



**World Health
Organization**

Country Office for Myanmar

**National AIDS Programme
Department of Health
Ministry of Health**

Report of the

HIV Sentinel Sero-surveillance Survey 2008

Myanmar

March 2009



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Acknowledgments

HIV sentinel sero-surveillance survey is being carried out annually with the combined efforts of our State/Divisional AIDS/STD Officers, Team Leaders and Officials from Monitoring and Evaluation section of the National AIDS Programme. Thus, we would like to express our gratitude to all our colleagues, officials from Drug Dependency Treatment and Research Units, officials from the International and local Non-government Organizations for providing their invaluable cooperative support for this survey. We also like to acknowledge the technical and financial support provided by the country and regional offices of the World Health Organization and the financial support of the Three Diseases Fund. Our special thanks go to the National Tuberculosis Programme and the Directorate of Medical Services for their invaluable support and co-operation. Last but not the least, we are indebted to all those who participated in this survey.

**National AIDS Programme
Department of Health
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List of abbreviations

AHRN: Asia Harm Reduction Network
ARHP: Asian Regional HIV/AIDS Project
ANC: Antenatal care
AZG: Artsen Zonder Grenzen, MSF Holland
CCDAC: Central Committee for Drug Abuse Control
DoH: Department of Health
FSW: Female Sex Worker
HAARP: HIV/AIDS Asia Regional Programme
HSS: HIV Sentinel Surveillance Survey
IDU: Injecting Drug User
LOP: Lashio Outreach Project
MANA: Myanmar Anti-Narcotics Association
MDM: Médecins du Monde
MMA : Myanmar Medical Association
MNMA : Myanmar Nurse and Midwife Association
MOP: Muse Outreach Project
MSF: Médecins San Frontières
MSI : Marie Stopes International
MSM : Men who Have Sex with Men
NAP: National AIDS Programme
NTP: National TB Project
NGO: Non-Government Organization
PMCT: Prevention of Mother to Child Transmission
PSI: Population Services International
STI: Sexually Transmitted Infection
WHO: World Health Organization
3 DF: Three Diseases Fund

1. Background

The National AIDS Programme carries out yearly HIV sentinel serosurveillance survey (HSS) of selected subpopulation groups in Myanmar since 1992. The sentinel groups included are pregnant women attending the antenatal clinics (ANC), new military recruits, blood donors as low risk population, injecting drug users (IDUs), men who have sex with men (MSM) and female sex workers (FSW) as high risk populations. Surveillance is also conducted among new tuberculosis (TB) patients. HIV sentinel sero-surveillance survey (HSS) is the systematic and regular collection of information on the occurrence, distribution and trends in HIV infection and factors associated with infection for use for public health action. In concentrated epidemics, surveillance is conducted among selected groups who may be at highest risk and are most critical to be targeted for interventions.

2. Methodology

All AIDS/STD teams who carried out HSS were expected to adhere to the HSS guidelines 2007. HSS was conducted annually from March to May 2008 in 34 sentinel sites where AIDS/STD teams are located. The specimens from military recruits were collected from the new conscripts in Yangon and Pyin Oo Lwin. During the same period, TB/HIV surveillance, i.e. the screening for HIV among newly diagnosed TB patients was undertaken in 10 townships.

Table 1 shows the sentinel groups, number of sentinel sites, and target sample size for each site. The sentinel group, new TB patients, has been included for three consecutive years, which allows trend analysis to be done for this group for the first time in 2007.

Table 1. Number of sentinel sites and sample size for each sentinel group, HSS 2008

Sr. No.	Sentinel groups	Number of sentinel site	Sample size per site
1	Pregnant women attending ANC clinics	32	400
2	Male STI patients	34	150
3	New TB patients	10	150
4	Female sex workers	6	200
5	Injecting drug users	6	200
6	Men who have sex with men	2	200
7	New military recruits	2	400
8	Blood donors	2	Not identified**

* Pyinmana and Pyin Oo Lwin Townships accounted for surveying only male STI patients

** Collective data compilation was done for blood donors especially from Yangon and Mandalay

HSS is conducted through the facility-based sampling approach, in which consecutive eligible participants are recruited until the required sample size is achieved. The sampling method used is anonymous unlinked sampling after obtaining verbal informed consent from the injecting drug users, the female sex workers, new TB patients and military recruits. The AIDS/STD team in each township organizes, supervises and monitors the survey process across the various participating facilities.

In addition to HIV and syphilis test results, information on age, place of residence and marital status is collected from all groups except military recruits and blood donors. For pregnant women, the parity status (primiparous status vs. multiparous) is also recorded. Female sex workers are also distinguished as either direct or indirect sex workers, and TB patients are categorized according to the type of TB they have been diagnosed with.

Prior to the 2007 HSS round, HIV and syphilis testing were being done at the reference laboratories in Yangon and Mandalay. In 2007, NAP piloted a protocol in which HIV antibody testing was done at twenty pilot sentinel sites in an effort to decentralize the testing process. In those twenty sites, HIV antibody testing was performed at site level and the results were compared with those of reference laboratories in order to assess the accuracy of decentralized results. At the site laboratory, serum specimens were screened using an HIV rapid test kit (mostly Determine) and the reactive specimens were further confirmed by a second HIV rapid test kit (Unigold) according to WHO testing strategy II. A third serum specimen was sent to the National Health Laboratory and Public Health Laboratory in Yangon and Mandalay. At the reference laboratories, the first test used was ELISA followed by the second rapid test e.g. Unigold or Stat-pak for confirmation.

The test results (reported on Form 2) from the twenty pilot sentinel sites were sent to NAP - Nay Pyi Taw and the results of HIV and syphilis from the reference laboratories were also sent to NAP.

Data entry and cleaning were undertaken by National AIDS Programme (NAP) by using a simple Excel worksheet. Analysis was done in NAP. Descriptive analysis was performed using SPSS software and calculated the prevalence of each sentinel groups disaggregated by age and sex and/or by sentinel site.

The test results of the local and the reference laboratories- National Health Laboratory (Yangon) and Public Health Laboratory (Mandalay) were compared and analyzed using percent agreement using McNemar chi-square test. The results of this quality assessment are also presented in this report

3. Findings

3.1 HSS (2008) results

3.1.1 Sample collection

Overall, 31,899 participants were included in 34 sentinel sites during the 2008 round.

- A total of 4,469 male STI patients from the (33) sentinel sites were collected during the survey
- 838 commercial sex workers were included in the survey from six sites
- 400 the men having sex with men from two sites
- 891 injecting drug users were also surveyed in six townships
- 12,376 pregnant women who attended antenatal clinics in 32 townships
- 800 new military conscripts in two selected recruitment areas
- 1,496 new tuberculosis patients in ten townships
- 10,629 blood units screened for HIV from Yangon and Mandalay townships were analysed for HSS

Most of the sentinel sites were able to achieve the desired sample size. Table 2 provides comparison between the required and achieved sample sizes among different sentinel populations. Sample size achievement was around 70% for FSW and IDUs and 100% for MSM and military recruits. It was not possible to collect specimens from male STI patients and female sex workers at Keng Teng sentinel site.

Table 2: Comparison between the required and achieved sample size among different sentinel population groups – HSS 2008

Sentinel group	Required sample size per site	No of sites	No (%) of sites achieving targeted sample size	Total sample size	Achieved sample size No (%)
Male STI	150	34	24 (71)	5,100	4,469(88%)
FSW	200	6	2 (33)	1,200	838 (70%)
MSM	200	2	2 (100)	400	400 (100%)
IDU	200	6	1 (16.7)	1,200	891 (74%)
Pregnant women	400	32	31 (97)	12,800	12,369 (97%)
New military recruits	400	2	2 (100)	800	800 (100%)
New TB patients	150	10	9 (90)	1,500	1,496 (99.7%)
Blood donors	not specified	2			10,629

3.1.2 HIV prevalence by sentinel population

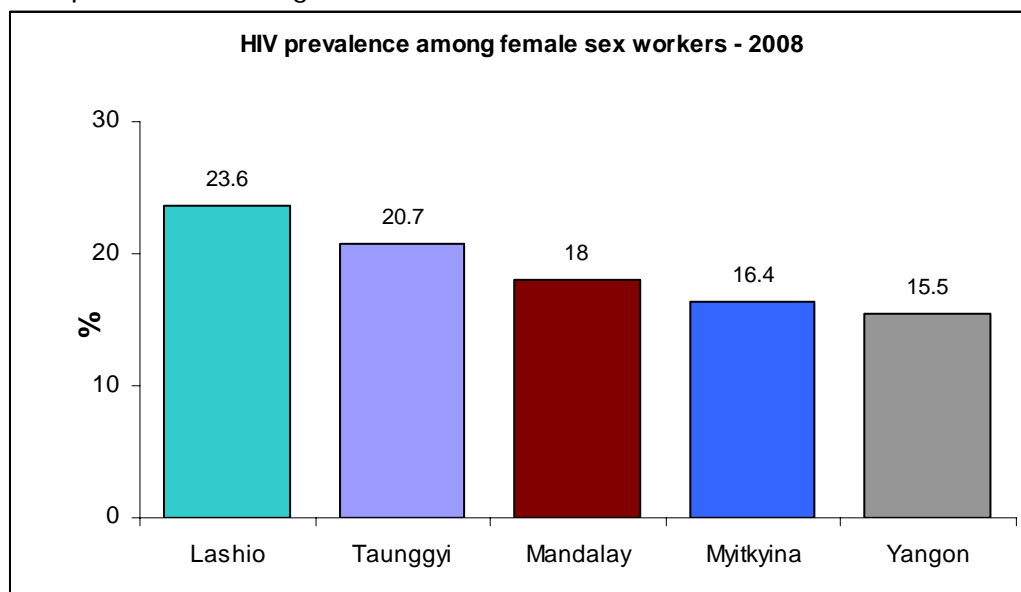
Table 3 shows HIV prevalence among different population groups. HIV prevalence was the highest among MSM followed by IDUs. HIV prevalence per population group for each sentinel site is presented in annex 1. Among women attending ANC clinics, the median HIV prevalence was 1%, ranging from 0 to 6% across 32 sentinel sites.

Table 3: HIV prevalence among sentinel populations – HSS 2008

Population group	No. of Sites	No. Examined	No. Positive	% Sero-positive%	Range			95% CI
					Median	Minimum	Maximum	
Male STI patients	33	4,469	242	5.42	4	0	22.3	4.77-6.12
FSWs	5	838	154	18.38	18.0	15.5	23.58	15.81-21.17
IDUs	6	891	334	37.5	37.22	12.5	54	34.3-40.76
MSM	2	400	115	28.8	29	25	33	24.36-33.46
Pregnant women	32	12,376	156	1.26	1	0	6	1.07-1.47
Blood (units) donors	2	10,629	51	0.48	0.4	0	1	0.36-.63
New military recruits	2	800	20	2.50	2.5	2.5	2.5	15.34-38.35
New TB patients	10	1,496	166	11.1	8.67	4.67	28.77	9.55-12.8
Total		31,926	1,238					

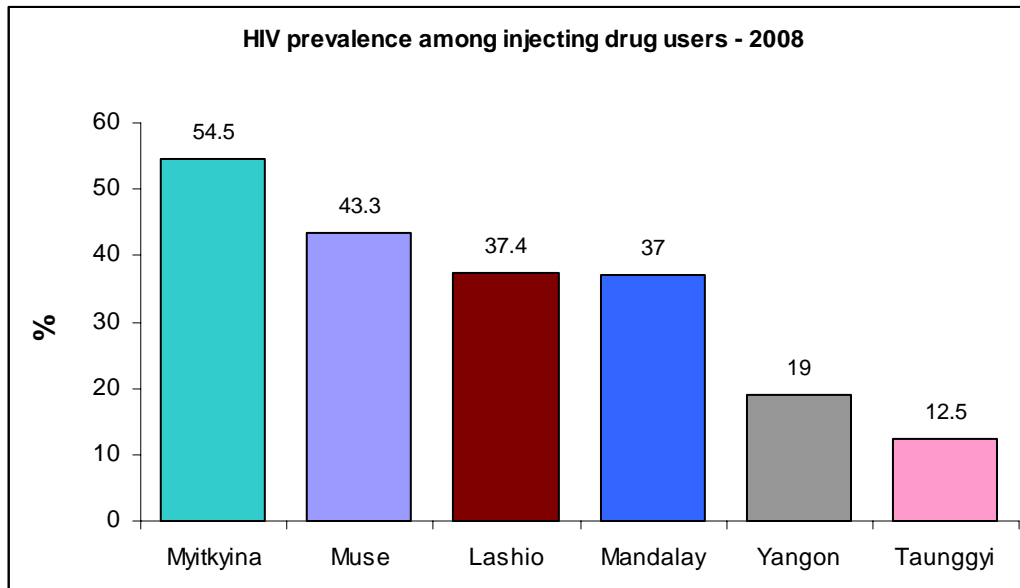
HIV prevalence was similar in primipara women 1.1% (50/4694) and multipara women 1.2% (82/6836) ($p=0.3$). (Figure 1).

Figure 1. HIV prevalence among female sex workers, HSS 2008



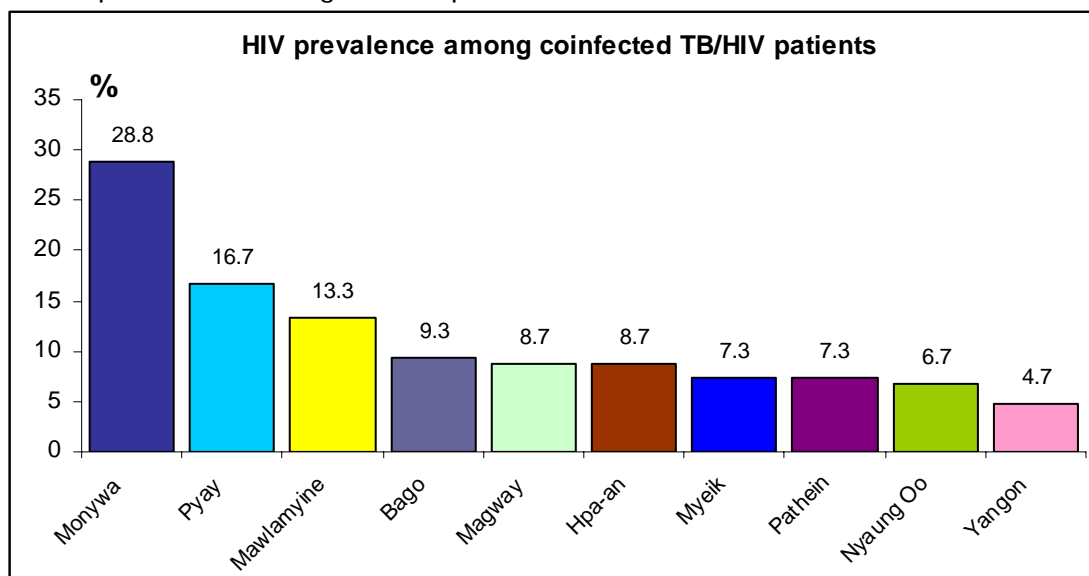
Among female sex workers, HIV prevalence was the highest in Lashio (23.6%) followed by Taunggyi (20.7%), Myitkyina (16.4%) and Yangon (15.5%). HIV prevalence among direct sex workers 21.4% (136/636) was twice that of indirect sex workers 9.8% (21/215) (p=0.02).

Figure 2. HIV prevalence among injecting drug users, 2008



As show in Figure 2, Myitkyina had the highest HIV prevalence (54.5%) among IDUs out of six townships included in HSS. HIV prevalence in Muse, Lashio and Mandalay townships had similar HIV levels ranging from 43%-37%, whereas Taunggyi with very small sample size and Yangon had significantly lower levels of prevalence among IDU.

Figure 3. HIV prevalence among new TB patients, HSS 2008



Among new tuberculosis patients, HIV prevalence ranged from 4.67% in Yangon to 28.77% in Monywa. Analyses by type of TB showed that HIV prevalence was lower among smear-positive TB patients (8.3%, 58/699) compared to smear-negative TB patients (12.6%, 84/665) and extra-pulmonary tuberculosis patients (22.7%, 10/44) ($p=.002$) (Figure 3).

3.1.2 HIV prevalence by sex and age

HIV prevalence among female and male TB patients was 9.6% and 11.9%, respectively.

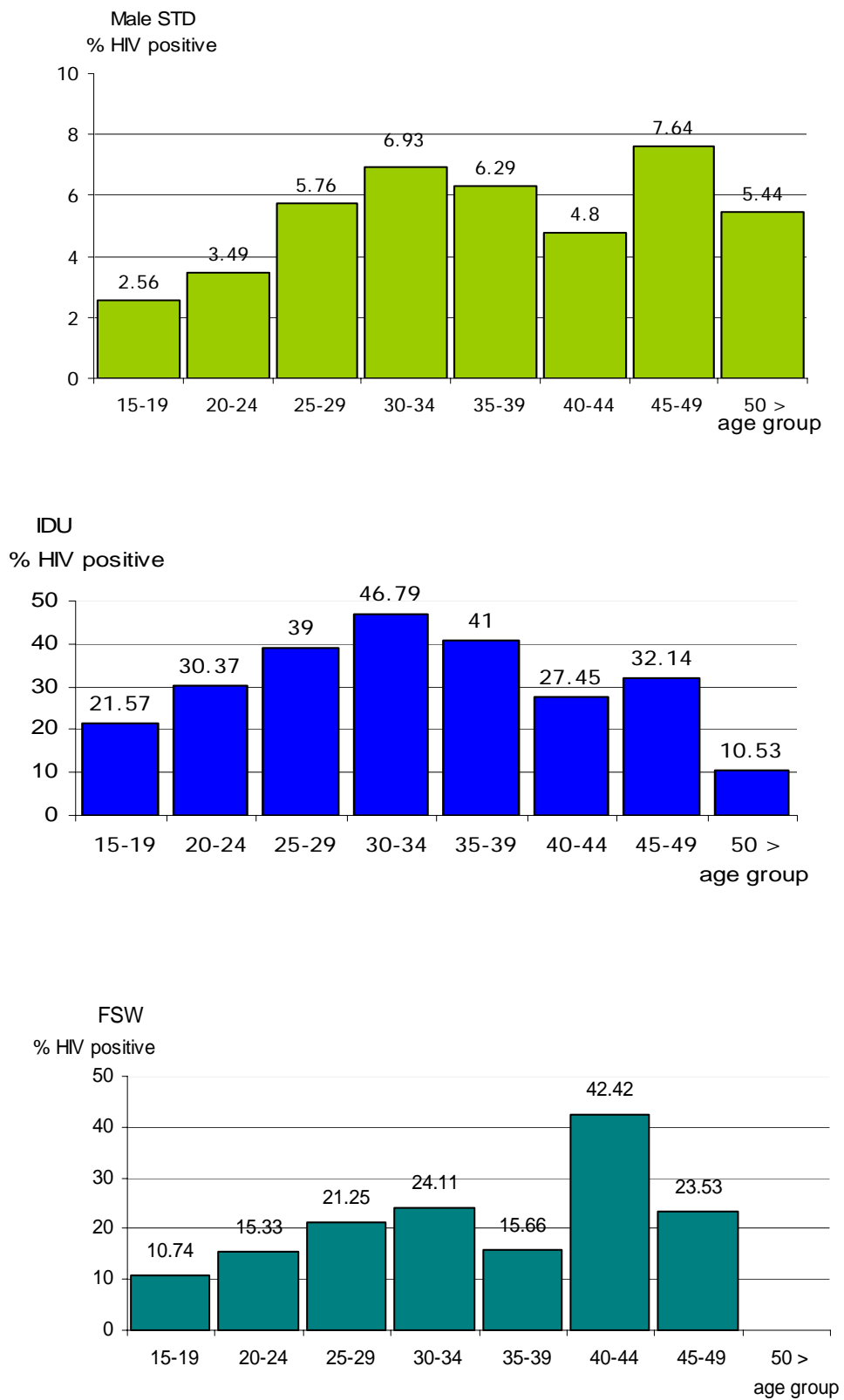
Among blood donors 2,474/10,629 (26.5%) were female. The HIV prevalence was 0.24% in female and 0.55% in male donors.

HIV prevalence by age groups is presented for each population in Figure 4. Among the most at-risk populations (i.e. male STI patients, FSW, IDU, and MSM), HIV prevalence appears to peak after 30 years.

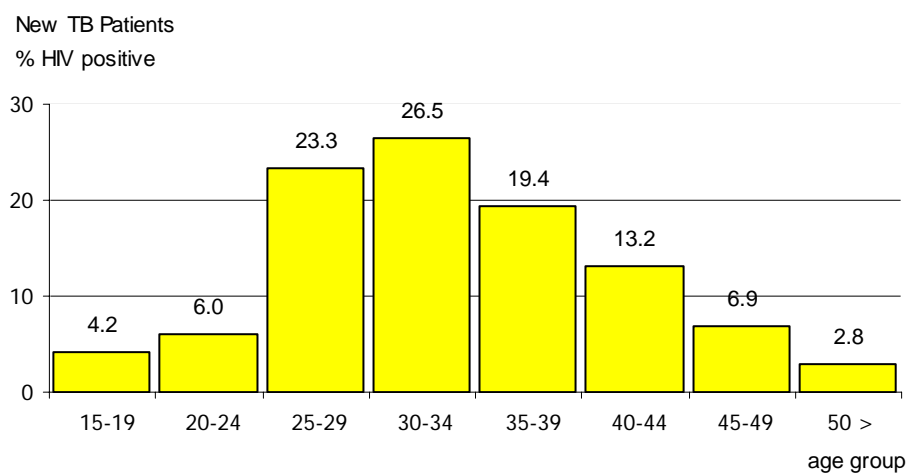
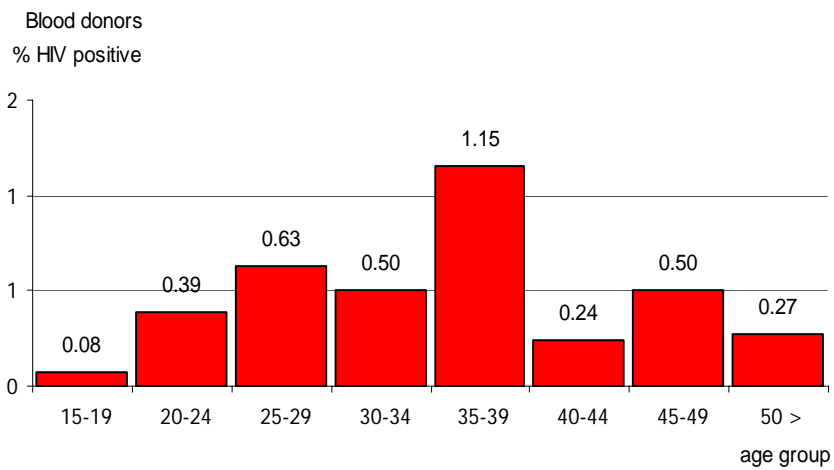
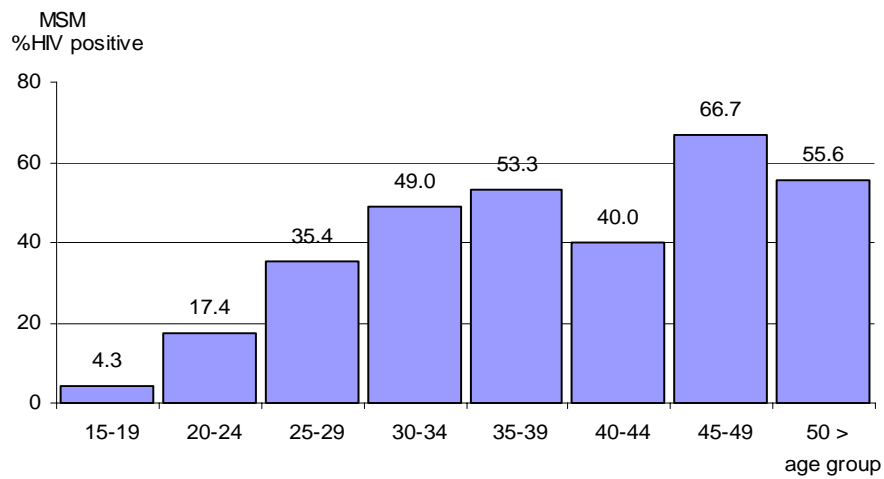
Among pregnant women, HIV prevalence was higher in the 35-39 years age group.

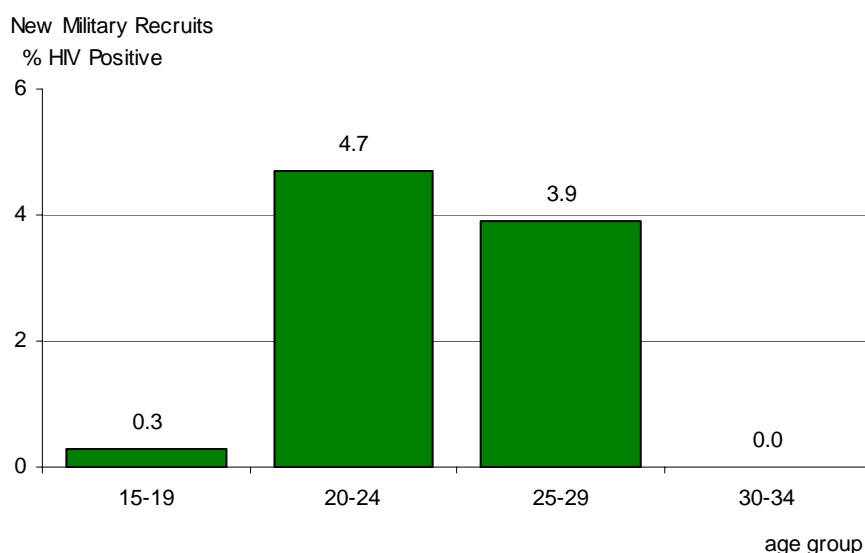
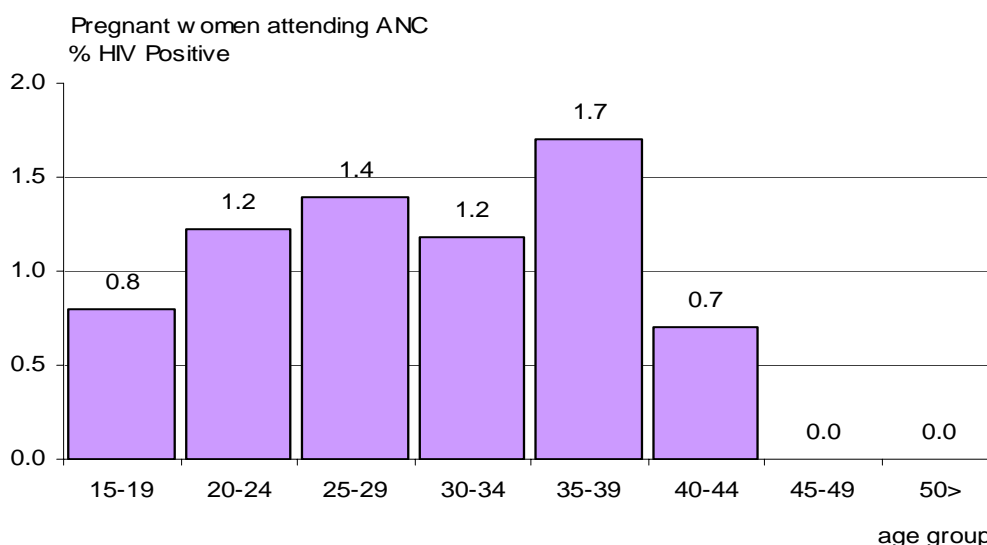
In the younger age groups 15-19 years old pregnant women ($n=738$) and military recruits ($n=351$) HIV prevalence was 0.8% and 0.3%, respectively; among the 20-24 years old pregnant women ($n=3,287$) military recruits ($n=299$) HIV prevalence was 1.2% and 4.7%, respectively (Figure 4).

Figure 4. HIV prevalence by age group and sentinel population – HSS 2008



National AIDS Programme



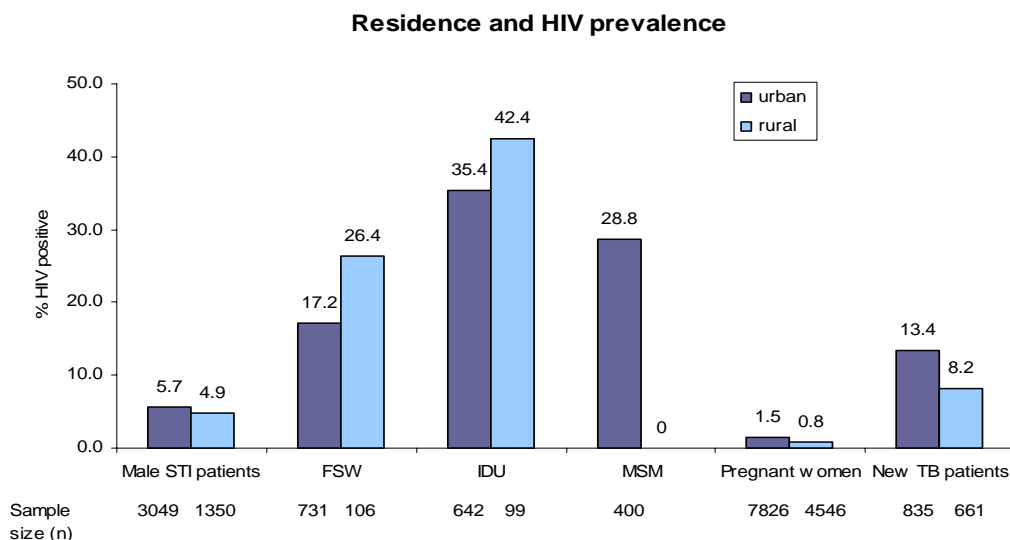


3.1.3 HIV prevalence by place of residence and marital status

For TB patients, HIV prevalence was nearly twice as high among persons living in urban areas compared to those living in rural areas (Figure 5). Similarly, HIV prevalence among pregnant women was twice as high (1.5%) (121/7820) in urban areas compared to those living in rural areas (0.8%) (35/4542) ($p < 0.001$).

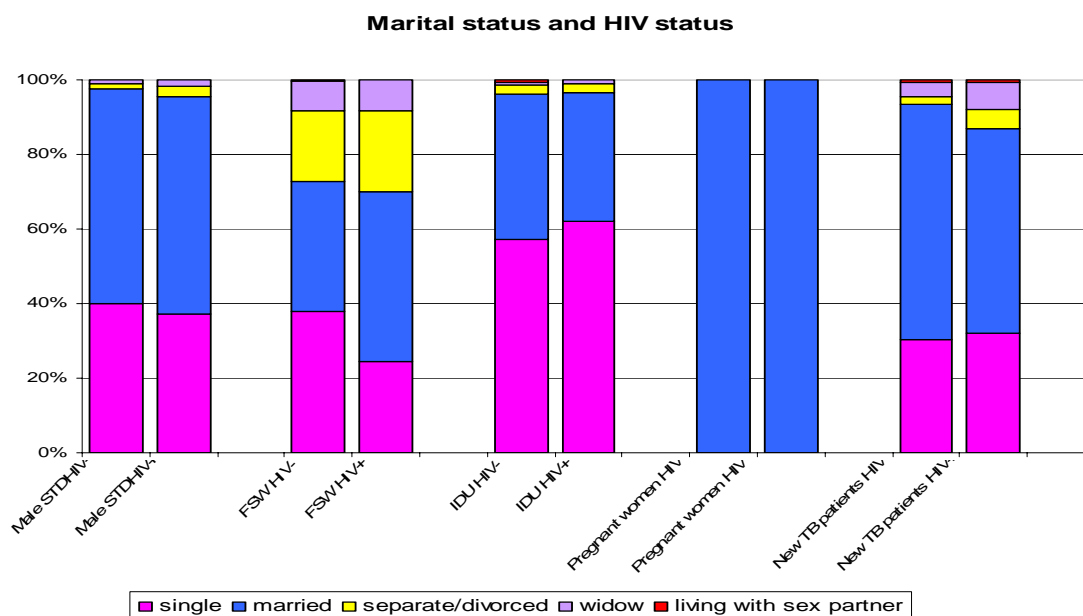
In contrast, HIV prevalence was higher in rural injecting drug users (42.4%=42/99) compared to urban IDUs (35.4%). This was true for female sex workers (Figure 5). However, there was little difference in HIV prevalence among male STI patients by residence. The sample collected for MSM was only from urban areas.

Figure 5. HIV prevalence in different sentinel groups by place of residence – HSS 2008



The marital status of different population groups did not differ significantly by HIV status with the exception of FSWs (Figure 6). Interestingly, married FSWs were found to have higher prevalence rate than FSWs who were widows.

Figure 6. Distribution by marital status according to HIV status in the different sentinel populations – HSS 2008



3.2. Results of syphilis screening

The prevalence of syphilis was the highest (14.1%) among MSM group, followed by FSW (5.5%) and new TB patients (4.8%). (Table 4)

Table 4: Prevalence of syphilis (VDRL+) among sentinel population, HSS 2008

	sample(n)	VDRL+ (n)	VDRL + (%)
Male STI patients	4,451	171	3.8
FSW	388	46	5.5
IDU	891	26	2.9
MSM	397	56	14.1
Pregnant women	12,361	255	2.1
urban	7,818	160	2.1
rural	4,539	95	2.1
New military recruits	800	23	2.9
New TB patients	1,407	68	2.8

Syphilis testing was started on sentinel groups in 2007. The prevalence of syphilis among pregnant women was the same as that of the previous year. Among FSWs and IDUs, there were wide variations in the syphilis prevalence by site(Figure 7 & 8).

Figure 7. Prevalence of syphilis of FSW by sites- HSS 2007-2008

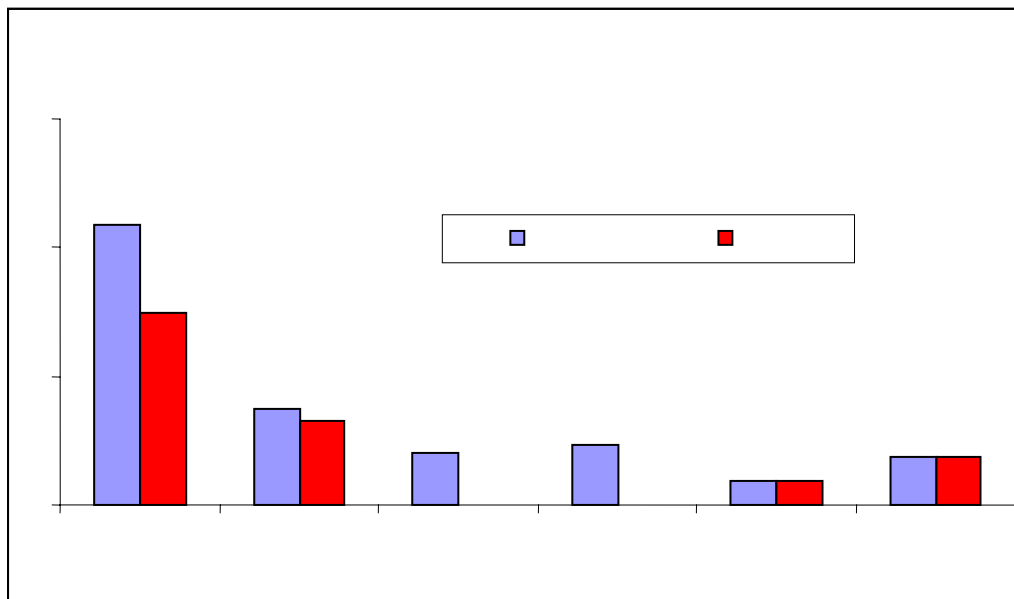


Figure 8. Prevalence of syphilis of injecting drug users by sites- HSS 2007-2008

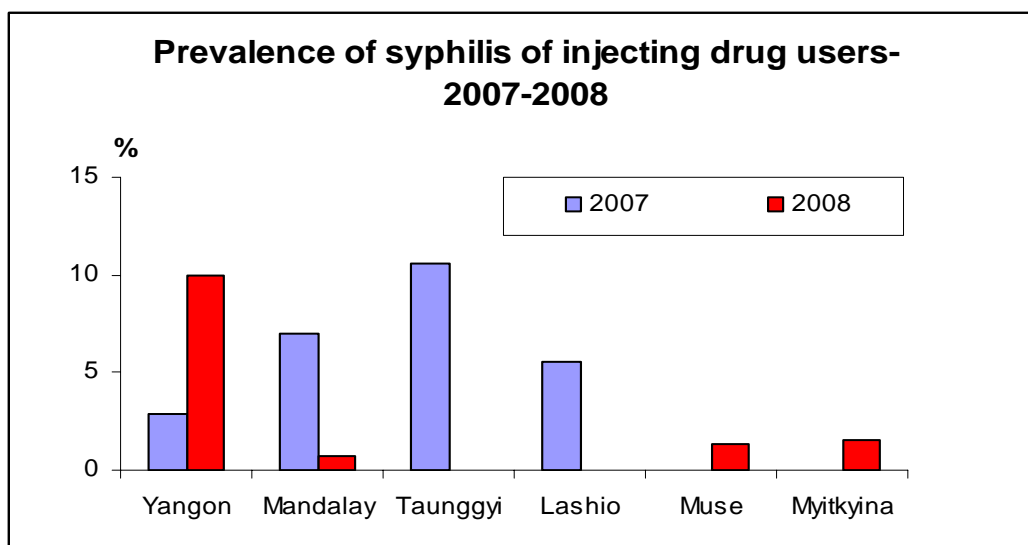


Figure 9 showed the comparison of VDRL positive rate between urban and rural populations. In most population groups, syphilis prevalence was similar in urban and rural settings. It is quite alarming that the spread of sexually transmitted diseases has expanding to rural populations.

Figure 9. VDRL positive rate among sentinel groups, by place of residence, HSS 2008

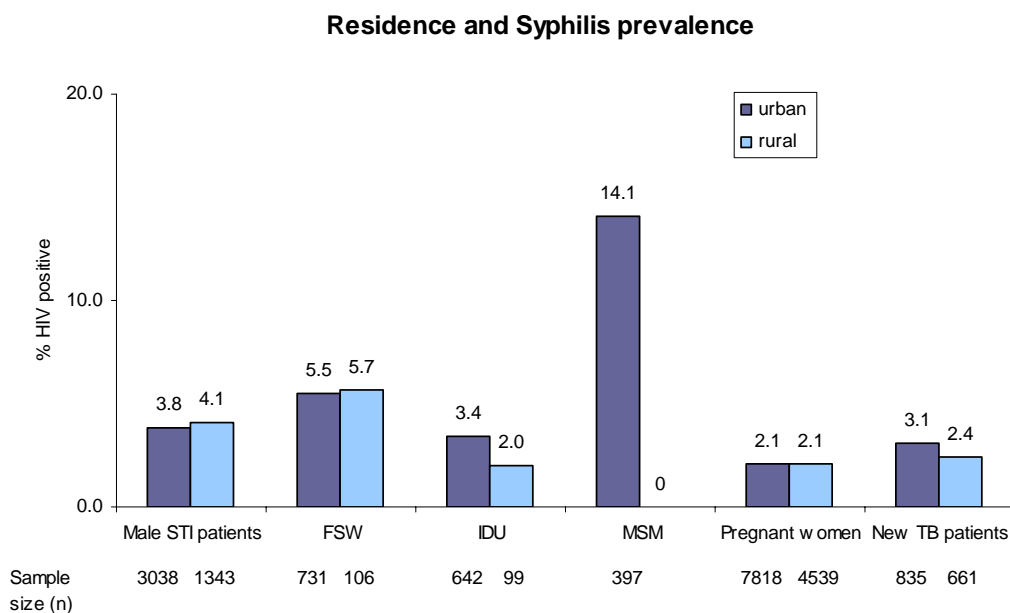


Figure 10 depicts that prevalence of syphilis is higher in people living with HIV than who do not have HIV.

Figure 10. Prevalence of syphilis (VDRL+) by HIV status and sentinel population group – HSS 2008

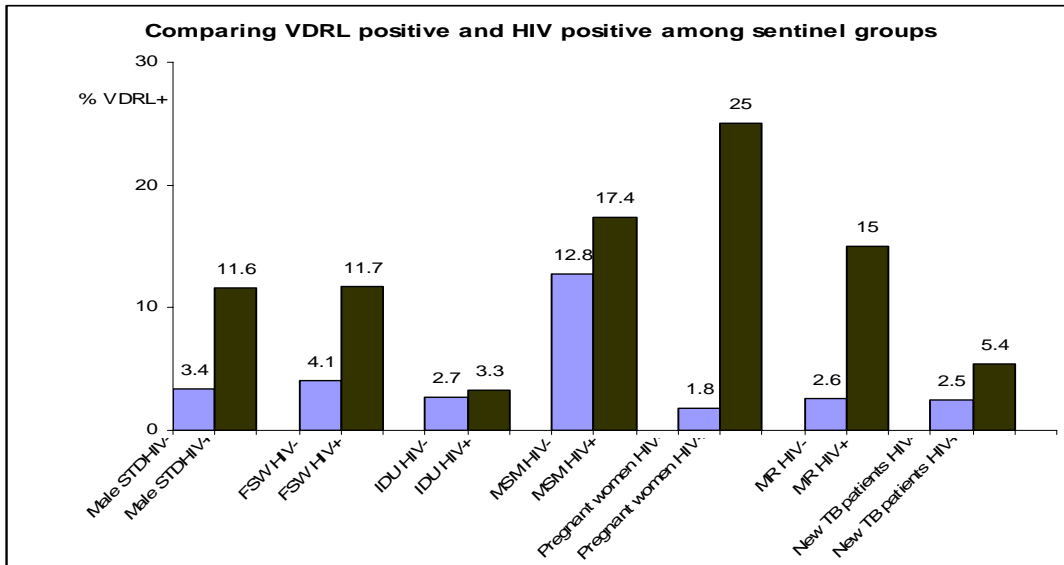
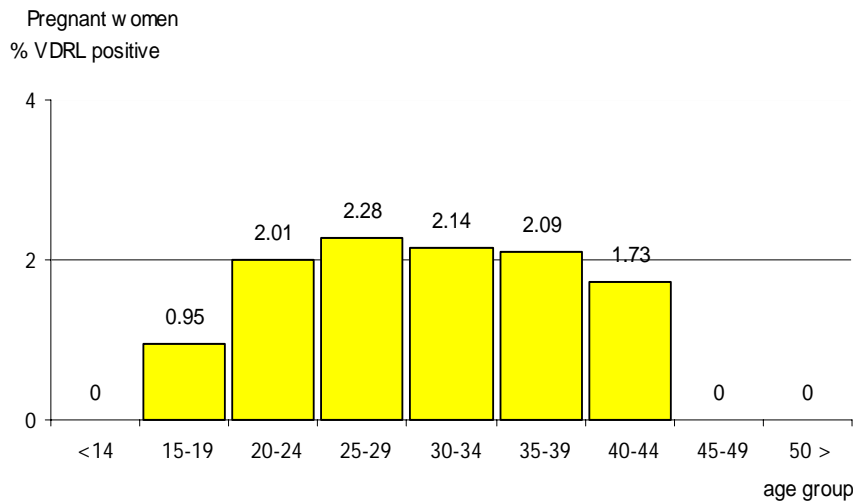
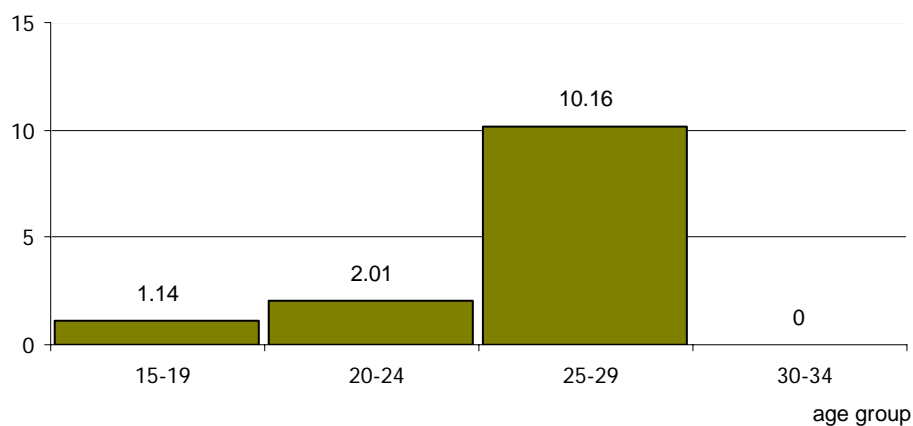


Figure 11 presents the prevalence of syphilis by age group in pregnant women and new military recruits. The age group 25-29 years had highest prevalence of syphilis.

Figure 11. Prevalence of syphilis (VDRL+) by groups in pregnant women and new military recruits



New Military Recruits
% VDRL positive

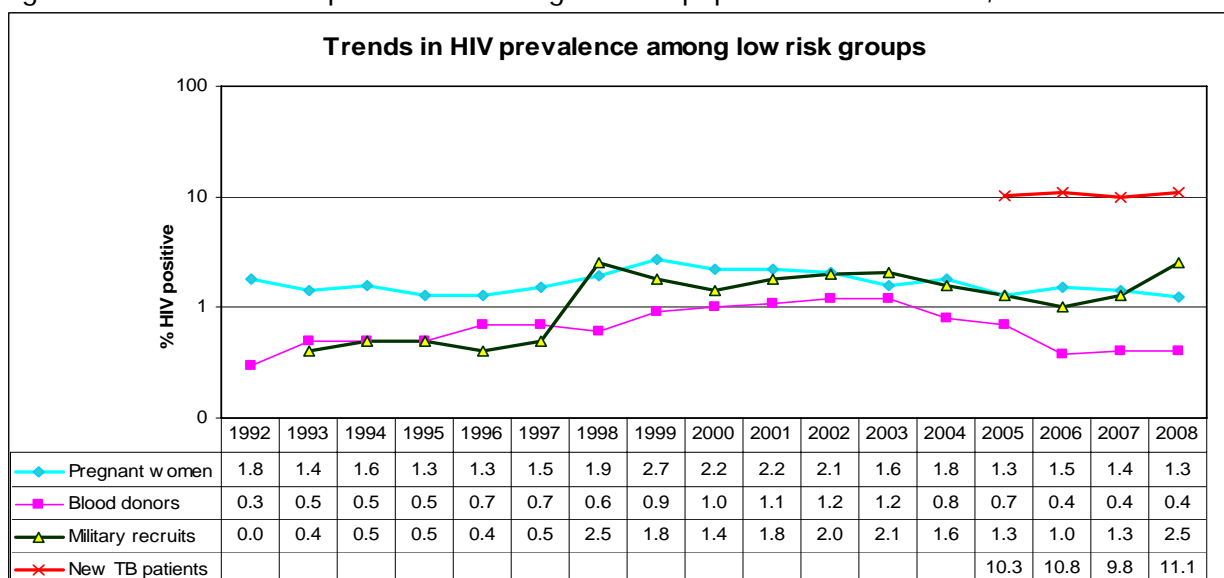


4. Trends over time

4.1. HIV prevalence among low risk population 1992-2008

Among low risk population, HIV prevalence levels in 2008 continued to plateau after reaching a peak in the late 1990s. A slight rise was observed especially among new military conscripts in 2008. Among new TB patients, HIV prevalence changed little from 10.8% in 2006 to 11% in 2008 (Figure 12).

Figure 12. Trends in HIV prevalence among low risk population - 1992-2008, HSS

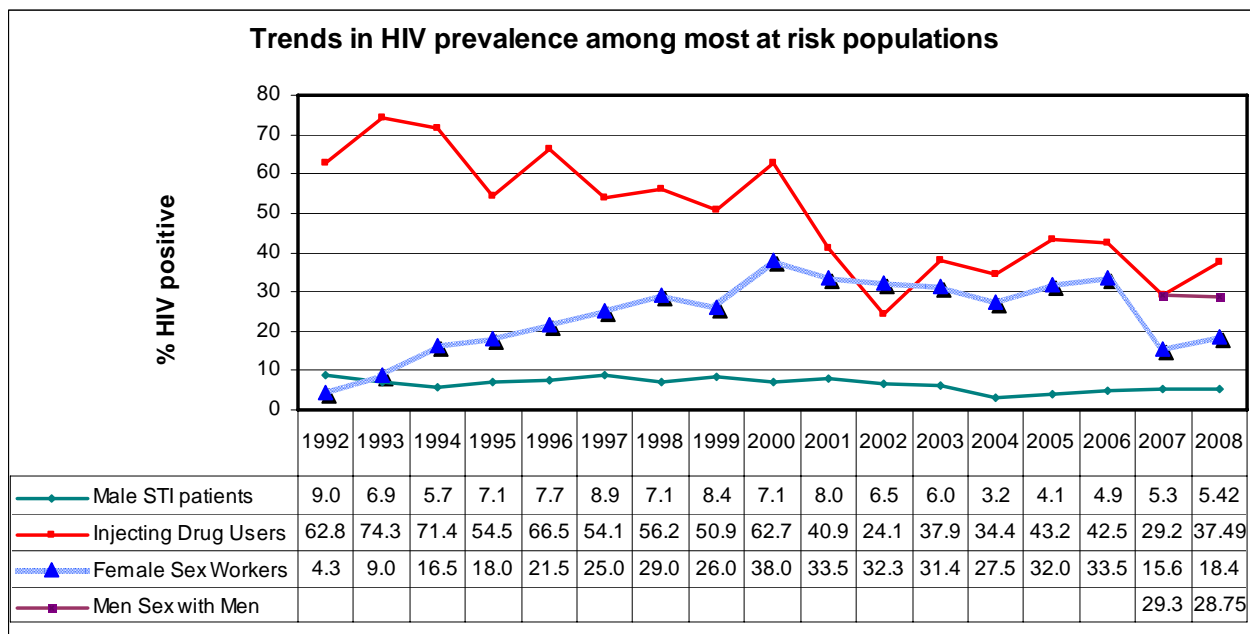


4.2. HIV prevalence among most at risk population 1992-2008

Since 2000, HIV prevalence among most at risk population has been slowly declining. It was noted that relatively sharp decline in HIV prevalence among FSWs and IDUs from 2006 to 2007 may be explained by the expansion of sentinel sites (resulting in an increased sample size). In addition, better understanding and standardizing sampling methodology across

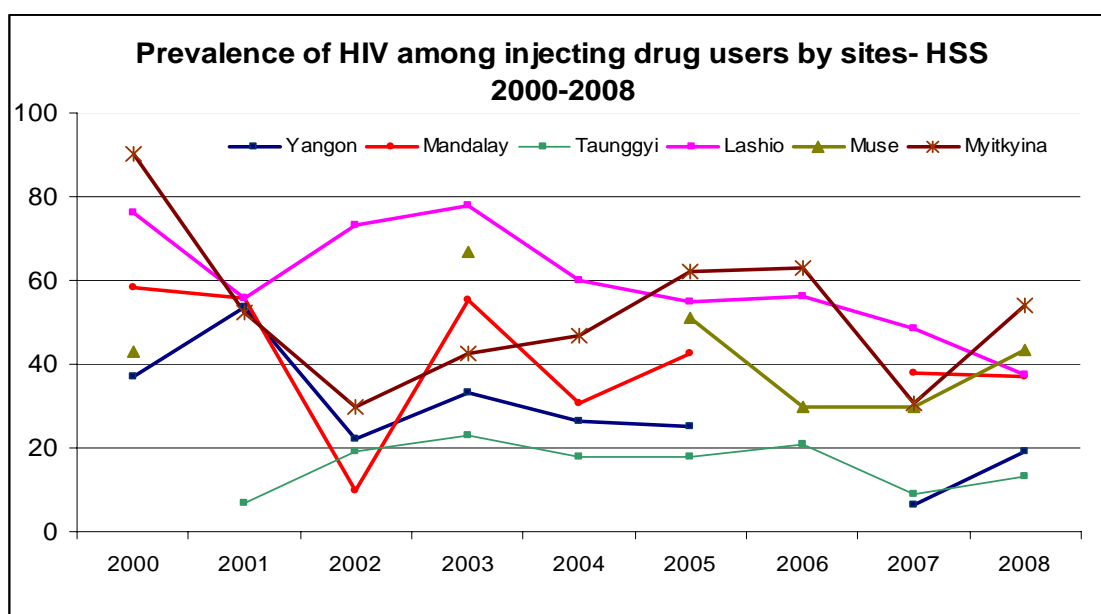
sentinel sites and better cooperation with stakeholders could be one of the reasons for that decline. (Figure 13)

Figure 13. Trends in HIV prevalence among most at risk population - 1992-2008 HSS



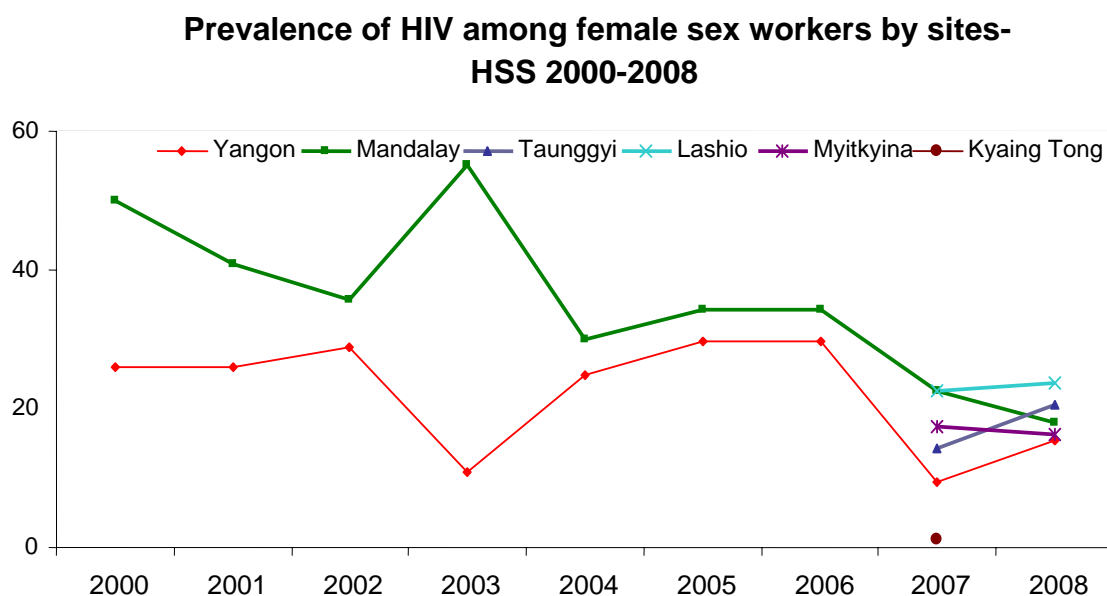
Despite of the trend of HIV prevalence among injecting drug users appeared to be in a downward trend since 2000, a rising trend was seen in Myikyina and Yangon during this year. This trend was alarming and need a vigilant interventions must be intensified (Figure 14).

Figure 14. Prevalence of HIV among injecting drug users by sites- 2000-2008



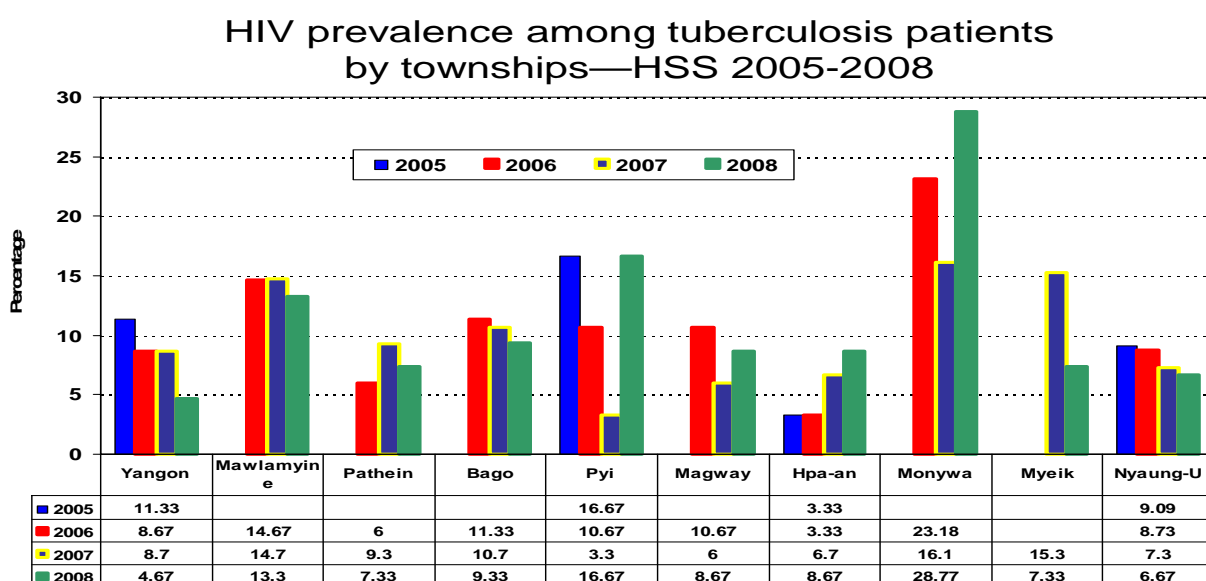
In 2008, HIV positivity rate among female sex workers appeared to increase in all sentinel sites except Mandalay and Lashio townships. Figure 15 depicts trends of HIV prevalence among female sex workers by sites.

Figure 15. Prevalence of HIV among female sex workers by sites- 2000-2008



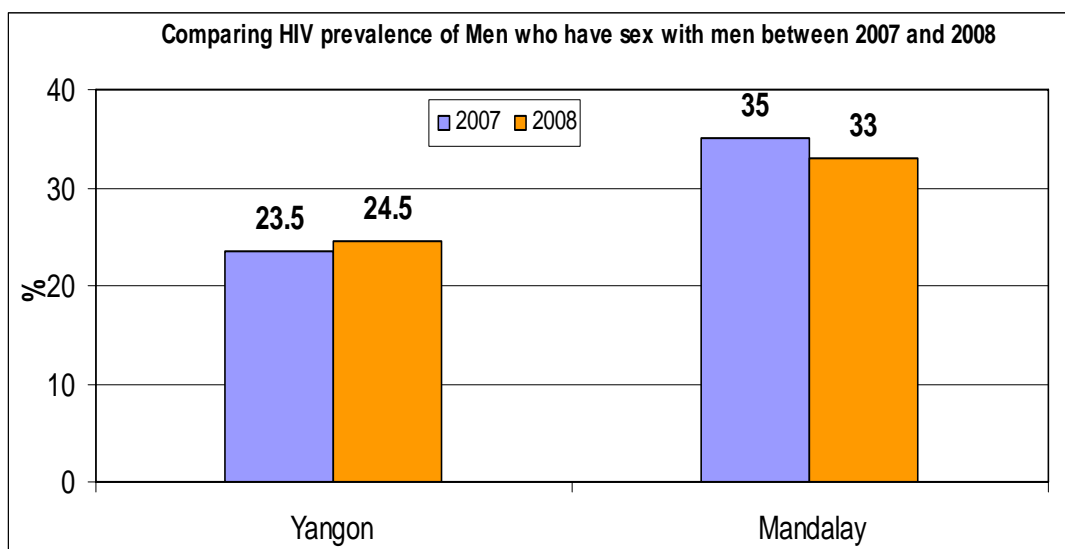
HIV prevalence among tuberculosis patients varied with the sites of collection. Upward trends were observed in Monywa, Hpa-an and Pyi. HIV prevention and care and support must be prioritized in these areas.

Figure 16. HIV prevalence among tuberculosis patients by site -2005-2008



Men who have sex with men have been included as one of the sentinel groups since 2007. At that time, HIV prevalence in this group was high (29.3%) in both Yangon and Mandalay sentinel sites. However, HIV prevalence among MSM is still very high at the same level. Targeted prevention interventions for that group must be intensified to enhance the national responses.

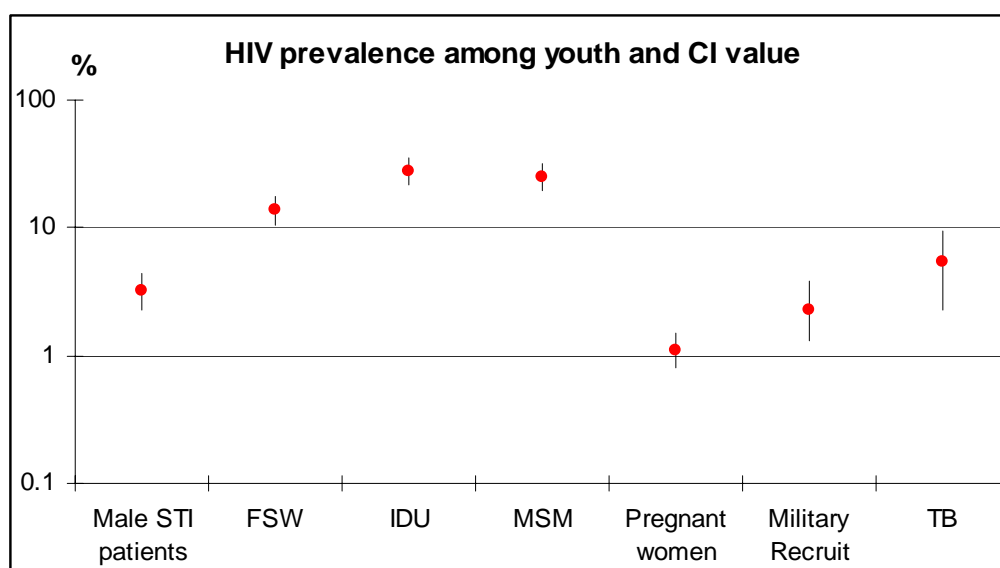
Figure 17. HIV prevalence among men who have sex with men – 2007-2008



Increasing trends of HIV prevalence and syphilis prevalence observed in the new military recruits suggests a urgent need for interventions to prevent heterosexual transmission.

HIV prevalence among youth, a proxy for incidence of HIV, was significantly high in most sentinel population groups. Thus, the prevention programmes must be strengthened with intervention programmes in all sentinel groups (Figure 18).

Figure 18. HIV prevalence among young (15-24 years) populations, by sentinel groups, HSS 2008



4.3. HIV prevalence among young population

HIV prevalence among young people can be regarded as a proxy for HIV incidence.

It was encouraging to note that HIV prevalence among young high risk population is declining. However, among young military recruits, there appears to be an upward trend. It will be important to continue tracking HIV prevalence among these populations in the coming rounds of HSS (Figure 19 & 20).

Figure 19. Prevalence of HIV among young injecting drug users and female sex workers, 2000-2008

Prevalence of HIV among injecting drug users and female sex workers by age group (15-24)—Myanmar, 2000–2008

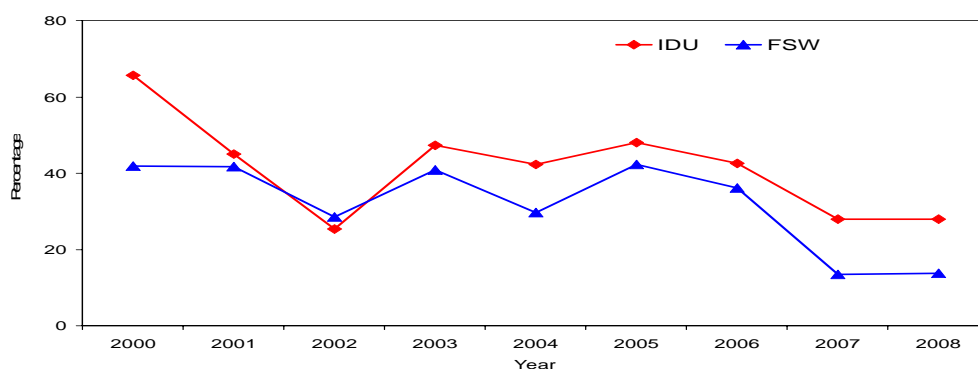
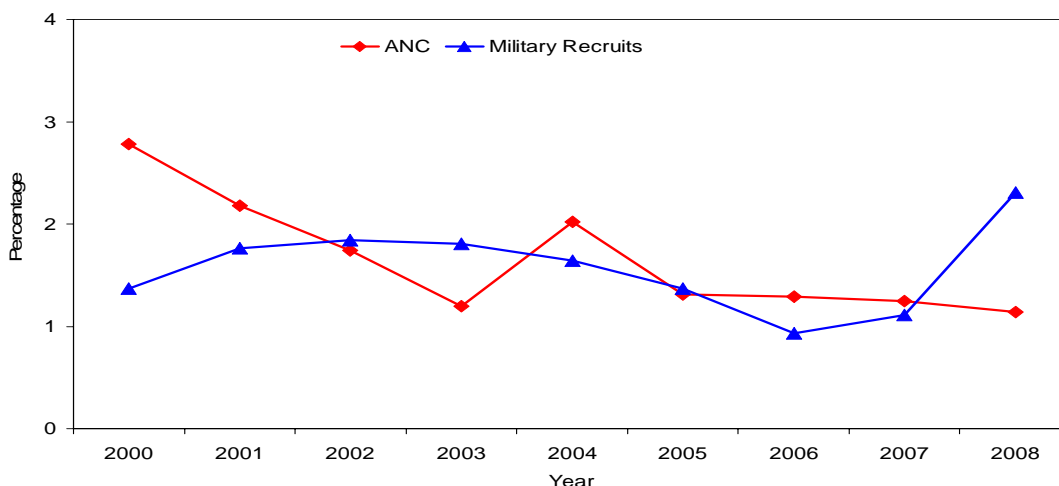


Figure 20. Prevalence of HIV among young pregnant women and military recruits, 2000-2008

Prevalence of HIV among pregnant women and military recruits by age group (15-24)—Myanmar, 2000–2008



5. Decentralization of HIV testing

The decentralized HIV testing approach continued used in 2008. HIV antibody testing was performed at the local level in 20 sites and repeated in the reference laboratories.

The results of the reference laboratories were regarded as the gold standard. In total, the number of false positive and false negative were equal and minimal (0.3%) and could not have affected the HIV prevalence results for the purpose of surveillance (Table 5).

Table 5: Comparing HIV test results of local and reference laboratories

		Reference Lab		Total
		Negative	Positive	
Local Lab	Negative	11,659	40	11,699
		99.66	0.34	
	Positive	25	750	775
		3.23	96.77	
	TOTAL	11,684	790	12,474

There was high concordance between the laboratory results of local and reference laboratories at all sites with the exception of one site which showed more than 50% discordant results (Table 7).

Table 6: Sensitivity and specificity of decentralized testing compared to the reference laboratory testing by sentinel populations

Sentinel population	Sample (n)	HIV test positive			false negative (n)	false positive (n)	Sensitivity (%)	Specificity (%)
		refer (%)	local (%)	Difference (%)				
Male STD patients	2,712	6.05	5.49	0.56	23	8	99.1	94.6
FSW	838	18.38	18.26	0.12	2	1	99.7	99.4
IDU	741	36.3	36.44	-0.14	1	2	99.8	99.3
MSM	400	28.75	29.5	-0.75	0	3	100	97.5
ANC	7,783	1.13	1.09	0.04	14	11	99.8	87.1
Total	12,474	5.2	6.2	-1	40	25	99.7	96.8

Table 7: Comparison of local and reference HIV testing by sentinel sites – HSS 2008

No.	Sentinel sites	Total sample (n)	False negative (n)	False positive (n)	HIV test positive		
					central (%)	local (%)	difference /central
1	Yangon	1,150	1	5	12.26	12.6	-0.34
2	Mandalay	1,104	0	0	17.03	17.03	0
4	Taunggyi	716	1	3	5.17	5.45	-0.28
5	Lashio	839	3	0	13.11	12.75	0.36
6	Tachileik	535	7	1	2.8	1.68	1.12
9	Kawthoung	550	2	4	3.09	3.45	-0.36
10	Myitkyina	915	3	3	16.5	16.5	0
11	Bamaw	549	1	0	3.09	2.91	0.18
12	Mawlamyine	550	3	1	1.82	1.45	0.37
13	Patheingyi	550	12	0	5.09	2.91	2.18
14	Bago	529	4	3	3.77	3.59	0.18
15	Pyi	400	0	0	0.75	0.75	0
16	Magway	550	0	0	1.09	1.09	0
17	Hpa-an	550	0	0	2.18	2.18	0
18	Sittway	511	0	0	0.2	0.2	0
19	Monywa	550	0	1	0.73	0.91	-0.18
20	Loikaw				-	-	-
21	Haka	271	0	0	1.48	1.48	0
24	Myeik	550	2	3	1.45	1.64	-0.19
26	Pakokku	556	0	0	1.62	1.62	0
27	Shwebo	549	1	1	1.64	1.64	0
	TOTAL	12,474	40	25	5.2	6.2	-1

6. Limitations

6.1. Incomplete sample collection: Total of 21,270 participants (excluding blood donors) in this HSS 2008 round were sampled from AIDS/STD clinics and TB clinics, MCH clinics, Drug treatment centers, and in collaboration with NGO's drop-in centers and clinics from PSI, AZG(MSF-H), MDM, Care, AHRN, World Vision, MSF-CH, MSI, and local NGOs such as MMA, MANA, MRCS and general practitioners' private clinics. Most of the AIDS/STD teams achieved the targeted sample collection in 2008. However, the required sample could not be fully achieved for FSWs, IDUs and male STI patients.

6.2. Socio-demographic data were missing in some for some of the sentinel groups: Data for military recruit could not be collected in the standard data collection forms. In some sites, (e.g., injecting drug users of Muse township) forms were unreadable due to improper labeling and bad transport.

6.3. There was a possibility of introduction of the potential bias as the sample size of STI patients or high risk population was greater than the number of STI patients who normally come to the clinics during the survey period.

7. Recommendations

7.1. Recommendations for programme implementation

- All implementers at field level must adopt the HSS 2007 protocol: the sampling methodology must be fixed as serial consecutive sampling, the eligibility criteria should be followed as mentioned in the protocol
- HIV antibody testing should be decentralized in piloted 20 sentinel sites, however, most importantly the laboratory technicians must follow the HIV testing strategy II, all positive sera and 10% of negative sera must be sent to reference laboratory for the quality assessment.
- In addition to the internal quality assessment, all AIDS/STD teams must participate in the external quality control procedures.
- In order to decentralize HIV antibody testing the remaining 14 sites must test the specimens in own laboratories and all second specimens must send to State and Divisional AIDS/STD teams for checking the HIV and VDRL tests.
- The new sites for military recruits should be considered to participate in the next rounds.
- The expansion of sentinel sites for TB must be carried out in the next rounds.
- The prevention intervention activities must be intensified not only for high risk population but also for general population including rural population.
- Strengthen human resources and institutional capacity in surveillance for data analyses and interpretation.

7.2. Recommendations for surveillance

- Coordination with international NGOs, national NGOs, Drug Treatment Centers and Myanmar Medical Associations especially with general practitioners must be strengthened in respective areas. Particularly the samples of male STI patients from Haka, Kyaingtong, Nyaung Oo, Pyin Oo Lwin and Taungoo townships were received insufficient number. Therefore, the collaboration with stakeholders must be encouraged.
- HSS data should be triangulated with other data resources: behavioral surveillance surveys, programme monitoring data, rapid assessments and other surveys data to understand the magnitude and epidemiological nature of the HIV.
- National AIDS Programme must strengthen the supervisory mechanism for the sentinel surveillance sites. State and Divisional AIDS/STD officers must conduct preliminary assessment for the needs and attempt to arrange the mechanisms of specimen collection at the respective areas where they cover before the HSS commences.
- State and Divisional AIDS/STD officers and team leaders must supervise overall process of specimen collection and specimen transportation.
- Routine documentation of specimen in the form 1 must be completed, however, site of specimen collection must be added in the extra column.
- Due to insufficient specimen of female sex workers in two consecutive years, Kyaingtong township must collaborate with Tachileik township as the nature of sex work is most likely the same.
- Particularly in Taunggyi township where samples of injecting drug users collected was insufficient amount. National AIDS Programme must consider taking out of IDU sentinel site.

7.3. Recommendations for research

- Undertake behavioural surveys among high risk groups such as men who have sex with men to identify how the impact of prevention programmes can be maximized.
- Together with STI surveillance survey and integrated behavioural surveillance will help interpreting the HSS results.

Annexes

Annex 1: Total number of blood samples collected during HSS 2008 round

Sr No	Sentinel Sites	Male STI	FSW	IDU	MSM	Pregnant women	Military Recruits	Total
1	Yangon	150	200	200	200	400	400	1,550
2	Mandalay	150	200	154	200	400	400	1,504
3	Meitila	150	0	0	0	400	0	550
4	Taunggyi	150	150	16	0	400	0	716
5	Lashio	145	123	171	0	400	0	839
6	Tachileik	135	0	0	0	400	0	535
7	Muse	130	0	150	0	400	0	680
8	Dawei	200	0	0	0	400	0	600
9	Kawthoung	150	0	0	0	400	0	550
10	Myitkyina	150	165	200	0	400	0	915
11	Bamaw	150	0	0	0	400	0	550
12	Mawlamyine	150	0	0	0	400	0	550
13	Bamaw	150	0	0	0	400	0	550
14	Bago	150	0	0	0	380	0	530
15	Pyi	200	0	0	0	400	0	600
16	Magway	150	0	0	0	400	0	550
17	Hpa-an	150	0	0	0	400	0	550
18	Sittway	134	0	0	0	377	0	511
19	Monywa	150	0	0	0	400	0	550
20	Loikaw	150	0	0	0	400	0	550
21	Haka	42	0	0	0	229	0	271
22	Hintharta	150	0	0	0	400	0	550
23	Maubin	150	0	0	0	400	0	550
24	Myeik	150	0	0	0	400	0	550
25	Myingyan	149	0	0	0	400	0	549
26	Pakkoku	156	0	0	0	400	0	556
27	Shwebo	150	0	0	0	400	0	550
28	Kyaintong	0	0	0	0	400	0	400
29	Myawaddy	150	0	0	0	400	0	550
30	Nyaung U	12	0	0	0	400	0	412
31	Taungoo	54	0	0	0	400	0	454
32	Myaung Mya	48	0	0	0	190	0	238
33	Pyin Oo Lwin	69	0	0	0	0	0	69
34	Pyinmana	145	0	0	0	0	0	145
Total		4,469	838	891	400	12,376	800	19,774

Annex 2: HIV prevalence (%) by sentinel population and sites, HSS, 2008

Sentinel Sites	Sentinel Populations							
	Male STD	CSWs	IDUs	MSM	Preg. Women	Blood Donors	New Mil. Recruits	TB-HIV
Yangon	7.3	15.5	19	25	3	0.64	2.5	4.67
Mandalay	12	18	37.01	33	2.75	0.21	2.5	
Meiktila	1.3				1.5			
Taunggyi	2	20.7	13		0			
Lashio	8.3	23.6	37.43		1.25			
Tachileik	5.9				1.75			
Muse	22.3		43.33		3.08			
Dawei	3.5				1.5			
Kawthoung	6				2			
Myitkyina	8	16.4	54.0		1			
Bamaw	8				1.25			
Mawlamyine	4				1			13.33
Patheingyi	13.3				2			7.33
Bago	9				0.53			9.33
Pyi	4.5				0.75			16.67
Magway	2.7				0.5			8.67
Hpa-an	4.7				1.25			8.67
Sittway	0.7				0			
Monywa	2				0.25			28.77
Loikaw	1.3				1			
Haka	4.8				0.87			
Hinthada	3				0			
Maubin	4				2			
Myeik	4				0.5			7.33
Myingyan	0				1.25			
Pakokku	5.1				0.3			
Shwebo	2.7				1.25			
Kyaingtong	-	-			5.75			
Myawaddy	3.3				1			
Nyaung-U	0				0.25			6.67
Taungtha	14.8				0			
Myaungmya	0.7				0.25			
Pyin Oo Lwin	2.9							
Pyinmana	2.1							

Annex 3: HIV prevalence by age group, HSS, 2008

Age (Year)	Sentinel Populations											
	IDUs			Male STD			CSWs			MS M		
	Exam	Pos	%	Exam	Pos	%	Exam	Pos	%	Exam	Pos	%
0 -4												
5 -9												
10-14	1	0		2	0	0	2	0	0			
15-19	51	11	21.57	313	8	2.56	149	16	10.7	69	3	4.3
20-24	135	41	30.37	831	29	3.49	261	40	15.33	121	21	17.36
25-29	200	78	39	1007	58	5.76	160	34	21.25	96	34	35.42
30-34	156	73	46.79	765	53	6.93	112	27	24.11	49	24	48.98
35-39	100	41	41	604	38	6.29	83	13	15.66	30	16	53
40-44	51	14	27.45	417	20	4.8	33	14	42.42	20	8	40
45-49	28	9	32.14	288	22	7.64	17	4	23.53	6	4	66.67
50 >	19	2	10.53	239	13	5.44	1	0	0	9	5	56
Total	741	269	36.30	4466	241	5.40	818	148	18.09	400	115	29

Age (Year)	Sentinel Populations											
	Blood donors			Pregnant women			New Military Recruits			TB-HIV		
	Exam	Pos	%	Exam	Pos	%	Exam	Pos	%	Exam	Pos	%
0 -4												
5 -9												
10-14										5	0	0.00
15-19	1301	1	0.08	737	6	0.81	351	1	0.28	72	3	4.17
20-24	3110	12	0.39	3284	40	1.22	299	14	4.68	150	9	6.00
25-29	1892	12	0.63	3600	50	1.39	128	5	3.91	150	35	23.33
30-34	1387	7	0.50	2717	32	1.18	2	0	0.00	155	41	26.45
35-39	1129	13	1.15	1482	25	1.69				175	34	19.43
40-44	840	2	0.24	404	3	0.74				152	20	13.16
45-49	599	3	0.50	54	0	0.00				145	10	6.90
50 >	371	1	0.27	6	0	0.00				492	14	2.85
Total	10629	51	0.48	12284	156	1.27	780	20	2.56	1496	166	11.10

Annex 4. Site specific sero-positivity rates (%) and sample size (n) for each sentinel group, HSS- 2008

No.	Sentinel Sites		Sentinel Populations							TB-HIV
			Male STD	CSWs	IDUs	MSM	Preg. Women	Blood Donors	New Mil. Recruits	
1	Yangon	n*	150	200	200	200	400	6,753	400	150
		%	7.33	15.50	19	24.50	3.00	0.64	2.50	4.67
2	Mandalay	n*	150	200	154	200	400	3,876	400	
		%	12.00	18.00	37.01	33.00	2.75	0.21	2.50	
3	Meiktila	n*	149				399			
		%	1.33				1.50			
4	Taunggyi	n*	150	150	16		400			
		%	2.00	20.67	12.50		0.25			
5	Lashio	n*	145	123	171		400			
		%	8.28	23.58	37.43		1.25			
6	Tachileik	n*	135				400			
		%	5.93				1.75			
7	Muse	n*	130		150		389			
		%	22.31		43.33		3.08			
8	Dawei	n*	200				400			
		%	3.50				1.50			
9	Kawthoung	n*	150				400			
		%	6.00				2.00			
10	Myitkyina	n*	150	165	200		400			
		%	8.00	16.36	54.00		1.00			
11	Bamaw	n*	150				399			
		%	8.00				1.25			
12	Mawlamyaing	n*	150				400			150
		%	4.00				1.00			13.33
13	Pathein	n*	150				400			150
		%	13.33				2.00			7.33
14	Bago	n*	150				380			150
		%	9.00				0.53			9.33
15	Pyi	n*	200				400			150
		%	4.50				0.75			16.67
16	Magway	n*	150				400			150
		%	2.67				0.50			8.67
17	Hpa-an	n*	150				400			150
		%	4.67				1.25			8.67

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18	Sittway	n*	134		377		
		%	0.75		0.00		
19	Monywa	n*	150		400		146
		%	2.00		0.25		28.77
20	Loikaw	n*	150		400		
		%	1.33		0.75		
21	Haka	n*	42		229		
		%	4.76		0.87		
22	Hintharta	n*	150		400	400	
		%	2.67		0.00	2.5	
23	Maubin	n*	150		400	400	
		%	4.00		1.50	2.25	
24	Myeik	n*	150		400		150
		%	4.00		0.50		7.33
25	Myingyan	n*	149		400		
		%	0.00		1.25		
26	Pakokku	n*	156		400		
		%	5.13		0.25		
27	Shwebo	n*	150		399		
		%	2.67		1.25		
28	Kyaingtong	n*	NA	NA	400		
		%			5.75		
29	Myawaddy	n*	150		400		
		%	3.33		1.00		
30	Nyaung-U	n*	12		400		150
		%	0.00		0.25		6.67
31	Taungoo	n*	54		400		
		%	14.81		0.25		
32	Myaungmya	n*	150		400		
		%	0.67		0.25		
33	Pyin Oo Lwin	n*	69				
		%	2.90				
34	Pyinmana	n*	145				
		%	2.07				

n*= total numbers tested for HIV

Red colored figure indicates sample size = <50

Remarks:

- IDU samples from Taunggyi sentinel site were very low.
- Male STD sub-population from some sentinel site was insufficient. (12 from Nyaung U, 69 from Pyin Oo Lwin and 54 from Taungoo).
- Particularly from Kyaingtong, the male STI patients and FSW samples were not received.

Annex 5: Prevalence of syphilis (VDRL+) by sentinel population and site, 2008

No.	Sentinel sites	Sentinel populations - % VDRL+						
		Male STD	CSW	IDUs	MSM	New Military Recruits	Pregnant women	TB patients
1	Yangon	12.8	15.0	10	13.7	2	3.5	5.3
2	Mandalay	0.67	6.5	0.7	14.6	0.3	2.3	
3	Meiktila	2.0					0	
4	Taunggyi	0	0	0			0	
5	Lashio	0.7	0	0			0.5	
6	Tachileik	11.9					3	
7	Muse	2.3		1.3			0.5	
8	Dawei	9.0					5.8	
9	Kawthoung	1.3					0.5	
10	Myitkyina	2.0	1.8	1.5			0.8	
11	Bamaw	3.3					1.3	
12	Mawlamyine	6.8					2.3	2
13	Patheingyi	2.7					5	6.7
14	Bago	4.7					2.9	4.7
15	Pyi	0					2.8	2
16	Magway	6					1.5	0
17	Hpa-an	12					3.8	3.3
18	Sittway	3.7					1.1	
19	Monywa	0.7					2	2.1
20	Loikaw	1.3					1.3	
21	Haka	0					0.9	
22	Hintharta	3.3					5.8	
23	Maubin	4.7					4.5	
24	Myeik	2.0					1.8	2
25	Myingyan	0					0	
26	Pakokku	1.4					0.8	
27	Shwebo	2.7					3.5	
28	Kyaingtong						2.5	
29	Myawaddy	6.7					3.3	
30	Nyaung-U	8.3					0	0
31	Toungoo	11.1					4.3	
32	Myaungmya	2.1					0.5	
33	Pyin U Lwin	0						
34	Pyinmana	3.5						