



**World Health  
Organization**

Country Office for Myanmar

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

Report of the

# **HIV Sentinel Sero-surveillance Survey**

## **2007**

## **Myanmar**

## **Acknowledgments**

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National AIDS Programme  
Department of Health  
Ministry 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 Program  
HSS : HIV Sentinel Sero-Surveillance  
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  
MSF: Médecins Sans Frontières  
MSI : Marie Stopes International  
MSM: Men who have Sex with Men  
MRCS: Myanmar Red Cross Society  
NAP: National AIDS Programme  
NGO: Non-Governmental Organisation  
PMCT: Prevention of Mother-to-Child Transmission  
PSI: Population Services International  
STI : Sexually Transmitted Infections  
WHO: World Health Organization

## 1. Background

HIV surveillance 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 populations who are at the highest risk of acquiring HIV and thus, are most critical for interventions.

Since 1992, the National AIDS Programme (NAP) has been carrying out annual HIV sentinel sero-surveillance survey (HSS) among selected subpopulation groups in Myanmar. The sentinel groups included are populations at low risk: pregnant women attending antenatal clinics, new military recruits, blood donors; and those at high risk: injecting drug users, men who have sex with men, sex workers and male patients attending sexually transmitted infection (STI) clinics. Patients newly diagnosed with tuberculosis were also included in surveillance to assess the prevalence of HIV among TB patients.

## 2. Methods

The methodology of sentinel surveillance survey was updated in 2007 and shared with all stakeholders, through a training programme for medical officials from 45 AIDS/STD team leaders, TB team leaders and the representatives from international and local non-governmental organizations. The training programme took place in Nay Pyi Taw with the technical support of the World Health Organization. The protocol for sentinel surveillance survey was approved and adopted in the same year.<sup>1</sup>

HSS was conducted in 34 sentinel sites where AIDS/STD teams are located started from May to July. At the same time, TB/HIV surveillance, ie. the screening for HIV among newly diagnosed TB patients, was conducted in 10 townships.

In 2007, a new sentinel group, men who have sex with men (MSM) was added in two sites. Also, the list of male STI sites was expanded to include Pyinmana and Pyin U Lwin townships. The sample size for each sentinel group was calculated using a standard formula. Table 1 provides the sentinel groups, number of sentinel sites, and target sample size for each site. The sentinel group of 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 by population sentinel group, HSS, Myanmar, 2007

Sr. No.	Sentinel groups	Number of sentinel site	Sample size/ 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

<sup>1</sup> HIV Sentinel Sero-Surveillance Manual, Myanmar. National AIDS Programme, Department of Health. 3<sup>rd</sup> version March 2007

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 U Lwin Townships accounted for surveying male STI patients in their first debut

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

HSS is conducted through facility-based sampling, in which consecutive eligible patients are recruited until the required sample size is achieved. The sampling method used is unlinked anonymous sampling after obtaining the informed consent verbally from the participants. 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, age, place of residence and marital status is collected on all groups except for military recruits and blood donors. For pregnant women, the parity (primipara or multipara) is also recorded. Sex workers are categorized as either direct or indirect sex workers. TB patients are categorized according to the type of TB they have been diagnosed with.

Prior to the 2007 round, HIV and syphilis testing has been done at reference laboratories in Yangon and Mandalay. In 2007, NAP piloted a protocol in which HIV antibody testing was conducted at the twenty sentinel sites in an effort to decentralize the 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 results at the site laboratories. At the site laboratory, the serum specimens were screened using a 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. Another serum specimen was also sent to National Health Laboratory and Public Health Laboratory in Yangon and Mandalay. In such laboratories, the first test used was ELISA and the second test was followed by a rapid test eg. Unigold® or Stat-pak® for further confirmation.

The test results (reported on Form 2) from the pilot twenty 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 done by NAP by using a simple Excel worksheet. Data analysis was done by NAP with technical assistance of WHO. Descriptive analysis was performed using SPSS software. HIV prevalence was calculated among each sentinel group and sentinel site, disaggregated by age and sex and/or sentinel.

Test results of the local tests were compared with results of the reference laboratories-National Health Laboratory (Yangon) and Public Health Laboratory (Mandalay) using appropriate statistical tests. The results of quality assessment are also presented in this report.

### 3. Findings

#### 3.1. HSS (2007) results

##### 3.1.1. Sample collection

Overall, 33,205 participants were included in 34 sentinel sites during the 2007 round. These included:

- A total of 4,451 male STI patients from the 34 sentinel sites
- 945 commercial sex workers from 6 sites
- As a new sentinel group, 400 MSM in two sentinel sites
- 932 injecting drug users in six townships
- 12,639 pregnant women who attended antenatal clinics in 32 townships
- 1,200 new military conscripts in two selected recruitment areas
- 1,499 new tuberculosis patients in 10 townships
- 10,987 blood donors from Yangon and Mandalay townships were sampled for HSS

Although the sample size was increased for some sentinel populations in this round, most of the sentinel sites were able to achieve the desired sample size. Table 2 compares required and achieved sample size among different sentinel populations. About 80% of the sample size was achieved for female sex workers and injecting drug users and 100% for men who have sex with men.

Table 2. Comparison between required and achieved sample size among different sentinel groups, HSS 2007

Sentinel groups	# of sample size required	# of sites	# (%) of sites achieving targeted sample size	No of participants to be included	No (%) of participants included
Male STI	150	34	23* (68)	5,100	4,451(87)
FSW	200	6	2 (33)	1,200	945 (79)
MSM	200	2	2 (100)	400	400 (100)
IDU	200	6	2 (33)	1,200	932 (78)
Pregnant women	400	32	30 (93)	12,800	12,639 (99)
New military recruits	400	2	2 (100)	800	1,200 (150)
New TB patients	150	10	9 (90)	1,500	1,499 (100)
Blood donors	400	2	2 (100)	800	10,987

\* one site excluded from the analysis



### 3.1.2. HIV prevalence per sentinel population

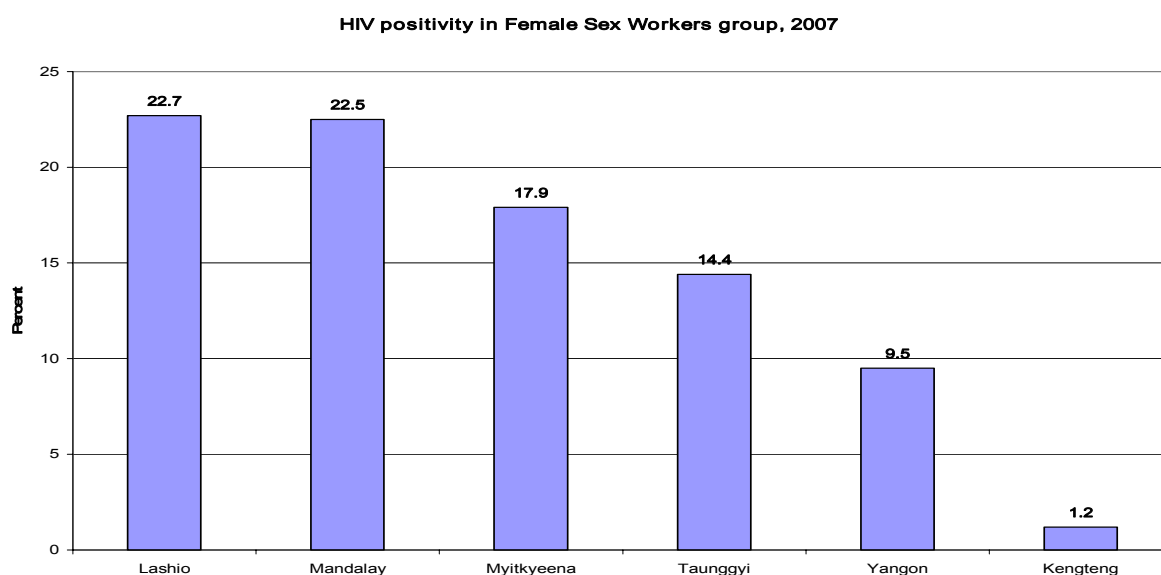
HIV prevalence among different population groups is shown in Table 3. HIV prevalence was highest among MSM, followed by Injecting Drug Users. HIV prevalence by sentinel population and sites was presented in annex 1.

Table 3. HIV prevalence among sentinel populations – HSS 2007

Sentinel groups	# of HIV tested (n)	# of sites (n)	# of HIV positive (n)	HIV prevalence across sites				
				Median (%)	Minimum (%)	Maximum (%)	Mean (%)	95% CI (%)
Male STI patients	4,451	33	236	4.6	0.0	19.6	<b>5.3</b>	(4.6-6.0)
FSW	945	6	147	15.8	1.2	22.7	<b>15.6</b>	(13.3-17.9)
IDU	932	6	272	30.4	6.5	48.5	<b>29.2</b>	(26.3-32.1)
MSM	400	2	117	29.3	23.5	35.0	<b>29.3</b>	(24.8-33.8)
Pregnant women	12,639	32	173	1.3	0.3	3.5	<b>1.4</b>	(1.2-1.6)
New military recruits	1,200	2	15	1.3	1.2	1.3	<b>1.3</b>	(0.7-1.9)
New TB patients	1,499	10	147	9.0	3.3	16.1	<b>9.8</b>	(8.3-11.3)
Blood donors	10,987	2	46	0.4	0.4	0.4	<b>0.4</b>	(0.3-0.4)
Total	33,053	34	1,153					

Among pregnant women attending antenatal clinics, HIV prevalence was not different in primipara women 1.3% (61/4858) compared to multipara women 1.5% (110/7329) ( $p=0.3$ ). (Fig 1)

Figure 1. HIV prevalence among female sex workers by sentinel site, 2007



Among female sex workers, HIV prevalence was significantly higher in Lashio (22.7%) and Mandalay (22.6%), followed by Myitkyina (17.9%), Taunggyi (14.4%), Yangon (9.6%) and Kyaingtong (1.2%). HIV prevalence was higher among direct sex workers 19.0% (113/596) than indirect sex workers 12.3% (33/268) ( $p=0.02$ ).

Figure 2. HIV prevalence in Injecting Drug Users, 2007

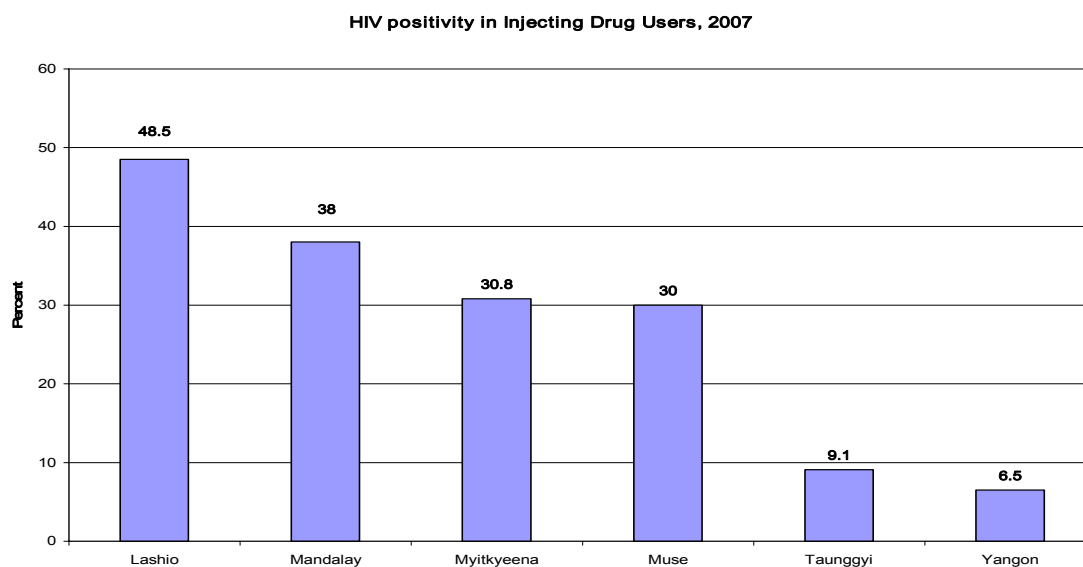


Figure 2 shows that Lashio had the highest HIV prevalence in Injecting Drug Users from the six townships. HIV prevalence in Mandalay, Myitkyina and Muse townships had similar results ranging from 30-38%, whereas Taunggyi and Yangon showed significantly lower prevalence.

Figure 3. HIV prevalence in new TB patients, 2007

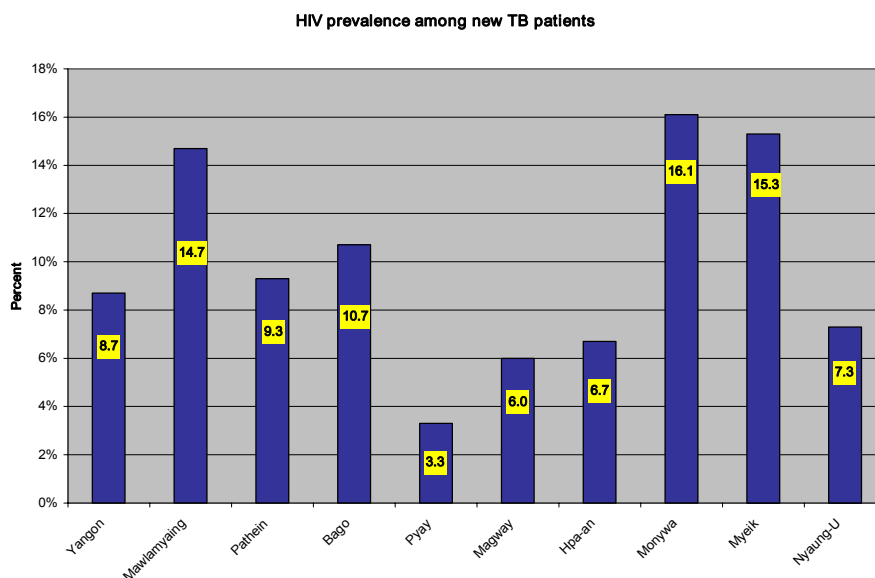


Figure 3 indicates that among new tuberculosis patients, HIV prevalence ranged from 3.3% in Pyaw to 16.1% in Monywa. Analysis by type of TB showed that HIV prevalence was lower among smear-positive TB patients (5.2%, 30/583) compared to smear-negative TB patients (12.8%, 81/635) and extra-pulmonary tuberculosis patients (10.7%, 14/131) ( $p < 10^{-3}$ ).

### 3.1.3. HIV prevalence by sex and age

Out of 932 injecting drug users, 19 (2%) were female. The HIV prevalence among female IDU was 31.6% (6/19) and among male 29.1% (266/913).

Among TB patients, 490/1,349 (36.3%) were female. The HIV prevalence was 6.7% in female compared to 10.7% in male.

Among blood donors 2911/10,987 (26.5%) were female. The HIV prevalence was 0.37% in female and 0.43% in male.

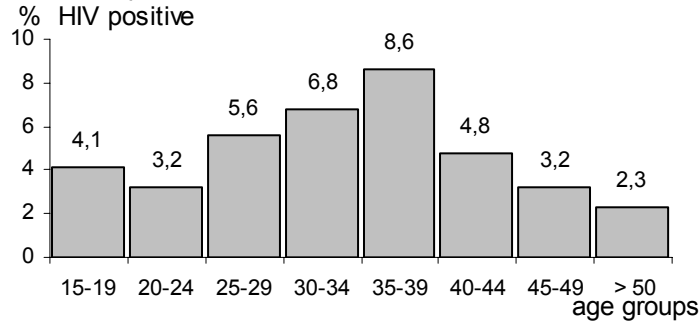
The HIV prevalence by age groups is presented for each population in Figure 4. Among the most at-risk populations (ie. male STI patients, FSW, IDU, and MSM) HIV prevalence seemed to peak after 30 years. It is important to note that high levels of infection were observed among young people aged 15-19 in the IDU and MSM samples. These findings should be interpreted with appropriate caution given the moderate sample size, but warrant further monitoring and exploration.

Among pregnant women, HIV prevalence was higher in the 25-34 years age group.

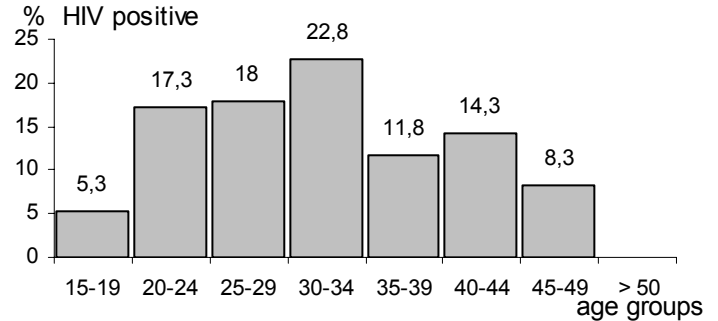
Among pregnant women and military recruits, in the younger age groups 15-19 years old ( $n=814$  and  $n=543$  respectively) and 20-24 years old ( $n=3,422$  and  $n=540$  respectively), HIV prevalence were similar at 0.9% and 1.3% respectively (Figure 4).

Figure 4. Percentage of HIV-positive per age categories by sentinel population – HSS 2007

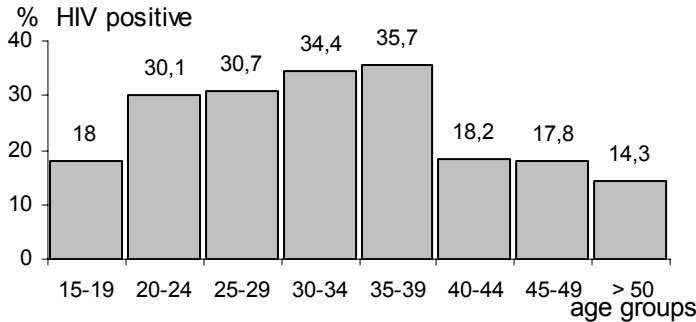
**Male STI patients**



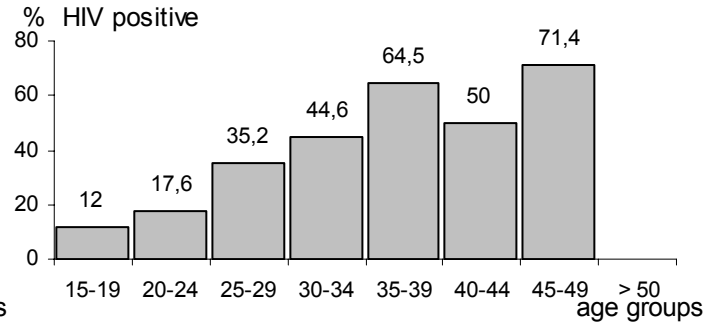
**FSW**



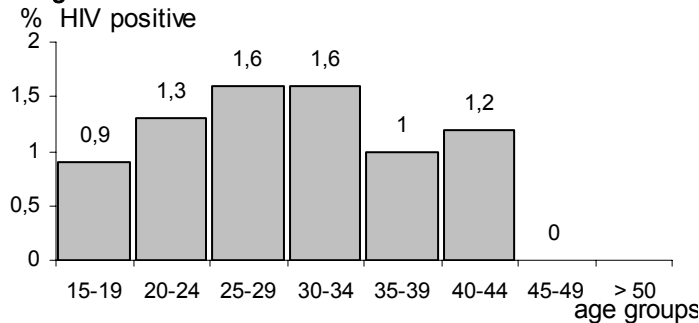
**IDU**



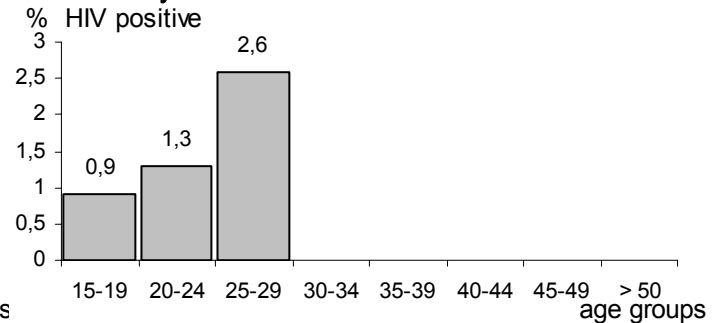
**MSM**



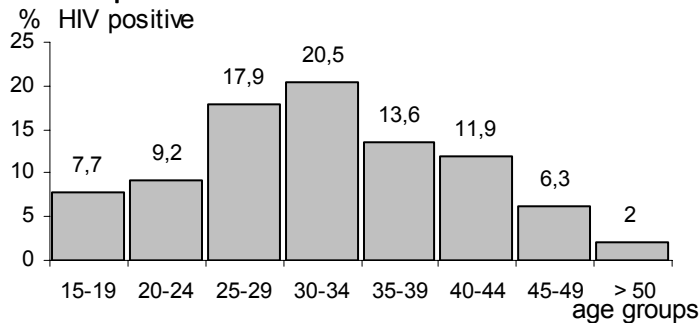
**Pregnant women**



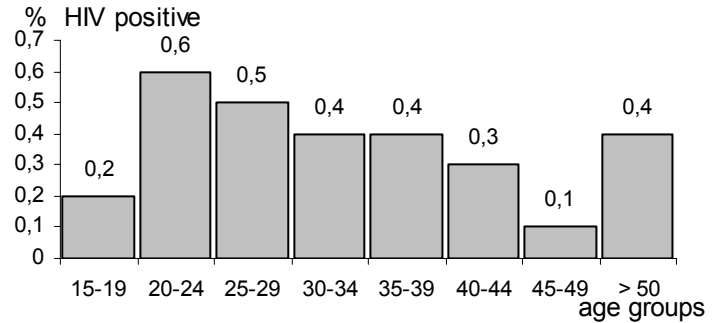
**New military recruits**



**New TB patients**



**Blood donors**

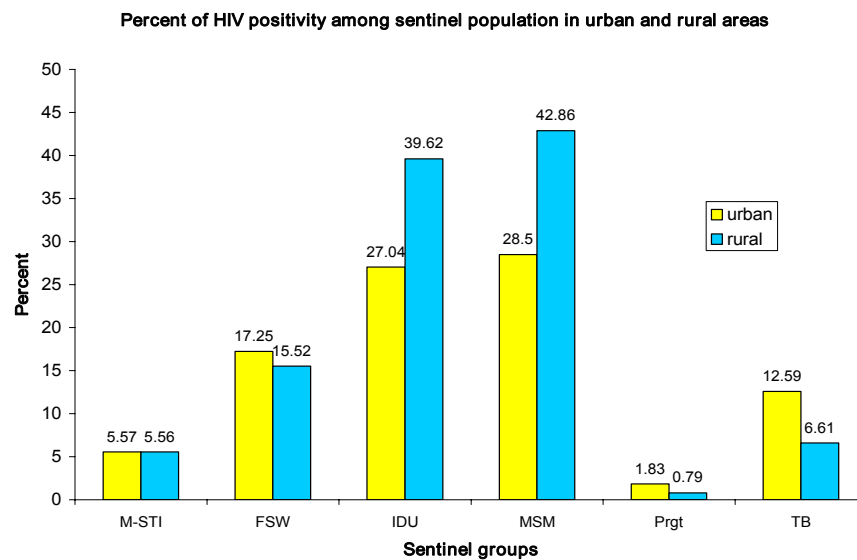


### 3.1.4. HIV prevalence by place of residence and marital status

Among the pregnant women and the new TB patients, the HIV prevalence was twice as high among persons living in urban areas compared to those living in rural areas (Figure 5). In pregnant women, HIV prevalence was 0.8% (31/4039) among those living in rural areas compared to 1.7% (140/8098) among those living in urban areas ( $p < 10^{-3}$ ).

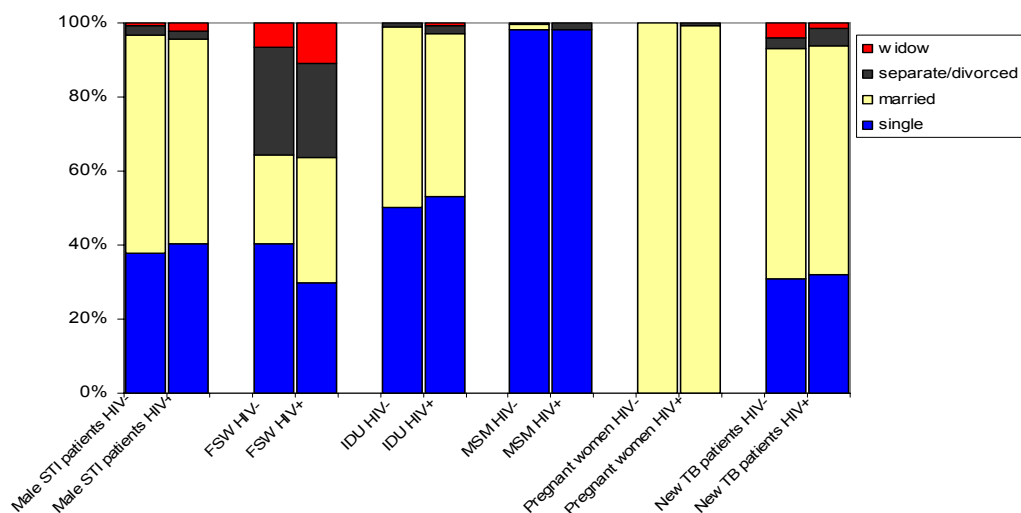
In contrast, HIV prevalence was higher in rural settings of injecting drug users and men who have sex with men (39.62% = 63/159, 42.86% = 9/21 respectively). There was little difference in HIV prevalence among male STI patients and female sex workers by urban or rural place of residence.

Figure 5. HIV prevalence in different sentinel groups according to urban or rural place of residence – HSS 2007



Regarding the distribution by marital status, there was no marked difference according to the HIV status in the different sentinel populations (Figure 6).

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



### 3.2. Results of syphilis screening

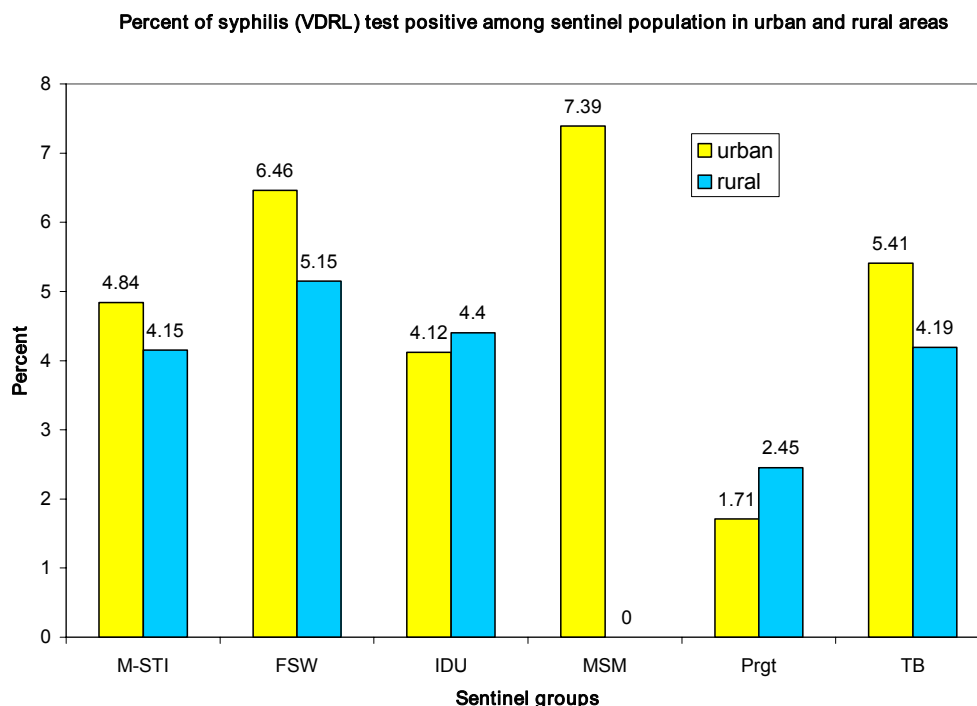
The laboratory diagnosis of presence of syphilis was done for all sentinel groups. It is evident in this report that the prevalence of acute syphilis (VDRL+) was high in the group of men who have sex with men, female sex workers and male STI patients affecting 7%, 6% and 5 % respectively (Table 4). However high syphilis prevalence was noted in new TB patients (4.8%) and injecting drug users (4.2%). Among pregnant women, prevalence of acute syphilis was 1.7% (138/8,088) in those living in urban areas compared to 2.5% (99/4,038) in those living in rural areas. These rates underscore the importance of doing regular syphilis screening for pregnant women.

Table 4. Prevalence of syphilis (VDRL+) among sentinel population

Sentinel groups	Sample (n)	VDRL+ (n)	VDRL+ (%)
Male STI patients	4,450	218	<b>4.9</b>
FSW	813	49	<b>6.0</b>
IDU	766	32	4.2
MSM	400	28	<b>7.0</b>
Pregnant women	12,628	251	2.0
urban	8,088	138	1.7
rural	4,038	99	2.5
New military recruits	1,200	13	1.1
New TB patients	1,407	68	<b>4.8</b>

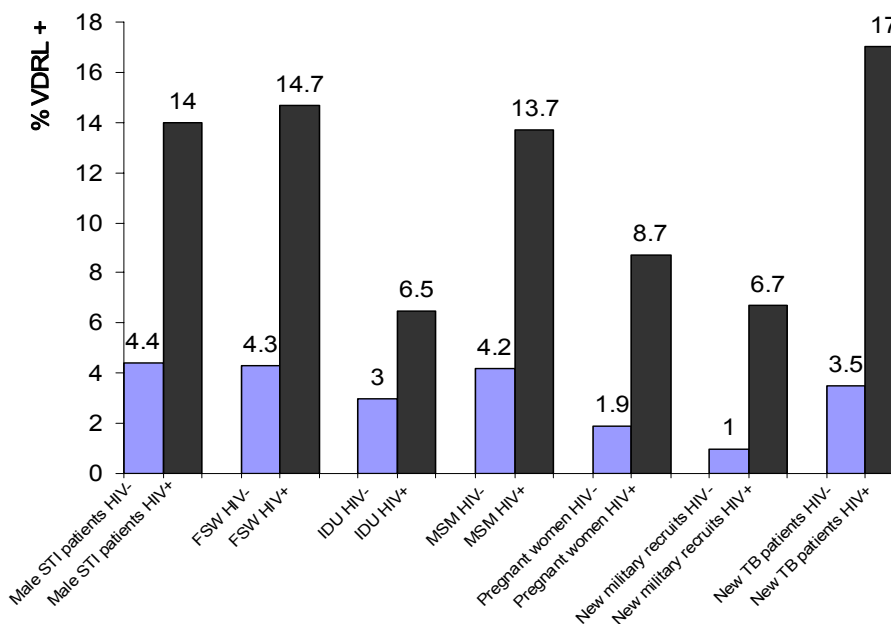
Syphilis prevalence was not very different between those who reside in urban and in rural areas, except for pregnant women and men who have sex with men (Fig 7).

Figure 7. Syphilis prevalence in sentinel groups comparing urban and rural areas



As expected, the prevalence of syphilis in people living with HIV was substantially higher than HIV negative persons in all sentinel populations (Figure 8).

Figure 8. Prevalence of syphilis (VDRL+) according to HIV status per sentinel population – HSS 2007



Among low risk population of pregnant women and new military recruits, the prevalence of syphilis was surprisingly higher among the younger age group 15-19 years old (Figure 9) than among 20-24 year olds.

Figure 9. Prevalence of syphilis (VDRL+) according to age groups in pregnant women and new military recruits



During HSS 2007, among pregnant women of primiparity and multiparity, 1.9% and 2.1% respectively tested VDRL positive.

Detailed results of VDRL screening by sentinel population and by site are presented in Annex 3.



## 4. Trends over time

### 4.1. HIV prevalence among low risk population 1992-2007

Among low risk populations, HIV prevalence levels in 2007 continued the general decline observed since their peak in the late 1990s. A slight rise was observed among new military recruits in 2007. Among new tuberculosis patients, HIV prevalence decreased from 10.8% in 2006 to 9.8% in 2007.

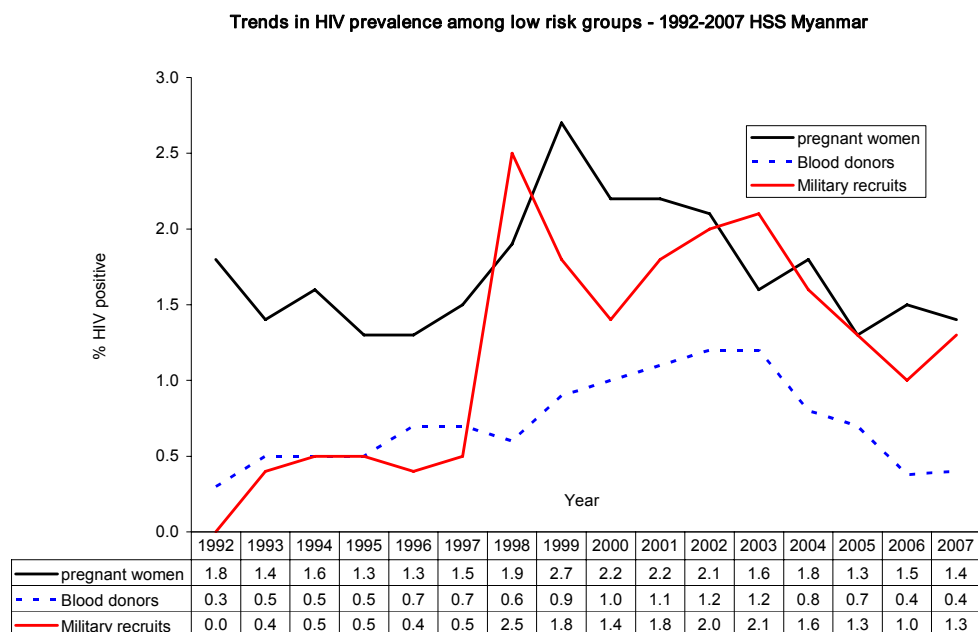


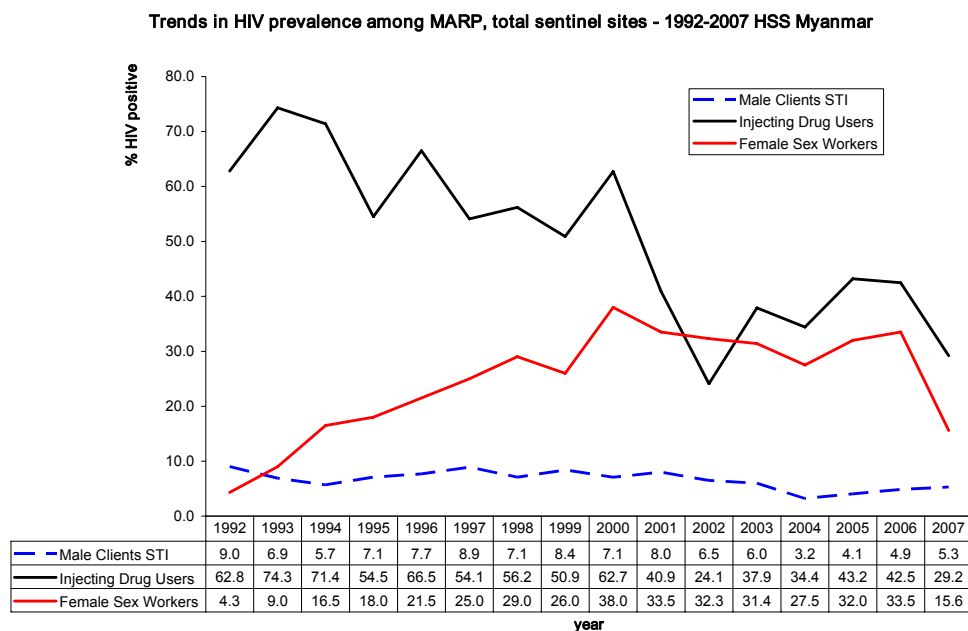
Fig 10. Trends in HIV prevalence among low risk population - 1992-2007 HSS

### 4.2. HIV prevalence among key populations at higher risk 1992-2007

Levels of HIV have declined sharply between 2006 and 2007 among FSW and IDU populations. Because the trends are based on data pooled across sites, interpretation of the HIV prevalence trends among key populations at higher risk (Figure 11) must take into account the expansion of sentinel sites and small sample sizes in earlier rounds of surveillance in different sites. For example, four sites have been added for female sex workers in 2007. Considering samples from Yangon and Mandalay only, HIV prevalence among FSW was 33.5% in 2006 and 16% (64/400) in 2007. Similarly for IDU, prevalence estimates in some years were based on sample sizes of fewer than 50 and may have wide confidence intervals, making it difficult to describe trends over time. Such sharp declines are not easily accounted for by real changes in risk or disease among FSW and IDU, and are more likely to reflect differences in the population sampled from year to year. Understanding the differences in recruitment and execution of the sampling method for HSS in different years is critical to understanding and interpreting these trends.

A slight rebound was observed in male STI patients from 4.9% in 2006 to 5.3% in 2007.

Figure 11. Trends in HIV prevalence among most at risk populations - 1992-2007 HSS



### 4.3. Decentralization of testing

With the aim of decentralization, HIV antibody testing was performed at both the local level in 20 AIDS/STD teams and in reference laboratories. In these 20 sites, local HIV testing was done for all of the sentinel groups.

In total, the number of false positive and false negative were equal and minimal (0.3%) and would not have affected the HIV prevalence results in a purpose of surveillance (Table 5).

Table 5. HIV test results performed at local and reference laboratories, 2x2 table

	Central test -	Central test +	Total
Local test -	11876	41	11,917
Local test +	41	751	792
Total	11,917	792	12,709

The laboratory results between the local site and reference site was compared across those twenty sites, with the exception of one site (Myitkyina AIDS/STD team) that showed more than 50% discordant results (Table 6). This outlier was excluded from further analysis of sensitivity and specificity.

For the remaining sites, overall prevalence was generally unaffected by decentralized testing (-0.1%) as discordant results were well balanced. The overall sensitivity and specificity compared with the reference testing were 96.2% and 99.9% (Table 7).

Table 6. Sensitivity and specificity of decentralized testing compared to the reference laboratory testing in total and by sentinel populations (sample excluding sentinel site 10 – Myitkyina)

Sentinel population	Sample (n)	HIV test positive			false negative (n)	false positive (n)	Sensitivity (%)	Specificity (%)
		refer (%)	local (%)	differ-ence /				
Male STI patients	2,669	5.7	5.4	-0.3	11	3	92.8	99.9
FSW	702	16.8	16.5	-0.3	2	0	98.3	100
IDU	653	28.6	28.5	-0.1	1	0	99.5	100
MSM	400	29.3	29.5	+0.2	1	2	99.1	99.3
ANC	7,440	1.5	1.4	-0.1	11	4	90.3	99.9
<b>Total</b>	<b>11,864</b>	<b>5.8</b>	<b>5.7</b>	<b>-0.1</b>	<b>26</b>	<b>9</b>	<b>96.2</b>	<b>99.9</b>

Table 7. Comparison of local and reference HIV testing at sentinel sites – HSS 2007

No.	Sentinel sites	Total sample (n)	false negative (n)	false positive (n)	HIV test positive		
					central (%)	local (%)	difference /central
1	Yangon	1156	1	2	8.2	8.3	+0.1
2	Mandalay	1079	2	0	19.8	19.6	-0.2
4	Taunggyi	790	4	0	5.2	4.7	-0.5
5	Lashio	858	0	0	16.1	16.1	0
6	Tachileik	550	2	1	2.0	1.8	-0.2
9	Kawthaung	563	1	1	3.4	3.4	0
<b>10</b>	<b>Myitkyina</b>	<b>845</b>	<b>15</b>	<b>32</b>	<b>12.3</b>	<b>14.3</b>	<b>+2.0</b>
11	Bamaw	500	2	3	3.8	4.0	+0.2
12	Mawlamyaing	550	0	0	2.7	2.7	0
13	Pathein	550	0	0	4.2	4.2	0
14	Bago	550	5	0	4.4	3.5	-0.9
16	Magway	515	1	0	1.9	1.7	-0.2
17	Hpa-an	550	0	1	1.1	1.3	+0.2
18	Sittway	550	1	0	0.7	0.5	-0.2
19	Monywa	550	2	0	2.0	1.6	-0.4
20	Loikaw	550	5	1	1.8	1.1	-0.7
21	Haka	353	0	0	0.8	0.8	0
24	Myeik	550	0	0	2.9	2.9	0
26	Pakokku	550	0	0	2.4	2.4	0
27	Shwebo	550	0	0	2.9	2.9	0
	<b>TOTAL</b>	<b>12709</b>	<b>41</b>	<b>41</b>	<b>6.2</b>	<b>6.2</b>	<b>0</b>

## **5. Discussion**

### **5.1. Sample collection**

22,066 participants (excluding blood donors) in this HSS round 2007 were sampled from AIDS/STD teams clinics clients and TB clinics patients in collaboration with NGO's drop-in centres and clinics from PSI, AZG (MSF-H), MDM, CARE, AHRN, World Vision, MSF-CH, MSI; local non-governmental organizations such as MMA, MNMA and MRCS and general practitioners' private clinics.

In 2007, the sample sizes for each sentinel population were achieved by most AIDS/STD teams. Those townships that did not achieve their target sample size may need to strengthen their collaboration with stakeholders at the field level.

The amount of socio-demographic data collected from each sentinel group is limited, however, there have been some problems with confirming syphilis, place of residence and parity (primipara or multipara) status for pregnant women. Syphilis testing among FSW and IDU was also not always done or recorded. The most complete information was collected from MSM, military recruits, and blood donors.

10,987 blood donors from National Blood Centre of Yangon and Public Health Laboratory of Mandalay were sorted out for HSS. Usually, HIV testing strategy I was used for transfused blood units. Thus, the false positive might have occurred as the screening algorithm used, HIV testing strategy II, may have been less specific.

### **5.2. HIV prevalence**

Among the low risk groups HIV prevalence were similar in 2007 compared with the previous results, with the exception of increases seem among military recruits. Because the confidence intervals of HIV prevalence of 2006 and 2005 values included the 2007 results, a statistically significant decline of HIV prevalence since 2000 was not confirmed. It is also important to note that the HIV positive rate of pregnant women was consistent with the results from PMCT data during the same time period.

In the group of male STI patients the trend of HIV prevalence appeared to be slightly raised since 2004. These observed increases in both male STI patients and new military recruits suggest the need to remain vigilant toward a rebound in heterosexual transmission.

In spite of the men who have sex with men group being included in the HSS for the first time this year, the prevalence was highest at 29.3%. Targeted prevention services for these groups must be increased.

The most remarkable finding of 2007 HSS was a sharp decline in HIV prevalence from 2006 to 2007 among female sex workers (reduced by 50%) and injecting drug users (reduced by almost 30%).

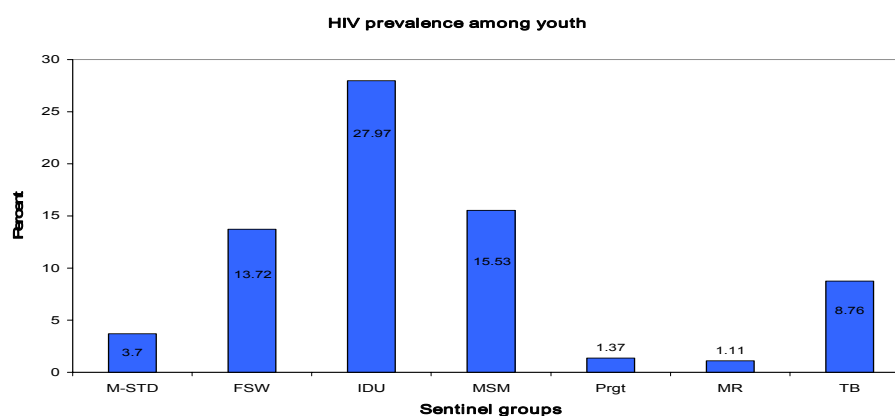
The expansion of FSW sentinel sites to potentially lower risk or earlier stage epidemics is not a sufficient explanation for the observed decline. This is because sharp declines were also found in both Yangon and Mandalay, areas in which FSW sentinel surveillance has been conducted for many years. A closer look at the sample in Yangon shows that multiple facilities contribute to the FSW sentinel site in this city. For example, this year the samples were collected from six AIDS/STD locations (Insein, South Okkalapa, North Okkalapa, Mingalar Taung Nyunt, Thaketa and Kyimyindine) under supervision of AIDS/STD team (Yangon). In Mandalay, the drop-in centres and AIDS/STD team were both sources of sample collection. It is difficult to determine how consistently from year to year the sample was distributed across different facilities/sources. Differences in recruitment and distribution of sample may affect the prevalence measured from a particular sentinel site.

The declines among injecting drug users may reflect a shifting population of injectors. The methodology for sampling in 2007 relied on sequential sampled IDU accessing drop-in centres and methadone treatment centres for services. Most of the sample of injecting drug users were collected with the collaborative efforts between DoH's Drug Treatment Centers and of NGOs, including MDM, CARE, AHRN, ARHP (HAARP), MANA, LOP and CCDAC. The explanation of changing sampling/recruitment methods could be as easily applied to IDU populations as for FSW. Other factors for the change in prevalence may be related to information from programme staff suggesting that some IDU are switching back to oral drug use. This has been especially remarked on in Taunggyi, where supply of drugs used for injection have become more scarce.

HIV prevalence in pregnant women attending antenatal care had no significant difference with the result of 2006, although it showed a slight fall.

Figure 12 shows the prevalence among young people, where the prevalence was highest among injecting drug users followed by men who have sex with men. Specifically, the HIV prevalence of youth among pregnant women (1.37%) was accounted for the indicator of Millennium Development Goal 6. In addition, it indicated that prevalence appeared to decline since 2000.

Figure 12. HIV prevalence in young people (15-24 years) across sentinel groups



HIV prevalence among young people was alarming as it can be regarded as a proxy for incidence of HIV, therefore, prevention programmes must be strengthened.

This HSS round experienced some constraints. Male STI patients in Taungoo township were excluded from the analysis due to selection bias. This township is a medium-sized city in Bago Division and the TB team leader was jointly attached to the AIDS/STD team. The HIV prevalence in male STI patients was highest (34/150; 22.7%) among sites. Due to the risk of non-comparability in future rounds, it was decided to exclude this outlier sentinel group site. Including this site, the estimated national HIV prevalence among male STI would have been 5.9% instead of 5.3% as described below.

Among pregnant women, HIV prevalence was twice as high in those living in urban areas compared to rural areas. The majority of pregnant women were accessing antenatal services in hospitals in urban areas. That may lead to overestimation of HIV prevalence in urban women.

Among the new military recruits, because of a communication gap, the information on place of residence was unfortunately missed.

Facility-based survey can always be questioned in regards to the representativeness of the wider population. HIV prevalence may be higher and lead to overestimates, as people who are sick or seeking health services are usually at higher risk than general population. Thus, among key populations at higher risk, facility-based survey should be followed by community-based surveillance in order to better understand the real situation. Nevertheless, HIV prevalence among men who have sex with men and injecting drug users calls for immediate attention and reinforcement of targeted prevention and care services.

Results showed variability of trends at site level, which is inherent to the surveillance process and the limited sample size. However the sites which reported the maximum changes (decline or increase) in HIV prevalence within one year, should receive a supervisory visit by NAP to document any change in source of reporting, and check for any mistakes in transmission of information from the sentinel site to the central level. In 2007, Yangon and Mandalay have registered around 10% change in HIV prevalence among STI patients compared to 2006 and should be visited.

### **5.3. Prevalence of Syphilis**

An unexpected high prevalence of syphilis was noted among 15-19 years pregnant women and new military recruits. This is a warning sign that sexually transmitted diseases are common among young age groups (Figure 13).

Figure 13: Prevalence of syphilis (VDRL+) according to age groups in pregnant women and new military recruits.



#### 5.4. Decentralization of HIV testing

- Decentralization of HIV testing proved to be effective with very limited discordant results that would have little impact on the determination of survey outputs. These results were also confirmed in reference laboratories and indicate efficient performance at the local level.

- It should be reminded that the purpose of the analysis was to assess the impact of decentralized testing on surveillance results by comparing discordant results and how they modified the results of prevalence.

## 6. Recommendations

- The facilities from which IDU were sampled, the distribution of the sample across facilities, and the process of recruitment (ie. selective or sequential) of female sex workers and injecting drug users must be documented so as to better interpret the trends in HIV prevalence. Facility-based data are highly sensitive to changes in sampling of participants and can lead to selection bias in the measured prevalence. Routine documentation of the sampling method can become integral to the surveillance dataset on an ongoing basis.
- HSS data should be triangulated with other sources of information, including behavioural surveillance surveys, programme monitoring data, rapid assessments, and other surveys data to develop a fuller understanding of the magnitude and trajectory of the HIV epidemic. This type of triangulation will be supported by adoption of community-based integrated bio-behavioural surveillance (IBBS) as a complementary component of the second-generation surveillance system.
- Blood donor screening should not be considered part of the HSS system. It is a routine programme activity that must be monitored by routine data collection.
- HIV antibody testing can and should be carried out in a decentralized fashion at qualified local laboratories trained to use WHO strategy II and monitored by external quality control procedures. Quality control measures will include transport of all positive and 10% of the negative samples to the reference laboratory.
- The National AIDS Programme should strengthen the supervisory mechanisms for the sentinel surveillance sites. This will ensure that all sentinel sites including supporting partners will fully understand and adhere to the revised HSS protocols.
- Urban/rural differences in HIV prevalence should be investigated further and may be important to include in the future process of HIV estimates and projections.



## Annexes

### Annex 1: Sample size (n) and results of 2007 HIV prevalence (%) by sentinel population and by sites

Sites	Sentinel populations								
	Male	STI	CSW	IDU	MSM	New Military Recruits	Pregnant women	TB patients	Blood donors
1Yangon	n	156	200	200	200	600	400	150	6545
	%	3.8	9.5	6.5	23.5	1.3	2.5	8.7	0.4
2Mandalay	n	92	200	187	200	600	400		4451
	%	19.6	22.5	38.0	35.0	1.2	2.5		0.4
3Meiktila	n	150					400		
	%	7.3					0.3		
4Taunggyi	n	150	174	66			400		
	%	5.3	14.4	9.1			0.5		
5Lashio	n	130	128	200			400		
	%	2.3	22.7	48.5			2.3		
6Tachileik	n	150					400		
	%	4.0					1.3		
7Muse	n	120		110			399		
	%	11.7		30.0			3.5		
8Dawei	n	100					300		
	%	6.0					2.0		
9Kawthaung	n	164					399		
	%	6.7					2.0		
10Myitkyina	n	114	162	169			400		
	%	14.9	17.3	30.8			1.8		
11Bamaw	n	150					350		
	%	6.7					2.6		
12Mawlamyaingn	n	150					400	150	
	%	4.0					2.3	14.7	
13Pathein	n	150					400	150	
	%	8.7					2.5	9.3	
14Bago	n	150					400	150	
	%	8.0					3.0	10.7	
15Pyay	n	150					400	150	
	%	3.3					0.8	3.3	
16Magway	n	115					400	150	
	%	6.1					0.8	6.0	
17Hpa-an	n	150					400	150	
	%	0.7					1.3	6.7	
18Sittway	n	150					400		
	%	1.3					0.5		
19Monywa	n	150					400	149	
	%	6.7					0.3	16.1	

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20Loikaw	n	150		400	
	%	4.7		0.8	
21Haka	n	63		291	
	%	1.6		0.7	
22Hintharta	n	150		400	
	%	7.3		1.3	
23Maubin	n	150		400	
	%	1.3		0.5	
24Myeik	n	150		400	150
	%	8.0		1.0	15.3
25Myingyan	n	160		400	
	%	0.6		0.5	
26Pakokku	n	150		400	
	%	6.7		0.8	
27Shwebo	n	150		400	
	%	6.7		1.5	
28Kyaingtong	n	150	81	500	
	%	0.0	1.2	1.4	
29Myawaddy	n	150		400	
	%	2.7		0.3	
30Nyaung-U	n	75		400	150
	%	0.0		0.8	7.3
31Taungoo	n	excluded		400	
	%			1.3	
32Myaungmya	n	150		400	
	%	4.7		1.0	
33Pyin U Lwin	n	60			
	%	3.3			
34Pyinmana	n	102			
	%	2.9			

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**Annex 2: HIV prevalence by age group and type of residence**

	<b>MALE STI PATIENTS</b>			<b>FSW</b>			<b>IDU</b>			<b>MSM</b>		
	sample (n)	HIV+ (n)	HIV+ (%)	sample (n)	HIV+ (n)	HIV+ (%)	sample (n)	HIV+ (n)	HIV+ (%)	sample (n)	HIV+ (n)	HIV+ (%)
<15	5	0	<b>0.0</b>	0			0			2	1	<b>50.0</b>
15-19	320	13	<b>4.1</b>	151	8	<b>5.3</b>	50	9	<b>18.0</b>	83	10	<b>12.0</b>
20-24	837	27	<b>3.2</b>	330	57	<b>17.3</b>	236	71	<b>30.1</b>	136	24	<b>17.6</b>
25-29	966	54	<b>5.6</b>	222	40	<b>18.0</b>	228	70	<b>30.7</b>	71	25	<b>35.2</b>
30-34	800	54	<b>6.8</b>	123	28	<b>22.8</b>	180	62	<b>34.4</b>	56	25	<b>44.6</b>
35-39	636	55	<b>8.6</b>	85	10	<b>11.8</b>	98	35	<b>35.7</b>	31	20	<b>64.5</b>
40-44	418	20	<b>4.8</b>	21	3	<b>14.3</b>	66	12	<b>18.2</b>	12	6	<b>50.0</b>
45-49	219	7	<b>3.2</b>	12	1	<b>8.3</b>	45	8	<b>17.8</b>	7	5	<b>71.4</b>
≥ 50	217	5	<b>2.3</b>	1	0	<b>0.0</b>	28	4	<b>14.3</b>	2	1	<b>50.0</b>

**PREGNANT WOMEN****MILITARY RECRUITS****NEW TB PATIENTS****BLOOD DONORS**

	<b>PREGNANT WOMEN</b>			<b>MILITARY RECRUITS</b>			<b>NEW TB PATIENTS</b>			<b>BLOOD DONORS</b>		
	sample (n)	HIV+ (n)	HIV+ (%)	sample (n)	HIV+ (n)	HIV+ (%)	sample (n)	HIV+ (n)	HIV+ (%)	sample (n)	HIV+ (n)	HIV+ (%)
<15	4	0	<b>0.0</b>				3	0	<b>0.0</b>			
15-19	814	7	<b>0.9</b>	543	5	<b>0.9</b>	78	6	<b>7.7</b>	1656	4	<b>0.2</b>
20-24	3422	46	<b>1.3</b>	540	7	<b>1.3</b>	173	16	<b>9.2</b>	3189	18	<b>0.6</b>
25-29	3551	57	<b>1.6</b>	114	3	<b>2.6</b>	179	32	<b>17.9</b>	1752	9	<b>0.5</b>

30-34	2720	43	<b>1.6</b>	2	0	<b>0.0</b>	185	38	<b>20.5</b>	1199	5	<b>0.4</b>
35-39	1556	15	<b>1.0</b>	1	0	<b>0.0</b>	162	22	<b>13.6</b>	1096	4	<b>0.4</b>
40-44	416	5	<b>1.2</b>				135	16	<b>11.9</b>	909	3	<b>0.3</b>
45-49	42	0	<b>0.0</b>				127	8	<b>6.3</b>	721	1	<b>0.1</b>
≥ 50	1	0	<b>0.0</b>				457	9	<b>2.0</b>	465	2	<b>0.4</b>

### HIV prevalence by type of residence in sentinel population

	MALE STI PATIENTS			FSW			IDU			MSM		
	sample (n)	HIV+ (n)	HIV+ (%)	sample (n)	HIV+ (n)	HIV+ (%)	sample (n)	HIV+ (n)	HIV+ (%)	sample (n)	HIV+ (n)	HIV+ (%)
urban	3002	163	<b>5.4</b>	748	128	<b>17.1</b>	773	209	<b>27.0</b>	379	108	<b>28.5</b>
rural	1129	56	<b>5.0</b>	116	18	<b>15.5</b>	159	63	<b>39.6</b>	21	9	<b>42.9</b>
	PREGNANT WOMEN			NEW TB PATIENTS								
	sample (n)	HIV+ (n)	HIV+ (%)	sample (n)	HIV+ (n)	HIV+ (%)						
urban	8098	140	<b>1.7</b>	818	102	<b>12.5</b>						
rural	4039	31	<b>0.8</b>	681	45	<b>6.6</b>						

**Annex 3: Prevalence of syphilis (VDRL+) by sentinel population and by site**

		sentinel populations- % VDRL+						
Sites		Male STI	CSW	IDU	MSM	New Military Recruits	Pregnant women	TB patients
1	Yangon	9.0	21.7	2.9	14.0	0.0	0.8	5.2
2	Mandalay	17.4	7.5	7.0	0.0	2.2	0.3	
3	Meiktila	0.0					1.5	
4	Taunggyi	1.3	4.0	10.6			1.3	
5	Lashio	2.3	4.7	5.5			1.5	
6	Tachileik	6.0					3.0	
7	Muse	2.5		0.0			0.0	
8	Dawei	8.0					2.0	
9	Kawthaung	1.8					3.1	
10	Myitkyina	0	1.9	0			0.5	
11	Bamaw	3.3					0.0	
12	Mawlamyaing	9.3					3.5	5.3
13	Patheingyi	10.7					5.8	12.7
14	Bago	7.3					3.8	4
15	Pyaw	7.3					4.8	7.3
16	Magway	9.6					3.3	1.3
17	Hpa-an	3.3					1.3	6.7
18	Sittway	8.0					5.0	
19	Monywa	0.7					0.3	4
20	Loikaw	5.3					2.5	
21	Haka	0.0					0.7	
22	Hintharta	8.7					3.0	
23	Maubin	2.7					3.0	
24	Myeik	5.3					2.5	4
25	Myingyan	0.0					1.0	
26	Pakokku	0.7					0.5	
27	Shwebo	2.7					0.0	
28	Kyaingtong	1.3	3.7				0.6	
29	Myawaddy	6.0					2.0	
30	Nyaung-U	0.0					1.5	2
31	Taungtha	excluded					3.5	
32	Myaungmya	8.7					1.3	
33	Pyin U Lwin	0.0						
34	Pyinmana	11.8						

## Annex 4: Trends in HIV prevalence by sentinel site and sentinel population

(red marker indicates sample size=&lt;50)

Male STD	2000	2001	2002	2003	2004	2005	2006	2007
Yangon	13	12	15	15	5.2	4	15.5	3.8
Mandalay	12.1	29	12.8	7.6		8.6	10.9	19.6
Meiktila	15	11	13	21	5.9	5.5	12	7.3
Taunggyi	3	6	11	11	0	0	4	5.3
Lashio		7	0	1	0	0	0	2.3
Tachileik	6	7	6	13	2	3	1	4
Muse	9	5	6.4	2.5	2	7	6	11.7
Dawei	14	9	6	7	0	0	3	6
Kawthaung	19	30	4	3	9	19	12	6.7
Myitkyina	18.8	7	17	13.5	3	13	9.3	14.9
Bamaw	9	9	5	10	5	6	3	6.7
Mawlamyaing	2	0	2	0	2	0	2	4
Patheingyi	2	0	4	0	0	6	9.3	8.7
Bago	6	4	3	7	9	6	4	8
Pyaw	9	3	15	14	4	0	7	3.3
Magway	2	8	0	6	4	0	4	6.1
Hpa-an	0	14	7	0	1	2	9	0.7
Sittway	0	4	1	2	1	2	3	1.3
Monywa	0	1	8	0	4	1	2	6.7
Loikaw	3	4	2	0	2.7	4		4.7
Haka	0	0	0	2.2	2.1	7.4		1.6
Hintharta		0	1	0	1	2	0	7.3
Maubin		0	4	0	2	1	0	1.3
Myeik		21	3	4	8	0	1	8
Myingyan		10	11	6	4.8	3	4.9	0.6
Pakokku		4.8	2	4	5	7	3	6.7
Shwebo		4	12	9	1	5	4	6.7
Kyaingtong			6	8	5.9	7.1	0	0
Myawaddy			7	6	1	9.2	2	2.7
Nyaung-U					2	1	2	0
Taungtha							15	
Myaungmya							1	4.7
Pyin U Lwin								3.3
Pyinmana								2.9

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<b>CSW</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
Yangon	26	26	29	11	25	29.6	29.6	9.5
Mandalay	50	41	35.7	55.2	30	34.3	34.3	22.5
<b>IDUs</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
Yangon	37.1	53.6	22	33.3	26.3	25.3		6.5
Mandalay	58.11	55.7	10	55.2	30.7	42.4		38
Taunggyi		7	19	23	18	18	21	9.1
Lashio	76	55.6	73	77.8	60	54.9	56.1	48.5
Muse	42.9			66.7		51.2	30	30
Myitkyina	90.2	52.5	30	42.6	46.7	62	63	30.8