

Report of the 2007 survey

**HIV Sentinel Sero-Surveillance
Survey in Sri Lanka**

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Abbreviations used in this report	
AIDS	Acquired immunodeficiency syndrome
CP	Central province
DTCO	District tuberculosis control officer
DU	Drug User
ELISA	Enzyme-linked immunosorbent assay
FSW	Female sex worker
HIV	Human immunodeficiency virus
MOH	Medical officer of health
MSM	Men having Sex with Men
N & E P	North and East provinces
NCP	North Central province
NSACP	National STD/AIDS control programme
NWP	North Western province
Sab P	Sabaragamuwa province
SP	Southern province
STD	Sexually transmitted disease
TB	Tuberculosis patient
TW	Transport worker
UP	Uva province
WP	Western province

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1. Introduction

Good Surveillance does not necessarily ensure the making of right decisions, but it reduces the chances of making the wrong ones.

Alexander D. Langmuir (Langmuir 1963)

Surveillance, the eyes and ears of public health, provides information through which public health programmes can act effectively and efficiently. Controlling and preventing diseases based on information collected through surveillance requires action.

The surveillance of Human Immunodeficiency Virus (HIV) infection is of great value in designing, implementing and monitoring of public health programmes for the prevention and control of HIV infection and the Acquired Immunodeficiency Syndrome (AIDS). There are number of different methods available for HIV surveillance. Of these behavioural surveillance, biological or sero-surveillance, HIV and AIDS case surveillance and use of other supplementary data such as Sexually Transmitted Infections (STI) and Tuberculosis surveillance have been recommended by WHO/UNAIDS.

High quality sentinel surveillance systems have frequent and timely data collection, conduct surveillance in appropriate populations, are consistent in the sites and groups that are measured over time and provide estimates that are representative of the population.

The National STD/AIDS Control Programme (NSACP) of Sri Lanka has been annually conducting HIV Sentinel sero-surveillance since 1993. This survey was initially designed on the guidelines prepared by World Health Organization (WHO) in 1989. The purpose of HIV sentinel survey is to track HIV infection levels through 'watch post' institutions. These sentinel institutions routinely draw blood for other purposes. The usual method of HIV testing for sentinel survey is known as Unlinked Anonymous Testing. This method involves the use of blood already collected for another purpose. Having performed the stipulated test, the labels of tubes are removed to delink from any identity and the HIV test is carried out. The purpose of unlinked anonymous testing is not to identify infected individuals or case finding. The objective is public health surveillance of HIV infection. The strengths and weaknesses of HIV sentinel surveys have been clearly described in 'the guidelines for

Second Generation HIV Surveillance' published by UNAIDS/WHO. The HIV sero-surveillance in Sri Lanka has been regularly reviewed and necessary modifications done based on the new evidence about the local HIV epidemic. Certain Sentinel groups were discontinued while others were newly added depending on the new evidence of the local epidemic. Enrolment of some sentinel groups was done in the field level rather than from clinic settings (sex workers, transport workers, armed forces and drug users).

In Sri Lanka, behavioural surveillance with regard to HIV commenced in 2006 and the first round of BSS has been completed in 2007. Once the BSS system get well established, the possibility of conducting integrated behavioral and sero surveillance will be explored in future.

All surveillance methods have their limitations. The HIV sentinel surveillance is no exception. However, the information generated by sero-survey complements to other data on the HIV epidemic and will be useful to improve the understanding of the HIV epidemic in Sri Lanka.

2. Methodology

Six populations were included in the survey. These were female sex workers, STD clinic attendees, patients with tuberculosis, military service personnel, drug users and pre-employment category. Female sex workers were included in the survey, from the beginning due to their multiple sexual partners and high risk behaviour patterns. STD clinic attendees represent clients of sex workers and their partners. The patients with tuberculosis do not represent a behaviour category. However, they are a good sentinel group to monitor HIV infections in a low prevalence situation due to the synergistic relationship between HIV and TB infections. Military (service) personnel were included in the survey since 2003 due to their reported high risk behaviours. Pre-employment category was included since 2004 for North and East provinces only. The main reason for this was difficulty in getting adequate sample sizes for all the sentinel groups in N&E Provinces. This group consisted of people who came for pre-employment screening with VDRL. However, in terms of behavioural risk this sentinel group represents the general population. Drug user group was newly added in 2006 survey due to their high risk behaviours with respect of acquiring HIV infection. Transport worker group which became consecutively negative for HIV antibodies since its inclusion in 2003, was dropped in 2006 survey. Among reported HIV positives in Sri Lanka, 11%

transmission can be attributed to homosexual mode. Thus an attempt made to include MSM group in 2006 and 2007 sentinel survey. Main MSM networks which also participated in the BSS were contacted and consented to participate. However during the survey period it was not possible to arrange to get blood samples.

Duration of the survey

The survey of 2007 was planned to be conducted over a period of 3 months from 15th August 2007. Almost all the sentinel sites performed well and covered the stipulated sample sizes for the STD clinic attendees within the 3 month period. Most sentinel sites failed to cover sample sizes for other primary sentinel groups namely FSW and TB patients. However, some sentinel sites extended the survey by two more weeks to get more blood samples.

Sentinel sites

All sentinel sites that took part in the 2006 survey were also included in the 2007 survey. All nine provinces were included. (Annex IV). For a given sentinel site there were more than one sample collecting centres (Table 1). For the purpose of this survey, Northern province and the Eastern province were combined as one sentinel site (Northern & Eastern provinces).

Table 1. Sentinel sites and sample collecting centers for 2007 survey

Sentinel Sites	Sample-collecting centers
1. Western Province (WP)	Colombo, Colombo South, Colombo North, Negombo, Kalutara
2. Central Province (CP)	Katugastota, Matale, , Nuwara Eliya
3. Southern Province (SP)	Mahamodara, Matara, Hambantota
4. Sabaragamuwa Province (Sab.P)	Ratnapura, Kegalle
5. North Western Province (NWP)	Kurunegala, Chilaw
6. North Central Province (NCP)	Anuradhapura, Polonnaruwa
7. Uva Province (UP)	Badulla, Mahiyangana, Kataragama
8. North-Eastern Province (N&E P)	Trincomalee, Batticaloa, Vavuniya, Jaffna

Sampling method

Female sex workers were enrolled mainly from the field visits to brothels and other places where sex work take place. Blood samples were collected from all the sex workers present on the day of visit after obtaining consent for VDRL. Some sex workers were enrolled from the STD clinics. Specially designed card (pink in colour) containing necessary information was given to FSW to prevent double counting.

STD clinic attendees and pre-employment category were consecutively enrolled from STD clinics till the stipulated sample size was obtained. Similarly patients with TB were enrolled consecutively from chest clinics and wards.

Collection of the samples from military service personnel was carried out by the Sri Lanka Army Medical Services from selected camps situated in three provinces namely Western Province, North Central Province and North-Eastern Province.

Drug Users as a new sentinel group were enrolled from the rehabilitation centres maintained by the National Dangerous Drugs Control Board (NDDCB).

Sample size

Sample sizes were mainly based on WHO recommendations for HIV sero-surveillance surveys. The sample collection was discontinued once the stipulated sample sizes were completed. These predetermined sample sizes are given in table 2.

Table 2. Stipulated sample sizes for each sentinel group and site

Sentinel Group	WP	CP	SP	Sab.P	NWP	NCP	UP	NEP
1. FSW	400	250	250	250	250	250	250	250
2. STD	500	250	250	250	250	250	250	250
3. TB	250	250	250	250	250	250	250	250
4. Service personnel	400	-	-	-	-	400	-	400
5. Pre-employment	-	-	-	-	-	-	-	1000
6. Drug User	250	-	250	-	-	-	-	-

The following **working definitions** were used for survey.

1. Female Sex Workers (FSW) - Women who have practised commercial sex work during past one year. They were enrolled mainly by field visits. However, when this option was limited, sex workers who were seeking care at STD clinics were also enrolled for the survey. Both indirect and direct female sex workers were included in the survey irrespective of their age.

2. STD clinic attendees (STD)- Persons who attend a STD clinic seeking care at selected sentinel sites during the survey period. Both males and females were included. Both newly registered patients and those who came for follow up visits were included. All age groups over 18 months were included in the survey if they had attended for a STD related complaint. Those who came for routine pre-employment, or antenatal screening, were excluded from the STD clinic attendee category. Patients with previously diagnosed HIV infection were excluded from the survey unless they have come for a STD related complaint. This was to prevent artificially high HIV prevalence rates in the HIV care providing STD clinic settings.

3. TB patients (TB) - Both new and old TB patients who were registered in the TB register maintained by the District Tuberculosis Control Officer (DTCO) during the survey period were enrolled. Both pulmonary and extra-pulmonary TB cases were included. Lowest age group for TB patients was 18 months. Patients older than 49years were allowed if sample size could not be achieved during the survey period.

4. Service personnel (Service) - Currently serving army personnel in combat in selected army camps in each sentinel site were enrolled. Female officers and those who were engaged in full time office work were excluded. Age was limited to 18 to 49 years. To prevent double counting a beige colour card with relevant information was given to those enrolled.

5. Pre-employment (PE)- Both males and females who attend STD clinics for pre-employment medical screening for syphilis during the survey period. The age was limited to 18 to 49 years.

6. Drug User (DU)- Any man or woman who has used at least one drug in the previous six months for other than medically prescribed purposes.

Method of HIV testing

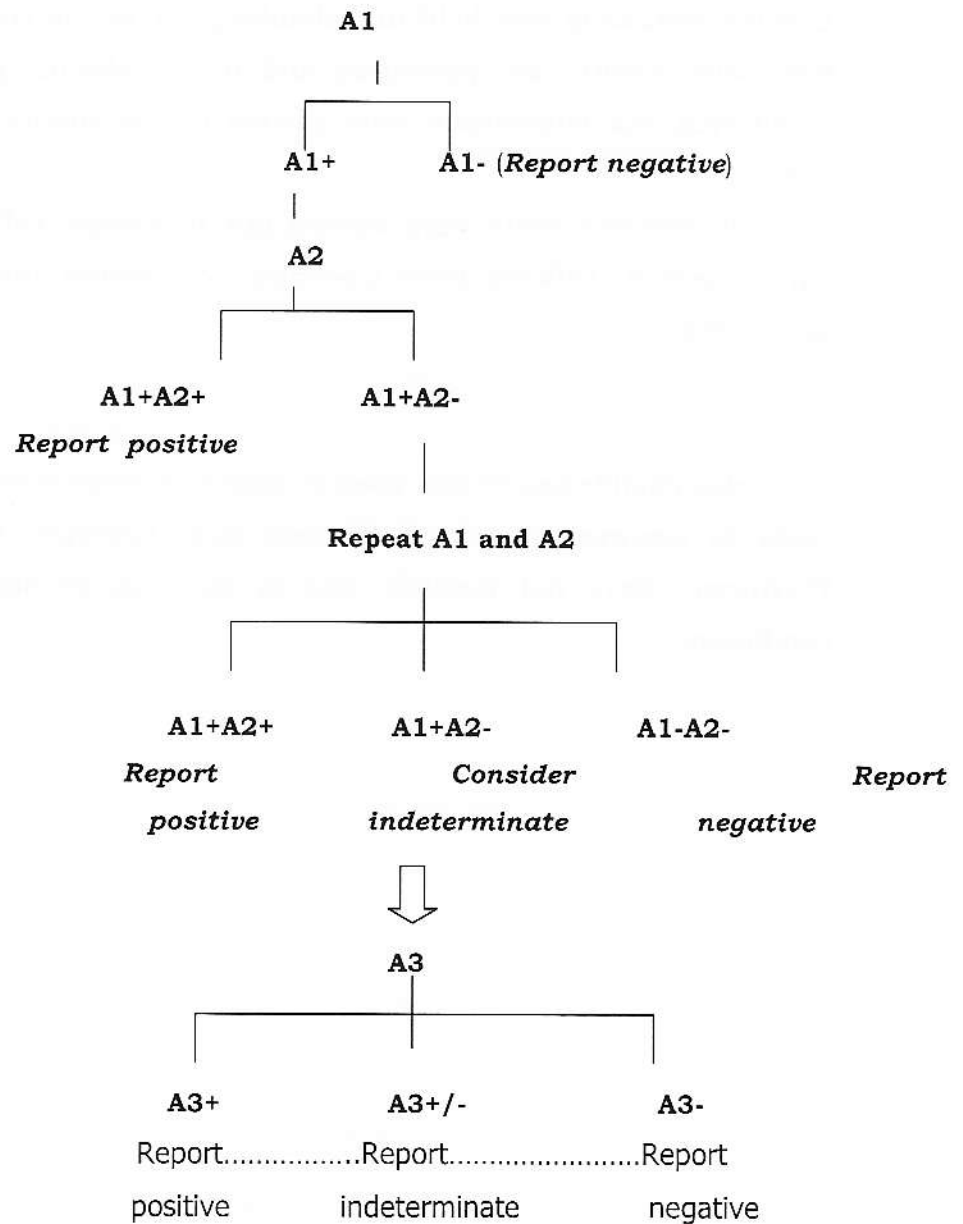
All HIV tests were done on an unlinked anonymous basis. Routinely collected blood was used only in STD clinic attendees. In all other sentinel groups blood samples were collected for the VDRL test on obtaining consent. Once the VDRL tests were carried out, left over blood were used for HIV testing after removing individual identifying labels.

Laboratory testing strategy for HIV antibodies

HIV antibody status was mainly determined based on the results of two screening assays (i.e. ELISA and Particle agglutination assay) and a confirmatory test carried out for indeterminate tests.. All samples tested positive with the first test were tested with the second screening test. If both tests were positive the sample was considered as positive. If the 1st test was positive and the 2nd test was negative or vice versa , then both screening tests were repeated (1st and 2nd test) and if both were positive it was considered as positive. If one test was positive and the other test was negative it was considered as indeterminate.

Since the prevalence of HIV is low in Sri Lanka, it was decided that indeterminate samples from screening tests should be tested again with a confirmatory test. The same methodology was used in the 2006 survey as well.

Testing Algorithm used for the 2007 survey is given below.



Assay A1, A2 represents 2 different screening assays (ELISA and Particle agglutination tests). A3 represent a confirmatory test (Line Blot assay)

Staff training, Monitoring and supervision

The survey protocol was modified to suit changes in the 2007 survey. A training workshop was held in Colombo prior to the commencement of survey to familiarize health-care personnel and other relevant persons on this protocol. Monitoring and supervision were carried out to ensure uniformity at all sentinel sites.

Supervisory visits were carried out to sample collecting centers during the survey period. Officers from Colombo conducted these visits. A standardized structured

checklist(Annex V) was used to collect relevant information. Many supervisory visits to sentinel sites in North and East province, Uva and North Western Provinces were not possible due to logistical problems and difficult weather conditions .

3. Results

A total of 7103 samples were tested and 07 HIV antibody positive samples were detected in 2007 HIV sentinel sero-survey. Of these, 5 were from STD patients and 1 each from TB and drug user categories. There were no HIV positives among female sex workers, pre employment group or service personnel. In addition not a single indeterminate results was reported from sentinel sites.

Table 3. HIV test results by sentinel sites and sentinel groups

Sentinel Sites	Sentinel groups											
	STD		FSW		TB		Service		DU		PE	
	No. tests	No. +ve	No. tests	No. +ve	No. tests	No. +ve	No. tests	No. +ve	No. tests	No. +ve	No. tests	No. +ve
WP	656	1 [0.1%]	421	0	227	0	400	0	235	1 [0.4%]	-	-
CP	250	3 [1.2%]	58	0	204	0	-	-	-	-	-	-
S.P	320	1 (0.3%)	144	0	120	0	-	-	150	0	-	-
Sab.P	183	0	150	0	173	0	-	-	-	-	-	-
NWP	263	0	203	0	121	1 [0.8%]	-	-	-	-	-	-
NCP	351	0	180	0	179	0	400	0	-	-	-	-
UP	216	0	62	0	143	0	-	-	-	-	-	-
N & E P	222	0	0	0	66	0	441	0	-	-	565	0

Table 3 describes the number of HIV antibody tests, number of HIV positive samples and sero-positivity rates amongst different sentinel groups at various sites. All sites were able to enroll adequate sample sizes for STD clinic attendees except for N&E Province. Most of sites had enrolled more than the stipulated sample size for the given site. Of the 07 HIV positive samples, 5 were from STD patients whose sero-prevalence rates ranged from 0.1% to 1.2%. It has been observed that Western Province sentinel site was able to enroll total number of STD patients within 2weeks of the commencement of the survey. So it is point prevalence rate which is more refine measure of the HIV burden among STD patients in the Western Province.

Period prevalence of HIV among FSW is 0%. Only Western province was able to enroll adequate number of FSW for the survey. Northern & Eastern provinces could not enroll a single FSW. Uva and Central Provinces enrolled fewer than 100 FSWs.

Among TB patients, satisfactory numbers were enrolled only in 2 sentinel sites. There was 1 HIV antibody positive sample amongst TB patients from the NWP, giving a sero-prevalence rate of 0.8%.

Stipulated numbers have been enrolled for Service personnel in 3 provinces. Similar to previous years none of the blood samples gave positive results.. Only 565 samples were collected for the pre-employment group out of 1000 stipulated number and it was unsatisfactory. However this group found to be sero negative consecutively.

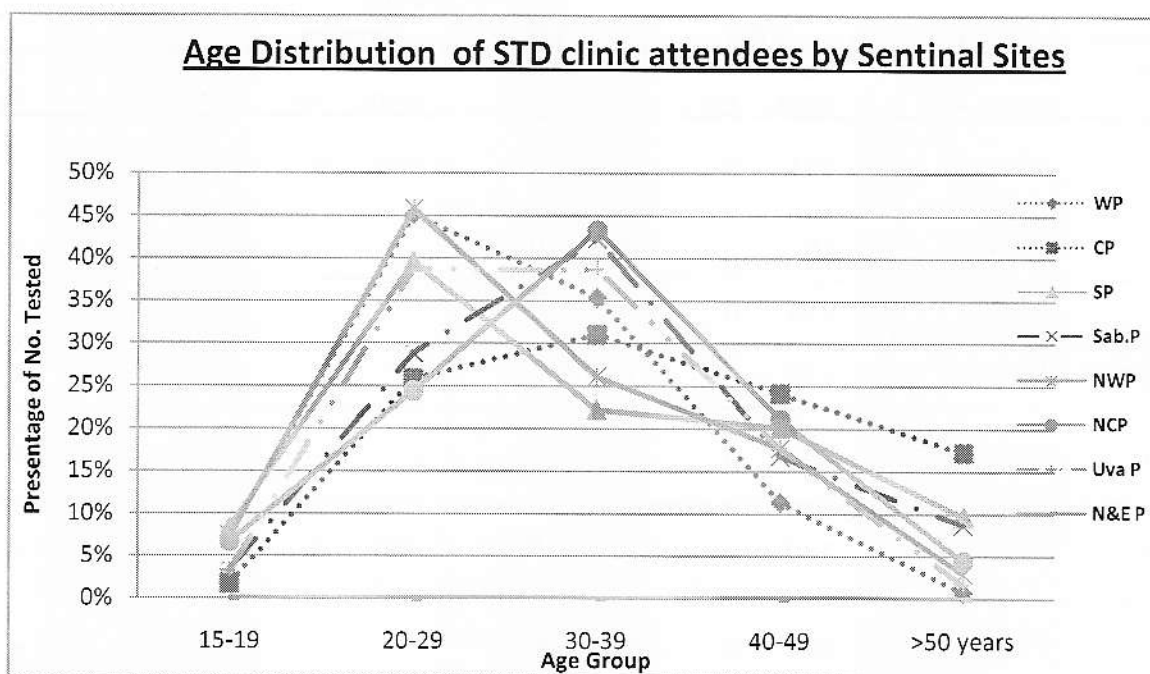
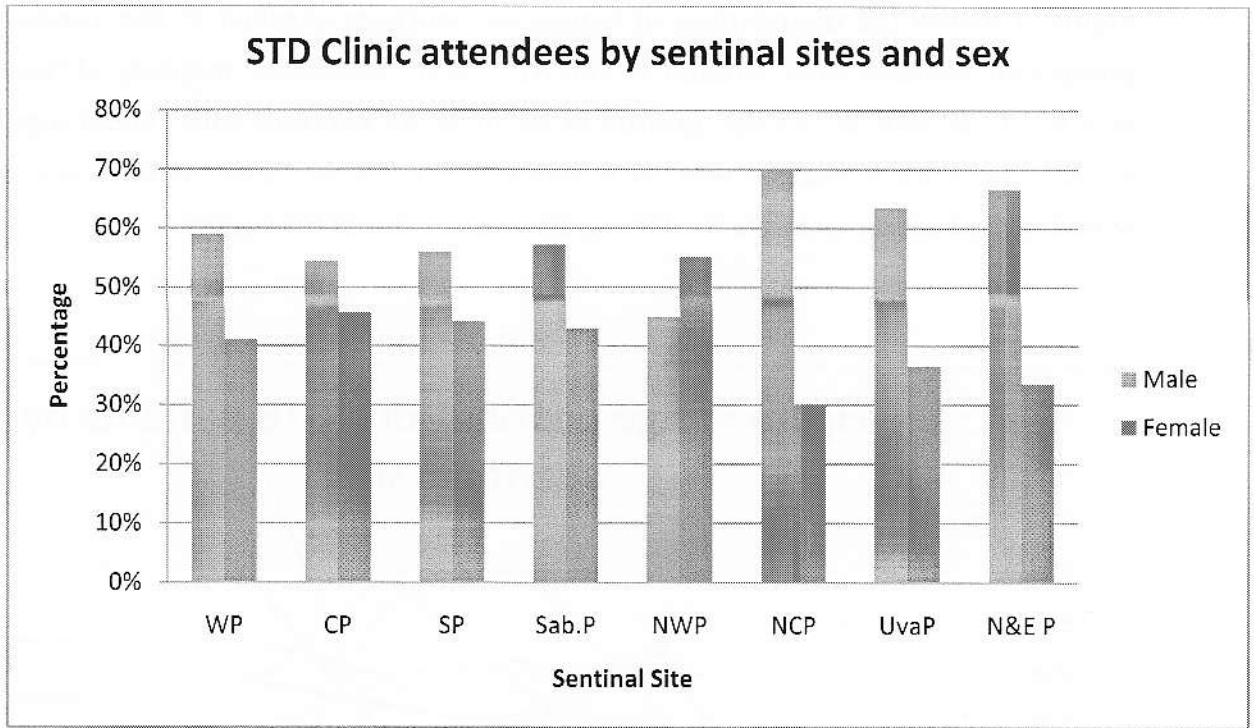


Figure 1 shows the distribution of STD clinic attendees enrolled in various sentinel sites by age group and sentinel sites. Majority of the sample was in 20-29 and 30-39 age groups in all sentinel sites. Mean age for the sample was 31.7 with a standard deviation of 10.7.

A total of 2,456 STD clinic attendees were tested and 5 found to be HIV positive making the prevalence rate ranging from 0.1 to 1.2%.



In all sentinel sites, a higher percentage of male STD clinic attendees were enrolled for the survey. Only exception was in the NWP, where reversal of the male to female ratio was observed (45% vs 55%). In the NCP the difference between male and female STD clinic attendees found to be 40%.

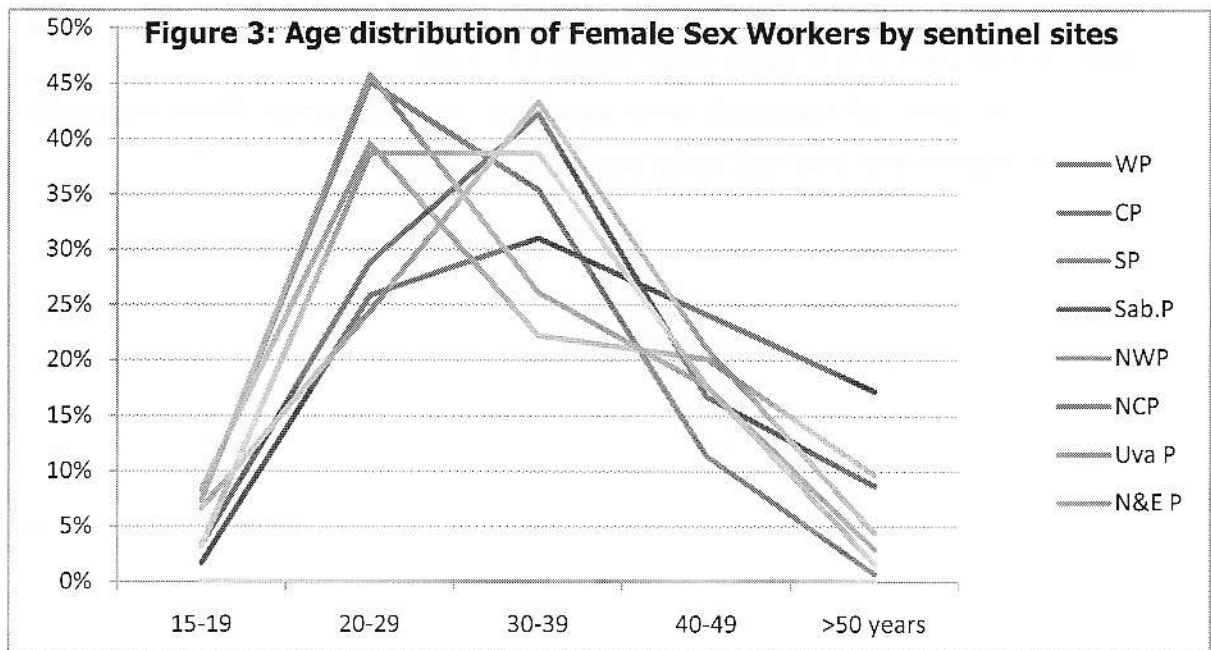
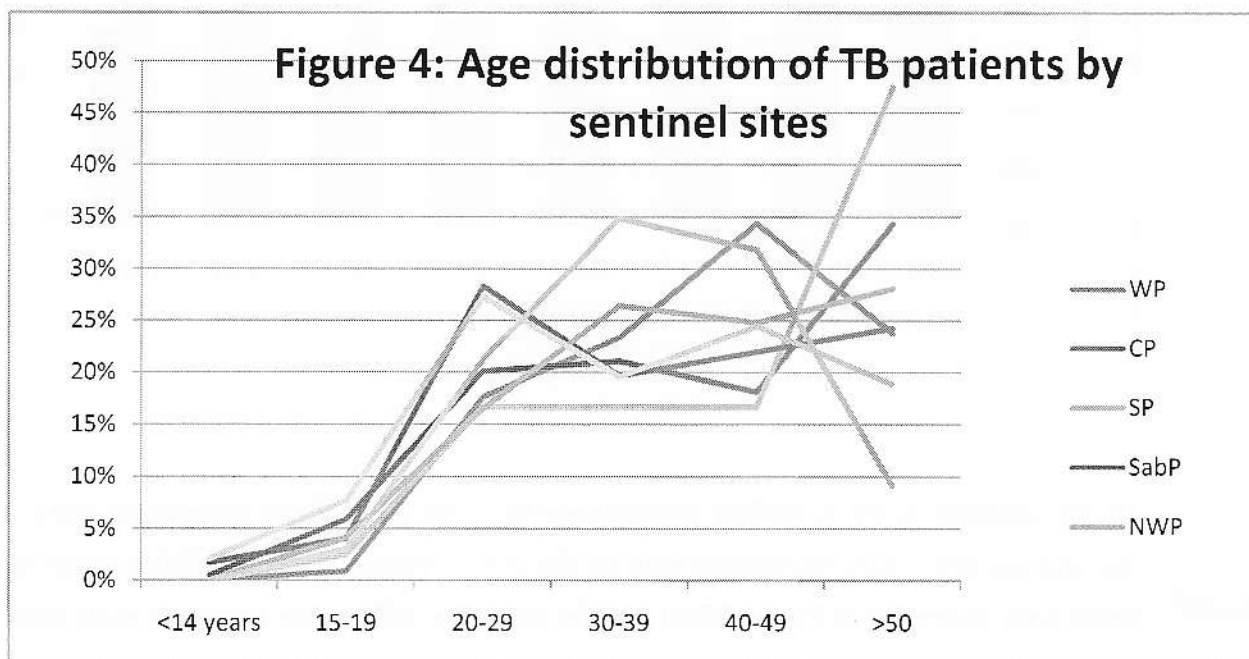


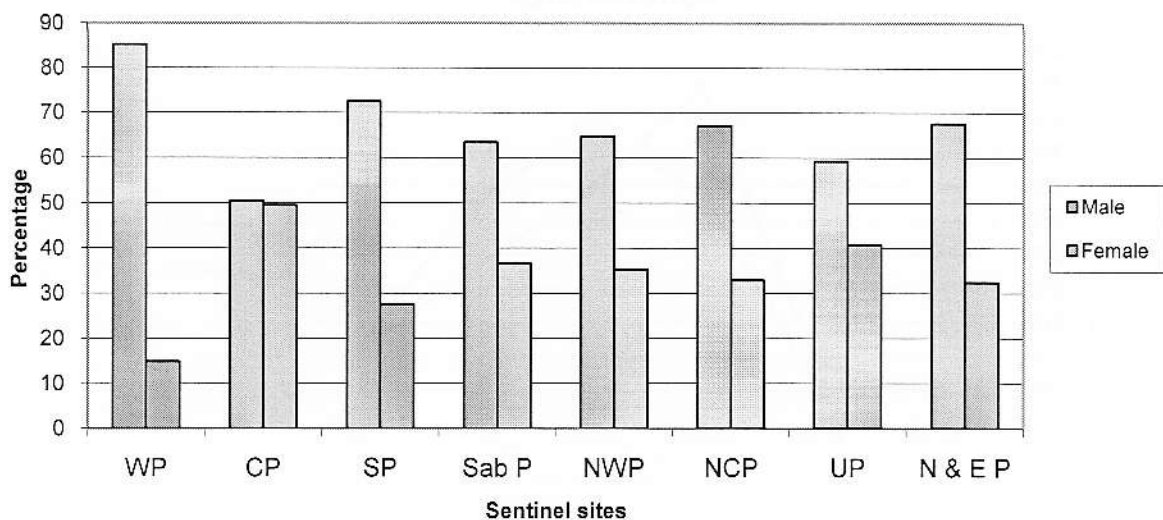
Figure 3 shows the distribution of female sex workers enrolled in the survey by age group and sentinel sites. Similar to the STD clinic attendees, majority of the sample was in 20-29 and 30-39 age groups in all most all sentinel sites. Mean age for the female sex worker sample was 31.4 years. Of the total 1218 female sex workers tested none became positive for HIV antibodies in the 2007 survey.



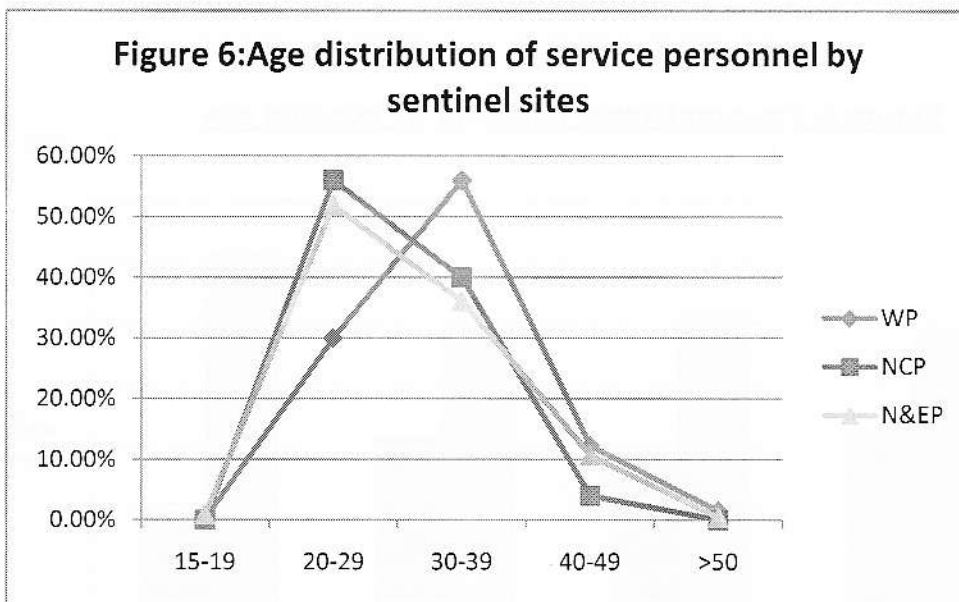
None of the sentinel sites were able to enroll adequate numbers of TB patients. In all sites more patients in the older age group were enrolled. Mean age for the sample was 38.4 years. Only 8 cases were below 15 years.

A total of 1233 patients were tested during the survey. There was only one HIV positive sample (48 year old male] amongst TB patients.

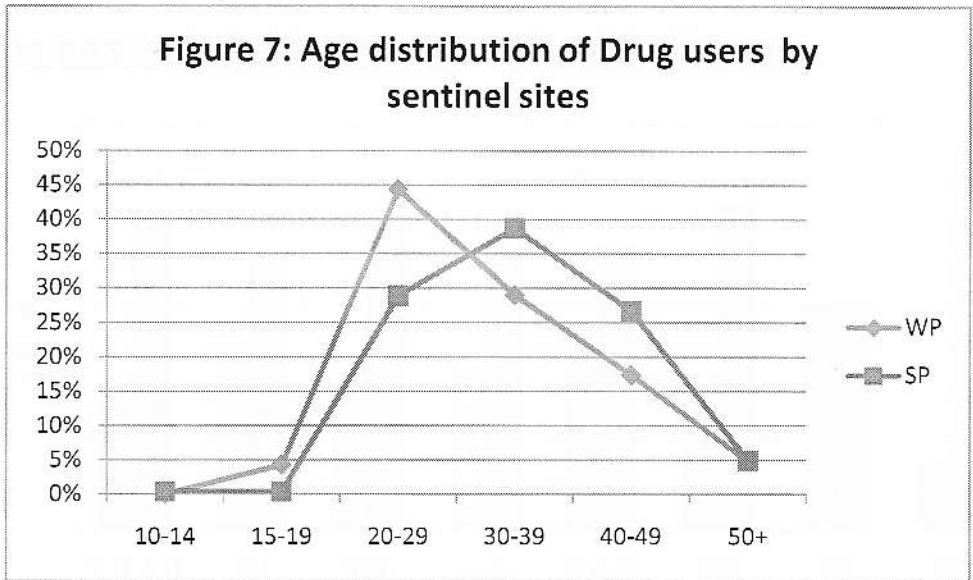
Figure 5. TB patients by sentinel sites and sex



In all sentinel sites, a higher proportion of males was noted among TB patients (figure 5). Similar to the results of last year, this sex difference was most marked in the western province (95.6% males Vs 4.4% females).

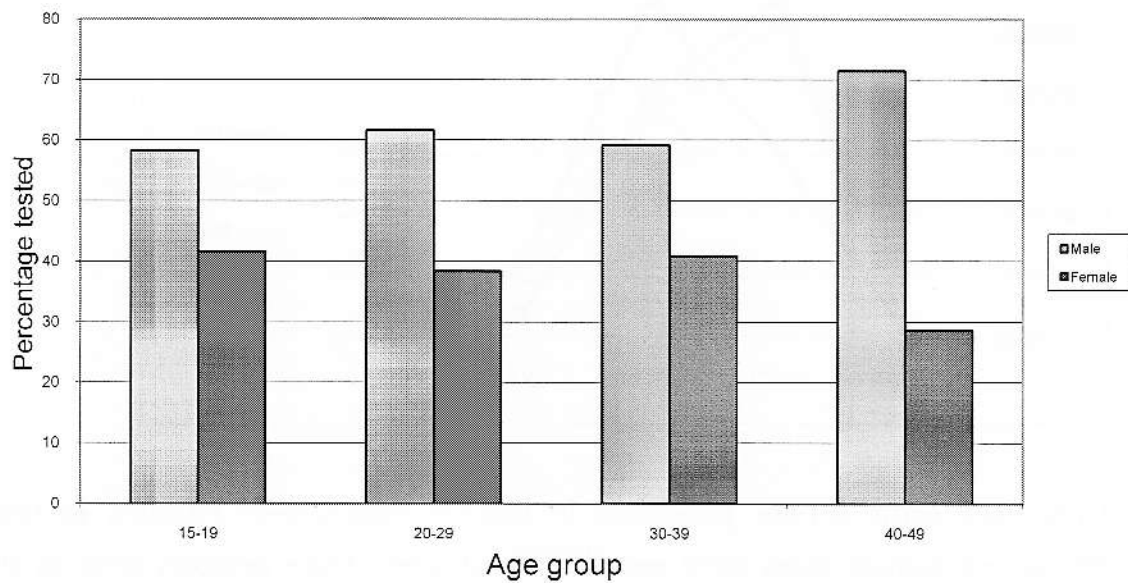


Only male army service personnel in combat duties were enrolled in the survey. Stipulated sample sizes were enrolled in all sites. More persons were in the 30-39 and 20-29 year age groups (figure 6). Mean age of the sample was 30.7 years (SD 5.8). Of the 1241 samples tested, there were no HIV antibody positive samples.



Drug users were enrolled from the rehabilitation camps in the WP and SP sentinel sites. Majority of them were in 20-29 and 30-39 age groups(fig.7). Mean age for the drug users was 33.6 with a standard deviation of 8.8. One drug user sample was found to be HIV positive.

Figure 8. Pre-employment category by age and sex



The enrolment of the pre-employment category was commenced only since year 2004. Samples were collected only from bleeding sites situated in north & east provinces. Inability to enroll adequate sample sizes for other sentinel groups in the North-East sentinel site was the main reason to initiate this new sentinel group. Pre-employment category consists of males and females who come for VDRL screening as part of their pre-employment medical screening before they are confirmed in a government employment. Therefore this group represent the general population. A total of 691 samples were collected. Sixty one percent of the sample consisted of males. Proportion of males were highest in 40-49 age group. Mean age of the sample was 27 years with a standard deviation of 6.3. Of all the groups surveyed, Pre Employment category had the lowest mean age. None of the samples were positive for HIV antibodies in this category.

SUMMARY

Table 4. Summary of HIV positive cases found in HIV sentinel sero-survey 2007.

No	Sentinel site	Bleeding site	Sentinel group	Age	Sex	Sero-prevalence rate
1	Western P.	Colombo	STD	28	Male	0.1%
2,	Central P.	Kandy	STD	48	Male	1.2%
3,				51	Female	
4,				49	Female	
5	Southern P.	Galle	STD	40	Female	0.3%
6	North Western P.	Kurunegala	TB	48	Male	0.8%
7	Western P.	Colombo	DU	39	Male	0.4%

Of the 7 HIV antibody positive samples , 5 were from STD patients (5 females and 3 males) Highest sero-prevalence of 1.1% was found in Central and North-East provinces. Another 2 HIV positive samples were found among FSW samples from Western and North Western provinces. One TB patient sample became positive in the Western Province giving a sero prevalence rate of 0.4% and one drug user sample became positive in the Western province (sero prevalence rate 0.5%).

4. Discussion

The number of blood samples tested in 2007 HIV sentinel sero-survey was 7103. Of these, 7 samples gave positive HIV antibody test results. Similar to previous year, inclusion of the Pre-employment category, i.e. people whose VDRL test was done as a requirement for pre-employment screening, was continued this year too. This group was added only to sample collecting centres situated in the North and East provinces. The main reason for adding this group to N & E provinces was its inability to enrol adequate sample sizes for most of the sentinel groups. It was thought that in terms of risk behaviours this category may represent general population and may not be appropriate for sero-surveillance for a low HIV prevalent country. However due to inability to achieve required sample sizes for all the sentinel groups in North and East provinces, continue to emphasize the importance of vigilance in this province.

There were no changes in the sentinel sites from the previous survey. However it should be noted that Jaffna STD clinic participated in this year's survey with lot of commitment. In terms of HIV spread, this area is generally considered to be high risk due to its proximity to South Indian states where HIV prevalence is high. Volatile political environment and presence of military in the area may further worsen the situation.

Similar to the testing protocol for the 2006, confirmatory HIV testing was planned to be carried out for indeterminate samples from the screening tests. However, none of the samples fell into the indeterminate category. The enrolment of STD clinic attendees was satisfactory in all sentinel sites. Both male and female patients who attended public STD clinics during the survey period were taken as STD clinic attendees. Male STD clinic attendees are thought to be representing clients of sex workers. There were five STD clinic patients found to be HIV positive and the sero-prevalence rate ranged from 0.1 to 1.2% .

Female sex worker are an important risk group for HIV infection. It is well known that liaisons between males and sex workers are the main driving force of HIV epidemic in Asian countries. Both direct and indirect female sex workers were enrolled mainly from the community for HIV sero-survey. None of the sex workers became HIV positive in the current survey. Enrolment of adequate sample sizes for female sex workers was a recurrent problem for many sentinel sites. Only the Western province was able to enrol adequate sample for 2007 survey.

Patients with tuberculosis were traditionally included in sero-surveys due to its synergistic nature with HIV infection. One TB patient from North Western Province found to be HIV positive. None of the sentinel sites were able to get adequate sample sizes for TB patients.

The enrolment of Service personnel consistently were satisfactory. There were no HIV positive samples in this group. Drug users were added to the sentinel survey from 2006. Intra venous drug use is directly linked to the HIV transmission. IVDU prevalence is very low in Sri Lanka and to monitor the drug user behavior as a proxy measure it was decided to add drug users for the sentinel surveillance since 2006. Similar to 2006, one drug user sample from the Western province became positive for HIV antibodies.

HIV sentinel survey conducted in 2007 neither show a clear trend for all the sentinel groups surveyed nor marked change in HIV sero-prevalence among the sentinel groups surveyed except for the female sex worker category. Female sex workers found to be with a zero prevalence in the last survey and the prevalence rose to 0.4% in 2006 survey. Still these results are compatible with a low level HIV prevalence in the country. A properly conducted behavioural surveillance system would be more sensitive to issues related to HIV epidemic in this situation. The first round of behavioural survey was completed recently. The results of this survey will be useful to get a better understanding of the HIV epidemic in Sri Lanka.

Acknowledgement

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The NSACP appreciates the support given by Medical Service Unit of the Sri Lanka Army and the National dangerous drugs control board.

Last but not least, all the participants of this survey is acknowledged with special thanks.

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