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NATIONAL AIDS CONTROL PROGRAMME III

Report on Mid-Term Review of Sexually Transmitted Infection Services

DECEMBER 2009

With support from
Bill & Melinda Gates Foundation, WHO and FHI



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Report on Mid-Term Review of
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सत्यमेव जयते

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Secretary & Director General



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FOREWORD

Sexually Transmitted Infections (STI) and Reproductive Tract Infections (RTI) are important co-factors for the transmission of HIV infection. In addition, untreated STIs may lead to infertility and other adverse foetal outcomes in women. According to the estimates of the World Health Organisation, 340 million cases of curable STIs occur globally. STIs are among the top five reasons for seeking health care services.

The National AIDS Control Programme (NACP) in India was initiated in 1992. The current third phase of the programme, NACP-III (2007-2012), aims to halt and reverse the epidemic in India by integrating programmes for prevention, care, support and treatment with special focus on providing good quality STI and RTI services through public facilities and by partnership with private providers. NACO and development partners together carried out a Joint Mid-term Review (MTR) of the programme in 2009. The main objectives of the MTR were to assess the strengths, progress and adequacy of finances for project development objectives, and suggest possible areas for revision in the strategy.

This report outlines the review of the National STI/RTI Programme along with the recommendations for future directions and priority areas. The report will guide the policy planners and the managers for further strengthening the STI/RTI control and prevention programme. This extensive literature review of the published and unpublished STI studies from India over the last ten years will be useful for many including STI researchers. I congratulate all the organizations and individuals who contributed to the review process and report.



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अपनी एचआईवी अवस्था जानें, निकटतम सरकारी अस्पताल में मुफ्त सलाह व जाँच पाएँ
Know Your HIV status, go to the nearest Government Hospital for free Voluntary Counselling and Testing



सत्यमेव जयते

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PREFACE

The provision of services for Sexually Transmitted Infections (STI) and Reproductive Tract Infections (RTI) is an important strategy for the prevention of HIV transmission under the National AIDS Control Programme (NACP III) and Reproductive and Child Health (RCH II) programme of the National Rural Health Mission (NRHM).

The National STI/RTI prevention and control programme is an integrated effect of NACO and NRHM that utilises the public health services available from medical colleges, to peripheral health units (Primary Health Centres, Community Health Centres, First Referral Units, District Hospitals, and STI/RTI clinics etc.) for the prevention and treatment of STI and RTI among general population. The convergence with NRHM has been strengthened through constitution of a joint working group at the national level and by implementing the programme through PHCs and CHCs. In addition, NACO also ensures the provision of STI/RTI services for sub-groups such as high risk groups (HRG) and bridge populations through targeted interventions (TI).

During financial years 2007-08, 2008-09 and 2009 -10, around 2.6 million, 6.6 million and 8.2 million episodes of STI and RTI were treated at the STI clinics managed under NACP. The colour coded STI/RTI drug kits are procured and distributed free to all designated STI clinics. NACO has already completed the orientation and training on STI management for State AIDS Control Societies (SACS), Technical Support Units (TSU), State Training and Resource Centres (STRC), preferred providers and TINGOS.

Mid-term Review of STI programme was undertaken to understand the implementation needs and quality of service delivery. The feedback will help in improving the quality of the services and give necessary direction to the programme.

I would like to thank everyone particularly the STI division of NACO, National Technical Support Unit (NTSU), World Health Organization (India office), Public Health Foundation of India, Voluntary Health Services, FHI and Bill & Melinda Gates Foundation who jointly worked on the mid-term review of the National STI/RTI programme and prepared its reports.

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LIST OF ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome	NAT	Nucleic Acid Test
ANC	Antenatal Care	NCCLS	National Committee for Clinical Laboratory Standards
ANM	Auxiliary Nurse Midwife	NFHS	National Family Health Survey
APAC	AIDS Prevention and Control Project	NIHFW	National Institute of Health and Family Welfare
ART	Antiretroviral Treatment	NG	Neisseria Gonorrhoea
BCC	Behaviour Change Communication	NGO	Nongovernmental Organisation
BMGF	Bill & Melinda Gates Foundation	NRHM	National Rural Health Mission
BSS	Behavioural Surveillance Survey	OI	Opportunistic Infection
BV	Bacterial Vaginosis	OPD	Out-Patient Department
CBO	Community Based Organisation	OR	Operations Research
CMIS	Computerised Management Information System	PCR	Polymerase Chain Reaction
CHC	Community Health Centre	PHC	Primary Health Centre
CT	Chlamydia Trachomatis	PGIMER	Post Graduate Institute of Medical Education and Research
DH	District Hospital	PID	Pelvic Inflammatory Disease
DOTS	Direct Observed Treatment Short-course	PPNG	Penicillinase Producing Neisseria Gonorrhoeae
DP	Development Partners	PPTCT	Prevention of Parent-to-Child Transmission
ELISA	Enzyme Linked ImmunoSorbent Assay	PP	Private Preferred Providers
ESCM	Enhanced Syndromic Case Management	PPP	Public Private Partnership
FHI	Family Health International	PSU	Primary Sampling Units
FSW	Female Sex Worker	RAS	Rapid Assessment Survey
GTB	Guru Tegh Bahadur	RCH	Reproductive and Child Health
GUD	Genital Ulcer Disease	RCSHA	Resource Centre for Sexual Health & HIV/AIDS
HIV	Human Immunodeficiency Virus	RPR	Rapid Plasma Reagin
HRG	High Risk Groups	RTI	Reproductive Tract Infection
HSS	HIV Sentinel Surveillance	SACS	State AIDS Control Societies
HSV	Herpes Simplex Virus	SCM	Syndromic Case Management
IBBA	Integrated Behavioural and Biological Assessment	SEAR	South-East Asia Region
ICTC	Integrated Counseling and Testing Centre	SHRC	Sexual Health Resource Centre
ICMR	Indian Council of Medical Research	SJH	Safdarjung Hospital
IDU	Injecting Drug User	SLP	State Lead Partners
IEC	Information, Education and Communication	STD	Sexually Transmitted Disease
LGV	Lymphogranuloma Venereum	STI	Sexually Transmitted Infection
M & E	Monitoring & Evaluation	TB	Tuberculosis
MAMC	Maulana Azad Medical College	TI	Targeted Intervention
MIC	Minimum Inhibitory Concentration	TPHA	Treponema Pallidum Haemagglutination Assay
MIS	Management Information System	TPPA	Treponema Pallidum Particle Agglutination
MO	Medical Officer	TV	Trichomonas Vaginalis
MSM	Men Who Have Sex with Men	UAT	Unlinked Anonymous Testing
MTR	Mid-Term Review	UD	Urethral Discharge
NACO	National AIDS Control Organisation	VCD	Vaginal-Cervical Discharge
NACP	National AIDS Control Programme	VCTC	Voluntary Counselling and Testing Centre
NARI	National AIDS Research Institute	VDRL	Venereal Diseases Research Laboratory

A mid-term review (MTR) of National AIDS Control programme, Phase Three (NACP III) was carried out in Nov-Dec 2009 to reflect, reassess and discuss the progress achieved and challenges encountered. As part of the MTR, a comprehensive review of the Sexually Transmitted infection (STI)/ Reproductive Tract infection (RTI) control and prevention programme was carried out and comprised of 3 activities: a review of literature, field visits to select states, and analysis of the NACO's Computerised Management Information System (CMIS) data.

Review of Literature: A desk review of studies on STIs/RTIs in India was carried out in August-Sept 2009. The review focused on the burden of STIs/RTIs in the country based on the latest data available for different population groups: general population, high risk groups, and bridge populations; trends and changing patterns of STIs/RTIs in these groups; and changes in antimicrobial resistance patterns.

The review of STI/RTI related literature showed that there is a marked heterogeneity in the recorded epidemiology of different STIs/RTIs in the country. The data highlighted the wide variation in reported and recorded STI/RTI prevalence in the country - based on both syndromic and aetiologic diagnosis in different population groups. There were very few studies conducted after 2006 that could actually qualify for mid-term evaluation of NACP-III. While most of the available data was from clinic-based studies, there was very limited data available from community-based studies. In addition, interpretation of STI prevalence data from India was complicated overall by the wide variety of methods for laboratory diagnosis and incomplete description of methodology in reports.

Burden of STIs: General population: Rates of STIs in the general population were similar in urban and rural areas. The review showed that a high proportion of STIs/RTIs identified by screening tests among the female general population were

asymptomatic. Except Delhi, all the other population based surveys showed that the prevalence of reactive syphilis serology in the male general population was $\leq 2\%$; while in females it was $\leq 1.2\%$. In the female general population, prevalence of *Neisseria gonorrhoea* (NG) was $\leq 1.9\%$, and *Chlamydia trachomatis* (CT) was $\leq 1.3\%$. In the male general population, although the prevalence of CT was low ($\leq 1.1\%$), the prevalence of NG infection was higher as compared to females (up to 3.9%).

There was a considerable burden of RTIs among the female general population: across studies, the prevalence of candidiasis ranged from 7.2% to 23.9% and bacterial vaginosis from 17.8% to 63.7%. HSV2 seropositivity (IgG) was somewhat higher in women compared to men in the general population.

High risk groups (HRGs): The review showed that there was a high and variable level of syphilis seropositivity among HRGs. Syphilis seropositivity and HIV seroprevalence was higher in transgenders as compared to men who have sex with men (MSM). A significant percentage of MSM suffered from oropharyngeal and rectal gonorrhoea. While the prevalence of chlamydia infection was low in the MSM population, different studies recorded widely varying values in FSWs. HSV2 seropositivity (IgG) was high in both FSWs and MSM.



Trends of STIs: The HIV sentinel surveillance data showed a general declining trend in syphilis prevalence among ANC attendees in the high prevalence states which was corroborated by the NACO CMIS data. Though syphilis prevalence data for HRGs is available through the HIV sentinel surveillance, the data should be disaggregated by site to ensure that comparisons over time are made at the same geographical locations and even then the findings need to be interpreted with caution since widespread non-adherence to the sampling protocol for high risk groups has been reported.

Operational Issues: The review showed that only about half of people in the general population suffering from STI symptoms seek treatment. In addition, a substantial proportion of HRGs and clients of FSWs were also found to resort to home-based remedies, buying medication from chemist shops, or no treatment at all. While syphilis screening is carried out by RPR/VDRL to the level of the district hospitals, a study done in 2005-06 showed that laboratory capability is available in less than 3 percent of primary health centres (PHCs) and less than a quarter of community health centres (CHCs) in the country.

Gonococcal isolates reported as “less sensitive” to ceftriaxone were described in a few studies. However, clinical outcome data validating these in vitro findings had not been reported and few studies had reported minimum inhibitory concentrations (MICs) using agar dilution techniques. Also monitoring of gonococcal susceptibility was episodic and limited in geographic scope with most of the data originating from the northern part of the country.

Field Visits: Field visits undertaken to review the implementation of the STI/RTI control and prevention programme in six selected states (Kerala, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal) revealed the following findings:

The clinic attendance over three months (June-August 2009) varied between the states. Of the total visits over three months, the proportion of NGO/PP clinic attendees diagnosed with an STI syndrome ranged from 37% in Kerala to 96% in Orissa. In West Bengal, Kerala and Uttar Pradesh, NGO/PP site data

showed that there was a lower proportion of GUD ranging from 9-16%, while Orissa was high at 35%. Syphilis screening coverage over six months at the sites visited varied from 4% (Tamil Nadu) to 39% (Maharashtra). Presumptive treatment regime for HRGs as recommended under NACO technical guidelines was being followed at all the sites visited. Though, syndromic management guidelines were being followed in about half the sites visited, there was a wide variation across states and service providers. Under usage of penicillin injections for treating syphilis and non-herpetic GUD was a constraint in certain states. Less than one-third of the government sites visited had adequate stocks of the pre packaged colour coded STI treatment kits.

Though the majority of clinic staff had been trained in syndromic management, the training was not specific to STI management among HRGs. Less than half of the sites visited had adequate facilities for clinical examination of HRGs and supervisory visits were not being carried out on a regular basis.

While the majority of the NGO clinics had good coordination mechanisms with the outreach teams, such systems were found lacking in PP and government sites, leading to under utilization of clinical services.

Analysis of STI data, NACO CMIS: For the purpose of MTR, analysis of STI data from NACO CMIS was undertaken for selected states: Andhra Pradesh, Maharashtra, Gujarat, Tamil Nadu, Uttar Pradesh, West Bengal and Manipur. The reference time period for the analysis was from April 2005 to March 2009, with 2005-06 as baseline. Overall, the analysis showed that (i) there has been variation in the pattern of reporting from STI services with the expansion of the STI programme and introduction of the new CMIS reporting formats; (ii) utilization pattern of STI clinic services in some states was high, while utilization pattern among females was as much as in males; (iii) there were several missed opportunities for syphilis screening at the STI and ANC clinics; (iv) there was a definite decline in syphilis sero-positivity among those screened at STI and ANC clinics; (v) GUD:UD ratio revealed that there was a geographical diversity in the distribution

of STIs across the eight states and higher overall GUD:UD for the entire country, although not conclusive, indicated that reservoirs of infections are persisting; (vi) syndromic diagnosis showed higher non-herpetic to herpetic GUD indicating that there is still a preponderance of treatable bacterial STIs in various states.

Recommendations: Based on findings from the desk review of literature, observations from the field visits and analysis of the NACO CMIS data, the report recommends various steps to improve the National STI/RTI control and prevention programme.

In order to strengthen implementation of the National STI/RTI control and prevention programme, there is a need for greater synergy with the National Rural Health Mission (NRHM) for maximal output. In addition, recognizing that the private sector is a major provider in STI services, strategic partnerships should be built with the private and NGO sector so as to leverage their strengths. Specifically, the following steps are recommended: (i) Build capacity of TIs for STI service delivery to HRGs in terms of training, drug procurement, infrastructure, outreach, provider attitudes, and accessibility; (ii) Ensure optimal synergy with NRHM through regular convergence meetings at the National and State levels for STI programme planning and service quality at the subdistrict level; (iii) Review and strengthen systems for supportive supervision and monitoring at STI service delivery sites; (iv) Strengthen implementation of 100% syphilis screening and treatment of all ANC women and HRG populations; (v) Consider using WHO approved point of care (POC) testing technologies for syphilis in order to improve coverage of syphilis screening among ANC women and HRGs. On similar lines, whole blood HIV screening of HRGs at the TI-STI sites has the potential to improve uptake of services; (vi) Increase involvement of ASHA and link worker roles in STI/RTI programming for improving

health care seeking behaviour, and in identification and referrals to the programme; (vi) Improve healthcare seeking behaviour by raising awareness of STIs and promoting early treatment at medical facilities; (vii) Strengthen capacities in the regional STI research and training reference centres to undertake operational research.

For strengthening STI Strategic Information the report recommends the following steps: (i) Strengthen CMIS reporting for complete, correct, timely and consistent reporting from all Government, Private, and TI set ups; (ii) For estimation of STI burden for programme planning, a working group should be set up at the National level and a consultation held to decide on the best possible method to arrive at the estimates using standardized laboratory tests and internationally recommended modeling guidelines; (iii) Besides implementing a basic STI surveillance system in all STI clinics, TI clinics and ANC clinics, adding a small number of priority STI laboratory diagnostic tests to the National BSS could provide additional community-based prevalence data as part of the routine surveillance system; (iv) Strengthen STI drug resistance monitoring by formulating a multi-regional, coordinated approach to routine gonococcal antibiotic susceptibility monitoring with careful attention to quality control; (v) Research priorities, and follow up studies with standardization of methods, protocols, laboratory tests are needed to assess the impact of interventions and a coordinated operational research plan is needed to support the national STI response; (vi) A small STI working group at national level with well defined terms of reference should be constituted to review existing programme and research data, make recommendations to ensure programme quality and use of data to inform the national programme and target interventions to focus on highest risk areas and sub-populations.

The National AIDS Control Organisation (NACO) and Development Partners carried out a Joint Mid-term Review (MTR) of the implementation of the National AIDS Control Programme, Phase Three (NACP III) between November 16 and December 3, 2009. The specific objectives of the MTR were as follows:

1. To assess overall progress made in relation to target, coverage, access and quality/intensity of the interventions with in-depth analysis of Targeted interventions (TI), Sexually transmitted infection (STI) services, Prevention of parent to child transmission (PPTCT), Social inclusion and equity, Information, education & communication (IEC).
2. To assess important processes for implementing the NACP-III such as an institutional management processes, efficiency and workload, technical needs assessment and innovations in delivery of services.
3. To examine the challenges faced in the implementation of NACP-III and recommend actions to address them.

As a part of the MTR, a review of the National STI/RTI control and prevention programme was conducted specifically to assess the coverage, efficiency and quality of STI services.

The National AIDS Control programme (NACP) in India was initiated in 1992. The current third phase of the programme, NACP-III (2007-2012) aims to halt and reverse the epidemic in India by integrating programmes for prevention, care, support and treatment.¹ The programme aims to achieve this by four main strategies:

1. Prevention of new infections in high risk groups and general population through:
 - a. Saturation of coverage to 80% of high risk groups (HRGs) with targeted interventions (TIs). The core activities of a TI include (i) Behaviour change, (ii) Access to services for sexually transmitted infections (STI), (iii) Monitoring access and utilization of condoms, (iv) Ownership building, and (v) An enabling environment.
 - b. Scaled up interventions in the general population. These interventions include: increasing awareness, management of sexually transmitted infections (STI) and reproductive tract infections (RTI), condom promotion, integrated counseling and testing centres (ICTCs), prevention of parent to child transmission (PPTCT), post exposure prophylaxis and infection control. During NACP-II, the focus was on service delivery through tertiary and district level health care institutions. NACP III proposes to integrate and scale-up HIV-related services to sub-district and community levels through existing infrastructure in the public and private sectors. The type of services delivered at different levels will be based on HIV prevalence, capacity and need.
2. Providing greater care, support and treatment to a larger number of people living with HIV/AIDS.
3. Strengthening the infrastructure, systems and human resources in prevention, care, support and treatment programmes at the district, state and national levels.
4. Strengthening a nation-wide Strategic Information Management System.

The mainstay of the NACP-III strategy continues to be prevention with 67.2% of the total budgetary allocation. Provision of STI/RTI care services is a very important strategy to prevent HIV transmission and promote sexual and reproductive health under the NACP III and Reproductive and Child Health (RCH II) of the National Rural Health Mission (NRHM). The National STI/RTI control and prevention programme comprises an integrated effort from NACP and NRHM to utilize public health services from medical colleges, to peripheral health units (PHCs, Community health centres, first referral units, district hospitals, STI/RTI clinics and other centres such as peripheral health institutions) to prevent and treat STIs/RTIs in the general population. Besides, the National AIDS Control Organisation (NACO) is providing STI/RTI services to subgroups such as bridge populations and HRGs.

Burden of STIs/RTIs in India

STIs/RTIs are a major public health problem.² The emergence of HIV has increased the importance of measures aimed at STI control. A proper understanding of the patterns of STIs prevailing in different geographic areas of the country is necessary for effective planning and implementation of control strategies.

Incidence/prevalence data have a key role in designing control strategies for HIV and STIs. Moreover, comprehensive baseline information on the epidemiology of STIs, the proportion of symptomatic and asymptomatic infections and other associated factors are essential for the design, implementation and monitoring of successful targeted interventions (TIs), which are important in reducing the incidence of HIV infection. However, in India, reliable data on the incidence and prevalence of STIs are limited, mainly due to the inadequacy of the existing surveillance system⁸. Lack of laboratory diagnostic facilities, limited resources, poor recognition of STIs/RTIs as a major public health problem by the medical profession, stigma and discrimination associated with STIs and poor attendance of STI patients, especially women, in STI

clinics, are some of the main reasons cited for lack of STI/RTI data¹¹.

The estimated burden of STIs in the country forms one of the bases of NACP-III calculations for setting programme targets. A nationwide community-based study was commissioned by NACO in 2002- 03 to estimate the STI prevalence in urban and rural areas of India. The study was conducted in five geographical regions of the country. Of 168 primary sampling units (PSUs)/clusters selected for the survey, data was received from 157 clusters. Total

number of persons interviewed from all these clusters was 15,382 (7314 males and 8068 females). Later the five zones originally formed were further clubbed to four geographic regions North, East, West and South consisting of 48, 38, 32 and 33 clusters respectively and data was analyzed by HIV epidemic zones levels. The study showed a prevalence of 5-6% STIs/RTIs in the adult population.³ Based on this, it was estimated that approximately 30 million episodes of STIs/RTIs occur every year in the country.^a

Summary Results of STI/RTI Community Prevalence Study (NACO 2003)				
STI/RTI prevalence by HIV epidemic zone and place of residence ^b				
	Low-moderate		High	
	Urban	Rural	Urban	Rural
No STI/RTI	83.9	86	84.8	82
Candidiasis (Smear + culture)	6.6	5.5	6.6	8.1
Bacterial Vaginosis (Nugent)	7.2	6.4	4.0	6.5
Vaginal Trichomoniasis (Wet mount + culture)	2.7	1.8	1.5	1.3
Urethral Trichomoniasis		0.1		0.2
Chancroid	0	0.1	0	0.1
HSV2 IgM (ELISA)	0.6	0.7	1.6	1.9
Syphilis (VDRL+TPHA)	0.4	1.0	0.8	1.2
N gonorrhoea (PCR)	0.2	0.1	0.2	0.6
C trachomatis (PCR)	0.1	0	0.4	0.2
HPV (PAP smear)	1.6	0.8	0.4	0.3
HIV (ELISA)	0.1	0.3	1.4	1.1

The results presented in the report provided the STI prevalence by two HIV epidemic zones - High and Low-moderate since data was inadequate to analyze the moderate epidemic zone separately.

By the end of NACP-III, the program has aimed at a target of treating 15 million episodes of STIs/RTIs: this target to be achieved jointly by NACO supported designated STI/RTI clinics, NRHM health facilities under the public sector and STI clinics managed by Targeted Intervention projects. It is envisaged that the remaining 15 million episodes will be covered through Private Providers. However, it is important to validate these estimates while reviewing the performance of the program.

Objectives of the STI MTR

A mid-term review of the National STI /RTI control and prevention program was conducted as a part of the Mid-term review of NACP- III in Nov-Dec 2009 with the following objectives:

- To collect evidence on STI/RTI magnitude and trends in different population groups so as to set realistic targets.
- Document change in trends in epidemiological profile of cases and population groups.
- To recommend mid course correction for target setting and strategic plan
- To define further operations research questions

This review comprised of three distinct activities:

1. A review of literature,
2. Field visits to select states to review the implementation of the STI/RTI control and prevention program, and
3. Analysis of the NACO Computerized Management Information System (CMIS) data.

^aIt is noted that STI/RTI prevalence data generated from this study has been used to estimate possible incident cases.

^bTesting sizes and male-female breakdown not specified in the study report.

Review of Literature

A desk review of published and unpublished studies on STIs/RTIs in India was carried out in August-Sept 2009. A thorough PubMed search was done and related articles searched relating to the following population groups: General population, STI clinic attendees, Female sex workers (FSW), Men having sex with men (MSM) and transgenders, Truckers, Migrants, and Clients of female sex workers. Wherever possible, the full text article was reviewed. Websites of various organizations working on STIs/RTIs and with high-risk groups were searched for relevant data/publications. In addition various organizations and institutes were contacted for the relevant published/unpublished STI/RTI related data. Only those articles were selected where the study was conducted after the year 2000.

In addition, data from the following sources was reviewed:

HIV Sentinel Surveillance (HSS)⁴: HSS is an annual exercise conducted to monitor the trends and levels of HIV epidemic among different population groups in the country. HIV surveillance among ANC clinic attendees is used as a proxy for the general population. HIV sero-surveillance in high risk groups like MSM, IDUs, and FSWs is done at sentinel sites, such as nongovernmental organization drop-in centres and de-addiction centres. In addition to these clearly defined population groups, the

surveillance system also tracks trends among male and female STI patients seeking care in government health facilities as a proxy for people with high-risk behaviours.

The methodology adopted is consecutive sampling at the service facilities and unlinked anonymous testing after removing all the identifiers. Along with the sample for HIV testing, a sample is also screened for syphilis (VDRL/RPR). For TI sites, specimens are collected following unlinked anonymous testing with informed consent (UAT with consent), where informed consent from participants is taken but no identifier is recorded and HIV test results are not returned.

Since 2006, the surveillance network has been expanded to cover all the states of the country. The 2007 round of HSS was conducted across the country from October 2007 to January 2008 at 1134 sentinel sites. Analysing trends in VDRL/RPR positivity from the HSS can help in triangulating the data gathered from other sources. However, a review of India's HSS in 2008 concluded that the quality and interpretability of the current TI surveillance was compromised by non-adherence to protocol, inconsistent inclusion of syphilis testing and use of the camp approach to meet sample size targets among high-risk groups.⁶¹

Behavioural Surveillance Survey (BSS)⁵: NACO has conducted three rounds of National BSS in the year



2001, 2006, and 2009. As the results of BSS-2009 are currently being analysed, the results from BSS-2006 have been included in this report. National BSS 2006 was conducted to assess current risk behaviour in specific population groups in India and to measure behavioural changes from BSS 2001 to BSS 2006. In addition, the survey collected data on self-reported STIs and STI related treatment seeking behaviour of the general population and high risk groups in urban and rural areas.

BSS 2006 among general population (15-49 years) was carried out following the same methodology adopted for BSS 2001. As per the sampling design adopted for BSS 2006, a total sample of 97,240 respondents (males and females in the age group of 15-49 years) were covered for the general population survey. There were an equal number of respondents from urban and rural areas in each sampling unit. This sample was covered from 2434 rural and urban PSUs scattered over 25 states/groups of states. In both rural and urban PSUs the total sample was equally divided between males and females in the age group of 15-49 years. In each selected PSU, a sample of 40 respondents (20 males and 20 females) was covered for the general population survey.

For the BSS among FSWs, all the states and union territories in the country were categorised in 25 sampling units. A total of 6613 clients of sex workers and 7417 FSWs were interviewed across all the sampling units. In addition, a total of 2638 MSM were interviewed in National BSS 2006 across 10 locations. A two-stage cluster sampling design was adopted for selecting respondents for both the target categories.

National Family Health Survey (NFHS)⁶: The 2005-06 NFHS was the third in a series of national surveys; earlier NFHS surveys were carried out in 1992-93 (NFHS-1) and 1998-99 (NFHS-2). Fieldwork for NFHS-3 was conducted from December 2005 to August 2006. Each round of NFHS had two specific goals: (a) to provide essential state and national level data to monitor health and family welfare programmes and policies implemented by the Ministry of Health and Family Welfare and other ministries and agencies, and (b) to provide information on important emerging health and family welfare issues.

For NFHS-3, interviews were conducted with 124,385 women aged 15-49 years and 74,369 men

aged 15-54 years from all 29 states. The survey also collected data on the health care seeking behaviour of the general population.

Integrated Behavioural and Biological Assessment (IBBA)³⁴:

IBBA was the first large-scale bio-behavioural survey conducted among high risk populations in India in 2005-07. It was commissioned by the Bill & Melinda Gates Foundation as a part of monitoring and evaluation of the "Avahan: India AIDS Initiative". The survey was conducted in 29 districts in six states of India, and along four selected segments of the National Highways - among FSWs, high-risk MSM (including transgenders), IDUs, clients of sex workers and truckers. The survey involved collection of behavioural response and biological samples from approximately 26,000 participants spanning across six states and national highways.

Probability based sampling methods were used for all survey groups in all districts. Participation rates were generally satisfactory with a handful of exceptions in specific locations. Coordination and monitoring of the behavioural and biological components followed a detailed protocol. Data management, statistical analysis and reporting were carried out through a central facility.

A second round of IBBA was conducted in 2009. The data is still under analysis and will be available in the near future for comparison with IBBA-1 results.

STI capacity building Operations Research (OR)

study: In coordination with peer-based outreach and community-led approaches, clinics supported by Avahan state lead partner (SLPs) provide an essential service package (ESP) for FSW and MSM designed to detect and treat curable STIs and to reinforce condom use. The main clinical components of this ESP are syndromic case management, provision of regular check-ups, bi-annual syphilis screening, and presumptive treatment for asymptomatic infections.

OR studies have been undertaken to determine the optimal clinical management approach to reduce STIs among FSW and MSM including: (a) To validate the essential service package for FSW and MSM; and (b) To monitor the STI prevalence and patterns within the cohort, the community of FSW, MSM and men attending STI clinics. Baseline data from these OR studies has been included in this report.

Field Visits

As a part of the Midterm review of the NACP-III, field visits were undertaken to review the implementation of the STI/RTI control and prevention programme. This was done through interviews with STI and TI staff of SACS and Technical Support Units (TSUs) in six selected states; and field visits to select districts (4-5 per state) to directly assess STI service delivery for HRGs through site assessment at designated STI clinics, TI NGO and PP clinics. A total of 88 sites were visited (Government: 39, NGO: 28, Private Preferred Providers-PP: 21) in 27 districts across six states (Kerala, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh, West Bengal) between August-October 2009.

designed to provide continuous critical information on the course of the HIV/AIDS epidemic in India. The CMIS enables NACO and SACS to use evidence based planning for identifying appropriate strategies and for developing state level capacities for collection, analysis, interpretation of data and relevant remedial actions. Currently CMIS is installed at all 35 SACS and 3 Municipal AIDS Control Societies and all except Lakshadweep are reporting through CMIS.

The following table gives the details of registration of reporting units in CMIS as on April 15th, 2009 (*Source: NACO CMIS bulletin April 2008-March 2009*):

In this routine passive surveillance, the data is

Reporting units in CMIS as on April 15th, 2009				
S. No	Reporting Unit Type Units	Total Registered reporting during 2008-09	Number of units Reporting	Percentage
1.	Blood Bank	2582	2177	84.3
2.	ICTC	4938	4225	85.6
3.	STI Clinic	1400	867	61.9
4.	Targeted Interventions	1271	837	66.0
5.	ART Centre	200	186	93.0
6.	Community Care Centre	258	130	50.2

Analysis of NACO Computerized Management Information System (CMIS) data

The NACP collects routine information on programme components from all states and Union Territories from Blood Banks, Integrated Counseling and Testing Centres, STI/RTI Clinics, ART Centres, from NGOs implementing targeted interventions and Community Care Centres. This information is collected monthly in standard reporting formats across the country through a comprehensive software CMIS which is installed in all State AIDS Control Societies (SACS). This routine data provides a wealth of information for decision making and day-to-day management decisions for making programme results more effective.

The CMIS was initiated in 2001. It has been

reported in the prescribed format once every month. The data collected is essentially an aggregate of health service statistics, coverage and basic characteristics like gender and age segregation; individual data is not captured in the CMIS. The reporting units mentioned above include all i.e. NACO supported, private and charitable/NGO supported. The reporting from external agencies was initiated recently.

For the purposes of the STI MTR, analysis of STI data from NACO CMIS was undertaken for selected states (Andhra Pradesh, Maharashtra, Gujarat, Tamil Nadu, Uttar Pradesh, West Bengal and Manipur). The STI data, retrieved from CMIS, had to be restructured in order to carry out the analysis. Since the MTR aimed to assess the progress of the NACP-III, the reference time period for the analysis was from April 2005 to March 2009, with 2005-06 as baseline.

Review of Literature

The review focused on the uptake of STI/RTI services; burden of STIs/RTIs in the country based on the latest data available for different population groups: general population, high risk groups, and bridge populations; trends and changing patterns of STIs/RTIs in these groups; and changes in antimicrobial resistance patterns.

Uptake of STI/RTI Services

Accessibility and availability of health care is important for ensuring a community's general health status and reflects the reach and coverage of health facilities. Findings from the **National Family Health Survey-3** (2005-06) showed that the private medical sector remains the primary source of health care for the majority of households in both urban areas (70%) and rural areas (63%). The main provider of care among private providers is a private doctor or clinic. A total of 46% of urban households and 36% of rural households go to a private doctor or private clinic for health care. Private hospitals are the second most common source of health care among urban households and public sector Community health centres (CHC)/rural hospitals/Primary Health Centres (PHC) are the second most common source of health care among rural households.⁶

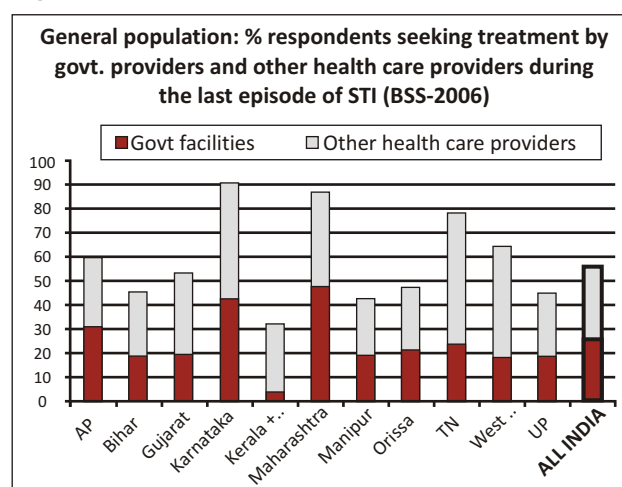
Data from NFHS-3 showed that overall 11% of women and 5% of men in the age group of 15- 49 years who ever had sex complained of symptoms suggestive of STIs/RTIs in the 12 months preceding the survey.

On the other hand, as per the **Behavioural Surveillance Survey (BSS)** -2006, the percentage of respondents who reported either genital discharge, genital ulcer/sore or both in last 12 months varied between 3.1% for males (n= 48,623) and 7% for females (n=48,617). Across most of the states, the proportion was higher in the rural areas and among female respondents. Compared to general illnesses, the proportion of the general population seeking care from government facilities for STI related symptoms was much less. In the BSS, the treatment seeking behaviour with regard to the last episode of STIs was

captured in the form of type of treatment sought by those who had reported to have experienced either or both the STI symptoms (genital discharge and genital sore/ulcer) in the previous 12 months. Among the respondents who reportedly suffered from any STI symptom during last 12 months, 56% sought treatment from one or the other healthcare providers like traditional healer, trained village worker, private hospital/clinic and government hospitals in the last episode of STIs. A higher proportion of general population respondents in urban (61%) than rural (55%) areas sought treatment for STI symptoms from any healthcare provider.

At the national level, the proportion of general population respondents seeking treatment for STIs from government hospitals/clinics increased from 23% at the time of BSS 2001 to 26% during BSS 2006 (however, the report does not mention whether this change was statistically significant). Across states the proportion of general population respondents who sought treatment from any healthcare provider was significantly higher in the states of Karnataka (92%), Maharashtra (88%), Tamil Nadu (79%), Punjab and Chandigarh (71%) and Jharkhand (70%). Less than two-fifths of the respondents in Kerala and Lakshadweep and Jammu & Kashmir went to any healthcare provider for the treatment of STI symptoms.

Proportion of respondents (who suffered from at least one STI symptom in the last 12 months) seeking treatment from a government facility was higher in Maharashtra (48%), Karnataka (44%) and



Himachal Pradesh (39%) whereas Kerala and Lakshadweep (4%) reported least utilisation of a government facility for STI treatment.

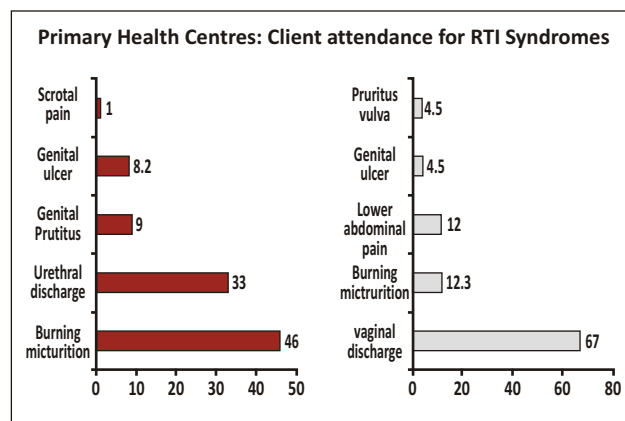
The BSS-2006 also showed that a substantial proportion of MSM, FSWs and their clients resort to home-based remedies, buying medication from chemist shops, or no treatment at all.^c

RTI/STI Service Provision in the Primary Health care

At the behest of the Ministry of Health and Family Welfare, the National Institute of Research in Reproductive Health (NIRRH) supported by the World Health Organisation (WHO), assisted the formulation of the National Guidelines for Management of RTIs/STIs for medical and paramedical health workers in the primary health care system. In this context, countrywide Rapid Assessment Surveys (RAS) were conducted in 2005-06 on a representative sample of facilities selected from six zones in the country to assess their management practices (operational, clinical, laboratory) on RTIs/STIs at different levels [District hospitals (n=10), Community health centre (CHC, n=33), Primary health centre (PHC, n=69) and Subcentre (n=138)] of the health system. The RAS findings gave a snapshot of the ground realities of the existing scenario on RTI service delivery in the primary health care system.⁷

The study showed that in general, more women as compared to men seek care at the PHCs and subcentres. As per the country wide pooled data, the average number of female clients attending PHC outpatient departments (OPD) per month were 1710 and male clients were 1548. Overall 12% of female clients and 6% of male clients attended the PHC OPD for complaints related to RTIs/STIs. More than 90% (98% females and 91% males) of these clients belonged to 20-40 years age-group.

The most common RTI/STI related complaints among men seeking treatment at the PHCs were burning micturition (46%), urethral discharge (33%) followed by pruritus (9%), and genital ulcer (8%);



while most women complained of vaginal discharge (67%), burning micturition (12%), lower abdominal pain (12%), pruritus vulvae and genital ulcer (4.5%).

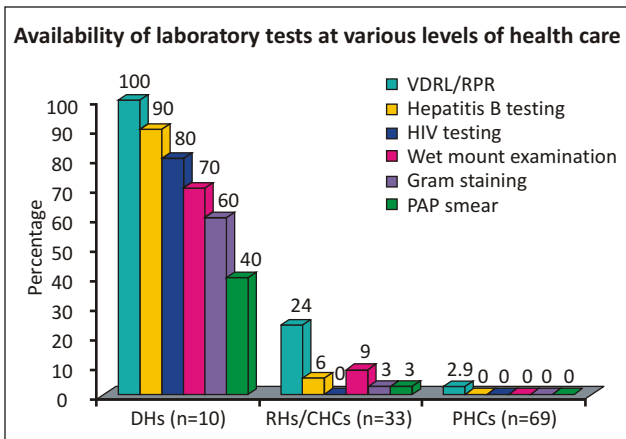
Majority of Medical officers (MOs) reported management practices based on symptoms alone and non responsive cases were referred to first referral unit or District hospital. The most common drugs used by MOs to treat RTIs were norfloxacin, metronidazole, ciprofloxacin and co-trimoxazole. Minority of Auxiliary Nurse Midwives (ANMs) reportedly had treated RTIs among women and generally followed a practice of referring such cases to PHCs. Third generation cephalosporins (cefixime, ceftriaxone) and azithromycin were not available and neither prescribed by the MOs to treat vaginal discharge or urethral discharge syndrome. Moreover, doxycycline though available in some of the PHCs, was not known to MOs as a recommended drug to treat chlamydial infection and therefore was not utilized for its treatment.^d Counselling RTI patients on their diagnosis, the mode of transmission and the need to treat all partners was almost lacking among MOs as well as ANMs in all the zones. Separate records and regular reporting and feedback were non-existent in all the zones except south zone.

The basic requirements for examination of RTI/STI clients were inadequate - starting from the STI department of the District hospital to the subcentres. A separate room for examination and audio-visual privacy were conspicuously absent in about 45% PHCs and 62% of sub-centres. In the

^c BSS 2009 was conducted in six states: Andhra Pradesh (AP), Tamil Nadu (TN), Maharashtra, Karnataka, Manipur and Uttar Pradesh.

The corresponding figures for the indicator “% of respondents seeking treatment in a government hospital/ clinic during the last episode of STI” as per the BSS-2009 for selected states are as follows: Andhra Pradesh: 42.5%; Karnataka: 37.1%; Manipur: 18.5%

^d Though doxycycline was the recommended drug at the time of the study, under the revised National guidelines, it is no longer recommended for treatment of chlamydial infection.



eastern zone they were almost non-existent and were available in only 1/3rd of the facilities. It was also observed that there was no separate seating arrangement and toilets for patients in many PHCs and sub-centres.

Availability of equipments like uterine sound, speculum, tenaculum, microscope, glass slides, examination table, refrigerator and sterilizing equipments though adequate in District and Rural Hospitals, were inadequate in the PHCs. Other essential equipments and supplies for carrying out laboratory diagnosis of RTIs such as burner lamps, centrifuge machine, gynaecological torch, and specimen collection swabs etc. were not available or not in working condition in most of the PHCs. The availability of reagents and supplies required for laboratory diagnosis of RTIs were also available in only 9% of CHCs and 6% of PHCs. RPR/VDRL kits were present in only 3% of PHCs and 21% of CHCs. The availability of general and the specific RTI/STI related laboratory tests at various levels of health facility are shown in the above figure. Wet mount examination, Gram staining, VDRL/RPR, HIV and Hepatitis B tests were available in 60-100% of district hospitals but were largely not available at CHCs and PHCs.

Burden of STIs/RTIs

The exact burden of STIs in India remains relatively unknown because there is no adequate and comprehensive surveillance system in operation. Community-based surveys can provide useful information on disease prevalence, contribute to the calculation of the burden of disease, and assist with identification of factors associated with the presence of infection. Despite their importance, community-based surveys assessing the prevalence

of STIs are rarely undertaken as a result of a variety of factors, including cost and capacity.

Epidemiological diversity in India

Before examining the reported epidemiology of STIs in any detail in India, it is critical to bear in mind possible reasons contributing to epidemiological diversity.^{8,9}

- The size of the country. In a country as large as India, there are wide variations influencing the risks and vulnerabilities of different populations to STIs (including HIV). Thus, the wide variation in reported prevalence may be a reflection of the 'true' epidemiological diversity.
- Studies are carried out among people with different levels of risk - some studies focus on people in the 'general population' (often loosely defined), whilst others concentrate on 'risk groups'. It is clearly important to know who is included in the survey results, and exact criteria for inclusion should be clearly defined.
- Studies cited do not use either comparable sampling methods or even laboratory diagnostic tests. It is well recognised that differences in sensitivity and specificity of laboratory tests and quality control procedures, can dramatically influence the reported prevalence. In the case of syphilis, for example, some studies report all rapid plasma reagin (RPR - a screening test for syphilis) positive cases, whilst others report only those confirmed by *Treponema pallidum* haemagglutination assay (TPHA - a confirmatory test for syphilis). Diagnosis of other pathogens, such as *Chlamydia trachomatis*, shows an even wider variation in methods and standards used, and as a consequence, a highly variable reported prevalence. Besides, in many studies the laboratory methods used are either inadequately explained or are not detailed at all. Such variations in samples and methods complicate any comparisons between studies.

Retaining this critical perspective on the published data is important for both understanding the current reported figures, and for designing future research and control programmes.

General Population

Based on the desk review of published and unpublished population based studies conducted

General Population: STI/RTI Prevalence (%)		
	Females	Males
Clinical Examination: STI syndromes		
Genital discharge	8 - 51	0.2 - 6.6
Genital ulcer	0 - 7.8	0.7 - 2
Lower abdominal pain/PID	0.6 - 37	-
Scrotal swelling	-	0 - 1.5
Inguinal swelling	-	0.3 - 1.7
Laboratory Investigations		
Syphilis	0 - 4.7	1 - 10.1
Gonorrhoea	0 - 1.9	0 - 3.9
Chlamydia	0 - 1.3	0 - 1.1
Trichomonas	1.2 - 8	1.5 - 3.6
Candidiasis	7.2 - 23.9	-
Bacterial Vaginosis	17.8 - 63.7	-
HSV2 serology (IgG)	8.6 - 17.9	7 - 10.6
HIV	0 - 0.95	0 - 1.4

after the year 2000, the prevalence of STIs/RTIs among the general population in the country is summarized in the box.^e

In addition, the data highlighted the following key points:

1. Rates of STIs in the general population were almost similar in urban and rural areas.

A community-based study was conducted in Mysore, Karnataka between October 2005 and November 2006 in both urban and rural populations.¹⁰ The study showed that weighted HIV prevalence was 0.8% overall and 0.7% and 0.9% in rural and urban populations, respectively. The overall STI prevalence (syphilis, gonorrhoea, chlamydia) was 2.8% for men and 1.8% for women. Despite higher HIV prevalence in urban areas, the prevalence of syphilis, gonorrhoea and chlamydia infections were similar for urban and rural areas as shown in the

Individual STI prevalence- by location (Mysore: 2005-06)				
	Females (n=2570)		Males (n=2053)	
	Rural	Urban	Rural	Urban
<i>N gonorrhoea</i> (Nucleic Acid Test NAT)	0.2	0.1	0	0
<i>C. trachomatis</i> (NAT)	1.1	1.0	0.9	1.3
Active syphilis (RPR+TPHA)	1.0	1.0	2.2	1.7
HSV2 IgG (ELISA)	13.8	11	9	9.5
HIV (ELISA)	0.5	0.8	0.9	1.1
Any Bacterial STI	1.8	1.7	2.8	2.8

^e A total of 25 studies for female and 15 for male general population were reviewed. The range mentioned is the minimum and maximum value reported across various population based studies.

table. The prevalence of active syphilis among rural and urban populations was 1.6% and 1.3%, respectively, and there was a statistically significant two-fold difference in prevalence between men (2%) and women (1%) in the urban sample. The prevalence of gonorrhoea was extremely low, only five cases were found in total. The overall prevalence of HSV-2 IgG was 11.6%, 12.7% among women and 10.6% among men.

A facility based study from Delhi in 2002-04 studied symptomatic and asymptomatic women attending rural and urban peripheral health centres to determine the laboratory prevalence of STIs, RTIs and HIV.¹¹ A total of 4090 women in four study groups were subjected to general and speculum examination and screened for aetiological agents of RTI/STI. The main

RTI/STI Prevalence among women (%), Facility based Delhi 2002-04 (n=4090)	
<i>Candida</i> (culture)	20.2
Bacterial Vaginosis (smear)	4.1
Trichomoniasis (culture)	2.1
<i>N gonorrhoea</i> (culture)	0.7
Syphilis (RPR+TPHA)	1.1
<i>C. trachomatis</i> (ELISA)	1.5
HSV2 IgM (ELISA)	5.7
HIV (ELISA)	0.1

complaint was vaginal discharge, singly (11.2%) or along with other symptoms (49%). Based on laboratory tests, overall, the proportion of women infected was 32.1% (single 27.9%, multiple 4.2%). The difference observed in the infection rate in the women from urban (33.4%) and rural (30.9%) areas was found to be insignificant. Total prevalence of RTIs (24.3%) was higher than that of STIs (12.5%). In addition, the study found a high prevalence of both STI (9.9%) and RTI (15.2%) agents in the asymptomatic women. Overall, in both urban and rural areas, candida infection was predominant, followed by HSV-2 IgM, BV and trichomoniasis. HIV seroprevalence was very low.

Two rounds of community STI prevalence studies have been conducted in Tamil Nadu.¹² The first round was implemented in 1998 in 3

Individual STI prevalence- by location (TN 2003-04), AIDS Prevention & Control Project (APAC)			
	Numbers	% Positive	
	tested	Rural	Urban
Active syphilis (RPR+TPHA)	1342	1.4	0.8
N gonorrhoea (Culture)	1254	0.7	2.3
C. trachomatis (PCR)	366	-	0.6
Trichomoniasis (Wet mount)	705	6.0	5.1
HSV2 IgM (ELISA)	1326	2.3	1.7
HIV (ELISA)	1318	0.6	1.0

districts and the second round in 2003-04 in 6 districts to assess the point prevalence of STIs in the general population. Both rounds used a health camp approach to recruit patients. The community prevalence of STIs in Tamil Nadu in 1998 was 14.6% overall (8.3% when HIV and hepatitis B were excluded). The second round (2003-04) showed a lower prevalence of gonorrhoea, however, there was a noticeable increase in syphilis seropositivity among the male and female populations sampled. The rural/urban prevalence of individual STIs among the total population surveyed in the second round is shown in the above table.

2. *A high proportion of STIs/RTIs identified by screening tests among the female general population were asymptomatic.*

In a study from Chennai, data was collected during community-wide health camps comprising physical examinations, interviews and laboratory testing between March and June 2001.¹³ The study showed that the population was young, sexually active, with a low prevalence of STI. The most commonly detected STI among women was HSV2 IgG, but they were more likely than men to be asymptomatic. Only 10.7% of the men and 0.8% of the women who had HSV2 antibodies or syphilis had self reported genital sores. In addition, only 22.2% of the women actually having STIs (CT/NG/TV)

Prevalence of STIs (%) in a community-based sample Chennai, Tamil Nadu, 2001		
	Males (n=770)	Females (n=850)
N gonorrhoea (PCR)	0.4	0.4
C. trachomatis (PCR)	0.5	0.2
Trichomoniasis (Culture)	Not tested	6.7
HSV2 IgG (ELISA)	10.1	16
Syphilis (RPR+TPPA)	1.0	1.1
HIV (ELISA)	1.0	0.2

RTI/STI Prevalence among women (%), Delhi, 2002; Community sample (n=213)	
Candida (culture)	16.9
Bacterial Vaginosis (smear)	32.8
Trichomoniasis (culture)	2.8
N gonorrhoea (PCR)	0.9
Syphilis (VDRL+TPHA)	4.8
C. trachomatis (PCR)	0
HIV (ELISA)	0.95

had symptoms of genital discharge. For women, only 33.3% and 22.5% of gonococcal and trichomonas infections respectively were symptomatic, whereas none of the chlamydial infections was symptomatic.

In a community based STI prevalence study from Delhi (conducted using a camp approach and as a part of the larger nationwide study conducted by NACO in 2002³), a high percentage of asymptomatic women were found to have bacterial vaginosis (39/125 i.e. 31.2%).¹⁴

3. *Syphilis seropositivity:* Except Delhi, all the other population based surveys showed that the prevalence of reactive syphilis serology in the male general population was $\leq 2\%$; while in females it was $\leq 1.2\%$. Most studies relied on a syphilis screening test (VDRL or RPR) followed by a confirmatory test (TPHA or TPPA).

An extension of NACO's community based STI prevalence study³ studied the seroprevalence of syphilis in both urban and rural communities in Delhi. Samples from 178 males and 227 females were tested and those positive by VDRL and/or TPHA were further tested by Fluorescent treponema antibody absorption (FTA-ABS) test for confirmation and discrepant analysis. While 6.9% (i.e. 28/405) of the total samples tested were positive by these criteria (10.1% males and 4.4% females), 3.9% (i.e. 16/405) had a concomitant positive VDRL test indicating acute syphilis.¹⁵ However, these findings were not borne out by the HIV Sentinel Surveillance data on ANC women where the syphilis prevalence in Delhi ranged from 0.1% - 1.3% between 2003-2007.

4. *Prevalence of N gonorrhoea (NG) & C trachomatis (CT):* In the female general population, prevalence of NG was $\leq 1.9\%$, and CT was $\leq 1.3\%$. In the male general population, although the prevalence of CT was low ($\leq 1.1\%$),

the prevalence of NG infection was higher as compared to females (Range: 0-3.9%).

A community-based survey of STI prevalence was conducted among men in 3 economically poor communities in Mumbai slums in 2003.¹⁶ Men were randomly selected for STI testing, were informed at the time of the survey interview and asked to attend community-identified collection sites for STI testing. Among the 641 men tested, the most common current STI was gonorrhoea (3.9%) with 6.1% of men being positive for an acute STI (NG/CT/acute syphilis/HSV2 IgM) and 9.7% positive for HSV2 IgG.

5. *There is a considerable burden of RTIs among the female general population*

Across studies, in women, the prevalence of candidiasis ranged from 7.2% to 23.9% (diagnosed on smear or culture) and bacterial vaginosis (diagnosed by gram staining) from 17.8% to 63.7%.

Community based STI prevalence studies in Delhi (conducted using a camp approach) have shown variable RTI prevalence rates: candidiasis (16.9% - 23.9%), bacterial vaginosis (32.8% - 63.7%).

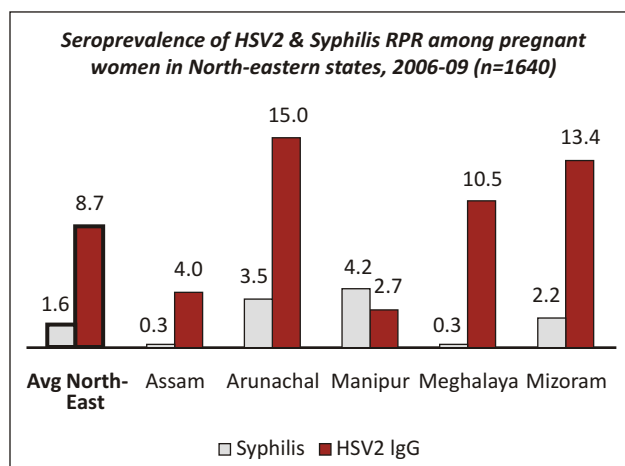
A community-based cross-sectional study to assess the prevalence of RTIs among 263 ever married women, carried out in the village Naila, Rajasthan in 2002 detected a prevalence of candidiasis and bacterial vaginosis in 14% and 26% respectively. The study also showed that the prevalence of RTI was highest (76%) in women aged 30-34 years and lowest (33%) in 15-19 years age.¹⁷

6. *HSV2 seropositivity (IgG) was somewhat higher in women (8.6% - 17.9%) compared to men (7% - 10.6%) in the general population.*



A community-based cross-sectional survey was carried out in the tribal population of Jabalpur district in 2004-05. Of the 2568 individuals interviewed, 12.7% had at least one STI syndrome (females: 17.6%; males: 8.4%). The commonest syndrome in females was vaginal discharge (16%).¹⁸ Another article based on the same study examined 852 serum samples from two different groups- STI patients and age- and sex-matched healthy tribal individuals selected randomly from tribal villages by house-to-house survey.¹⁹ This study showed the presence of various viral STIs, especially HSV2, in the tribal community of Central India. The prevalence of HSV2 IgG was 20.8% in STI patients (males: 12%, females: 25.8%), compared to 12.4% in the general population (males: 7.3%, females: 17.9%). The difference was statistically significant in the female population. No HIV infection was found in the study population.

A recently completed ICMR study (2006-09) assessed the seroprevalence of HSV2 in pregnant women in Northeastern states.²⁰ A total of 1640 pregnant women from ANC clinics of five selected northeastern states were enrolled for the study. The overall prevalence of HSV2 IgG was 8.66%. The highest HSV2 seroprevalence was observed in Arunachal Pradesh (14.98%), while the lowest was in Manipur (2.74%). The maximum percentage of sero-positivity was observed in the age group of 18-24 years (49.3%), followed by the age group 25-29 years (29.58%). Out of the total RPR (syphilis) tests, 1.59% were found reactive (titres not mentioned). The maximum RPR reactivity was observed in Manipur (4.23%) and minimum in Meghalaya (0.25%).



Recent studies

Other studies that were published after completion of the STI MTR are summarised below:

A study conducted in low-income peri-urban and rural neighbourhoods of Mysore between November 2005 and March 2006 showed that the burden of *T. vaginalis* infection at 8.5% was relatively high among a community sample of young reproductive aged women. Among women with culture-positive *T. vaginalis* infection, 41% were asymptomatic. There was no significant difference in the prevalence of *T. vaginalis* infection among women complaining of abnormal vaginal discharge as compared with women with no complaints of abnormal vaginal discharge.²¹

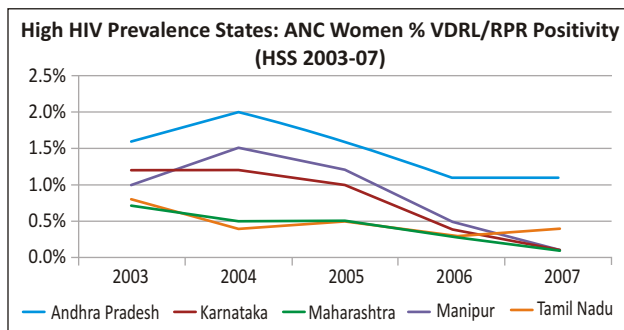
Another study sampled 32 rural and 34 urban clusters using a stratified random method to represent adults in the high HIV prevalence Guntur district in Andhra Pradesh.²² The overall seroprevalence of HSV2 (IgG) and syphilis adjusted for the age, sex and rural-urban distribution of Guntur district population was 5.87% and 1.75%, respectively. Seroprevalence for both HSV2 and syphilis was higher in urban areas, HSV2 was higher amongst women and syphilis was slightly higher in men as shown in the following table. In addition, 23% of those seroprevalent for syphilis and 12% seroprevalent for HSV2 were also found to be HIV infected.

Population-based rates* of HSV-2 and syphilis seroprevalence (%) in Guntur District, Andhra Pradesh, 2004-05 (n=12,617)				
	Females		Males	
	Rural	Urban	Rural	Urban
HSV-2 IgG (ELISA)	4.56	12.77	3.2	8.15
Syphilis IgG (ELISA)	1.38	1.51	1.71	2.93

*adjusted for age, sex, gender and rural/urban distribution of the population in Guntur district

NACO HSS Data

The HIV Sentinel Surveillance system (HSS) utilizes data from pregnant women at Antenatal clinics as a surrogate for general population. Hence trends in syphilis seropositivity in the ANC clinic attendees can be a reflection of the changing patterns among the general population.



Analysis of trends in syphilis seropositivity among ANC women from consistent sites between 2003-2007 showed a consistently declining pattern in the high prevalence states after 2004 as seen in the graph above.

CMIS data also corroborates the declining patterns in syphilis reactivity. Analysis of CMIS data at the National level showed a declining trend in syphilis positivity in the ANC women from 1.7% in 2005-06 to 0.8% in 2008-09.

Female Sex Workers

Female sex workers (FSWs) play an important role in heterosexual transmission of HIV. Control of sexually transmitted infections among sex workers may have a significant impact upon the spread of HIV. Targeting core groups, such as sex workers, is pivotal to HIV prevention in India. As per NACO estimates, 0.6% - 0.7% of the adult female urban population is engaged in transactional sex.²³

The NACP-III plan aims to target 1 million of the estimated FSW population in the country (i.e. 80%

FSW: STI/ RTI Prevalence ^f (%)	
Clinical Examination: STI syndromes	
Genital discharge	3.7 - 77.1
Genital ulcer	0 - 7.3
Lower abdominal pain/PID	0 - 33.9
Laboratory Investigations	
Syphilis	1.7 - 39.7 ^g
Gonorrhoea	0 - 16.9 ^h
Chlamydia	0.9 - 22.6 ⁱ
Trichomonas	2 - 54.1
Candidiasis	8.9 - 25
Bacterial Vaginosis	11.3 - 52.6 ^j
HSV2 IgG	34.6 - 100
HIV	2.2 - 54

^f Summary data derived from a total of 21 studies on FSWs. The range mentioned is the minimum and maximum value reported across various studies. However, few outliers have been mentioned separately.

^g Syphilis prevalence of 51% recorded in FSWs from Yevatmal, Maharashtra in 2005-06

^h *N gonorrhoea* prevalence of 29% recorded in FSWs from West Bengal in 2004

ⁱ *C Trachomatis* prevalence of 67.8% recorded in FSWs from Kolkata in West Bengal in 2001

^j STI OR: Baseline prevalence of BV 71% among FSWs in Hyderabad and Mumbai



of 1.25 million FSW as estimated by the expert group²⁴) by rapidly scaling up the number of targeted interventions.

Based on the desk review of published and unpublished studies conducted after the year 2000, the prevalence of STIs/RTIs among the FSW population in the country is summarized in the above box.

In addition, the data highlighted the following key points:

1. Burden of STIs: As seen from the above table, there is a highly variable level of STI prevalence among FSWs recorded from different parts of the country. In addition, various studies showed that HSV2 seropositivity (IgG) is high among these high risk groups. While the detailed data is presented in *Annexure 1*, some of these studies are discussed below:

FHI conducted a series of baseline STI prevalence studies between 1999-2001 to monitor the impact of HIV/STI prevention programmes among FSWs in Kerala (Trivandrum, Thrissur, Calicut),²⁵⁻²⁷ Andhra Pradesh (Kakinada, Peddapuram),²⁸ and Gujarat (Ahmedabad, Surat).^{29,30} These prevalence studies were implemented by different NGOs working with FSWs, in collaboration with local government agencies, laboratories and academic departments. The prevalence of active syphilis and HIV among FSWs was much lower in the studies from Kerala as compared to Gujarat and Andhra Pradesh. However, 55%-99% of FSWs from Kerala were detected to have HSV2 IgG antibodies. As HSV2 antibody testing was not carried out in the other studies, no comparison was possible.

Gujarat SACS has conducted several population based cross-sectional STI prevalence surveys

amongst FSWs in Gujarat with technical assistance from FHI/RCSHA/SHRC - at Surat (2000), Vadodara (2004), and Rajkot (2006). In brief, the findings of the surveys showed that 44.3% - 55.9% of the FSW population had one or more STIs (active syphilis, gonorrhoea, genital chlamydia and trichomoniasis). Another study conducted among FSWs in Surat in 2005-06 showed a much lower prevalence of all STIs tested and HIV as compared to 2000.³¹ However, as the article does not describe the methodology in detail, the two studies are not comparable.

APAC conducted an STI prevalence survey among FSWs in 10 intervention sites across 8 districts of Tamil Nadu in 2003.³² The study recruited the participants using a health camp approach and showed that the overall laboratory confirmed prevalence of any STI (syphilis, gonorrhoea, chlamydia, chancroid, trichomonas, HSV, HIV, hepatitis B) was 56%. Among these, 83% had proven non-viral STIs. The prevalence of bacterial vaginosis and candidiasis was 52.6% and 9.2% respectively.

Prevalence of STIs in FSWs, Tamil Nadu, 2003		
	No. tested	% Prevalence
<i>N gonorrhoea (Culture)</i>	278	1.4
<i>C trachomatis (PCR)</i>	257	19.5
<i>Trichomoniasis (Culture)</i>	278	31.6
<i>Syphilis (RPR+TPPA)</i>	293	15.7
<i>Chancroid (Culture)</i>	278	0
<i>HSV2 IgM (ELISA)</i>	287	4.2
<i>HIV (ELISA)</i>	285	9.5
<i>Any STI</i>	266	56

A population-based study of FSWs conducted in Goa in 2004-05 following the demolition of the red-light area, showed that STIs were common, with 25.7% prevalence of HIV and 22.5% prevalence of bacterial STIs. Antibodies to HSV-2 were detected in 57.2% of women.³³

The Integrated behavioural and biological assessment (IBBA) was carried out to measure the impact of Avahan interventions among high-risk and bridge populations. The first round of the IBBA in FSWs was undertaken in a total of 24 districts in the 4 south Indian high prevalence states and Nagaland between November 2005 and September 2006 in a phased manner. Laboratory tests revealed a high variability in STI prevalence rates, with the highest recorded from Maharashtra as shown in the following figure.³⁴ Among the three types of STIs

(syphilis, NG, CT), syphilis was the predominant STI in all the districts except Shimoga and Thane (street-based). Positivity for *N gonorrhoeae* or *C trachomatis* by NAT test was generally on the lower side, ranging from 0.2% -9.3% and 0.9% - 22.6% respectively. Further analysis of the Avahan IBBA round one data showed that combined NG/CT prevalence among FSWs ranged from 0.9% - 24.3%. (FHI unpublished data).

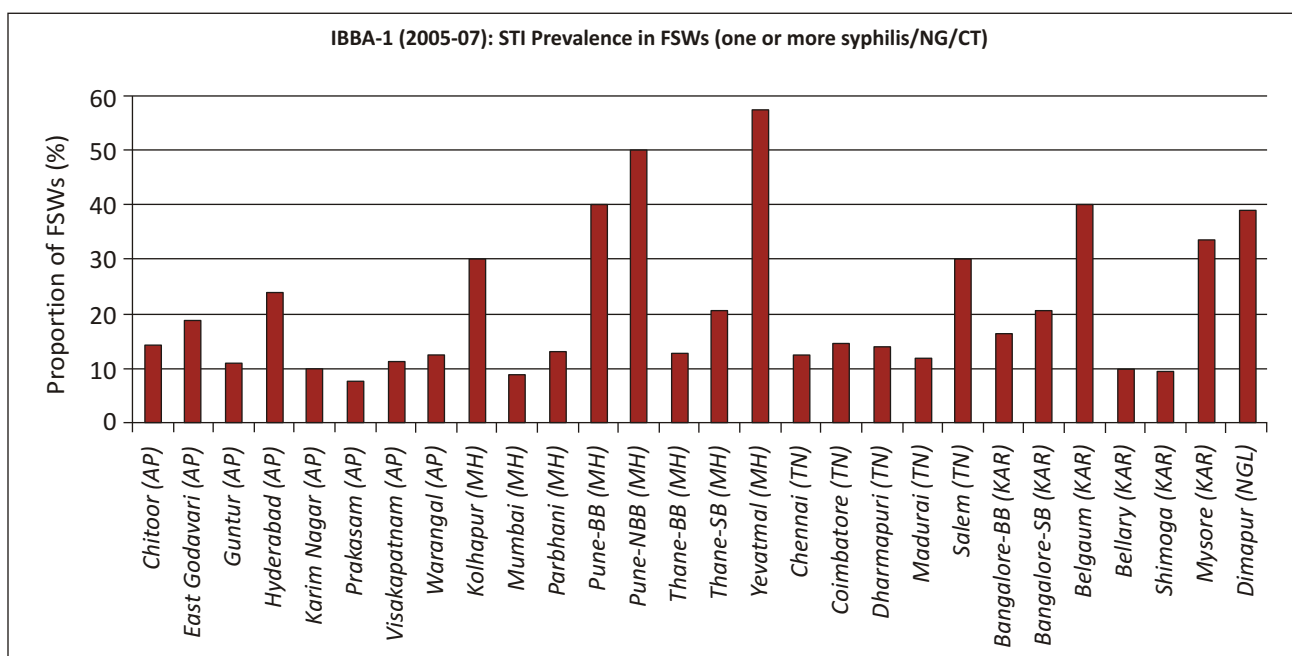
A comparative cross-sectional study was undertaken to assess the success of intervention programmes among the sex workers in Calcutta- the Sonagachi Project and other areas in which only the NACO's interventions were implemented.³⁵ There was a significant decline in the prevalence of syphilis, vaginal discharge, candidiasis, and trichomoniasis between 1992 and 2003. However, the prevalence of a Gram-positive cervical smear, condyloma acuminata, and molluscum contagiosum did not change. This study also found that no difference existed between the 2 groups in regards to the prevalence of all STIs combined, although active syphilis was higher in the NACO intervention areas, whereas laboratory-proven chlamydia and gonorrhoea were higher in the Sonagachi area. But there were significant baseline differences between intervention and control arms. However, another study implemented in six different red light areas of West Bengal showed a much higher prevalence of syphilis (21.4%) and gonorrhoea (29%) as compared to the earlier study.³⁶

2. Geographical areas with high STI prevalence:

STI rates varied widely by geographic location. Identification of areas with high STI prevalence based on the desk review was limited by the number and distribution of STI prevalence studies conducted.

Based on prevalence of syphilis, gonorrhoea and chlamydia among FSWs, high STI prevalence areas have been identified as follows:

- Syphilis: Highest rates of syphilis seropositivity among FSWs were detected in the following states:
 - ◆ Maharashtra: Syphilis prevalence ranged from 11.5% - 51% in the districts of Parbhani, Kolhapur, Pune, Mumbai (brothel-based and street-based), Yevatmal (2005-06)³⁴
 - ◆ Nagaland: Dimapur, 22.1% (2005-06)³⁴
 - ◆ West Bengal, 21.4% (2004)³⁶
 - ◆ Andhra Pradesh: Hyderabad, 17.4% (2005-06)³⁴
 - ◆ Gujarat: Ahmedabad, 17.4% (2003)²⁹; Vadodara, 11.6% (2004)⁷¹
 - ◆ Kerala: Calicut, 16.7% (2001)²⁷
 - ◆ Karnataka: Bangalore (street based), 13.8% (2005-06)³⁴
 - ◆ Tamil Nadu: Prevalence ranged from 11% - 12% in the districts of Chennai, Coimbatore, Dharmapuri, Madurai (2005-06)³⁴

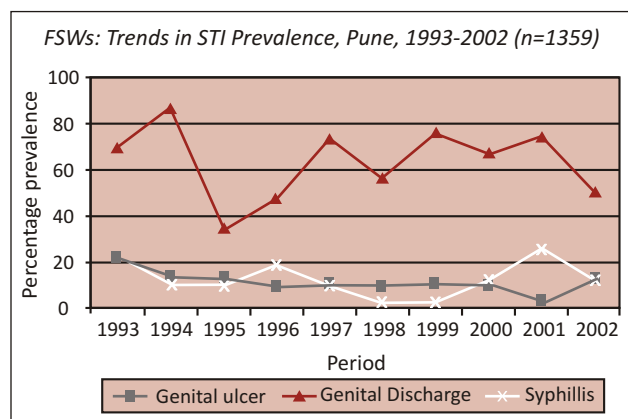


- Gonorrhoea: Highest prevalence of *N gonorrhoea* was detected in FSWs in West Bengal (29% - 2004³⁶, 9.4%-Kolkata 2001⁶³); Mumbai (brothel-based) (9.3% - 2005-06³⁴); Rajkot (9% - 2006⁷¹); and Goa (8.9% - 2004-05).³³
- Chlamydia: FSWs from the following areas had high chlamydia prevalence: Kolkata (67.8% - 2001⁶³); Dimapur (22.6%- 2005-06)³⁴; Tamil Nadu (19.5%- 2003)³²; Calicut, Kerala (15.8%- 2001)²⁷; and Thane, Maharashtra (street-based:14.2%- 2005-06).³⁴
- As mentioned earlier, analysis of the Avahan IBBA round one data showed that combined NG/CT prevalence among FSWs ranged from 0.9% - 24.3%. The combined rate was greater than 10% in 8 out of the 30 FSW sites sampled and were located in Andhra Pradesh (Hyderabad, 11.4%), Maharashtra (Mumbai street-based, 14.4%; Mumbai brothel-based, 14.1%; Thane street-based,17.3%; Yevatmal, 12.4%), the North-east (Dimapur, 24.3%) and Karnataka (Mysore, 13.8%).(FHI unpublished data).

The Avahan STI Capacity Building Project Operations Research baseline data in Mumbai and Hyderabad showed that 26.1% of FSW were positive for NG and/or CT, but the inclusion criteria for the study selected for the highest risk sex workers.³⁷

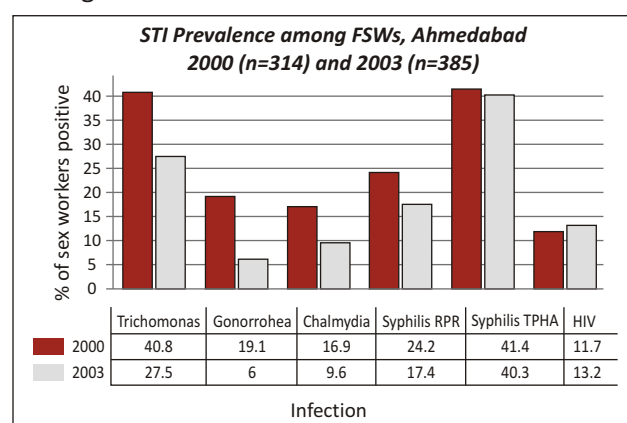
3. Trends of STIs: Some studies that have analysed the trends of STIs among FSWs are discussed below:

A study from Pune followed up a cohort of FSWs attending 3 STD clinics by studying trends in HIV prevalence, STIs, and risk behaviours measured from 1993 to 2002.³⁸ The prevalence of HIV infection remained stable from 1993 to 2002 (46% in 1993 and 50% in 2002; $P = 0.80$). The presence of genital ulcers on clinical examination decreased over time ($P < 0.001$), whereas the prevalence of syphilis



increased over time ($P = 0.001$). As shown in the above figure, genital discharge diseases remained stable over the period of 10 years.

Ahmedabad Municipal Corporation ACS and an NGO- Jyoti Sangh conducted two rounds of population based surveys to study the prevalence and trends of STIs and HIV among FSWs in Ahmedabad, Gujarat during 1999-2003.³⁹ There were highly significant declines in the levels of trichomoniasis, gonorrhoea, chlamydia and syphilis RPR i.e. the curable STIs as shown in the following figure. A repeat STI prevalence study conducted in December 2005 showed a further decline in syphilis (3.7% by VDRL) and HIV seroprevalence (3.2%) among FSWs in Ahmedabad.⁴⁰



Two cross-sectional surveys among random samples of FSWs were conducted in Mysore district, Karnataka, 30 months apart, in 2004 and 2006 in order to investigate the impact on sexual behaviour and STIs of a comprehensive community-led intervention programme.⁴¹ Majority of the FSWs were street based (88%). Laboratory investigations showed that STI prevalence declined from baseline to follow-up as shown in the following table. While HIV prevalence remained stable, HSV2 seroprevalence increased at the follow-up survey and was strongly associated with HIV infection at both baseline and follow-up.

STI Prevalence among FSWs at baseline and follow up, Mysore	2004 (n=429)	2006 (n=425)
<i>N gonorrhoea</i> (PCR)	5.4	2.4
<i>C. trachomatis</i> (PCR)	10.8	4.7
Trichomoniasis (PCR)	32.9	14.1
HSV2 IgG (ELISA)	64.4	79
Syphilis (RPR+TPHA)	24.7	12
High titre Syphilis (RPR $\geq 1:8$ +TPHA)	14.8	3.1
HIV (ELISA)	26	24

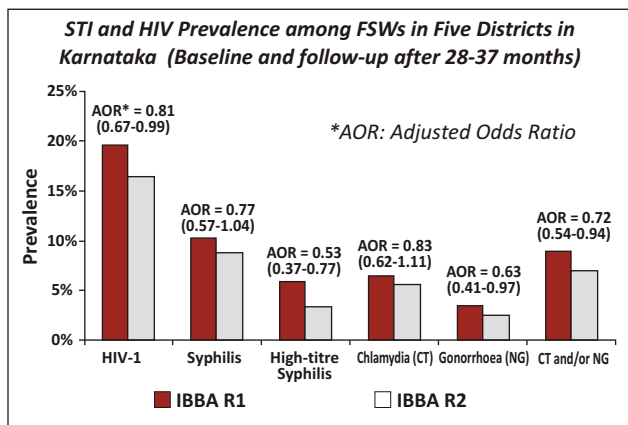
Besides the above mentioned studies, trend data for STIs is available from two sources: the Avahan IBBA and the national HIV sentinel surveillance. Though syphilis prevalence data for high risk groups is available through the HIV sentinel surveillance, further analysis of the trends is needed. Data should be disaggregated by site to ensure that comparisons over time are made at the same geographical locations and even then the findings need to be interpreted with caution since widespread non-adherence to the sampling protocol for high risk groups has been reported.

The IBBA data is limited to high risk populations in select districts in high prevalence states. A second round of IBBA was conducted in 2009 using similar methodology. The results of this survey are currently being analysed and will be available in the near future and will give an idea of the trends in STI/RTI prevalence among FSWs in these districts.

Recent studies

The following studies were published after completion of the STI MTR:

Baseline and follow-up (conducted 28-37 months after baseline) IBBA studies were conducted on random samples of FSWs in five districts (Mysore, Belgaum, Shimoga, Bellary and Bangalore Urban) in Karnataka between 2004 and 2009 in order to examine the impact of a large-scale HIV prevention programme for FSWs.⁴² Compared with baseline, there were significant reductions in the prevalence of HIV (19.6% vs 16.4%, $p=0.04$); high-titre syphilis (5.9% vs 3.4%, $p=0.001$); and chlamydia and/ or gonorrhoea (8.9% vs 7.0%, $p=0.02$). In Mysore district only, FSW were also tested for trichomonas infection in both the rounds. Almost one-third (32.9%) were infected at baseline, but this proportion fell to 13.5% by the follow-up survey ($p < 0.001$).



The evaluation of the Frontiers Prevention Project (FPP) being implemented in Andhra Pradesh was based on two cross-sectional surveys among FSWs and MSM at 24 sites in AP conducted 4 years apart. The evaluation results showed that community-based prevention leads to a reduction in STIs among FSWs.⁴³ There were impressive reductions in the biomarkers for syphilis and HSV2 among FSWs studied at the intervention sites as shown in the following table:

	Pre-intervention (2003-4)		Post-intervention (2007)	
	Non-FPP (n=1750)	FPP (n=1692)	Non-FPP (n=855)	FPP (n=1292)
Syphilis ELISA	13	18	8	10
HSV2 IgG ELISA	46	47	21	29

Men Who Have Sex With Men & Transgenders

Men who have sex with men (MSM) and transgenders constitute a high risk group for STIs and HIV. There is an increased recognition of their vulnerability and the role of male-to-male transmission in the spread of the HIV epidemic in the country. Accordingly, under the NACP-III, there is an increased focus on provision of preventive services for this population. There are an estimated 2.35 million MSM in the country (including 0.24 million male / transgendered sex workers). Under NACP-III, 235 targeted interventions (9% of the total 2,500) are planned exclusively for MSM / Hijras (up from 30 under NACP-II), in addition to 235 composite interventions.

Based on the desk review of published and unpublished studies conducted after the year 2000, the prevalence of STIs among the MSM and transgender population in the country is summarized in the box below.

In addition, the data highlighted the following key points:

1. Burden of STIs: There is very limited data on prevalence of different STIs/HIV amongst MSM in India. Information available currently on STIs amongst MSM in India is predominantly based on the data from STI clinics, which may not represent the prevalence in the community as a whole. As seen from the following table, there is a highly variable level of syphilis seropositivity among MSM recorded from different parts of the country.

MSM & TG: STI/ RTI Prevalence (%) ^k	
Clinical Examination: STI syndromes	
Genital discharge	0 - 8.5
Genital ulcer	0 - 7.3
Scrotal swelling	0.7
Inguinal swelling	0 - 0.6
Warts/Condyloma acuminata	0.3- 5.9
Laboratory Investigations	
Syphilis	MSM: 3 - 17 TG: 16.6 - 57
Gonorrhoea	Oropharyngeal: 0.9 - 4.7 Rectal: 1.9 - 11.1 Urethral: 1.6 - 6.3
Chlamydia	0.6 - 4.0
Trichomonas	0.3 - 1.3
HSV2 IgG	16 - 61.5
HIV	MSM: 0 - 20.9 TG: 12 - 68

Syphilis seropositivity and HIV seroprevalence is higher in transgenders as compared to MSM. While prevalence of chlamydia infection is low in the MSM population, a significant percentage of MSM suffered from oropharyngeal (up to 4.7 %) and rectal gonorrhoea (up to 7.4 %). In addition, various studies showed that HSV2 seropositivity (IgG) is high among these groups. While the detailed data is presented in *Annexure 2*, some of these studies are discussed below:

In a population based STI prevalence study in Chennai in 2001, a total of 5.9% of the population studied reported MSM behaviour in the past. These males were over eight times more likely to be infected with HIV than other men in that population, and 60% more likely to be infected with other STIs.⁴⁴

A pilot study undertaken to assess the sexual behaviour, STIs and HIV prevalence in a population of MSM and transgenders attending STI clinics in Mumbai in 2001 showed HIV prevalence was significantly higher in the transgenders (68%) compared with MSM (17%). However, the numbers of transgenders were small, it was a clinic based sample, and most of them had had sex in exchange for money in the past six months; hence the findings could not be generalised to the transgender population at large.⁴⁵

^k Summary data from a total of 13 studies on MSM. The range mentioned is the minimum and maximum value reported across various studies.

A study from Mumbai screened VCTC clinic attendees and studied 1700 consecutive MSM and transgenders between 2002-2003.⁴⁶ General HIV seropositivity amongst the study population was 15.6% (males: 11.3%, transgenders: 55.9%) while 12.6% suffered from an STI (males: 11.6%, transgenders: 21.5%). The study showed that there is high prevalence of both HIV and STI in MSM groups, especially among transgenders who are involved in commercial sex work, and have unprotected sexual practices with multiple partners.

Another study from Mumbai that studied same-sex partnerships and sexual risk behaviour of men attending STI clinics in Mumbai found that the prevalence of HIV was higher among men having sex with Hijras (14%) or with all 3 genders (13%) than among men having sex with men and women (8%).⁴⁷

Gujarat SACS has conducted several STI prevalence surveys amongst MSM in Gujarat with technical assistance from RCSHA/SHRC. These population based cross-sectional studies were implemented by a CBO-Lakshya Trust, and were carried out between 2004-2006 at Vadodara (2004), Surat (2005) and Rajkot (2006).^{48,49,50} The findings of the surveys showed that the STI prevalence in this population ranged from 23.4% -28.9%. These studies also recorded a high prevalence of oropharyngeal (0.9% - 4.7%) and rectal gonorrhoea (5.4% - 6.5%) among the MSM studied. However, most of these STIs were asymptomatic.

A cross-sectional probability-based survey of 4597 self-identified MSM in selected districts from four states in south India in 2006-07 showed that the STI prevalence ranged from 11.6% - 14.7%. Laboratory investigations showed that across the four states, syphilis seropositivity ranged between 8.4% - 14% while chlamydia seroprevalence was between 0.6% - 4%.⁶⁵ One of the key findings of the study was that hijras are at high risk of HIV and depend mostly on sex work as their main source of income. Compared with other self-identified MSM, they had the highest prevalence of HIV.³⁴

The above mentioned study was a part of the IBBA that was conducted in 6 states for measuring the impact of Avahan interventions among high-risk and bridge populations. The first round of the IBBA in

STI Prevalence among MSM in 4 South Indian states, 2006-07

	Andhra Pradesh (n=1621)	Maharashtra (n=653)	Tamil Nadu (n=2025)	Karnataka (n=298)
HIV (ELISA)	20.9	11.3	7.5	17.3
Syphilis (RPR+TPHA)	13	8.4	14	11.9
High titre syphilis (RPR≥1:8 +TPHA)	4.2	3.2	3.3	6.0
Urethral Gonorrhoea (NAT)	0.6	0.3	0.1	0.6
Urethral Chlamydia (NAT)	1.6	4.0	0.6	1.6
Any STI (NG/CT/syphilis)	14.7	11.6	14.7	13.4
HSV2 IgG (ELISA)	61.5 (167)*	43.8 (73)*	32.2 (1656)*	36.7 (266)*

*Figures in parentheses () indicate sample size

MSM was undertaken in a total of 11 districts in the 4 south Indian states between March 2006 and April 2007 in a phased manner. The survey covered MSM and Hijra communities as “combined” groups in Andhra Pradesh, Karnataka, and Pune district of Maharashtra. In addition, Hijras were covered as a separate group in 5 districts of Tamil Nadu.³⁴ Among the districts selected, MSM from Madurai in Tamil Nadu and Hyderabad in Andhra Pradesh recorded the highest prevalence of HIV and STIs. Among the three types of STIs (syphilis, NG, CT), syphilis was the predominant STI in all the districts. While prevalence of *N gonorrhoea* was low (0 - 0.9%), chlamydia prevalence as recorded across districts ranged from 0 - 4.4%. Further analysis of the Avahan IBBA round one data showed combined NG/CT prevalence among MSM ranging from 0.99% - 3.5%. (FHI unpublished data).

A second round of IBBA was conducted in 2009 using similar methodology. The results of this survey are currently being analysed and will be available in the near future and will give an idea of the trends in STI/RTI prevalence among MSM in these districts.

2. Geographical areas with high STI prevalence:

Based on prevalence of syphilis, gonorrhoea and chlamydia, high STI prevalence areas have been identified as follows:

- Syphilis: High rates of syphilis seropositivity were detected in MSM in the following states:
 - ◆ Tamil Nadu: 4 districts, 12.2% - 17.8% (2006-07)³⁴
 - ◆ Andhra Pradesh: Hyderabad, 15.7%; East Godavari, 13% (2006-07)³⁴
 - ◆ Maharashtra: Pune, 14.6% (2006-07)³⁴; Mumbai, 11.7% (2002-03)^{67,68}

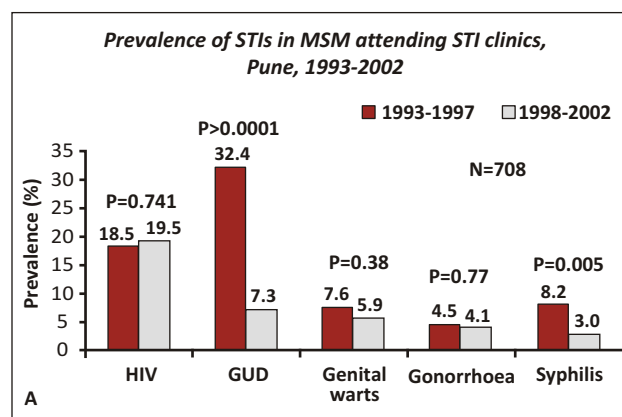
- ◆ Gujarat: Surat, 12.4% (2005)⁴⁹
- ◆ Karnataka: Bangalore, 11.9% (2006-07)³⁴

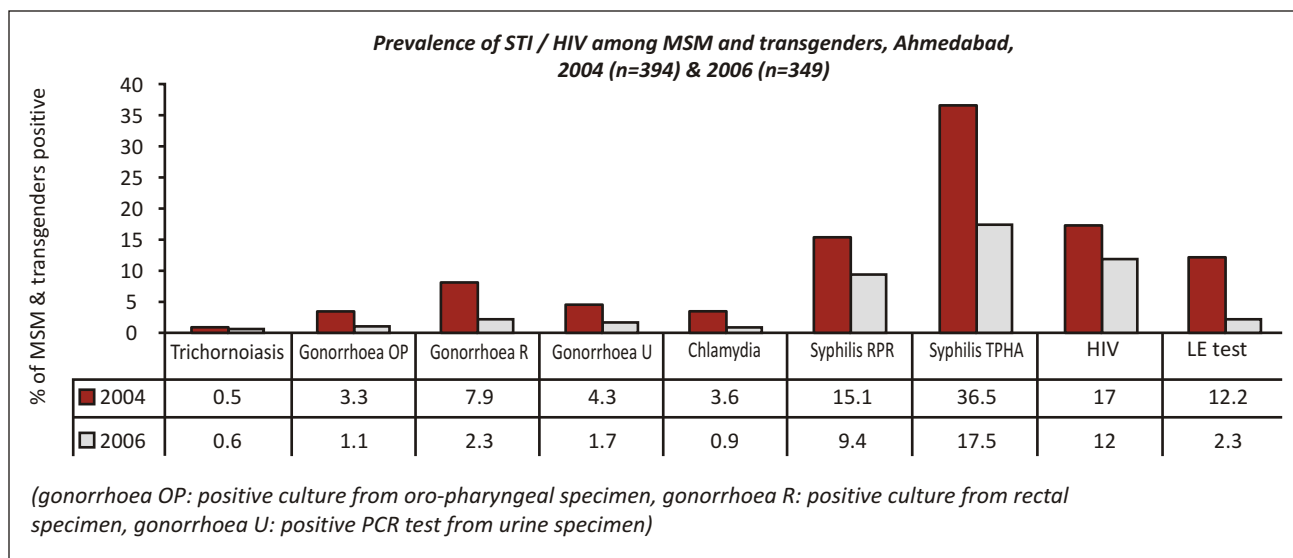
In transgenders, high rates of syphilis seropositivity were reported from Mumbai (25%),⁶⁹ Ahmedabad (20.9%, 2006),⁵² Tamil Nadu (16.6%, 5 districts-2006-07).³⁴

- Gonorrhoea: High prevalence of *N gonorrhoea* was detected in MSM from Vadodara, Gujarat (6.3% - 2004),⁴⁸ and Pune (4.1%- 2002).⁵¹ In Gujarat, MSM were also tested for rectal gonorrhoea and found to have a high prevalence in all 3 sites (Vadodara: 6.5%, 2004⁴⁸; Rajkot: 6.1%⁵⁰, 2006; Surat: 5.4%,2005⁴⁹).
- Chlamydia: High prevalence of *C trachomatis* was detected in MSM from Mumbai- Thane (4.4%- 2006-07),³⁴ and Gujarat (Vadodara: 3.4%- 2004⁴⁸; Rajkot: 2.5%- 2006⁵⁰).

3. Trends of STIs: Few studies that have assessed the trends of STIs among MSM are discussed below:

In a study among STI clinic attendees in Pune conducted between 1993-2002, of 10,785 men screened, 708 (6.6%) were MSM. Among the MSM, a total of 18.9% were detected as HIV positive, 21.5% had genital ulcer disease, 5.8% had syphilis and 4.3% had gonorrhoea. Over the decade, neither





HIV nor NG prevalence changed among MSM, but syphilis and GUD decreased significantly.⁵¹

Ahmedabad Municipal Corporation ACS and an NGO- Chuval Gram Vikas Trust conducted two rounds of population based surveys to study the prevalence and trends of STIs and HIV among MSM and transgenders in Ahmedabad during 2004 and 2006.⁵² The surveys showed that, except for trichomoniasis, there was a significant decline in the levels of all other STIs tested in 2006 when compared to 2004. In addition, in 2006, the prevalence of syphilis was higher among transgenders (20.9%) as compared to MSM (7.8%).

Besides the above mentioned studies, trend data for STIs among MSM is available from two sources: the Avahan IBBA and the national HIV sentinel surveillance. The IBBA data is limited to high risk populations in select districts in high prevalence states. As mentioned in the earlier section, presently, only the baseline data are final. Though a second round of IBBA was conducted in 2009 using similar methodology, the results of this survey are currently being finalised and will in future give an idea of the trends in STI/RTI prevalence among MSM in these districts.

Though syphilis prevalence data for HRGs is available through the HIV sentinel surveillance, further analysis of the trends is needed. Data should be disaggregated by site to ensure that comparisons over time are made at the same geographical locations and even then the findings need to be interpreted with caution since widespread non-adherence to the sampling protocol for HRGs has been reported.

Recent studies

The following studies was published after completion of the STI MTR:

HIV/STI prevalence among MSM in Tamil Nadu was studied in Oct-Nov 2008 using respondent-driven sampling in eight cities (n = 721). 34% were married and 40% self-identified as homosexual. HIV, HSV2, chronic hepatitis B virus (HBV) and syphilis prevalence were 9%, 26%, 2% and 8%, respectively; among married men, all were higher: 14%, 32%, 3% and 11% (p < 0.01 for HIV and HSV-2).⁵³

The evaluation of the Frontiers Prevention Project (FPP) being implemented in Andhra Pradesh was based on two cross-sectional surveys among FSWs and MSM at 24 sites in AP, conducted 4 years apart. The evaluation results showed that community-based prevention leads to a reduction in STIs among MSM.⁴³ There were impressive reductions in the biomarkers for syphilis and HSV2 among MSM studied at the intervention sites as shown in the following table:

Evaluation of an intervention project among MSM, Andhra Pradesh				
	Pre-intervention (2003-4)		Post-intervention (2007)	
	Non-FPP (n=1106)	FPP (n=1680)	Non-FPP (n=218)	FPP (n=1317)
Syphilis ELISA	20	22	9	12
HSV2 IgG ELISA	34	40	29	32

Neisseria gonorrhoea: Antibiotic Resistance Patterns

Antibiotic resistance in aetiologic pathogens could pose an important obstacle in prevention and control of STIs. For example, over the past decade, strains of *N gonorrhoea* have been reported to

develop high levels of resistance against several antimicrobial agents previously used for the treatment of gonorrhoea. The remarkable ease with which *N gonorrhoeae* acquires drug resistance is one of the prime areas of concern. The first penicillinase-producing *N gonorrhoeae* (PPNG) strain was identified in 1976 and since then there has been a rapid rise in penicillin- as well as tetracycline-resistance. Recently, resistance to the quinolones and azithromycin as well as decreasing in vitro susceptibility to third-generation cephalosporins has emerged. Continuous surveillance of antimicrobial resistance of *N gonorrhoeae* is essential to monitor its emergence and spread and to provide a rational basis for formulating national treatment guidelines.

Gonococcal susceptibility to cephalosporins needs to be monitored closely in light of the recent emergence of multi-resistant *N gonorrhoeae* in several countries in the Western Pacific region. Gonococcal isolates reported as “less sensitive” to ceftriaxone were described in India as early as 1999. Majority of the studies on antibiotic resistance patterns of *N gonorrhoea* have been conducted in North India, and there is scant literature from other areas. Most of the studies are from tertiary referral centres, and the data generated may not be indicative of the antibiotic sensitivity patterns at the community level. In addition, determination of the clinical significance of the less sensitive or resistant strains has not been reported.

Brief details of various studies conducted are discussed below:

Chandigarh: In a study from PGI Chandigarh, a total of 45 consecutive isolates of *N gonorrhoeae* were obtained from patients with suspected acute gonococcal urethritis. Of these, 35 were resistant to ciprofloxacin. All isolates were sensitive to ceftriaxone while 21 were resistant to penicillin and 23 to tetracycline. Ten isolates were found to be β -lactamase producers.⁵⁴

Pune: Antibiotic susceptibility tests by disc diffusion on 277 *N gonorrhoeae* isolates during 1996-2002 revealed that the per cent resistant isolates showed an increasing trend over the years, for all antibiotics. While ciprofloxacin resistant isolates increased from 74% to 100%, isolates showing lower susceptibility to ceftriaxone appeared from 1999 onwards with

one in 1999 and two each in the years 2000, 2001 and 2002, respectively.⁵⁵

Delhi: A Gonococcal Antimicrobial Susceptibility programme (GASP) under the World Health Organization South East Asia Region (WHO SEAR) became functional in SEAR in 1997. Under the programme, antimicrobial resistance patterns of *N gonorrhoeae* were studied in 7 different focal-point laboratories. Antimicrobial susceptibility testing was carried out following either National Committee for Clinical Laboratory Standards (NCCLS) method or calibrated dichotomous sensitivity (CDS) technique, using high- and low-potency discs, respectively. Penicillin resistance was reported from all 7 laboratories but varied between 20% and 79%. PPNGs were reported from Delhi-MAMC (10%), Nagpur (13.5%), and the WHO Regional Reference Laboratory, Vardhman Mahavir Medical College, and Safdarjung Hospital (RRL), New Delhi (26.8%). Resistance to ciprofloxacin was reported from all the laboratories and varied considerably (range 11% - 100%). Delhi (RRL 88.4% and MAMC 100%) and Hyderabad (57%) reported very high percent resistance.⁵⁶

Studies in antimicrobial resistance patterns in *N gonorrhoeae* have been reported from three tertiary hospitals in Delhi:

Lok Nayak Hospital (MAMC): In a study conducted between April - Nov 2000, 35 male patients with gonococcal urethritis were studied.⁵⁷ The clinical and bacteriological response was assessed on day 5 after treatment with a single dose ciprofloxacin, 500 mg. The sensitivity pattern of *N gonorrhoea* was observed to be: ceftriaxone 100%, azithromycin 100%, tetracycline 65.7%, penicillin 40% and ciprofloxacin 5.7% by disc diffusion method. On the fifth day a large number of treatment failures (88.5%) were seen with ciprofloxacin while none was noted one week after re-treatment with ceftriaxone.

Another study from the same institution conducted between Jan 2004 - June 2005 studied 60 gonococcal isolates from males with urethritis, females with endocervicitis and their sexual contacts.⁵⁸ Nine antibiotic resistance patterns were observed. 98% of isolates were resistant to ciprofloxacin, while 20% isolates were penicillinase producing *N gonorrhoeae* (PPNG) and 18.3% isolates were tetracycline resistant *N gonorrhoeae* (TRNG).



GTB Hospital: A study from a large tertiary East Delhi hospital that caters mainly to semiurban and migratory population studied 10 isolates of *N gonorrhoeae*.⁵⁹ Of these one isolate was PPNG, and another one was TRNG.

Regional STI Teaching & Training Centre (SJH): Regular monitoring of antimicrobial susceptibility has been carried out at the Regional STI centre at Safdarjung hospital (SJH) from 1995 onwards. The antimicrobial susceptibility pattern of *N gonorrhoeae*, based on disc diffusion with various antibiotics in 2000 and 2001, was compared with data from previous years (i.e., 1995 to 1999).⁶⁶ All the strains were found to be susceptible to ceftriaxone and spectinomycin throughout the period. Penicillin resistance increased significantly ($P < 0.001$), from 6.8% in 1996 to 66.7% in 2001. Even the percentage of less sensitive isolates increased from 0% in 1996 to 25% in 2001, and that of PPNG isolates increased from 3.4% in 1996 to 26.8% in 2001. Tetracycline resistance remained constant at 12% from 1998 to 2001 but decreased to 7.4% in 2001. The ciprofloxacin resistance showed a significant increase, from 3.4% in 1996 to 90.7% in 2001.

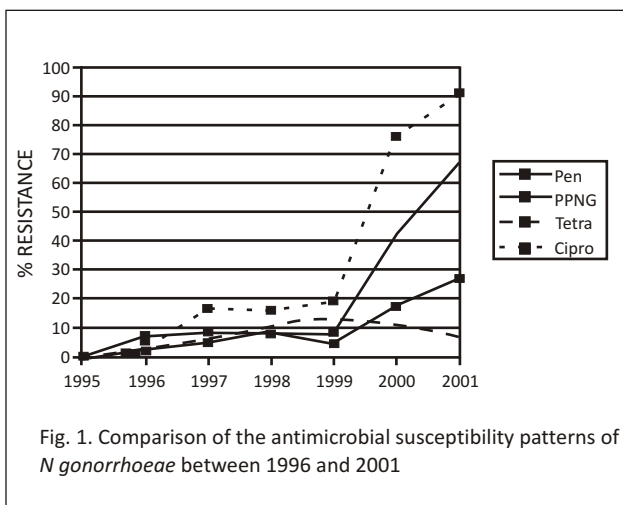
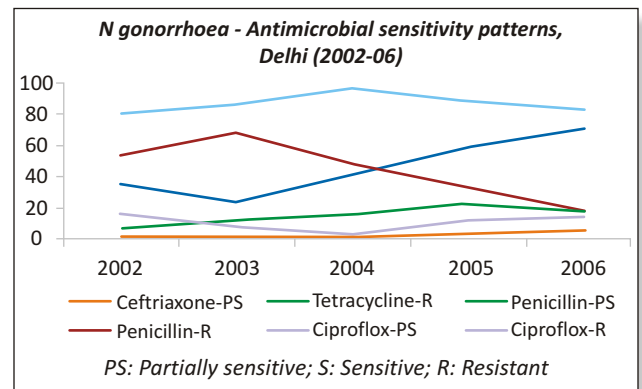


Fig. 1. Comparison of the antimicrobial susceptibility patterns of *N gonorrhoeae* between 1996 and 2001

Subsequently, antimicrobial susceptibility of 382 *N gonorrhoeae* isolates from clinical cases in males and females between 2002-2006 was determined by disc diffusion technique.⁶⁰ During the period of study, the number of isolates decreased every year, from 119 in 2002 to 55 isolates in 2006. A significant increasing trend of penicillin and ciprofloxacin resistance up to 2003 and 2004, respectively, and subsequent decrease in resistant strains with a concomitant increase in less susceptible strains, was observed. Tetracycline-resistant *N gonorrhoeae* increased significantly from 6.7% in 2002 to 22.9% in 2005. Only one isolate was resistant to spectinomycin and nine isolates were less susceptible to ceftriaxone, during this 5 year period. A substantial proportion (23.3%) of strains were multiresistant.



Thereafter, the antibiotic resistance patterns in this regional centre have remained the same. Data up to 2008 has shown that almost 90% of the *N gonorrhoeae* isolates are resistant/less sensitive to penicillin, while 100% are resistant/less sensitive to ciprofloxacin. After 2005, only 2 more isolates of ceftriaxone resistance were identified, however they have been responsive to treatment (*Dr Manju Bala- Personal communication*).

Another study (2002-04) from the same institute compared the antimicrobial resistance pattern of *N gonorrhoeae* isolates from urban and rural peripheral health centres and from STI clinic attendees in Delhi.⁶¹ Penicillin-resistant, ciprofloxacin-resistant, penicillinase-producing *N gonorrhoeae* and tetracycline-resistant *N gonorrhoeae* strains were higher in STI clinic attendees than in peripheral health centres. High-level resistance to ciprofloxacin and multiresistant strains were also higher in STI clinic attendees (22.4%) vs PHC attendees (7.7%). In contrast, ceftriaxone less-sensitive strains were significantly higher in peripheral health centres. Only one strain

was resistant to spectinomycin. The study emphasized the importance of surveillance of antimicrobial resistance of *N gonorrhoeae* in different population subgroups in order to monitor the spread of multiresistant strains.

Visits to the Field

The National STI/RTI control and prevention programme comprises an integrated effort from the NACO and NRHM to utilize the full spectrum of public health services from medical colleges to peripheral health units (PHCs, community health centres, first referral units, district hospitals, STI/RTI clinics and other centres such as peripheral health institutions) to prevent and treat STIs/RTIs in the general population. In addition, NACO provides STI/RTI services to subgroups such as bridge populations (e.g. migrants, truckers) and HRGs through the SACS supported TIs implemented by non-governmental organizations (NGO) and community based organizations (CBO). This is in recognition of the link between STI and HIV whereby the presence of an STI increases the risk of HIV transmission to a sex partner. With prevention being the mainstay of the NACP-III strategy, STI/RTI prevention and treatment services are also offered through TI-NGO/CBO clinics and Preferred Providers (PP) for bridge populations and HRGs as a focused intervention where the need would be the highest.

Management of both symptomatic and asymptomatic infections is the cornerstone of STI control for HRGs under NACP III. Asymptomatic infections are managed by presumptive treatment and regular STI screening. For persons presenting with STI symptoms and signs, syndromic case management (SCM) is advocated. SCM is a comprehensive approach for STI/RTI control endorsed by the WHO. SCM achieves high cure rates because it provides immediate treatment at the first visit and at little or no laboratory cost. It also encompasses the other important components of STI/RTI case management, namely treatment compliance and follow-up, counseling, partner treatment and condom promotion. Implementation of a standardized SCM simplifies training and supervision, reporting and drug management.

As a part of the Midterm review of the NACP-III, field visits were undertaken to review the

implementation of the STI/RTI control and prevention programme.

Summary of Salient Findings

Clinical coverage of HRGs: The clinic attendance over three months (June-August 2009) varied between the states, and ranged from 16% to 25% of the total HRG population in the NGO/PP sites visited, however, the possibility of double counting could not be ruled out.

Over a period of three months, the proportion of NGO/PP clinic attendees diagnosed with an STI syndrome ranged from 37% in Kerala to 96% in Orissa. In West Bengal, Kerala and Uttar Pradesh, NGO/PP site data showed that there was a lower proportion of GUD ranging from 9% - 16%, while Orissa was high at 35%. The proportion of 'other' STIs was significant in Orissa, Uttar Pradesh and West Bengal (ranging from 15% - 21%). Presumptive treatment regime for HRGs as recommended under NACO technical guidelines was being followed at all the sites visited.

However, syphilis screening coverage over six months at the sites visited varied from 4% in Tamil Nadu to 39% in Maharashtra.

STI syndromic management: Though, syndromic management guidelines were being followed in about half the sites visited, there was a wide variation across states and service providers. The sites visited in West Bengal showed the maximum adherence to the National guidelines, while tertiary sites such as STD departments of medical colleges preferred a clinical-aetiological approach to STI management. Under usage of penicillin injections for treating syphilis and non-herpetic GUD was a constraint in certain states. Of the 39 government sites visited, only 12 had adequate stocks of the pre packaged colour coded STI treatment kits. TI NGOs were procuring STI drugs from their budgetary allocation but at many places the appropriate drugs were either not available or were in short supply.

Training and supervision: Though the majority of clinic staff had been trained in syndromic management, the training was not specific to STI management among HRGs. Most sites reported that they had received at least one supervisory visit in the last 12 months; however, this was not being carried out on a regular basis.

Clinic facilities: Only 41% of 88 sites visited had facilities for clinical examination of HRGs. Though the SACS have provided budgetary allocation for the examination area to the government sites, it remained unutilized in 21 of the 39 sites. About half the sites had maintained proper documentation as per NACO operational guidelines.

Coordination between clinic and outreach: 21 of the 28 NGO clinics had established coordination mechanisms with the outreach teams. However, where the clinical services were provided through PP or government sites, coordination mechanisms were found lacking, leading to under utilization of clinical services.

Analysis of STI Data of CMIS, NACO

Analysis and use of routine programme data is essential to strengthen programme implementation and to inform policy. In view of common mode of transmission and synergistic effects of STIs and HIV transmission, the NACO included services for management of STIs as a major programme strategy for prevention of HIV. As discussed in the earlier section, the National STI/ RTI control and prevention programme comprises an integrated effort by NACP and NRHM to utilize the public health services of medical colleges and district level hospitals to peripheral health institutions. STI clinics in medical colleges and district hospitals are supported by NACO and report to NACO's CMIS. Report from STI clinics at sub-district level health care facilities are reported to the Management Information System (MIS) of NRHM. Besides, NACO has also initiated provision of RTI/STI services to HRGs and bridge populations through NGO clinics. For the purpose of MTR, analysis of STI data from NACO CMIS was undertaken for selected states (Andhra Pradesh, Maharashtra, Gujarat, Tamil Nadu, Uttar Pradesh, West Bengal and Manipur) to review the following issues:

- i. What has been the reporting pattern of STI clinics?
- ii. What has been the utilization pattern of STI services? (in terms of numbers of new attendees)

- iii. What was the trend of syphilis sero-positivity from the STI clinics?
- iv. What was the distribution of different STI syndromes?

Salient Findings

The analysis revealed the following issues:

1. There has been variation in the pattern of reporting from STI services with the expansion of the STI programme and introduction of the new CMIS reporting formats.
2. Utilization pattern of STI clinic services in some states (Tamil Nadu, Maharashtra) was high. In addition, except for Manipur, all other states reported almost equal proportions of male and female clients accessing the STI clinics.
3. There were some missed opportunities for syphilis screening at the STI and ANC clinics:
 - Only 30% of new STI clinic attendees were screened for syphilis (except for states of West Bengal, Tamil Nadu and Karnataka).
 - Syphilis screening of pregnant women was reported for 30%-50% of those attending ANC services.
 - Only 10% of the new STI clinic attendees were referred to ICTCs for HIV testing.
4. Though screening had only been done for a small proportion of those attending STI and ANC clinics, there was a definite decline in syphilis sero-positivity.
5. GUD:UD ratio revealed that there was a geographical diversity in the distribution of STIs across the eight states. Higher overall GUD:UD for the entire country, although not conclusive, indicated that reservoirs of infections are persisting.
6. Syndromic diagnosis showed higher non-herpetic to herpetic GUD indicating that there is still a preponderance of treatable bacterial STIs in various states.

Based on findings from the desk review of literature, observations from the field visits and analysis of the NACO CMIS data, the following steps (not in order of priority) are recommended to improve the National STI/RTI control and prevention programme.

1. Strengthen Programme Implementation

In order to strengthen implementation of the National STI/RTI control and prevention programme, there is a need for greater synergy with the NRHM for optimal utilization of available resources under both programmes and to avoid duplication. In addition, recognizing that the private sector is a major provider of STI services, strategic partnerships should be built with the private and NGO sector so as to leverage their strengths. Specifically, the following steps are recommended:

- a. Build capacity of TIs for STI service delivery to HRGs in terms of training, drug procurement, infrastructure, outreach, provider attitudes, and accessibility.
 - Training: There should be an integrated approach to a person accessing STI/RTI services and should encompass a continuum of care from prevention, treatment, and linkage to other services.
 - ◆ Currently the focus of training is on the syndromic management of STIs/RTIs. However for effective utilization of services there is a need for more focus on HRG specific issues - a need for greater sensitivity while dealing with clients, avoidance of stigma & discrimination, maintenance of privacy & confidentiality, non-judgmental attitudes, etc.
 - ◆ Training should focus on improving the clinical skills and competencies of the staff in history taking and clinical examination of FSW/MSM in a friendly and non-judgmental environment, including per speculum and proctoscopic examinations. The training

should also include health education on STIs, partner treatment, condom promotion, treatment compliance, risk reduction, referral to ICTCs, recognition and referral or management of common infections like TB / OIs, management of HIV, and delivery of ART at the primary care level.

- ◆ Outreach workers (ORW)/Peer educators (PEs): Their scope of work should include active promotion of STI services. A training module should be developed for ORWs and PEs and should cover key messaging on STIs in order to improve STI service utilization, inter personal communication skills, and basic information on STI/RTI symptoms and complications.
 - ◆ Treatment literacy module should be developed for the end user and HRGs focusing on behaviour change communication, knowledge of STIs, their symptoms and treatment, self risk perception, etc.
 - Strengthen linkages between NGO TI-STI clinics and ICTCs in order to improve early access to care and treatment services for HRGs.
 - Accessibility: Ensure that NGO TI-STI clinic timings is not a barrier to uptake of services by the HRGs. Establishment of services should also consider location to ensure that distance is not a barrier to uptake.
 - Infrastructure: Ensure availability of the requisite infrastructure in terms of adequate space for privacy, examination gloves, instruments like speculum, proctoscope, lamps etc.
- b. Ensure optimal synergy with NRHM through regular convergence meetings at the National and State levels for STI programme planning and service quality at the subdistrict level.



- c. Review and strengthen systems for supportive supervision and monitoring at STI service delivery sites. The PP scheme also requires intensive supportive supervision to establish and build up quality of care, availability of appropriate STI drugs and ensure appropriate documentation.
- d. Strengthen implementation of 100% syphilis screening and treatment of all ANC women and HRG populations. Besides laboratory strengthening for implementation of 100% syphilis screening, there should be greater advocacy and training of health care providers in administration of penicillin, and management of anaphylactic reactions. HIV screening and syphilis screening should be integrated in all PPTCT and STI clinics. In order to ensure quality of syphilis screening, at least one microbiology department per state should be upgraded to provide laboratory support to the STI clinics - government, NGO and PP sites.
- e. Consider using WHO approved point of care (POC) testing technologies for syphilis in order to improve coverage of syphilis screening among ANC women and HRGs.¹ On similar lines, whole blood HIV screening of HRGs at the TI-STI sites has the potential to improve uptake of services.
- f. Increase involvement of ASHA and link worker roles in STI/RTI programming for improving health care seeking behaviour, and in identification and referrals to the programme.

¹ A recent study (2008-09) evaluated the diagnostic performance and utility of a point-of-care (POC) syphilis screening test among FSWs in Bangalore. The study concluded that while the test had a relatively low sensitivity in detecting active syphilis, however, among hard-to-reach populations who may not return for follow-up treatment, POC screening with this assay could still confer an advantage over offsite RPR testing with respect to treatment coverage. (Mishra S et al. Syphilis screening among female sex workers in Bangalore, India: comparison of point-of-care testing and traditional serological approaches. *Sex Transm Infect* 2010, 86: 193-198)

Appropriate training modules for these workers should be developed at the national level and translated in regional languages for incorporation in their regular trainings.

- g. Improve uptake of STI services. Healthcare seeking behaviour can be improved by raising awareness of STIs and promoting early treatment at medical facilities. In addition, routine PPTCT counseling should include a focus on STIs/RTIs.
- h. Strengthen capacities in the regional STI research and training reference centers to undertake operational research by providing the necessary training, infrastructure, equipment, etc. The technical consultation to review HIV surveillance in India (April 2008)⁶² recommended that laboratory strengthening in the regional centres should focus on quality control for syphilis testing; high quality laboratory testing to inform and improve syndromic guidelines; support for select aetiologic testing, besides regular STI drug resistance monitoring

2. Strengthen STI Strategic Information

- a. Strengthen CMIS reporting for complete, correct, timely and consistent reporting from all Government, Private, and TI set ups. Improving the completeness of reporting will require focusing on capacity building and operational support. High priority should be given to developing and institutionalizing a data analysis and feedback system. For this purpose, the existing guidelines and reporting formats may need to be revised.

There is a need to strengthen the capacity at the state (SACS/TSU) and national level for monitoring of reporting delays, reminders, data checks, and regular analyses and feedback to reporting sites. A point person for the TI-STI programme may be considered at the state level whose responsibilities will include data analysis, data utilization and feedback to the sites for improving the programme. Key information

areas that need to be assessed on a regular basis include the availability of adequate quantities of kits, essential drugs and diagnostics; availability of trained staff; utilization of STI services; partner notifications, referrals; monitoring of syphilis prevalence, etc.

b. STI programme treatment targets: Additional data is required for estimation of STI burden in the country for programme planning. For this purpose, a working group consisting of key stakeholders and technical experts should be set up at the National level and a consultation should be held to decide on the best possible method to arrive at the estimates, using standardized laboratory tests and internationally recommended modeling guidelines.

c. STI surveillance: As recommended by the technical consultation that reviewed HIV surveillance in India (April 2008),⁶² a basic STI surveillance system should be implemented in all STI clinics, TI clinics and ANC clinics in order to provide consistent and reliable information on changes in the presenting symptoms and syndromic diagnoses over time. The STI surveillance framework should include: (i) STI case-reporting from sentinel STI clinics (one per district); (ii) syphilis screening for all pregnant women and populations with high-risk behaviours at TI sites; and (iii) universal reporting on key syndromes among men and women at all sub-district level health facilities and TI clinics. In addition, the consultation recommended that the NRHM should be supported in universal reporting of STI syndromes at sub-district level health facilities. This could be supplemented with periodic facility-based aetiological surveys for data on patterns of infection among STI patients

In addition, adding a small number of priority STI laboratory diagnostic tests to the National BSS could provide additional community-based prevalence data as part of the routine surveillance system.

d. Strengthen STI drug resistance monitoring by formulating a multi-regional, coordinated



approach to routine gonococcal antibiotic susceptibility monitoring with careful attention to quality control. This should include baseline MICs for cephalosporins using agar dilution techniques and case reporting for cefixime treatment failures. Based on antimicrobial susceptibility data, guidelines for second-line treatment may need to be formulated.

e. Operations research priorities in STI/RTI need to be established and funded. A coordinated operational research plan is needed to support the national STI response. Research priorities, and follow up studies are needed to assess the impact of interventions. These studies should be multicentric with standardization of methods, protocols, laboratory tests for easy comparability.

f. A small STI working group at national level with well defined terms of reference should be constituted. The working group should review existing programme and research data, make recommendations to ensure programme quality and use of data to inform the national programme and target interventions to focus on highest risk areas and sub-populations. Regular reviews of the STI/RTI programme should be held with the state level STI programme coordinators.

In order to monitor achievements under the National programme, it is important to set feasible and realistic targets. For this a regional strategy for prevention and control of STIs already exists and may be adapted to the country context.

Female Sex Workers: STI/RTI Prevalence Studies

Place_Year	Sample Size	Type of FSW	Type of Study	STI Syndromes					% with ≥ 1 STI	STI Prevalence				HSV-2		Others		
				Genital discharge	Genital ulcer	Lower abdominal pain	Inguinal LNopathy	Genital warts /CA		Molluscum	Syphilis	Gonorrhoea	Chlamydia	Trichomoniasis	HIV	IgM	IgG	Candidiasis
ANDHRA PRADESH																		
Kakinada_2000 ²⁸	173	NBB	Population	73.4	1.7	9.8	1.2	2.9	6.9	68.2@	31.2 (RPR $\geq 1:8$)	11 (Culture)	4.6 (PAC E2)	43.4 (Culture)	42 (ELISA)			
Peddapuram_2000 ²⁸	205	BB	Population	77.1	1.5	3.9		2.4	6.8	65.8 [@]	22 (RPR $\geq 1:8$)	5.4 (Culture)	11.2 (PACE 2)	54.1 (Culture)	34 (ELISA)			
AP_2005 ⁶⁴	1391		Clinic based	52	3.5	17.4								11.7				
AP_8 dist_2005-6 ⁶⁴			IBBA							7.6-24.1*	5.2-17.4 (RPR+TPHA)	0.2-6.4 (NAT)	1.7-6.5 (NAT)	8.0-26.3 (ELISA)	55.7-87.4 (ELISA)			
GOA																		
Goa_2004-05 ⁵³	326		Population							22.5 [#]		8.9 (PCR)	7.3 (PCR)	9.4 (Culture)	25.7 (ELISA)	57.2 (ELISA)		
GUJARAT																		
Ahmedabad_1999 ²⁹	314	NBB	Population	83.1	3.8	1.3				58.9*	24.2 (RPR $\geq 1:8$ +TPHA)	19.1 (Culture)	16.9 (PACE-2)	40.8 (Culture)	11.7 (ELISA)			
Ahmedabad_2003 ³⁹	385	NBB: 68% BB: 32%	Population	43.1	1.8	7.3					17.4 (RPR $\geq 1:8$ +TPHA)	6 (Culture)	9.6 (PACE-2)	27.5 (Culture)	13.2 (ELISA)			
Ahmedabad_2005 ⁴⁰	1527		Clinic								3.7 (VDRL)				3.2 (ELISA)			
Surat_2000 ³⁰	118	BB	Population	51.7	5.9	20.3		11	20.3	55.9 [@]	22.9 (RPR $\geq 1:8$ +TPHA)	16.9 (Culture)	8.5 (PAC E2)	14.4 (Culture)	43.2 (ELISA)			
Surat_2005-06 ³¹	300										6.66 (RPR +TPHA)	0 (Culture)		2 (Wet mount)	11.7 (ELISA)	10.3 (Culture)	13.3 (Nugent)	

Place_Year	Sample Size	Type of FSW	Type of Study	STI Syndromes					% with ≥ 1 STI	STI Prevalence				HSV-2		Others		
				Genital discharge	Genital ulcer	Lower abdominal pain	Inguinal LNopathy	Genital warts /CA		Molluscum	Syphilis	Gonorrhoea	Chlamydia	Trichomoniasis	HIV	IgM	IgG	Candidiasis
Vadodara_2004 ⁷¹	285	NBB	Population	51.6	2.2	0.7		2.8	1.8		11.6 (RPR \geq 1:8 +TPHA)	3.5 (Culture)	4.9 (PACE-2)	39.3 (Culture)	8.8 (ELISA)			
Rajkot_2006 ⁷⁰	300	NBB: 75% BB: 25%	Population	3.7	0	0	0.7	0.7	1.3	44.3 ⁶⁹	4 (RPR \geq 1:8 +TPHA)	9 (Culture)	7.7 (PACE-2)	30.3 (Culture)	2.8 (ELISA)			
KARNATAKA																		
		SSW	IBBA								(RPR \geq 1:8 +TPHA)	(PCR)	(PCR)	(ELISA)	(ELISA)			
Mysore_2004-06 ⁴¹	2004: 429 2006: 425										14.8	5.4	10.8	32.9	26.1	64.4		
Karnataka_5dist_2005-06 ³⁴			IBBA							9.5-20.6*	3.1	2.4	4.7	14.1	24.2	79		
KERALA																		
Trivandrum_2000-01 ²⁵	117	NBB	Population	61.5	1.7	10.3	---	5.1	4.3	27.4 ⁶	4.3(RPR \geq 1:8 +TPHA)	0 (Culture)	5.9 (PACE-2)	9.4 (Culture)	2.6 (ELISA)	11.1	53.8	
Calicut_2001 ²⁷	120	NBB	Population	50.8	1.7	1.7		1.7		57.5 ⁵	16.7(RPR \geq 1:8 +TPHA)	5 (Culture)	15.8 (PACE-2)	34.2 (Culture)	5.7 (ELISA)	20	99.1	25 (Culture)
Trissur_2001 ²⁶	186	NBB	Population	51.1	0.5	4.8				36 [^]	7(RPR \geq 1:8 +TPHA)	0 (Culture)	5.4 (PACE-2)	28.5 (Culture)	3.8 (ELISA)	7.5	90.3	10.8 (Culture)
MAHARASHTRA																		
Pune_1993-2002 ³⁸	1359	BB	STI Clinic												54 (ELISA)			
Maha_6dist_2005-06 ³⁴			IBBA							9.0-57.5*	3.6-51 (RPR+TPPA)	0.9-9.3 (NAT)	2.0-14.2 (NAT)	7-38.7 (ELISA)	34-100 (ELISA)			

Place_Year	Sample Size	Type of FSW	Type of Study	STI Syndromes						% with ≥ 1 STI	STI Prevalence				HSV-2		Others	
				Genital discharge	Genital ulcer	Lower abdominal pain	Inguinal LNopathy	Genital warts /CA	Molluscum		Syphilis	Gonorrhoea	Chlamydia	Trichomoniasis	HIV	IgM	IgG	Candidiasis
NAGALAND																		
Dimapur_2005-06 ³⁴			IBBA							39.1*	22.1 (RPR+TPPA)	4.6 (NAT)	22.6 (NAT)		11.6 (ELISA)	52.6 (ELISA)		
TAMIL NADU																		
TN_2003 ³²	293	NBB	Population	57.8	4.2	33.9	0.3			56 [†]	15.7 (RPR+TPPA)	1.4 (Culture)	19.5 (PCR)	31.6 (Culture)	9.5 (ELISA)	4.2 (ELISA)	9.2	52.6
TN_5 dist_2005-06 ³⁴			IBBA							10.8-14.5*	7.5-11.9 (RPR+TPHA)	0-2.2 (NAT)	0.9-4.3 (NAT)		2.2-12.5 (ELISA)	34.6-62.9 (ELISA)		
WEST BENGAL																		
Kolkata_2001 ⁶³	165	BB								80.8	20 (VDRL)	9.4 (Culture)	67.8 (ELISA)					
Kolkata_2003 ³⁵		BB																
Sonagachi	1992: 370-418			48.3			5.3	2.4			4.8			15.3			16.5	
Sonagachi	2003: 168			14.3	4		4.2	3.6		24	1.7	7.1	7.1	3			8.9	
NACO	2003: 169			18.3	2.4		2.4	0		25	6.5	5.3	2.4					
WBengal_2004 ³⁶	270										21.4	29 (PCR)	3.6 (PCR)		14.4	62.2	12.9	16.6
Operations Research																		
Hyderabad & Mumbai ³⁷	417			Vagino-cervical: 58.5; ano-rectal: 1	3.1	13.9	1.0	1.2			10.1 (RPR+TPHA)	14.1 (NAT)	16.1 (NAT)	n=399 31.1 (PCR)			n=402 21.1 (KOH)	n=396 71 (Nugent)

Place_Year	Sample Size	Type of FSW	Type of Study	STI Syndromes						% with ≥ 1 STI	STI Prevalence				HSV-2		Others	
				Genital discharge	Genital ulcer	Lower abdominal pain	Inguinal LNopathy	Genital warts /CA	Molluscum		Syphilis	Gonorrhoea	Chlamydia	Trichomoniasis	HIV	IgM	IgG	Candidiasis
Recent Studios																		
Andhra Pradesh_2003-04 ⁴³	Non-FPP: 1750 FPP: 1692										13 (ELISA)					46 (ELISA)		
Andhra Pradesh_2007 ⁴³	Non-FPP: 855 FPP: 1292										18 (ELISA)					47 (ELISA)		
Karnataka_5dist_2004-06 ⁴²	2312	IBBA									8 (ELISA)					21 (ELISA)		
Karnataka_5dist_2009 ⁴²	2400	IBBA									10 (ELISA)					29 (ELISA)		
											10.2 (RPR +TPHA)	3.5 (NAT)	6.5 (NAT)	19.6 (ELISA)				
											8.7 (RPR +TPHA)	2.5 (NAT)	5.6 (NAT)	16.4 (ELISA)				

* Positive for syphilis/NG/CT;

⁴² Positive for syphilis/NG/CT/TV;

⁴³ Positive for NG/CT/TV;

⁴⁴ Positive for syphilis/CT/TV;

⁴⁵ Positive for any STI: syphilis/NG/CT/Chancroid/TV/HSV/HIV/HBV

MSM and Transgenders: STI/RTI Prevalence Studies

Place_Year	Sample Size	Type of Study	STI Syndromes							% STI prevalence	STI Prevalence				HIV		HSV-2	
			Genital discharge	Genital ulcer	Anal ulcer	Scrotal swelling	Inguinal swelling	Warts/C acuminata	Molluscum		Syphilis	Gonorrhoea	Chlamydia	Trichomoniasis	HIV	IgM	IgG	
ANDHRA PRADESH																		
AP_4dist_2006-07 ⁸⁵	1621	IBBA										13 (RPR + TPHA)	0.6 (NAT)	1.6 (NAT)			20.9 (ELISA)	61.5 (ELISA)
GUJARAT																		
Vadodara_2004 ⁴⁸	319	Population	0	1.3	0.6	0.6	0.6	0.6	1.6	1.6		7.2 (RPR ≥ 1:8)	OP:4.3 (Culture)	3.4 (PCR)	0.9 (Culture)		6.8 (ELISA)	
Surat_2005 ⁴⁹	299	Population	0	0.7	0.7	0.3	0.3	1	1.3	23.4 [®]		12.4 (RPR ≥ 1:8)	OP:4.7 (Culture)	2 (PCR)	1.3 (Culture)		15.6 (ELISA)	
Ahmedabad_2004 ⁵²	394	Population	1.3	0	0.6	0.6	0.6	1.5	0.3			15.1 (RPR ≥ 1:8)	OP:3.3 (Culture)	3.6 (PCR)	0.5 (Culture)		17 (ELISA)	
Ahmedabad_2006 ⁵²	349	Population	0	0	0.9	0	0.3	0	0			9.4 (RPR ≥ 1:8)	OP:1.1 (Culture)	0.9 (PCR)	0.6 (Culture)		12 (ELISA)	
	MSM:306												MSM: 7.8 (Culture)	R:2.3 (Culture)				
	TG:43												TG: 20.9 (PCR)	U:1.7 (PCR)				
Rajkot_2006 ⁵⁰	325	Population	0.3	1.3	0.3	0.7	0.3	0.3	1.3	28.9 [®]		7.4 (RPR ≥ 1:8)	OP:0.9 (Culture)	2.5 (PCR)	0.3 (Culture)		14 (ELISA)	
													R:6.1 (Culture)					
													U:2.2 (PCR)					

Place_Year	Sample Size	Type of Study	STI Syndromes							% STI prevalence	STI Prevalence				HSV-2		
			Genital discharge	Genital ulcer	Anal ulcer	Scrotal swelling	Inguinal swelling	Warts/C acuminata	Molluscum		Syphilis	Gonorrhoea	Chlamydia	Trichomoniasis	HIV	IgM	IgG
KARNATAKA																	
Karnat_2006-07 ⁶⁵	298	IBBA									11.9 (RPR+TPH A)	0.6 (NAT)	1.6 (NAT)		17.3 (ELISA)		36.7 (ELISA)
MAHARASHTRA																	
Pune_1993-2002 ³¹	708	STI Clinic		21.5							5.8 (VDRL/RPR +TPHA)	4.3 (smear/culture)			18.9 (ELISA)		
1993-97				32.4					7.6		8.2	4.5			18.5		
1998-2002				7.3					5.9		3	4.1			19.5		
Mumbai_2001 ⁴⁵	150	STI Clinic									(TPHA)				(ELISA + Rapid)		
	MSM:122										17				17		40
	TG:28										57				68		71
Mumbai_2002-03 ⁶⁸	1700	VCTC													15.6 (ELISA)		
	MSM:1537								13.5		11.7	R:1.9			11.3		
	TG:163								22.2		18.5	R:7.4			55.9		
Mumbai ⁶⁹	TG:205	VCTC									25 (VDRL)				40 (Rapid)		
Mumbai_2002_04 ⁴⁷	2312														0-14 (ELISA)		
Mah_2006-07 ⁶⁵	653	IBBA									8.4 (RPR+TPH A)	0.3 (NAT)	4 (NAT)		11.3 (ELISA)		43.8 (ELISA)
TAMILNADU																	
TN_5dist_2006-07 ³⁴	TG: 404	IBBA									16.6 (RPR+TPH A)	0 (NAT)	0 (NAT)		12 (ELISA)		46.2 (ELISA)
TN_4dist_2006-07 ⁶⁵	2025	IBBA									14 (RPR+TPH A)	0.1 (NAT)	0.6 (NAT)		7.5 (ELISA)		32.2 (ELISA)

Place_Year	Sample Size	Type of Study	STI Syndromes							% STI prevalence	STI Prevalence				HIV		HSV-2	
			Genital discharge	Genital ulcer	Anal ulcer	Scrotal swelling	Inguinal swelling	Warts/C acuminata	Molluscum		Syphilis	Gonorrhoea	Chlamydia	Trichomoniasis	HIV	IgM	IgG	
RECENT STUDIOS																		
Andhra Pradesh 2003-04 ⁴³	Non-FPP: 1106 FPP: 1680											20 (ELISA)						34 (ELISA)
Andhra Pradesh 2007 ⁴³	Non-FPP: 218 FPP: 1317											22 (ELISA)						40 (ELISA)
Tamil Nadu 2008 ⁵³	721	Respondent driven										9 (ELISA)						29 (ELISA)
												12 (ELISA)						32 (ELISA)
												8 (RPR+TPPA)						26 (ELISA)

* Positive for syphilis/NG/CT;
 @ Positive for syphilis/NG/CT/TV

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