

Tackling HIV In India: Evidence-Based Priority Setting And Programming

Today's challenge is to scale up proven interventions to reach the vast majority of India's vulnerable populations.

by **Mariam Claeson and Ashok Alexander**

ABSTRACT: In the wake of a downward revision of the number of HIV-infected people, India is launching an ambitious US\$2.5 billion, five-year HIV plan. Responding to new data on HIV prevalence and risk behavior, India has earmarked almost 70 percent of the budget for prevention; one-third focuses on prevention activities for those at highest risk of HIV, and the remainder addresses HIV testing expansion and services for pregnant women. About 20 percent of the total budget is for care and treatment. Although the size and scope of the proposed HIV response pose challenges, the world has much to learn from India's data-informed approach to policy and priority setting. [*Health Affairs* 27, no. 4 (2008): 1091-1102; 10.1377/hlthaff.27.4.1091]

AFTER TWO DECADES OF HIV INFECTION IN INDIA, the government has a greater understanding of the magnitude, trends, and diversity of the largest HIV epidemic in Asia. Still, few national HIV estimates have caused as heated an international debate as the Indian epidemic data have caused. Illustrative of the widely divergent views were the December 2006 media stories, two weeks apart, declaring that "India is now the epicenter of the global HIV/AIDS epidemic.... Even a small further increase in infection rate could mean that up to 25 million Indians contract HIV in the coming years," and that "India overestimates HIV/AIDS.... The number of Indians affected by HIV/AIDS may be lower than the UN estimate of 5.7 million, a study suggests.... There may be between 3.2 million and 3.5 million adults with the infection in India."¹

■ **India's data sources.** In 2006, India vastly increased its data sources. The number of routine facility-based HIV surveillance sites increased from 703 in 2005 to 1,122 in 2007.² The third National Family Health Survey (NFHS-3), a national population-based survey, included HIV testing of more than 102,000 adults.³ The In-

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tegrated Biological and Behavioral Assessment (IBBA), a cross-sectional HIV and risk-behavior survey of 24,400 adults from high-risk groups in six states, was conducted as part of the evaluation of a large-scale, externally funded prevention intervention.⁴ This growing evidence base has enabled the government and stakeholders to mount a well-informed and sharpened national HIV response.

■ **HIV prevalence estimates.** Based on the results from the NFHS-3, with upward adjustments to account for underrepresented groups at greatest risk of HIV, India's 2006 HIV prevalence estimates were revised significantly downward in July 2007 (Exhibit 1).⁵ Previous official governmental estimates for 2005 were based on a methodology that relied mainly on data from antenatal clinics (ANCs).⁶ Many countries, mainly in Africa, have also revised their national estimates after doing population-based surveys.⁷ Despite the tendency to overestimate HIV prevalence in the general population when using ANC data, these data remain the single most consistently available source of information for tracking and analyzing HIV trends.

■ **Distribution of HIV infection.** The distribution of estimated infections in India has remained almost unchanged, even after the revised estimates. HIV continues to be concentrated in the South—which has about 64 percent of HIV infections but only 30 percent of India's population—and in the Northeast. There is wide variation in HIV infection rates in the country. About fifty key districts in India have more than half of the country's HIV cases.⁸

■ **Impact on global HIV burden.** India is home to one-sixth of the world's population, so despite the downward revision of its HIV prevalence, the burden remains of both national and global importance. Given India's size, diversity, and complexity, from the standpoint of public health analysis it is best viewed as a continent. It is the world's seventh-largest country by geographic area and is divided into twenty-eight states and seven union territories, which together contain 604 districts. The population of each district in India ranges between one and four million—larger than many countries. When these factors are recognized, it is easy to understand the heteroge-

EXHIBIT 1 Revised HIV Prevalence Estimates In India

	2005	2006
	Old official estimate	New official estimate
People living with HIV		
Point estimate (millions)	5.7	2.5
95% confidence interval (millions)	3.4–9.4	1.75–3.15
Adults living with HIV (ages 15–49, millions)	5.2	2.2
Adult HIV prevalence rate (ages 15–49)	0.9%	0.36%

SOURCES: For old official estimate, UNAIDS, *2006 Report on the Global AIDS Epidemic*, http://www.unaids.org/en/HIV_data/2006GlobalReport/default.asp (accessed 2 December 2007). For new official estimate, UNAIDS, *07 AIDS Epidemic Update*, December 2007, http://data.unaids.org/pub/EPISlides/2007/2007_epiupdate_en.pdf (accessed 8 April 2008).

neity of the HIV epidemic and the need for local-level analysis.

■ **Local impact.** Aggregated reporting of HIV data at the national level masks many concentrated epidemics at the state and district levels. Some simple indicators of variability show that four states have much higher HIV prevalence rates than India has as a whole (Exhibit 2). Much variability exists within states, too. For example, the coastal districts in Andhra Pradesh have consistently had HIV prevalence (ANC estimates) greater than 1 percent, compared to less than 0.75 percent in many interior districts.⁹ The percentage of men reporting nonregular partners in the previous year (see Exhibit 2) shows large interstate variability in two rounds of the national Behavioral Surveillance Survey (BSS).¹⁰ The differences in spread of HIV between and within Indian states result from many factors, such as variations in the effectiveness of ongoing programs and interventions, differences in the underlying sexual partnerships and networks of the population, and biological cofactors.¹¹

Drivers Of The Indian HIV Epidemic

In India, as in the rest of Asia, two of the most important factors that determine the rate of growth in and ultimate prevalence of HIV infection are the size of the population of sex workers and their clients and the frequency with which unprotected commercial sex takes place.¹²

EXHIBIT 2 HIV Prevalence And Sexual Behavior In India's General Population, 2007

State	Population (thousands)	HIV prevalence ^a	Male:female ratio of HIV infection ^a	National BSS 2001 ^b		National BSS 2006 ^b	
				Percent of men who reported nonregular sexual partner in past year	Percent of men with nonregular partner who reported condom use	Percent of men who reported nonregular sexual partner in past year	Percent of men with nonregular partner who reported condom use
Andhra Pradesh	78,892	0.97	1.6:1	19.2	51.6	21.0	74.6
Karnataka	54,692	0.69	1.6:1	7.9	37.2	3.1	73.0
Maharashtra	94,839	0.62	1.6:1	15.0	77.0	11.0	63.6
Manipur	2,388	1.13	2.1:1	4.8	30.1	4.5	74.7
Tamil Nadu	63,755	0.34	0.7:1 ^c	6.6	45.4	15.4	50.0
Uttar Pradesh	186,297	0.07	2.1:1	8.3	27.9	9.2	45.0
Rest of India	581,549	0.12	2.1:1	— ^d	— ^d	— ^d	— ^d
India	1,062,412	0.28	1.6:1	11.8	51.2	8.9	58.3

SOURCES: See below.

^aInternational Institute for Population Sciences and Macro International, *National Family Health Survey, India (NFHS-3)*, 2005–2006, vol. 1, September 2007, http://www.nfhsindia.org/nfhs3_national_report.html (accessed 30 November 2007).

^bNational AIDS Control Organisation, "National Baseline Behavioral Surveillance Survey (BSS) among General Population, 2001" (New Delhi: Government of India, 2002); and NACO, *Endline Behavioral Surveillance Survey (BSS), 2006, General Population Final Report* (New Delhi: Government of India, 2007).

^cThe explanation for this low male-to-female ratio in Tamil Nadu is not well understood. It may represent a mature epidemic where men became infected first and have subsequently died.

^dGiven the wide variation between states, average data are not presented.

■ **Sex work.** One of the single most affected groups with HIV in India is female sex workers. HIV prevalence among them in the South ranges from less than 1 percent in some districts in Kerala and Tamil Nadu to more than 30 percent in districts in Maharashtra and Karnataka.¹³ Unlike in Thailand and Cambodia, where much of the sex work is brothel-based and more organized, sex work in India is more varied and requires that programs to reach female sex workers be flexible. Data from the IBBA found that 56 percent of these workers in the South solicit in open spaces (streets, highways, and so forth); only 24 percent are brothel-based, and 15 percent work out of homes.

■ **Injecting drug use.** Injecting drug use with unclean equipment is another major driver of the HIV epidemic, especially in the Northeast but also throughout many of India's urban areas. About 25 percent of the injecting drug users, most of them men, reside in the northeastern states.¹⁴ HIV prevalence in 2006 among clusters of injecting drug users ranges from 2.4 percent to 19.8 percent in the northeastern states, 20.4 percent in Mumbai, 16.8 percent in Chennai, and 10 percent in New Delhi.¹⁵ Transmission from injecting drug users often overlaps with commercial sex transmission, thereby spreading HIV more rapidly.

■ **Men who have sex with men.** In recent years, large-scale data collection efforts among men who have sex with men and with transgendered men have shed substantial light on the epidemic among these groups.¹⁶ HIV prevalence among self-identified men who have sex with men is high (four of ten IBBA districts where such self-identified men were surveyed had more than 20 percent prevalence). Limited surveillance data in the North reveal that in eight of seventy-six districts surveyed, men who had sex with men had more than 10 percent HIV prevalence. The epidemic potential created by the intersection of men who have sex with men (including those who are married) and the rest of the general population is not well characterized in India and deserves further study.

■ **Clients of sex workers.** Clients of sex workers are a critical group for HIV prevention interventions. Precise estimates of the number of male clients are difficult to make, but recent surveys suggest that as many as one in twenty males ages 15–49 have paid for sex over the past twelve months. There is much regional and subregional variation.¹⁷ The HIV prevalence among clients from the IBBA is about one-third to one-quarter of that among female sex workers in most districts where both populations were surveyed. Across the four southern high-prevalence states, as many as one in ten male clients are HIV-positive. The high male-to-female ratios of HIV prevalence across India, excluding Tamil Nadu, are consistent with an epidemic driven by high-risk behavior among males, as shown in Exhibit 2.

The History Of India's Response To The HIV/AIDS Epidemic

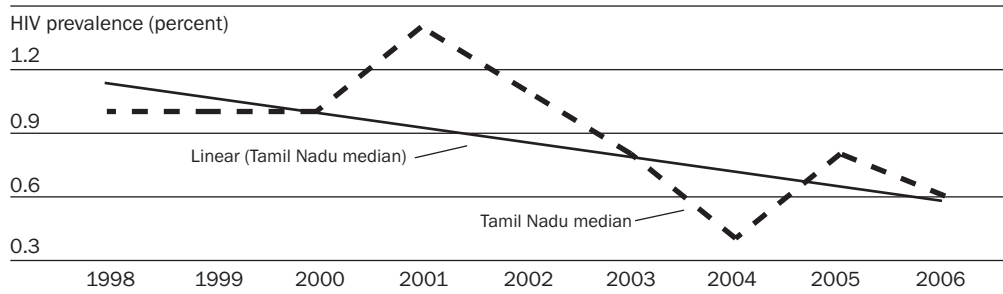
■ **NACP-I: 1992–1999.** The Indian National AIDS Control Project started in 1987, a year after the first case was identified, with a focus on blood screening, health education, and monitoring of HIV infection in “high-risk” cities.¹⁸ The government

developed a two-year medium-term plan with support from the Global Program on AIDS and an annual budget of US\$2 million. The first National AIDS Control Program (NACP-I) was launched in 1992, with financial support from the World Bank and a budget of US\$99.6 million.¹⁹ The program focused on strengthening the management capacity in the country through the establishment of the National AIDS Control Organisation (NACO) and State AIDS Control Societies; promoting public awareness for HIV prevention focusing on sexual transmission; improving blood safety; building surveillance, clinical management, and counseling capacity; and controlling sexually transmitted infections (STIs). In his address to parliamentarians in December 2002, then Prime Minister Atal Bihari Vajpayee called HIV and AIDS “India’s most important public health problem.” Analysis at the time indicated that without immediate intervention, HIV infection could affect at least 5 percent of the adult population—more than thirty-seven million people—by 2005.²⁰

■ **NACP-II: 2000–2006.** Under NACP-II, with an overall budget of US\$460 million, the scope of HIV prevention and control activities was increased—including prevention interventions for groups at risk and the general population, AIDS care, and institutional strengthening—with the engagement of public, private, and voluntary sectors in planning and decentralization of the implementation of services to states and municipal corporations.²¹ The government developed a framework for its response and established a consortium of external partners, who worked in the spirit of the “three ones” (one action framework for coordination, one national coordination authority, and one national-level monitoring and evaluation framework) under the leadership of NACO. The NACP partnership identified strategic areas for financing by different agencies.

■ **NACP-III: 2007–2011.** In 2007, NACP-III set ambitious targets (Exhibit 3), aiming to achieve the Millennium Development Goals (MDGs) for HIV and AIDS ahead of schedule. The national program budget has quadrupled to around US\$2.5

EXHIBIT 3
Median HIV Prevalence Among Antenatal Clinic (ANC) Sites In South India With Continuous Surveillance From At Least 2000, 1998–2006



SOURCE: National AIDS Control Organisation, *Annual Sentinel Surveillance Site-Wise Report, August–October 1994–2006* (New Delhi: Government of India, 2007).

NOTE: For linear trend, $y = -0.0688x + 1.2326$.

billion.²² Prevention, with a strategic focus on high-risk groups, is the mainstay of NACP-III. Almost 70 percent of NACP-III's budget is earmarked for prevention, of which more than a third is focused on scaling up prevention for the groups at highest risk. The evidence-based prevention packages for these groups include condom promotion, peer education, treatment of STIs, comprehensive harm reduction for injecting drug users, structural interventions, community mobilization, and links to care services. NACP-III was designed through an inclusive process involving all major development partners and civil society. The national plan explicitly builds on, and institutionalizes, an evidence-based programming approach. The government has prioritized districts based on current data and is also investing in a strategic information management unit (SIMU) whose function is to house and build epidemiologic and analytic skills. About 20 percent of the budget is for care, support, and treatment, and the remainder supports capacity building and the SIMU.

What Works? Lessons From HIV Prevention Programs

The Global HIV Prevention Working Group and others have been sharply critical about the dearth of scaled-up HIV prevention efforts, saying that although "attention to the epidemic, particularly for treatment access, has increased in recent years, the effort to reduce HIV incidence is faltering. Globally, for every patient who initiated antiretroviral therapy in 2006, six other individuals became infected with HIV."²³ Evidence from Thailand, Cambodia, and parts of India, however, suggests that transmission can be reduced over time by sustained, effective HIV prevention efforts that use existing interventions and target those most likely to acquire and transmit HIV.

■ **Thailand.** In Thailand, with a population of sixty-two million, the government prioritized targeted female sex worker interventions and pursued a 100 percent condom-use program in commercial sex establishments. From 1985 to 1993, reported condom use among female sex workers with male clients rose ninefold, from about 12 percent to 95 percent, with a documented decline in public-sector STI cases and in HIV prevalence among military recruits, and an ANC prevalence that remained under 2 percent.²⁴ Thailand's HIV incidence is still declining, although the pattern of HIV infections has shifted.²⁵ HIV prevalence among injecting drug users remains high, in the range of 30–50 percent, and HIV prevalence in Bangkok among men who have sex with men increased from 17 percent in 2003 to 28 percent in 2005.

■ **Cambodia.** In Cambodia, with fourteen million people, high HIV and STI prevalence rates were documented in 1996 among brothel-based female sex workers in five cities, with an average HIV prevalence of 40.6 percent.²⁶ In 1999 the government of Cambodia mounted a focused prevention effort with sex workers, including condom provision and STI care, a 100 percent condom-use policy in brothels, aggressive social marketing of condom use, and HIV prevention efforts among the uniformed services. Between 1999 and 2002 there were documented declines in HIV prevalence among both brothel- and nonbrothel-based sex workers, the police, and

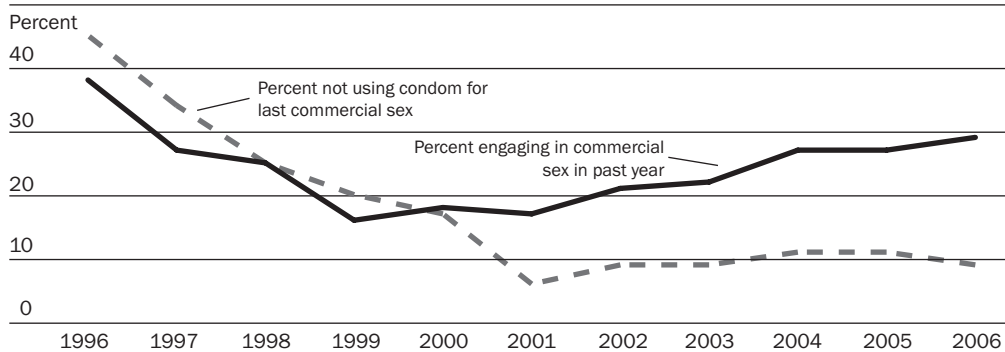
the general population.²⁷

■ **India.** In India, the state of Tamil Nadu, with a population the size of Thailand, has demonstrated a decline in HIV in ANC surveillance and low HIV prevalence among sex workers. HIV prevention interventions were initiated in 1994, and coverage gradually increased over the next decade and was sustained.²⁸ HIV prevalence in antenatal clinics consistently surveyed over the time period fell from 1 percent in 1998 to 0.6 percent in 2006 (Exhibit 3). An example of the effect on behavior of this targeted and sustained programming is shown in Exhibit 4: unprotected commercial sex encounters declined dramatically among truck drivers and helpers and their partners from 1996 to 2001.²⁹ Since 2001, truck drivers' and helpers' reported condom use has remained at about 90 percent, at the same time that there has been a slight increase in their reported contact with female sex workers.

The Sonagachi program, a brothel-based sex worker intervention in Kolkata, West Bengal, began in 1992, increased coverage rapidly, and maintained prevention efforts. Sonagachi provides an important lesson in the key role that community mobilization can play in sustaining a change in social norms. Results showed high and consistent reported condom use among female sex workers with their clients in a red light district, and sustained, relatively low HIV prevalence levels (11 percent) among sex workers.³⁰

The Bill and Melinda Gates Foundation's India AIDS initiative, Avahan, created an infrastructure and rolled out service delivery to high-risk groups in six high-prevalence states and along the national highway system in its first two years.³¹ This complemented the efforts of the Indian government and its other partners to achieve high coverage (more than 80 percent of the estimated denominator) of high-risk groups with high-quality services at scale (across entire geographic re-

EXHIBIT 4
Percentage Of Truck Drivers And Helpers In Tamil Nadu Who Reported Engaging In Commercial Sex In The Preceding Twelve Months, And Condom Use At Last Commercial Sex, 1996–2006



SOURCE: Adapted from Monitoring the AIDS Pandemic Network, *Sex Work and HIV/AIDS in Asia*, MAP Report 2005, http://www.mapnetwork.org/docs/MAP_SW%20in%20Asia%20Final%2004July05_en.pdf (accessed 11 April 2008).

gions). Key to this collective accomplishment was the regular collection and use of district- and statewide mapping and size estimation data, to both locate services and use denominators to estimate coverage.

Finally, data from the national BSS suggest that India is making headway on HIV prevention. The surveys enable a comparison of behavior between 2001 and 2006 among men in the general population, female sex workers and their clients, and other groups. Exhibit 2 shows reported nonregular sexual partners and condom use among men, demonstrating variability across the states and an increase in reported condom use over time.

Policy Implications For Containing India's HIV Epidemic

These successful Asian prevention programs to date have a few characteristics in common: high-level political commitment; investment in evidence-based, targeted interventions (promotion of condom use, STI treatment, clean needle exchange, use of peer education); good monitoring and evaluation; a focus on achieving high coverage; and adequate technical, human, and financial resources.

Globally, we have solid evidence for what works in addressing concentrated epidemics through large-scale programs, focusing on vulnerable communities at highest risk. This focus is key to containing the epidemic in Asia. The challenge today is scaling up proven interventions to provide services to the vast majority of populations at risk. In most countries in Asia, this will require expanding programs in both geographic reach and populations served, monitoring the quality and use of services, and measuring the impact on behavioral change.

The Indian government realizes that a large-scale national program, with high coverage of effective interventions, would greatly reduce the size of India's HIV epidemic by dramatically decreasing new HIV infections and reducing AIDS treatment and other potential costs, providing a high return on investment. To achieve this, India has boldly focused its broad-based, multisector programmatic efforts on prevention supported with almost 70 percent of the national HIV budget (Exhibit 5). The prevention design focuses on the main drivers of the epidemics—namely, high-risk sexual behavior and injecting drug use. At the same time, efforts are mobilized to protect vulnerable groups at highest risk from stigma and discrimination through policy reforms. The ambitious target is to achieve 100 percent coverage of these groups, working mainly with nongovernmental organizations. Implementation success will require further identification of major sites with large numbers of people engaging in high-risk behavior, through mapping and routine tracking of program coverage and impact. The prevention design envisions a tripling of sites where pregnant women are screened for HIV and provided with preventive therapy, expansion of HIV testing sites to the subdistrict level across the country, a sixfold expansion of condom outlets, and a tripling of condom sales through social marketing. Blood safety and STI services will also be expanded, and communication efforts will be put in place to address stigma and in-

EXHIBIT 5
Comparison Of HIV/AIDS Achievements Under The Second Indian National AIDS Control Program (NACP-II) And Targets For The Third Indian National AIDS Control Program (NACP-III)

HIV/AIDS intervention element	NACP-II (achieved in 2005)	NACP-III (target for 2011)
Number of high-risk group members covered with prevention services	<500,000	2.1 million
Condoms distributed (social marketing, commercial, and free)		
Pieces per year	1 billion	3.0 billion
Outlets	0.5 million	3 million
Number of people tested for HIV (per year)	1 million	22 million
Number of antiretroviral centers established	54	250
Number of people on antiretroviral therapy	75,000	300,000
Number of Prevention to Parent to Child Transmission Centers (PPTCTs) established	1,508	4,955
Number of pregnant women covered through PPTCT counseling (per year)	640,000	7.5 million
Number of HIV-positive pregnant women receiving nevirapine	16,800	75,600

SOURCE: National AIDS Control Organisation, *Strategy and Implementation Plan: National AIDS Control Programme Phase III (2006–2011)*, 30 November 2006 (see Note 14 in text).

NOTE: High-risk groups are female sex workers, men who have sex with men, and injecting drug users.

crease service use. Finally, a “link-worker” program is designed to ensure that rural at-risk women, through either their own or their partners’ behavior, are able to obtain prevention information, services, and care. The number of antiretroviral therapy centers and patients targeted for therapy have also been increased.

The Challenge Ahead For India

India faces several programmatic challenges as it moves to implement this ambitious plan: achieving high-quality program management and execution; developing informed and active demand for HIV interventions through community mobilization; addressing stigma and discrimination of marginalized groups and people living with HIV and AIDS; sustaining ongoing efforts in data collection with a more comprehensive analysis to understand the changing dynamics of HIV spread in India and where infections are occurring; increased use of data locally; and monitoring the use of interventions to maximize their effectiveness.

■ **Constraints of scaling up.** The constraints to scaling up high-priority health interventions have been well analyzed globally; among the more relevant findings are that it is not just how much money is spent, but how money is spent, that matters. The main constraints are weak systems, processes, incentives, values, and norms.³² More concentrated probing into the Indian government’s challenges have identified the need for more disaggregated analysis about the needs of the poor, better targeting of these needs, and better community ownership of interventions.³³ Delivering a complex public health program for HIV prevention among some of the most marginalized groups in the country and sustaining reductions in risk and vul-

nerability will likely be even more of a challenge.

■ **Community ownership.** Some practical insights have been gained on how to generate demand for HIV prevention services among people who face a long list of competing priorities. A transfer of ownership for beneficiaries and shared decision making is one of the major challenges of management in the field of development today, including HIV and AIDS programs. If the national program is to achieve the community ownership and sustained demand for services that NACP-III envisions, the approach on the ground has to reflect the same commitment as that at the policy level.³⁴ This must also be reinforced by efforts to strengthen policy and practices that reduce stigma and advance the rights of people living with HIV and of vulnerable groups who are most likely to contract HIV.

■ **Beyond public health.** New data and experience from mature programs in the southern states have uncovered other constraints that go beyond public health but must be addressed if India is to make lasting headway, such as addressing underlying structural socioeconomic factors, inequities, and human and gender rights. If asked, a sex worker will most likely tell you that her most immediate concerns are harassment, discrimination, and violence coming from the police, her partners, and the general public. Violence is seen to influence the movement of women into sex work; and violence against sex workers, men who have sex with men, and transgendered men diminishes their ability to act as empowered individuals, lessens their ability (choice) to use condoms, and dictates whether women are able to leave sex work. Data from the IBBA suggest that sex workers who have been forced to have sex in the previous twelve months report lower condom use (20 percent lower with occasional clients and 15 percent with regular clients) and higher rates (by 30 percent) of reported STI symptoms compared to those who have not faced such violence.

Both anecdotal information and research are showing the role of stigma in influencing the dynamics of the HIV epidemic, by hampering HIV prevention and AIDS treatment and care. For example, one study of students, faculty, and technical staff of the public health services (433 respondents) showed that 35 percent of them felt that it would be better if HIV-positive people killed themselves and that infected people deserved their fate; 34 percent would not associate with people with AIDS; 42 percent believed that those with HIV should be quarantined; and 31 percent favored barring infected students from college classes.³⁵ By driving those most at risk of infection and those living with the virus “underground,” stigma and discrimination make it difficult to provide effective prevention and treatment.

■ **Need for flexibility.** Given the complexity and heterogeneity of HIV, India will need to be flexible to address the changing environment—including the growing economy and income inequities—that influence rural-to-urban migration, knowledge, attitudes, and risk-taking practices and the interrelated changes in sexual mores. In the NACP-III design, India has recognized this need for flexibility and locally informed decision making. There are plans for increased capacity for data analysis and use at the national and state levels and devolved planning at the local level. A

challenge for India is to use this current database well to plan efficiently for resource allocation, to design data collection efforts that fill remaining data gaps, and to build capacity throughout the country to use the data for program improvement and policies. The recent controversy around the HIV estimates in India underscores the need for improved public health science there.³⁶

INDIA IS NOT COMPLACENT. It has invested and will be investing in more and better data to understand its HIV epidemic. It will estimate where infections are occurring, determine the size and location of key target groups, and monitor the effects of interventions. Based on data, India remains committed to the increased allocation of money for HIV programming that addresses prevention and care. There are no real “innovations” in India’s approach to HIV prevention planning but, rather, sound policy making: investment in good data to inform decisions; analysis of the data to determine the epidemic drivers; and comprehensive plans and budgets for scaling up known interventions directed at those populations with the behavior that is responsible for the most exposure to HIV, without moral undertones.³⁷ The world has much to learn from India’s approach.

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The authors acknowledge the helpful review and contributions from Gina Dallabetta, Padma Chandrasekaran, and Tisha Wheeler (Avahan, Bill and Melinda Gates Foundation) and Kees Kostermans (World Bank).

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