

HIV Sentinel Surveillance and HIV Estimation in India 2007

A Technical Brief

**NATIONAL AIDS CONTROL ORGANISATION
MINISTRY OF HEALTH AND FAMILY WELFARE
GOVERNMENT OF INDIA
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Index

- ⊕ Executive Summary
- ⊕ Introduction
- ⊕ Sentinel Site Distribution in 2007
- ⊕ Patterns of HIV Epidemic at National Level
- ⊕ HIV Epidemic among High Risk Groups
 - Female Sex Workers
 - Men who have Sex with Men
 - STD Clinic Attendees
 - Injecting Drug Users
- ⊕ HIV Epidemic among General Population
- ⊕ HIV Burden in India
 - Methodology of Estimation of HIV Burden
 - Estimates of HIV prevalence in India
 - Estimates of HIV Burden in India

Executive Summary

- ▣ HIV Sentinel Surveillance is an annual exercise conducted to monitor the trends and levels of HIV epidemic among different population groups in the country. It is implemented with the support of two national institutes and five regional public health institutes of India. The methodology adopted is Consecutive Sampling at the service facilities and Unlinked Anonymous Testing after removing all the identifiers.
- ▣ HIV Sentinel Surveillance 2007 was conducted at 1134 sentinel sites – 646 sites among general population and 488 sites among high risk group population (FSW, MSM, IDU, Migrants and Truckers). A total of 3,58,797 samples were tested during HIV Sentinel Surveillance 2007.
- ▣ The overall HIV prevalence among different population groups in 2007 continues to portray the concentrated epidemic in India, with a very high prevalence among High Risk Groups – IDU (7.2%), MSM (7.4%), FSW (5.1%) & STD clinic attendees (3.6%) and low prevalence among ANC clinic attendees (Population adjusted - 0.48%).
- ▣ Except Andhra Pradesh with HIV prevalence of 1%, all other states have shown less than 1% HIV prevalence among ANC clinic attendees. At the district level, a total of 87 districts (117 sites) have shown HIV prevalence $\geq 1\%$ among ANC clinic attendees in 2007. Out of these, 13 districts are in moderate and low prevalence states. Ten districts have shown a very high prevalence of $\geq 3\%$ among ANC clinic attendees. Nine districts have been identified as having ANC HIV prevalence $\geq 1\%$ for the first time in low and moderate prevalence states which includes 3 districts in Bihar, one district each in Chhattisgarh, Gujarat, Kerala, Madhya Pradesh, Orissa and West Bengal.
- ▣ An overall decline in HIV prevalence among ANC clinic attendees is noted at all India level and in high prevalence states in South and Northeast. Decline is also noted in new infections/ HIV incidence as reflected by HIV prevalence among ANC clinic attendees aged 15-24 years. Rising trend among ANC clinic attendees is observed in some low and moderate prevalence states, especially in the four states of Gujarat, Rajasthan, Orissa and West Bengal.
- ▣ Forty seven districts (48 sites) have shown $>5\%$ HIV prevalence among FSW, which also include FSW sites in low prevalence states namely West Bengal, Bihar and Gujarat. FSW sites in Pune, Mumbai and Thane have shown $> 30\%$ HIV prevalence among FSW. Among FSW, there is a decline in South Indian states indicating a possible impact of interventions, while rising trends are evident in the North East suggesting a dual nature of the epidemic.
- ▣ Expanded surveillance among MSM has revealed more than 5% HIV prevalence in Karnataka (17.6%), Andhra Pradesh (17%), Manipur (16.4%), Maharashtra (11.8%), Delhi (11.7%), Gujarat (8.4%), Goa (7.9%), Orissa (7.4%), Tamil Nadu (6.6%) and West Bengal (5.6%).

- ▣ Among IDUs, Maharashtra (24.4%), Manipur (17.9%), Tamil Nadu (16.8%), Punjab (13.8%), Delhi (10.1%), Chandigarh (8.6%), Kerala (7.9%), West Bengal (7.8%), Mizoram (7.5%) & Orissa (7.3%) have shown high HIV prevalence of $\geq 5\%$. New pockets of epidemic among IDU identified during 2006 continue to show high HIV prevalence in 2007. Trends among IDUs are on a decline in Manipur, Nagaland and Chennai while there is a steady rise in Meghalaya, Mizoram, West Bengal, Mumbai, Kerala and Delhi.
- ▣ It is estimated that in 2007, there are 2.31 million (1.8 – 2.9 million) people living with HIV/AIDS in India with an estimated adult HIV prevalence of 0.34% (0.25% – 0.43%). Out of the estimated number of PLHA, 39% are females and 3.5% are children.
- ▣ Thus, HIV epidemic in India is heterogenous in nature, both in terms of routes of transmission as well as geographic spread. Possible impact of interventions could be noted in places where HIV was visible and interventions were started earlier while rising trends are observed in other states. New pockets of IDU and MSM were identified which require cognizance and action.

Introduction

The 2007 round of HIV Sentinel Surveillance (HSS) was conducted across the country from October 2007 to January 2008 at 1134 sentinel sites. Surveillance was conducted among ANC clinic attendees, STD clinic attendees, Female Sex Workers (FSW), Men who have Sex with Men (MSM), Injecting Drug Users (IDU), Migrants and Truckers. **Table I** shows the expansion of sentinel sites typology-wise in the country over the years. Methodology adopted was Unlinked Anonymous Testing of consecutively selected samples at service points such as ANC clinics, STD clinics, Drop-in-centres, De-addiction Centres, etc.

Table I: Number of Sentinel Sites by Year and Type from 1998 to 2007, India

Site type/year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
STD	76	75	98	133	166	163	171	175	251	248
ANC	92	93	111	172	200	266	268	267	470	484
IDU	5	6	10	10	13	18	24	30	51	52
MSM	-	-	3	3	3	9	15	18	31	40
FSW	1	1	2	2	2	32	42	83	138	137
ANC (Rural)	-	-	-	-	-	210	122	124	158	162
TB	2	2	-	-	-	-	7	4	-	-
Migrant	-	-	-	-	-	-	-	1	6	3
Eunuchs	-	-	-	-	-	-	-	1	1	1
Truckers	-	-	-	-	-	-	-	-	15	7
Fisher Folk	-	-	-	-	-	-	-	-	1	-
Others (Seamen)	-	-	-	-	-	1	-	-	-	-
Total	176	177	224	320	384	699	649	703	1122	1134

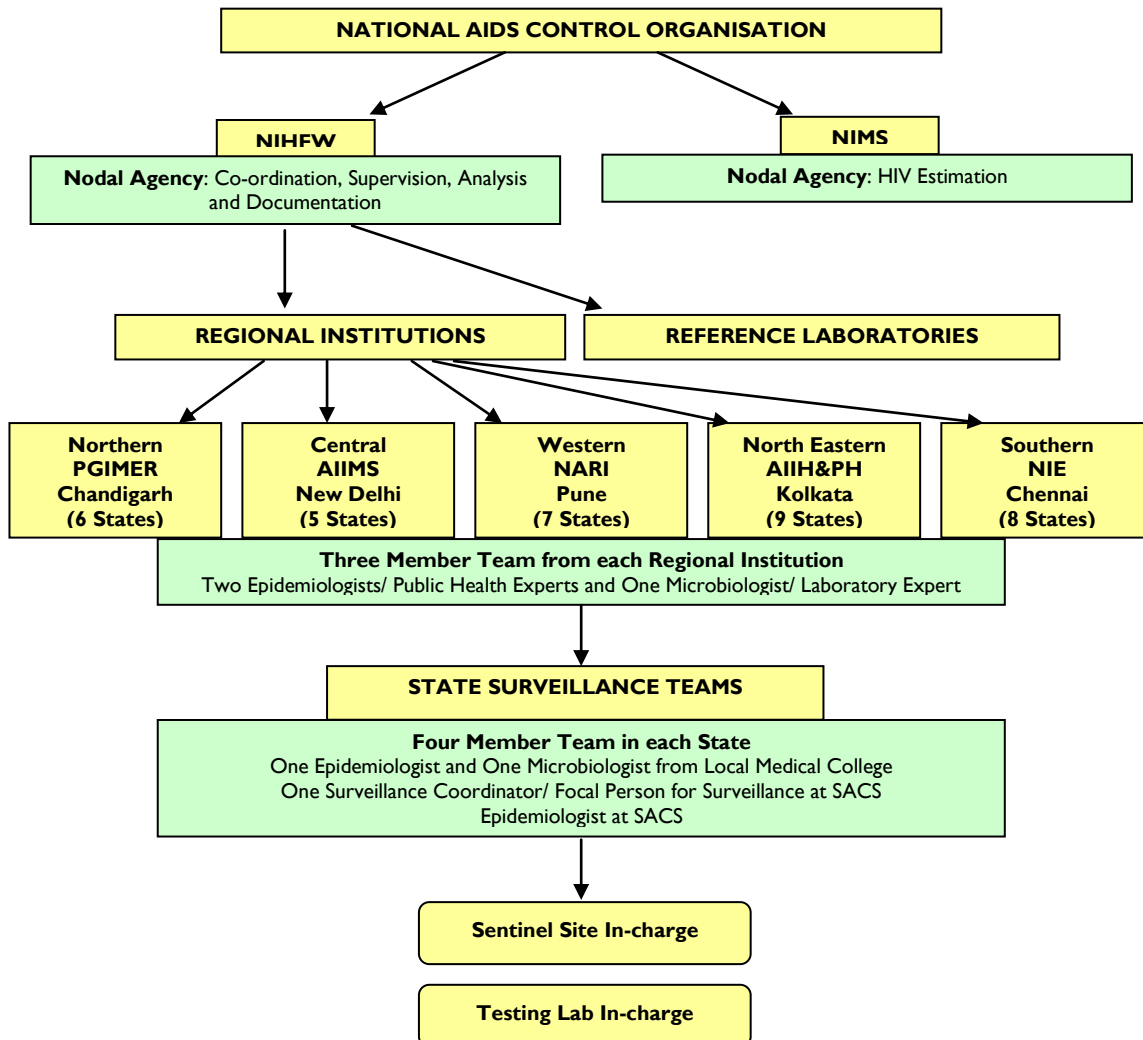
NACO conducts the HIV Sentinel Surveillance and estimation with the support of two National institutes: National Institute of Health and Family Welfare, New Delhi and National Institute of Medical Statistics, ICMR, New Delhi. Since 2006, five regional institutes have been identified in the country that 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 presented in **Figure I**.

Besides monitoring and supervision, the Regional Institutes also play a crucial role in validating the significant findings. For the first time, after HSS 2007, detailed epidemiological investigations were

carried out by teams from Regional Institutes and State Epidemiologists at the sites that have shown significantly high prevalence. The objective was to identify if the high prevalence is a reflection of true picture or because of operational factors such as faulty sampling process, wrong inclusion criteria, mixing or contamination of samples. The investigations also enquired into the training status of the staff at the sentinel sites and availability of the required infrastructure. ANC sites with greater than 3% positivity, ANC sites with which have shown greater than 1% positivity for the first time and high risk group sites (STD/ FSW/ MSM/ IDU) with greater than 15% positivity were investigated. Overall 41 sites were investigated and the findings validated.

The samples collected for HIV Sentinel Surveillance are tested in around 300 testing laboratories across the country. The quality of testing at these testing labs is continuously monitored by 11 National Reference Laboratories (NRLs) through External Quality Assurance Scheme (EQAS). All the positive samples and 5% of the negative samples selected through consecutive random sampling from each testing lab are retested at NRLs. The results from NRLs are reviewed to understand the quality of testing at different testing labs.

Figure 1: Organizational Structure for HIV Sentinel Surveillance 2007



Sentinel Site Distribution

During the earlier years of NACP, sentinel sites were established in the high prevalence states where the epidemic was on rise. As a result, there is a vast network of sentinel sites in these states with every district having one or more number of sentinel sites. Forty Three percent(43%) of ANC sites and around one-third (31%) of high risk group sites in the country are in the six high prevalence states in 2007. Though sentinel sites among high risk groups were less in number than those among general population, they were also increased significantly.

Since 2006, surveillance network has been expanded to cover all the states of the country. In the low prevalence states of North India, there has been a significant increase in the sentinel sites established among general population as well as high risk groups. According to the current situation, all states have sentinel sites among general population and all states except Daman & Diu and Dadra Nagar Haveli have sentinel sites among STD clinic attendees. FSW sites are established in 25 states, IDU sites in 21 states and MSM sites in 19 states. Ten states contribute 62% of sentinel sites among HRG. While six states (J&K, D&D, DNH, Lakshadweep, Uttarakhand, A&NI) do not have any high risk group sites, the rest of the states together contribute only 38% of HRG sites.

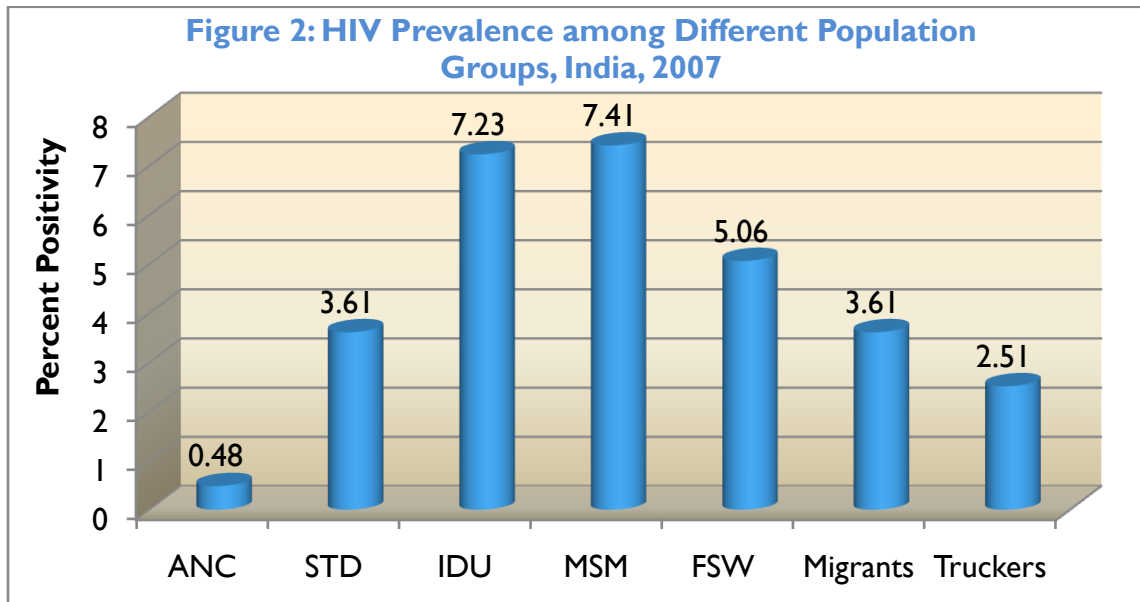
Looking at the district level distribution, currently there are 622 districts in the country out of which sentinel sites are established in 589 districts. There are 310 districts with two or more sentinel sites among different population groups. 476 districts have ANC sites and 176 districts have HRG sites. Andhra Pradesh, Kerala, Mizoram, Nagaland and West Bengal have high risk group sites established in more than 60% of districts. There is a need for expanding the surveillance among high risk groups, especially among MSM, IDU and Migrants. Even some high prevalence states have very few districts with HRG sites. (Karnataka: 2/27 Districts – 6 sites; Maharashtra: 12/35 Districts – 17 sites; Tamil Nadu: 11/30 Districts – 14 sites; Manipur: 4/9 Districts – 8 sites). In high prevalence states where the epidemic is established and interventions are scaled up, surveillance among high risk groups will provide information on the impact of our interventions. Distribution of sentinel sites across districts is presented in **Table 2**.

Table 2: Distribution of Sentinel Sites across Districts, State-wise Summary, 2007

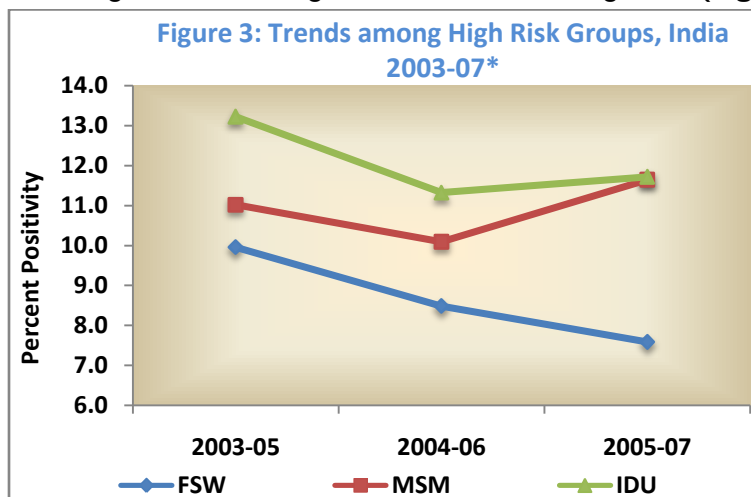
S. N	State	Total No. of Dts.	Dts. with site	Dts. with ANC site	Dts. with Only ANC site	No. of ANC sites	Dts. with HRG site	Dts. without HRG site	No. of HRG sites
1	A & N Islands	3	3	3	2	3	0	3	0
2	Andhra Pradesh	23	23	23	5	52	16	7	20
3	Arunachal Pradesh	16	11	6	4	6	1	15	1
4	Assam	27	25	16	10	16	11	16	13
5	Bihar	38	36	23	8	23	14	24	15
6	Chandigarh	1	1	1	0	1	1	0	5
7	Chhattisgarh	16	16	14	10	17	1	15	2
8	D & N Haveli	1	1	1	1	1	0	1	0
9	Daman & Diu	2	2	2	2	2	0	2	0
10	Delhi	9	9	5	1	5	5	4	10
11	Goa	2	2	1	0	2	1	1	1
12	Gujarat	25	25	25	14	25	3	22	6
13	Haryana	20	19	12	7	12	9	11	9
14	Himachal Pradesh	12	12	8	6	9	5	7	6
15	Jammu&Kashmir	14	14	14	8	15	0	14	0
16	Jharkhand	24	18	12	7	15	5	19	6
17	Karnataka	27	27	27	20	54	2	25	6
18	Kerala	14	14	6	0	6	13	1	15
19	Lakshadweep	1	1	1	0	2	0	1	0
20	Madhya Pradesh	50	45	36	30	36	3	47	3
21	Maharashtra	35	35	35	20	73	12	23	18
22	Manipur	9	9	9	4	14	4	5	8
23	Meghalaya	7	6	6	4	7	1	6	1
24	Mizoram	8	7	7	2	8	5	3	6
25	Nagaland	11	11	11	3	19	8	3	9
26	Orissa	30	30	30	17	31	9	21	10
27	Puducherry	4	2	2	0	2	2	2	5
28	Punjab	20	18	13	11	13	6	14	10
29	Rajasthan	33	32	26	14	26	5	28	5
30	Sikkim	4	3	2	1	3	2	2	3
31	Tamil Nadu	30	30	30	13	63	11	19	14
32	Tripura	4	4	1	0	2	1	3	1
33	Uttar Pradesh	70	69	51	39	61	8	62	9
34	Uttarakhand	13	11	7	4	9	0	13	0
35	West Bengal	19	18	10	3	13	12	7	23
	INDIA	622	589	476	270	646	176	446	240

Patterns of HIV Epidemic at National Level

At the national level, the overall HIV prevalence among different population groups in 2007 continues to portray the concentrated epidemic in India, with a very high prevalence among High Risk Groups – IDU (7.2%), MSM (7.4%), FSW (5.1%) & STD clinic attendees (3.6%) and low prevalence among ANC clinic attendees (Age adjusted - 0.48%). New pockets of epidemic among IDU identified during 2006 continue to show high HIV prevalence in 2007. Expanded surveillance among MSM has shown new pockets of high HIV prevalence among MSM in 2007. **Figure 2** depicts the concentrated nature of HIV epidemic in India.



Trends among different population groups at national as well as state level are derived using Three Year Moving Average of the HIV prevalence at consistent sites from 2003 to 2007. At all India level, the trends of HIV prevalence among ANC clinic attendees and FSW are showing a clear decline. Stable to rising trends are noted among IDU while rising trends are noted among MSM. **(Figure 3)**



*3-yr Moving Average
Based on Consistent Sites: IDU – 13, MSM – 7, FSW – 22.

HIV Epidemic among High Risk Groups

As mentioned above, HIV epidemic in India is concentrated in nature with high prevalence among high risk groups. Heterosexual mode of transmission is still the predominant mode of HIV transmission in India. Though HIV trends among high risk groups have mixed patterns, there are pockets of high HIV prevalence among high risk groups in many parts of the country. **Table 3** summarises the distribution of pockets of high HIV prevalence among high risk groups in India.

Table 3: States and Districts with high HIV Prevalence among Different Groups, 2007

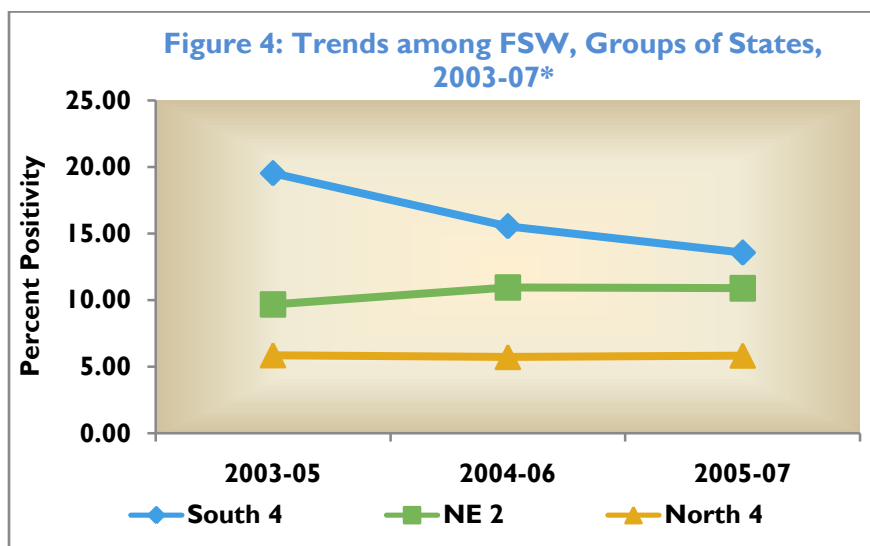
States with high HIV prevalence among IDU	Maharashtra (24.4%), Manipur (17.9%), Tamil Nadu (16.8%), Punjab (13.8%), Delhi (10.1%), Chandigarh (8.6%), Kerala (7.9%), West Bengal (7.8%), Mizoram (7.5%) & Orissa (7.3%)
Number of Districts with >5% HIV prevalence among IDU	23 out of 49 districts with IDU sites
Number of Districts with >15% HIV prevalence among IDU	7 out of 49 districts with IDU sites
States with high HIV prevalence among MSM	Karnataka (17.6%), Andhra Pradesh (17%), Manipur (16.4%), Maharashtra (11.8%), Delhi (11.7%), Gujarat (8.4%), Goa (7.9%), Orissa (7.4%), Tamil Nadu (6.6%) and West Bengal (5.6%)
Number of Districts with >5% HIV prevalence among MSM	21 out of 40 districts with MSM sites
Number of Districts with >15% HIV prevalence among MSM	9 out of 40 districts with MSM sites
States with high HIV prevalence among FSW	Maharashtra (17.9%), Manipur (13.1%), Andhra Pradesh (9.7%), Nagaland (8.9%), Mizoram (7.2%), Gujarat (6.5%), West Bengal (5.9%) & Karnataka (5.3%)
Number of Districts with >5% HIV prevalence among FSW	47 out of 129 districts with FSW sites
Number of Districts with >15% HIV prevalence among FSW	8 (FSW sites in Pune, Mumbai and Thane have shown > 30% HIV prevalence among FSW)

Female Sex Workers

At the state level, HIV prevalence among FSWs is very high in Maharashtra (17.91%), followed by Manipur (13.07%), Andhra Pradesh (9.74%), Nagaland (8.91%) and Mizoram (7.2%). Among the other states, Gujarat, Karnataka, and West Bengal have HIV prevalence greater than 5% among FSW. **Table 4** shows state-wise HIV prevalence among high risk groups.

Overall, 48 sites have shown greater than 5% HIV prevalence among FSW which includes 7 sites in West Bengal, 4 in Bihar, 3 sites in Manipur, 12 in Maharashtra, 10 in Andhra Pradesh, 4 in Tamil Nadu, 3 in Karnataka, 2 in Gujarat and 1 site each in Delhi, Mizoram and Nagaland. FSW sites in Pune, Mumbai and Thane have shown > 30% HIV prevalence among FSW.

Among FSW, there is a decline in South Indian States reflecting the impact of interventions, while rising trends are evident in the North East suggesting a dual nature of the epidemic. In the low prevalence states, the trends are stable. **Figure 4** depicts HIV trends among FSW in different regions of India.



* 3-yr Moving Average Based on Consistent sites: South4 (AP, TN, Kar, Mah): 7 sites, NE2 (Mani, Naga): 2 sites, North 4 (Guj, Raj, Ori, WB): 7 sites

Men who have Sex with Men

Expansion of surveillance among MSM has revealed new pockets of epidemic. Among MSM, high HIV prevalence is recorded in the states of Karnataka (17.6%), Andhra Pradesh (17.04%), Manipur (16.4%), Maharashtra (11.80%) and Delhi (11.73%), and Goa (7.93%) and Gujarat (8.40%). In total, 11 states have shown greater than 5% HIV prevalence among MSM. **Table 4** shows state-wise HIV prevalence among high risk groups.

All the new MSM sites established in Andhra Pradesh and Orissa have shown high HIV prevalence, suggesting that there may be many pockets of high prevalence among MSM which need to be detected. Moreover, urban areas of the country such as Delhi, Pune, Bangalore, Surat, Rajkot and Kolkata recorded very high HIV prevalence among MSM. Overall, 21 districts have shown greater than 5% HIV prevalence among MSM.

Figure 5 shows the HIV trends among MSM in select states of India. Among MSM, HIV trends are rising in south Indian states. Rising trends are also noted Delhi while trends are stable at the single MSM site in Manipur.

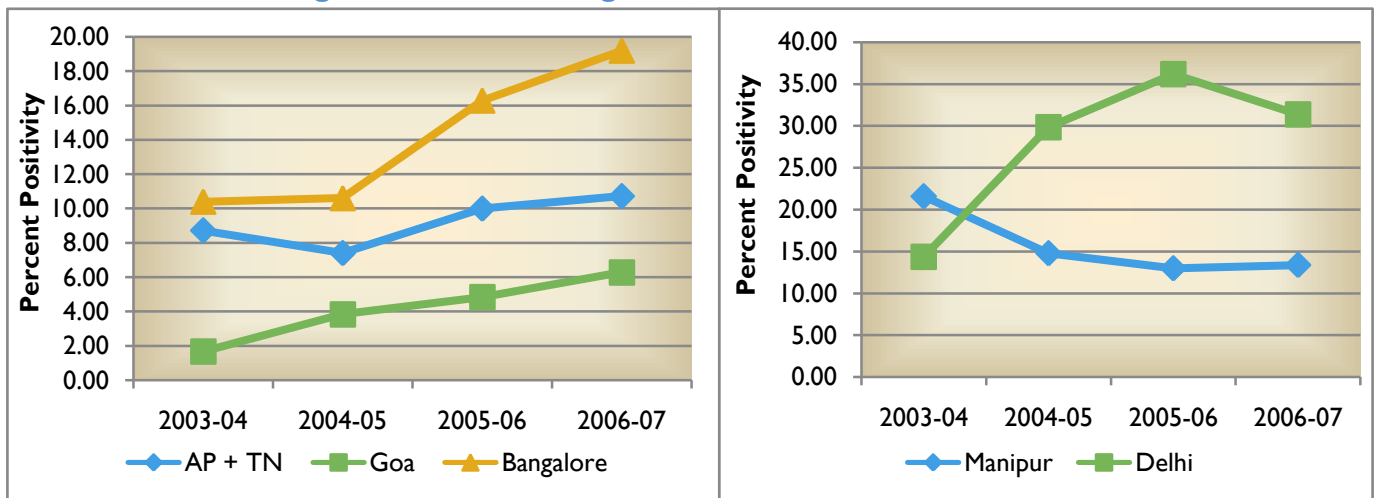
STD Clinic Attendees

Among the STD clinic attendees, Andhra Pradesh continues to show the highest prevalence (19.72% - (7.60% - 39.20%)) followed by Maharashtra (16.18% - (7.20%-32.20%)), Karnataka (7.15% - (1.60%-10.80%)) and Tamil Nadu (12.04% - (1.60%- 38.40%)). Mizoram (7.13%) and Goa (5.60%) have shown HIV prevalence greater than 5% among STD clinic attendees. **Table 6** shows state-wise HIV prevalence among STD clinic attendees.

At the district level, 48 sites have HIV prevalence greater than 5% among STD clinic attendees, out of which 12 districts are in low prevalence states – Chhattisgarh (2), Gujarat(2), Goa(1), Delhi(3), Madhya Pradesh (2), West Bengal (1) and Mizoram(1). 13 districts have shown very high prevalence of greater than 15% among STD clinic attendees in high prevalence southern states.

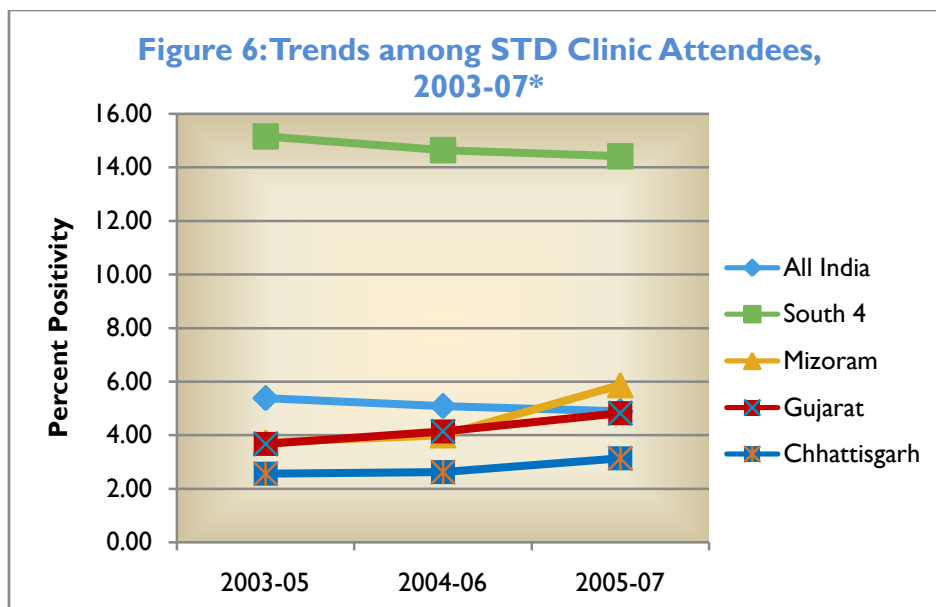
Trends among STD clinic attendees are declining at all India level and in high prevalence states, while rising trends are noted in Chhattisgarh, Mizoram and Gujarat. Stable trends are noted in other low prevalence states. **Figure 6** shows the HIV trends among STD clinic attendees in select regions and states in India.

Figure 5: Trends among MSM, Select States, 2003-07*



* 2-yr Moving Average Based on Consistent sites: AP + TN: 3 sites, Goa: 1 site, Bangalore: 1 site, : Delhi:1 site, Manipur: 1 site

Figure 6: Trends among STD Clinic Attendees, 2003-07*



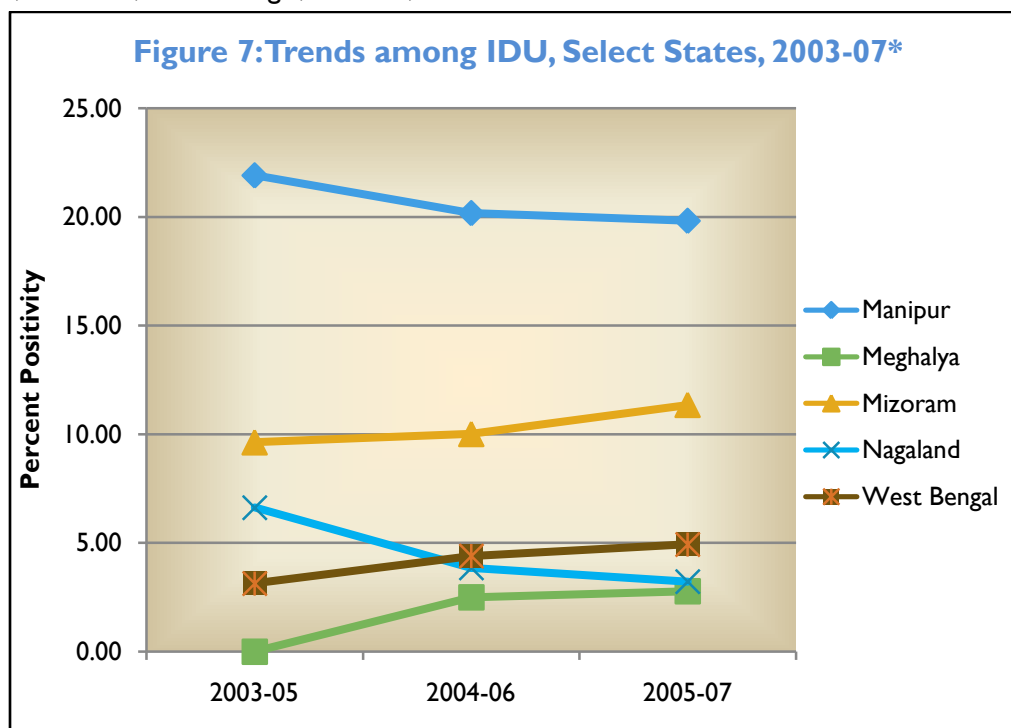
* 3-yr Moving Average Based on Consistent sites: All India: 157 sites, South4 (AP, TN, Kar, Mah): 36 sites, NE2 (Mani, Naga): 3 sites, Mizoram: 1 site, Gujarat: 8 sites, Chhattisgarh: 3 sites.

Injecting Drug Users

Pockets of HIV Epidemic among IDU identified in 2006 continue to show high HIV prevalence. **Table 4** shows state-wise HIV prevalence among high risk groups. Apart from Maharashtra (24.4%), Manipur (17.90%) and Tamil Nadu (16.80%), high prevalence persists among IDUs in the states of Chandigarh (8.64%), Punjab (13.79%), Delhi (10.10%), Orissa (7.3%) and Kerala & West Bengal (7.8%). 6 states have shown HIV prevalence between 1% and 5% among IDUs- Andhra Pradesh (3.71%), Assam (2.14%), Karnataka (2%), Meghalaya (4.17%), Nagaland (1.90%) and Uttar Pradesh (1.29%).

Overall, 22 districts (24 sites) have shown HIV prevalence greater than 5% among IDUs which includes 4 sites in West Bengal & Manipur, 3 each in Kerala and Orissa, 2 sites in Mizoram, Punjab, Tamil Nadu and 1 site each in Chandigarh, Delhi, Maharashtra and Nagaland.

Figure 7 shows HIV trends among IDU in select states. Trends among IDUs are on a decline in Manipur, Nagaland and Chennai reflecting impact of interventions while rising trends are noted in Meghalaya, Mizoram, West Bengal, Mumbai, Kerala and Delhi.



* 3-yr Moving Average Based on Consistent sites: Manipur: 3 sites, Meghalaya: 1 site, Mizoram: 1 site, Mumbai: 1 site, Nagaland: 5 sites, West Bengal: 1 site

Heterogenous spread of HIV epidemic is evident from the fact that overall, 143 high risk group sites have shown HIV prevalence greater than 5% out of which 39 have shown greater than 15% HIV prevalence in 2007. **Figure 8** shows the districts with HIV prevalence greater than 15% among FSW, MSM and IDU.

Figure 8: Districts with HIV Prevalence > 15% among High Risk Groups, 2007

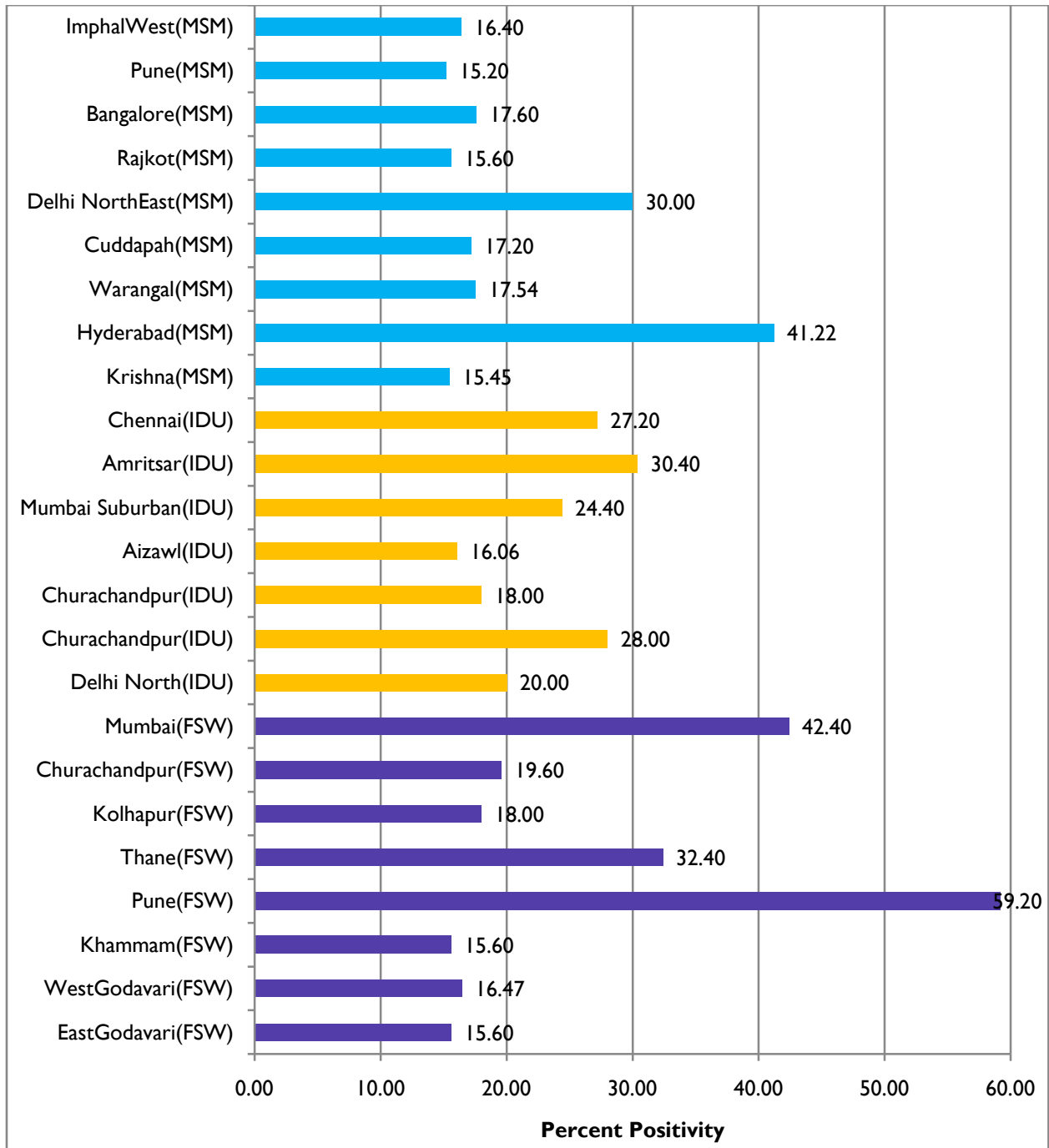


Table 4: State-wise HIV Prevalence among IDU, MSM & FSW, 2003-2007

SN	State	Mean Prevalence_IDU					Mean Prevalence_MSM					Mean Prevalence_FSW					
		2003	2004	2005	2006	2007	2003	2004	2005	2006	2007	2003	2004	2005	2006	2007	
1	A & N Islands						1.25						0.50	0.40			
2	Andhra Pradesh					3.71	13.20	16.00	6.45	10.25	17.04	20.00	16.97	12.97	7.32	9.74	
3	Arunachal Pradesh				0.00	0.00									0.00		
4	Assam	5.56	4.48	7.86	2.86	2.14				0.78	2.78	0.00	0.00	0.76	0.46	0.44	
5	Bihar				0.20	0.60	1.60	1.60	0.40	0.30	0.00	4.80	0.20	2.24	1.68	3.40	
6	Chandigarh		4.80	9.20	17.60	8.64		1.36	1.60	4.80	3.60	0.60	0.80	0.67	0.67	0.40	
7	Chhattisgarh														1.57	1.43	
8	D & N Haveli																
9	Daman & Diu																
10	Delhi	14.40	17.60	22.80	10.00	10.10	27.42	6.67	20.40	12.27	11.73	1.61	4.60	3.15	2.80	3.15	
11	Goa						9.09	1.68	4.90	4.80	7.93	30.15					
12	Gujarat							6.80	10.67	11.20	8.40		9.20	8.13	6.40	6.53	
13	Haryana				0.00	0.80					0.00	5.39		2.00	1.19	0.91	
14	Himachal Pradesh										0.44	0.00	0.00	0.80	0.00	0.66	0.87
15	Jammu&Kashmir	0.00	0.00	0.00	2.50										0.00		
16	Jharkhand				0.40								0.00	0.80	0.88	1.09	
17	Karnataka	2.80	0.00		3.60	2.00	10.80	10.00	11.61	19.20	17.60	14.40	21.60	18.39	8.64	5.30	
18	Kerala		2.58	5.19	9.57	7.85		0.89	3.20	0.64	0.96	1.94			0.32	0.87	
19	Lakshadweep																
20	Madhya Pradesh													1.82	1.07	0.67	
21	Maharashtra	22.89	29.20	12.80	20.40	24.40	18.80	11.20	10.40	15.60	11.80	54.29	41.69	23.62	19.57	17.91	
22	Manipur	24.47	21.00	24.10	19.80	17.90	29.20	14.00	15.60	10.40	16.40	12.80	12.40	10.00	11.60	13.07	
23	Meghalaya	0.00	0.00	0.00	3.33	4.17											
24	Mizoram	6.40	6.80	4.80	3.05	7.53							13.69	14.00	10.40	7.20	
25	Nagaland	8.43	3.22	4.51	2.39	1.91						4.40	4.44	10.80	16.40	8.91	
26	Orissa				10.40	7.33					7.37		5.18	2.60	1.00	0.80	
27	Pondicherry							5.22	5.60	2.47	2.00		1.94	0.28	1.44	1.30	
28	Punjab				13.80	13.79				4.80	1.22	0.00			1.36	0.65	
29	Rajasthan									0.00		3.92	2.31	3.72	2.55	4.16	
30	Sikkim			0.48	0.20	0.47										0.00	
31	Tamil Nadu	63.81	39.92	18.00	24.20	16.80	4.20	6.80	6.20	5.60	6.60	8.80	4.00	5.49	4.62	4.68	
32	Tripura			10.92	0.00	0.00											
33	Uttar Pradesh				4.63	1.29					0.40	6.60	8.00	3.50	1.52	0.78	
34	Uttaranchal																
35	West Bengal	2.61	3.83	7.41	4.64	7.76		1.33	0.54	6.60	5.61	6.47	4.11	6.80	6.12	5.92	

Note: The presented values are mean prevalence (Percent positivity) among each high risk group. The data represents all sites in a particular year.

HIV Epidemic among General Population

HIV Sentinel Surveillance system utilizes the data from the pregnant women at Antenatal clinics as a surrogate for general population. During 2007, HIV Sentinel Surveillance was conducted at 646 antenatal clinics and samples were collected from 2,45,516 pregnant women to monitor HIV trends among general population. **Table 5** summarises the distribution of pockets of high HIV prevalence among ANC clinic attendees in India. HIV prevalence among ANC clinic attendees at different sentinel sites shows the heterogenous distribution of HIV epidemic and also the emerging pockets of HIV infection.

Table 5: States and Districts with high HIV Prevalence among ANC Clinic Attendees, 2007

Number of States with >1% Median HIV prevalence among ANC clinic attendees	Only One (Andhra Pradesh)
Number of Districts with >1% HIV prevalence among ANC clinic attendees	87 (13 of these are in low prevalence states) out of 476 districts with ANC sites
Number of Districts with >3% HIV prevalence among ANC clinic attendees	10 out of 476 districts with ANC sites
Number of Districts Newly Identified during HSS 2007 with >1% HIV prevalence among ANC clinic attendees in low prevalence states	9 (Three in Bihar and One each in Chhattisgarh, Gujarat, MP, Kerala, Orissa and West Bengal) out of 476 districts with ANC sites

Table 6 shows state-wise HIV prevalence among ANC and STD clinic attendees. Considerable differences continue to exist in the prevalence rates across different geographical regions. Except Andhra Pradesh with median HIV prevalence of 1%, all other states have shown less than 1% median HIV prevalence among ANC clinic attendees. Mizoram and Manipur have shown 0.75% HIV prevalence among ANC clinic attendees while Nagaland has shown 0.6%.

At the district level, a total of 87 districts (117 sites) have shown HIV prevalence $\geq 1\%$ among ANC clinic attendees in 2007. Out of these, 13 districts are in moderate and low prevalence states - Gujarat (2), Madhya Pradesh (1), Orissa (2), West Bengal (2), Bihar (3), Chhattisgarh (1), Kerala (1) & Mizoram (1).

Figures 9 & 10 show the districts with greater than 3% HIV prevalence among ANC clinic attendees and the districts that have been newly identified with high HIV prevalence among ANC clinic attendees respectively. Ten districts (11 sites) have shown a very high prevalence of $\geq 3\%$ among ANC clinic attendees. Ukhrul in Manipur (6%), Tuensang in Nagaland (Urban-5.6% & Rural-4.30%) and Gulbarga (5%) & Chikmagalur (3.5%) in Karnataka, Salem (4.25%) & Namakkal (3.25%) in Tamil Nadu, Sangli (3.25%) in Maharashtra and Krishna (3.5%) in Andhra Pradesh have shown the highest HIV prevalence among ANC clinic attendees. Nine districts have been identified as having ANC HIV prevalence $\geq 1\%$ for the first time in low prevalence states. (Table 4). The epidemic in Gujarat is spreading faster with six districts with HIV prevalence $\geq 1\%$ among ANC clinic attendees in 2006 and one more new district identified in 2007 with HIV prevalence $\geq 1\%$.

Figure 9: Districts with >3% HIV Prevalence among ANC Clinic attendees, 2007

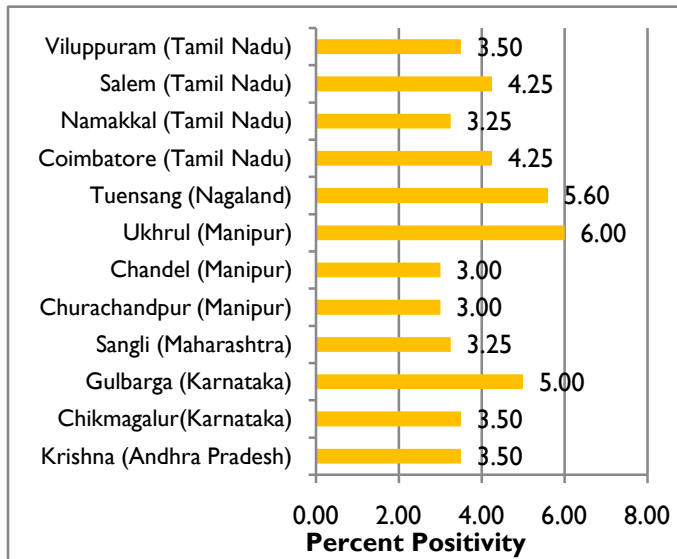
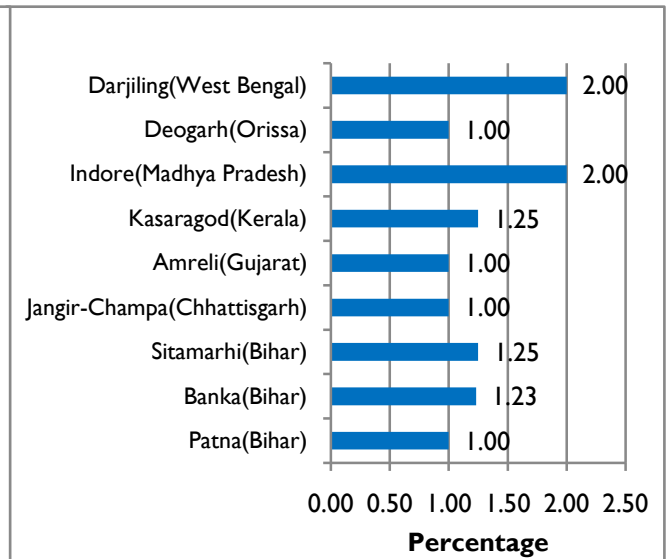
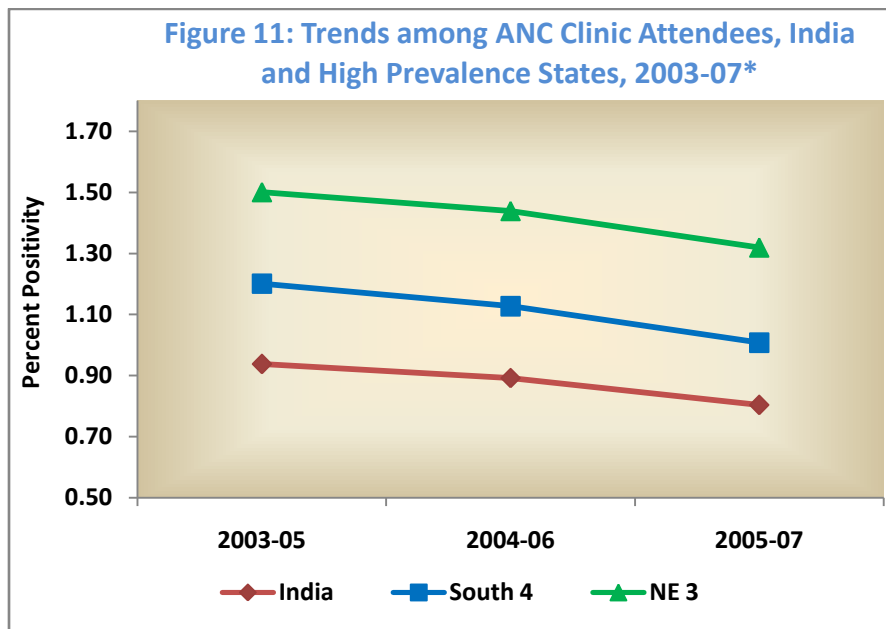


Figure 10: Newly Identified Districts with >1% HIV Prevalence among ANC Clinic attendees. 2007

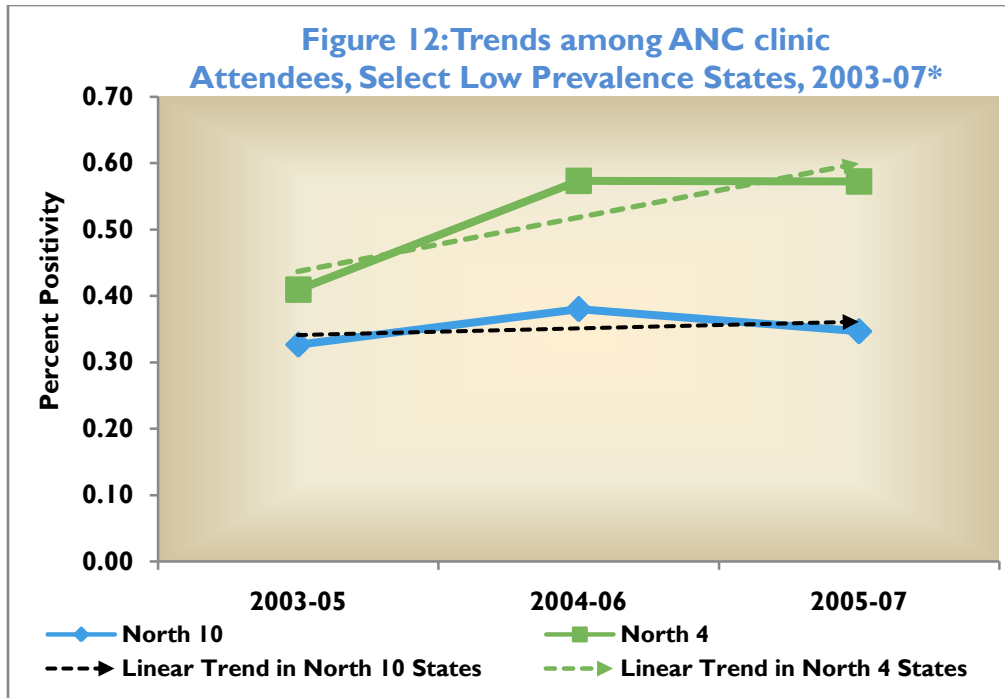


At the national level as well as in the high prevalence states where interventions were in place for many years, decline in HIV trends is very evident (**Figure 11**), indicating a possible impact of interventions. Whereas among the low prevalence states, HIV trends among ANC clinic attendees are found to be rising (**Figure 12**). On further analysis, the rise is found to be more in the states of Gujarat, West Bengal, Orissa and Rajasthan among the north Indian states.

Figure 11: Trends among ANC Clinic Attendees, India and High Prevalence States, 2003-07*



* 3-yr Moving Average Based on Consistent Sites: India – 360 sites, South 4 (AP, TN, Kar, Mah) – 219 sites, NE 3 (Mani, Naga, Mizo) – 28 sites.



*3-yr Moving Average Based on Consistent sites: North 10 (Bih, Chand, Chhat, Del, Guj, Ori, Pun, Raj, UP, WB):56 sites;
 North 4 (Guj, Raj, Ori, WB): 21 sites

Table 6: State-wise HIV Prevalence among ANC and STD Clinic Attendees, 2003-2007

S.No.	State	ANC Clinic Attendees					STD Clinic Attendees				
		2003	2004	2005	2006	2007	2003	2004	2005	2006	2007
1	A & N Islands	0.50	0.00	0.00	0.17	0.25	1.80	1.60	0.40	0.80	1.33
2	Andhra Pradesh	1.25	1.63	1.75	1.26	1.00	21.47	16.40	22.80	24.40	17.20
3	Arunachal Pradesh	0.00	0.20	0.46	0.00	0.00	0.45	0.00	0.00	0.42	0.00
4	Assam	0.00	0.00	0.00	0.00	0.00	1.20	0.80	0.89	0.50	0.50
5	Bihar	0.00	0.00	0.00	0.50	0.25	0.40	1.20	0.00	0.40	0.40
6	Chandigarh	0.50	0.50	0.00	0.25	0.25	0.80	1.80	1.00	1.66	0.42
7	Chhattisgarh	0.58	0.00	0.25	0.00	0.25	2.13	2.80	2.77	2.58	3.33
8	D & N Haveli	0.13	0.00	0.25	0.00	0.50	n/a	n/a	n/a	n/a	n/a
9	Daman & Diu	0.33	0.38	0.13	0.00	0.13	n/a	n/a	n/a	n/a	n/a
10	Delhi	0.13	0.38	0.25	0.00	0.25	6.52	7.98	9.15	2.00	5.20
11	Goa	0.50	1.13	0.00	0.50	0.18	14.62	16.02	14.01	8.60	5.60
12	Gujarat	0.25	0.13	0.25	0.50	0.25	4.47	3.60	2.00	3.31	2.40
13	Haryana	0.26	0.00	0.13	0.13	0.13	1.20	0.93	1.30	0.81	0.00
14	Himachal Pradesh	0.00	0.13	0.13	0.00	0.00	0.40	0.00	0.40	0.60	0.00
15	Jammu&Kashmir	0.00	0.08	0.00	0.00	0.00	2.60	0.16	0.00	0.00	0.20
16	Jharkhand	0.00	0.00	0.13	0.00	0.00	0.13	0.13	0.00	0.40	0.40
17	Karnataka	1.25	1.25	1.00	1.00	0.50	10.40	12.00	13.60	7.57	8.40
18	Kerala	0.00	0.33	0.25	0.13	0.38	1.88	2.78	2.82	1.23	1.60
19	Lakshadweep	0.00	0.00	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	0.00	1.81	1.80	0.47	0.47	1.72
21	Maharashtra	0.75	0.75	1.00	0.75	0.50	12.0	10.8	12.8	10.0	11.62
22	Manipur	1.00	1.38	1.00	1.25	0.75	13.0	7.20	12.2	4.80	4.08
23	Meghalaya	0.35	0.00	0.00	0.00	0.00	0.26	0.00	0.00	1.18	2.21
24	Mizoram	0.97	1.50	0.88	1.00	0.75	3.80	1.00	3.00	3.07	7.13
25	Nagaland	1.13	0.95	1.50	0.93	0.60	0.98	1.72	3.48	0.00	3.42
26	Orissa	0.00	0.50	0.25	0.50	0.00	2.40	2.80	4.00	2.80	1.60
27	Pondicherry	0.13	0.25	0.25	0.25	0.00	2.45	5.74	4.22	4.03	3.22
28	Punjab	0.00	0.25	0.13	0.00	0.00	1.60	1.16	1.07	0.27	1.60
29	Rajasthan	0.00	0.00	0.13	0.00	0.13	6.08	2.92	5.60	1.60	2.00
30	Sikkim	0.21	0.00	0.25	0.10	0.09	0.00	0.00	0.86	0.00	0.00
31	Tamil Nadu	0.50	0.67	0.50	0.25	0.25	9.64	8.40	9.20	8.00	8.00
32	Tripura	0.00	0.25	0.00	0.42	0.25	2.80	0.73	1.26	0.45	0.40
33	Uttar Pradesh	0.00	0.25	0.00	0.00	0.00	0.55	0.80	0.40	0.62	0.48
34	Uttaranchal	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.00	0.00
35	West Bengal	0.50	0.50	0.84	0.00	0.00	1.61	0.88	2.16	1.01	0.80

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. The data represents all sites in a particular year.

HIV Burden in India

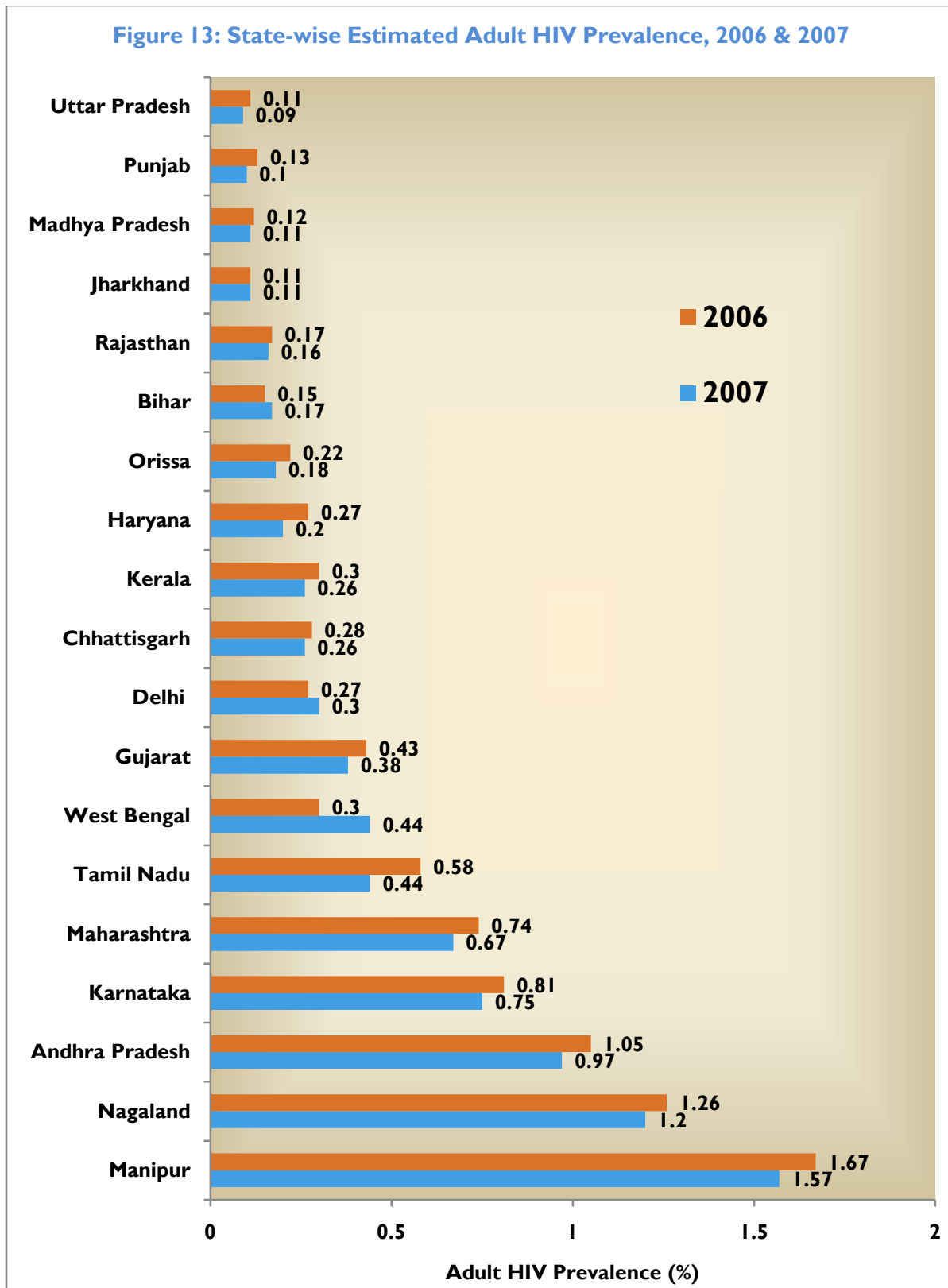
The data generated through HIV Sentinel Surveillance is used to estimate the level of infections in the country at regular intervals. The annual surveillance and estimation helps to understand the course of epidemic stage in different regions. NACO utilizes this information for effective planning and implementation of its programmes. Standardized methods supported by the WHO/UNAIDS are employed for estimating the burden of the epidemic over time. While adult HIV prevalence is estimated using the Workbook method as well as from Spectrum Software, the number of infections for all ages is estimated by the Spectrum software. In view of the diverse epidemic across the states, additional statistical treatment has been given to the data as per the recommendations of the consultative group on estimation in 2006.

Methodology for Estimation of HIV Burden in India

State-specific adult HIV prevalence has been estimated using WHO/UNAIDS Workbook restructured in 2006 for Indian epidemic situation. It included five sub-populations viz., intravenous drug users (IDU), men having sex with men (MSM), female sex workers (FSW), long distance truckers and the general population represented by the antenatal clinic attendees. The number of adult HIV positives among each risk group in a state has been derived as the product of the respective population size and the HIV prevalence. The results have been aggregated to obtain the number of infections in a state. The national estimate for adult HIV prevalence is derived as the percentage of total infections across the states over the national population. New epidemic curves have been fitted on six data points (2002-2007) for each state and for the country using the curve fitter in the Workbook. These curves projected the trend estimates of adult HIV prevalence for the period 1985-2010 for each state and for the country as a whole. The results along with other demographic and epidemiological parameters have been input to the Spectrum to estimate the total number of infections by age group. The Spectrum software uses its default assumptions on HIV progression, age distribution and TFR reduction among the infected along with the input data to project the results for all ages.

Estimates of HIV Prevalence in India

Estimated Adult HIV prevalence in India in 2007 is 0.34% (0.25% - 0.43%). Estimated HIV prevalence among males (0.40%) continues to be higher than among females (0.27%). Estimated Adult HIV prevalence remains greater than 1% in Manipur (1.57%) and Nagaland (1.20%) in 2007. Andhra Pradesh has an estimated adult HIV prevalence of 0.97% while Karnataka and Maharashtra have estimated adult HIV prevalence less than 1%. Tamil Nadu, West Bengal, Gujarat and Delhi have estimated adult HIV prevalence of 0.4%. **Figure 13** shows the state-wise estimated adult HIV prevalence in 2006 & 2007 derived from Spectrum Package. **Table 7** shows the state-wise estimated adult HIV prevalence for the years 2006 and 2007 derived from Workbook model as well as Spectrum Package.



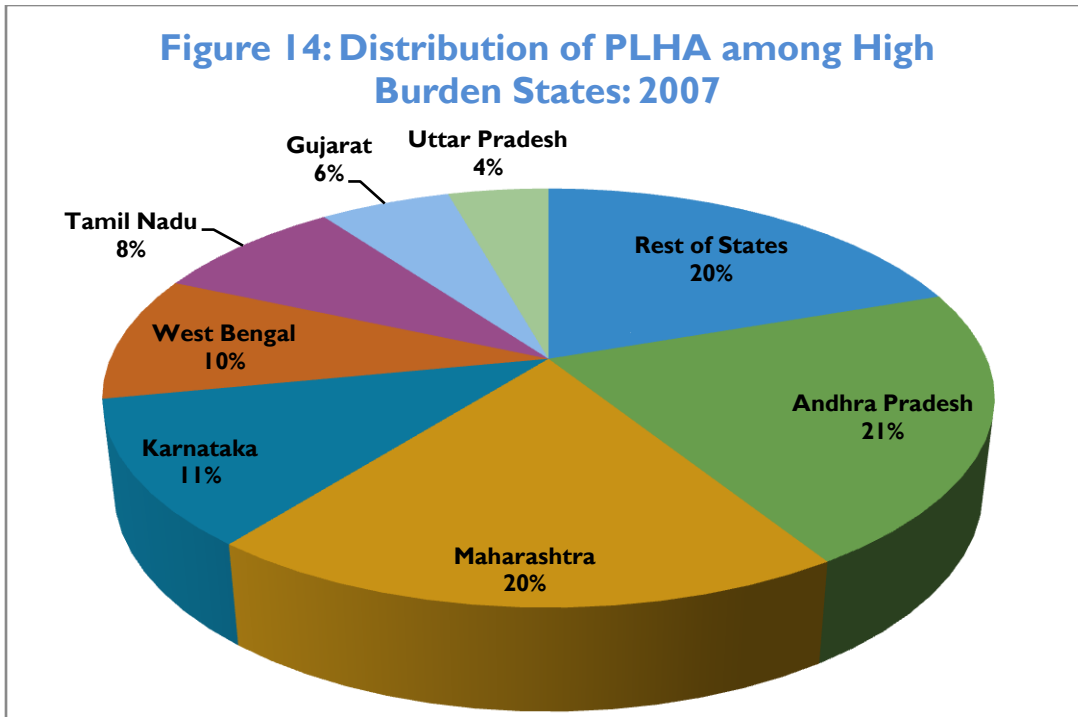
Note: The figures presented in the graph are estimated Adult HIV prevalence figures derived from Spectrum Package.

Table 7: State-wise Estimated Adult HIV Prevalence in 2006 and 2007

State	Workbook Results		Spectrum Results	
	2006	2007	2006	2007
Andhra Pradesh	1.05	0.87	1.05	0.97
Karnataka	0.81	0.67	0.81	0.75
Maharashtra	0.74	0.65	0.74	0.67
Manipur	1.67	1.57	1.67	1.57
Nagaland	1.26	1.02	1.26	1.20
Tamil Nadu	0.39	0.38	0.58	0.44
Gujarat	0.43	0.37	0.43	0.38
Bihar	0.16	0.18	0.15	0.17
Chhattisgarh	0.17	0.19	0.28	0.26
Delhi	0.27	0.47	0.27	0.30
Haryana	0.10	0.11	0.27	0.20
Jharkhand	0.11	0.12	0.11	0.11
Kerala	0.13	0.20	0.30	0.26
Madhya Pradesh	0.11	0.12	0.12	0.11
Orissa	0.22	0.19	0.22	0.18
Punjab	0.12	0.10	0.13	0.10
Rajasthan	0.17	0.19	0.17	0.16
Uttar Pradesh	0.11	0.08	0.11	0.09
West Bengal	0.30	0.49	0.30	0.44
National	0.36	0.33	0.37	0.34

Estimates of HIV Burden in India

The total number of People Living with HIV/AIDS (PLHA) in India in 2007 is estimated to be 2.31 million (1.8 – 2.9 million). Females constitute around 39% of the burden (0.9 million). Children below 15 years constitute 3.5% of the estimated number of PLHA while elderly people with age greater than 49 years constitute 7.8%. Adults aged 15-49 years constitute 88.7% of the estimated number of PLHA. The highest number of PLHA are in Andhra Pradesh and Maharashtra, with nearly half-a-million PLHA each. Besides Tamil Nadu and Karnataka, West Bengal, Gujarat and Uttar Pradesh are estimated to have higher burden of the epidemic with greater than 0.1 million PLHA in each of these states. The four South Indian states contribute 60% of all PLHA in the country and along with West Bengal, Gujarat and Uttar Pradesh, they contribute 80% of PLHA in India. 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 less than 25,000. The states of Kerala, Bihar and Rajasthan have more than 50,000 PLHA each though the HIV prevalence in these states is low. **Figure 14** shows the distribution of PLHA among the high burden states of India.



Trends of Adult HIV prevalence in India portray a stable trend. **Figure 15** shows the trends of estimated adult HIV prevalence in India from 2002 to 2007 and the estimated number of PLHA in India.

