National HIV Serological Surveillance, 2004-2005 Bangladesh

Sixth Round Technical Report

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Foreword

This report summarises the findings of the sixth round of National HIV Serological Surveillance in Bangladesh, which has been conducted between August 2004 and April 2005. On behalf of the Government of Bangladesh ICDDR,B: Centre for Health and Population Research in close collaboration with the Institute of Epidemiology, Disease Control and Research (IEDCR) carried out the surveillance.

Findings of the 6th round indicate that the prevalence of HIV among the injection drug users (IDU) in Central Bangladesh is increasing and is at 4.9%. For the first time, HIV has been detected in IDU from two other cities. We know from the 5th round data that the IDUs are well integrated in the community, socially and sexually, thus raising grave concern about the spread of HIV infection to the general population.

Although HIV prevalence is low in other most at risk population groups sampled, but active syphilis prevalence continue to be high, indicating that unsafe sexual behaviour is still very high. This cautions us to expand, modify and intensify our efforts in prevention programmes.

It has been proven over time, all over the world that HIV/AIDS has major health, social, economic, political and legal consequences, which will touch almost all aspects of human life. This in turn threatens the national development and efforts to improve the quality of life of our people. The Government of Bangladesh is very concerned about the new information being presented in this report. However, we still have the window of opportunity to avoid an HIV epidemic in Bangladesh if we immediately start taking aggressive prevention efforts.

We hope that this report will inspire all those involved in HIV/AIDS prevention programme- including different Government sectors, community based organisations, NGOs, International Organisations to step up effective prevention programmes and scale up successful interventions across the country. As we know that early action at the beginning of an epidemic is most effective, we should not lose out on the opportunity to turn Bangladesh into a success story for HIV prevention.

Professor Dr. Md. Shahadat Hossain
Line Director, NASP & SBTP
Director General, DGHS
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The sixth round of annual HIV surveillance is the result of the combined efforts and contributions of many individuals and organisations. Thanks are due to all those listed below as well as to the many participants who gave their blood and shared some of their personal information.

The National AIDS/STD Programme (NASP), Directorate General of Health Services, Ministry of Health and Family Welfare, is responsible for HIV surveillance in Bangladesh. The sixth round was conducted by ICDDR,B: Centre for Health and Population Research in close collaboration with the Institute of Epidemiology, Disease Control and Research (IEDCR) and the funding was provided by GOB/DFID/IDA.

A large number of NGOs, private organisations and community groups participated in the surveillance by providing access to the vulnerable population groups and helped in various aspects of the surveillance. These organisations are listed in annexe 1.

The Principal Investigators (PI) were Dr Tasnim Azim, Laboratory Sciences Division (LSD) ICDDR,B and Director, Institute of Epidemiology, Disease Control and Research (IEDCR). Co-investigators were Dr Motiur Rahman, LSD, ICDDR,B; Dr Md Shah Alam, LSD, ICDDR,B and Dr Rasheda Khanam, Health Systems and Infectious Diseases Division (HSID), ICDDR,B. Dr Imtiaz Ashraf Choudhury, IEDCR, DGHS helped in coordination of field activities. Mr Md Humayun Kabir, HSID, ICDDR,B provided support in the field management as and when required. Laboratory staffs for serological surveillance were Mr Giasuddin Ahmed, Mr Mohammed Repon Khan and Mr M Safiullah Sarker. Field staffs for serological surveillance were Mr Bikash Chandra Swar, Mr Kartic Chandra Das, Mr Shah Jalal Bhuiyan, Mr Habibur Rahman, Mr K M Zahid, Mr S M Akramul Haque, Mr Md Awlad Hossain, Mr Md Morshed Alam Khan, Mr Abdus Salam, Mr Kazi Nurul Haque, Mr Md Helal Uddin, Mr Md Mohiuddin Khadem, Mr Porimol Sarker, Mr Mamun Ar Rashid, Mr Md Amirul Islam, Mr Tajmul Haque, Mr Mohammed Ali, Mr Gour Nitai Halder, Mr Ashish Kumar Sarker and Mr Khandaker Minhaz. Data analysis support was provided by Mr Masud Reza, LSD, ICDDR,B and data entry was done by Mr Mohammed Sha Al Imran and Mr Md Emarat Hossain. All logistics and administrative support was provided by Mr Md Ishaque, LSD, ICDDR,B.

The Surveillance Advisory Committee, which is chaired by the chairperson of the TC-NAC, provided advice and direction throughout the surveillance round. The members of the Surveillance Advisory Committee are listed in annexe 2.

Acronyms and Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
BSS	Behavioural Surveillance System
CBO	Community Based Organisation
DFID	Department for International Development
DIC	Drop in Centre
DGHS	Directorate General of Health Services
ELISA	Enzyme Linked Immunosorbent Assay
FHI	Family Health International
GOB	Government of Bangladesh
HIV	Human Immunodeficiency Virus
HSID	Health Systems and Infectious Diseases Division
HCV	Hepatitis C Virus
ICDDR,B	Centre for Health and Population Research (International Centre for Diarrhoeal Diseases Research, Bangladesh)
IDA	International Development Association
IDU	Injection Drug User
IEDCR	Institute of Epidemiology, Disease Control and Research
LSD	Laboratory Sciences Division
LIA	Line Immuno Assay
MOHFW	Ministry of Health and Family Welfare
MSM	Males Who Have Sex With Males
MSW	Male Sex Worker
NASP	National AIDS/ STD Programme
NGO	Non-Government Organisation
RPR	Rapid Plasma Reagin Test
SAC	Surveillance Advisory Committee
STD	Sexually Transmitted Disease
STI	Sexually Transmitted Infection
TPPA	Treponema Pallidum Particle Agglutination Assay
UNAIDS	Joint United Nations Programme on HIV/AIDS
USAID	United States Agency for International Development
WHO	World Health Organisation

Table of Contents

List of Tables

List of Figures

List of Boxes

Executive Summary

Bangladesh has carried out serological surveillance annually since 1998 and from the very beginning has recorded the highest HIV rates in injection drug users in Central city A. This rate has been steadily rising over the years and now, during the 6th round, it is at 4.9%. The geographical coverage of injection drug users in surveillance has increased dramatically over the rounds, with only one city being covered in the 1st round to 17 cities in the 6th round. In previous years no HIV was detected in injection drug users outside Central city A. However, in the 6th round for the first time HIV has been detected, albeit in very low numbers, in injection drug users from two other cities- Southeast-D and in Northwest F1.

For the first time female injection drug users were included as a separate group in surveillance and very fortunately HIV prevalence was zero. Active syphilis rates were high in female injection drug users- 9.2% that is comparable to the rates in female sex workers suggesting that female injection drug users are engaging in unsafe sex. In male injection drug users such high rates of active syphilis (9%) have been recorded from only one city; Southeast -H1. In all other cites the active syphilis rates in male injection drug users range between 0-3.9%.

HIV remains low, less than 1%, amongst most of the other vulnerable population groups sampled: female sex workers in brothels, hotels, streets, and casual (part-time) sex workers, male sex workers, males who have sex with males, transgender (Hijras), heroin smokers and some groups of mobile men (internal migrants) considered as possible bridges including rickshaw pullers, dockworkers and truckers.

As before female sex workers had high rates of active syphilis. However, there are some encouraging results from female sex workers from the streets of Central city A as active syphilis rates declined significantly over the rounds (from 35% in the 1st round to 6.2% in the 6th round). Brothels showed a mixed picture with rates declining in brothels from three cities and remaining unchanged in six.

Casual female sex workers (i.e. those who sold sex part-time) were sampled from three border cities. The sex workers in the two Northwest border cities commonly reported crossing over the border to India and selling sex while across the border. In one of these cities (Northwest-K1), the HIV rate was 1.7% and this is the group with the second highest HIV prevalence. Sex workers were for the first time sampled from Southeast-H1 bordering Myanmar but the proportions reporting crossing over to Myanmar and selling sex there was small. In this city although no HIV was detected, active syphilis rate was high (10%).

Active syphilis rates in males who have sex with males and male sex workers were low but they are rising although the rise is not statistically significant. Hijras have shown a significant decline in active syphilis rates over the rounds. Rickshaw pullers, truckers, and dockworkers are continuing to show low rates of active syphilis and fortunately no HIV.

During the 6th round, only serological surveillance was conducted and unlike all previous years, behavioural surveillance was not carried out. However, other research data from studies carried out at a similar time are available in the country and they all confirm continuing high risky behaviours. As predicted, the HIV rates are rising steadily in injection drug users in Central-A and soon it will be too late to prevent a large-scale epidemic if intervention programmes are not scaled up and adapted to the needs of the communities that they serve. Stigma continues to remain a major barrier to working with marginalized population groups, which enhances their vulnerability. Bangladesh cannot afford to ignore the increase in HIV among injecting drug users. Bangladesh must mobilize the political will to act rapidly and decisively to avert an HIV epidemic, or it will be too late.

1. HIV SURVEILLANCE IN BANGLADESH

In 1998, the Government of Bangladesh set up the National HIV Surveillance System. This surveillance system is based on the UNAIDS/WHO "Guidelines for Second Generation HIV Surveillance" (UNAIDS/WHO 2000), which not only monitors the spread of HIV epidemic by serological surveillance but also tracks the risk behaviours that provides warning signs for the spread of HIV epidemic. This Second Generation Surveillance System was in place till the end of the 5th round of surveillance (2003-2004) and both serological surveillance and behavioural surveillance were done in tandem. However, during the 6th round (2004-2005), only serological surveillance for HIV was carried out; behavioural surveillance was not done.

Institute of Epidemiology, Disease Control and Research (IEDCR) participated actively during the 6th round of the serological surveillance. A representative at the medical officer level participated in all field level surveillance activities including meetings with the collaborating NGOs and CBOs, orientation workshops, field site preparation, quality control of the sample collection and constant liaison with the National AIDS/STD Programme (NASP) office.

This report presents the methodology, findings and conclusions from the 6th round of serological surveillance for HIV that was conducted between August 2004 to May 2005. Funding for the 6th round of serological surveillance was provided by the Government of Bangladesh/Department for International Development (DFID)/International Development Association (IDA).

2. DESIGN AND METHODOLOGY

2.1 SELECTION OF POPULATION GROUPS FOR SURVEILLANCE

According to the WHO/UNAIDS guidelines for the 2nd Generation Surveillance System, in countries where HIV prevalence is low, sampling for HIV concentrates on those populations that are considered to be most vulnerable to HIV and also on those that may act as an "epidemiological bridge" from the most at risk populations to the general population.

As Bangladesh has continued to remain a low prevalent country for HIV, the population groups considered for the 6th round of the serological surveillance were similar to earlier rounds and included female sex workers in brothels, hotels, streets, and casual sex workers, male sex workers, males who have sex with males (MSM), transgender (Hijras), injection drug users (IDU) and heroin smokers. The population groups considered as possible bridges included some groups of men on the move, i.e. men who stay away from home for prolonged periods of time (internal migrants), such as rickshaw pullers, dockworkers and truckers. The final selection of these population groups for the 6th round of surveillance were decided through a discussion meeting in the Surveillance Advisory Committee (SAC) on 25th June 2005.

A few major decisions were taken by the SAC regarding sampling for the 6th round:

- To increase coverage of IDU as much as possible for a wider geographical representation.
- As IDU in one neighbourhood of Central A were found to be experiencing a concentrated epidemic during the 5th round (GoB 2004) and also as a cohort research study of ICDDR,B was covering a large proportion of IDU from that neighbourhood (Azim, Chowdhury et al. 2004), it was decided that sampling from Central city A would need to be modified. The modification included: i) treating that neighbourhood as a separate area and attempting to get as many IDU from that area as possible with an aim to obtain a census population from that area. This area has been designated as A1; and ii) to sample the rest of Central city A as one city with a sample size of ~400 and this has been referred to as area A2. Sampling from this area would follow the methodology of the previous rounds; in previous rounds IDU were sampled from the areas covered by the Drop-In Centres (DICs) of the NGO running the needle/syringe exchange programme (NEP). Each DIC covers a known number of IDU and in order to obtain 400 samples, proportionate sampling from the areas covered by each DIC was done.
- To include truckers and dockworkers in this round of serological surveillance and if possible patients with sexually transmitted infections (STI).
- To exclude regular sex partners of brothel based female sex workers (Babus) and those of Hijras.
- Not to include launch workers.

As surveillance progressed, a few more changes were incorporated. The changes and reasons for change are provided below:

1. Due to time and budget constraints and in order to accommodate other new sites, the SAC meeting on 6th March 2005 accepted excluding rickshaw pullers from Southeast-A and STI patients.

2. It was agreed that hotel based female sex workers in Central city A will be covered in the sixth round. However, there are ongoing STI research studies in hotel based sex workers where blood is being drawn and other samples are being collected at regular intervals. Sex workers would be resistant to give further samples of blood and this would jeopardise the activities of the intervention organisation. From this round of surveillance, we have become committed to taking consent from all participants so that using left over serum drawn for other purposes is no longer a possibility. This is for ethical reasons. As a result, we were obliged to exclude this group of sex workers from the 6th round of surveillance.

3. The coverage area for MSM in Central Bangladesh was expanded in the 6th round to include intervention areas covered by one CBO and one NGO. In the previous rounds, the intervention area covered by one CBO only was included.

4. Serological surveillance was expanded to sample IDU from eight new cities of which five were new to interventions and casual (part-time) female sex workers from two new cities.

5. As the number of sites for IDU were expanded substantially and also as the total number of samples collected during surveillance increased beyond 8000 samples from the 5th round onwards, practical solutions to accommodate the increased number of samples had to be taken. One such solution was to reduce the number of tests for hepatitis C (HCV). HCV testing has so far been done on all samples from IDU. For this round tests have been restricted to IDU from new sites only.

The definitions of the population groups sampled for surveillance were the same as in previous rounds and are shown in Box 1 below:

Box 1. Definitions used for each population group

Injection drug users: Those who were primarily injectors and had injected in the previous year

Heroin smokers: Those who were primarily smokers and had not injected more than twice in the previous six months

Female sex workers:
Brothel sex workers: Those who were selling sex in a brothel during the previous month
Street sex workers: Those who were selling sex on the street during the previous month
Hotel sex workers: Those who were selling sex in hotels during the previous month
Casual sex workers: Those who were selling sex either in the street, residence or hotel during the previous month and had either one or more main sources of income

Males who have sex with males:
Male sex workers: Males who were selling sex to other males during the previous month
Non-sex workers: Males who had male sex partners but did not sell sex

Hijras (Transgender or third gender): Those who identified themselves as belonging to a traditional Hijra sub-culture (Transgender)

Truckers: Those who were currently working as truck drivers or helpers

Dockworkers: Those who were currently working on dockyards

Rickshaw pullers: Those who were currently working as rickshaw pullers

The groups finally selected for surveillance are shown in Table 1 where populations covered in all rounds are also listed.

Table 1. Population groups sampled in serological surveillance 1998-1999 (round I), 1999-2000 (round II), 2000-2001 (round III), 2002 (round IV), 2003-2004 (round V) and 2004-2005 (round VI)

Population group		Geographical Location		1998-1999	1999-2000	2000-2001	2002	2003-2004	2004-2005
				Round I	Round II	Round III	Round IV	Round V	Round VI
Injection drug users (IDU)	From detoxification clinics	Central	A	√	√	√			
	Out of detoxification clinics	Central	A1						√
			A2						√
			A†		√	√	√	√	√
			C						√
			E					√	√
			H					√	√
		Northwest	A		√	√	√	√	√
			B			√	√	√	√
			B1					√	
			B2					√	√
			D						√
			F					√	√
			F1					√	√
			G						√
		Southeast	D					√	√
			H1						√
		Southwest	B						√
			D						√
		South	A						√
Female injection drug users		Central	A, E, H						√
Heroin smokers		Central	A				√	√	√

Population group	Geographical Location		1998-1999	1999-2000	2000-2001	2002	2003-2004	2004-2005
			Round I	Round II	Round III	Round IV	Round V	Round VI
Brothel based female sex workers	All brothels						√	√
	Central	B	√	√	√	√		
		C		√		√		
		D			√	√		
		E	√					
	Southwest	A, C		√	√	√		
		B			√	√		
Street based female sex workers	Central	A	√	√	√	√	√	√
		B				√		
	Southeast	A					√	√
	Southwest	A				√	√	
Hotel based female sex workers	Central	A				√	√	
	Southeast	A					√	√
	Northeast	A					√	√
Casual female sex workers	Southeast	D						√
		H1						√
	Northwest	K1					√	√
		M1					√	√
	South	A					√	√
Male sex workers (MSW)	Central	A			√	√	√	√
Males who have sex with males (MSM)	Central	A			√	√	√	√
MSM and MSW combined	Central	A	√	√				
		C				√	√	
	Southeast	A				√	√	√
	Northeast	A				√	√	√
Hijras	Central	A				√		
		A, G					√	√

Population group	Geographical Location		1998-1999	1999-2000	2000-2001	2002	2003-2004	2004-2005
			Round I	Round II	Round III	Round IV	Round V	Round VI
Partners of Hijra	Central	A, G					√	
Babus ‡	Central	B				√	√	
		D				√	√	
		L					√	
STI patients	Central	A	√	√				
	Southeast	A	√	√	√			
	Northwest *	A, C	√	√	√			
	Northeast	A	√		√	√		
Truckers	Central	A	√		√	√		
	Southwest	B			√			
		B1						√
Dockworkers	Southeast	A			√			√
	Southwest	C			√			
Rickshaw pullers	Central	A					√	√
	Southeast	A			√		√	
	Southwest	B			√			
Launch workers	Central	A				√		

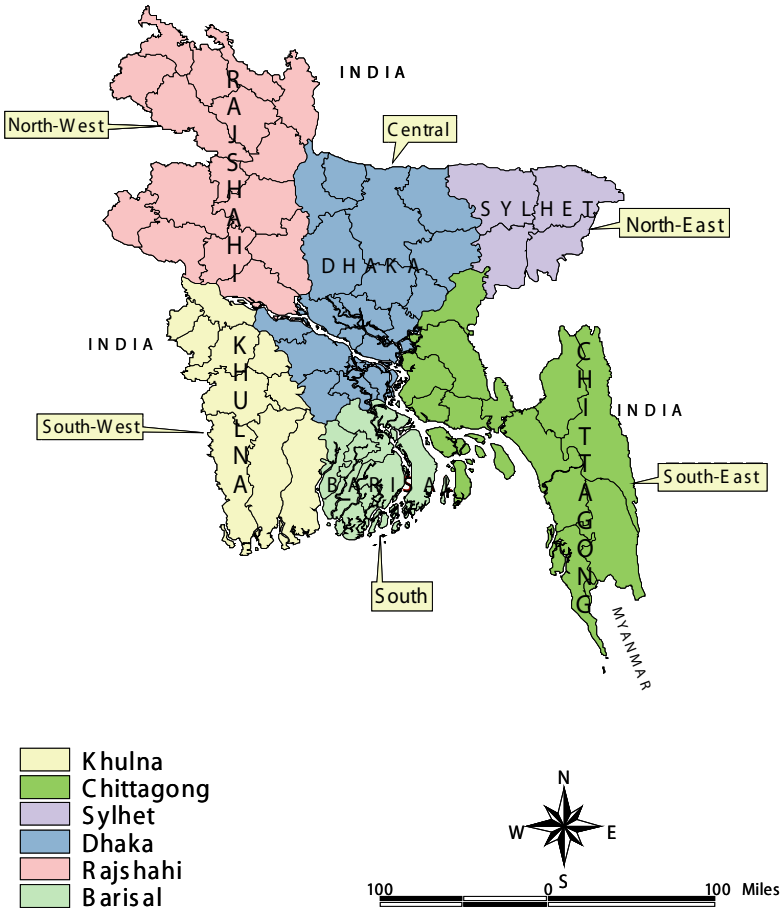
†Central-A represents the merged result of Central-A1 and Central-A2

‡Babus are boyfriends/regular partners of brothel based female sex workers

*In the first round, sampling was done only in Northwest-A, in the subsequent rounds sampling was done for Northwest-A and C and these two sites together represents a single site

As in previous rounds, for surveillance the country was divided into 6 geographical regions as per the administrative divisions: Central, Northwest, Northeast, South, Southeast and Southwest (Fig-1). For purposes of maintaining anonymity and confidentiality, each city under surveillance in each region was designated by a particular alphabet code, such as Central A, Southeast D, etc.

Figure 1. Geographical regions under surveillance



2.2 STRATEGY FOR SEROLOGICAL SURVEILLANCE

For serological surveillance sampling has always been through organisations running intervention programmes for HIV prevention. However, starting from the 5th round, where considerable expansion of the surveillance took place, new groups in new geographical areas have been continued to be added. Some of these groups in some of the areas were very new to intervention at the time of sampling. The population groups from the 5th round onwards that were new to intervention at the time of sampling are listed below in Table 2.

Table 2. Population groups in different geographical sites new to intervention at the time of serological surveillance sampling, 2003-2004 (Round V) and 2004-2005

Population groups new to intervention, Geographical location	2003-2004 Round V	2004-2005 Round VI
Injection drug users:		
Central-C		√
Southeast-D	√	
Southeast-H1		√
Southwest-B		√
Southwest-D		√
Northwest-F	√	
Northwest-F1	√	
Northwest-G		√
Brothel based female sex workers:		
Central-L		√

In many of the sites sampled during the 6th round, interventions had been in place but major changes were occurring in the field with earlier projects closing and new projects starting. As a result the NGOs that were previously conducting interventions were no longer working there instead newly funded NGOs were preparing to start. Surveillance was conducted in this interim period in those areas where no intervention activities were ongoing during that period of time. These sites are listed below in Table 3.

Table 3. Population groups in different geographical sites where intervention activities were temporarily absent at the time of serological surveillance sampling, 2004-2005

Population Groups, Geographical Location	2004-2005 Round VI
Injection drug users:	
Northwest-D	√
South-A	√
Casual female sex workers:	
Southeast H1	√
Northwest K1	√
Northwest M1	√
Truckers:	
Southwest-B1	√

The strategies that were followed in all rounds of serological surveillance including sites with new intervention activity were as follows:

1. Interested organisations were included as collaborating partners only if they met the following criteria for inclusion:

- The capacity to access the selected population groups.
- Access to an established clinic with medical professionals providing treatment services, particularly for the diseases being screened for by surveillance.
- The availability of staff willing to collaborate with serological surveillance.

2. Meetings were held with the staff members of the organisations that had access to the most at risk populations to explain the purposes and methodology of surveillance as well as to provide results of previous rounds. Subsequently, outreach workers of those organisations took the same information to individuals within the population groups in the field and encouraged them to come to their DIC or clinics for giving blood.

3. In some cases, apart from the meetings with the concerned organisation staff, a series of small workshops were held with the individuals within most at risk populations at the field sites to provide information on surveillance.

For those sites where interventions were temporarily interrupted the following strategies were taken:

1. Local guides were hired for access to the population groups of interest. Most of these guides were the ex-employees of those organisations who were previously providing the intervention.

2. Hired local guides were informed about the purpose and methodology of surveillance activity who then disseminated this information in the field and encouraged participants to give blood.

3. As there was no intervention programme, hired local guides along with the ICDDR,B field staff helped in distribution of the syphilis test results. Syphilis treatment was ensured in those sites by hiring local physicians.

Sampling for surveillance and overlap with other ongoing research studies

ICDDR,B has several ongoing research studies on IDU cohorts in Central-A (male, female and HIV positive cohorts) and in Southeast-D; hotel based female sex workers in Central-A and the baseline survey for the HIV/AIDS Prevention Project (HAPP) on female sex workers from some brothels in Bangladesh. For all these studies questionnaires are administered and blood is drawn for measurement of antibody levels to some STIs and HIV (except in the case of hotel based sex workers). As repeated blood drawing from the same people jeopardises both intervention activities and research, where possible data from the research studies were used in surveillance. The studies that overlapped with surveillance are listed below:

1. An HIV negative male IDU cohort study in Central A1- the data were incorporated into the surveillance data of Central area A1. This is described in more detail below in Box 2.

2. HIV positive IDU cohort study - the number of known HIV positive IDU who were alive during the surveillance period for IDU in area A1 and were part of the HIV positive cohort were incorporated into the surveillance data of Central area A1. This is described in more detail below in Box 2.

3. Female IDU cohort - data from the research study on all female IDU who could be located in Central- A, E, H was incorporated into surveillance.

4. IDU cohort study in Southeast-D - the data from the research study was incorporated into surveillance.

5. Hotel based female sex workers in Central-A - as mentioned earlier (section 2.1), an ongoing research study on hotel based female sex workers in Central-A does not test for HIV and therefore, without consent for HIV testing, the leftover samples could not be used for HIV surveillance.

6. Baseline survey for HAPP on selected brothels of Bangladesh - this survey was conducted on a portion of sex workers from brothels Central-C, Central-D, Central-L, Central-N, Central-P and South-E and the data from the survey was incorporated into surveillance.

Sampling from male IDU in Central-A was done differently because of several ongoing research studies as discussed above and this is described in Box 2 below:

Box 2. Sampling of male IDU from Central-A

Central-A was divided into two areas: A1 and A2

This was done because of the findings from the 5th round where IDU in one neighbourhood of Central-A were found to be experiencing a concentrated epidemic and also as IDU cohort research studies of ICDDR,B were covering a large proportion of male IDU from that neighbourhood. The areas were:

i) A1 - this included the area covering the neighbourhood with the concentrated HIV epidemic. Attempts were made to sample as many IDU from this area as possible and the IDU included in this area were those:

- who were part of the ICDDR,B HIV positive cohort study at a period between 6.6.04 to 10.11.04
- who were part of the ICDDR,B HIV negative male cohort study during the same period
- who were specifically sampled from that area for surveillance during the same period and who were not members of the cohort studies

ii) A2 - this included the rest of Central city A from where approximately 400 were sampled. Sampling from this area followed the same methodology as in previous rounds so that IDU were sampled from the areas covered by the Drop-In Centres (DICs)

Box 2. Sampling of male IDU from Central-A

of the NGO running the needle/syringe exchange programme (NEP). Each DIC covers a known number of IDU and in order to obtain 400 samples, proportionate sampling from the areas covered by each DIC was done.

The data obtained from Central-A1 and A2 were combined to reflect Central-A.

Sample size

The sample size was calculated as 380 with an estimation of the HIV prevalence rate of 1% with a 1% precision and 95% confidence level. It was decided to take the first four hundred individuals who came to the clinic. At sites where the numbers of individuals available were less than 400, a take all approach was employed.

A total of 11,029 samples were collected during the 6th round of serological surveillance. The total number of samples and dates of sample collection from the different sites are shown below (Table 4).

Table 4. Population groups sampled with sampling dates, 2004-2005

Population Groups, Geographical Location	Number of samples collected	Start date	End date
Injection drug users (IDU)*:			
Central-A1	664	6.6.04	10.11.04
Central-A2	397	26.9.04	14.10.04
Central-A†	1061	6.6.04	14.10.04
Central-C	395	10.2.05	9.3.05
Central-E	103	6.12.04	22.12.04
Central-H	178	7.12.04	19.12.04
Southeast-D	159	27.2.05	28.4.05
Southeast-H1	155	6.3.05	31.3.05
Northwest-A	398	19.10.04	23.11.04
Northwest-B	208	19.10.04	20.11.04
Northwest-B2	66	30.10.04	8.11.04
Northwest-D	120	28.3.05	13.4.05
Northwest-F	57	14.3.05	24.3.05
Northwest-F1	49	14.3.05	24.3.05
Northwest-G	111	20.3.05	31.3.05
Southwest-B	100	14.4.05	5.5.05
Southwest-D	201	14.4.05	10.5.05
South-A	202	4.4.05	28.4.05
Female injection drug users:			
Central-A, E, H	119	16.1.05	23.5.05
Heroin smokers:			
Central-A	399	8.2.04	27.2.05

Population Groups, Geographical Location	Number of samples collected	Start date	End date
Brothel based female sex workers:			
Central-B	401	15.9.04	14.10.04
Central-C	150	26.12.04	19.1.05
Central-D	397	5.2.05	1.3.05
Central-L	166	5.2.05	1.3.05
Central-N	370	18.2.05	12.3.05
Central-P	190	13.12.04	13.1.05
Southwest-A, C	252	1.3.05	23.3.05
Southwest-B	167	4.4.05	20.4.05
South-E	62	13.1.05	18.1.05
Street based female sex workers:			
Central-A	402	9.9.10	4.10.05
Southeast-A	402	2.3.05	16.3.05
Hotel based female sex workers:			
Southeast-A	128	9.1.05	17.2.05
Northeast-A	165	15.1.05	29.3.05
Casual female sex workers:			
Southeast-D	97	4.4.05	20.4.05
Southeast-H1	150	9.4.05	28.4.05
Northwest-K1	120	16.4.05	27.4.05
Northwest-M1	200	17.4.05	10.5.05
South-A	400	4.4.05	25.4.05
Male sex workers (MSW):			
Central-A	235	29.8.04	15.10.04
Males who have sex with males (MSM):			
Central-A	405	29.8.04	14.10.04
MSM and MSW combined:			
Southeast-A	284	9.1.05	30.3.05
Northeast-A	231	10.1.05	30.3.05
Hijras:			
Central-A, G	381	28.11.04	10.3.05
Truckers:			
Southwest-B1	400	16.4.05	30.4.05
Dockworkers:			
Southeast-A	395	19.3.05	29.3.05
Rickshaw pullers:			
Central-A	401	6.12.04	9.1.04
Total	**11,029**	**29.8.04**	**23.5.05**

*Most IDU were under the needle/syringe exchange programme (NEP) except 9 IDU in Central - A1, 3 IDU in Central-A2, and 37 female IDU in Central-A, E, H

†Central-A1 and Central-A2 are combined together to represent Central-A

Blood collection

A 5ml blood sample was collected from each individual by venepuncture into sterile, plain Vacutainers (Becton Dickinson, Rutherford, NJ, USA). Serum was separated by centrifugation. Whole blood and serum samples were transported to the Virology

Laboratory of ICDDR,B, while maintaining the cold chain, and were stored at -20°C until testing was done.

As in previous rounds, each blood sample was split into two: one unlinked sample was screened for HIV, and the other linked sample that could be traced to the individual was screened for syphilis, so that treatment could be given if necessary. The unlinked anonymous samples were also used to assay for HCV among IDU.

Informed consent and confidentiality

Informed and signed consent was obtained from all study participants prior to drawing blood. The summary of the consent paper was read out for those study participants who could not read and the left thumb impression was obtained from those who could not sign.

All the sample tubes containing serum for HIV and HCV testing were unlinked and anonymous, i.e. they were labelled only with information about age, sex, site, and surveillance round. The samples were also stored in such a way that the sampling period was unidentifiable. Tubes containing serum for syphilis tests were labelled with all information so that the test results could be linked back to the individuals for the purpose of treatment.

Personnel and training

Serological surveillance was conducted by a team from ICDDR,B comprising of laboratory and field staff. Prior to sampling, a weeklong (26th July 2004 to 2nd August 2004) training was provided to the field staffs covering areas on basic concepts of HIV/AIDS, current situation of HIV/AIDS in Bangladesh and interview techniques. In addition, hands on training for the field staffs were provided in serum separation, labelling, de-linking, sample transportation and preservation. Trained team members and other resource persons from the HIV/AIDS Programme of ICDDR,B conducted the training.

Questionnaire

A brief questionnaire was administered to all participants where a few demographic questions were asked. The exception was with female casual sex workers, where questions on other occupations, client accessing spots and mobility were also asked. In those areas where research studies were being conducted, where possible the data was taken from those studies.

Laboratory methods

Tests were done for syphilis, HCV (in some groups of IDU only) and HIV.

Syphilis was tested by the Rapid Plasma Reagin (RPR) test (Nostion II, Biomerieux BV, Boxtel, The Netherlands)) and Treponema Pallidum Particle Agglutination (TPPA) test (Serodia TPPA, Fujirebio Inc., Japan). Tests were done for active syphilis only. Samples positive for TPPA with an RPR titre of $\geq$8 were considered to reflect active syphilis. TPPA test was carried out only when RPR was positive.

For antibodies to HCV, sera were initially tested using ELISA kit (UBI HCV EIA 4.0 and Hepanostika HCV Ultra) and all positive samples were re-tested with a second ELISA kit (IMX HCV Version 3.0). Discrepant results in the two ELISAs were confirmed by Line Immunoassay (LIA; INNO-LIA HCV). Samples positive for any two tests were considered as positive.

For HIV testing, samples were initially tested by a commercial Enzyme Linked Immunosorbent Assay (ELISA) kit (Vironostika HIV Uni-Form II Plus O, Biomerieux, Boxtel, The Netherlands) and positive results were confirmed by LIA (INNO-LIA HIV I/II Score, Innogenetics, Ghent, Belgium). An indeterminate result by LIA was considered as negative.

Syphilis result and treatment

Syphilis results were provided to participating organisations within two weeks of sample collection, along with the drugs for treatment. The particular clinic or intervention site personnel were then responsible for providing treatment to individuals who tested positive for syphilis. However, in sites where there were no intervention programmes, local guides and clinical staffs were hired by the surveillance team for distribution of the results and to provide treatment for the syphilis positive cases.

Data entry and analysis

All data were entered in the Statistical Package for Social Sciences (SPSS, version 11.5 for Windows, SPSS Inc., Chicago, IL, USA). Data analyses were carried out using SPSS and Epi Info Windows version 3. For comparison of continuous non-parametric data between any two sites the Mann-Whitney U test was used. For categorical data, chi-square statistic was used. For comparison of data over time chi-square for trends was used.

3. RESULTS

Findings from the 6th round of serological surveillance have been grouped into the following categories:

- Injection drug users (IDU) and heroin smokers
- Female sex workers
- Males who have sex with males (MSM)
- Male sex workers (MSW) and Hijras
- Bridge population groups

3.1 INJECTION DRUG USERS AND HEROIN SMOKERS

Serological surveillance collected samples from IDU from seventeen different sentinel sites covering Central, Southeast, Southwest, South and Northwest regions of Bangladesh (Table 1). The majority of the IDU were under the NEP but there were some exceptions and these include nine IDU in Central-A1, three in Central-A2, and thirty-seven female IDU in Central-A, E, H. Most of the IDU sampled from the different cities were male IDU (except for female IDU in Central-A, E, H where they have been considered to be a separate group). A few female IDU were included: two in Central-C, one each in Southeast-D, Southeast-H1, Northwest-F, Northwest-F1 and Northwest-G.

As in previous rounds, samples were also collected from heroin smokers from Central-A.

Demographic characteristics

Demographic characteristics of IDU and heroin smokers are summarised in Table 5.
IDU from Northwest-B were the oldest amongst all groups of IDU sampled ($p \leq 0.001$). The proportion of male IDU who never attended school varied from site to site. The median duration of schooling was highest in South-A ($p<0.05$ for all comparisons). The median duration of coverage by NEP was highest in IDU from Northwest-A ($p<0.001$) and IDU from this city had also been injecting drugs for a significantly longer period than IDU from other cities ($p<0.05$ for all comparisons).

Female injectors were younger ($p<0.001$) than the male injectors in Central-A. Fewer female IDU ever attended school and their schooling duration was also lower compared to male IDU in Central-A ($p<0.001$ and $p=0.024$ respectively).

Heroin smokers sampled were younger than the IDU in Central-A ($p<0.001$). The proportion of heroin smokers who ever attended school and their median duration of education was similar to that of IDU in Central-A.

Table 5. Demographic characteristics of IDU and heroin smokers, 2004-2005

Geographical Location (N)	Age in years median (25^{th}-75^{th} quartiles)	Ever attended school, n (%)	Education (years) median (25^{th} –75^{th} quartiles)	Duration as IDU/heroin smoker (months) median (25^{th}-75^{th} quartiles)	Duration in NEP (months) Median (25^{th}-75^{th} quartiles)
Injection drug users:					
Central-A1 (664)	35 (28-40)	318 (47.9), 44.0-51.8	5 (3-8)	60 (30-96)	44.7 (23.4-68.2)
Central-A2 (397)	32 (28-38)	259 (65.2), 60.3-69.9	6 (4-9)	48 (24-96)	18 (11-48)
Central-A (1061)	33 (28-40)	577 (54.4), 51.3-57.4	5 (3-8)	57 (24-96)	34.8 (12-60)
Central-C (395)	26 (24-30)	335 (84.8), 80.9-88.2	8 (6-10)	10 (5-24)	0.7 (0.2-1)
Central-E (103)	35 (30-40)	39 (37.9), 28.5-48.0	5 (3-8)	36 (24-84)	24 (18-34)
Central-H (178)	28 (25-33)	97 (54.5), 46.9-62.0	8 (5-9)	24 (12-36)	12 (7-24)
Southeast-D (159)	27 (25-30)	137 (86.2), 79.8-91.1	9 (4-10)	30 (12-60)	NQ
Southeast-H1 (155)	26 (22-30)	94 (60.6), 52.5-68.4	5 (3-8)	9 (4-24)	2 (1-3)
Northwest-A (398)	38 (32-45)	261 (65.6), 60.7-70.2	5 (3-9)	72 (48-108)	60 (36-60)
Northwest-B (208)	40 (35-45)	90 (43.3), 36.4-50.3	5 (3-9)	48 (30-84)	42 (24-42)
Northwest-B2 (66)	37 (30-42)	36 (54.5), 41.8-66.9	9 (5-10)	54 (24-96)	18 (7.8-24)
Northwest-D (120)	28 (25-35)	87 (72.5), 63.6-80.3	7 (5-10)	18 (10-36)	7 (6-12)
Northwest-F (57)	30 (27-35)	52 (91.2), 80.7-97.1	9 (5-10)	60 (36-84)	8 (5-12)
Northwest-F1 (49)	30 (30-35)	38 (77.6), 63.4 - 88.2	8 (5-10)	36 (12-60)	12 (6-12)
Northwest-G (111)	32 (30-40)	67 (60.4), 50.6-69.5	8 (5-10)	36 (18-72)	1 (0-1.5)
Southwest-B (100)	32 (27-36)	73 (73.0), 63.2-81.4	8 (5-10)	24 (12-60)	2 (0.5-3)
Southwest-D (201)	27 (24-30)	178 (88.6), 83.3-92.6	9 (6-10)	8 (6-12)	3 (2-3)
South-A (202)	27 (24-30)	75 (86.6), 81.2-91.0	10 (8-12)	7.5 (4-24)	4 (2-6)
Female injection drug Users:					
Central-A, E, H (119)	28 (23-35)	44 (37.0), 28.3-46.3	4 (2-5)	60 (30-120)	NQ
Heroin smokers:					
Central-A (399)	30 (25-35)	219 (54.9), 49.9-59.8	5 (3-8)	84 (48-120)	NA

NQ = This question was not asked, NA = Not applicable

HIV and syphilis prevalence (Table 6)

In Central-A1, 7.1% of the IDU tested positive for HIV. This is the highest prevalence recorded for HIV so far amongst all vulnerable population groups sampled. Central-A2, recorded 1.3% HIV positive. To make these sites comparable to the previous years, both Central-A1 and Central-A2 were combined together and termed as Central-A. This combined site shows HIV prevalence at 4.9%, which is close to a concentrated epidemic.

For the first time during the 6^{th} round HIV was detected in cities other than Central-A and these were Southeast-D (0.6%) and Northeast-F1 (2.0%). No HIV was detected in the other sites. Among heroin smokers, two (0.5%) tested positive for HIV in Central-A. Active syphilis rate varied from as low as 0 to as high as 9.2% among IDU in different sites and the highest rate was recorded in Southeast-H1. Active syphilis rate for heroin smokers was comparable to that of IDU from the same region.

Table 6. Prevalence of HIV and active syphilis among IDU and heroin smokers, 2004-2005

Study Populations, Geographical Location (N)	HIV n (%), 95% CI	Active syphilis n (%), 95% CI
Injection drug users:		
Central-A1 (664)	47 (7.1), 5.2-9.3	25 (3.8), 2.5-5.5
Central-A2 (397)	5 (1.3), 0.4-2.9	6 (1.5), 0.6-3.3
Central-A (1061)[†]	52 (4.9), 3.7-6.4	31 (2.9), 2.0-4.1
Central-C (395)	0, 0-0.9	7 (1.8), 0.7-3.6
Central-E (103)	0, 0-3.5	1 (1.0), 0-5.3
Central-H (178)	0, 0-2.1	7 (3.9), 1.6-7.9
Southeast-D (159)	1 (0.6), 0-3.5	4 (2.5), 0.7-6.3
Southeast-H1 (155)	0, 0-2.4	14 (9.0), 5.0-14.7
Northwest-A (398)	0, 0-0.9	4 (1.0), 0.3-2.3
Northwest-B (208)	0, 0-1.8	1 (0.5), 0-2.6
Northwest-B2 (66)	0, 0-5.4	1 (1.5), 0-8.2
Northwest-D (120)	0, 0-3.0	0, 0-3.0
Northwest-F (57)	0, 0-6.3	0, 0-6.3
Northwest-F1 (49)	1 (2.0), 0.1-10.9	0, 0-7.3
Northwest-G (111)	0, 0-3.3	2 (1.8), 0.2-6.4
Southwest-B (100)	0, 0-3.6	3 (3.0), 0.6-8.5
Southwest-D (201)	0, 0-1.8	2 (1.0), 0.1-3.5
South-A (202)	0, 0-1.8	0, 0-1.8
Female injection drug users:		
Central-A (119)	0, 0-3.1	11 (9.2), 4.7-15.9
Heroin smokers:		
Central-A (399)	2 (0.5), 0.1-1.8	12 (3.0), 1.6-5.2

[†]Central-A1 and Central-A2 were merged together to represent Central-A

Hepatitis C (HCV) prevalence (Table 7)

Due to the increase in the number of samples from IDU, testing for HCV was restricted to the eight sites that were new to surveillance during the 6th round. HCV prevalence varied among the sampled sites from as low as 2.5% in Southwest-D to as high as 57.5% in Northwest-D.

Table 7. Prevalence of HCV in IDU, 2004-2005

Study Populations, Geographical Location (N)	HCV n (%), 95% CI
Injection drug users:	
Central-C (395)	16 (4.1), 2.3-6.5
Southeast-H1 (155)	58 (37.4), 29.8-45.5
Northwest-D (120)	69 (57.5), 48.1-66.5
Northwest-G (111)	56 (50.5), 40.8-60.1
Southwest-B (100)	11 (11.0), 5.6-18.8
Southwest-D (201)	5 (2.5), 0.8-5.7
South-A (202)	12 (5.9), 3.1-10.1
Female injection drug users:	
Central-A, E, H (119)	20 (16.8), 10.6-24.8

Breakdown of HIV prevalence according to different Drop In Centres in Central-A (Table 8)

During the 5th round of surveillance, IDU from Central city A were broken down into seven neighbourhoods based on the areas covered by the DICs of the NEP. Such a breakdown of the city showed that IDU in the neighbourhood covered by DIC-1 had an HIV prevalence of 8.9%, while those covered by DIC-2 had a prevalence of 2.1% (GoB 2004). In all other neighbourhoods no HIV was detected. A similar breakdown into neighbourhoods based on areas covered by the DICs was done during the 6th round. In the period during which the 6th round was conducted the number of DICs had increased to 14. The area where a concentrated epidemic of HIV was recorded in the 5th round was now covered by three DICs (# 1-3 of Table 8); this area is Central-A1 of the 6th round. Central-A2 was therefore covered by 11 DICs (# 4-14 of Table 8) in the 6th round. HIV prevalence in the different areas are shown in Table 8 and the data show that in Dhaka-2, HIV was detected in two neighbourhoods covered by DIC # 4 and 5. In the previous round, HIV was detected in IDU from the neighbourhood of DIC # 4 but not from that of DIC # 5. The latter area is now showing high rates of HIV infection, however, the number of IDU sampled from this area was low.

Table 8. Prevalence of HIV in IDU according to Drop in Centre (DIC) in Central-A, 2004-2005

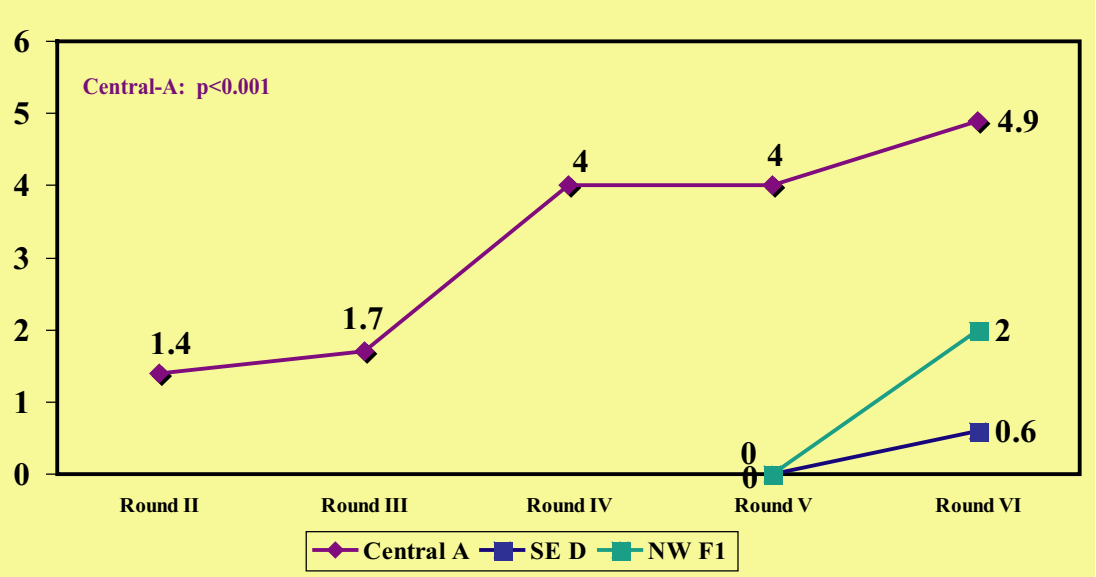
DIC area, (N)	HIV, n (%), 95% CI
Central –A1 (664): (DIC-1, DIC-2 and DIC-3)	47 (7.1), 5.2-9.3
Central-A2 (397): (11 DICs)	5 (1.3), 0.4-2.9
DIC- 4, (51)	1 (2.0), 0-10.4
DIC- 5, (45)	4 (8.9), 2.5-21.2
DIC- 6, (13)	0, 0-24.7
DIC- 7, (51)	0, 0-7.0
DIC- 8, (40)	0, 0-8.8
DIC- 9, (11)	0, 0-28.5
DIC-10, (79)	0, 0-4.3
DIC-11, (11)	0, 0-28.5
DIC-12, (49)	0, 0-7.3
DIC-13, (27)	0, 0-12.8
DIC-14, (20)	0, 0-16.8
Total (1061)	**52 (4.9), 3.7-6.4**

Comparison over the rounds (Fig 2, 3, 4)

Over the rounds of serological surveillance, there has been a significant rise in HIV prevalence ($p<0.001$) in Central-A (Fig 2). Over the 5th and 6th rounds of surveillance, HIV prevalence increased from 0 to 2% and 0.6% in Northwest F1 and Southeast-D region respectively, however, these changes are not significant.

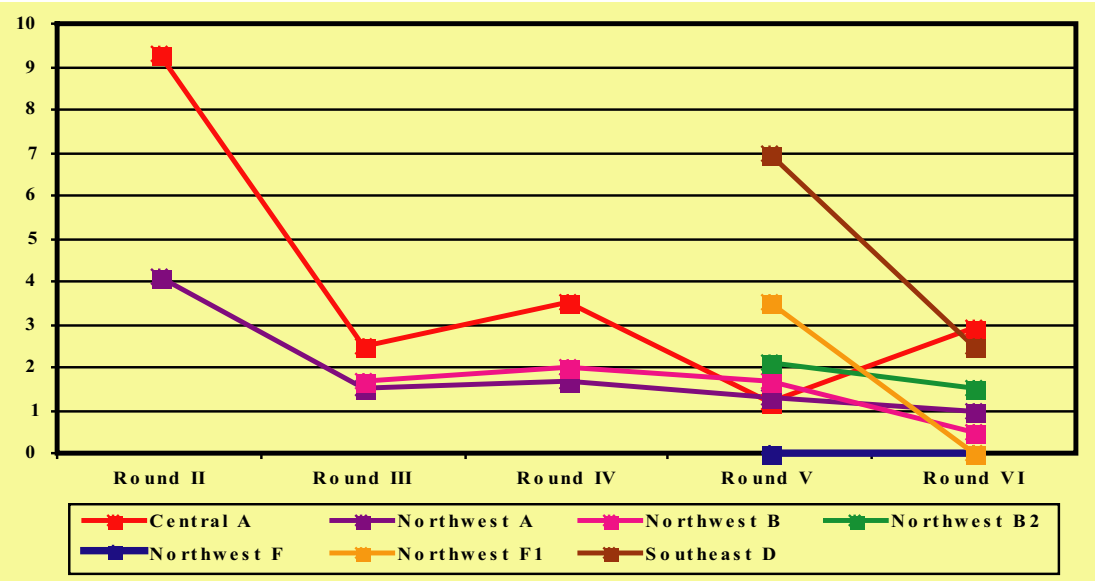
Sampling was done for two or more consecutive rounds in Northwest-A, Northwest-B, Northwest-B2 and Northwest-F and HIV was never detected in those sites.

Fig 2. HIV in IDU over the rounds of serological surveillance in Bangladesh (where HIV has been detected)



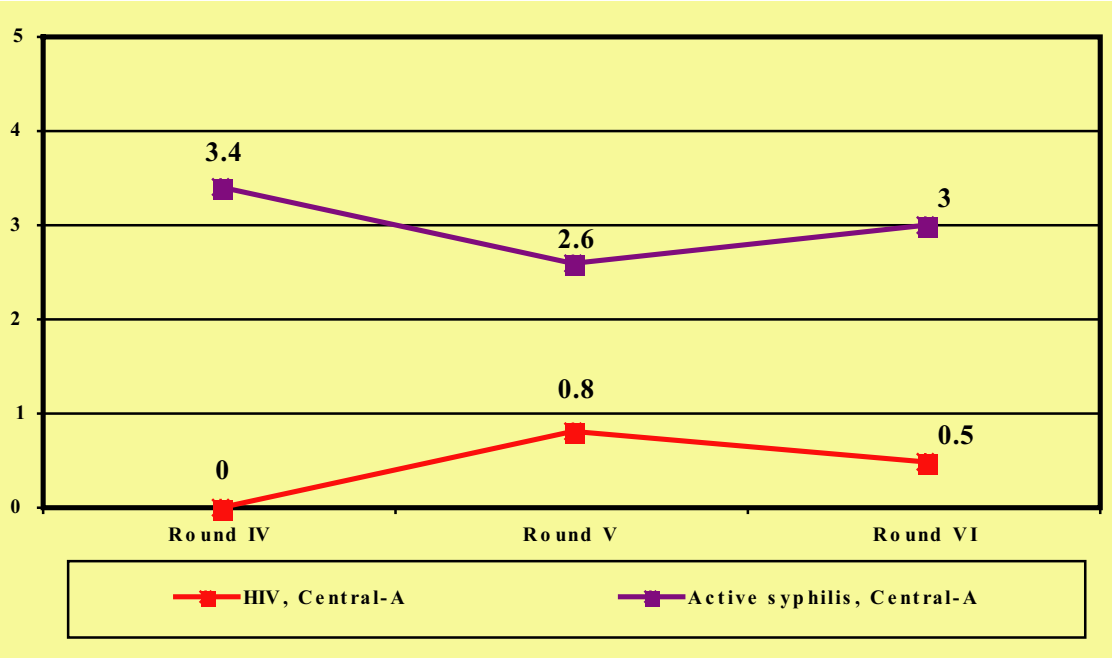
Among IDU in Central-A and Northwest-A active syphilis rates declined significantly over the rounds ($p<0.001$ and $p=0.01$, respectively) (Fig 3). For IDU from Northwest-B, Northwest-B2, Northwest-F1 and Southeast-D no significant changes in the active syphilis rates were observed. None tested positive for active syphilis in Northwest-F in both 5th and 6th rounds.

Fig 3. Active syphilis in IDU over the rounds of serological surveillance in Bangladesh



Heroin smokers from Central-A have been sampled since the 4th round; none were HIV positive in the 4th round, 0.8% were positive in the 5th round and in the 6th round 0.5% were HIV positive (Fig 4). Over the rounds changes in active syphilis rates among heroin smokers were not significant.

Fig 4. HIV and active syphilis in heroin smokers over the rounds of surveillance in Central Bangladesh



3.2 FEMALE SEX WORKERS

The female sex workers sampled included brothel-based female sex workers from all brothels in the country; street-based female sex workers in two cities (Central-B and Southeast-A); and hotel-based female sex workers in two cities (Southeast-A and Northeast-A). In addition, casual female sex workers, i.e. women who were part-time sex workers were sampled from five cities (Southeast-D, Southeast-H1, South-A, Northwest K1 and Northwest-M1). Three cities among five were border cities; the two cities in the Northwest were both bordering India and Southeast-H1 bordered Myanmar.

Demographic characteristics (Table 9)

Demographic characteristics of female sex workers are summarised in Table 9. Questionnaires for basic demographic information were administered to female sex workers from all sites however for the casual female sex workers, a separate set of questionnaire was administered where some questions on other occupations, spots for accessing clients and mobility were added.

Among all groups of sex workers, hotel based sex workers in Southeast-A were the youngest ($p<0.05$). The proportion of female sex workers who had some schooling was lowest among casual female sex workers in Southeast-H1 ($p<0.05$). Of those who were educated the median duration of education ranged from 3-6 years.

Hotel based sex workers from Southeast-A were in the sex trade for the lowest duration among all groups of sex workers ($p<0.001$) while brothel based sex workers from Southwest-B were in the sex trade for the longest duration ($p<0.05$).

Table 9. Demographic characteristics of female sex workers, 2004-2005

Geographical Location (N)	Age in years median (25^{th}-75^{th} quartiles)	Ever attended school n (%)	Education (years) median (25^{th}-75^{th} quartiles)	Duration as sex worker (months) median (25^{th}-75^{th} quartiles)	Duration at same site as sex worker (months) median (25^{th}-75^{th} quartiles)
Brothel based female sex workers:					
Central-B (401)	20 (18-25)	126 (31.4), 26.9-36.2	5 (3-6)	36 (11.5-84)	24 (7-84)
Central-C (150)	25 (22-30)	26 (17.3), 11.6-24.4	4.5 (2.8-6)	96 (45-156)	69 (24-120)
Central-D (397)	24 (19-30)	102 (25.7), 21.5–30.3	4 (3-5)	60 (24-120)	48 (18-96.0)
Central-L (166)	25 (20-32)	47 (28.3), 21.6-35.8	4 (2-5)	79 (28.5-162)	60 (24-120)
Central-N (370)	25 (20-30)	82 (22.2), 18.0-26.7	5 (3-7)	72 (24-132)	48 (12-120)
Central-P (190)	20 (19-27)	42 (22.1), 16.4-28.7	5 (4-6)	48 (19.8-96)	45 (12-75)
Southwest-A, C (252)	25 (20-30)	75 (29.8), 24.2-35.8	3 (2-5)	72 (36-120)	60 (18.5-120)
Southwest-B (167)	26 (22-34)	43 (25.7), 19.3-33.1	5 (3-7)	120 (84-180)	120 (60-180)
South-E (62)	26 (23-30)	15 (24.2), 14.2-36.7	4 (3-5)	84 (60-169)	78 (60-126)
Street based female sex workers:					
Central-A (402)	25 (20-30)	137 (34.1), 29.5-38.9	5 (3-7)	48 (24-84)	48 (24-84)
Southeast-A (402)	26 (22-30)	93 (23.1), 19.1-27.6	5 (2-5)	36 (18-60)	36 (18-60)
Hotel based female sex workers:					
Southeast-A (128)	19 (18-21)	78 (60.9), 51.9-69.4	6 (5-7)	12 (5-24)	12 (5-24)
Northeast-A (165)	25 (20-30)	72 (43.6), 35.9-51.6	5 (3-7)	24 (12-48)	24 (12-48)
Casual female sex workers:					
Southeast-D (97)	25 (20-30)	40 (41.2), 31.3-51.7	4 (3-6)	12 (12-36)	12 (12-36)
Southeast-H1 (150)	20 (18-25)	9 (6.0), 2.8-11.1	3 (3-9)	NQ	NQ
Northwest-K1 (120)	30 (25-35)	34 (28.3), 20.5-37.3	4 (3-5)	NQ	NQ
Northwest-M1 (200)	30 (26-36)	87 (43.5), 36.5-50.7	4 (2-6)	NQ	NQ
South-A (400)	28 (25-33)	205 (51.3), 46.2-56.2	4 (2-5)	36 (24-48)	33 (24-48)

NQ = This question was not asked

Other characteristics of casual female sex workers (Table 10)

In Southeast-D, most of the women interviewed were primarily sex workers but a few were casual sex workers and they either worked as maids or worked in a job (service). In the four other cities, most of the women interviewed were casual sex workers and a mix of other occupations were recorded with one-third being housewives in Southeast-H1, more than 70% were in business in Northwest-K1 while 70% were stone crushers in Northwest-M1.

Table 10. Other characteristics of casual female sex workers, 2004-2005

Geographical location	Other occupation (%)	Spot for accessing clients (%)
Southeast-D	Maid- 12.4 Service- 9.3	Residence- 84.5 Hotel- 11.3 Street- 2.1
Southeast-H1	House wife- 37.3 Business- 12.7 Cook-7.3 Maid- 6.0 Smuggler- 6.0	Residence- 29.3 Street-7.3 Hotel- 2.0 Multiple- 61.3
Northwest-K1	Business- 70.8 Service- 14.2 Maid- 6.7 House wife-5.0	Street- 34.2 Residence-18.3 Shop- 6.7 Rail station7.5
Northwest-M1	Stone crusher- 70.0 House wife- 13.5 Service- 6 Maid-2	Multiple- 38.0 Stone crushing spot- 28.5 Residence-20.5 Street- 9.5
South-A	Maid- 19.3 Tobacco roller- 13.8 Stone crusher-5.3 Service-4.3	Street- 34 Residence- 32 Multiple-28 Launch Ghat- 4.3

As it is believed that people frequently cross over the border to India from cities Northwest K1 and MI and to Myanmar from Southeast-H1, the female sex workers were asked questions regarding their mobility to India and Myanmar. Responses revealed that they did frequently cross the border to India and Myanmar where a considerable proportion sold sex (Table 11). The proportion of sex workers who crossed the border was highest in Northwest-K1 compared to those in Northwest-M1 ($p<0.001$) and Southeast-H1 ($p<0.001$). Among those who crossed the border in the three different cities, as high as 89.7% of the female sex workers from Northwest-M1 sold sex.

Table 11. Mobility of the casual female sex workers in the border area, 2004-2005

Variables	Southeast-H1 N = 150	Northwest-K1 N = 120	Northwest-M1 N = 200
Proportion crossed the border to India or Myanmar n (%), 95% CI	13 (8.7), 4.7-14.7	103 (85.8), 78.3-91.5	29 (14.5), 9.9-20.2
Proportion sold sex across the border, (%), 95% CI	6 (46.2), 19.2-74.9 N = 13*	85 (82.5), 73.8-89.3 N = 103*	26 (89.7), 72.6-97.8 N = 29*
Average time of last visit (months), median (25^{th}-75^{th} quartiles)	1 (0.2-4)	0.1 (0-0.3)	1 (0.5-3.5)
Average time of last episode of selling sex across the border (months), median (25^{th}-75^{th} quartiles)	0.2 (0.2-0.4)	1 (0-0.5)	1 (0.5-3.3)

* These are the number of sex workers who crossed the border

HIV and syphilis prevalence (Table 12)

As with the previous rounds, HIV prevalence was <1% amongst all groups of female sex workers other than the casual female sex workers in Northwest-K1 where the rate was 1.7%. Active syphilis rates varied but generally the rate was high in female sex workers. Active syphilis rates were close to or greater than 10% in two brothels from Central-C and South-E and in two casual female sex workers sites from Southeast-D and Southeast-H1.

Table 12. Prevalence of HIV and active syphilis among female sex workers, 2004-2005

Study Populations, Geographical Location (N)	HIV n (%), 95% CI	Active syphilis positive n (%), 95% CI
Brothel based female sex workers:		
Central-B (401)	1 (0.2), 0-1.4	7 (1.7), 0.7-3.6
Central-C (150)	1 (0.7), 0-3.7	16 (10.7), 6.2-16.7
Central-D (397)	1 (0.3), 0-1.4	15 (3.8), 2.1-6.2
Central-L (166)	0, 0-2.2	14 (8.4), 4.7-13.7
Central-N (370)	0, 0-1.0	14 (3.8), 2.1-6.3
Central-P (190)	0, 0-1.9	16 (8.4), 4.9-13.3
Southwest-A, C (252)	1 (0.4), 0-2.2	7 (2.8), 1.1-5.6
Southwest-B (167)	1 (0.6), 0-3.3	7 (4.2), 1.7-8.4
South-E (62)	0, 0-5.8	6 (9.7), 3.6-19.9
Street based female sex workers:		
Central-A (402)	1 (0.2), 0-1.4	25 (6.2), 4.1-9.0
Southeast-A (402)	0, 0-0.9	30 (7.5), 5.1-10.5
Hotel based female sex workers:		
Southeast-A (128)	0, 0-2.8	2 (1.6), 0.2-5.5
Northeast-A (165)	1 (0.6), 0-3.3	10 (6.1), 2.9-10.9
Casual female sex workers:		
Southeast-D (97)	0, 0-3.7	9 (9.3), 4.3-16.9
Southeast-H1 (150)	0, 0-2.4	15 (10.0), 5.7-16.0
Northwest-K1 (120)	2 (1.7), 0.2-5.9	5 (4.2), 1.4-9.5
Northwest-M1 (200)	0, 0-1.8	1 (0.5), 0-2.8
South-A (400)	0, 0-0.9	6 (1.5), 0.6-3.2

Comparison over the rounds (Fig 5, 6, 7 and annexe 3, 4)

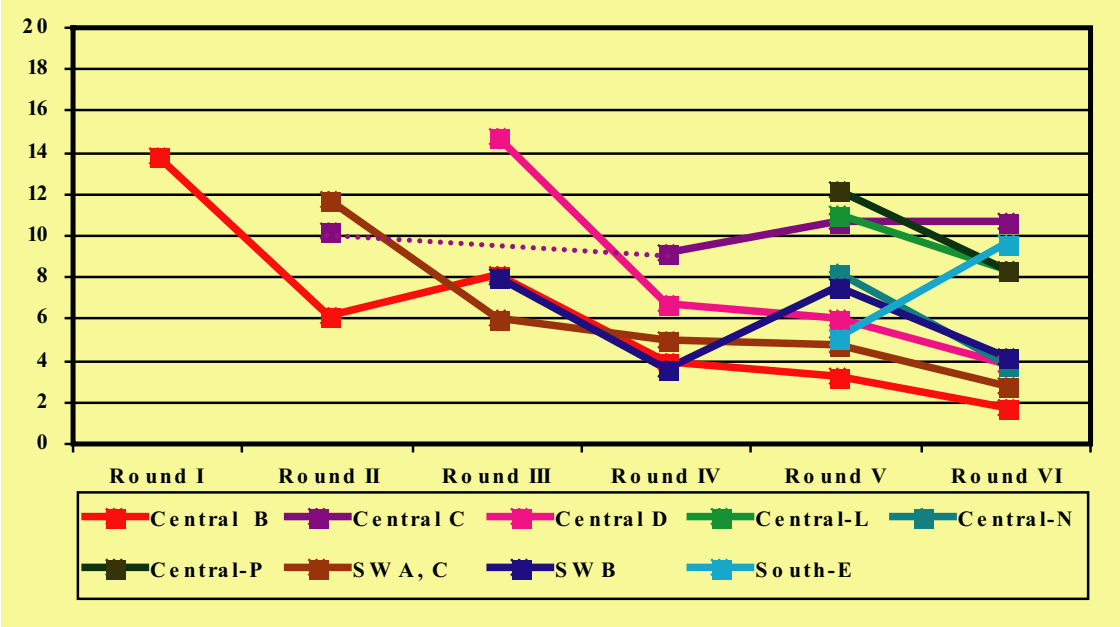
Annexe 3 and annexe 4 shows the comparisons between HIV and active syphilis rates between the rounds in female sex workers from different sites.

HIV has remained below 1% for sex workers in all rounds except among the casual female sex workers in Northwest-K1, where the HIV prevalence was 2% (95% CI: 0.2-7.0) in the 5th round and in round 6th it is 1.7% (95% CI: 0.2-5.9). This change is not significant.

Among brothel based sex workers, sampling has been done from nine cities for more than one round of surveillance. Active syphilis rates over the rounds declined significantly in the brothels in Central-B ($p<0.001$); Central-D ($p<0.001$) and Southwest-A, C ($p<0.001$).

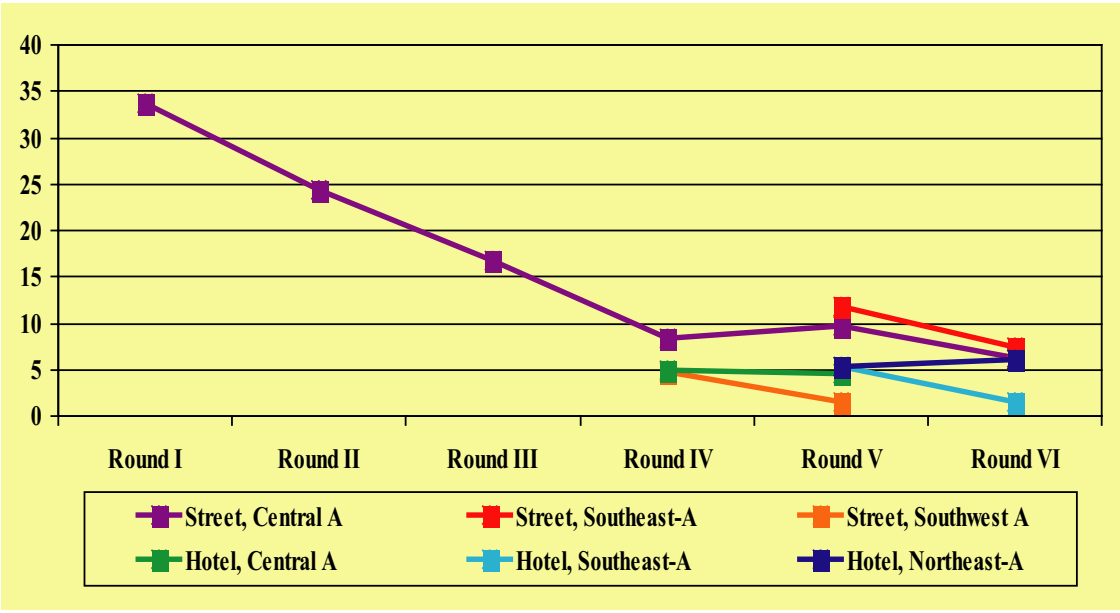
But active syphilis rates remained unchanged over the rounds in the sex workers from brothels in Central-C, Central-L, Central-N, Central-P, Southwest-B and South-E (Fig 5).

Fig 5. Active syphilis in brothel based sex workers over the rounds of serological surveillance



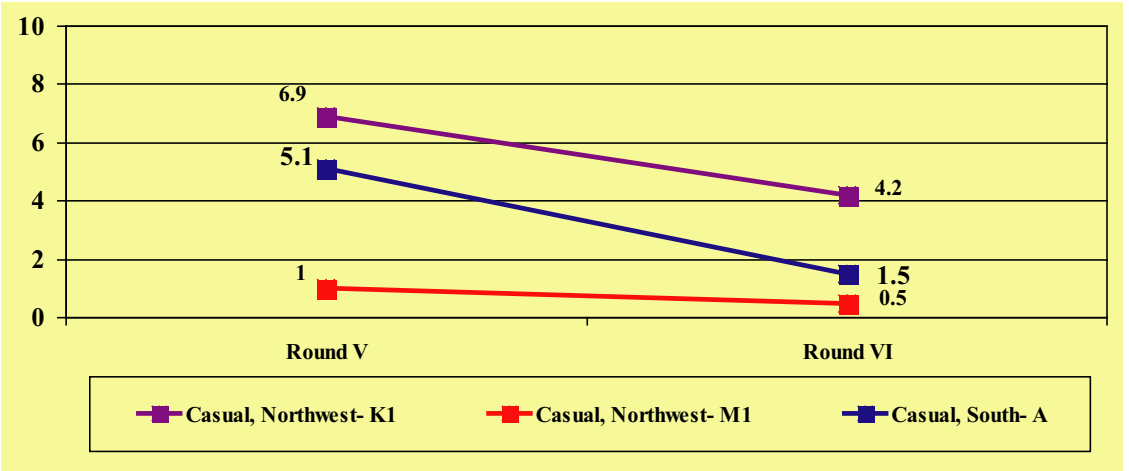
Significant decline in active syphilis rate has been recorded in Central-A over the six rounds ($p<0.001$). Declines are not significant for the street based sex workers from Southeast-A and Southwest-A. In hotel based sex workers from Central-A, Southeast-A and Northeast-A no changes in active syphilis rates has been recorded (Fig 6).

Fig 6. Active syphilis in street and hotel based sex workers over the rounds of serological surveillance



Between the 5th and 6th rounds, active syphilis rates in casual female sex workers remained unchanged in all three sites (Fig 7).

Fig 7. Active syphilis in casual female sex workers over the rounds of serological surveillance



3.3 MALES WHO HAVE SEX WITH MALES

Where possible attempts were made to separate MSM from MSW for the serological surveillance. Such separation was only possible in Central-A; MSM and MSW were sampled as a combined group of MSM in Southeast-A and Northeast-A.

Demographic characteristics (Table 13)

The MSM groups sampled from the three cities were similar in age and on average had similar median years of education. MSM from Northeast-A had been living in the same city for longer duration (p=0.03) than those from Central-A.

Table 13. Demographic characteristics of MSM and combined MSM and MSW, 2004-2005

Geographical location (N)	Age in years median (25th-75th quartiles)	Ever attended school, n (%)	Education (years) median (25th–75th quartiles)	Duration living in the same city (months) median (25th-75th quartiles)
Males who have sex with males:				
Central-A (405)	24 (20-28)	337 (83.2), 79.2-86.7	9 (6-12)	144 (60-240)
Combined MSM and MSW:				
Southeast-A (283) Northeast-A (231)	24 (20-29) 23 (20-27)	230 (81.3), 76.2-85.6 207 (89.6), 84.9-93.2	9 (5-14) 9 (5-12)	144 (60-252) 192 (60-276)

HIV and syphilis prevalence (Table 14)

Only two MSM tested HIV positive out of a total of 919 samples. Active syphilis rates were similar in MSM from the three different cities.

Table 14. Prevalence of HIV and syphilis among MSM and combined MSM and MSW, 2004-2005

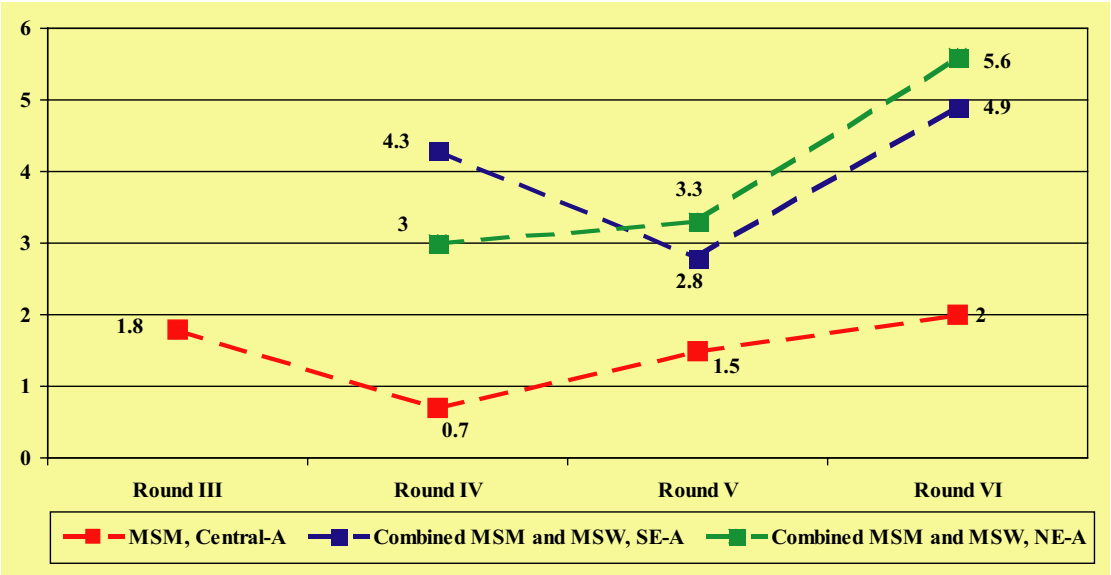
Study Populations, Geographical Location (N)	HIV n (%), 95% CI	Active syphilis n (%), 95% CI
Males who have sex with males: Central-A (235)	0, 0-1.6	9 (3.8), 1.8-7.1
Combined MSM and MSW: Southeast-A (283) Northeast-A (231)	 1 (0.4), 0-2.0 1 (0.4), 0-2.4	 14 (4.9), 2.7-8.2 13 (5.6), 3.0-9.4

Comparison over the rounds (Fig 8)

Trends in active syphilis rates could be determined for MSM in Central A from the third round and for the combined MSM and MSW sites in two other cites from the fourth round.

HIV prevalence has throughout remained below one percent in MSM from all three cities. Although, over the rounds, active syphilis rate increased in all three cities, this increase is not statistically significant.

Fig 8. Active syphilis rates in MSM and combined MSM and MSW sites over the rounds



3.4 MALE SEX WORKERS AND HIJRAS

Male sex workers (MSW) were sampled from Central-A only. As with the previous round, Hijras were sampled from Central-A and G and they were considered together to represent a single site.

Demographic characteristics (Table 15)

MSW and Hijras from the Central region were similar in terms of age. The proportions ever attended school and median years of schooling were higher among MSW than Hijras in the same region ($p<0.001$ and $p=0.006$ respectively). Hijras reported to be in the sex trade for a longer duration than MSW in the Central region ($p=0.001$) but both groups worked in the same city for a similar duration.

Table 15. Demographic characteristics of MSW and Hijras, 2004-2005

Geographical location (N)	Age in years median (25^{th}-75^{th} quartiles)	Ever attended school n (%), 95% CI	Education (years) median (25^{th} –75^{th} quartiles)	Duration as male/Hijra sex worker (months) median (25^{th}-75^{th} quartiles)	Duration at the same site as male/Hijra sex worker (months) median (25^{th}-75^{th})
Male sex workers:					
Central-A (235)	22 (20-28)	193 (82.1), 76.6-86.8	8 (5-9)	60 (36-120)	60 (24-108)
Hijras:					
Central-A, G (381)	23 (20-28)	263 (69.0), 64.1-73.6	7 (5-9)	84 (48-120)	60 (36-120)

HIV and syphilis prevalence (Table 16)

Only 3 Hijras out of the 381 sampled tested positive for HIV, while none of the MSW sampled in the 6th round were found to be HIV positive. Active syphilis rates were similar between MSW and Hijras. Also active syphilis rates were similar between MSM and MSW in the Central-A.

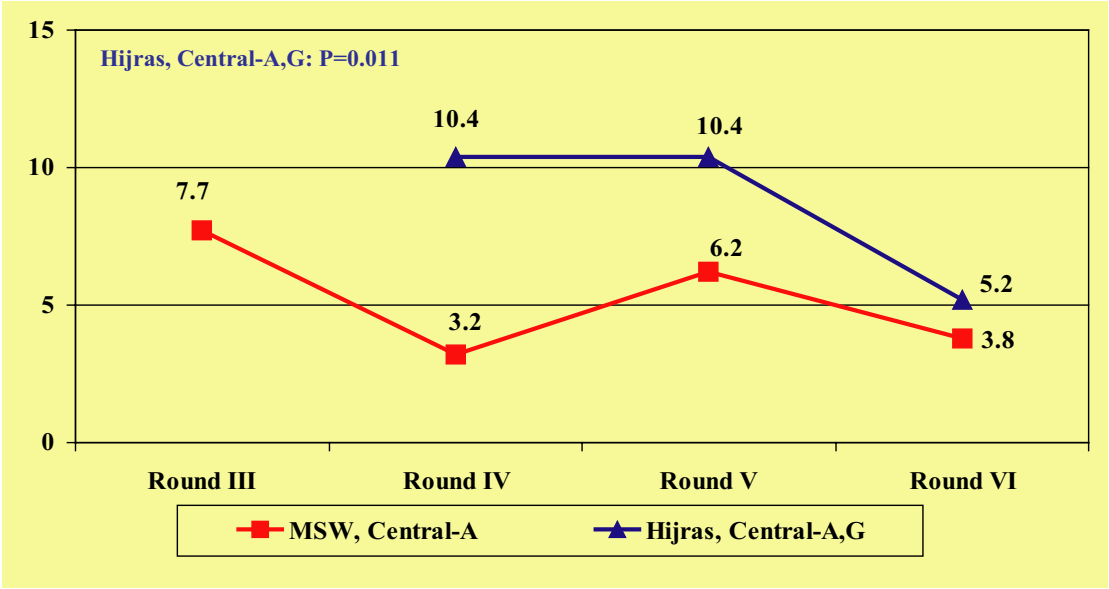
Table 16. Prevalence of HIV and syphilis among MSW and Hijras, 2004-2005

Study Populations, Geographical Location (N)	HIV n (%), 95% CI	Active syphilis n (%), 95% CI
Male sex workers: Central-A (235)	0, 0-1.6	9 (3.8), 1.8-7.1
Hijras: Central-A, G (381)	3 (0.8), 0.2-2.3	20 (5.2), 1.1-3.2

Comparison over the rounds (Fig 9)

MSW have been sampled for serological surveillance since the 3rd round in Central-A and HIV has never been found among them. Hijras have been sampled from 4th round and since than HIV prevalence has remained below one percent. Active syphilis rates in MSW from Central-A have varied considerably over the rounds, but the difference over the rounds is not significant (Fig 9). In Hijras active syphilis rates have declined and this decline is significant (p=0.011).

Fig 9. Active syphilis rates in MSW and Hijras over the rounds



3.5 BRIDGE POPULATION GROUPS

Bridge population groups sampled during the 6th round of surveillance were all mobile men (internal migrants) and included rickshaw pullers, truckers and dockworkers. Rickshaw pullers were sampled from Central-A, dockworkers were sampled from Southeast-A and truckers were sampled from Southwest-B1.

Demographic characteristics (Table 17)

More truckers compared to rickshaw pullers and dockworkers ever attended school ($p<0.001$ for both comparisons) and their median years of schooling were also higher ($p\leq 0.001$ for both comparisons).

Table 17. Demographic characteristics of truckers, rickshaw pullers and dockworkers, 2004-2005

Geographical location (n)	Age in years median (25th-75th quartiles)	Ever attended school n (%), 95% CI	Education (years) median (25th–75th quartiles)	Duration as Truckers/Rickshaw pullers/Dockworkers (months) median (25th-75th quartiles)
Truckers:				
Southwest-B1 (398)	23 (20-29)	345 (86.7) 82.9-89.9	6 (4-8)	36 (18-60)
Rickshaw pullers:				
Central-A (401)	25 (20-30)	260 (64.8) 59.9-69.5	5 (3-8)	48 (24-96)
Dockworkers:				
Southeast-A (395)	25 (20-30)	268 (67.8) 63.0-72.4	5 (3-8)	48 (24-96)

HIV and syphilis prevalence (Table 18)

None of the truckers, rickshaw pullers and dockworkers sampled in the 6th round was HIV positive. Active syphilis rates were also very low with none positive in truckers and only 1.7% positive in dockworkers.

Table 18. Prevalence of HIV and syphilis among truckers, rickshaw pullers and dockworkers, 2004-2005

Study Populations, Geographical Location (N)	HIV n (%), 95% CI	Active syphilis n (%), 95% CI
Truckers: Southwest-B1 (398)	0, 0-0.9	0, 0-9.2
Rickshaw pullers: Central-A (401)	0, 0-0.9	0, 0-9.2
Dockworkers: Southeast-A (395)	0, 0-0.9	7 (1.8), 0.7-3.6

Comparison over the rounds (Annexe 3 and annexe 4)

Annexe 3 and annexe 4 shows the prevalence rates for HIV and active syphilis over the rounds for truckers, rickshaw pullers and dockworkers. For those sites where sampling was done for more than one round, changes in HIV or active syphilis rates were not significant over the rounds.

4. DISCUSSION / CONCLUSION

The highlights of the findings from the 6th round of serological surveillance are:

1. There is close to a concentrated HIV epidemic in IDU in Central-A (4.9%). This HIV epidemic is slowly spreading from one neighbourhood to other areas within the city.
2. Syphilis rates are declining in female sex workers from the streets of Central Bangladesh and in some brothels.
3. MSM are showing a rise in syphilis rates, although this is not statistically significant.

The results of the 6th round of serological surveillance again show that in Bangladesh IDU in Central city A are the group that have the highest prevalence of HIV and that it is now almost at the level of a concentrated epidemic. For the first time in Bangladesh, HIV has been detected in IDU in cities outside Central city A - in Southeast-D and in Northwest F1 although levels are very low. In all other groups HIV prevalence is very low.

IDU in Central-A were sampled in a different way this time because of ongoing research studies where HIV positive IDU are being identified and followed (Azim, Chowdhury et al. 2004). Therefore, although the IDU from Central-A sampled in this round are not strictly comparable to those sampled in earlier rounds, it is clear that levels are close to that of a concentrated epidemic. For the first time female IDU were included as a separate group in surveillance and HIV prevalence was zero. As the female IDU sampled were part of a research study, some behavioural data was available from that group. These data showed that approximately 44% of female IDU were current sex workers operating primarily from the streets of Central Bangladesh and the percentage with active syphilis was also high. Approximately 82% shared their needles/syringes while injecting in the last six months. It is indeed fortunate that no HIV was detected in female IDU but the ongoing research findings show that female IDU share their injection equipment with male IDU. The female IDU therefore are the group that will form a direct bridge between IDU and the general population.

The 5th round of surveillance showed that HIV was concentrated in one neighbourhood of Central city A, which was a possible epicentre of the epidemic. The results from the 6th round show that the HIV epidemic is no longer localised to one neighbourhood but has spread to a wider area. Subset analyses of the behaviour data from the 5th round of surveillance showed that although there were subtle differences in behaviours of the IDU in the neighbourhood with the epidemic compared to the rest of the city which could explain the earlier spread of HIV in that area (Azim, Reza et al. 2005), but it was clear that the larger issues of sharing were not different. Therefore it is unlikely that HIV will remain confined to any specific neighbourhood as is being shown by the data from the 6th round of surveillance. Given the prevalent risky behaviours it is important to appreciate that HIV can move rapidly in IDU as evidenced in other countries (MAP 2004) and therefore intense and innovative programming is essential to prevent a full-blown epidemic in these IDU.

The most encouraging results are from female sex workers from the streets of Central city A as active syphilis rates declined significantly in sex workers over the rounds. Brothels showed a mixed picture with rates declining in brothels from three cities and remaining unchanged in six. It is not possible to determine from surveillance whether the improvement in syphilis rates reflect the success of prevention programmes or the more enhanced treatment for syphilis that has become available to sex workers. In the 5th round of Behavioural Surveillance, more female sex workers from the streets of Central city A reported consistent condom use compared to the 4th round (GoB 2004) suggesting that intervention programmes in some areas are having a positive effect. Sex workers from hotels and casual sex workers sampled from the different cities showed no changes in rates. In some of these places the intervention programmes were in transition so that services were not available to those sex workers during the period of surveillance. Such transitions with gaps in services are of major concern as they can compromise the overall HIV/AIDS/STI situation in the country.

Bangladesh is surrounded by India and Myanmar and both countries are experiencing concentrated HIV epidemics (UNAIDS 2004). Mobility with crossing over the border to India was commonly reported by the sex workers in the two Northwest border cities and selling sex while across the border was also not uncommon. Sex workers were for the first time sampled from Southeast-H1 bordering Myanmar and the proportions reporting crossing over to Myanmar and selling sex there was small. Fortunately no HIV was detected but active syphilis rates were high. So far subtyping of HIV strains obtained from surveillance have shown the predominant subtype is subtype C and the strains are closely related to the strains from India, China and Myanmar (Azim, Sarker et al. 2004). It is known that such cross border movement can be deleterious for the HIV epidemic as has been recorded in countries such as Nepal (NewEra/SACTS/FHI 2002) and prevention programmes need to address issues related to mobility.

Active syphilis rates in MSM are rising and although the rise is not significant the data suggest that the intervention programme needs to intensify its activities. MSM are a very hidden group and hence the surveillance reaches only those who are more visible. During the 5th round, the highest active syphilis rates were recorded in Hijras but fortunately those rates have declined significantly during the 6th round.

Rickshaw pullers, truckers, and dockworkers are continuing to show low rates of active syphilis and fortunately no HIV, although in one rickshaw puller HIV was detected in the 5th round of surveillance. Such low levels in bridge groups are not surprising as levels in clients of sex workers always lag behind the prevalence of infections in sex workers.

One of the limitations of the serological surveillance system in Bangladesh has been that it uses intervention organisations to access individuals within the different most at risk populations. This is a cause for concern as data has shown that in population groups most at risk of HIV, individuals within interventions are likely to practice safer behaviours (Jenkins, Rahman et al. 2001). However, despite this limitation it is likely that the present surveillance system is not misrepresenting the HIV epidemic in Bangladesh. There are several reasons for believing this:

1. In each round and especially since the 5th round, population groups who are new to interventions have been included in surveillance, i.e. those individuals who have not been covered by HIV programmes prior to surveillance. Therefore, these are virgin population groups as far as exposure to interventions is concerned and the argument that they may be practicing safer behaviours because of interventions does not apply.
2. During the 6th round, a considerable proportion of female IDU were not members of the NEP and they were still found to be HIV negative.
3. Other research studies have been conducted at various times to assess HIV prevalence in different population groups and none have found high levels of HIV (Bogaerts, Ahmed et al. 1999; Shirin, Ahmed et al. 2000; Bogaerts, Ahmed et al. 2001; Gibney, Saquib et al. 2002; Hawkes, Morison et al. 2002; Sabin, Rahman et al. 2003; Alam, Sarker et al. 2005).

Another shortcoming of the serological surveillance system is that it may be missing some of the most at risk populations. It is known that there are a large number of female sex workers operating through residences who have no access to information and whose vulnerability to infection has not been assessed. Similarly, isolated groups such as tribal populations especially those in border areas have never been accessed by surveillance or any research study on HIV/AIDS/STI. A very vulnerable group of people are migrants returning from jobs overseas. It is known that of the passively reported cases of HIV/AIDS, most are returnee migrants and a single Voluntary Counselling and Testing (VCT) Unit in Bangladesh has recorded that 66% of the HIV positive people detected in that Unit were returnee migrants many of whom reside in rural areas (Zaidi, Zahiruddin et al.). It is not always possible for surveillance to reach all population groups; other surveys and research studies are required to obtain more in-depth information in an ethical manner, which goes beyond the scope of surveillance.

Despite the limitations of the present surveillance system, it is believed that the expanding surveillance system in Bangladesh is providing data that is relevant and representative. The system has successfully recorded the gradual spread of HIV in IDU in Central-A and the country is fortunate in having this information to act on to prevent a wide scale epidemic. The findings of this 6th round of serological surveillance reinforces previous data suggesting that time is running out for Bangladesh and the time to act is now.

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ANNEXE: 1

PARTICIPATING ORGANISATIONS

1. Ad-din Welfare Center
2. Badhan Hijra Sangha
3. Bandhu Social Welfare Society (BSWS)
4. Bangladesh Womens Health Coalition (BWHC)
5. CARE-Bangladesh
6. Community Health Care Project (CHCP)
7. Concern for Environmental Development and Research (CEDAR)
8. Durjoy Nari Sangha
9. DISHARI Bahumukhi Samaj Kallayan Samity.
10. Family Planning Association of Bangladesh (FPAB)
11. Grassroots Health and Rural Organization for Nutrition Initiative (GHARONI)
12. Health and Education for the Less Privileged (HELP)
13. Joy Nari Kallayan Sangha
14. Jagroto Jubo Sangha (JJS)
15. Karmajibi Kallayan Sangstha (KKS)
16. Kalikapur Jubo Sangshad (KAJUS)
17. Light House
18. Marie Stopes Clinic Society (MSCS)
19. Mukti Mohila Samittee (MMS)
20. Nari Mukti Sangha
21. Nari Maitree
22. Organization of Development Program for the Underprivileged (ODPUP)
23. Peoples Resource Oriented Voluntary Association (PROVA)
24. Population Services and Training Center (PSTC)
25. Punarjibon
26. Padakhep Manabik Unnayan Kendra
27. PIACT Bangladesh
28. Proyas Manobid Unnayan Society
29. Social Marketing Company (SMC)
30. Save the Children (Australia)
31. SAWRAB Samaj Kallyan Sangstha
32. Shapla Mohila Sangstha
33. Sustha Jibon
34. Society for Health Extension and Development (SHED)
35. Shuktara Kallayan Sangstha
36. Semonti Mohila Unnayan Sangstha.
37. Sylhet Jubo Academy (SJA)
38. Social Advancement Society (SAS)
39. The Salvation Army
40. Voluntary Paribar Kallayan Association (VPKA)
41. Voluntary Family Welfare Association (VFWA)
42. World vision
43. Young Power in Social Action (YPSA)

ANNEXE: 2

MEMBERS OF THE SURVELILANCE ADVISORY COMMITTEE (SAC)

Chairperson of SAC is the chairperson of TC-NAC

1. Director General, Directorate General of Health Services
2. Major General (Rtd) A S M Matiur Rahman, Chairperson, TC-NAC and Chief Advisor, National AIDS/STD Programme (NASP), DGHS
3. Prof (Dr) Fatima Parveen Chowdhury, Line Director HIV/AIDS and SBTP, NASP and Director CME, DGHS
4. Director General, Department of Narcotics Control
5. Director, IEDCR
6. Programme Manager, National AIDS/STD Programme, DGHS
7. Deputy Programme Managers, National AIDS/STD Programme, DGHS
8. Prof Nazrul Islam, Head, Department of Virology, BSMMU
9. Secretary General, Bangladesh Medical Association
10. Representative of the Inspector General of Police
11. Brigadier General Q M S Hafiz, National Programme Officer, WHO
12. Dr Robert J Kelly, Country Director, FHI/IMPACT
13. Ms Tara O'Day, Deputy Country Director, FHI/IMPACT
14. Mr Parvez Sazzad Mallick, Senior Technical Officer, FHI/IMPACT
15. Dr Muhammad Abdus Sabur, Sector Manager, Health and Population, DFID
16. Dr Najmus S Sadiq, Assistant Resident Representative, UNDP
17. Dr Zareen Khair, Programme Specialist, USAID
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19. Dr Farzana Ishrat, Public Health Specialist, World Bank
20. Dr Evaristo Marowa, Country Coordinator, UNAIDS
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22. Ms Ismat Bhuiyan, Project Director, The Population Council
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ANNEXE: 3

Prevalence of active syphilis over six rounds of serological surveillance, 1998-1999, 1999-2000, 2000-2001, 2002, 2003-2004 and 2004-2005

Study Populations, Geographical Location	Active syphilis % Positive (95% CI), number positive (total number tested)					
	1998-1999 Round I	1999-2000 Round II	2000-2001 Round III	2002 Round IV	2003-2004 Round V	2004-2005 Round VI
Injection Drug Users (IDU):						
Detoxification Clinic: Central-A	4.5 (2.7-7.0), 18 (402)	4.0 (2.3-6.4), 18 (402)	4.3 (1.2-10.8), 4 (92)	ND	ND	ND
Out of detoxification clinic: Central-A1	ND	ND	ND	ND	ND	3.8 (2.5-5.5), 25 (664)
Central-A2	ND	ND	ND	ND	ND	1.5 (0.6-3.3), 6 (397)
Central-A†	ND	9.3 (6.7-12.5), 39 (418)	2.5 (1.2-4.5), 10 (401)	3.5 (1.9-5.8), 14 (403)	1.2 (0.4-2.9), 5 (404)	2.9 (2.0-4.1), 31 (1061)
Central-C	ND	ND	ND	ND	ND	1.8 (0.7-3.6), 7 (395)
Central-E	ND	ND	ND	ND	5.6 (2.1-11.8), 6 (107)	1.0 (0-5.3), 1 (103)
Central-H	ND	ND	ND	ND	1.6 (0.2-5.8), 2 (122)	3.9 (1.6-7.9), 7 (178)
Southeast-D	ND	ND	ND	ND	7.0 (2.6-14.6), 6 (86)	2.5 (0.7-6.3), 4 (159)
Southeast-H1	ND	ND	ND	ND	ND	9.0 (5.0-14.7), 14 (155)
Northwest-A	ND	4.1 (2.4-6.5), 17 (416)	1.5 (0.5-3.2), 6 (402)	1.7 (0.7-3.5), 7 (405)	1.3 (0.4-2.9), 5 (394)	1.0 (0.3-2.3), 4 (398)
Northwest-B	ND	ND	1.7 (0.2-5.9), 2 (120)	2.0 (0.5-5.0), 4 (200)	1.7 (0.5-4.2), 4 (239)	0.5 (0-2.6), 1 (208)
Northwest-B1	ND	ND	ND	ND	1.3 (0-6.9), 1 (78)	ND
Northwest-B2	ND	ND	ND	ND	2.1 (0.1-11.3), 1 (47)	1.5 (0-8.2), 1 (66)
Northwest-D	ND	ND	ND	ND	ND	0 (0-3.0), 0 (120)
Northwest-F	ND	ND	ND	ND	0 (0-4.2), 0 (85)	0 (0-6.3), 0 (57)
Northwest-F1	ND	ND	ND	ND	3.5 (0.4-12.1), 2 (57)	0 (0-7.3), 0 (49)
Northwest-G	ND	ND	ND	ND	ND	1.8 (0.2-6.4), 2 (111)
Southwest-B	ND	ND	ND	ND	ND	3.0 (0.6-8.5), 3 (100)
Southwest-D	ND	ND	ND	ND	ND	1.0 (0.1-3.5), 2 (201)
South-A	ND	ND	ND	ND	ND	0 (0-1.8), 0 (202)
Female IDU: Central-A, E, H	ND	ND	ND	ND	ND	9.2 (4.7-15.9), 11 (119)

Study Populations, Geographical Location	Active syphilis % Positive (95% CI), number positive (total number tested)					
	1998-1999 Round I	1999-2000 Round II	2000-2001 Round III	2002 Round IV	2003-2004 Round V	2004-2005 Round VI
Heroin Smokers: Central-A	ND	ND	ND	3.4 (1.8-5.7), 13 (387)	2.6 (1.2-4.7), 10 (391)	3.0 (1.6-5.2), 12 (399)
Brothel Based Female Sex Workers: Central-B	13.8 (10.5-17.6), 54 (392)	6.2 (4.1-9.0), 25 (402)	8.1 (5.6-11.2), 33 (407)	3.9 (2.3-6.3), 16 (406)	3.2 (1.7-5.4), 13 (404)	1.7 (0.7-3.6), 7 (401)
Central-C	ND	10.2 (7.2-14.1), 33 (322)	ND	9.2 (5.1-15.0), 14 (152)	10.7 (6.4-16.6), 17 (159)	10.7 (6.2-16.7), 16 (150)
Central-D	ND	ND	14.8 (11.4-18.8), 57 (384)	6.7 (4.5-9.6), 27 (402)	6.0 (3.9-8.8), 24 (401)	3.8 (2.1-6.2), 15 (397)
Central-E	28.7 (23.5-34.4), 81 (282)	ND	ND	ND	ND	ND
Central-L	ND	ND	ND	ND	11.0 (6.3-17.5), 15 (136)	8.4 (4.7-13.7), 14 (166)
Central-N	ND	ND	ND	ND	8.2 (5.7-11.5), 31 (376)	3.8 (2.1-6.3), 14 (370)
Central-P	ND	ND	ND	ND	12.2 (8.0-17.5), 25 (205)	8.4 (4.9-13.3), 16 (190)
Southwest-A, C‡	ND	11.7 (8.5-15.5), 41 (351)	6.0 (3.7-9.1), 20 (335)	5.0 (2.6-8.5), 12 (241)	4.8 (2.6-7.9), 14 (293)	2.8 (1.1-5.6), 7 (252)
Southwest-B	ND	ND	8.0 (4.6-12.9), 15 (187)	3.6 (1.5-7.3), 7 (195)	7.6 (4.1-12.6), 13 (171)	4.2 (1.7-8.4), 7 (167)
South-E	ND	ND	ND	ND	5.1 (1.1-14.1), 3 (59)	9.7 (3.6-19.9), 6 (62)
Street Based Female Sex Workers: Central-A	33.8 (29.1-38.6), 135 (400)	24.3 (20.3-28.7), 103 (423)	16.7 (13.3-20.6), 70 (419)	8.4 (5.9-11.6), 34 (403)	9.7 (7.0-13.1), 39 (401)	6.2 (4.1-9.0), 25 (402)
Central-B	ND	ND	ND	3.0 (1.1-6.4), 6 (199)	ND	ND
Southeast-A	ND	ND	ND	ND	11.9 (8.9-15.5), 48 (402)	7.5 (5.1-10.5), 30 (402)
Southwest-A	ND	ND	ND	4.7 (2.7-7.7), 15 (317)	1.5 (0.5-3.2), 6 (403)	ND
Hotel Based Female Sex Workers: Central-A	ND	ND	ND	4.9 (3.0-7.5), 20 (405)	4.5 (2.7-7.0), 18 (400)	ND
Southeast-A	ND	ND	ND	ND	5.3 (2.2-10.6), 7 (132)	1.6 (0.2-5.5), 2 (128)
Northeast-A	ND	ND	ND	ND	5.4 (2.5-10.0), 9 (166)	6.1 (2.9-10.9), 10 (165)

Study Populations, Geographical Location	Active syphilis % Positive (95% CI), number positive (total number tested)					
	1998-1999 Round I	1999-2000 Round II	2000-2001 Round III	2002 Round IV	2003-2004 Round V	2004-2005 Round VI
Casual Female Sex Workers:						
Southeast-D	ND	ND	ND	ND	ND	9.3 (4.3-16.9), 9 (97)
Southeast-H1	ND	ND	ND	ND	ND	10.0 (5.7-16.0), 15 (150)
Northwest-K1	ND	ND	ND	ND	6.9 (2.8-13.8), 7 (101)	4.2 (1.4-9.5), 5 (120)
Northwest- M1	ND	ND	ND	ND	1.0 (0.3-2.7), 4 (381)	0.5 (0-2.8), 1 (200)
South-A	ND	ND	ND	ND	5.1 (2.5-9.1), 10 (197)	1.5 (0.6-3.2), 6 (400)
Male Sex Workers (MSW): Central-A	ND	ND	7.7 (5.0-11.3), 24 (310)	3.2 (1.7-5.5), 13 (401)	6.2 (3.7-9.7), 17 (274)	3.8 (1.8-7.1), 9 (235)
Males Who Have Sex With Males (MSM): Central-A	ND	ND	1.8 (0.7-3.6), 7 (399)	0.7 (0.2-2.1), 3 (406)	1.5 (0.6-3.2), 6 (399)	2.0 (0.9-3.9), 8 (405)
MSM and MSW combined[§]: Central-A	7.0 (4.7-9.9), 28 (401)	6.7 (4.4-9.7), 26 (388)	ND	ND	ND	ND
Central-C	ND	ND	ND	2.3 (1.0-4.2), 9 (400)	2.5 (1.2-4.5), 10 (400)	ND
Southeast-A	ND	ND	ND	4.3 (2.5-6.8), 17 (397)	2.8 (1.4-4.9), 11 (398)	4.9 (2.7-8.2), 14 (283)
Northeast-A	ND	ND	ND	3.0 (1.6-5.2), 12 (402)	3.3 (1.7-5.5), 13 (400)	5.6 (3.0-9.4), 13 (231)
Hijras: Central-A	ND	ND	ND	10.4 (7.6-13.9), 41 (393)	ND	ND
Central-A, G	ND	ND	ND	ND	10.4 (7.6-13.8), 42 (405)	5.2 (1.1-3.2), 20 (381)
Partners of Hijra: Central-A, G	ND	ND	ND	ND	2.3 (0.3-8.0), 2 (88)	ND
Babus (Brothel): Central-B	ND	ND	ND	1.6 (0.4-4.0), 4 (252)	2.0 (0.6-4.6), 5 (251)	ND
Central-D	ND	ND	ND	6.0 (3.1-10.2), 12 (200)	6.3 (3.2-11.0), 11 (175)	ND
Central-L	ND	ND	ND	ND	5.4 (1.1-14.9), 3 (56)	ND

Study Populations, Geographical Location	Active syphilis % Positive (95% CI), number positive (total number tested)					
	1998-1999 Round I	1999-2000 Round II	2000-2001 Round III	2002 Round IV	2003-2004 Round V	2004-2005 Round VI
STI Patients: Central-A	11.0 (8.1-14.5), 44 (399)	5.2 (3.2-7.8), 21 (404)	ND	ND	ND	ND
Southeast-A	7.6 (5.2-10.6), 31 (409)	4.2 (2.5-6.7), 17 (404)	2.2 (1.0-4.2), 9 (403)	ND	ND	ND
Northwest-A, C*	2.2 (1.0-4.2), 9 (401)	1.7 (0.7-3.5), 7 (408)	1.5 (0.6-3.3), 6 (392)	ND	ND	ND
Northeast-A	8.1 (5.6-11.2), 32 (397)	ND	5.1 (3.2-7.8), 20 (389)	0.9 (0-5.1), 1 (106)	ND	ND
Truckers: Central-A	2.0 (0.9-3.9), 8 (403)	ND	2.1 (0.9-3.9), 9 (437)	1.0 (0.3- 2.5), 4 (402)	ND	ND
Southwest-B	ND	ND	1.8 (0.7-3.6), 7 (392)	ND	ND	ND
Southwest-B1	ND	ND	ND	ND	ND	0 (0-9.2), 0 (398)
Dockworkers: Southeast-A	ND	ND	2.8 (1.4-5.0), 11 (392)	ND	ND	1.8 (0.7-3.6), 7 (395)
Southwest-C	ND	ND	1.0 (0.3-2.5), 4 (401)	ND	ND	ND
Rickshaw pullers: Central-A	ND	ND	ND	ND	0.2 (0-1.4), 1 (401)	0 (0-9.2), 0 (401)
Southeast-A	ND	ND	1.0 (0.3-2.5), 4 (400)	ND	1.2 (0.4-2.9), 5 (401)	ND
Southwest-B	ND	ND	1.0 (0.3-2.5), 4 (401)	ND	ND	ND
Launch Workers: Central-A	ND	ND	ND	1.5 (0.5-3.2), 6 (402)	ND	ND
TOTAL	11.3 (10.3-12.4), 440 (3886)	8.0 (7.2-8.8), 347 (4338)	4.6 (4.1-5.1), 322 (7063)	3.9 (3.5-4.4), 311 (7877)	4.5 (4.1-4.9), 471 (10445)	3.4 (3.1-3.8), 376 (11029)

†Central-A represents the merged result of Central-A1 and Central-A2

‡Southwest A and C, two geographical related areas together representing one site

§In some sites male sex workers (MSW) and non-sex worker MSM could not be differentiated and they were sampled as a single group

*In the first round, sampling was done only in Northwest-A, in the subsequent rounds sampling was done for Northwest-A and C and these together represented a single site

ANNEXE: 4

Prevalence of HIV over six rounds of serological surveillance, 1998-1999,1999-2000, 2000-2001, 2002, 2003-2004 and 2004-2005

Study Populations, Geographical Location	HIV % Positive (95% CI), number positive (total number tested)					
	1998-1999 Round I	1999-2000 Round II	2000-2001 Round III	2002 Round IV	2003-2004 Round V	2004-2005 Round VI
Injection Drug Users (IDU):						
Detoxification clinic: Central-A	2.5 (1.2-4.5), 10 (402)	0.2 (0-1.4), 1 (402)	0 (0-3.9), 0 (92)	ND	ND	ND
Out of detoxification clinic: Central-A1	ND	ND	ND	ND	ND	7.1 (5.2-9.3), 47 (664)
Central-A2	ND	ND	ND	ND	ND	1.3 (0.4-2.9), 5 (397)
Central-A†	ND	1.4 (0.5-3.1), 6 (418)	1.7 (0.7-3.6), 7 (401)	4.0 (2.3-6.4), 16 (403)	4.0 (2.3-6.3), 16 (404)	4.9 (3.7-6.4), 52 (1061)
Central-C	ND	ND	ND	ND	ND	0 (0-0.9), 0 (395)
Central-E	ND	ND	ND	ND	0 (0-3.4), 0 (107)	0 (0-3.5), 0 (103)
Central-H	ND	ND	ND	ND	0 (0-3.0), 0 (122)	0 (0-2.1), 0 (178)
Southwest-D	ND	ND	ND	ND	0 (0-4.2), 0 (86)	0.6 (0-3.5), 1 (159)
Southeast-H1	ND	ND	ND	ND	ND	0 (0-2.4), 0 (155)
Northwest-A	ND	0 (0-0.9), 0 (416)	0 (0-0.9), 0 (402)	0 (0-0.9), 0 (405)	0 (0-0.9), 0 (394)	0 (0-0.9), 0 (398)
Northwest-B	ND	ND	0 (0-3.0), 0 (120)	0 (0-1.8), 0 (200)	0 (0-1.5), 0 (239)	0 (0-1.8), 0 (208)
Northwest-B1	ND	ND	ND	ND	0 (0-4.6), 0 (78)	ND
Northwest-B2	ND	ND	ND	ND	0 (0-7.5), 0 (47)	0 (0-5.4), 0 (66)
Northwest-D	ND	ND	ND	ND	ND	0 (0-3.0), 0 (120)
Northwest-G	ND	ND	ND	ND	ND	0 (0-3.3), 0 (111)
Northwest-F	ND	ND	ND	ND	0 (0-4.2), 0 (85)	0 (0-6.3), 0 (57)
Northwest-F1	ND	ND	ND	ND	0 (0-6.3), 0 (57)	2.0 (0.1-10.9) 1 (49)
Southwest-B	ND	ND	ND	ND	ND	0 (0-3.6), 0 (100)
Southwest-D	ND	ND	ND	ND	ND	0 (0-1.8), 0 (201)
South-A	ND	ND	ND	ND	ND	0 (0-1.8), 0 (202)
Female IDU: Central-A, E, H	ND	ND	ND	ND	ND	0 (0-3.1), 0 (119)

Study Populations, Geographical Location	HIV % Positive (95% CI), number positive (total number tested)					
	1998-1999 Round I	1999-2000 Round II	2000-2001 Round III	2002 Round IV	2003-2004 Round V	2004-2005 Round VI
Heroin Smokers: Central-A	ND	ND	ND	0 (0-0.9), 0 (387)	0.8 (0.2-2.2), 3 (391)	0.5 (0.1-1.8), 2 (399)
Brothel Based Female Sex Workers: Central-B	0 (0-0.9), 0 (392)	0 (0-0.9), 0 (402)	0.5 (0.1-1.8), 2 (407)	0.2 (0-1.4), 1 (406)	0.5 (0.1-1.8), 2 (404)	0.2 (0-1.4), 1 (401)
Central-C	ND	0 (0-1.1), 0 (322)	ND	0 (0-2.4), 0 (152)	0 (0-2.3), 0 (159)	0.7 (0-3.7), 1 (150)
Central-D	ND	ND	0.3 (0-1.4), 1 (384)	0.7 (0-2.2), 3 (402)	0.5 (0.1-1.8), 2 (401)	0.3 (0-1.4), 1 (397)
Central-E	1.5 (0.4-3.8), 4 (267)	ND	ND	ND	ND	ND
Central-L	ND	ND	ND	ND	0 (0-2.7), 0 (136)	0 (0-2.2), 0 (166)
Central-N	ND	ND	ND	ND	0 (0-1.0), 0 (376)	0 (0.1.0), 0 (370)
Central-P	ND	ND	ND	ND	0.5 (0-2.7), 1 (205)	0 (0-1.9), 0 (190)
Southwest-A, C‡	ND	0 (0-1.0), 0 (351)	0 (0-1.1), 0 (335)	0 (0-1.5), 0 (241)	0 (0-1.3), 0 (293)	0.4 (0-2.2), 1 (252)
Southwest-B	ND	ND	0.5 (0-2.9), 1 (187)	0.5 (0-2.8), 1 (195)	0.6 (0-3.2), 1 (171)	0.6 (0-3.3), 1 (167)
South-E	ND	ND	ND	ND	0 (0-6.1), 0 (59)	0 (0-5.8), 0 (62)
Street Based Female Sex Workers: Central-A	0 (0-0.9), 0 (400)	0.2 (0-1.3), 1 (423)	0.5 (0.1-1.7), 2 (419)	0.2 (0-1.4), 1 (403)	0.2 (0-1.4), 1 (401)	0.2 (0-1.4), 1 (402)
Central-B	ND	ND	ND	0 (0-1.8), 0 (199)	ND	ND
Southeast-A	ND	ND	ND	ND	0 (0-0.9), 0 (402)	0 (0-0.9), 0 (402)
Southwest-A	ND	ND	ND	0 (0-1.2), 0 (317)	0 (0-0.9), 0 (403)	ND
Hotel Based Female Sex Workers: Central-A	ND	ND	ND	0.2 (0-1.4), 1 (405)	0 (0-0.9), 0 (400)	ND
Southeast-A	ND	ND	ND	ND	1.5 (0.2-5.4), 2 (132)	0 (0-2.8), 0 (128)
Northeast-A	ND	ND	ND	ND	0.6 (0-3.3), 1 (166)	0.6 (0-3.3), 1 (165)

Study Populations, Geographical Location	HIV % Positive (95% CI), number positive (total number tested)					
	1998-1999 Round I	1999-2000 Round II	2000-2001 Round III	2002 Round IV	2003-2004 Round V	2004-2005 Round VI
Casual Female Sex Workers:						
Southeast-D	ND	ND	ND	ND	ND	0 (0-3.7), 0 (97)
Southeast-H1	ND	ND	ND	ND	ND	0 (0-2.4), 0 (150)
Northwest-K1	ND	ND	ND	ND	2.0 (0.2-7.0), 2 (101)	1.7 (0.2-5.9), 2 (120)
Northwest- M1	ND	ND	ND	ND	0 (0-1.0), 0 (381)	0 (0-1.8), 0 (200)
South-A	ND	ND	ND	ND	0 (0-1.9), 0 (197)	0 (0-0.9), 0 (400)
Male Sex Workers (MSW):						
Central-A	ND	ND	0 (0-1.2), 0 (310)	0 (0-0.9), 0 (401)	0 (0-1.3), 0 (274)	0 (0-1.6), 0 (235)
Males Who Have Sex With Males (MSM):						
Central-A	ND	ND	0 (0-0.9), 0 (399)	0.2 (0-1.4), 1 (406)	0 (0-0.9), 0 (399)	0 (0-0.9), 0 (405)
MSM and MSW combined[§]:						
Central-A	0.2 (0-1.4), 1 (401)	0 (0-0.9), 0 (388)	ND	ND	ND	ND
Central-C	ND	ND	ND	0 (0-0.9), 0 (400)	0 (0-0.9), 0 (400)	ND
Southeast-A	ND	ND	ND	0 (0-0.9), 0 (397)	0.3 (0-1.4), 1 (398)	0.4 (0-2.0), 1 (283)
Northeast-A	ND	ND	ND	0 (0-0.9), 0 (402)	0.3 (0-1.4), 1 (400)	0.4 (0-2.4), 1 (231)
Hijras:						
Central-A	ND	ND	ND	0.8 (0.2-2.2), 3 (393)	ND	ND
Central-A, G	ND	ND	ND	ND	0.2 (0- 1.4), 1 (405)	0.8 (0.2-2.3), 3 (381)
Partners of Hijra:						
Central-A, G	ND	ND	ND	ND	0 (0-4.1), 0 (88)	ND
Babus (Brothel):						
Central-B	ND	ND	ND	0 (0-1.5), 0 (252)	0 (0-1.5), 0 (251)	ND
Central-D	ND	ND	ND	0 (0-1.8), 0 (200)	0 (0-2.1), 0 (175)	ND
Central-L	ND	ND	ND	ND	0 (0-6.4), 0 (56)	ND

Study Populations, Geographical Location	HIV % Positive (95% CI), number positive (total number tested)					
	1998-1999 Round I	1999-2000 Round II	2000-2001 Round III	2002 Round IV	2003-2004 Round V	2004-2005 Round VI
STI Patients:						
Central-A	0.3 (0-1.4), 1 (399)	0 (0-0.9), 0 (404)	ND	ND	ND	ND
Southeast-A	0.2 (0-1.4), 1 (409)	0 (0-0.9), 0 (404)	0.2 (0-1.4). 1 (403)	ND	ND	ND
Northwest-A, C*	0 (0-0.9), 0 (401)	0 (0-0.9), 0 (408)	0 (0-0.9), 0 (392)	ND	ND	ND
Northeast-A	0 (0-0.9), 0 (397)	ND	0 (0-0.9), 0 (389)	0 (0-3.4), 0 (106)	ND	ND
Truckers:						
Central-A	0 (0-0.9), 0 (403)	ND	0 (0-0.8), 0 (437)	0 (0-0.9), 0 (402)	ND	ND
Southwest-B	ND	ND	0 (0-0.9), 0 (392)	ND	ND	ND
Southwest-B1	ND	ND	ND	ND	ND	0 (0-0.9), 0 (398)
Dockworkers:						
Southeast-A	ND	ND	0 (0-0.9), 0 (392)	ND	ND	0 (0-0.9), 0 (395)
Southwest-C	ND	ND	0 (0-0.9), 0 (401)	ND	ND	ND
Rickshaw pullers:						
Central-A	ND	ND	ND	ND	0.2 (0-1.4), 1 (401)	0 (0-0.9), 0 (401)
Southeast-A	ND		0 (0-0.9), 0 (400)	ND	0 (0-0.9), 0 (401)	ND
Southwest-B	ND	ND	0 (0-0.9), 0 (401)	ND	ND	ND
Launch Workers:						
Central-A	ND	ND	ND	0 (0-0.9), 0 (402)	ND	ND
TOTAL	0.4 (0.3-0.7), 17 (3871)	0.2 (0.1-0.4), 8 (4338)	0.2 (0.1-0.3), 14 (7063)	0.3 (0.2-0.5), 27 (7877)	0.3 (0.2-0.5), 35 (10445)	0.6 (0.5-0.8), 70 (11,029)

†Central-A represents the merged result of Central-A1 and Central-A2
‡Southwest A and C, two geographical related areas together representing one site
§In some sites male sex workers (MSW) and non-sex worker MSM could not be differentiated and they were sampled as a single group
*In the first round, sampling was done only in Northwest-A, in the subsequent rounds sampling was done for Northwest-A and C and these together represented a single site