HIV Sentinel Surveillance and HIV Estimation, 2006

A. Introduction

HIV Surveillance in India has started from the year 1985 when ICMR for the first time initiated the surveillance activity in blood donors and patients with Sexually Transmitted Diseases (STDs). After National AIDS Control Organisation (NACO) was established in 1992, sentinel surveillance for HIV/AIDS in India had been initiated with sentinel sites confined to selected cities in the beginning. In 1998, NACO formalized annual sentinel surveillance for HIV infection across the country.

Surveillance is the *ongoing systematic* collection, collation, analysis and interpretation of data in order that ACTION may be taken. Deriving programmatic implications for further ACTION is the main purpose of Surveillance system. Surveillance is aimed to provide data within the limitations of time and extent. Feasibility and cost-effectiveness to conduct the study every year is an important aspect in planning the surveillance activities. For HIV sentinel surveillance, specific sites are selected across the country for different target populations where an annual exercise of collecting a stipulated number of samples for HIV testing is undertaken. Since data is collected from the same selected sites every year, it provides information to understand the spread and trends of HIV epidemic in different geographical regions as well as in different population sub-groups. In the absence of any other information, the data is also used for the purpose of estimation of HIV infected persons in the country.

The first HIV estimation in India was done in 1994 based on data from 52 sites. Since then, the process of estimation of HIV infected persons in the country has evolved to a very great extent. Since, the sample from which data is collected through sentinel surveillance is not exactly representative of the general population, certain assumptions were used to generate estimates for the general population. Over the years, these assumptions were gradually refined with the help of other available data sources. The year 2006 provided a unique opportunity when multiple data sources such as a community based HIV prevalence study of National Family Health Survey-III, Integrated Bio-behavioural Assessment Survey, Endline Behavioural Surveillance Survey could be utilized along with the data from the expanded sentinel surveillance system to arrive at more robust HIV estimates that are more closer to reality. Moreover, in 2006, the Workbook Model of WHO-UNAIDS is adopted that allows international comparability. Special statistical packages such as Random-effects Model and Spectrum Projection Software are utilized to make more accurate and reliable estimates.

B. Current Status of Sentinel Sites in the country

Over the years, the numbers of sentinel sites were increased from 180 in 1998 to 703 in 2005. This was expanded greatly for 2006 surveillance round to a total of 1,122 sites, to cover all the districts of the country. Out of these, 628 sites are established at Antenatal clinics where blood is collected for HIV testing from the pregnant women attending these clinics. Other 494 sites are established among High risk group populations such as STD clinic attendees, Female Sex Workers (FSW), Injecting Drug Users (IDU), Men who have Sex with Men (MSM), Migrants, Truckers and Transgenders. **Table 1** shows the growth of sentinel sites in the country over the years.

Table 1: Number of Sentinel Sites by Year and Type from 1998 to 2006, India

Site type/year	1998	1999	2000	2001	2002	2003	2004	2005	2006
STD	76	75	98	133	166	163	171	175	251
ANC	92	93	111	172	200	266	268	267	470
IDU	5	6	10	10	13	18	24	30	51
MSM	-	-	3	3	3	9	15	18	31
FSW	1	1	2	2	2	32	42	83	138
ANC (Rural)	-	-	-	-	-	210	122	124	158
TB	2	2	-	-	-	-	7	4	-
Migrant	-	-	-	-	-	-	-	1	6
Eunuchs	-	-	-	-	-	-	-	1	1
Truckers	-	-	-	-	-	-	-	-	15
Fisher Folk	-	-	-	-	-	-	-	-	1
Others (Seamen)	-	-	-	-	-	1	-	-	-
Total	**176* (180)**	**177* (180)**	**224* (232)**	**320**	**384**	**699**	**649**	**703**	**1122**

**Number of sites of which data is available with NIHFW.*

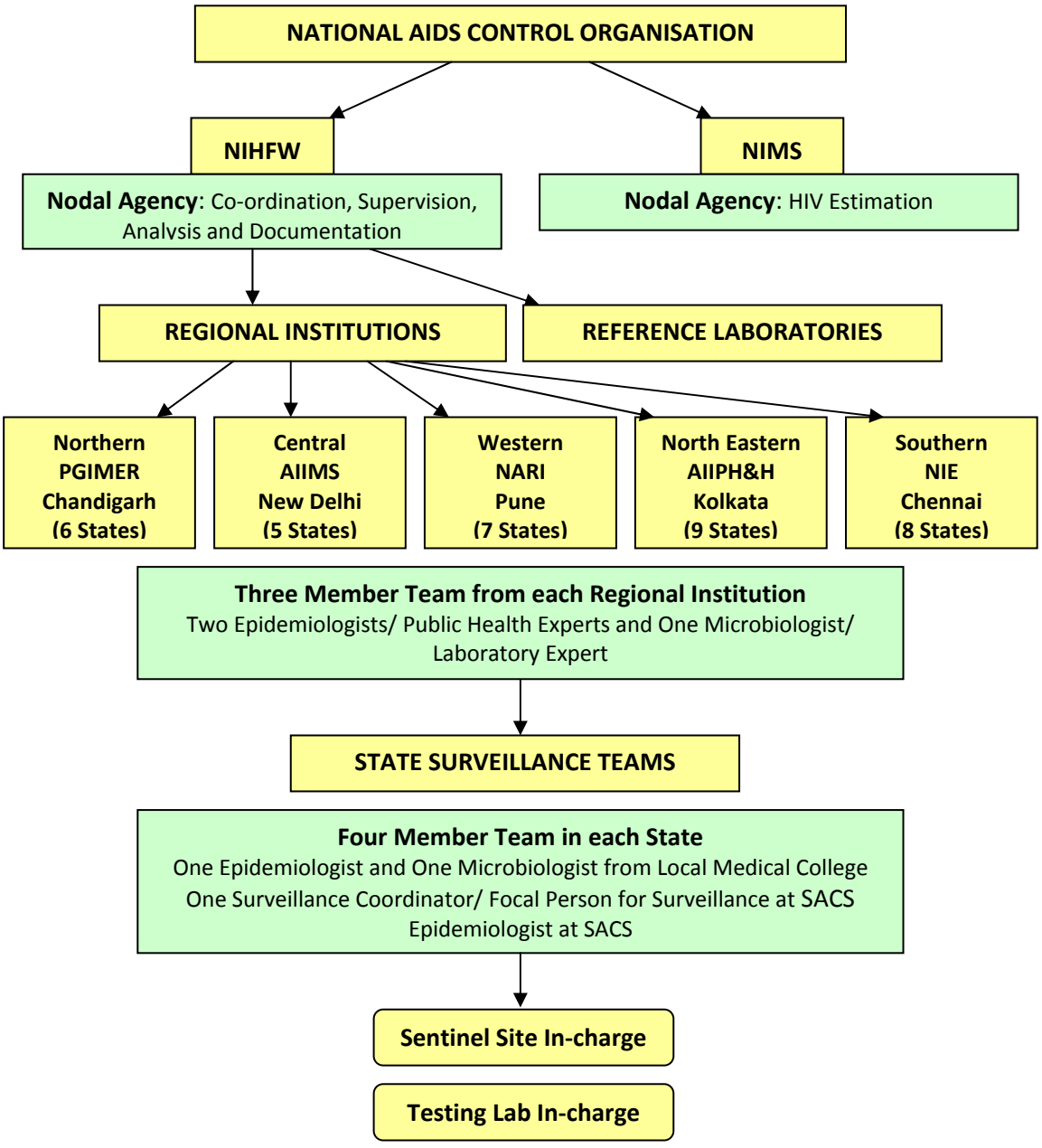
C. Methodology of HIV Sentinel Surveillance

Sampling is done at selected sentinel sites annually for a period of three months. For ANC settings, consecutive women attending the designated ANC sites who meet the inclusion criteria are included. Women are enrolled till the sample size of 400 is reached or until the end of the surveillance period, whichever is earlier. In case of STD sites, the samples are collected from two sources, STD and Obstetrics and Gynaecology (OBG) clinics located in the same hospital. A total of 150 samples from individuals in the STD clinic and 100 samples from individuals in the OBG clinic are collected for a sample size of 250. Only consecutive new cases of STDs diagnosed syndromically (i.e., cases of genital ulcer, urethral or cervical discharge and genital warts) are recruited. Individuals from high-risk groups - IDU, FSW, and MSM are sampled at service points – for example, de-addiction center, drop-in centers, clinics until the sample size of 250 is reached or until the end of the surveillance period, whichever is earlier. HIV Testing strategy adopted is anonymous unlinked and some additional variables are collected with the specimen. There is a well-defined system of External quality assurance for field work and laboratory testing.

D. Organisation Structure for HIV Sentinel Surveillance

NACO conducts the HIV Sentinel Surveillance and estimation with the support of two National institutes: National Institute of Health and Family Welfare, New Delhi and National Institute of Medical Statistics, ICMR, New Delhi. Since 2006, five regional institutes have been identified in the country that not only help in monitoring and supervision, but also in improving quality of the data collected and its analysis. Apart from these, every state has a State Surveillance Team, comprising of public health experts and microbiologists who take care of the training of the personnel involved in sentinel surveillance system as well as supervision and monitoring. NACO has also appointed epidemiologists at the SACS to support data analysis at the state level. The organization chart of HIV Sentinel Surveillance System is provided in **Figure 1**.

Figure 1: Organisation Structure for HIV Sentinel Surveillance



E. Magnitude of the HIV epidemic

Based on the revised estimates, the adult HIV Prevalence in 2006 is estimated to be 0.36% (0.27% – 0.47%) at the all India level. Estimated HIV Prevalence is greater among males (0.43%) than among females (0.29%). Estimated adult HIV Prevalence is greater than 1% in Manipur (1.67%), Nagaland (1.26%) and Andhra Pradesh (1.05%). Karnataka, Maharashtra and Tamil Nadu have shown adult prevalence less than 1%. Mizoram and Goa have an estimated adult HIV Prevalence as high as 0.70-0.80 % each, close to the HIV Prevalence in some of the high burden states. Pondicherry and Gujarat also have an estimated adult HIV Prevalence of around 0.5%. **Figure 3** shows the state-wise estimated adult HIV Prevalence. It shows that 11 states have adult HIV Prevalence greater than the national average. Epidemic is growing in magnitude in states like Goa, Mizoram, Pondicherry and Gujarat.

The total number of People Living With HIV/AIDS (PLHA) in the country is estimated to be 2.47 million (2.0-3.1 million). The highest number of PLHA are in Andhra Pradesh and Maharashtra, with nearly 0.5 million PLHA each. Along with Tamil Nadu and Karnataka, the four south Indian states contribute 63% of all the PLHA in the country. Though Manipur and Nagaland have the highest HIV prevalence in the country, due to small population size, the estimated number of PLHA in these two states is around 25,000. Overall, the six high prevalence states contribute 65% of all PLHA in the country. Apart from these high prevalence states, West Bengal, Gujarat and Uttar Pradesh have higher burden of the epidemic with greater than 0.1 million PLHA in each of these states. Similarly, the states of Kerala, Bihar, Rajasthan, Orissa, Chhattisgarh, Madhya Pradesh and Haryana have around 50,000 PLHA each though the HIV prevalence in these states is low. **Figure 2** shows the distribution of PLHA among the high burden states of India.

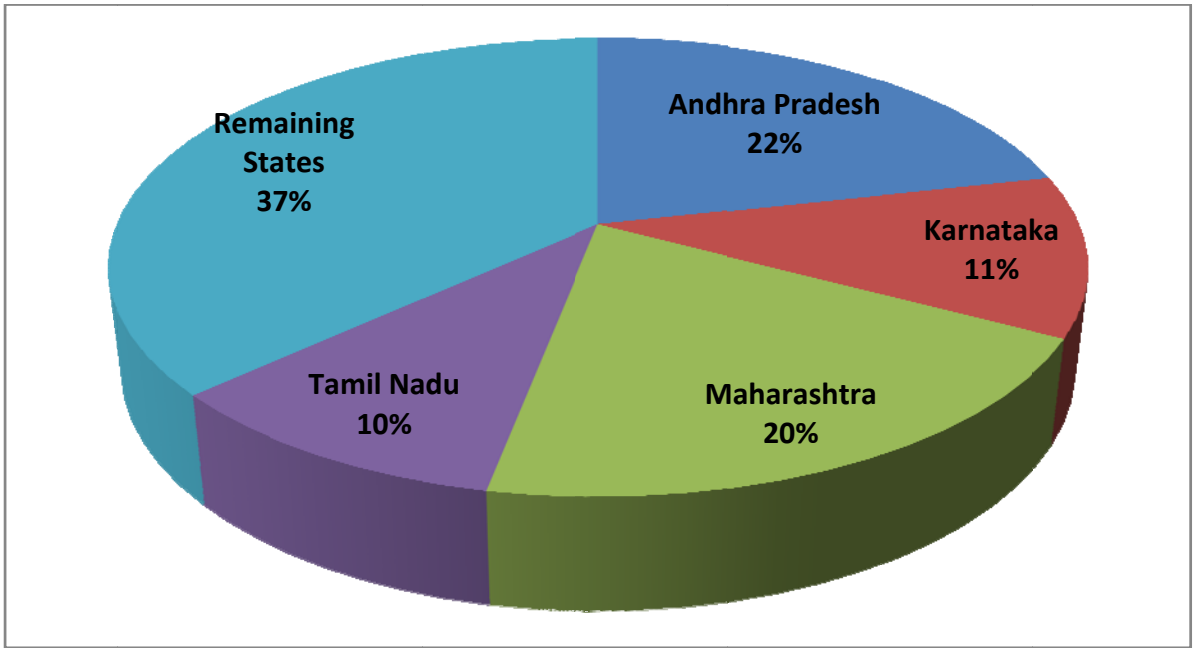


Figure 2: Distribution of PLHA among High Burden States: 2006

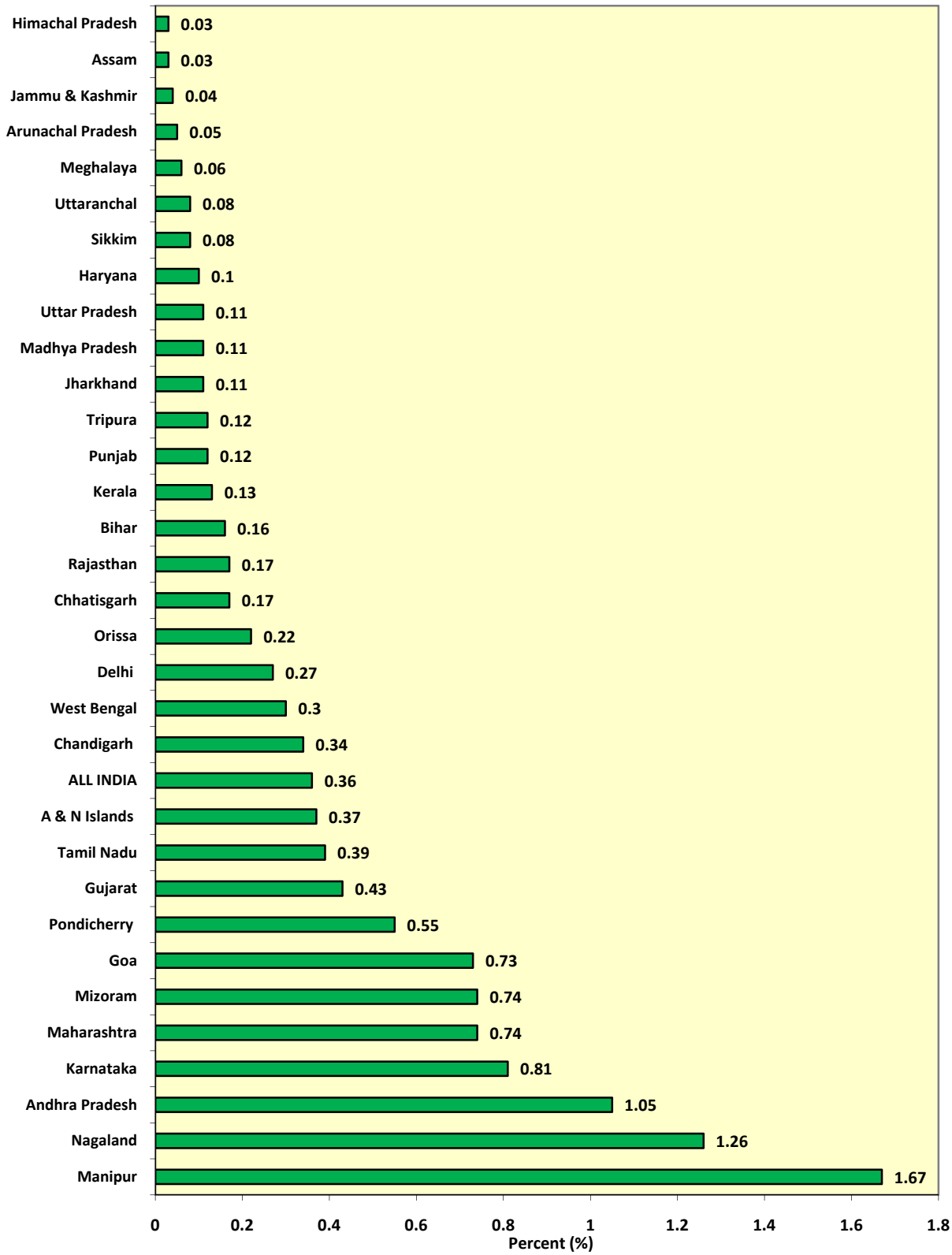


Figure 3: Estimated Adult HIV Prevalence, State-wise, India, 2006

F. Level of HIV epidemic among different population groups

HIV Sentinel Surveillance system utilizes the data from the pregnant women at Antenatal clinics as a surrogate for general population. The overall HIV prevalence among different population groups in 2006 continues to portray the concentrated epidemic in India, with a very high prevalence among High Risk Groups – IDU, MSM, FSW and STD clinic attendees and very low prevalence (<1%) among ANC clinic attendees. **Figure 4** depicts the concentrated nature of HIV epidemic in India. Injecting drug use emerged as an important mode of HIV transmission, with highest HIV Prevalence among IDUs. Homosexual route of transmission among men also emerged to be significant in different parts of the country.

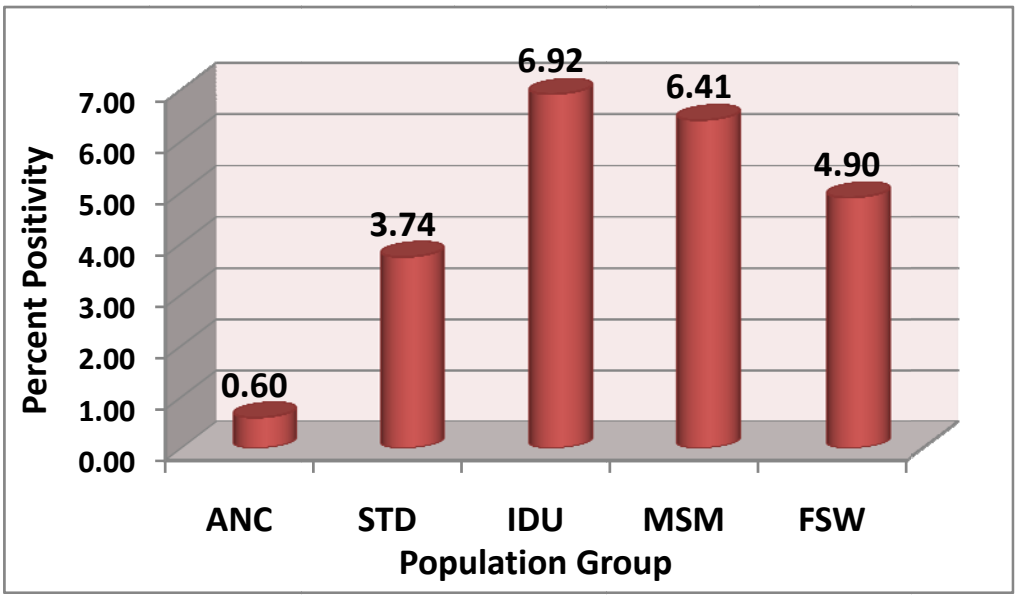


Figure 4: HIV Prevalence among Different Population Groups: India, 2006

HIV Prevalence among ANC clinic attendees remained greater than 1% in Andhra Pradesh (1.26%), Manipur (1.25%) and Karnataka (1.0%). Nagaland showed close to 1% HIV Prevalence. In addition, Mizoram showed a HIV Prevalence of 1% among ANC clinic attendees. Maharashtra and Tamil Nadu showed HIV Prevalence of 0.75% and 0.25% respectively among ANC clinic attendees. Goa, Gujarat, Bihar and Orissa have shown a HIV Prevalence of 0.5% among ANC clinic attendees.

At the district level, a total of 118 districts have shown HIV Prevalence > 1% among ANC clinic attendees. Out of these, 26 districts are in low prevalence states - Gujarat (6), MP (4), Orissa (4), UP (3), Mizoram (2), West Bengal (2), Arunachal Pradesh (1), Bihar (1), Chhattisgarh (1) Haryana (1) & Rajasthan (1). 14 districts have shown a very high prevalence of greater than 3% among ANC clinic attendees.

Among the STD clinic attendees, HIV Prevalence is very high in Andhra Pradesh (24.4%) followed by Maharashtra (10%), Goa (8.6%), Tamil Nadu (8%) and Karnataka (7.5%). 12 other states have shown HIV Prevalence between 1% and 5% among STD clinic attendees. Remaining states showed less than 1% prevalence.

At the district level, 48 districts have HIV Prevalence greater than 5% among STD clinic attendees, out of which 13 districts are in low prevalence states - Gujarat(3), Goa(2), Delhi(2), Madhya Pradesh(2),

Mizoram(1), Rajasthan(2), Pondicherry(1). 14 districts have shown very high prevalence of greater than 15% among STD clinic attendees. State-wise HIV Prevalence among different Population Groups for the year 2006 is given in **Table 2.**

Table 2: State-wise HIV Prevalence among Different Population Groups, 2006

S.No	Name of the State	HIV Prevalence				
		STD	ANC	IDU	MSM	FSW
1	Andaman & Nicobar Islands	0.80	0.17	NS	NS	NS
2	Andhra Pradesh	24.40	1.26	NS	10.25	8.84
3	Arunachal Pradesh	0.42	0.00	0.00	NS	0.00
4	Assam	0.50	0.00	2.86	0.78	0.40
5	Bihar	0.40	0.50	0.20	0.30	0.60
6	Chandigarh	1.66	0.25	17.60	4.80	0.67
7	Chhattisgarh	2.58	0.00	NS	NS	1.65
8	Dadra Nagar Haveli	NS	0.00	NS	NS	NS
9	Daman & Diu	NS	0.00	NS	NS	NS
10	Delhi	2.00	0.00	10.00	12.27	1.40
11	Goa	8.6	0.5	NS	4.8	NS
12	Gujarat	3.31	0.50	NS	11.20	6.40
13	Haryana	0.81	0.13	0.00	0.00	0.40
14	Himachal Pradesh	0.60	0.00	NS	0.44	0.66
15	Jammu & Kashmir	0.00	0.00	2.50	NS	0.00
16	Jharkhand	0.40	0.00	0.40	NS	0.87
17	Karnataka	7.57	1.00	3.60	19.20	9.60
18	Kerala	1.23	0.13	9.57	0.40	0.00
19	Lakshadweep	0.00	0.00	NS	NS	NS
20	Madhya Pradesh	0.47	0.00	NS	NS	1.07
21	Maharashtra	10.00	0.75	20.40	15.60	12.80
22	Manipur	4.80	1.25	20.00	10.40	11.60
23	Meghalaya	1.18	0.00	3.30	NS	NS
24	Mizoram	3.07	1.00	1.60	NS	10.40
25	Nagaland	0.00	0.93	1.25	NS	16.40
26	Orissa	2.80	0.50	10.40	NS	1.00
27	Pondicherry	4.03	0.25	NS	2.47	1.44
28	Punjab	0.27	0.00	13.80	4.80	1.60
29	Rajasthan	1.60	0.00	NS	0.00	1.20
30	Sikkim	0.00	0.10	0.20	NS	NS
31	Tamil Nadu	8.00	0.25	24.20	5.60	3.60
32	Tripura	0.45	0.42	0.00	NS	NS
33	Uttar Pradesh	0.62	0.00	4.63	NS	1.00
34	Uttaranchal	0.00	0.00	NS	NS	NS
35	West Bengal	1.01	0.00	4.00	6.60	7.58

Note: 1. Shaded cells are the states where the number of sites in a category is 3 or less and hence, mean positivity is presented. In all other cases, median prevalence is presented. 2. NS: No Site

Among the high risk groups, surveillance is conducted among Female Sex Workers (FSW) in 26 states, Injecting Drug Users (IDU) in 22 states and Men who have Sex with Men (MSM) in 18 states. HIV Prevalence among FSWs is very high in Nagaland (16.4%) followed by Maharashtra (12.8%), Manipur (11.6%), Mizoram (10.4%), Karnataka (9.6%) and Andhra Pradesh (8.8%). Overall, 8 states have shown greater than 5% HIV Prevalence among FSWs, while 9 states have HIV Prevalence between 1% and 5%. Remaining states recorded less than 1% prevalence among FSWs.

Unlike among ANC & STD clinic attendees and FSWs, the epidemic among IDUs is not confined to high prevalence states. Apart from Tamil Nadu (24.2%), Maharashtra (20.4%) and Manipur (20.0%), high prevalence among IDUs is recorded in the states of Chandigarh (17.6%), Punjab (13.8%), Orissa (10.4%) and Kerala (9.6%). 8 states have shown HIV Prevalence between 1% and 5% among IDUs. Thus, it is evident that epidemic among IDUs has spread to many newer regions.

Among MSM, high HIV Prevalence is recorded in the states of Karnataka (19.2%), Maharashtra (15.6%), Manipur (12.4%), Delhi (12.3%), Gujarat (11.2%) and Andhra Pradesh (10.3%). Overall, 8 states have shown greater than 5% HIV Prevalence among MSM, while 4 states have HIV Prevalence between 1% and 5%. Remaining states recorded less than 1% prevalence among MSM. Moreover, urban areas of the country such as Delhi, Pune, Bangalore, Surat, Vadodara, Rajkot and Kolkata recorded very high HIV Prevalence among MSM.

Overall, a total of 81 districts showed HIV Prevalence > 5% among one or more of the high risk groups. 8 districts showed HIV Prevalence > 15% among FSWs and 11 districts showed HIV Prevalence > 15% among IDUs. **Tables 3 & 4** present the State-wise HIV Prevalence among different population groups from 2003 to 2006.

Table 3: State-wise HIV Prevalence among ANC and STD Clinic Attendees, 2003-2006

		ANC				STD			
S.No.	State	2003	2004	2005	2006	2003	2004	2005	2006
1	A & N Islands	0.50	0.00	0.00	0.17	1.80	1.60	0.40	0.80
2	Andhra Pradesh	1.25	1.63	1.75	1.26	21.47	16.40	22.80	24.40
3	Arunachal Pradesh	0.00	0.20	0.46	0.00	0.45	0.00	0.00	0.42
4	Assam	0.00	0.00	0.00	0.00	1.20	0.80	0.89	0.50
5	Bihar	0.00	0.00	0.00	0.50	0.40	1.20	0.00	0.40
6	Chandigarh	0.50	0.50	0.00	0.25	0.80	1.80	1.00	1.66
7	Chhattisgarh	0.58	0.00	0.25	0.00	2.13	2.80	2.77	2.58
8	D & N Haveli	0.13	0.00	0.25	0.00	--	--	--	--
9	Daman & Diu	0.33	0.38	0.13	0.00	--	--	--	--
10	Delhi	0.13	0.38	0.25	0.00	6.52	7.98	9.15	2.00
11	Goa	0.50	1.13	0.00	0.50	14.62	16.02	14.01	8.60
12	Gujarat	0.25	0.13	0.25	0.50	4.47	3.60	2.00	3.31
13	Haryana	0.41	0.00	0.13	0.13	1.20	0.93	1.30	0.81
14	Himachal Pradesh	0.00	0.13	0.13	0.00	0.40	0.00	0.40	0.60
15	Jammu&Kashmir	0.00	0.08	0.00	0.00	2.60	0.16	0.00	0.00
16	Jharkhand	0.00	0.00	0.13	0.00	0.13	0.13	0.00	0.40
7	Karnataka	1.25	1.25	1.00	1.00	10.40	12.00	13.60	7.57
18	Kerala	0.00	0.33	0.25	0.13	1.88	2.78	2.82	1.23
19	Lakshadweep	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	Madhya Pradesh	0.00	0.25	0.25	0.00	1.81	1.80	0.47	0.47
21	Maharashtra	0.75	0.75	1.00	0.75	12.00	10.80	12.80	10.00
22	Manipur	1.00	1.38	1.00	1.25	13.00	7.20	12.20	4.80
23	Meghalya	0.35	0.00	0.00	0.00	0.26	0.00	0.00	1.18
24	Mizoram	0.97	1.50	0.81	1.00	3.80	1.00	3.00	3.07
25	Nagaland	1.13	0.95	1.50	0.93	0.98	1.72	3.48	0.00
26	Orissa	0.00	0.50	0.25	0.50	2.40	2.80	4.00	2.80
27	Pondicherry	0.13	0.25	0.25	0.25	2.45	5.74	4.22	4.03
28	Punjab	0.00	0.25	0.13	0.00	1.60	1.16	1.07	0.27
29	Rajasthan	0.00	0.00	0.13	0.00	6.08	2.92	5.60	1.60
30	Sikkim	0.21	0.00	0.25	0.10	0.00	0.00	0.86	0.00
31	Tamil Nadu	0.50	0.67	0.50	0.25	9.64	8.40	9.20	8.00
32	Tripura	0.00	0.25	0.00	0.42	2.80	0.73	1.26	0.45
33	Uttar Pradesh	0.00	0.25	0.00	0.00	0.55	0.80	0.40	0.62
34	Uttaranchal	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.00
35	West Bengal	0.50	0.50	0.84	0.00	1.61	0.88	2.16	1.01

Note: The presented values are median prevalence unless where the number of sites is 3 or less, in which case, mean (Percent positivity) is presented.

Table 4: State-wise HIV Prevalence among IDU, MSM & FSW, 2003-2006

		IDU				MSM				FSW			
S.No.	State	2003	2004	2005	2006	2003	2004	2005	2006	2003	2004	2005	2006
1	A & N Islands	-	-	-	-	1.25	-	-	-	-	0.50	0.40	-
2	Andhra Pradesh	-	-	-	-	13.20	16.00	6.45	10.25	20.00	16.97	12.97	7.32
3	Arunachal Pradesh	-	-	-	0.00	-	-	-	-	-	-	-	0.00
4	Assam	5.56	4.48	7.86	2.86	-	-	-	0.78	0.00	0.00	0.76	0.46
5	Bihar	-	-	-	0.20	1.60	1.60	0.40	0.30	4.80	0.20	2.24	1.68
6	Chandigarh	-	4.80	9.20	17.60		1.36	1.60	4.80	0.60	0.80	0.67	0.67
7	Chhattisgarh	-	-	-	-	-	-	-	-	-	-	-	1.57
8	D & N Haveli	-	-	-	-	-	-	-	-	-	-	-	-
9	Daman & Diu	-	-	-	-	-	-	-	-	-	-	-	-
10	Delhi	14.40	17.60	22.80	10.00	27.42	6.67	20.40	12.27	1.61	4.60	3.15	2.80
11	Goa	-	-	-	-	9.09	1.68	4.90	4.80	30.15	-	-	-
12	Gujarat	-	-	-	-	-	6.80	10.67	11.20	-	9.20	8.13	6.40
13	Haryana	-	-	-	0.00	-	-	-	0.00	-	-	2.00	1.19
14	Himachal Pradesh	-	-	-	-	-	-	-	0.44	0.00	0.80	0.00	0.66
15	Jammu & Kashmir	0.00	0.00	0.00	2.50	-	-	-	-	-	-	-	0.00
16	Jharkhand	-	-	-	0.40	-	-	-	-	-	0.00	0.80	0.88
17	Karnataka	2.80	0.00		3.60	10.80	10.00	11.61	19.20	14.40	21.60	18.39	8.64
18	Kerala	-	2.58	5.19	9.57		0.89	3.20	0.64	1.94	-	-	0.32
19	Lakshadweep	-	-	-	-	-	-	-	-	-	-	-	-
20	Madhya Pradesh	-	-	-	-	-	-	-	-	-	-	1.82	1.07
21	Maharashtra	22.89	29.20	12.80	20.40	18.80	11.20	10.40	15.60	54.29	41.69	23.62	19.57
22	Manipur	24.47	21.00	24.10	19.80	29.2	14.00	15.60	10.40	12.80	12.40	10.00	11.60
23	Meghalya	0.00	0.00	0.00	3.33	-	-	-	-	-	-	-	-
24	Mizoram	6.40	6.80	4.80	3.05	-	-	-	-	-	13.69	14.00	10.40
25	Nagaland	8.43	3.22	4.51	2.39	-	-	-	-	4.40	4.44	10.80	16.40
26	Orissa	-	-	-	10.40	-	-	-	-	-	5.18	2.60	1.00
27	Pondicherry	-	-	-	-	-	5.22	5.60	2.47	-	1.94	0.28	1.44
28	Punjab	-	-	-	13.80	-	-	-	4.80	0.00	-	-	1.36
29	Rajasthan	-	-	-	-	-	-	-	0.00	3.92	2.31	3.72	2.55
30	Sikkim	-	-	0.48	0.20	-	-	-	-	-	-	-	-
31	Tamil Nadu	63.81	39.92	18.00	24.20	4.20	6.80	6.20	5.60	8.80	4.00	5.49	4.62
32	Tripura	-	-	10.92	0.00	-	-	-	-	-	-	-	-
33	Uttar Pradesh	-	-	-	4.63	-	-	-	-	6.60	8.00	3.50	1.52
34	Uttaranchal	-	-	-	-	-	-	-	- -	-	-	-	-
35	West Bengal	2.61	3.83	7.41	4.64	-	1.33	0.54	6.60	6.47	4.11	6.80	6.12

Note: The presented values are mean prevalence (Percent positivity) among each high risk group.

G. Trends of HIV Epidemic

Based on the revised estimates, the HIV epidemic in the country has been declining. The estimated adult HIV Prevalence in the country has declined from 0.45% in 2002 to 0.36% in 2006. The total number of PLHA in the country is also declining from 2.73 million in 2002 to 2.47 million in 2006. The percent of PLHA who are females continues to be around 39%. **Figure 5** shows the trends of adult HIV Prevalence and the number of PLHA from 2002 to 2006.

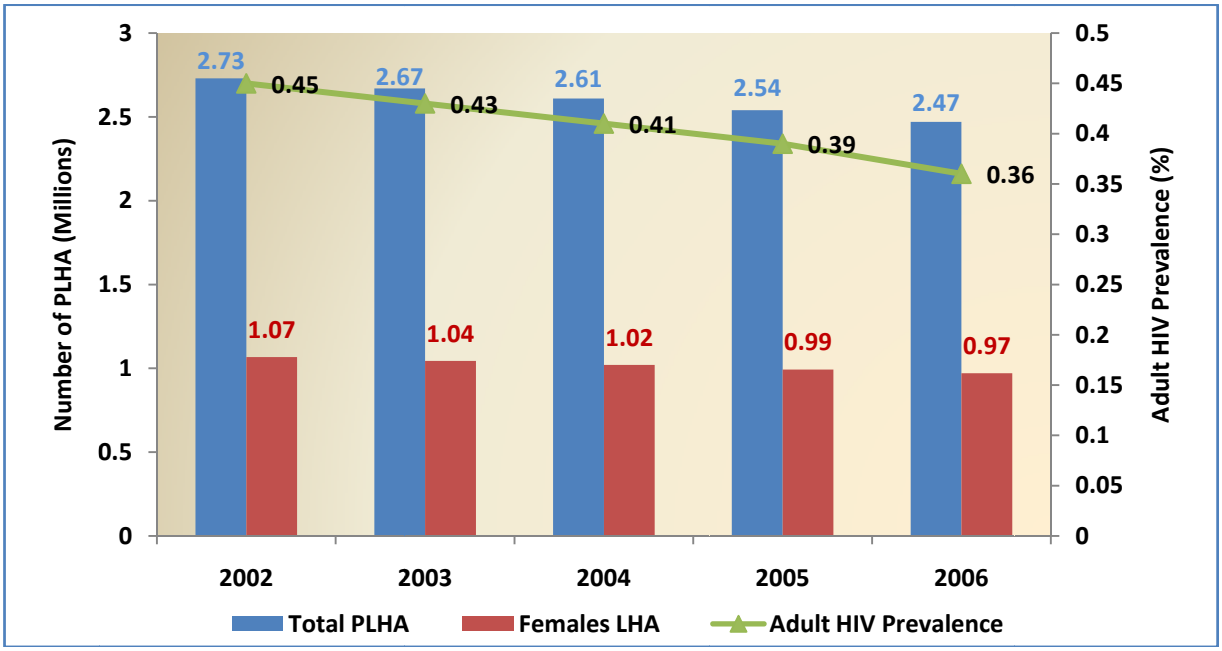


Figure 5: Trends of Adult HIV Prevalence and Number of PLHA (Total & Female): India, 2002-2006

Trends among different population groups at national as well as state level are derived based on the HIV Prevalence at consistent sites from 2003 to 2006. At all India level, the trends of HIV prevalence among ANC clinic attendees as well as among IDU and FSW show a decline, while among MSM, it is stable. **Figures 6 & 7** show the trends among different population groups at all India level.

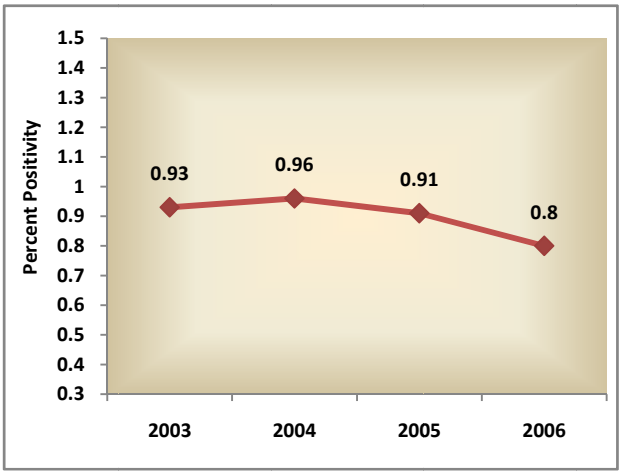


Figure 6: Trends among ANC clinic attendees, India 2003-06
**Based on 361 consistent sites*

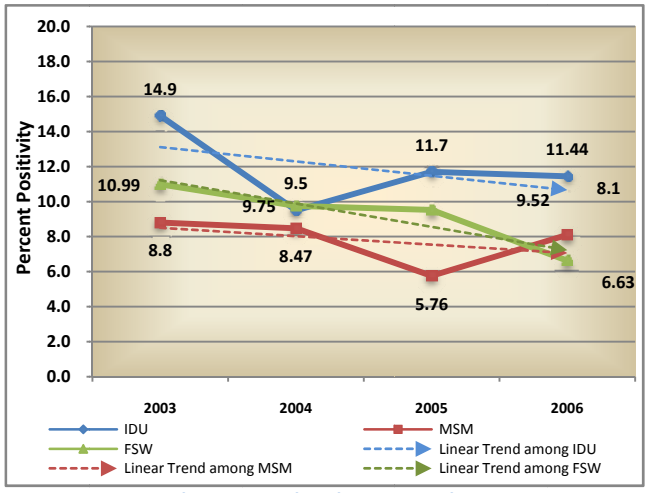


Figure 7: Trends among High Risk Groups, India 2003-06
**Based on Consistent Sites: IDU – 14, MSM – 6, FSW - 25*

But the trends show a different picture at the sub-national level. Among the high burden states, HIV Prevalence among ANC clinic attendees is declining in South Indian states while there is no significant decline in the North Eastern States. **Figure 8** shows the trends among ANC Clinic Attendees in the four South Indian States (Combined) and Two North Eastern States (Combined). Trends among FSW show a slight decline in the South Indian States reflecting the impact of the interventions, whereas in the North East, the HIV Prevalence among the FSW is increasing suggesting a dual nature of the epidemic in the North East. HIV Prevalence among IDUs is declining in the North Eastern States again reflecting the impact of the interventions, but still, the prevalence is greater than 10% in almost all the sites. The Southern states show a rise in the HIV Prevalence among IDUs. Trends among MSM do not show any significant decline in the Southern states.

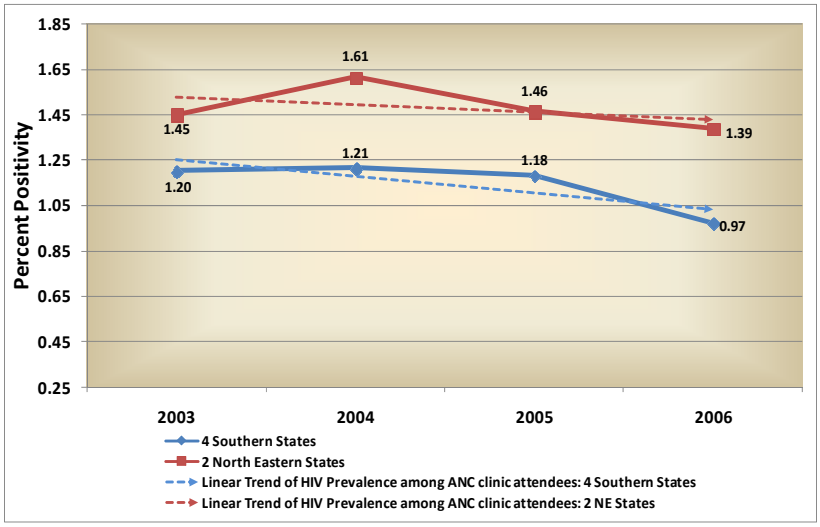


Figure 8: Trends among ANC clinic Attendees, South India & North East, 2003-06

Based on Consistent sites: 4 South Indian States: TN, AP, Karnataka & Maharashtra: 219 sites, 2 North Eastern States: Manipur& Nagaland: 25 sites

The north Indian states represent the low burden zone of the epidemic. But the trends in the north India show an increase in the HIV Prevalence among ANC Clinic attendees, which is an alarming signal for focused attention in these states. Though the rise is not steep, even a slighter rise of the epidemic in these rural dominated states is significant. Among the high risk groups, the north Indian states show a decline in the HIV Prevalence among Female Sex Workers but there is a significant rise in the HIV Prevalence among IDUs. **Figures 9 & 10** present the trends among different population groups in the North Indian States (All States except the six high burden states-combined).

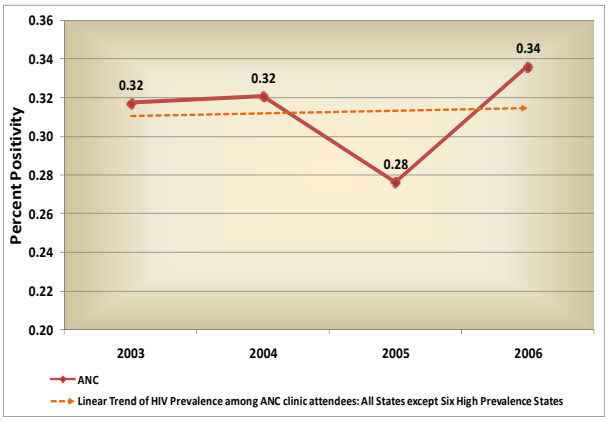


Figure 9: Trends among ANC clinic attendees, All States except Six High Burden States (Combined), 2003-06

Based on 117 consistent sites

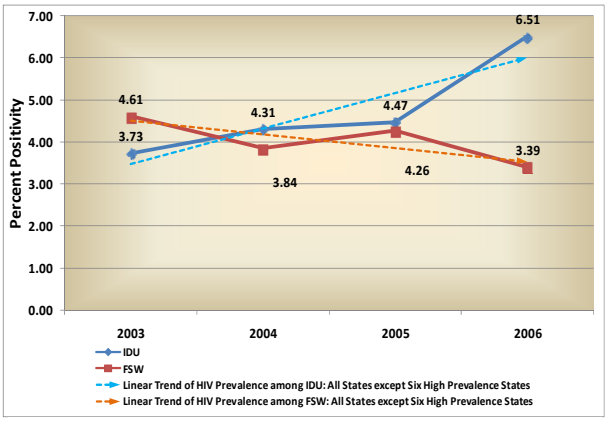


Figure 10: Trends among IDUs & FSW, All States except Six High Burden States (Combined), 2003-06

Based on consistent sites: IDU-4, FSW-14

H. Epidemiological Patterns of HIV Epidemic in India

Recent estimates of HIV infection show that, of the 2.5 million PLHIV in 2006, 88.7% are adults (15-49 yrs), 7.5% are aged 50 and above, while 3.8% are children (<15 yrs). The proportion of infections among children and adults above 50 years age has been increasing during the past five years. Females constitute 39.3% of the PLHA in the country. **Figure 11 & 12** show the distribution of PLHA in India by age and gender respectively.

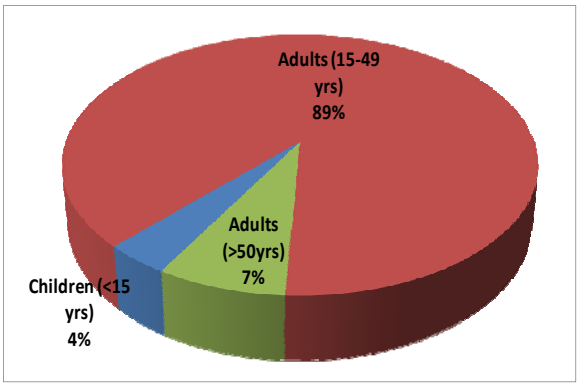


Figure 11: Percentage Distribution of PLHA by age, India, 2006

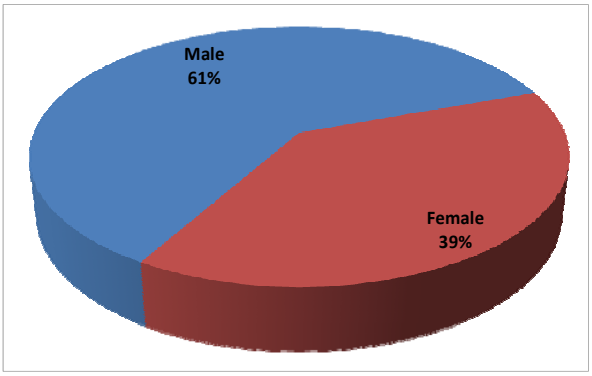


Figure 12: Percentage Distribution of PLHA by gender, India, 2006

HIV infections are greater among the urban population than in the rural population. However, some states such as Punjab, Uttar Pradesh and Tamil Nadu have shown higher HIV Prevalence among rural populations. **Figures 13 & 14** show the HIV Prevalence among ANC clinic attendees at all India level and in select states by place of residence.

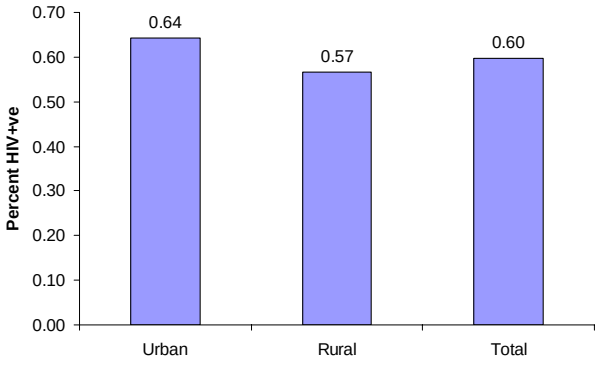


Figure 13: HIV Prevalence among ANC clinic attendees, All India, By Place of Residence, 2006

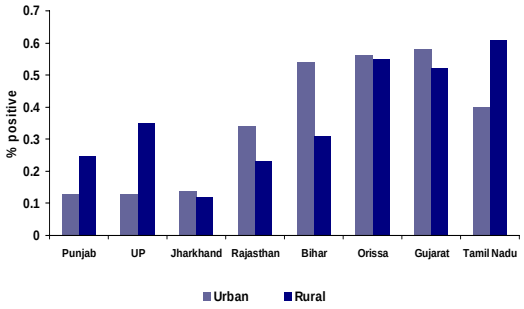


Figure 14: HIV Prevalence among ANC clinic attendees, Select States, By Place of Residence, 2006

Figure 15 shows that HIV Prevalence among ANC clinic attendees tends to decrease with increased education levels. **Figure 16** shows that HIV infection is highest among the women whose spouses work in the transport industry.

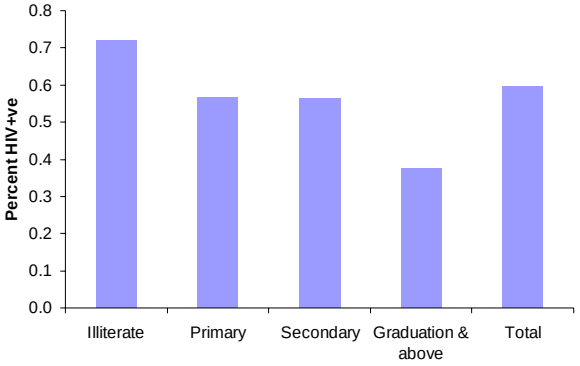


Figure 15: HIV Prevalence among ANC clinic attendees by education level, India, 2006

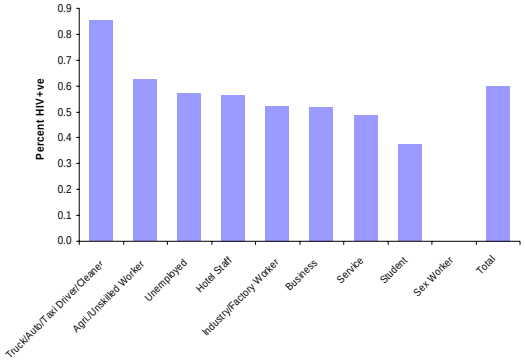


Figure 16: HIV Prevalence among ANC clinic attendees by Occupation of spouse, India, 2006

I. Summary

HIV situation in the country is assessed and monitored through regular annual sentinel surveillance mechanism established since 1992. The sentinel surveillance started with 180 sentinel sites which later expanded to 1122 sites, covering most of the districts of the country. These sentinel sites have been established in 628 Antenatal clinics representing general population and 494 at High Risk sites, representing High Risk Population. The high risk sites are among Injecting Drug users (51 sites), Female Sex workers (138 sites), Men having Sex with Men (31 sites) and STD Clinic attendees (251 sites).

As per the recent estimates using the internationally comparable Workbook method and using multiple data sources namely expanded sentinel surveillance system, NFHS-III, IBBA and Behavioural Surveillance Survey, there are 2 – 3.1 million (2.47 million) people living with HIV/AIDS at the end of 2006. Out of these, 0.97 million (39.3%) are women and 0.09 million (3.8%) are children. The estimated adult prevalence in the country is 0.36% (0.27% - 0.47%).

However, there are considerable differences in the prevalence rates across different geographical regions. HIV Prevalence amongst ANC clinic attendees has remained around 1% in the states of Andhra Pradesh, Karnataka, Manipur and Nagaland. The state of Mizoram has shown 1% HIV prevalence in ANC clinic attendees. The states of Tamilnadu and Maharashtra have recorded less than 1% HIV prevalence in ANC clinic attendees. A total of 118 districts have HIV prevalence among ANC clinic attendees greater than 1%, out of which 26 districts are in low prevalence states.

The HIV Prevalence among high risk groups continues to be nearly six to eight times greater than that among general population. Hence, India continues to be in the category of concentrated epidemic. Higher HIV prevalence among IDU is an important feature of North Eastern States. But in 2006, new pockets of high HIV prevalence among IDU has also been recorded in states of Punjab, Tamil Nadu, West Bengal, Kerala and Maharashtra indicating dual nature of the epidemic in the country.

There is decline in the HIV Prevalence among ANC clinic attendees in most of the high burden states, reflecting the impact of interventions. Similar trends are seen in Female Sex Workers also. But, some states show a stable or rising trend among ANC clinic attendees as well as FSWs. Trends among IDUs

show a rise in many states. Rising HIV prevalence among different population groups in North Indian states is an alarming signal for focused attention.

The epidemic is greater in urban areas than rural areas, greater among males than females, decreases with increasing education level, and is found to be highest among women whose spouses work in transport industry.

Based on the sentinel surveillance data for the last three years (2004-2006), all the districts in the country have been classified into four categories. There are 156 A category districts and 39 B category districts. The remaining are in categories C & D. The State-wise summary of district categorization and the list of Category A and B districts are provided in **Tables 5 & 6.**

Thus, HIV epidemic in India is a dual epidemic driven by sexual and IDU routes of transmission, concentrated in nature with high HIV prevalence among high risk groups and heterogeneous in spread with pockets of infection found in various districts of the country.

Table 5: Categorisation of Districts based on HIV Sentinel Surveillance 2004-2006: State Summary

S.No	Name of the State	Total No. of Districts	Category A	Category B	Category C	Category D
1	A & N Islands	2	0	0	1	1
2	Andhra Pradesh	23	23	0	0	0
3	Arunachal Pradesh	16	1	0	6	9
4	Assam	23	0	1	13	9
5	Bihar	38	2	1	27	8
6	Chandigarh	1	0	1	0	0
7	Chhattisgarh	16	1	0	9	6
8	Dadra Nagar Haveli	1	0	0	0	1
9	Daman & Diu	2	0	0	2	0
10	Delhi	9	0	4	5	0
11	Goa	2	1	1	0	0
12	Gujarat	25	6	4	9	6
13	Haryana	20	1	0	18	1
14	Himachal Pradesh	12	0	0	4	8
15	Jammu & Kashmir	14	0	0	7	7
16	Jharkhand	22	0	0	7	15
17	Karnataka	27	26	0	1	0
18	Kerala	14	0	2	12	0
19	Lakshadweep	1	0	0	1	0
20	Madhya Pradesh	48	5	3	23	17
21	Maharashtra	35	32	0	3	0
22	Manipur	9	9	0	0	0
23	Meghalaya	7	0	0	7	0
24	Mizoram	8	2	1	5	0
25	Nagaland	11	10	0	0	1
26	Orissa	30	4	3	18	5
27	Pondicherry	4	0	1	0	3
28	Punjab	17	1	1	15	0
29	Rajasthan	32	1	6	10	15
30	Sikkim	4	0	0	3	1
31	Tamil Nadu	30	22	5	3	0
32	Tripura	4	0	1	2	1
33	Uttar Pradesh	70	5	0	63	2
34	Uttaranchal	13	0	0	11	2
35	West Bengal	19	4	4	11	0
	Totals	609	156	39	296	118

Table 6: List of Category A and B Districts based on HIV Sentinel Surveillance 2004 - 2006

Catetory A (156)		
ANDHRA PRADESH (23/23)	Kodagu	**MIZORAM (2/8)**
Adilabad	Kolar	Aizawl
Anantapur	Koppal	Champhai
Chittoor	Mandya	**NAGALAND (10/11)**
Cuddapah	Mysore	Dimapur
East_Godavari	Raichur	Kohima
Guntur	Shimoga	Mokokchung
Hyderabad	Tumkur	Mon
Karimnagar	Udupi	Phek
Khammam	Uttara_Kannada	Tuensang
Krishna	**MADHYA PRADESH (5/48)**	Wokha
Kurnool	Balaghat	Kiphera
Mahabubnagar	Dewas	Peren
Medak	Harda	Zunheboto
Nalgonda	Panna	**ORISSA (4/30)**
Nellore	Rewa	Anugul
Nizamabad	**MAHARASHTRA (32/35)**	Bolangir
Prakasam	Ahmadnagar	Bhadrak
Rangareddi	Akola	Ganjam
Srikakulam	Amravati_Rural	**PUNJAB (1/17)**
Visakhapatnam	Aurangabad_MH	Ludhiana
Vizianagaram	Bhandara	**RAJASTHAN (1/32)**
Warangal	Beed	Ganganagar
West_Godavari	Buldana	**TAMIL NADU (22/30)**
ARUNACHAL PRADESH (1/16)	Chandrapur	Coimbatore
Lohit	Dhule	Cuddalore
BIHAR (2/38)	Gadchiroli	Dharmapuri
Araria	Hingoli	Erode
Lakhisarai	Jalgaon	Kanniyakumari
CHHATTISGARH (1/16)	Jalna	Karur
Durg	Kolhapur	Krishnagiri
GOA (1/2)	Latur	Madurai
North_Goa	Mumbai	Namakkal
GUJARAT (6/25)	Mumbai (Suburban)	Perambalur
Banas_Kantha	Nagpur_Rural	Pudukkottai
Dahod	Nanded	Ramanathapuram
Mahesana	Nandurbar	Salem
Navsari	Nashik	Sivaganga
Surat	Osmanabad	Theni
Surendranagar	Parbhani	The_Nilgiris
HARYANA (1/20)	Pune	Thiruvallur
Bhiwani	Raigarh_MH	Tiruchirappalli
KARNATAKA (26/27)	Ratnagiri	Tiruvanamalai
Bagalkot	Sangli	Toothukudi
Bangalore_City	Satara	Vellore
Bangalore_Rural	Solapur	Virudhnagar
Belgaum	Thane	**UTTAR PRADESH (5/70)**
Bellary	Wardha	Allahabad
Bidar	Yavatmal	Banda
Bijapur	**MANIPUR (9/9)**	Deoria
Chamarajanagar	Bishnupur	Etawah
Chikmagalur	Chandel	Mau
Dakshina_Kannada	Churachandpur	**WEST BENGAL (4/19)**
Davanagere	Imphal	Kolkata
Dharwad	Senapati	Puruliya
Gadag	Tamenglong	Barddhaman
Gulbarga	Thoubal	Uttar_Dinajpur
Hassan	Ukhrul	
Haveri	Moreh	

Catetory B (39)
ASSAM (1/23)
Sonitpur
BIHAR (1/38)
Katihar
CHANDIGARH (1/1)
Chandigarh
DELHI (4/9)
Delhi_Central
Delhi_East
Delhi_North
Delhi_North_East
GOA (1/2)
South_Goa
GUJARAT (4/25)
Ahmadabad
Bhavnagar
Rajkot
Boroda (Varodara)
KERALA (2/14)
Ernakulam
Kozhikode
MADHYA PRADESH (3/48)
Indore
Mandsaur
Bhopal
MIZORAM (1/8)
Kolasib
ORISSA (3/30)
Baleswar
Khordha
Koraput
PONDICHERRY (1/4)
Pondicherry
PUNJAB (1/17)
Bhatinda
RAJASTHAN (6/32)
Ajmer
Alwar
Barmer
Jaipur
Udaipur
Tonk
TAMIL NADU (5/30)
Chennai
Kancheepuram
Tirunelveli
Thanjavur
Villupuram
TRIPURA (1/4)
North Tripura
WEST BENGAL (4/19)
Darjeeling
Jalpaiguri
Medinipur_East
Murshidabad