
RPR	Rapid Plasma Regain
RTI	Reproductive Tract Infections
SIUT	Sindh Institute of Urology and Transplantation
SRCS	Systematic Random Cluster Sampling
STD	Sexually Tansmitted Disease
STI	Sexually Transmitted Infection
TLS	Time Location Sampling
TPHA	*Treponema Pallidum* Hemaggultination Assay
TV	*Trichomonas Vaginalis*

ACKNOWLEDGEMENTS

EXECUTIVE SUMMARY

Integrated Biologic (HIV/STI) and Behavioural Surveillance surveys were carried out from March to August 2004 in Lahore and Karachi in the following high risk groups: injecting drug users, female sex workers, male sex workers, Hijras (transgenders) and truckers. Sample sizes were 400 in each group at each site with the exception of Hijras, for whom the sample size was 200 at each site.

Representative sampling methodologies were utilised wherever possible and sexual and drug injecting risk parameters, along with HIV knowledge and intervention access, were measured in the behavioural component. The biologic markers for which specimens were obtained were HIV, syphilis, gonorrhoea and Chlamydia in all respondents, and Trichomonas and bacterial vaginosis in females.

Twenty three percent (94/402) of IDUs in Karachi were HIV infected, and 0.5% in Lahore (2/397). However, 82% used a shared needle in the previous week in Lahore, and 35% did so at all injections. The corresponding figures for Karachi were 48% and 6%. Mobility was high, with 51% of Lahore IDUs injecting in another city in the past year, and 21% in Karachi. Over 30% of all IDUs bought sex from a woman in the previous month, and around 90% of these did not use condoms consistently. Fourteen percent reported unprotected anal sex with men.

HIV infection was found in 4% of MSWs, and 2% of Hijras, in Karachi. None of the infected MSWs or Hijras reported injecting drug use. Over 90% of MSWs sold anal sex to men in the previous month, while 25% of MSWs bought sex from FSWs. HIV was identified in FSWs and truckers in Lahore and over 20% of all FSWs had sex with known IDUs. Sex with FSWs in the past year was reported by 28% of Truckers and none reported 100% condom use. Also, 15% of truckers bought sex from a man or Hijra and 94% never used condoms.

The high levels of sexual risk behaviours with interlinking networks with IDUs, was confirmed by alarming levels of STIs. The most striking examples were among Hijras in Karachi, with 60% syphilis prevalence, 29% rectal gonorrhoea and 18% Anal Chlamydia. In Lahore Hijra had 11% syphilis, 4% genital gonorrhoea and 1.5% genital Chlamydia. In MSWs, syphilis was reported to be 36% in Karachi and 6% in Lahore. In the same group anal gonorrhoea was 17% and anal Chlamydia 10% in Karachi. In FSWs syphilis was 7% in Lahore and 4% in Karachi. Other noticeable finding in FSWs was prevalence of 47% bacterial vaginosis in Lahore and 27% in Karachi. Genital gonorrhoea in this group was 12% in Lahore and 10% in Karachi. In truckers genital gonorrhoea was 3.5% in Karachi, where as prevalence of other STIs in this groups was less than 1%. Hepatitis C was tested in the IDUs and the prevalence was 91% in Lahore and 87% in Karachi. Syphilis among IDUs was 18% in Karachi and 4% in Lahore.

In summary, there has been an explosive HIV epidemic identified in IDUs in Karachi, with a pattern of high geographic IDU mobility. HIV was identified in all of the target groups sampled in at least one site. The heterogeneity and interlinking of high risk injecting and sexual behaviours, combined with low levels of HIV knowledge and prevention activity, and high levels of other STIs, give warning of serious HIV epidemic potential in Pakistan.

There is a high risk that the virus will now spread rapidly: First through injecting drug networks, then to sex partners of IDU and then through commercial sex, especially anal sex.

To avoid a large-scale sexual epidemic, large scale activities must rapidly deliver:

i)   Improved knowledge of HIV, sexual and injecting risk

ii) Access to clean needles and syringes for IDUs

iii) Universal access to condoms and lubricant for those with high risk behaviour

iv) Condom negotiating skills for those men and women selling sex

v)   STI screening and treatment for those at risk

vi) Structural and programmatic support for safe sex and injecting

In order to get a representative picture of the HIV and STIs, it is recommended that similar studies be conducted in Balochistan and the North West Frontier Province.

NATIONAL STUDY OF REPRODUCTIVE TRACT AND SEXUALLY TRANSMITTED INFECTIONS

1. INTRODUCTION

The UNAIDS median estimate for the number of HIV infected individuals in Pakistan at the end of 2003 is 74,000, in a total population of 157 million people. The adult HIV prevalence is estimated at 0.1%. However, there have been reports of relatively small local outbreaks among injecting drug users, and the high levels of injecting and sexual risk networking behaviour, which give notice of HIV epidemic potential in Pakistan. This pattern reflects the situation in many countries in Asia, where the HIV epidemic is concentrated among high-risk groups, principally starting in those involved in injecting drugs and then moving onto individuals buying and selling commercial sex. Clearly, the sexual partners of such individuals are also at risk of acquiring HIV infection, and the epidemic thereby moving into the general population. This has already happened in India, where a principally heterosexual epidemic has led to an HIV seroprevalence in antenatal clinic women which exceeds 3% in the State of Andhra Pradesh.

Another facet of this type of epidemic is that the behaviours which facilitate HIV transmission are either illegal or illicit, especially in a traditional and conservative society. People who engage in these behaviours belong to marginalised groups, or avoid seeking services in such a way which would potentially identify them as a member of a risk group. Male clients of male and female sex workers are a prime example of such a group. As a consequence, the groups at highest risk are often least likely to be sampled by the routine HIV surveillance activities, such as is carried out at general population antenatal clinics, and ingress of the HIV epidemic throughout the country recognised too late to prevent widespread transmission in the high-risk groups.

We are currently witnessing rapidly emerging epidemics in several countries in Asia that had previously recorded relatively low rates of HIV infection. For example, in Indonesia, recorded infection rates among IDUs in Jakarta were close to zero in 1997 and had risen to almost 50% by 2001. In female sex workers, sampled at sites throughout Indonesia, HIV prevalence increased from very low levels in 1998, to a median of 5% and a maximum of 26% in the year 2000. In Nepal, surveillance among IDUs in Kathmandu in 1996 showed that HIV prevalence had reached 50% in that group.The surveillance data from all of the above examples are taken from the UNAIDS website [www.unaids.org]

Surveillance of key risk behaviours is equally important because they are more closely linked to prevention programs, which have such behaviour change as their goal. A behavioural surveillance survey (BSS) implemented by FHI in Indonesia showed, for example, that despite the presence of interventions for sex workers and their clients over several years, condom use had barely increased and commercial sex patronage by men had actually increased [www.fhi.org]. Without these surveys, the Department of Health and its nongovernmental collaborative agencies likely would have believed that these key behaviours were changing.

As a low prevalence country, Pakistan has a critical need to accurately measure both biological and behavioural parameters so that prevention programs can respond and avert a generalised epidemic that is costly in human and monetary terms.

There is little facility-based, and even less community-based information on sexually transmitted infections (STIs) and reproductive tract infections (RTIs) in Pakistan. STI and RTI prevalence information from all the groups surveyed will be presented and discussed in this report.

It should also be noted that this study forms part of the 'National Study of Reproductive Tract and Sexually Transmitted Infections' in Pakistan as discussed below. It makes no claims to nationally representative data.

2. BACKGROUND

In 2002, the Pakistan MoH drafted an Expanded Response Programme, with the assistance of the World Bank and other funding agencies, to combat the spread of HIV and to be implemented over next five years. The objective is to prevent HIV from becoming established in vulnerable populations and spreading to the general adult population. Two key aims of the Expanded Response Programme are:

• Increased prevalence of safe behaviours and improved availability of STI services among vulnerable populations

• Improved knowledge and practice of HIV preventive measures including use of high quality STI services by the general population

The Government of Pakistan has shown a commitment to the ICPD plan of action regarding RTIs and STIs and also for limiting the spread of an HIV/AIDS epidemic in Pakistan. However, there is a current lack of data needed for sound programme planning and monitoring. The MoH and NACP envisaged that the National Study of Reproductive Tract and Sexually Transmitted Infections will provide the benchmarks for monitoring the progress of the Expanded Response Programme.

The overarching objective of the National Study was to design a national survey of RTIs and STIs with outputs that would feed into policy development and programme planning. The objectives were stated as follows:

i)   Obtain estimates of the prevalence of selected RTIs/STIs from samples that can defensibly construed as nationally and provincially representative, using the most reliable epidemiological and laboratory techniques that can practically be applied.

ii) Gather from all study participants a limited range of information about clinical symptoms, knowledge, beliefs, attitudes, and behaviours related to STDs;

iii) Examine in greater depth, from sub-samples within the above sampling framework: knowledge, beliefs, attitudes, and behaviours associated with risk practices and with health seeking behaviours; and

iv) Acquire estimates of prevalence of selected RTIs/STIs and associated behavioural factors from purposive samples of known or suspected high-risk groups.

The overall design of the National study was developed in active consultation between the Secretary, Ministry of Health, the Director-General Health and the programme manager of the National AIDS Control Programme, in collaboration with the UK Department for International Development. In the design phase, a team comprising experts from National and International organisations and institutions participated in six design workshops. The products of these consultations were presented by a team from the London School of Hygiene & Tropical Medicine, the Population Council and the Aga Khan University.

It was recommended that high-risk groups, bridging populations and the general population be studied as three distinct population groups in three separate studies. After discussion, it was decided to focus attention on the following five high-risk groups: female sex workers, male sex workers, hijras, injecting drug users and truckers.

Family Health International (FHI), in partnership with the Pakistan Medical Research Council (PMRC) Lahore, Shaukat Khanum Memorial Cancer Hospital and Sindh Institute of Urology and Transplantation were selected to implement the high-risk groups component in October, 2003 and data collection started in March, 2004.

3. OBJECTIVES

The objectives of the high-risk component of the survey:

i)   To estimate the prevalence of HIV and other classical STIs (syphilis, gonorrhoea, chlamydia, bacterial vaginosis, hepatitis C, and Trichomonas);

ii)   To measure key behaviours that modify the risk for HIV and other STIs;

iii) To assess self-reported STI symptoms and associated treatment-seeking behaviour;

iv)   To measure knowledge of HIV and STIs and perceived risk of infection and means of avoiding infection.

4. METHODS

4.1 Respondents

The following high-risk groups recommended by the study design team were sampled in the cities of Lahore and Karachi, as suggested by the design team:

- Female Sex Workers.
- Male Sex Workers.
- Hijras.
- IDUs.
- Truck Drivers and Assistants.

4.2 Target Group Definitions:

i)   Female Sex Workers: Women, engaging in sex, part-time or full time, as means of living, at least once in the past three months.

ii)   Injecting Drug Users: Males, who have injected drugs at least once in the past six months.

iii) Male sex workers: Men, 15 years of age or more, who sold sex at least once in the past one year.

iv)   Hijras: Individuals, who were born biologic males, but have adopted a female sexual persona and dress as women.

v)   Truckers and Assistants: Men driving trucks or assisting drivers along inter-state transport routes.

4.3 Justification for Sample Sizes for Key Target Groups

Sample sizes for each population sub-group included in this study were calculated on the basis of the following factors typically used in surveys with probability samples:

i)   the expected baseline value of key indicators (consistent condom use was used in the sample size computations);

ii)   magnitude of change it is desired to be able to detect in a follow-up study;

iii) confidence level;

iv)   statistical power; and

v)   design effect.

The following formula was used to determine the sample size for target groups:

$$ n = D \frac{\left[\sqrt{2P(1-P)} Z_{1-\alpha} + \sqrt{P_1(1-P_1) + P_2(1-P_2)} Z_{1-\beta} \right]^2}{\Delta^2} $$

Where:

D = design effect;

P1 = the estimated proportion at the time of the first survey;

P2 = the proportion at some future date, such that the quantity (P2 - P1) is the size of the magnitude of change it is desired to be able to detect;

P = (P1 + P2) / 2;

Δ2 = (P2 – P1)2

Z_{1-} = z-score corresponding to the probability with which it is desired to be able to conclude that an observed change of size (P2 - P1) would not have occurred by chance; for this survey we will use a one-sided test – assuming that risk behaviour will decrease as a result of interventions; and

Z_{1-} = z-score corresponding to the degree of confidence with which it is desired to be certain of detecting a change of size (P2 - P1) if one actually occurred.

The following assumptions have been made regarding these parameters:

i) Expected baseline value: 50%. Measurements require the highest sample size to detect change when the baseline is 50%, hence this figure was used. If it can be safely assumed that baseline values of all indicators are significantly lower or higher, then sample sizes could be lowered.

ii) Desired change to detect: 10-15%. This refers to the amount of change that can be detected between two survey rounds. For example, if condom use changed by an absolute 10-15%, this would be detected as a statistically significant change. A lower absolute change would not be considered statistically significant. Smaller differences require larger sample sizes.

iii) The alpha level has been set at 0.05, corresponding to 95% confidence in the observed estimates.

iv) The beta level has been set at 0.10, corresponding to 90% power.

Design effect: 1.7 for time-location sampling and 1.5 for RDS. This adjusts for the use of sampling designs that are not simple random methods, e.g. cluster sampling.

Minimum sample size requirements per target group to measure both differences between groups and changes over time at the levels of significance and power indicated above are summarized in Table 1, below:

Table - 1: Sample size requirements and sampling methodologies

High Risk Group	Sample sizes required for the behavioural survey						
	Indicator	Expected baseline value	Change to Detect	% in denominator	Design Effect	Required sample size	Sample size (rounded off)
FSW	Consistent condom use with clients	50%	15%	ALL	1.7 SRCS[1]	385	400
Male Sex Worker	Consistent condom use with clients	50%	15%	ALL	1.5 RDS[2]	339	400
Hijras (aggregate sites in analysis)	Consistent condom use with clients	50%	15%	ALL	1.5 SRCS	339	400
Injecting Drug User	Consistent use of sterile needle	50%	15%	ALL	1.5 TLS[3]	339	400
Truckers (aggregate sites in analysis)	Consistent condom use with FSW	50%	15%	ALL	1.7 SRCS	339	400

1 SRCS – systematic random cluster sampling
2 RDS – respondent driven sampling
3 TLS – time-location sampling

It should be noted that 400 for each target group at each site was also recommended by the design team. Where the design proposed and implemented by FHI differed from that recommended was in Hijras and Truckers. For Hijras, the sample size at each site was set at 200 because local key informants believed that it would be difficult to recruit 400 transgenders at each site. For truckers, it was thought that the time taken to recruit and manage a sample size of 800 at each site would prolong this single component of the study beyond an affordable time, and would delay the release of results. In any case, truckers are, by definition, mobile and not exclusive to any geographic site. For both groups, the option to aggregate the data for analysis was retained.

4.4 Ethical Review

Participation of all respondents in the studies was strictly voluntary. Measures were taken to assure the respect, dignity and freedom of each individual participating. Emphasis was placed on the importance of obtaining oral informed consent during training of the field staff. Complete confidentiality of study subjects was emphasised. Names or addresses of respondents were not asked or recorded.

This protocol was prepared in cooperation with PMRC that ensured that the methodology and the procedures laid out in it were in accordance with accepted ethical standards. Study protocols, questionnaires and consent forms for the target groups were also approved by the FHI Protection of Human Subjects Committee, and the Institutional Review Board of a national NGO, HOPE in Karachi.

4.4.1 Consent Form

The consent form explained all the behavioural and biologic sampling and examination procedures, along with the risks and benefits. A member of staff read out the contents of the consent forms, clarified any issues and answered any questions. The member of staff then signed the consent form as completed, and a second member of staff who had witnessed the process also signed the form.

4.5 Study Preparation

A central project office was established at Pakistan Medical Research Council's office in Sir Ganga Ram Hospital, Lahore. All necessary equipment was installed along with the recruitment of staff required for the smooth implementation of the project. Hard copies of completed questionnaires were transported to this location and kept in a locked cupboard during the Lahore data collection phase, and interim security arrangements made in Karachi for the data collected, before transport to the central office.

4.5.1 Selection and Training of Field Staff

PMRC was responsible for the engagement of project staff. In addition to these field personnel, PMRC committed its own personnel to the study, including the principal investigator/project manager, one deputy project manager, one project coordinator, contracted field staff, as well as financial and administrative support personnel. In addition, FHI staff and consultants were engaged as necessary during the mapping and sampling frame construction phases.

The staff was trained during a one week training course held in Lahore and appropriate cadres took part in the pre-test of the questionnaires, carried out before the finalization of the questionnaires, and field-testing the appropriate clinical and laboratory processes.

4.5.1.1 Interviewer Training

PMRC prepared interviewer guidelines, based on the set prepared by FHI for use with behavioural surveys. Training topics included:

- The presentation of the surveillance studies and their social and scientific goals and objectives;
- The study methodology (including sampling approach)
- Acceptance of the lifestyle of the target group and stigma reduction
- The consent process
- Techniques of filling out questionnaires
- Simulated interviews in Urdu

4.5.1.2 Clinical Staff Training

In the training for doctors, selected for the collection of biological data, audiovisual aides and other required materials were used, making sure that by the end of the training doctors were well versed and understood the study protocols for the physical examination collection of biological specimens.

4.5.1.3 Laboratory Staff Training

The principal laboratory partners were Shaukat Khanum Memorial Cancer Hospital in Lahore and Sindh Institute of Urology and Transplantation (SIUT) in Karachi. Consultants from the International Centre for Diarrhoeal Disease Research in Bangladesh (ICCDR) carried out oversight of the quality assurance process and trained the laboratory staff of Shaukat Khanum Memorial Cancer Hospital, staff of SIUT Karachi, and the project staff who were involved in the collection, handling and transportation of biological specimens. Training was carried out in Shaukat Khanum Hospital and at the field-sites.

4.6 Community Mobilization

Before the start of data collection, local NGOs, CBOs or individuals working closely with specific target groups in Karachi and Lahore were identified as project information conduits, key informants and study 'gatekeepers'. These gatekeepers also performed the role of project introduction and screening of respondents if there was doubt regarding membership of the relevant group. They never acted as interviewers and had no access to study information.

4.7 Data Collection

Data collection in Lahore began in March 2004 and ended in May 2004. Data collection began in June 2004 and finished in August 2004 in Karachi.

4.7.1 Sample Size

The target sample size was 400 for each group at each site, with the exception of Hijras, where a sample of 200 at each site was planned. The actual numbers of respondents sampled and included in the analysis are outlined in table 2, below:

Table - 2: High Risk Group Sample Size: Karachi and Lahore

Target Group	Karachi	Lahore	Total
Female Sex Workers	423	404	827
Male Sex Workers	407	400	809
Hijras	199	204	403
IDUs	402	397	799
Truck Drivers and Assistants	402	400	802

4.7.2 Selection and Establishment of Centres for Data Collection:

Five centres were established for collection of biological and behavioural data, one for each target group, in both Lahore and Karachi. The criteria, basic requirements and standards for selection of sites for each centre were worked out in detail before finalization of the sites. The following points were considered for the selection of sites for the centres:

• Close geographic proximity to the target group population.
• In case of scattered population of the target group, a central place was selected.
• Enough room and space available for setting up rooms for clinical examinations, interviewing and registration of respondents. Keeping in mind the confidentiality, privacy and respect for the respondents.
• Presence of electricity, running water, and a toilet.
• Logistically easy accessibility.

For FSWs, IDUs and truckers respectively, this meant renting rooms in the red-light areas, overlooking a major shooting-gallery and adjacent to the major truck-stop in each city. Centres for MSWs and Hijras were more centrally placed, in areas in which these populations would feel comfortable.

4.8 Respondent Sampling

Probability sampling was employed wherever possible. Where this was not thought to be possible, or did not prove to be possible, a chain referral system (respondent driven sampling, or RDS) was used. Respondent driven sampling is a new technique which seeks to deliver a representative sample through chain referral of individuals who refer individuals they know personally from their network [Heckathorn].

Female Sex Workers (FSWs)

A systematic random sample was taken in the red-light district of Lahore, where small household brothels – where two or three women selling sex live – were identified. Every sixth house in selected roads and alleys were sampled. The situation in Karachi was much more difficult, with a poorly defined red-light district. A sampling frame was developed, but it became clear that the sample could not be recruited in this manner and the project managers changed to RDS methodology before the start of data collection. It must be noted however, that the strict rules of RDS could not be sustained in this environment, and the resultant respondent group is best described as a snowball sample.

Male Sex Workers (MSWs)

RDS was used for the MSWs in Lahore. Fifteen seeds, or chain initiators were sampled. In Karachi, the same constraints applied as for the FSW group, and a snowball sample was obtained.

Hijras

Cluster sampling based on the random selection of Gurus (mentors). A list of Gurus was drawn up and their associated Hijras were enumerated, a random selection process carried out, and all the Hijras under the selected Gurus control invited to participate. A systematic random sample of enlisted Gurus was taken for sampling purposes and all Hijras under selected Guru were included in the sample.

Injecting Drug Users (IDUs)

The most frequented shooting galleries (parks, sections of streets) in Lahore and Karachi were selected and respondents chosen using a time-location methodology, where repeated trips were made to each site and different times on different days, and a random selection of individuals at the site invited to participate.

Truckers

Lists of trucking forwarding agents in the major truck-stop in Lahore and the major truck-stop in Karachi were drawn up. A random

selection of these agents were informed of their selection before their turn for sampling, and the drivers and assistants on the two trucks which arrived after an allotted time on a given date were invited to participate. There are, on average, 2 drivers and 2 assistants on each truck, so 50 forwarding agents were selected.

4.8.1 Behavioural Component

The behavioural questionnaire was administered in a private setting by trained interviewers of the same gender. The base of the questionnaires for each target group was the questionnaire developed and used in Bangladesh in 2002 for each target group, and adapted for local use in Pakistan before being translated into Urdu. The questionnaire was back-translated and pre-tested to ensure clarity and understanding.

Indicators, formulated to conform with international standards, included:

- Sexual risk behaviour including number & type of sex partners ("commercial", "regular" & "non-regular")
- Condom use with different types of sex partners
- Other practices related to condom use & safe sex
- Knowledge of STIs & STI care-seeking behaviours
- Knowledge & attitudes toward HIV/AIDS
- Drug & substance use (including injecting & needle sharing)
- Perception of HIV & STI risk
- Exposure to HIV/AIDS prevention interventions

4.8.2 Clinic Procedures

Truckers

Site administrative staff greeted the respondent and provided an orientation and completed registration. Interviewers took the respondent to a confidential area, where they ascertained that the individual was appropriate to be interviewed. Witnessed consent was then obtained for the interview, sample collection and examination. The interview

was then completed. The interviewer then gave the respondent a urine sample container and advised them to go to urinate, and pass the first 20ml into the urine container. The respondent returned with the specimen and was directed to the laboratory assistant, who took the urine specimen and a 10ml venous blood sample. It was then explained where and when the HIV and syphilis blood results would be available.

The doctor took a brief STI and general health history. The respondent was asked to stand up and lower his trousers to his knees. The penis, scrotum, perineum and inguinal area were examined for any discharge, ulcers, swellings, warts etc. If the man was uncircumcised, the foreskin was fully retracted. Finally the buttocks were separated to visually inspect the anal area.

Treatment was administered for any symptomatic STIs or simple ailments for which ready treatment is available. Any more complex problems were referred to a local public health facility for further management. The details of how to access their HIV and syphilis results were re-emphasised before the respondent left the clinic.

IDUs

Site administrative staff greeted the respondent and provided an orientation and complete registration. Interviewers took the respondent to a confidential area, where they ascertained that the individual was appropriate to be interviewed by examining the respondents' arms for needle track marks. Witnessed consent was then obtained for the interview, sample collection and examination. If the individual was considered appropriate, they then completed the standard interview. The interviewer then gave the respondent a urine sample container and advised them to go to urinate, and pass the first 20ml into the urine container. It should have been at least two hours since they last passed urine. The respondent returned with the specimen and

was directed to the laboratory assistant, who took the urine specimen and then a 10ml venous blood sample. It was explained where and when the HIV and syphilis blood results were available.

The doctor took a brief STI and general health history. The respondent was asked to stand up and lower his trousers to his knees. The penis, scrotum, perineum and inguinal area were examined for any discharge, ulcers, swellings, warts etc. If the man was uncircumcised, the foreskin was fully retracted. Finally the buttocks were separated to visually inspect the anal area.

Treatment was administered for any symptomatic STIs or simple ailments for which ready treatment is available. Any more complex problems were referred to a local public health facility for further management. The details of how to access their HIV and syphilis results were re-emphasised before the respondent left the clinic.

Hijras

Site administrative staff greeted the respondent and provided an orientation and complete registration. Interviewers took the respondent to a confidential area, where they ascertained that the individual is a Hijra and appropriate to be interviewed. Consent was then obtained for the interview, sample collection and examination. If the individual is considered appropriate, they then completed the standard interview.

The interviewer then gave the respondent a urine sample container and advised them to go to urinate, and pass the first 20ml into the urine container. It should have been at least two hours since they last passed urine. The respondent returned with the specimen and was directed to the laboratory assistant, who took the urine specimen and a 10ml venous blood sample. It was explained where and when the HIV and syphilis blood results would be available.

The doctor took a brief STI and general health history. The respondent was asked to stand up and lower his trousers to his knees. The penis, scrotum, perineum and inguinal area were examined for any discharge, ulcers, swellings, warts etc. If the hijra was uncircumcised, the foreskin was fully retracted. The respondent was asked to lie on the examination table in prone position so that an anal swab could be taken. The buttocks of the patient were separated and the anal swab was collected by insertion of the swab stick into the anus to distance of about 2.5 cm. The swab was rotated and moved gently from side to side for 10-12 seconds. If the swab was contaminated with faecal material the procedure was repeated. The swab was placed in the Amplicor tube, and vigorously swirled in the liquid for 15 seconds. The tube was closed tightly and kept cool at 4-8°c.

Treatment was administered for any STIs or simple ailments for which ready treatment was available. Any more complex problems were referred to a local public health facility for further management. The details of how to access their HIV and syphilis results was re-emphasised before the respondent left the clinic.

MSWs

Men were identified in the community by a previous respondent and escorted to the study site. The escort was thanked, the voucher collected and registered, and the incentive given. Site administrative staff greeted the respondent and provided an orientation and completed registration. Interviewers took the respondent to a confidential area, where they ascertained that the individual was an MSW and appropriate to be interviewed. Consent was then obtained for the interview, sample collection and examination. If the individual was considered appropriate, they then completed the standard interview.

The interviewer then gave the respondent a urine sample container and advised them to

go to urinate, and pass the first 20ml into the urine container. The respondent returned with the specimen and was directed to the laboratory assistant, who took the urine specimen and a 10ml venous blood sample. It was explained where and when the HIV and syphilis blood results would be available.

The doctor took a brief STI and general health history. The respondent was asked to stand up and lower his trousers to his knees. The penis, scrotum, perineum and inguinal area were examined for any discharge, ulcers, swellings, or warts. If the man was uncircumcised, the foreskin was fully retracted. The respondent was asked to lie on the examination table in prone position so that an anal swab could be taken. The Female swab from the Roche specimen collection kit was used for this specimen. The buttocks of the patient were separated and the anal swab was collected by insertion of the swab stick into the anus to distance of about 2.5 cm. The swab was rotated and moved gently from side to side for 10-12 seconds. If the swab was contaminated with faecal material the procedure was repeated. The swab was placed in the Amplicor tube, and vigorously swirled in the liquid for 15 seconds. The tube was closed tightly and kept cool at 4-8°c.

Treatment was administered for any STIs or simple ailments for which ready treatment was available. Any more complex problems were referred to a local public health facility for further management. The details of how to access their HIV and syphilis results was re-emphasised before the respondent left the clinic.

The respondent was given his small incentive and three vouchers with the respondent's number. He was requested to bring up to three friends or acquaintances who have sold sex in the previous one year. He was informed that a small incentive would be paid to him for every new individual respondent he brought for sampling.

FSWs

Site administrative staff greeted the respondent and provided an orientation and completed registration. Interviewers took the respondent to a confidential area, where they ascertained that the individual was an FSW and appropriate to be interviewed. Witnessed consent was then obtained for the interview, sample collection and examination. If the individual was considered appropriate, they then completed the standard interview. The laboratory assistant took a 10ml blood sample. It was explained where and when the HIV and syphilis blood results would be available.

The doctor took a brief STI, menstrual and general health history. The respondent was asked to lie down on the couch and disrobe below the waist. The external genitalia, perineum, inguinal and anal area were examined for any discharge, ulcers, swellings, warts etc. A speculum examination, with only water as lubricant, was carried out. One endocervical swab was introduced 2cm into the cervical os. It was gently rotated by rolling between the examiners index finger and thumb for 10 seconds. This swab was plated onto modified Thayer-Martin media, which was then placed in a candle jar. This process was repeated with a second endocervical swab, only this time the swab was placed in the PCR collection container. Finally, a gentle two fingered vaginal examination was carried out to identify any adnexal masses or tenderness and cervical excitation.

All FSWs were treated with presumptive therapy for gonorrhoea, chlamydia, Trichomonas, and bacterial vaginosis with azithromycin (1g), ciprofloxacin (500 mg), and metronidazole (2g) as a once-only dose at the time of the examination. This ensured that all women are treated for curable STIs at the time of presentation. Treatment was administered for any ulcerative STIs or simple ailments for which ready treatment was

4.8.3   Biologic Sampling

The biologic sampling for each group are summarised in Table -3, below.

Table -3: Biologic Sampling Protocol

Respondent group	Infection prevalences to be measured	Diagnostics
Female Sex Workers	HIV, Syphilis, Gonorrhoea, Chlamydia, Bacterial Vaginosis, *Trichomonas*	• HIV: Two ELISAs of different origin • Syphilis: RPR, TPHA confirmation • Gonorrhoea: PCR • Chlamydia: PCR • Bacterial vaginosis: Gram stain • *Trichomonas*: In Pouch • Hepatitis C: antibody assay
Male Sex Workers and Hijras.	HIV, Syphilis, Gonorrhoea, Chlamydia (urethral and rectal)	
Injecting Drug Users	HIV, Syphilis, Hepatitis C Gonorrhoea, Chlamydia	
Truckers and attendants	HIV, Syphilis, Gonorrhoea, Chlamydia, Trichomonas	

available. Any more complex problems were referred to a local public health facility for further management. The details of how to access their HIV and syphilis results were re-emphasised before the respondent left the clinic.

4.8.4   Laboratory Procedures

Shaukat Khanum Memorial Cancer Hospital and Research Centre served as the primary laboratory for Lahore and Sindh Institute of Urology and Transplantation served as primary site for Karachi. The Centres were assisted in methods and quality control by international consultants associated with the AIDS Department of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B).

• HIV serologic testing was performed using two enzyme-linked immunosorbent assay (ELISA) tests for screening and confirmation of positive results

• Polymerase chain reaction (PCR) for N. gonorrhoeae and C. trachomatis: High vaginal swab specimens from women and urethral and rectal swabs from men were stored in a cool box until they were transported for processing to the PMRC laboratory at Fatima Jinnah Medical College in Lahore, and SIUT, in Karachi. There the specimens were frozen at –20 C, batched, and tested according to the manufacturer's directions.

• Syphilis serologic testing were performed on sera transported in a cool box and processed using a quantitative rapid plasma reagin (RPR) screening test with a qualitative Treponema pallidum hemagglutination assay (TPHA) confirmation test. Syphilis was diagnosed as qualitatively positive RPR with positive TPHA confirmation.

• Trichomonas vaginalis was cultured in InPouch from urine from men and high vaginal swabs from women.

• Bacterial vaginosis was identified by a Nugent scoring process on a gram stain of a high vaginal swab.

• Hepatitis - C testing was performed on sera using an enzyme-linked immunosorbent assay. Confirmation using a second test system was not employed.

4.8.5 HIV Test Results and Syphilis Treatment:

Ensuring that participants have access to their HIV test results was a critical part of this

survey. Individuals were given an identification card with their study number, and they were informed that they could use this card to find out their HIV and syphilis results. Given the mobility of the population, arrangements were made with specified clinics or hospitals to provide free treatment and counselling. Training in counselling for HIV, STIs, and other blood borne infections was provided to participating service providers. The counselling was arranged at the designated clinic sites where results were given and treatment was administered. Syphilis was diagnosed and penicillin treatment recommended after a qualitatively positive RPR and TPHA, because of the potential risks of leaving an active infection untreated.

4.9 Data Management and Analysis

Standardized questionnaires were translated and adapted in Urdu. These questionnaires included questions on international indicators on risk behaviours. Results of lab tests and behaviour data were entered in SPSS and weighted and logistic regression analysis was done using STATA.

4.10 Monitoring:

The study was carried out in Pakistan by PMRC, with technical, logistic and financial management assistance from Family Health International. Supervisors maintained quality control by frequently checking on correct application of the sampling methodology and administration of the questionnaire during the field operation. Supervisors verified and coded the data. The project manager supervised the process of data entry and data analysis.

Project management team was monitoring the activities on day-to-day basis, Deputy Project Manager spent more than 90% of his time in the field supervising and monitoring the data collection in both the cities of Lahore and Karachi.

NACP being the chief beneficiary of this activity, was kept informed of the activities

and outcomes of the study process. This communication was helpful in getting timely support and guidance from the NACP.

DFID Pakistan played a consultative role in relation to PMRC, FHI and other collaborators and participated in study activities as appropriate.

FHI was responsible for the technical oversight and financing of this activity with DFID funds. FHI administered the sub agreement between FHI and PMRC. In addition to financial, technical and administrative oversight, FHI provided technical assistance to PMRC, both from FHI Asia Pacific Division (APD) in Bangkok and the Country office in Pakistan. The areas of technical assistance included review and finalization of study questionnaires, sampling frames, clinical and laboratory protocols, analysis plans and writing of the final report.

In addition, a Project Steering Committee that was constituted by Ministry of Health to monitor day-to-day progress of the study monitored the overall conduct of the study. The aims of the Steering Committee were:

I. To ensure that ethical, legal, logistic, communication and financial provisions for the smooth running of the project are adequately addressed.

II. To monitor the conduct of the study and ensure that the project implementation plan is followed during the data collection period.

III. To approve the results of study and guide dissemination of preliminary report.

The constituent members of the Steering Committee were:

i) Director General Health Ministry of Health

ii)   Program Manager National AIDS Control Programme

iii) Representative of Department For International Development, UK

iv)   Representatives of Family Health International and its partners

v)   Representative of Canadian International Development Agency

vi)   Program Manager Punjab Provincial AIDS Control Programme

vii) Program Manager Sindh Provincial AIDS Control Programme

viii) Representative of the World Bank

ix)   Representative of Civil Society Organization

x)   Technical Member (microbiologist)

The steering committee met on three occasions:

•   February 2004: To review progress of study preparations

•   April 2004: To review progress of implementation

•   August 2004: To review preliminary results and guide dissemination

5. RESULTS

5.1 HIV and Behavioural Indicators

Data tables outlining the descriptive analysis of the behavioural responses for each of the target groups at each of the sites are contained in the appendices (I-V). The more cohesive and programmatically relevant analysis is presented here, in the main body of the results.

The median age, and age range, of respondents is outlined in Table - 4. There were 14 respondents who reported that their age was below 15 years. Of these, 12 were MSWs.

The education level of respondents was generally low, with over 3/4th of FSWs having received no formal schooling (Table - 5). The absence of formal education was also over 50% in male groups, with the exception of truckers, of whom around 40% had never been to school.

The median income of all groups was between US$50 and US$90, as outlined in Table - 6. Sixty two percent of IDUs in Karachi and 43% in Lahore made money performing labouring jobs in the previous month.

Table - 4: Age of Respondents

Group	CITY	N	Minimum	Maximum	Median
FSW	Karachi	422	15	66	35
	Lahore	403	15	70	35
Trucker	Karachi	402	17	59	27
	Lahore	400	17	65	32
Hijra	Karachi	200	15	50	25
	Lahore	203	13	45	22
MSW	Karachi	409	14	65	24
	Lahore	400	13	62	23
IDU	Karachi	402	14	70	35
	Lahore	397	18	75	33

Table - 5: Percentage of Respondents with No Formal Schooling

Group	CITY	Frequency	Percent
FSWs	Karachi	322	76.3
	Lahore	337	83.6
Truckers	Karachi	182	45.3
	Lahore	138	34.6
Hijra	Karachi	100	49.8
	Lahore	105	51.7
MSW	Karachi	237	57.9
	Lahore	230	57.5
IDU	Karachi	237	59.0
	Lahore	243	61.2

Table - 6: Total Income from Previous Month

Group	CITY	Median Inmcome PkRs*
FSWs	Karachi	4000
	Lahore	5000
Truckers	Karachi	3500
	Lahore	3500
Hijra	Karachi	3500
	Lahore	3500
MSW	Karachi	3000
	Lahore	3000
IDU	Karachi	3000
	Lahore	3000

* 60 PkRs/1 US$

The HIV prevalence measured in the high-risk groups of Karachi and Lahore is outlined in Figure 1.

Analysis revealed no significant demographic or behavioural differences between the HIV positive and HIV negative IDUs. The finding suggests that the infection transmission is not contained within any one sub-group, and that all are at immediate risk. This also applies to the MSW and Hijra groups.

The drug injection patterns in Karachi and Lahore differed widely, with 70% of IDUs in Karachi injecting heroin within the previous month, compared 2% in Lahore. The drug most commonly injected drug in Lahore was Chlorpheniramine maleate (Avil), with 96% of IDUs in Lahore had injected within the previous month.

Although the HIV prevalence in IDUs in Karachi was much higher than Lahore at the

Figure - 1: HIV prevalence (%) in high-risk groups of Karachi and Lahore
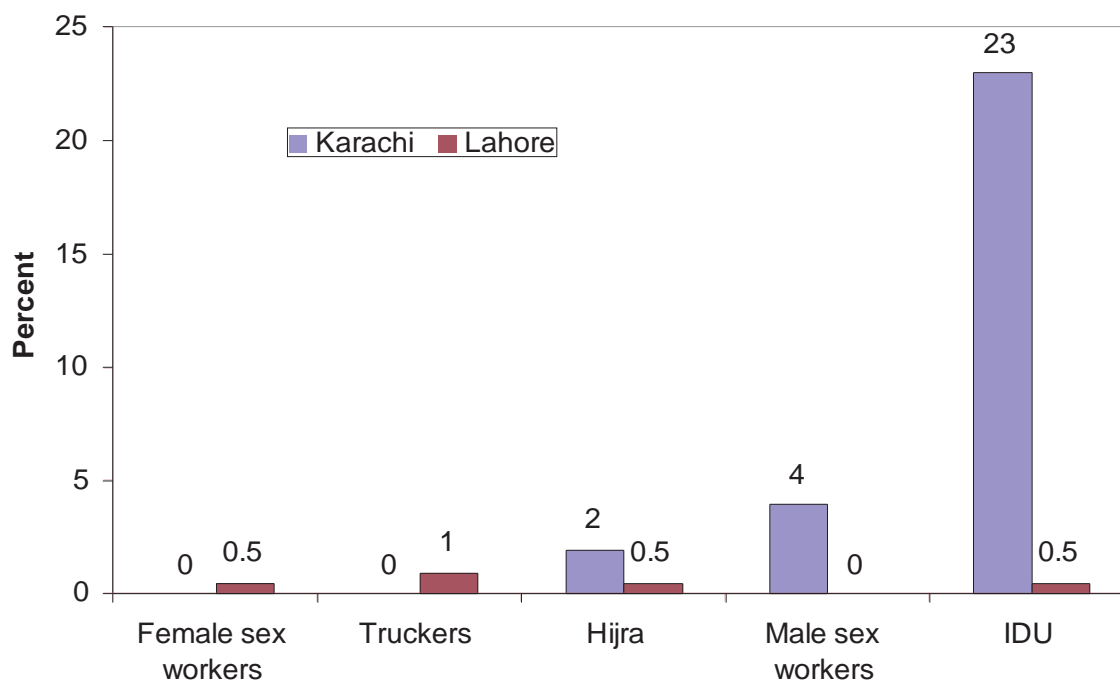
Figure- 2: IDU injection risk, Karachi and Lahore
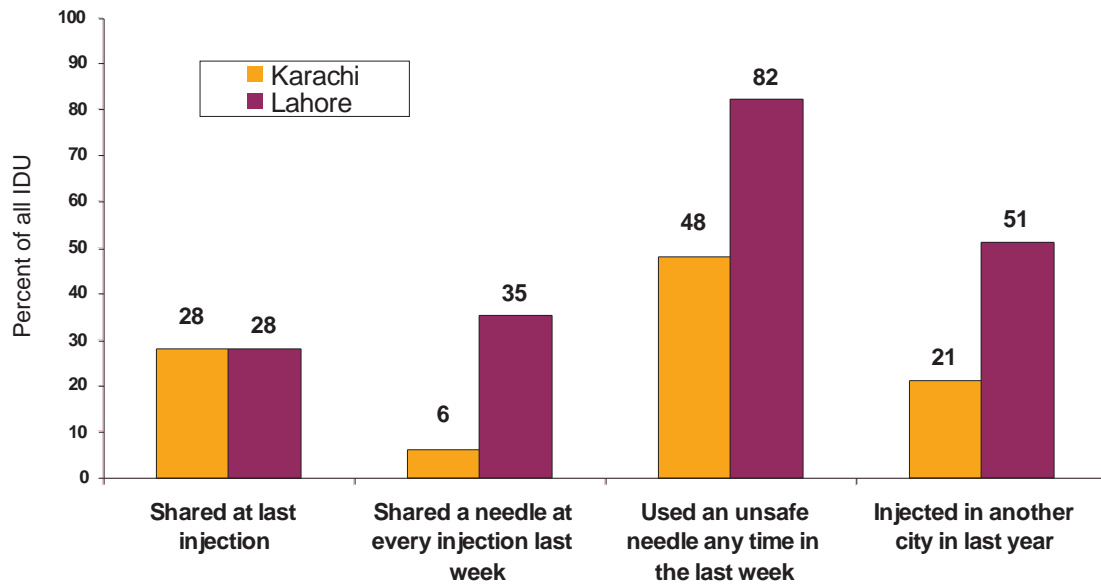
time of testing, it must be noted that reported unsafe injecting behaviour is significantly higher in Lahore, where 82% reported using a shared needle at some time in the previous week and 35% reported using a shared needle at all injections in the previous week. The corresponding figures for Karachi were 48% and 6% (Figure – 2).

While the percentage of IDUs, who have been involved in an intervention in the past year, is highest among all the high risk groups sampled (Figure - 3), it is under 25% in Karachi and extremely low for all the other groups.

Figure - 3: High risk group intervention contact in the previous year
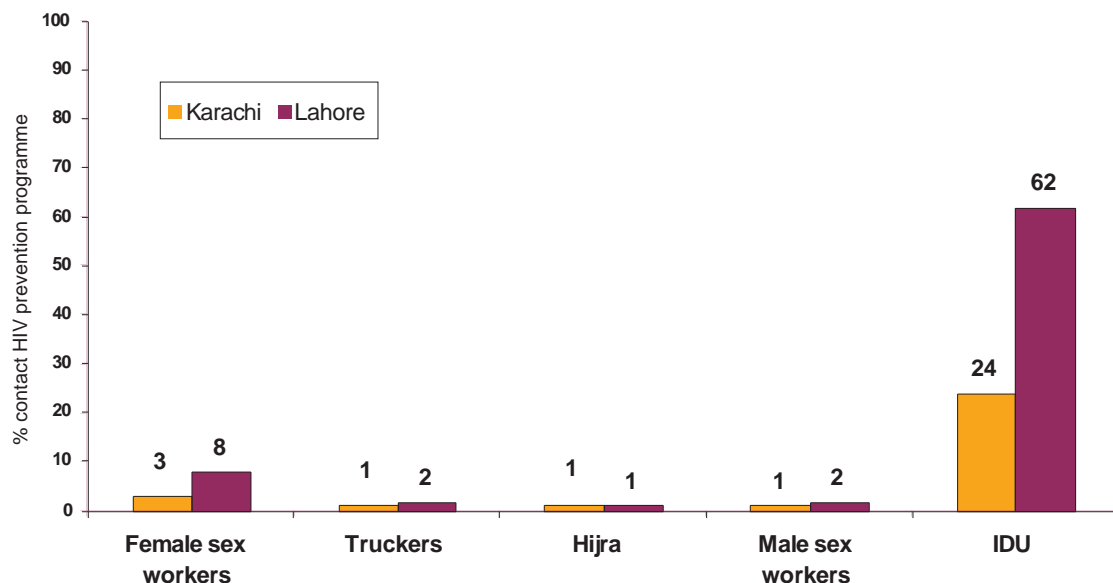
Figure - 4: HIV harm-reduction interventions delivered to IDUs in the past year
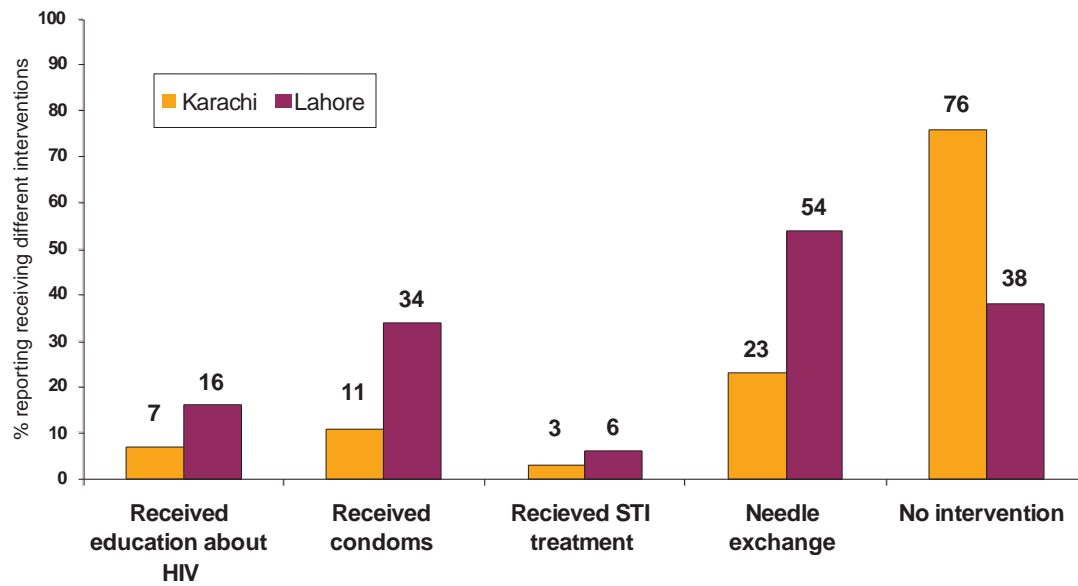
The different components of interventions delivered to IDUs in the past year are outlined below (Figure-4). Reports indicate that the interventions are not yet widely available and do not deliver a standard package of comprehensive care.

Of those IDUs who reported any intervention contact in the past year, attendance within the previous month was inconsistent (Figure - 5).

This low frequency of intervention contact for needle exchange can be put into context when the estimated number of injections, compared with frequency of attendance, is noted (Figure - 6). On average, IDUs would need to collect 20-30 needles per visit in order to meet their needs.

Figure - 5: IDUs who had participated in interventions in the previous year – participation in the past month

Number of times participated in programme in last month, of those using needle exchange last year

■ 5 or more ■ 2-4 ■ Once ■ Not in last month
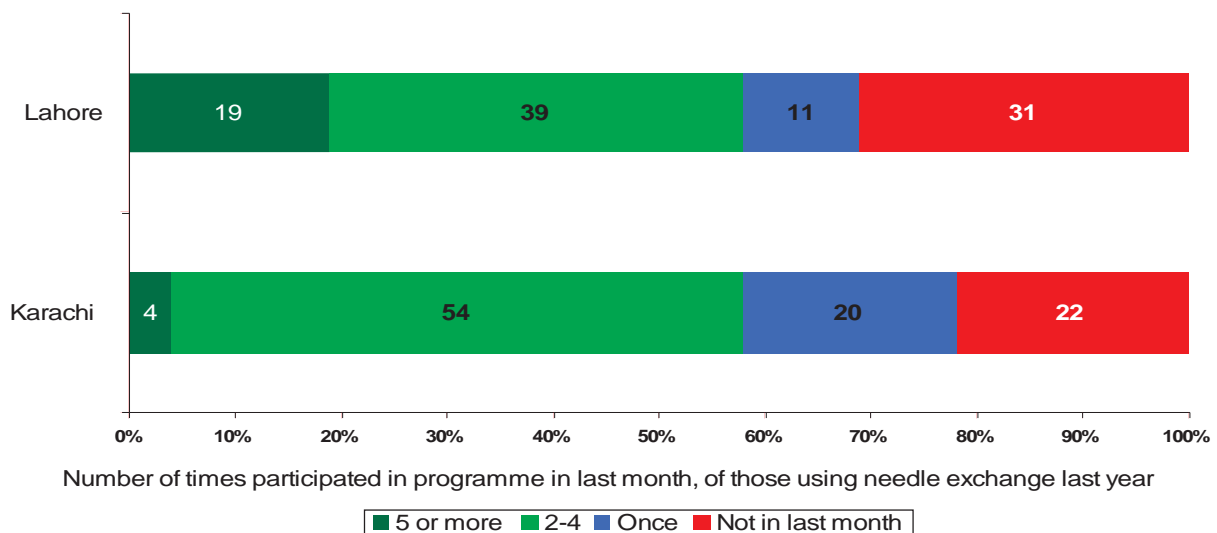
Figure - 6: Mean number of IDU injections compared with mean number of IDU needle exchange visits
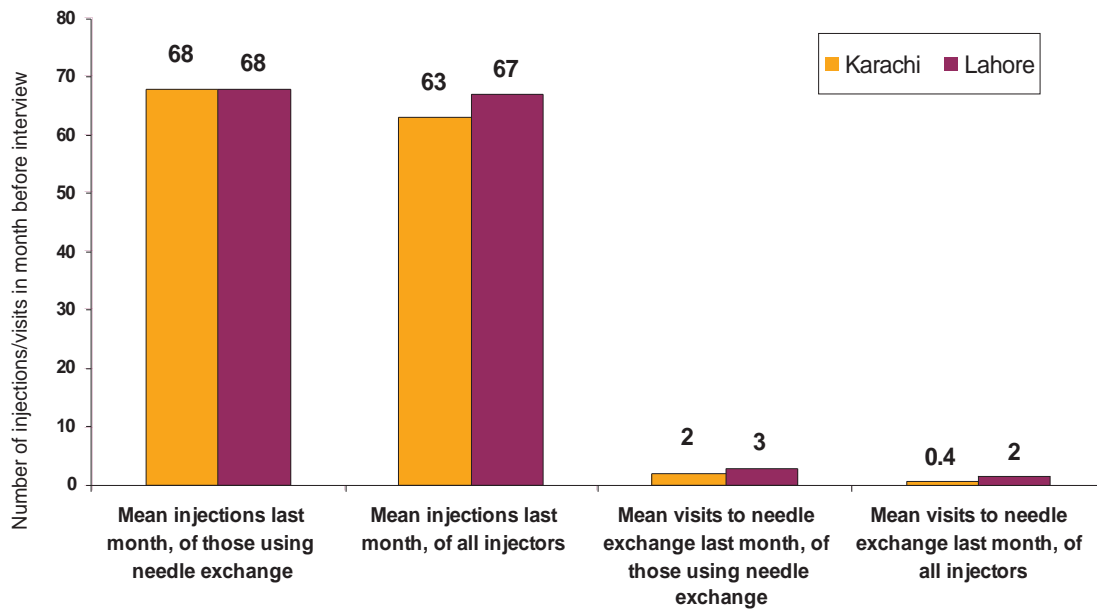
IDU contact with NGO, health, or law enforcement agencies in the previous year was higher in Lahore than Karachi (Figure - 7). Clearly there is a window of opportunity for beginning the process of stopping injecting practices with each contact.

The percentage of IDUs, who had sought to find out their HIV status at some point, was under 10% at both sites and did not differ by current HIV status. The IDUs, who were HIV positive, did not differ significantly from those, who were HIV negative, in age, frequency of injecting, needle sharing behaviour, commercial sex behaviour, or HIV risk perception (Figure- 8).

Figure 7: Voluntary or enforced interruption of injecting for IDUs in the past year
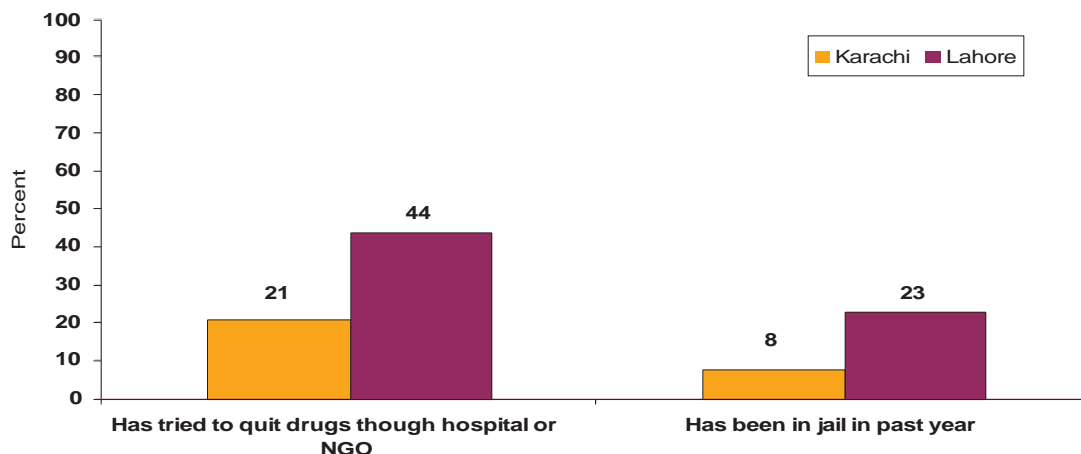
Figure - 8: IDU previous access to knowledge of HIV status, by current HIV status
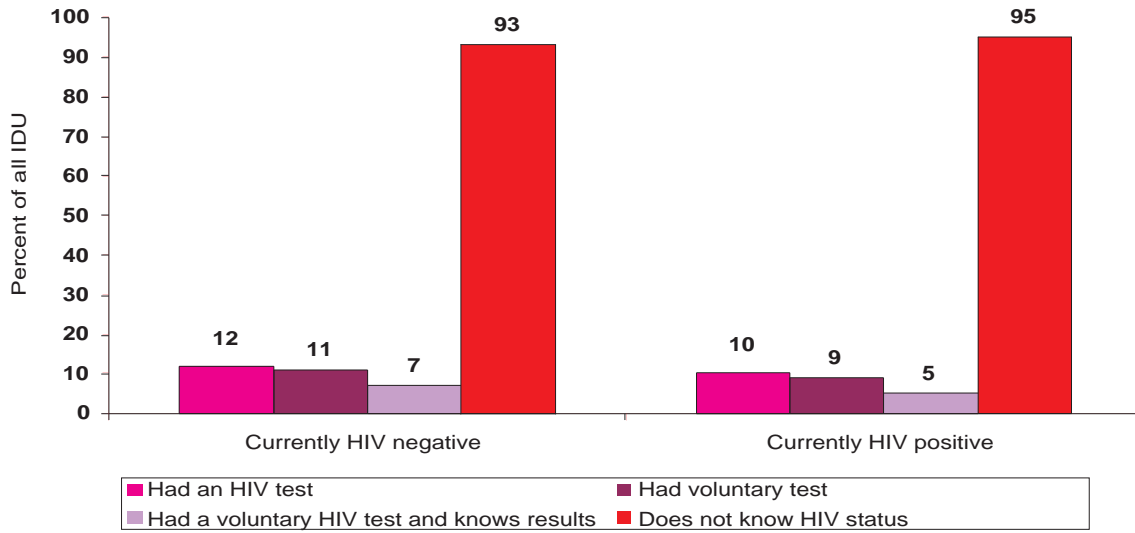
Clearly, a severe HIV epidemic in IDUs would be important in itself, however, the capacity to move from a numerically small group to the wider population would be of even greater epidemiological importance. Some indications of this capacity are seen in Figure 9 below.

When both sites are aggregated, 3% of all FSWs reported injecting drugs, but 21% had sex with clients, whom they knew to be IDUs and 15% FSWs had non-paying partners who were IDUs. Overall, one in four FSWs had IDU sexual partners. In addition, up to one third of IDUs bought sex from a woman in the last month, and between 2% and 6% sold sex to a man or woman (Figure -10).

Figure -9: FSW exposure to injecting drug use
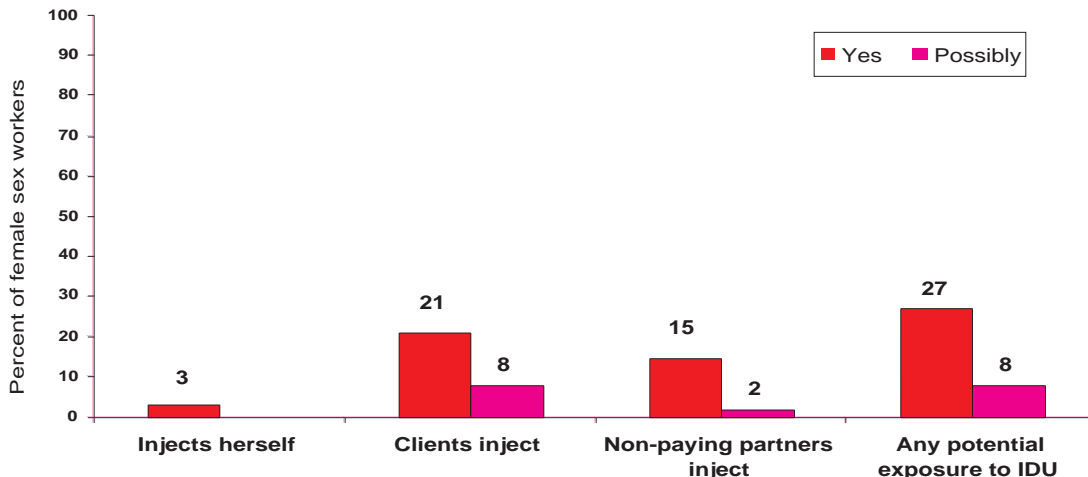
Figure - 10: Percent of IDUs who bought of sold sex in the past month
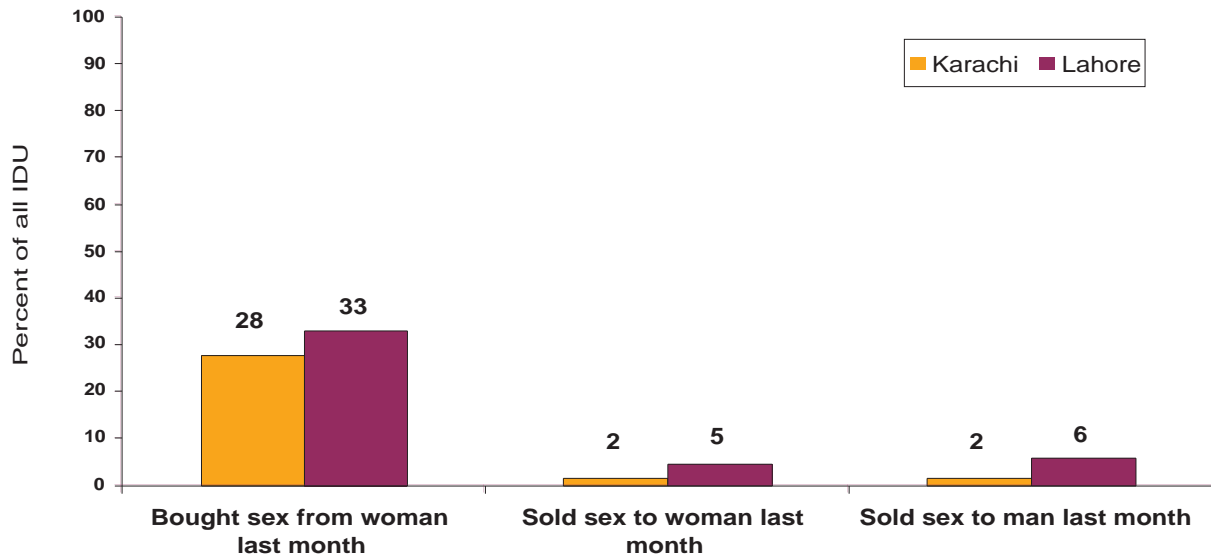
The fact that one third of male IDUs bought sex within the previous month, and one third had sex with a regular partner is troubling. The fact that less than 10% of men with these sexual contacts used condoms consistently during sexual contact with these partners is more troubling still (Figure -11).

Figure - 11: IDU condom use in previous month
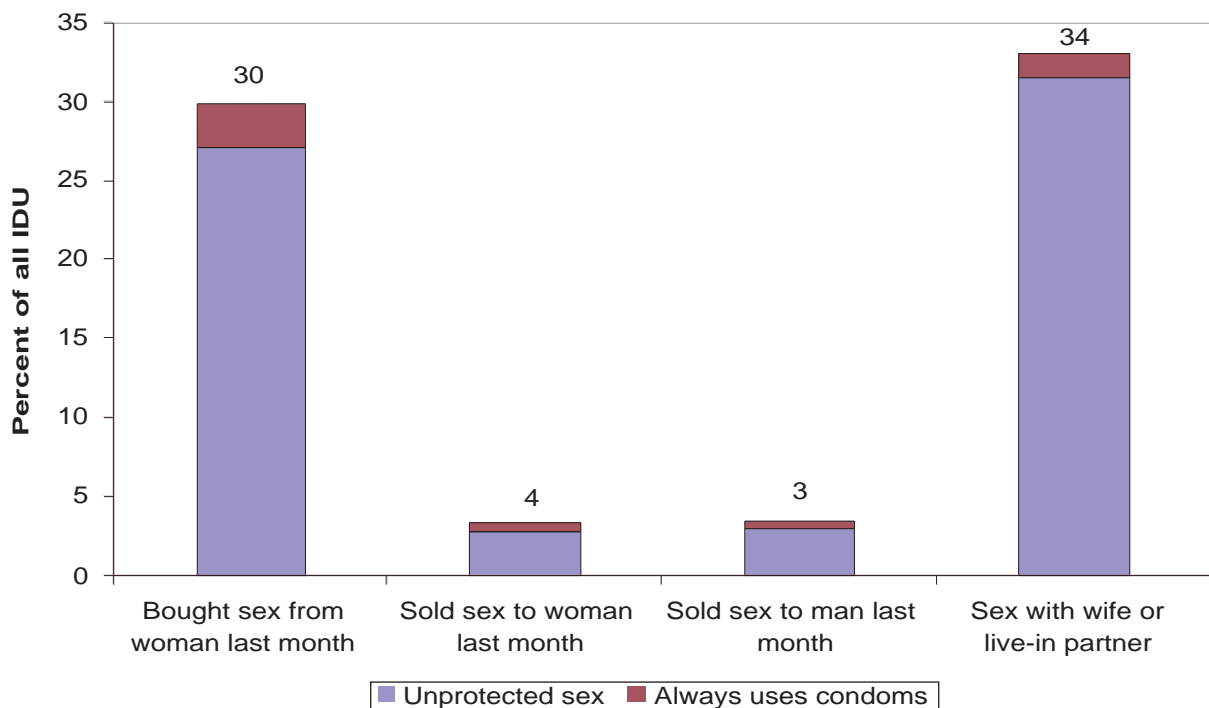
Figure - 12: Commercial male – female sexual contact in the past month
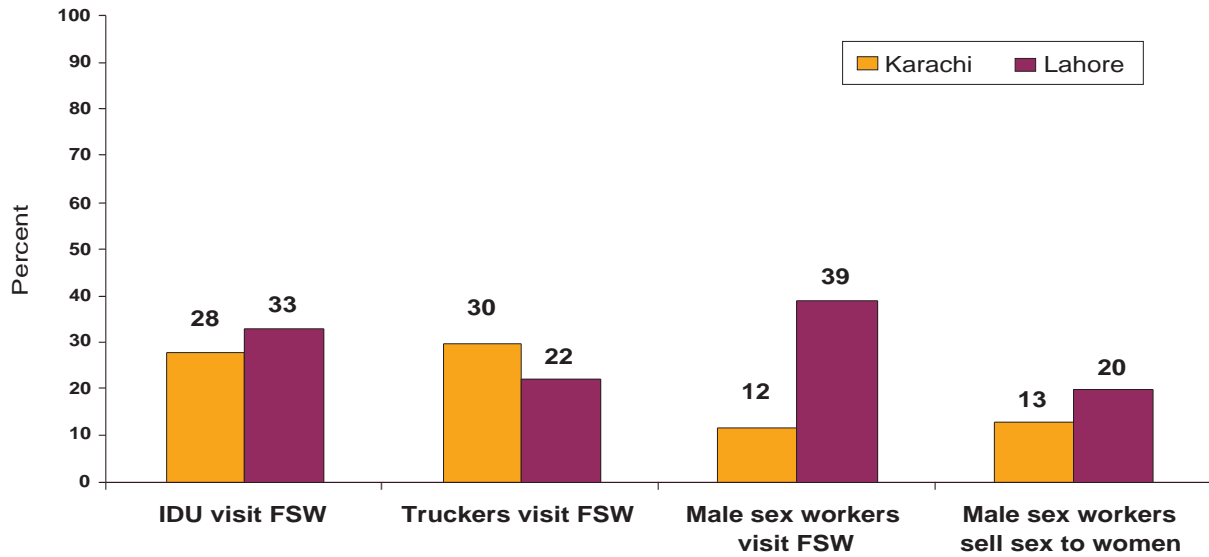
The network links between HIV risks through unsafe injecting practices are further exposed when the commercial sex contacts with FSWs of all the male groups is examined, as in Figure - 12.

Not only did males buy sex from women, but male sex workers, who principally sell sex to men, also bought sex from, and sold sex to women. Again, consistent (100%) condom use was either very low, or virtually non-existent in these commercial sex interactions (Figure - 13).

Figure - 13: Male respondents low consistent condom use during commercial sex
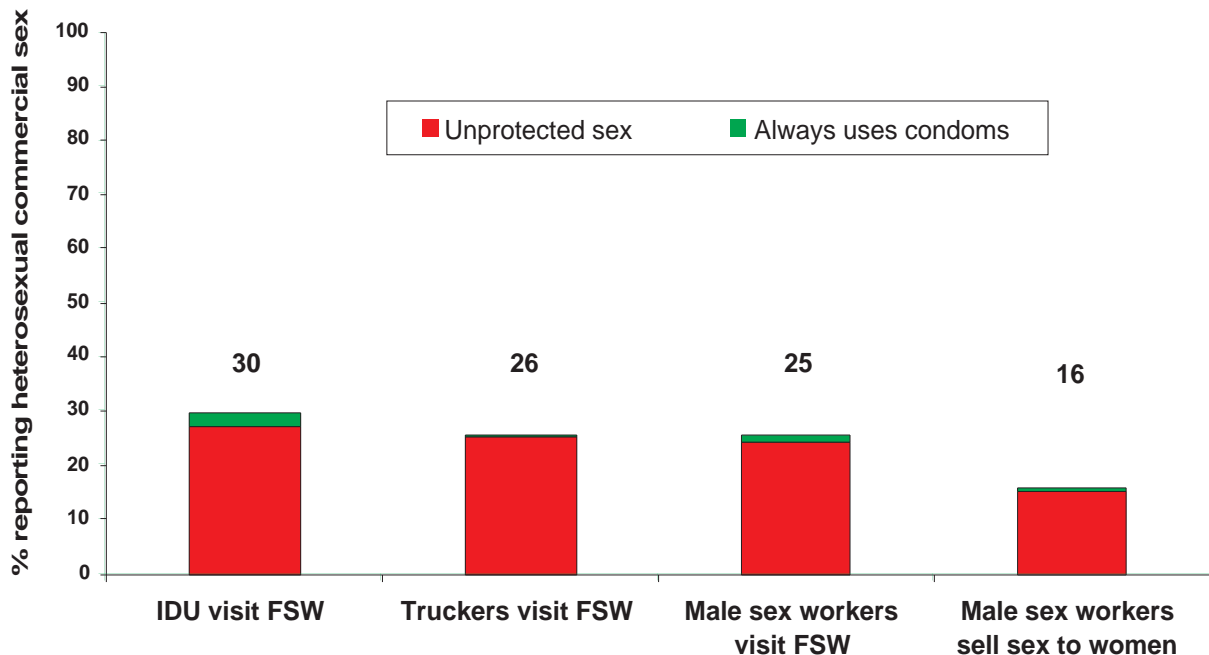
Figure 14: Condom use in commercial sex – reports by FSWs and male clients
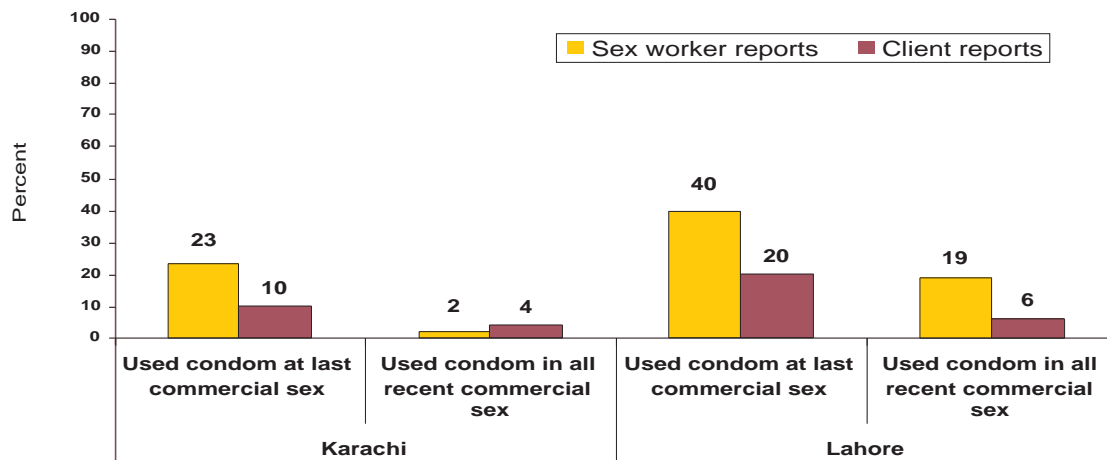
When the reports of condom use by female sex workers and male clients at last sex and consistent (100%) condom use are compared, the percentage of individuals, who engage in commercial sex and consistently use condoms is very low, especially in Karachi (Figure - 14). It should be noted that the male respondents were all members of high risk groups. However, even the most optimistic

reading of the data in Figure 14 would lead us to believe that over two thirds of all commercial sex acts were not covered by a condom, and the real percentage of condom use is probably even less.

Figure -15 shows that condom parameters were consistently poorer in Karachi. The fact that fewer than 20% of FSWs in Karachi

Knowledge and attitudes of FSWs about condom use are shown in Figure-15.

Figure - 15: FSW condom knowledge, attitudes and access
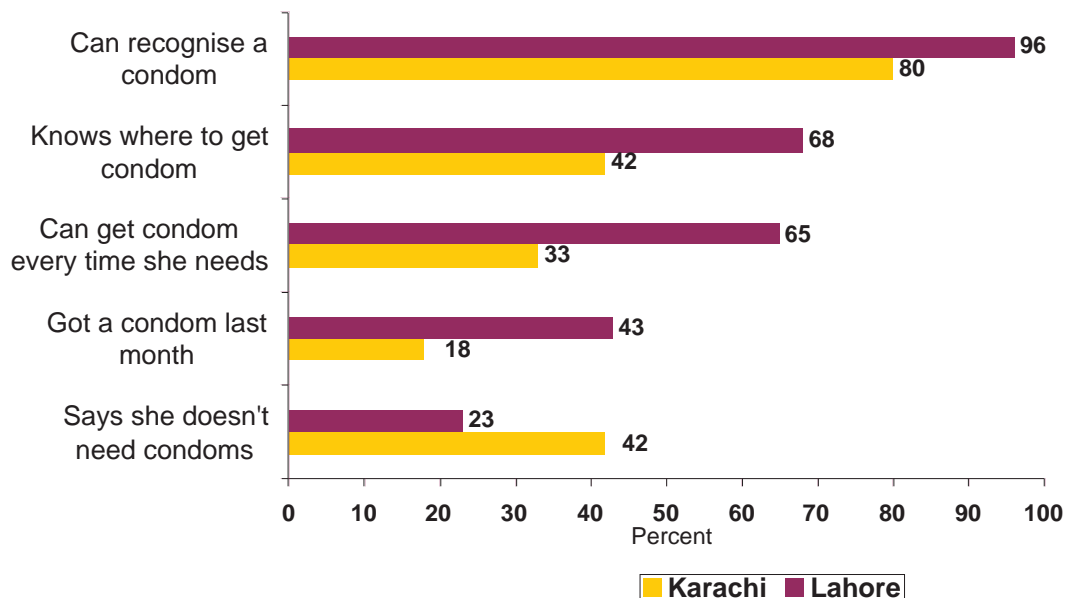
Figure -16: FSW HIV risk perception
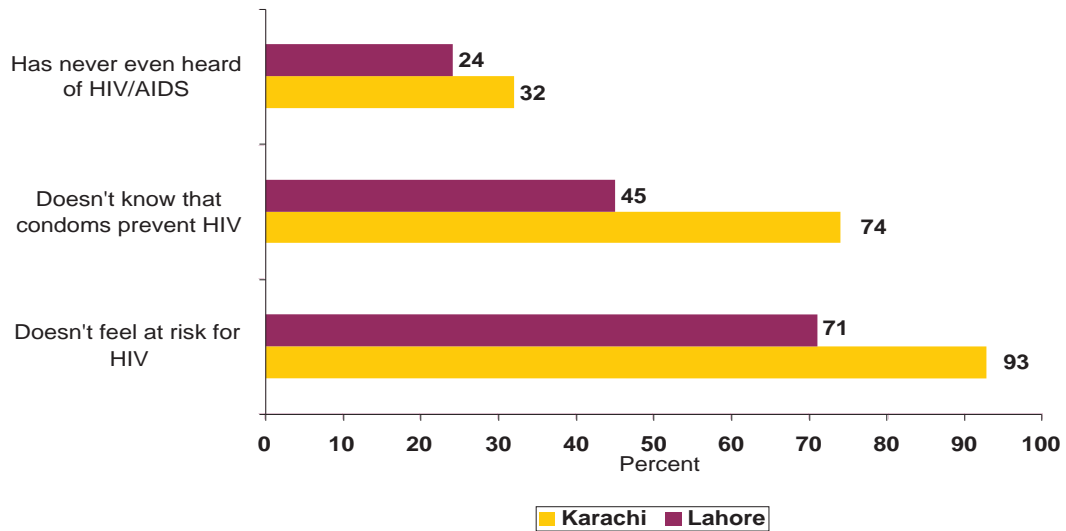
accessed a condom from any source in the previous month and over 30% of all FSWs stated that they did not need condoms is a major cause for concern. Some of the reasons for this relaxed attitude towards condoms are contained in Figure -16.

The fact that only 7% of FSWs in Karachi and 29% in Lahore feel at any risk of HIV infection, is truly startling. When viewed with the fact that three quarters of the FSWs in Karachi, and almost half in Lahore, do not know that condoms can prevent HIV, the need for urgent intervention becomes even more apparent. Three fourth of FSWs in Karachi never used a condom in the past week (compared to one half in Lahore), and only 5% FSWs in Karachi actually asked all clients to use a condom (Figure -17). Although FSWs were not interviewed at their place of work yet condom carriage was negligible.

Figure – 17 : Level of FSW condom carriage, request for use, and actual use
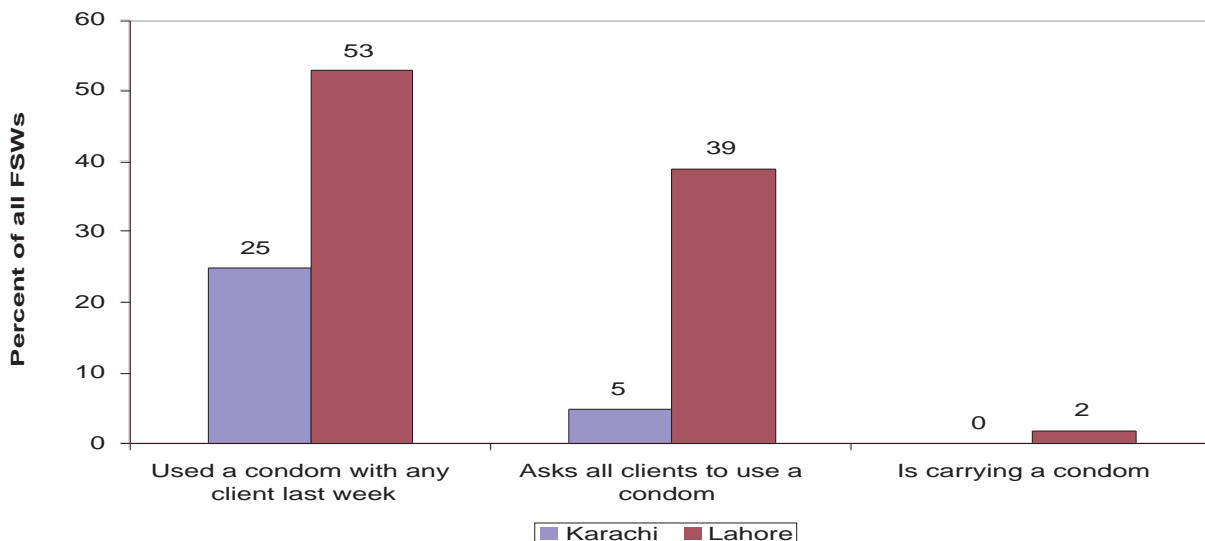
Figure - 18: source of condoms obtained by FSWs in previous month
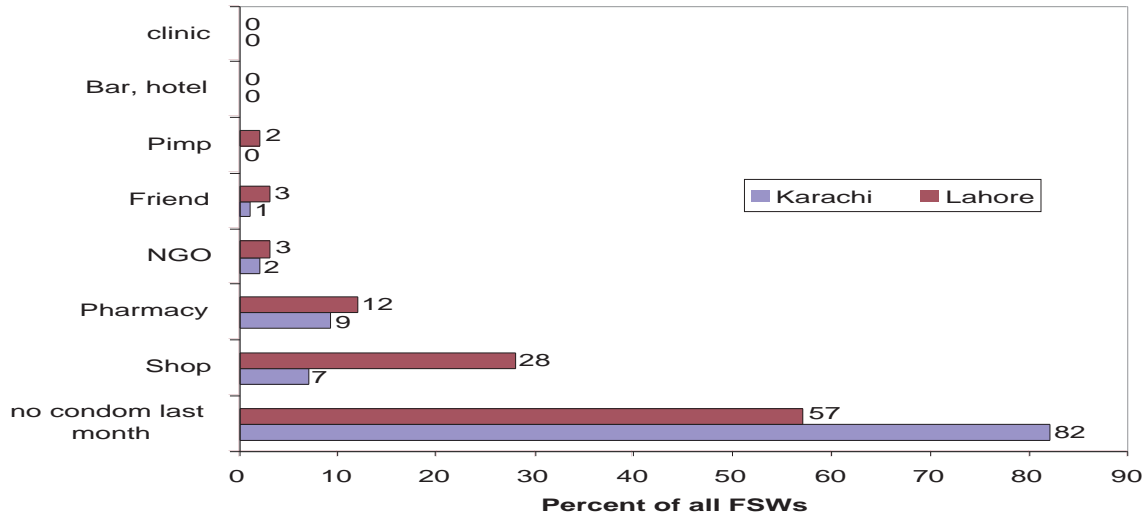
For FSWs, who accessed any condoms, private outlets – shops or pharmacies – were the easily the most common sources (Figure -18). Only one in every forty FSWs (2.5%) accessed a condom through a health care facility or NGO.

While the condom access figures are very low, a significantly higher percentage of FSW, who knew that condoms can prevent HIV, acquired condoms during the month (46%), than those who did not (19%). FSW reports of condom use with clients, stratified by consistency of FSW request for condom use, is outlined in Figure - 19.

Consistent condom use was almost exclusively reported by FSWs, who also reported consistently requesting condom use from their clients. As seen in Figure-20 below, HIV and condom knowledge and use were consistently better among women who had been exposed to any FSW specific intervention.

Figure- 19: FSW reported condom use, by consistency of request for use.
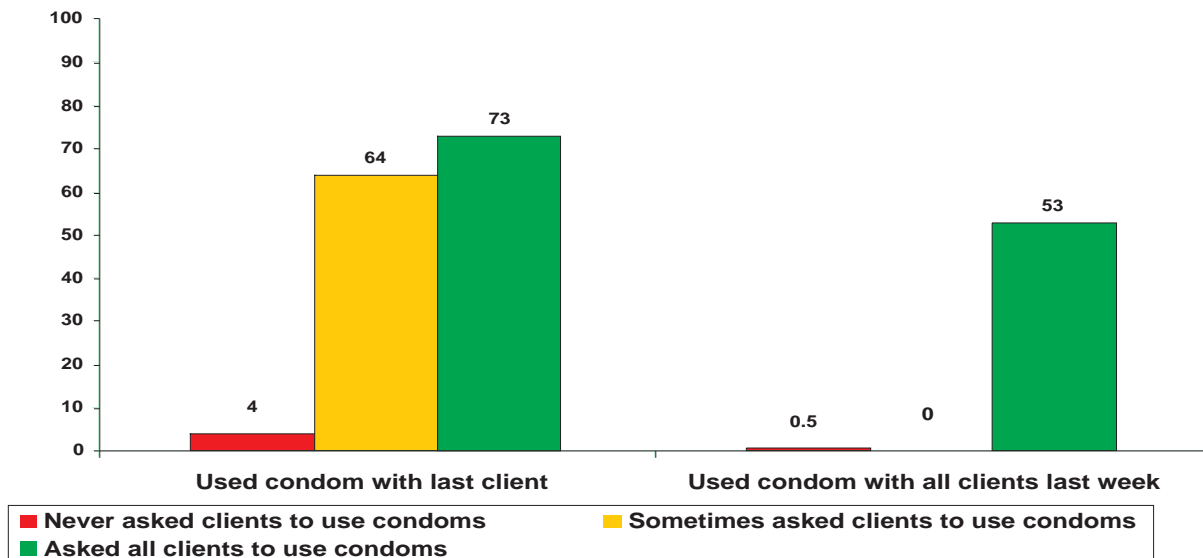
Figure - 20: FSW knowledge and condom use indicators, by intervention exposure.
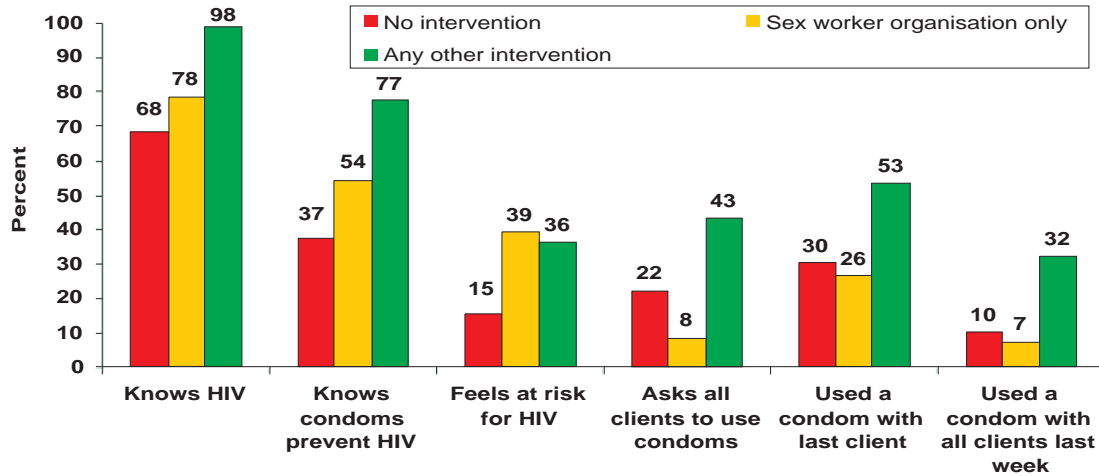
The fact that membership of an FSW organisation increased knowledge, but did not improve practice, as measured by the indicators in Figure- 20, is a subject for further study.

It should also be noted that the coverage of such FSW interventions is currently poor in both Karachi and Lahore (Figure-21).

The percentage of respondents from different target groups, who reported STI symptoms, in the previous year, is detailed in Figure-22. At least 30% of respondents in all groups reported STI symptoms in the previous year, including over 50% in IDUs and 70% in FSWs.

Figure- 21: Percentage of FSWs exposed to HIV interventions or support group.
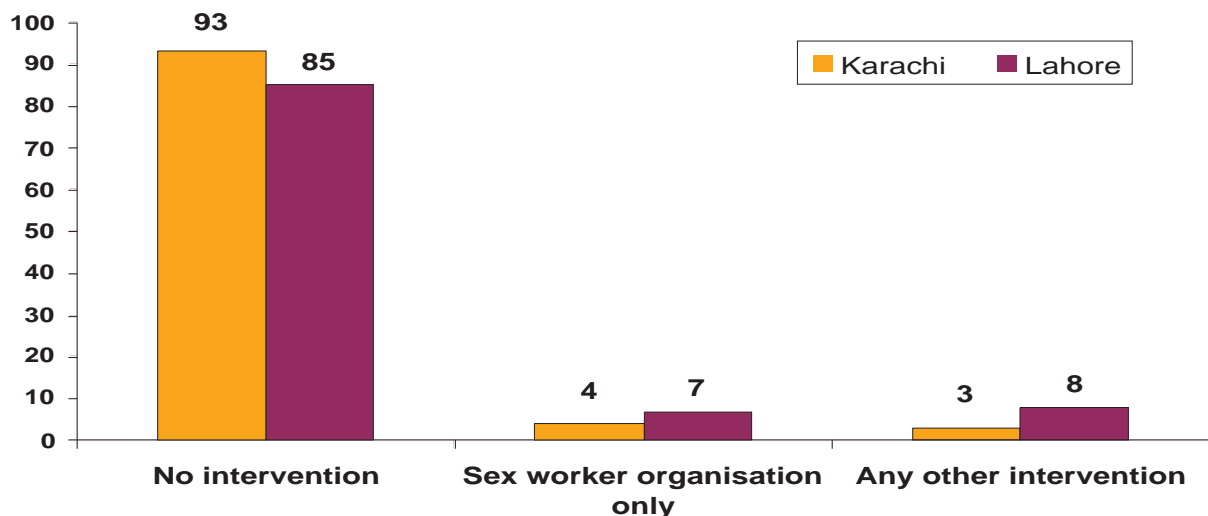
Figure - 22: Self-reported STI symptoms in past year, all groups.
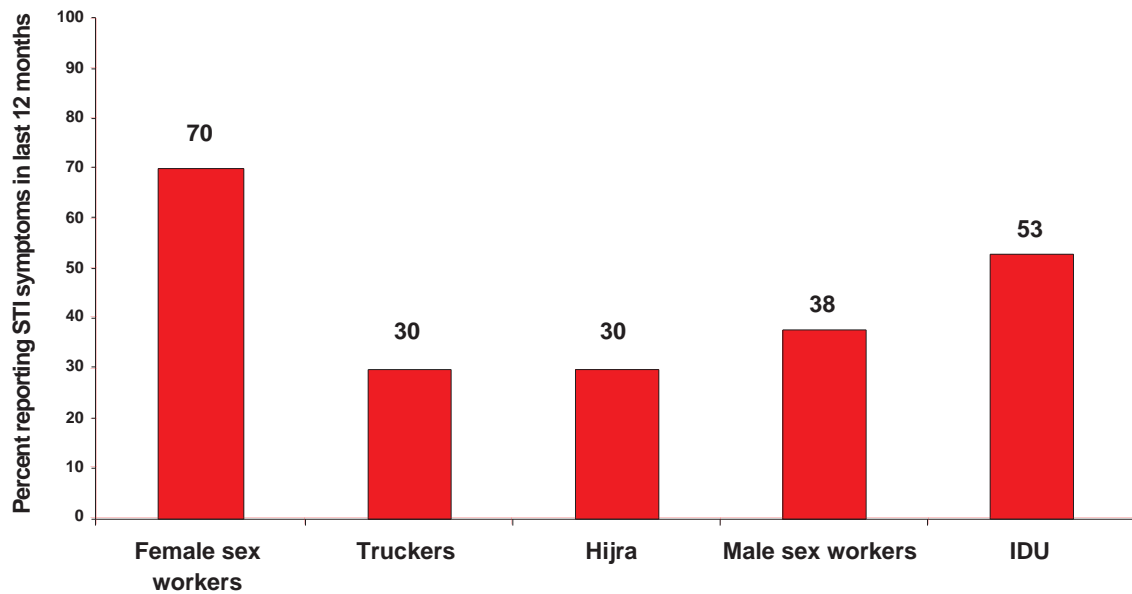
What respondents did when they had these symptoms is detailed in Figure -23. Almost one half of all respondents did not seek care when they suffered STI symptoms in the previous year, and under one third sought medical advice.

When anal sex is examined as HIV risk behaviour, a disturbing picture emerges. Anal sex was practiced by over 90% of male sex worker and Hijra groups, and roughly 10% of all other groups. Consistent condom use was very low (Figure- 24).

Figure 23: STI care seeking behaviour, all groups.
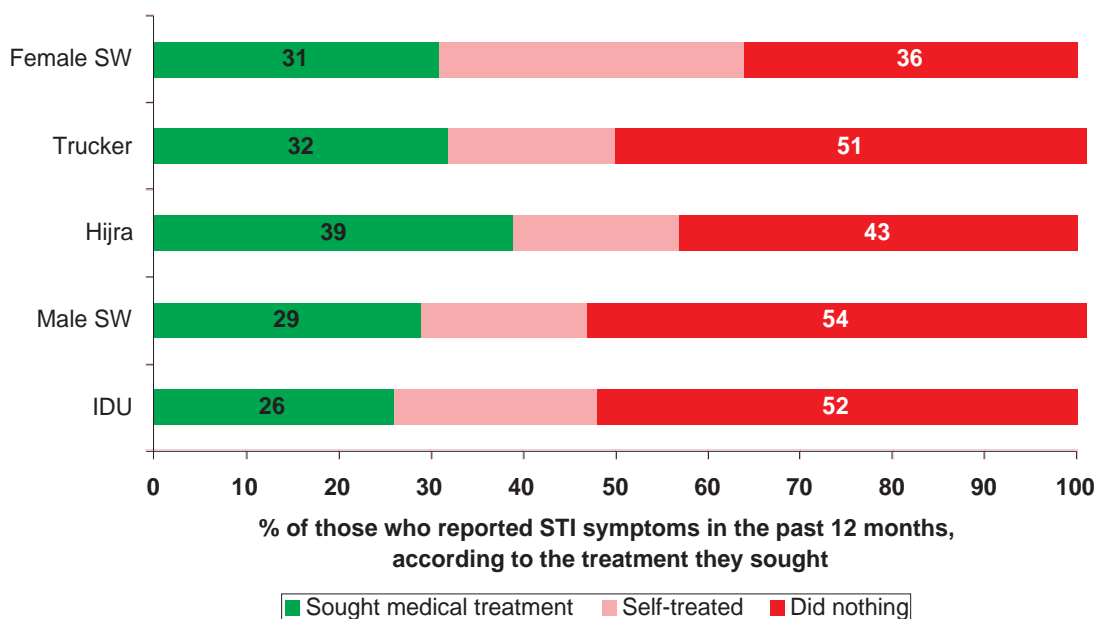
Figure - 24: Anal sex and lack of consistent condom use, all groups
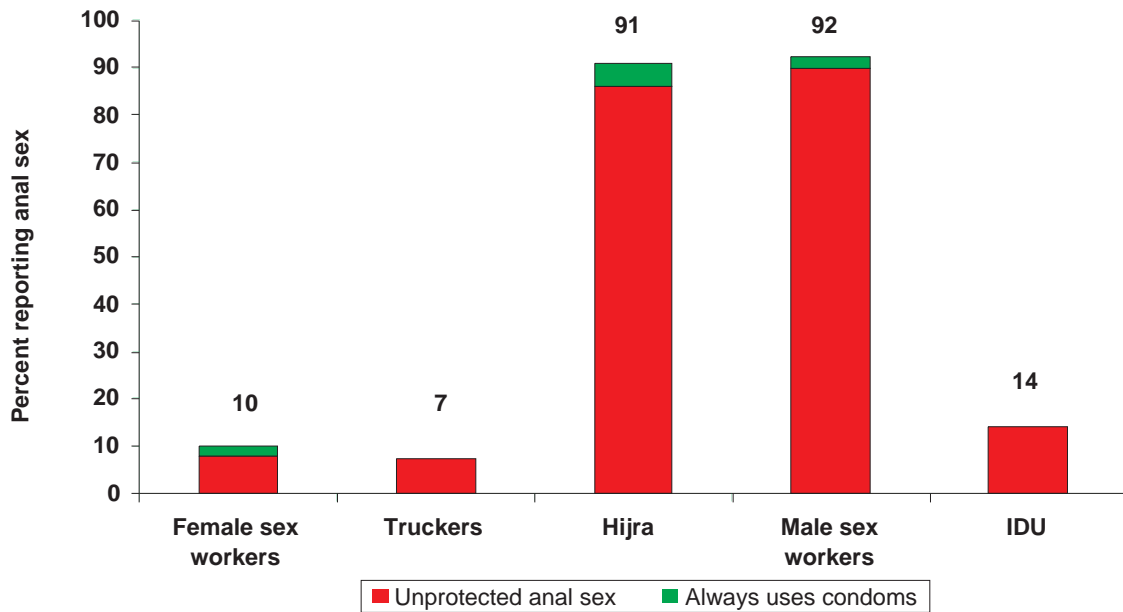
Only one percent of MSWs or Hijras, who practiced anal sex, used an effective water-based lubricant which would help prevent condom breakage and anal tearing (Figure - 25).

It has already been shown that many male sex workers buy sex from women, and it should be noted that the pattern of anal sex is also diverse within this group when selling sex.

The difference between Karachi and Lahore in the anal sex patterns of behaviour highlights the diversity of commercial sex activities (Figure-26). MSWs of Karachi were much more likely to sell receptive anal sex to clients than in Lahore. It is unclear whether this is as a result of a regional difference or a

Figure - 25: Male sex worker and Hijra lubricant use during last anal sex
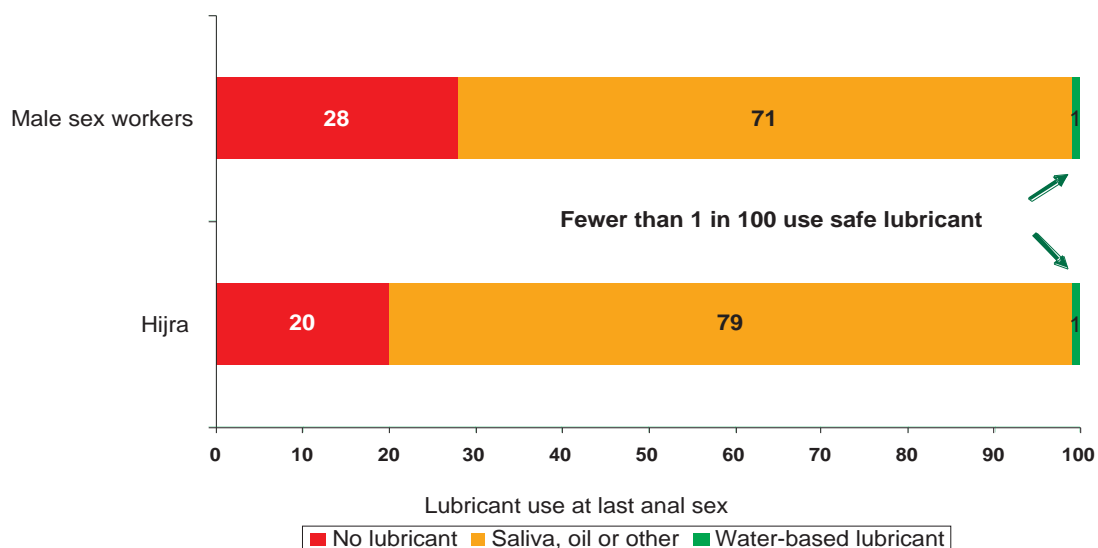
Figure - 26: Type of anal sex sold by male sex workers in the last month

Type of anal sex performed by male sex workers in the last month

■ Usually receptive anal sex ■ Usually insertive anal sex ▨ Often both
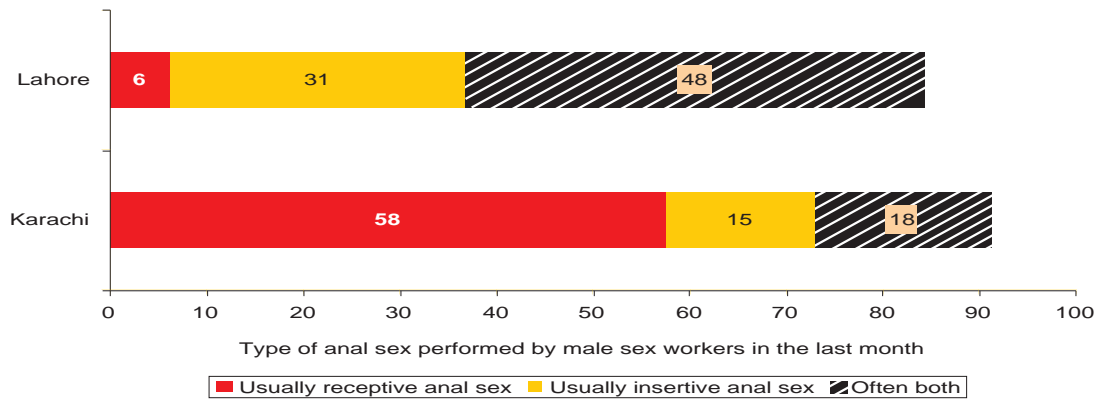
sampling anomaly. If it is the latter, it may have implications for trend measurement if the surveys are repeated.

The 17 HIV positive MSWs sampled in Karachi were not significantly different from HIV negative MSWs in age, education, monthly income, or alcohol or drug use (no HIV positive MSW drug injectors). Also, they did not differ from their peers in age at first intercourse or other sexual or condom behaviour parameters, in STI symptoms in the past year, or in HIV testing access. When questioned on their HIV risk perception, 8 HIV

positive respondents (50%) replied "don't know".

HIV awareness, condom prevention knowledge and risk HIV perception indicators for the FSW, male clients of FSWs (Truckers and IDUs), MSWs and Hijras are summarised in Figure - 27. The percentage of respondents, who reported that they had never heard of HIV, ranged from 20% to 42%, the percentage who did not know that consistent condom use could prevent HIV ranged from 45% to 60%, and the percentage who did not feel at risk of HIV infection ranged from 55% to 82%.

Figure - 27: HIV awareness, condom prevention knowledge and risk HIV perception indicators for risk groups

Percent

■ **Doesn't feel at risk for HIV** ■ **Doesn't know that condoms prevent HIV**
■ **Has never even heard of HIV/AIDS**
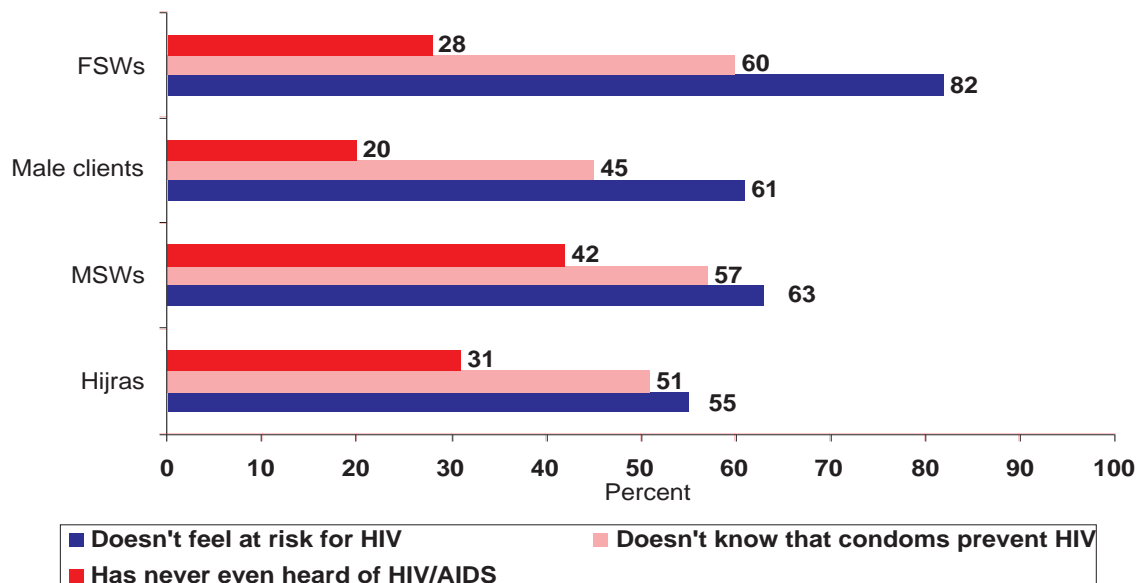
Figure - 28: Commercial sex participants – condom knowledge, access and carriage
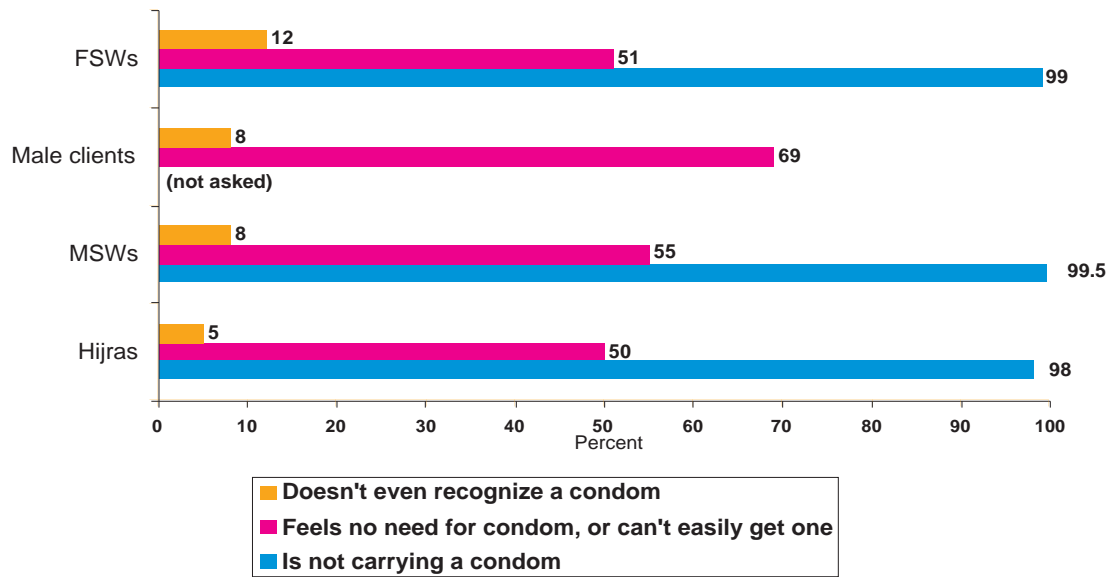
This lack of condom knowledge or HIV risk perception in reflected in the fact that under 2% of those groups who sell sex were carrying condoms, and over 50% of commercial sex participants did not feel the need for condoms, or that they could not easily access them (Figure-28).

5.2   STI /RTI Prevalence

The prevalence of RTI / STI has been depicted in Figures 29-32. In some groups, the prevalence of STIs was very high and there was a clear geographical differential. Very high prevalence of syphilis (60%) in Hijra and (36%) in MSWs in Karachi is alarming (fig 29).

Figure -29: Prevalence of syphilis in various high risk groups
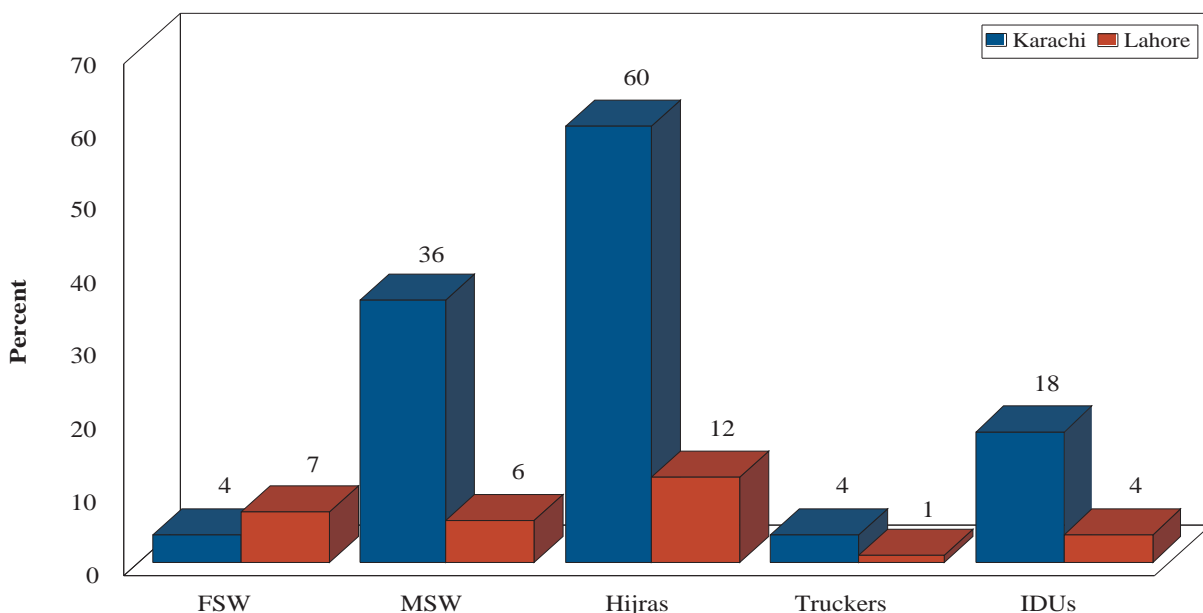
Figure – 30 : **Prevalence of gonorrhoea in various high risk groups**
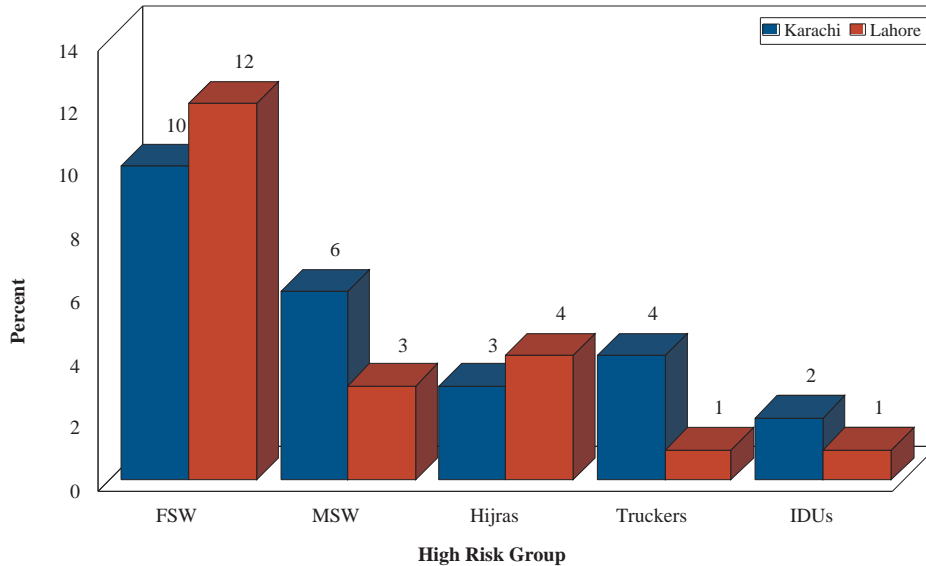
Both syphilis and gonorrhoea were more prevalent among all high risk of Karachi. Syphilis had a very high prevalence particularly among Hijras (60%) and MSWs (36%) in Karachi. The corresponding figures from Lahore were 12% for Hijras and 6% in MSWs.

The prevalence of genital Chlamydia, however, showed a reverse trend. Its prevalence was significantly lower among FSWs, MSWs and Hijras of Karachi as compared to corresponding groups of Lahore. Truckers and IDUs from Karachi had a slightly higher, though not statistically significant, prevalence of Chlamydia (Figure – 31).

Figure – 31: Prevalence of chlamydia in various high risk groups
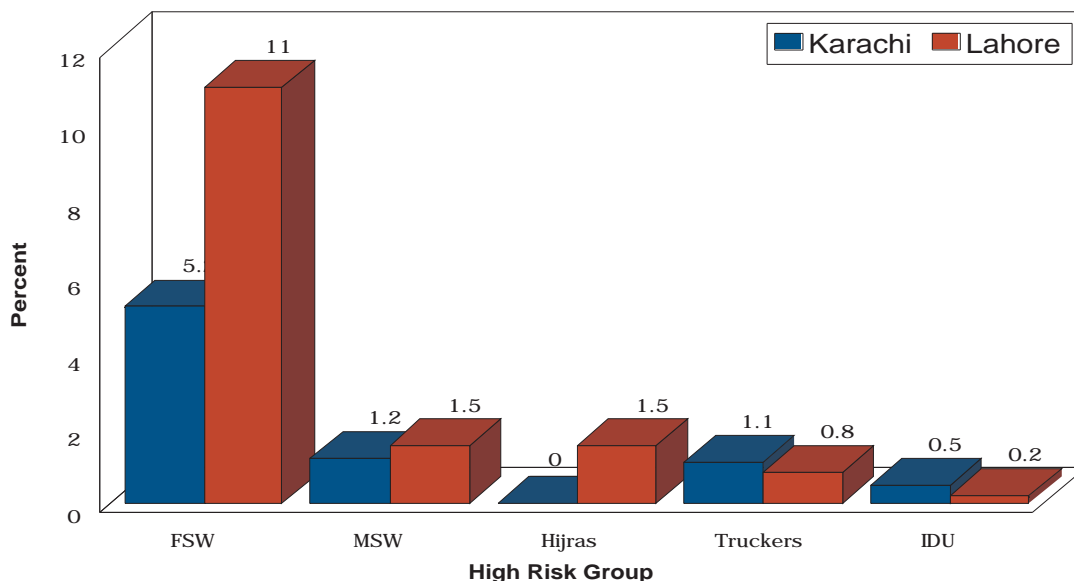
Figure – 32: Prevalence of bacterial vaginosis and trichomoniasis in FSWs
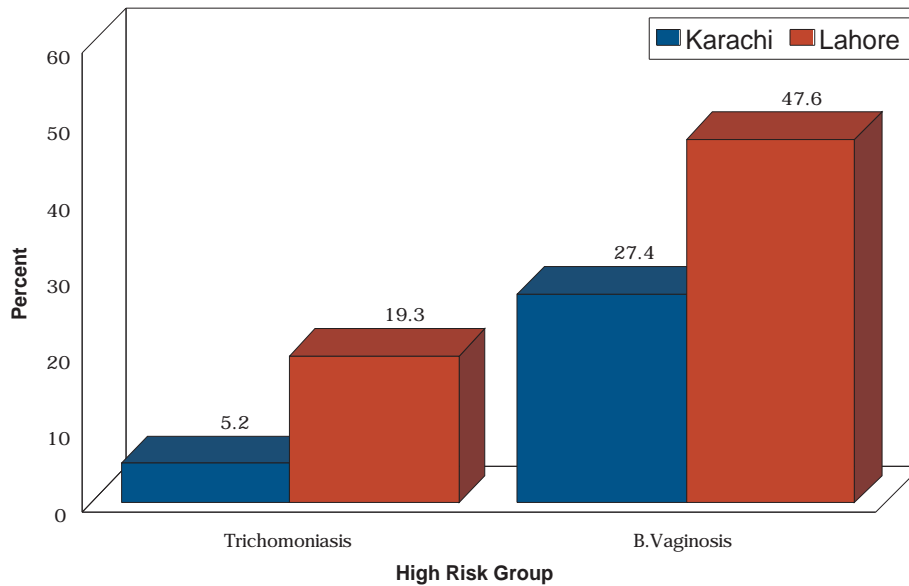
The prevalence of Trichomonas was checked in the urine of FSWs and Truckers using in-pouch technique. Only 5.2% FSWs in Karachi and 19.3% in Lahore had trichomoniasis. In Lahore, only 0.8% truckers tested positive for trichomonas, whereas none of the truckers in Karachi was positive for trichomoniasis (Figure – 32).

Bacterial vaginosis was twice as common among FSWs of Lahore (47.6%) as compared to FSWs of Karachi (27.4%).

5.3 Summary of Biologic Indicators

The biologic indicators are detailed in Tables - 7 and 8. The denominators may change for each test, for reasons such as: haemolysis of blood sample, presence of inhibitor in PCR specimen, or illegible marking on specimens. The results are also discussed in Discussion section.

Table 7: Karachi Biologic Indicators

Biological Indicator	FSW	MSW	Hijra	Trucker	IDU
HIV	0 (0/421)	4.1% (17/401)	1.5% (3/197)	0 (0/398)	23.3% (93/399)
Syphilis	3.6% (15/421)	35.6 (144/399)	60.2% (118/196)	4.0% (16/396)	18.2% (72/395)
Genital Gonorrhoea	9.8% (34/348)	5.8% (23/396)	3% (6/197)	3.5% (14/397)	1.8% (7/393)
Anal Gonorrhoea		17.5% (69/395)	29.4% (58/197)		
Genital Chlamydia	5.2% (18/348)	1.2% (5/396)	0 (0/197)	1.0% (4/397)	0.5% (2/393)
Anal Chlamydia		10.4% (41/394)	18.3% (36/197)		
Trichomonas	5.2% (20/386)			0 (0/401)	
Bacterial Vaginosis	27.4% (110/401)				
Hepatitis C					87% (347/399)

Table 8: Lahore Biologic Indicators

Biological Indicator	FSW	MSW	Hijra	Trucker	IDU
HIV	0.5% (2/378)	0 (0/387)	0.5% (1/191)	1.0% (4/380)	0.5% (2/380)
Syphilis	7.1% (27/387)	5.7% (22/387)	11.5% (22/192)	1.1% (4/380)	3.9% (15/381)
Genital Gonorrhoea	12.3% (47/383)	3.3% (13/395)	4.0% (8/198)	0.8% (3/397)	1.0% (4/397)
Anal Gonorrhoea		0 (0/400)	n/a		
Genital Chlamydia	11% (42/383)	1.5% (6/395)	1.5% (3/198)	0.8% (3/399)	0.2% (1/397)
Anal Chlamydia		n/a	n/a		
Trichomonas	19.3% (74/384)			0.8% (3/399)	
Bacterial Vaginosis	47.6% (189/397)				
Hepatitis C					91.8% (349/380)

6. DISCUSSION

The studies of high-risk groups in Pakistan were commissioned as a result of increasing awareness of the vulnerability of Pakistan to a widespread HIV epidemic, and a need for interventions in IDUs and to improve protection against HIV and other STIs within sexual networks [1,2]. The HIV and STI epidemics revealed by these studies, especially in Karachi, has shown how prescient these calls for action were, and how wide the gap between intervention needs and intervention access truly is.

Clearly, the most alarming statistic was 23% HIV prevalence among Karachi IDUs. The same community had been sampled 7 months previously, and only one out of 160 individuals tested was HIV positive [3]. This is in direct contrast to the experience in the neighbouring country of Nepal, where researchers reported a baseline HIV sero-prevalence of 1.6% among IDUs of Kathmandu in 1991, with no new cases in 1993 and 1994. Those investigators concluded that this finding confirmed the effectiveness of needle/syringe exchange programs in controlling the spread of HIV infection among intravenous drug users [4]. In Karachi, less than one quarter of IDUs had participated in a needle exchange programme in the previous year. In addition, one third of IDUs had been in prison during the previous year. This can be viewed as an intervention opportunity, but experience in Thailand was that drug use did not stop in prison, and that having been jailed was an important independent risk for HIV infection among Thai male IDU and MSM [5].

Couple studies in Manipur, India, showed that 45% of the wives of IDU were HIV-positive. A sexually transmitted infection (STI) in either member, reported by the husband, was strongly associated with infection in the wife [6]. While it is not possible to draw heterosexual transmission probability inferences from the data presented here, the Manipur study serves as clear warning of sexual spread of HIV infection. In the Pakistan context, where over 20% of FSWs reported IDU sexual contact, condom use was low, and over 18% of IDUs

in Karachi were infected with syphilis. This high prevalence of syphilis in IDUs may appear surprising, but it was not statistically significantly different from the 13% reported by Altaf in late 2003 [3].

The next most HIV-affected study group was male sex workers, with 4% infected in Karachi. With over 90% of MSWs regularly selling anal sex, with the high HIV transmission probability afforded by that anatomical route, and almost 20% of IDUs having reported buying anal sex in the past year (with 3% consistent condom use) and almost 20% of IDUs infected with syphilis , this is consistent with the behavioural data. The same logic applies to the Hijra group in Karachi, where 2% were HIV positive. The remarkably high levels of STIs in the MSW and Hijra groups give testimony to the HIV risk in these groups, and the STI results require to be placed in context.

The MSW and Hijra populations are both hidden and stigmatized. They are also poor, with a median income of under US$2 a day. Their access to medical care is limited by both stigma among health staff and financial considerations. The care they seek for STIs is likely to be sub-standard and ineffective. In the case of anorectal syphilis and gonococcal and Chlamydia infections, the symptoms may also go unnoticed, either because they lesions are internal, or because they are confused with tears with bacterial super infection caused by frequent un-lubricated receptive anal intercourse.

For serologically identified syphilis infection, the 36% in MSWs and 60% in Hijras in Karachi are truly remarkable, and probably approximates to cumulative lifetime infection for the reasons stated above. The corresponding figures from Lahore, 6% in MSWs and 12% in Hijras are much lower. Geographic differences in STI prevalence will be discussed below. The greater prevalence of syphilis in Hijras (transgenders) over other MSW has been noted previously in Jakarta [7], where 22% of transgenders were syphilis positive compared with 2% of MSWs. This may be partly explained by the fact that Hijras sell mostly receptive anal intercourse, compared with

MSWs who have much greater heterogeneity of sexual activity. It may also be that Hijras have a more high-risk client base, but this issue is difficult to study or confirm. A previous study of Hijras in Karachi in 1998 reported 37% syphilis prevalence [8]. It is salutary to note that Temmerman in Nairobi reported an upsurge of syphilis in antenatal clinic women paralleled the HIV epidemic in that population in the late 1980s and early 1990s [9]. Another set of studies from Africa which has relevance here is the four cities trial, where an international group of distinguished researchers examined the determinants of HIV prevalence in each of the cities (Ndola, Kisumu, Cotonou, and Yaounde) to tease out the key reasons for high community prevalence epidemics at some sites and lower level epidemics in others [10,11]. Buve et al. reported that "variations in prevalence of syphilis seroreactivity remained unexplained. More research is needed to better understand the epidemiology of sexually transmitted infections in Africa.' [10]. This is at least equally true in Asia. The only other study reporting we have found which has reported close to the syphilis prevalence in Karachi Hijras was from Bangladesh, where 57% of brothel-based female sex workers had evidence of previous or current syphilis infection [12].

Also from the four cities study, Auvert et al. concluded that "The strong association between HIV and HSV-2 and male circumcision, and the distribution of the risk factors, led us to conclude that differences in efficiency of HIV transmission as mediated by biological factors outweigh differences in sexual behaviour in explaining the variation in rate of spread of HIV between the four cities."[11]. In the case of the MSWs and Hijras in Pakistan, the biologic and behavioural indices point to extremely high HIV transmission risk. For the purposes of surveillance, we strongly recommend that stored serum from these studies be tested for HSV-2 antibodies, in order to quantify the additional risk from that source. For the purposes of intervention, urgent appropriate and accessible STI care and risk-reduction programming is required to prevent an explosive HIV epidemic in MSWs and Hijras. Male circumcision is almost universal in Pakistan.

The prevalences of rectal gonorrhoea and Chlamydia among MSWs and Hijras in Karachi, as measured by PCR, are also remarkable. Information on these types of specimens on community based samples is sparse in the scientific literature. One other published study from Jakarta, published in 2003 [13], reported anal gonorrhoea of 12% and anal Chlamydia 4%, and lifetime syphilis 43%. As yet unpublished data from two cities in the Philippines [Girault, personal communication], from studies in MSM (not specifically MSW) from the bars and the cruising venues revealed anal gonorrhoea levels of 9% and anal chlamydia of 16%.

It is necessary to discuss technical aspects of the Roche Amplicor PCR, which was the test used to obtain the gonorrhoea and Chlamydia prevalences from male urine, anal swabs and Endocervical swabs from women. While this methodology is accepted as the gold standard for diagnosis of chlamydial infection [14], there is much more discussion about the sensitivity and specificity of gonorrhoea results from samples from different anatomical sites [15]. One of the anatomical sites which have come under specific scrutiny is swabs from the anal canal. As noted in the references, this anatomical site has been the source of swabs in different service and study situations, but it is not FDA approved, and it is now known that false positives can occur as a result of other non-pathogenic neisseria species [16]. In order to counter this risk of false positives, we introduced a DNA extraction step for the anal swabs. We believe that a technical problem occurred in this step in processing the Lahore anal samples, resulting in zero positive results for both gonorrhoea and Chlamydia. As a result, it will not be possible to present anal swab data from Lahore without further examination of the test system and blanket retesting.

Much has been written on the relationship between HIV, STI, female sex workers and truckers, especially in Africa [17]. In this discussion, it is intended to principally draw on references from South Asia, and some from South-east Asia, as support data for the findings of the studies in this report.

The fact that none of the FSWs sampled in Karachi tested HIV positive probably relates more to the lower HIV transmission coefficients of vaginal sex compared to anal sex, than to absolute absence of exposure (see above). With such low levels of condom use and high FSW/IDU interaction, it can only be a matter of time, measured in months rather than years. Urgent risk reduction services, including condom provision and negotiation skills-building and appropriate and accessible STI management, are required in both Karachi and Lahore. Our experience in sampling for these studies may be instructive. We found the FSW population in Karachi much more diffuse and difficult to characterise and access. The same will certainly also be true for interventions and more creative strategies may be required than in the well-defined red-light district in Lahore.

The prevalence of syphilis, genital Chlamydia, trichomoniasis and bacterial vaginosis were all significantly higher in FSWs in Lahore, with no significant differences in gonorrhoea levels. This may be partly explained by higher number of reported client sexual contacts in Lahore, but there is much we do not know about the epidemiology of STIs in different geographic and cultural contexts. What we can say however, is that the FSW STI results in this study stand comparison to results from studies by our international laboratory partner, ICDDRB, in Dhaka in Bangladesh where, in a study of brothel-based FSWs published in January 2005, 17.5% were positive for N. gonorrhoeae; 15.5% for C. trachomatis; 7.5% for T. vaginalis, and 6.6% had active syphilis [19]. A study among hotel-based FSWs by the same researchers in Dhaka, published in 2004, found the following STI prevalences: 35.8% for N. gonorrhoeae, 43.5% for C. trachomatis, 4.3% for T. vaginalis, and 8.5% for syphilis [18]. If the same researchers, using the same laboratory methodologies but sampling different FSW profile groups within the same city obtain such different results, it could be expected that two different FSW profile groups, separated by several hundred kilometres, may also yield different results, as they have in Pakistan. It was noted that the references above found Trichomonas infection prevalence in Dhaka

was closer to that in Karachi, however, another study of street-based FSWs in Dhaka, published in 2000, reported a Trichomonas prevalence of 45% [19]. The only non-sexually transmitted RTI examined was bacterial vaginosis. While the prevalence in FSWs in Lahore (48%) is much higher than in Karachi (27%), it should be noted that the Nugent score for bacterial vaginosis is a subjective diagnosis which is prone to inter-observer bias. It is probably relevant that a further 15% of BV slides from Karachi were scored as 'indeterminate'. High levels of bacterial vaginosis of up to 60% in sex workers in south Asia have been reported previously [20].

The classical dyad for heterosexual spread of HIV into new geographic areas is the female sex worker and the long-distance trucker. While no HIV was identified in either FSWs or truckers in Karachi, 2 FSWs and 4 truckers were found to be HIV positive in Lahore. It must be noted that the main truck stand in Lahore, from which the trucker sample was drawn, is at some kilometres distance from the red-light area and it is not clear that the HIV transmission between these groups was direct. In terms of STIs, the trucker group predictably had the lowest prevalences, as they are not principally involved in injecting drugs or selling sex. The STI results were consistent with a study carried out at the main truck stand in Dhaka, where the following prevalences were found: serological syphilis (5.7%), gonorrhoea (2.1%), chlamydia (0.8%) [21].

To conclude the discussion of the biologic specimens, it is necessary to mention the Hepatitis C results. The overall 90% prevalence of Hepatitis C antibodies is consistent with previous studies carried out in both Karachi and Lahore [3, 22]. Incidence studies carried out in drug users in southern China noted that 80% of injectors became Hepatitis C positive within one year of start of injecting drug use [23]. Given this information, it is suggested that Hepatitis C is not included in any follow-up studies as the infection levels rapidly reach saturation, so the results have limited epidemiological value, the tests are expensive, and researchers are not in the position to provide ongoing treatment of this chronic infection.

7 Conclusions & Recommendations

As these studies were designed to provide surveillance data from high-risk groups in Pakistan for the purposes of programme planning, no attempt is made to position these surveys within the body of published scientific literature. This would be done if the work were to be written up for presentation to a peer review scientific journal. However, the urgency of the emerging HIV epidemic dictates that this information be disseminated rapidly and widely for maximal practical utilisation. It is in this spirit that the following conclusions and recommendations are presented:

I. HIV is already well established in Pakistan. This study may indicate that a large scale HIV epidemic has begun in IDUs in Karachi, with increased HIV transmission in MSWs and Hijras. HIV infection had entered all groups in at least one of the sites by mid-2004.

II. The epidemic in Karachi is currently concentrated among those with well-defined risk behaviours, and follows a hierarchy of risk:

   i) IDUs
   ii) Those with multiple anal sex partners
   iii) Those who buy and sell heterosexual sex

III. There is a high risk that the virus will now spread rapidly

   i) First through injecting drug networks
   ii) Then to sex partners of IDU
   iii) And then through commercial sex, especially anal sex

IV. HIV and STI prevention interventions must target individuals who inject drugs or engage in commercial sex, especially anal sex.

V. These prevention interventions must provide services. Information, education and communication programmes are important, but they will not prevent a wider epidemic.

VI. Prevention services must have high coverage of key IDU and commercial sex risk populations at key sites throughout Pakistan. Further study is required in other cities in Pakistan, to identify the highest risk locations, in order to prioritise provision of services.

VII. Services targeting IDUs should include:

   i) Easy access to sterile needles and syringes wherever drug use is prevalent
   ii) Promote safe sex in programmes for drug injectors (and provide condoms)
   iii) HIV harm reduction programmes for IDUs in prison, to prevent HIV transmission in prison.
   iv) Voluntary counselling, testing and care services for HIV-infected IDUs

VIII. To avoid a large-scale sexual epidemic, large scale activities must increase rapidly:

   i) STI screening and treatment for those at risk
   ii) Knowledge of HIV, sexual and injecting risk
   iii) Universal access to condoms and lubricant for those with high risk behaviour
   iv) Negotiating skills for those selling sex
   v) Legal and structural support for safe sex and injecting

IX. Stigma reduction and HIV care and support interventions are required, in addition to prevention activities. This is important not only for humanitarian purposes, but also to increase and improve access of marginalised groups to interventions. It must be remembered that these groups are traditionally 'hard to reach' and this will increase if they are further stigmatised.

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Annexure – I
Injecting Drug Users: Lahore and Karachi
Descriptive analysis of behavioural data, 2004

Injecting Drug Users	Lahore (Number = 397)		Karachi (Number = 402)	
Age, Education and residential status information	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Median Age in years (range)	33	20-75	35	14-70
No formal schooling	243/397	61.2%	237/402	59.0%
Currently legally married	168/395	42.5%	105/401	26.2%
Currently living with a spouse or another regular partner	138/394	35.0%	56/400	14.0%
Blood Borne Transmission Risk Indices	**Frequency**	**Percentage**	**Frequency**	**Percentage**
sold blood for money in the past 12 months	6/395	1.5%	2/387	0.5%
last time injected, used a needle or syringe after someone else had used it	70/396	17.7%	74/402	18.4%
last time injected, passed needle or syringe on to someone else	93/396	23.5%	97/401	24.1%
last time injected, the injection was performed by a professional injector	16/395	4.1%	19/401	4.7%
Last time injected, the needle and syringe were cleaned in between use	80/94	85.1%	124/132	93.9%
last time injected, someone used the same needle or syringe either before or after	98/394	24.9%	122/397	30.7%
when injected in the past one week, how often used a needle or syringe that no one else had ever used?				
I. Always	88/396	22.2%	238/402	59.2%
II. most of the time	58/396	14.6%	44/402	10.9%
III. sometimes	115/396	29.0%	94/402	23.4%
IV. never	135/396	34.1%	26/402	6.5%
In last year, ever injected drugs in another city/district	202/396	51.0%	83/400	20.8%

Sex Transmission Risk Indices

Sex with women	Frequency	Percentage	Frequency	Percentage
In the past 12 months, had sexual intercourse (vaginal or anal) with a spouse or regular female partner	186/380	48.9%	82/373	21.9%
Used a condom at last sexual intercourse with regular female partner	33/187	17.6%	10/82	12.2%
In the past 12 months, paid any female partners to have sexual intercourse (vaginal or anal)	127/375	33.9%	111/376	29.5%
Used a condom last time paid a woman to have sex	40/127	31.5%	19/111	17.2%

Injecting Drug Users	Lahore (Number = 397)		Karachi (Number = 402)	
100% condom use with female sex workers in last year	14/128	10.9%	8/111	7.2%
Sex with men or Hijras	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Paid a man or hijra to have anal sex in the past 12 months	85/378	22.5%	68/375	18.2%
Used a condom last time paid a male or hijra partner for anal sex	6/84	7.1%	9/68	13.3%
100% condom use with male or Hijra commercial partner in the last year	1/87	1.1%	2/68	2.9%
In the past 12 months, been given money or drugs in exchange for sex (commercial selling)?	42/377	11.1%	17/374	4.6%
Used a condom last time was paid to have anal sex	2/20	5.0%	2/8	25.0%
100 % condom use when was paid for sex in the last year	1/20	5.0%	6/372	25.0%
in the past one month, have participated in group sex	19/380	5.0%	6/372	1.6%
In the past 12 months, been given money or drugs by a woman in exchange for sex (commercial selling)?	18/41	43.9%	9/16	56.3%
used a condom last time being paid for vaginal or anal sex by those women	7/18	38.9%	2/9	22.3%
Condom and lubricant information	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Ever used a condom during sexual intercourse	133/380	35.0%	66/369	17.9%
Can identify a male condom	375/393	95.4%	351/398	88.2%
Can obtain a condom anytime needs one	132/375	35.2%	30/351	8.6%
In the past month, condom broke during use	12/328	3.7%	7/324	2.2%
STIs in the past year	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Had urethral discharge during the past 12 months	136/394	34.5%	108/400	27.0%
Had anal discharge during the last 12 months	135/394	34.2%	122/400	30.5%
Had genital ulcer/sore during the past 12 months?	110/393	28.0%	17/400	4.3%
HIV awareness and intervention participation	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Heard of HIV or the disease called AIDS	360/397	90%	288/398	72.4%
Correct use of condom can reduce HIV risk	309/397	85.4%	222/402	55.0%
Avoiding anal sex can reduce HIV risk	287/397	79.3%	246/402	60.9%
Correct use of condom during anal sex can reduce HIV risk	208/397	71.8%	209/402	51.7%
Getting Injection by a used needle can cause HIV	359/397	87.5%	282/402	70.0%
Know a place to go for a confidential HIV test	58/397	14.6%	55/402	13.7%
Ever had an HIV test?	51/397	12.8%	38/402	9.5%
Voluntarily underwent the HIV test	49/397	12.3%	32/402	8.0%
Found out the HIV test result	28/397	7.1%	31/402	7.7%
Every tried to quit injecting drugs	310/387	80.1%	158/399	39.6%
Been to jail in the past year	172/388	44.4%	85/399	21.3%
Attended any HIV prevention session in the past year	239/385	62.1%	94/398	23.6%

Annexure - II
Female Sex Workers: Lahore and Karachi
Descriptive analysis of behavioural data, 2004

Female sex workers	Lahore (Number = 404)		Karachi (number = 423)	
Age, commercial sex and first sex information	**Median**	**Range**	**Median**	**Range**
Age	35	15-70	35	15-66
Time has sold sex (years)	5	1-42	5	1-40
Age at first sexual intercourse	15	9-30	16	8-29
Education and residential status information	**Frequency**	**Percentage**	**Frequency**	**Percentage**
No formal schooling	337/403	83.6%	322/422	76.3%
Has lived in Lahore or Karachi Lahore all of life	208/403	51.6%	188/422	44.6%
Has lived in same house/brothel all of her life	73/403	18.1%	64/422	15.2%
Trafficked to current workplace	20/403	5%	0	0%
Migrated to this workplace	50/403	12.4%	42/422	10%
Currently Legally married	252/403	62.5%	350/422	82.9%
RISK BEHAVIORS				
Blood Borne risk	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Sold blood for money during last 12 months	3/403	0.7%	2	0.5%
Injected drugs during last 12 month	5/403	2.6%	7/161	4.4%
Know that some of their clients inject drugs	92/404	22.8%	75/413	18.2%
Any of non-paying partners inject drugs	29/225	12.9%	57/361	15.8%
Sexual Risk	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Used condom with first sexual partner	13/403	3.2%	8	1.9%
One-time clients	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Had one-time client during the last week	211/403	52.4%	214/422	50.7%
Used condom during vaginal sex with last one time client	101/214	47.9%	61/214	28.5%
Had anal sex with one time client in the past week	16/211	7.6%	30/214	14.1%
Used condom when had anal sex with one time client	6/16	37.5%	2/30	6.7%
Always used condom during the last week while having sex (vaginal or anal) with one time client	46/211	21.8%	5/214	2.4%
Never used condom during the last week while having sex (vaginal or anal) with one time client	88/211	41.7%	141/214	65.9%
Had oral sex with one time client in the past week	25/211	11.8%	25/214	11.7%
Always used condom during oral sex with on time client	2/25	8.0%	1/25	4.0%
Never used condom during oral sex with on time client	22/25	88.0%	24/25	96%
Regular Clients	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Had regular client during the last week	334/403	82.9%	337/418	80.6%
Used condom with last regular client during vaginal sex	157/334	47.0%	86/337	25.5%
Had anal sex with regular client in the past week	27/334	8.1%	29/337	8.6%

Female sex workers	Lahore (Number = 404)		Karachi (number = 423)	
Used condom at last anal sex with regular client	6/27	22.3%	2/29	6.8%
Always used condom during the last week while having sex (vaginal or anal) with regular client	67/334	20.1%	11/337	3.3%
Never used condom during the last week while having sex (vaginal or anal) with regular client	162/334	48.5%	249/337	73.9%
Had oral sex with regular client	21/334	6.2%	24/337	7.2%
Never used condom during oral sex with regular client	21/21	100%	20/24	83.4%
	Median	**Range**	**Median**	**Range**
Number of one-time or regular vaginal or anal sex partners in last one week	7	(1-63)	6	(1-19)
Non-paying partners	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Had sex with non-paying partners in last one week	225/404	55.7%	361/419	86.2%
Had vaginal or anal sex with those non-paying partners	225/225	100%	361/361	100%
Used condom at last vaginal or anal sex with those non-paying partners	49/225	21.8%	81/361	22.5%
Always used condom during vaginal or anal sex with those non-paying partners	18/225	8.0%	30/361	8.3%
Never used condom during vaginal or anal sex with those non-paying partners	170/225	75.6%	269/361	74.5%
Any of non-paying partners inject drugs	29/225	12.9%	57/361	15.8%
Condom knowledge and practice	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Can identify a condom	387/404	95.8%	335/361	79.4%
Can obtain a condom every time when needed	261/387	67.5%	140/335	41.8%
Condom broke while using during the last one month	69/387	17.8%	22/335	6.6%
STI history	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Had painful and smelly discharge from vagina during the last one year	210/404	51.9%	236/422	55.9%
Had pain in lower stomach area during the last one year	236/404	58.4%	227/ 422	53.8%
Had warts, sores or ulcers in genital area during the last one year	97/404	24.0%	34/ 422	8.1%
Additional Vulnerability	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Had sex in a group in the past month	52/404	12.9%	26	6.2%
Was forced to have sex within the past year	58/404	14.4%	66/419	15.8%
Know that some of their clients inject drugs	92/404	22.8%	75/413	18.2%
Awareness about HIV/AIDS	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Heard about HIV/AIDS	304/404	75.2%	287/420	68.4%
Know that correct use of condom can reduce HIV risk	220/404	54.5%	109/420	26.0%
Avoiding anal sex can reduce HIV risk	180/404	44.5%	91/420	22.5%
Correctly use of condom during anal sex can reduce HIV risk	170/404	42.1%	77/420	19.0%
Getting Injection by a used needle can cause HIV	291/404	72.1%	266/420	63.3%
Know a place for confidential HIV test	10/404	3.3%	9/420	2.1%
Ever had HIV test	3/404	0.7%	4/420	0.9%
Found out HIV result	3/404	0.7%	4/420	0.9%
Attended any HIV prevention session in the past year	33/404	8.1%	14/419	3.4%
Ever arrested during last one year	48/404	11.9%	41/420	9.8%

Annexure - III
Male Sex Workers: Lahore and Karachi
Descriptive analysis of HIV, syphilis and behavioural data, 2004

Male sex workers	Lahore (Number =400)		Karachi (number = 407)	
Age, commercial sex and first sex information	**Median**	**Range**	**Median**	**Range**
Age	23	8-62	24	14-65
Duration of selling sex in years	5	1-42	5	<1-25
Age at first sexual intercourse	16	7-31	14	8-30
Education and residential status information	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Had no formal schooling	230/400	57.5%	237/407	58.2%
Currently Legally married	73/400	18.3%	63/407	15.5%
Presently living with male sex partner	51/108	47.3%	22/407	55.0%
Presently living with female sex partner	56/108	51.9%	16/407	40.0%
Presently living with hijra sex partner	2/108	1.9%	2/407	5.0%
RISK BEHAVIORS				
Blood Borne risk	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Sold blood for money during last 12 months	2/400	0.5%	3/405	0.8%
Injected drugs during last 12 months	14/400	3.5%	15/405	3.7%
Sex with women	**Frequency**	**Percentage**	**Frequency**	**Percentage**
First sex partner was female	144/400	36%	98/405	24.2%
Ever had vaginal or anal sex with a women	263/400	65.8%	226/407	55.5%
At least one female paid for sex within the last one month	79/400	19.8%	51/399	12.8%
Used condom last time had vaginal or anal sex with these female clients within the last month	20/79	25.3%	3/51	5.9%
Always used a condom during vaginal or anal sex with female clients within the last month	4/79	5.1%	2/51	3.9%
Never used a condom during vaginal or anal sex with all of these female clients within the last month	59/79	74.7%	46/51	90.2%
Bought sex from a women during the last one month	157/400	39.3%	49/400	12.3%
Used a condom the last time bought vaginal or anal sex from a women in the last month	28/157	17.9%	6/49	12.3%
Always used a condom when bought sex from a women during the last one month	8/157	5.1%	3/49	6.2%
Had sex with a non-paying female during the last one month	94/400	23.5%	35/404	8.7%
Used a condom Last time had vaginal or anal sex with a non-paying female	18/94	19.2%	4/35	11.4%
Always used a condom when had vaginal or	6/94	6.4%	1/35	2.9%
anal sex with a non-paying female during the last one month				
Never used condom when had vaginal or anal	74/93	79.6%	33/35	94.3%
sex with non-paying females during the last one month				
Received money in return of sex during the last one year	394/400	98.5%	392/405	96.8%
First sex partner was male	253/400	63.3%	301/405	74.4%
First sex partner was hijra	3/400	0.8%	4/405	0.98%

Male sex workers	Lahore (Number =400)		Karachi (number = 407)	
Used condom with first sexual partner	22/400	5.5%	14/405	3.5%
Had anal sex with a man during the last one year	387/400	96.7%	404/407	99.3%
Had anal sex with a hijra during the last one year	141/400	35.3%	154/407	37.8%
Sold sex to a man during the last one week	347/400	86.8%	342/407	84.1%
Had one time clients during the last week	140/338	41.4%	273/345	79.2%
Had anal sex with one time clients in the last week	140/140	100%	273/273	100%
Used a condom at last anal sex with one time client	12/140	8.6%	16/270	5.9%
Used a condom with all of these one time clients	6/140	4.3%	8/273	2.9%
Always used condoms during anal sex with one time clients in last one week	3/140	2.2%	8/270	2.9%
Never used condoms during anal sex with one time clients in last one week	112/140	80.0%	248/270	91.9%
Had oral sex with one time client in the past week	41/140	29.3%	76/270	28.2%
Never used condom during oral sex with one time clients in the past week	41/41	100%	71/76	93.4%
Had regular clients during the last week	293/400	73.3%	161/346	46.6%
Had anal sex with these regular clients during the last week	293/293	100%	161/161	100%
Used a condom last time had anal sex with a regular client in the last week	17/293	5.8%	13/161	8.1%
Always used condoms during anal sex with regular clients within the last week	7/293	2.4%	8/161	4.9%
Never used condoms during anal sex with regular clients within the last week	271/293	92.5%	139/161	86.4%
Had oral sex with regular client(s) during the last week	71/293	24.3%	39/161	24.3%
Never used a condom during oral sex with regular clients within the last week	68/71	95.8%	36/39	92.3%
	Median	**Range**	**Median**	**Range**
Number of one-time or regular clients with whom had anal sex in last one week	4	(2-7)	4	(1-20)
	Frequency	**Percentage**	**Frequency**	**Percentage**
Bought sex from a man during the last one month	115/400	28.8%	79/403	19.6%
Bought sex from a hijra within the last one month	56/400	14.0%	51/404	12.6%
Had anal sex with these men and hijras	129/171	75.5%	107/130	82.3%
Used condom when last time paid for anal sex during the last one month	9/129	6.9%	5/130	3.9%
Always used condom, every time when paid for anal sex during the last one month	7/129	5.4%	4/130	3.1%
Had sex with a non-paying male during the last one month	90/400	22.5%	136/401	33.9%
Used condom Last time had sex with a non-paying male	6/90	6.7%	1/136	0.7%
Always used condom when had anal sex with non-paying male during the last one month	4/90	4.4%	1/136	0.7%
Had sex in a group in the last one month Among all your male sexual partners with whom you had anal sex in last month were they:	48/400	12%	76/403	18.9%
all receptive	9/399	2.3%	191/403	47.4%
all insertive	131/399	32.8%	71/403	17.6%
mostly receptive	20/399	5.0%	62/403	15.4%
mostly insertive	123/399	30.8%	44/403	10.9%
equally insertive and receptive	75/399	18.8%	33/403	8.2%

Condom and lubricant information	Frequency	Percentage	Frequency	Percentage
Can identify a male condom	357/400	89.3%	382/403	94.8%
Can obtain a condom when needed	140/356	39.3%	221/382	57.8%
Ever used lubricant during anal sex	212/400	53%	364/382	95.3%
Also used a condom at last anal sex with lubricant	5/212	2.3%	7/364	1.9%
STIs in the past year	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Had urethral discharge during the last 12 months	105/400	26.3%	118/404	29.2%
Had anal discharge during the last 12 months	31/400	7.8%	66/404	16.4%
Had genital ulcer/sore during the past 12 months	42/400	10.5%	67/404	16.6%
Awareness about HIV/AIDS	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Heard about HIV/AIDS	295/400	73.8%	173/404	42.8%
Correct use of condom can reduce HIV risk	203/400	50.8%	144/404	35.6%
Avoiding anal sex can reduce HIV risk	217/400	54.3%	143/404	35.4%
Correct use of condom during anal sex can reduce HIV risk	207/400	51.8%	140/404	34.7%
Getting Injection by a used needle can cause HIV	263/400	65.8%	161/404	39.9%
Know where to go for a confidential HIV test	3/400	0.8%	9/404	2.2%
Ever had HIV test	1/400	0.3%	6/404	1.5%
Voluntarily under went for a HIV test	0/400	0	6/404	1.5%
Found out HIV result	1/400	0.3%	6/404	1.5%
Attended any HIV prevention session in the past year	7/400	1.8%	5/404	1.3%

Annexure - IV
Hijras: Lahore and Karachi
Descriptive analysis of behavioural data, 2004

Hijras	Lahore (Number = 204)		Karachi (Number = 199)	
Education and residential status information	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Had no formal schooling	105/204	51.5%	100/199	50.3%
Currently Legally married	21/204	10.3%	12/198	6.1%
Presently living with male sex partner	48/204	23.5%	35/165	21.2%
Presently living with hijra sex partner	7/204	3.5%	6/165	3.7%
Age, commercial sex and first sex information	**Median**	**Range**	**Median**	**Range**
Age (years)	22	13-45	25	15-50
Duration of selling sex (years)	6	1-30	10	<1-30
Age at first sexual intercourse	14	7-24	13	7-25
RISK BEHAVIORS				
Blood Borne Risk	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Sold blood for money during last 12 months	1/204	0.5%	2/197	1.1%
Injected drugs during last 12 month	3/204	1.5%	2/199	1.1%
Sex with women	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Ever had vaginal or anal sex with a women	36/204	17.6%	24/198	12.2%
Used condom during last sex act with a women	8/36	22.3%	3/24	12.5%
Had sex with a women with in last one year	33/204	16.2%	11/204	5.4%
Sex with men	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Received money in return of sex during the last one year	202/204	99.1%	197/198	99.5%
First sex partner was male	191/204	93.6%	197/197	100%
Had anal sex with a man in last month	198/204	97.1%	188/198	94.9%
Had oral sex with a man in last month	106/204	53.5%	59/190	31.1%
Paid by a man for sex in last one week	187/204	91.7%	147/198	74.3%
Had one time clients in last one week	90/204	44.1%	114/171	66.7%
Asked one time clients to use condom with in last one week	6/90	6.7%	7/114	6.2%
Used condom the last time had anal sex with one time client	14/90	15.6%	10/114	8.8%
Always used condom during anal sex with all of these one time clients in last one week	8/90	8.9%	6/114	5.3%
Had oral sex with one time client in last one week	45/90	50.0%	34/114	29.8%
Never used condom during oral sex with all of these one time clients in last one week	44/45	97.8%	33/34	97.1%
Had regular clients during the last week	151/204	74.1%	81/174	46.6%
Used condom last time had anal sex with the regular client within the last week	23/151	15.3%	6/81	7.4%
Always used condom during anal sex with all of these regular clients within the last week	11/151	7.3%	5/81	6.2%
Had oral sex with regular clients in last one week	70/151	46.4%	27/81	33.4%

Hijras	Lahore (Number = 204)		Karachi (Number = 199)	
	Median	**Range**	**Median**	**Range**
Number of one-time or regular clients with whom had anal sex in last one week	3	(2-13)	3	(1-21)
Bought sex from a male in last one month	57/204	27.9%	2/198	1.1%
Used condom when last time bought anal sex during the last month	4/57	7.1%	0/2	0
Never used condom when bought anal sex in last one month	27/57	47.4%	1/2	50.0%
Had anal sex with non-paying partners in last one month	102/204	50.0%	59/195	30.3%
Used condom last time had anal sex with non-paying partner in last one month	11/102	10.8%	2/59	3.4%
Always used condom during anal sex with non-paying partners in last one month	7/102	6.8%	1/59	1.7%
Had sex in a group in the past month	39/204	19.1%	14/196	7.2%
Forced to have sex within the past year	69/204	33.8%	59/199	29.7%
Condom and lubricant information	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Can identify a male condom	194/204	95.1%	187/198	94.5%
Can obtain a condom when needed	82/194	42.5%	120/187	64.2%
Ever used lubricant during anal sex	143/204	70.1%	181/196	92.4%
Always used lubricant with a condom in last one month	0	0	8/181	4.4%
Condom broke during use in last one month	8/204	3.9%	5/127	3.9%
STIs in the past year	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Had Urethral discharge during the last 12 months	37/204	18.1%	20/198	10.1%
Had Anal discharge during the last 12 months	15/204	7.4%	35/198	17.7%
Had Genital ulcer/sore during the past 12 months	14/204	6.9%	25/198	12.6%
Awareness about HIV/AIDS	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Has heard about HIV/AIDS	159/204	77.9%	119/199	59.7%
Knew correct use of condom can reduce HIV risk	111/204	54.5%	84/199	42.3%
Knew that avoiding anal sex can reduce HIV risk	117/204	57.3%	88/199	44.2%
Knew that correct use of condom during anal sex can reduce HIV risk	110/204	53.9%	84/199	42.2%
Getting Injection by a used needle can cause HIV	145/204	71.1%	97/199	48.7%
Know a place for confidential HIV test	0/199	0	2/199	1.0%
Attended any HIV prevention session in last one year	3/304	1.5%	1/199	0.5%

Annexure - V
Truckers: Lahore and Karachi
Descriptive analysis of behavioural data, 2004

Truckers	Lahore (number = 400)		Karachi (number = 402)	
Age, occupation and first sex information	**Median**	**Range**	**Median**	**Range**
Age	32	17-65	27	17-59
Years in Trucking	10	1-42	6	1-35
Age at first sex	18	9-	17	13-
Condom use at first sex	4/400	1%	2/373	0.5%
Education And Residential Status Information				
Currently married	297/400	74.3%	231/400	57.8%
Currently living with spouse or another regular sex partner	289/400	72.3%	211/398	53.1%
RISK BEHAVIORS				
Blood Borne risk	**Frequency**	**Percent**	**Frequency**	**Percent**
Sold blood for money in the last 12 months	1/400	0.3%	2/400	0.5%
Injected drugs in the last 12 months	0	0	2/312	0.6%
Sexual Risk				
Regular Partners	**Frequency**	**Percent**	**Frequency**	**Percent**
Had sex with wife or regular sex partner in the past 12 months	313/400	78.3%	258/374	68.9%
Used condom when last time had sex with a wife or regular sex partner	31/313	9.9%	18/261	6.9%
Always used condom with regular sex partner during the last one year	8/313	2.6%	1/159	0.6%
Never used condom with regular sex partner during the last one year	242/313	77.3%	223/259	86.1%
Commercial female sex partners	**Frequency**	**Percent**	**Frequency**	**Percent**
Bought sex from a women in the last one year	86/400	21.5%	120/372	32.3%
Used condom when last time bought sex from a women	6/86	6.9%	2/120	1.7%
Always used a condom when bought sex from a women during the last one year	0	0	2/120	1.7%
Never used a condom when bought sex from a women during the last one year	69/86	80.3%	109/120	90.8%
	Median	**Range**	**Median**	**Range**
Of men who bought FSW sex in past year, number of FSW partners in the past month	1	(0-27)	0	(0-7)
Commercial male or hijra sex partners	**Frequency**	**Percent**	**Frequency**	**Percent**
Paid a man or hijra for sex during the last one year	27/400	6.8%	82/373	21.9%
Used a condom when last time paid a man or a hijra for anal sex	1/27	3.7%	0/83	0
Always used a condom when paid a man or a hijra for anal sex during the last one year	1/27	3.7%	0/83	0
Never used a condom when paid a man or a hijra for anal sex during the last one year	24/24	88.9%	79/83	95.1%
Of men who bought male or Hijra sex in past year, number of such partners in the past month	0	(0-10)	1	(0-4)

Truckers	Lahore (number = 400)		Karachi (number = 402)	
	Median	Range	Median	Range
Non-paying female partners	Frequency	Percent	Frequency	Percent
Had vaginal/anal sex with a non-paying girl friend during the last one year	51/400	12.8%	62/374	16.6%
Used a condom when last time had sex with a non-paying girlfriend	4/51	7.8%	2/62	3.3%
Always used a condom when had vaginal/anal sex with a non-paying girl friend during the last one year	2/51	3.9%	2/62	3.3%
Never used a condom when had vaginal/anal sex with a non-paying girl friend during the last one year	44/51	86.3%	57/62	91.9%
Had group vaginal or anal sex during the last one month	15/395	3.8%	13/369	3.5%
Condom knowledge and practice				
Can identify a male condom	317/400	79.3%	303/372	81.5%
Ever used condom during sexual intercourse	103/399	25.8%	49/372	13.2%
Can obtain a condom when needed	72/317	22.7%	18/303	5.9%
STI history				
Had urethral discharge during the last one year	65/399	16.3%	87/373	23.3%
Had anal discharge during the last one year	27/400	6.75%	19/373	5.1%
Had genital ulcers/sores during the last one month	33/396	8.3%	46/373	12.4%
Awareness about HIV/AIDS				
Heard about HIV/AIDS	360/400	90.0%	300/401	74.8%
Correct use of condom can reduce HIV risk	207/400	51.8%	112/402	27.9%
Avoiding anal sex can reduce HIV risk	253/400	63.3%	223/402	55.5%
Correct use of condom during anal sex can reduce HIV risk	211/400	52.8%	109/402	27.1%
Getting Injection by a used needle can lead to HIV infection	342/400	85.5%	288/402	71.6%
Know a place for confidential HIV test	13/394	3.3%	1/402	0.4%
Ever had HIV test	3/400	0.75%	1/402	0.25%
Voluntarily under went for a HIV test	3/400	0.75%	1/402	0.25%
Found out HIV result	3/400	0.75%	1/402	0.25%
Attended any HIV prevention session in the last year	4/400	1.0%	3/397	0.8%