

## CASE 21

# Empowering Communities to Tackle HIV

## India's Avahan Program

### The Case at a Glance

**HEALTH GOAL:** To prevent new HIV infections in India, particularly among key population groups: female sex workers and their partners, men who have sex with men, injection drug users, and transgender individuals.

**STRATEGY:** Community-based HIV prevention interventions designed to change risky behavior among groups with high HIV prevalence and vulnerability.

**HEALTH IMPACT:** Increased correct and consistent condom use, decreased sharing of needles among injection drug users, and increased use of the program's clinical services. Averted 202,000 HIV infections and 3.5 million disability-adjusted life years (2004–2008).

**WHY IT WORKED:** A focus on behavior change in key populations at heightened risk, particularly sex workers. A balance between high standards for success and programmatic agility. Strong management driven by robust data collection and review. Leveraging of local nongovernmental organizations and peer educators to access marginalized communities.

**FINANCING:** The program cost US\$258 million from 2004 to 2009. Estimated cost-effectiveness ratio: US\$46 per disability-adjusted life year averted.

**SCALE:** When combined with the complementary efforts of India's National AIDS Control Organization, Avahan reached 86 percent of female sex workers, 91 percent of men who had sex with men, and 84 percent of people who used intravenous drugs in the six target areas (2009).

For female sex workers, simply going to work can be a daily risk. Often driven by extreme poverty, many women pursue the only available option for supporting their families. Each transaction brings much-needed funds, but it may also bring a sexually transmitted infection or unwanted pregnancy. Many sex workers suffer abuse from their clients, ranging from minor insults to brutal physical assault or rape.<sup>1</sup> Life at home may offer little relief; intimate partner violence can be common and severe.<sup>2</sup> Too frequently, these women find little recourse when victimized; fear can prevent them from seeking police assistance, and police themselves may engage in harassment or violence.<sup>3</sup>

A biomedical threat compounds the social vulnerability of sex workers: an elevated risk of infection with HIV, the human immunodeficiency virus. As the virus continued to spread across Asia and Africa in the 1990s and early years of the following decade, global health activ-

ists feared that the epidemic was only in its first phase. The thought was enough to incite panic: while medical advances meant that HIV could be treated, the high cost of antiretroviral therapy (ART) prohibited most people living with HIV in low- and middle-income countries from accessing effective care.<sup>4</sup> In India, new infections were concentrated among society's most marginalized, stigmatized, and even criminalized groups: female sex workers, men who have sex with men, transgender people, and people who inject drugs. These groups were politically invisible, and they faced substantial barriers to advocating for their own health and safety.

The spread of HIV among key populations at heightened risk drove fears about a looming epidemic in India. National figures from 2001 showed an overall national prevalence of less than 1 percent—relatively low compared with the rates seen in sub-Saharan Africa. Even so, India's billion-plus population meant the absolute

numbers were staggering: nearly four million Indians were already believed to be living with HIV, and many believed the epidemic would soon spread from concentrated pockets to become a generalized epidemic.<sup>5</sup>

By helping scale up HIV interventions led by the Indian government and others, the 2003 introduction of Avahan (“Call to Action” in Sanskrit) contributed to a positive trend in HIV prevention programming. Using a community-based approach to gain access and build trust, Avahan offered proven prevention services in six of India’s states with the highest HIV prevalence and along national trucking routes. By 2009, Avahan was providing monthly services to more than 300,000 individuals from India’s most vulnerable key populations and roughly five million male clients and partners of female sex workers.<sup>6</sup> Studies estimate that Avahan averted hundreds of thousands of infections by 2013. However, controversy remains about the scale of Avahan’s impact and its cost-effectiveness compared with that of other HIV programs in India.

### **The Toll of HIV in Key Affected Populations**

HIV and AIDS were first recognized in the 1980s, and health professionals soon realized that the pandemic had already reached global scale. The virus primarily spreads through unprotected sex and other exposure to infected bodily fluids, such as shared needles or contaminated blood transfusions. During any single encounter, the risk of acquiring HIV is low. But with frequent repeated exposure, particularly during the most virulent phase of the infection, HIV can rapidly circulate among certain occupational, demographic, or behavioral groups. Those infected can transmit the virus to their spouses and other sexual partners—so-called “bridge groups”—who can pass it on to others. This can quickly cause an epidemic that is concentrated in certain groups to spread to the general population.

Groups with particularly high vulnerability to HIV include female sex workers, men who have sex with men, transgender people, and people who inject drugs. People in these key population groups, alongside their sexual partners, consistently account for a substantial proportion of infections across countries.<sup>7</sup> Studies from low- and middle-income countries suggest that the odds of HIV infection are 14 times as high for female sex workers as for other similarly aged women, and 19 times as high for men who have sex with men as for the general adult pop-

ulation.<sup>8</sup> High infection rates among key populations often signal an impending generalized epidemic.

The elevated risk within key populations is part biological, part social. For example, sex workers often have encounters with multiple clients each day, which exposes these women to high biological risk. Social forces heighten their vulnerability: they are often stigmatized, unable to seek help from health workers or police, and susceptible to abuse. They may lack access to condoms and the skills to demand their use by clients, or be so desperate as to accept a premium payment for unprotected sex.<sup>9</sup>

In the 1990s and into the next decade, India faced high infection rates among key populations, but prevalence remained relatively low in the general population. By 2003, the Indian government estimated national prevalence rates of less than 1 percent in the general population and 8 to 13 percent in key population groups. But several states and districts had disastrously high prevalence rates in these groups—for example, 54 percent among female sex workers in Mumbai.<sup>10</sup> Later modeling suggested that the government’s estimates were too high—the epidemic was never as big as was feared, and prevalence rates in South India were actually declining by the early years of the 21st century.<sup>11</sup>

### **Putting an Idea in Motion: Dire Predictions Shine Light on Key Populations**

In 2002, there was major concern that India would soon become ground zero for the global AIDS pandemic—although it is now clear that fears of HIV exceeded the actual trajectory of India’s epidemic. Despite relatively low national prevalence, the US National Intelligence Council issued a doomsday prediction that India would see 20 to 25 million cases by 2010—more infections than predicted in any other country.<sup>12</sup>

The Indian government had already recognized the threat. In 1992, India implemented the first phase of a World Bank–financed National AIDS Control Program (NACP-I). And in 1999, the expanded program (NACP-II) devoted 14 percent of its budget to key populations.<sup>13</sup> The Indian government’s AIDS control program, coupled with donor-funded interventions, made strides in changing norms about condom use among sex workers, among other prevention wins.<sup>14</sup> Yet despite its notable successes, the national program left large coverage gaps even in the states with highest prevalence.<sup>15</sup>

The US National Intelligence Council's prediction spurred action. Soon after its release, the document reached the desk of philanthropist Bill Gates. In late 2002, he announced that the Bill & Melinda Gates Foundation would pledge US\$100 million to fight HIV in India. At the time, this grant was the foundation's largest investment focused on a single country (it doubled the commitment to US\$200 million in 2003, and added another US\$58 million in 2006).<sup>16</sup>

Indian nongovernmental organizations (NGOs) and activists welcomed the foundation's commitment, but more broadly the announcement met a mixed reception.<sup>17</sup> The Indian government had already planned to expand its work with key populations, and there were reports of some tensions between public officials and Avahan staff when it was confirmed that the foundation would not channel its funds through the national program.<sup>18</sup> Despite this, Avahan forged ahead, tapping Indian national Ashok Alexander to bring his private-sector expertise to drive the new initiative forward.<sup>19</sup> To facilitate hands-on management, the foundation opened its first field office in New Delhi.<sup>20</sup>

Avahan's activities were concentrated in India's highest-HIV-prevalence states and along national trucking routes, where sex workers and their clients congregate.<sup>21</sup> Within those states, Avahan coordinated with the National AIDS Control Organization (NACO) to identify areas with high HIV prevalence and few prevention services for female sex workers, men who have sex with men, transgender people, and people who inject drugs.<sup>22</sup> Avahan used a competitive bidding process to recruit NGO "implementing partners" for day-to-day program management. Funds began to flow in late 2003 and early 2004, signaling that operations had begun in earnest.

## Avahan in Action

Avahan's approach was two-pronged, targeting short- and long-term sources of HIV risk. As a short-term measure to meet immediate needs, it filled gaps in the delivery of preventive and health services among its target groups. To promote long-term change, it empowered key populations to advocate for their own health and interests, while encouraging the government to reduce harmful policies that could create barriers or disincentives to preventive behavior, and to create an enabling environment for HIV prevention.<sup>23</sup>

As a starting point, Avahan planners understood they had to "know the epidemic" to "know the response."

Avahan's local partners worked in 83 target districts to identify entry points into wary communities. Local NGOs recruited peer educators from within key population groups; these insiders helped map beneficiary networks and took on outreach and service delivery responsibilities.<sup>24</sup>

For key populations at heightened risk of infection, the Avahan package included three core components. First, Avahan distributed free condoms at a massive scale—up to 10 million each month by 2007—and needles. Second, peer educators worked within their own networks on the ground to distribute products and collect information on beneficiaries. Third, Avahan opened a network of free clinics to diagnose and treat sexually transmitted infections (STIs).<sup>25</sup>

In addition to its core constituencies, Avahan targeted the clients and regular partners of female sex workers. Program staff helped open new condom outlets in non-traditional locations near transmission hot spots, such as tobacco shops and truck stops. Men at risk were exposed to health education and behavior change campaigns in areas where they congregated. Finally, staff developed a network of franchised clinics in the highest-risk areas, offering fee-based STI treatment and prepackaged prescription kits.<sup>26</sup>

Avahan also served as a platform for community mobilization of "bottom-up" activism to spark change within local communities. Local NGO partners and peer-group educators helped empower community groups to fight police abuse of sex workers and other vulnerable groups and to advocate for their interests by providing skills training and facilitation to self-help groups. Meanwhile, Avahan staff undertook mass media outreach and "top-down" lobbying of leaders and policymakers to help create an enabling environment.<sup>27</sup>

Avahan enlisted large international agencies to help tie together the diverse efforts of the program's many implementing partners and NGO subgrantees. In that role, organizations such as Family Health International, CARE International, and the World Health Organization drafted guidelines, trained grantees in community mobilization, and developed advocacy and communication plans.<sup>28</sup>

To track progress, Avahan staff relied on a dedicated monitoring and evaluation system. Although program managers did not conduct a baseline survey, they made frequent and rigorous data collection a central goal. Routine monitoring data were collected and reviewed at every level, complemented by population-based surveys.<sup>29</sup>

Avahan rapidly expanded and by late 2007 had undeniably achieved scale: 7,500 peer educators across 605 towns were reaching 280,000 members of key population groups (out of about 500,000) in targeted urban areas and distributing 10 million condoms each month.<sup>30</sup> Avahan and NACO reported that their combined efforts covered 86 percent of female sex workers, 91 percent of men who had sex with men, and 84 percent of people who used intravenous drugs in the six target areas.<sup>31</sup>

### The Payoff: Communities Protect Themselves from HIV

Avahan's rollout was not randomized, making it difficult to definitively attribute the health impact to Avahan

alone (see Box 1). Nonetheless, a host of observational studies and modeled impact evaluations paint a positive picture. They suggest that Avahan, working alongside government initiatives, curbed the drivers of HIV, even as the epidemic was already declining.

Across Avahan's target area, key populations adopted proven strategies to decrease their HIV risk. Rates of correct and consistent condom use skyrocketed among female sex workers, their male clients and partners, and men who have sex with men.<sup>32</sup> Likewise, injection drug users were less likely to share needles and more likely to use condoms with casual partners.<sup>33</sup> Two major evaluations and several smaller studies indicate that Avahan played a role in promoting these changes.<sup>34</sup>

Over time, the use of Avahan's clinical services increased and the STI picture improved. By the end of

#### Box 1. Strength of the Evidence

Avahan did not conduct a baseline survey and, in the interest of speed, it did not stagger or randomize the rollout. As a result, evaluators jumped through statistical hoops to assess the program's impact. Although Avahan is widely considered to have been a success, the evaluations do have limitations, prompting considerable debate about whether the observed trends can be attributed to Avahan's interventions.

In a 2011 article published in *The Lancet*, Ng and others attempted to work around these constraints by constructing a measure of program "intensity" based on Avahan's per capita spending in each district. In three of the six target states, higher program intensity was strongly associated with lower HIV prevalence, suggesting that Avahan averted roughly 100,000 new infections between 2003 and 2008. The intensity measure accounted only for Avahan spending and ignored complementary government-funded programs that were often operating in the same districts.<sup>39</sup> For this reason, some have noted that it might be a conservative estimate.<sup>40</sup> But the distribution of funding was nonrandom, so the findings could also reflect underlying differences between districts at the program's start.

In 2013, a second evaluation painted an even brighter picture of Avahan's impact. Using a mathematical model and Avahan-funded surveys, Pickles and others calculated HIV prevalence trends among key populations in the four southern states. They then linked the decline in prevalence to a plausible cause: increased self-reported condom use. The authors estimated that more than 200,000 infections had been averted between 2003 and 2007–2008, rising to more than 600,000 by 2013. However, because their

method used modeled projections as the control group and relied on self-reported data, the researchers also could not prove attribution.<sup>41</sup>

Adding to the controversy, another study found that while HIV and syphilis prevalence in pregnant women fell significantly in Avahan program areas, the rates of decline were faster in areas funded by India's less expensive NACO. Further, the authors found no significant associations between the density of Avahan spending or sex worker interventions and the decline in HIV prevalence, whereas significant associations were identified in NACO-financed areas.<sup>42</sup>

Some view Avahan's inability to definitely prove population-level impact as a cautionary tale. They argue that Avahan could have more convincingly demonstrated its impact with better baseline data, designated control districts, or a randomized phase-in of activities, particularly given the cost of the monitoring and evaluation component. In the absence of those measures, critics contend that the program's results are "promising and highly suggestive, but not definitive."<sup>43</sup>

Others forcefully disagree, reiterating perceived practical and ethical barriers to randomizing the program's introduction. The co-chairs of Avahan's Evaluation Advisory Group argued in 2011, in *The Lancet*, that "rapid rollout and ethical discussions" precluded more rigorous evaluation methods.<sup>44</sup> Others argued that a randomized design would have gotten in the way of the context-specific nature of the activities—forcing more uniformity in the intervention—and prevented the ongoing program adjustments made on the basis of monitoring results.<sup>45</sup>

2009, a beneficiary would visit an Avahan clinic more than eight times per year on average, a significant increase from 1.2 visits in the program's first year. As health seeking improved, the prevalence of STIs observed during clinic visits declined. Between 2005 and 2009, prevalence went from 39 percent to 11 percent among female sex workers and from 12 percent to 3 percent among men who had sex with men.<sup>35</sup> Because some STIs facilitate HIV transmission, these gains may also have helped slow the HIV infection rate.

Did Avahan in fact slow the spread of HIV in its target districts in India? Most likely it did. While the specifics vary substantially, experts estimate that Avahan averted between about 100,000 to 200,000 infections in its first phase, a figure that may have risen to 600,000 by 2013.<sup>36</sup> Put differently, Avahan may have prevented up to 42 percent of potential HIV infections in its target districts within its first 4 years, possibly rising to 57 percent of potential HIV infections over the entire 10-year period.<sup>37</sup> That said, whether and to what extent Avahan has made an impact is not undisputed: the evaluations lack a strong counterfactual, and HIV transmission was already falling. Some studies also suggest that the government's HIV program achieved similar and possibly greater gains at a lower cost.<sup>38</sup>

### Gains at What Price?

Between 2004 and 2009, Avahan's budget totaled US\$258 million, including US\$19 million for monitoring and evaluation.<sup>46</sup> These funds were provided by the Bill & Melinda Gates Foundation. Subgrantees spent about US\$45 per beneficiary on program activities; Avahan's middle management and senior oversight expenses added another US\$32 to the total per person cost. Notably, while the program cost compared favorably with the government's per-beneficiary spending for similar programs, Indian officials feared that the central overhead expenses would prove unaffordable if the Avahan program were to be taken over by the government.<sup>47</sup>

Avahan staff have published an analysis of the program's cost-effectiveness in 22 districts.<sup>48</sup> On the basis of their data, we calculated that Avahan averted 202,000 infections and an average of 17.19 disability-adjusted life years (DALYs) per HIV infection averted, for 3,471,973 total DALYs averted between 2004 and 2008. Using the total DALYs averted calculation done for *Millions Saved* led to the same cost-effectiveness ratio as the published study: US\$46 per DALY averted.<sup>49</sup>

### The Keys to Lasting Success

Avahan's strategy was to fight the virus in its "strongholds"—and it did so at a time when many HIV prevention programs shied away from working directly with these key marginalized populations. Peer educators from target communities had firsthand experience with the challenges their friends faced. A competitive bidding process enabled Avahan to select the best local NGOs for the job, ones with existing connections in target communities and with the capacity to deliver results.

Avahan was steadfast about its programming standards but also remained flexible. Rigorous clinical guidelines and a "common minimum program" of required elements kept Avahan firmly grounded in science.<sup>50</sup> But local implementers were empowered to tweak programmatic components to meet local needs. For example, in Bangalore, the partner NGO created "crisis response teams" to support people who experienced violence and help them file a police report; the strategy was so successful that it was eventually rolled out programwide.<sup>51</sup>

Another defining feature of the program was its leadership: a team of business-minded Indian nationals, steered by Ashok Alexander. Their hands-on management and "execution focus" helped jump-start the program and achieve rapid scale.<sup>52</sup> They also set ambitious goals, regularly reviewed program data, and often visited program sites, which promoted accountability. Grantees sometimes bristled at the demands and unrealistic targets managers placed on them. But Avahan's leaders paired high ambitions with understanding management; they were accepting of failures as long as everyone learned lessons from them.<sup>53</sup>

As the program progressed, it became clear that Avahan would need more than five years to achieve lasting impact and that its long-term success depended on a transition to ownership by the government and beneficiary communities.<sup>54</sup> In 2009 the Avahan program was renewed for a second phase, from 2009 to 2013. A written agreement with the Indian government stipulated that 10 percent of Avahan programs would transition to government control by 2009, another 20 percent two years later, and the final 70 percent by 2013.

This transition proved challenging. As the government assumed increasing responsibility for the project, Avahan planners had to compromise in some areas to meet government guidelines and budgets. For example, implementing partners had to lower staff salaries and increase the size of the catchment population served by each STI

clinic.<sup>55</sup> But smart planning helped ease transition pains. For example, early on Avahan had pushed its grantees to forge ties with state-level AIDS control entities. And a growing government budget for AIDS enabled the government to assume increasing financial responsibility for Avahan activities. Under the third NACP, from 2007 to 2013, NACO's budget increased fivefold, to US\$2.5 billion, with 70 percent dedicated to prevention.<sup>56</sup>

Throughout Avahan's lifespan, the criminalization of key population groups has been a barrier to success. Even as NACO and Avahan implemented interventions to reduce beneficiaries' social and medical vulnerabilities, restrictive legislation remained in place. In particular, sex work continues to have tenuous legal standing; although sex work per se is not illegal, solicitation, organized sex work, and buying or selling sex near public places are crimes.<sup>57</sup> As a result, individuals from key population groups and the health workers who serve them fear prosecution while organizing to improve safety, access to care, and community empowerment.

### Implications for Global Health

The launch of the Avahan program in 2003 coincided with the global increase in HIV funding. Yet Avahan differed in important ways from many other programs that were expanding around the same time. Starting in 2002, the Global Fund to Fight AIDS, Tuberculosis and Malaria distributed significant funds to countries for HIV prevention and treatment, but country proposals rarely prioritized marginalized or criminalized people.<sup>58</sup> Likewise, in the United States, the President's Emergency Plan for AIDS Relief (PEPFAR) began operations in 2003 and quickly became the world's largest AIDS funder. Yet PEPFAR focused its resources on care and treatment, not prevention. Meanwhile, the US Congress had prohibited the use of government funds for many harm-reduction initiatives, including HIV prevention services for sex workers and needle exchange.<sup>59</sup>

While the global rate of new infections eventually slowed, the total population living with HIV continued to rise, leading to a general perception that HIV prevention was foundering worldwide.<sup>60</sup> Within this context, some cite Avahan as an exception; building on preexist-

ing government efforts, the program bucked global trends by focusing on those most at risk without judging their lifestyles. India's preexisting support for key population programs and funding from a flexible private donor made this possible.

The approach of many international agencies has since shifted toward the proactive, nonjudgmental approach pioneered by India's NACP and Avahan, reflecting broad agreement that governments and funders have both a moral and pragmatic obligation to serve key populations. For instance, key populations featured prominently in PEPFAR's 2012 "blueprint" for an AIDS-free generation and in the Global Fund's 2014 key-population action plan.<sup>61</sup> While the focus on key populations is now mainstream, one aspect of Avahan has not been fully embraced: behavior change as a strategy for prevention. Proven biomedical interventions like voluntary male circumcision and treatment-as-prevention consume most donor funding despite the promising results from Avahan.

Avahan's programmatic legacy is mostly positive, although the missed opportunity to conclusively demonstrate the impact of a behavioral approach has limited Avahan's influence on other HIV prevention programs. Avahan did spend substantially on monitoring and evaluation, but most of the funds went to one-off surveys. A more sustainable alternative could have been to strengthen routine government surveys to track ongoing progress. Many also express frustration that results from Avahan's stand-alone surveys were not shared with external researchers and policymakers, limiting their use.

The ultimate lesson of Avahan, when paired with the government of India's preexisting AIDS program, is twofold. First, targeting key populations can likely help alter the course of a country's HIV epidemic. Second, only rigorous, prospective evaluation—facilitated by transparent measurement—can definitively confirm that finding and tell us by how much. Now under full government ownership, Avahan has the potential to sustain and expand the quality and sensitivity that characterized its first decade. Yet potentially threatening that quest for sustainability, one development is worth watching closely: 2015 administrative changes and budget cuts that, some say, may be affecting the availability of prevention and treatment interventions.<sup>62</sup>

## REFERENCES

- amfAR. 2013. *Tackling HIV/AIDS Among Key Populations: Essential to Achieving an AIDS-Free Generation*. Washington, DC: amfAR. [http://www.amfar.org/uploadedFiles/\\_amfarorg/Articles/On\\_The\\_Hill/2013/Key%20Populations%20Issue%20Brief%20-%20Final%20\(2\).pdf](http://www.amfar.org/uploadedFiles/_amfarorg/Articles/On_The_Hill/2013/Key%20Populations%20Issue%20Brief%20-%20Final%20(2).pdf).
- amfAR and Johns Hopkins Bloomberg School of Public Health. 2012. *Achieving an AIDS-Free Generation for Gay Men and Other MSM: Financing and Implementation of HIV Programs Targeting MSM*. New York and Baltimore, MD: amfAR and Johns Hopkins Bloomberg School of Public Health. [http://www.amfar.org/uploadedFiles/\\_amfar.org/In\\_The\\_Community/Publications/MSM-GlobalRept2012.pdf](http://www.amfar.org/uploadedFiles/_amfar.org/In_The_Community/Publications/MSM-GlobalRept2012.pdf).
- Armstrong, Gregory, Chumben Humtsoe, and Michelle Kermode. 2011. "HIV Risk Behaviours among Injecting Drug Users in Northeast India Following Scale-Up of a Targeted HIV Prevention Programme." *BMC Public Health* 11 (Suppl 6): S9. doi:10.1186/1471-2458-11-S6-S9.
- Armstrong, Gregory, Gajendra K. Medhi, Michelle Kermode, Jagadish Mahanta, Prabuddhagopal Goswami, and R.S. Paranjape. 2013. "Exposure to HIV Prevention Programmes Associated with Improved Condom Use and Uptake of HIV Testing by Female Sex Workers in Nagaland, Northeast India." *BMC Public Health* 13 (1): 476. doi:10.1186/1471-2458-13-476.
- Arora, P., N.J.D. Nagelkerke, R. Moinuddin, M. Bhattacharya, and P. Jha. 2013. "Female Sex Work Interventions and Changes in HIV and Syphilis Infection Risks from 2003 to 2008 in India: A Repeated Cross-Sectional Study." *BMJ Open* 3 (6): e002724. doi:10.1136/bmjopen-2013-002724.
- AVERT. 2015. "Needle and Syringe Programmes (NSPs) for HIV Prevention." Accessed July 8. <http://www.avert.org/needle-and-syringe-programmes-nsps-hiv-prevention.htm>.
- Baral, Stefan, Chris Beyrer, Kathryn Muessig, Tonia Poteat, Andrea L. Wirtz, Michele R. Decker, Susan G. Sherman, and Deanna Kerrigan. 2012. "Burden of HIV among Female Sex Workers in Low-Income and Middle-Income Countries: A Systematic Review and Meta-Analysis." *Lancet Infectious Diseases* 12 (7): 538–49. doi:10.1016/S1473-3099(12)70066-X.
- Baral, Stefan, Frangiscos Sifakis, Farley Cleghorn, and Chris Beyrer. 2007. "Elevated Risk for HIV Infection among Men Who Have Sex with Men in Low- and Middle-Income Countries 2000–2006: A Systematic Review." *PLoS Medicine* 4 (12): e339. doi:10.1371/journal.pmed.0040339.
- Bertozi, Stefano M., Nancy Padian, and Tyler E. Martz. 2010. "Evaluation of HIV Prevention Programmes: The Case of Avahan." *Sexually Transmitted Infections* 86 (Suppl 1): i4–5. doi:10.1136/sti.2009.039263.
- Bill & Melinda Gates Foundation. 2008a. *Avahan—The India AIDS Initiative: The Business of HIV Prevention at Scale*. New Delhi, India: Bill & Melinda Gates Foundation. [https://docs.gatesfoundation.org/Documents/Avahan\\_HIVPrevention.pdf](https://docs.gatesfoundation.org/Documents/Avahan_HIVPrevention.pdf).
- . 2008b. *Use It or Lose It: How Avahan Used Data to Shape Its HIV Prevention Efforts in India*. New Delhi, India: Bill & Melinda Gates Foundation.
- . 2009. "Avahan—The India AIDS Initiative." Fact sheet. [https://docs.gatesfoundation.org/Documents/Avahan\\_FactSheet.pdf](https://docs.gatesfoundation.org/Documents/Avahan_FactSheet.pdf).
- . 2010. *Breaking through Barriers: Avahan's Scale-Up of HIV Prevention among High-Risk MSM and Transgenders in India*. New Delhi, India: Bill & Melinda Gates Foundation. <https://docs.gatesfoundation.org/Documents/breaking-thru-barriers.pdf>.
- Boerma, Ties, and Isabelle de Zoysa. 2011. "Beyond Accountability: Learning from Large-Scale Evaluations." *Lancet* 378 (9803): 1610–12. doi:10.1016/S0140-6736(11)61519-5.
- Business Standard*. 2003. "Gates Foundation Hikes AIDS Grant to \$200 Million," October 14. [http://www.business-standard.com/article/economy-policy/gates-foundation-hikes-aids-grant-to-200-million-103101401088\\_1.html](http://www.business-standard.com/article/economy-policy/gates-foundation-hikes-aids-grant-to-200-million-103101401088_1.html).
- Cole, Claire, Maria May, Julie Rosenberg Talbot, Rebecca Weintraub, and Michael Porter. 2012. *The Avahan India AIDS Initiative: Managing Targeted HIV Prevention at Scale*. Cases in Global Health Delivery. Boston: Global Health Delivery Project at Harvard University.
- Deering, Kathleen N., Marie-Claude Boily, Catherine M. Lowndes, Jean Shoveller, Mark W. Tyndall, Peter Vickerman, Jan Bradley, et al. 2011. "A Dose-Response Relationship between Exposure to a Large-Scale HIV Preventive Intervention and Consistent Condom Use with Different Sexual Partners of Female Sex Workers in Southern India." *BMC Public Health* 11 (Suppl 6): S8. doi:10.1186/1471-2458-11-S6-S8.
- Gezari, Vanessa. 2002. "Gates Giving \$100 Million to Fight HIV: Indian Officials Say Billionaire Spreading 'Panic.'" *Chicago Tribune*, November 12. [http://articles.chicagotribune.com/2002-11-12/news/0211120154\\_1\\_national-aids-control-organization-hiv-and-aids-aids-sufferers](http://articles.chicagotribune.com/2002-11-12/news/0211120154_1_national-aids-control-organization-hiv-and-aids-aids-sufferers).
- Global Fund to Fight AIDS, Tuberculosis and Malaria. 2014. *Key Populations Action Plan 2014–2017*. Geneva: Global Fund to Fight AIDS, Tuberculosis and Malaria. [http://www.theglobalfund.org/documents/publications/other/Publication\\_KeyPopulations\\_ActionPlan\\_en/](http://www.theglobalfund.org/documents/publications/other/Publication_KeyPopulations_ActionPlan_en/).
- Gordon, David F. 2002. *The Next Wave of HIV/AIDS: Nigeria, Ethiopia, Russia, India, and China*. ICA 2002-04D. Washington, DC: National Intelligence Council. <http://fas.org/irp/nic/hiv-aids.html>.
- Goswami, P., H.K. Rachakulla, L. Ramakrishnan, S. Mathew, S. Ramanathan, B. George, R. Adhikary, et al. 2013. "An Assessment of a Large-Scale HIV Prevention Programme

## REFERENCES, continued

- for High-Risk Men Who Have Sex with Men and Transgenders in Andhra Pradesh, India: Using Data from Routine Programme Monitoring and Repeated Cross-Sectional Surveys." *BMJ Open* 3 (4): e002183. doi:10.1136/bmjopen-2012-002183.
- Gurung, Anup, Prakash Narayanan, Parimi Prabhakar, Anjana Das, Virupax Ranebennur, Saroj Tucker, Laxmi Narayana, et al. 2011. "Large-Scale STI Services in Avahan Improve Utilization and Treatment Seeking Behaviour amongst High-Risk Groups in India: An Analysis of Clinical Records from Six States." *BMC Public Health* 11 (Suppl 6): S10. doi:10.1186/1471-2458-11-S6-S10.
- Izugbara, Chimaraoke O. 2007. "Constituting the Unsafe: Nigerian Sex Workers' Notions of Unsafe Sexual Conduct." *African Studies Review* 50 (03): 29–49. doi:10.1353/arw.2008.0025.
- Jha, P., R. Kumar, A. Khera, M. Bhattacharya, P. Arora, V. Gajalakshmi, P. Bhatia, et al. 2010. "HIV Mortality and Infection in India: Estimates from Nationally Representative Mortality Survey of 1.1 Million Homes." *BMJ* 340 (2): c621. doi:10.1136/bmj.c621.
- Kuriakose, Dhiya. 2012. *Violence against SexWorkers in Chennai*. YouTube video, 6:56. Posted April 30. <https://www.youtube.com/watch?v=PlpdO8lrrec>.
- Laga, Marie, and Rob Moodie. 2012. "Avahan and Impact Assessment." *Lancet* 379 (9820): 1003–4. doi:10.1016/S0140-6736(12)60426-7.
- Lipovsek, V., A. Mukherjee, D. Navin, P. Marjara, A. Sharma, and K.P. Roy. 2010. "Increases in Self-Reported Consistent Condom Use among Male Clients of Female Sex Workers Following Exposure to an Integrated Behaviour Change Programme in Four States in Southern India." *Sexually Transmitted Infections* 86 (Suppl 1): i25–32. doi:10.1136/sti.2009.038497.
- Mainkar, Mandar M., Dilip B. Pardeshi, Jayesh Dale, Sucheta Deshpande, Shirin Khazi, Abhishek Gautam, Prabuddhago-pal Goswami, et al. 2011. "Targeted Interventions of the Avahan Program and Their Association with Intermediate Outcomes among Female Sex Workers in Maharashtra, India." *BMC Public Health* 11 (Suppl 6): S2. doi:10.1186/1471-2458-11-S6-S2.
- Mirelman, Andrew, Amanda Glassman, and Miriam Temin. 2016. *Estimating the Avertable Disease Burden and Cost-Effectiveness in Millions Saved Third Edition*. CGD Working Paper. Washington, DC: Center for Global Development.
- NACO (National AIDS Control Organization). 2007. *HIV Fact Sheets: Based on HIV Sentinel Surveillance Data in India 2003–2006*. New Delhi, India: Ministry of Health and Family Welfare. [http://naco.gov.in/upload/NACO%20PDF/HIV\\_Fact\\_Sheets\\_2006.pdf](http://naco.gov.in/upload/NACO%20PDF/HIV_Fact_Sheets_2006.pdf).
- . 2016. "About NACO." Accessed February 5. [http://www.naco.gov.in/NACO/About\\_NACO/](http://www.naco.gov.in/NACO/About_NACO/).
- Ng, Marie, Emmanuela Gakidou, Alison Levin-Rector, Ajay Khera, Christopher J.L. Murray, and Lalit Dandona. 2011. "Assessment of Population-Level Effect of Avahan, an HIV-Prevention Initiative in India." *Lancet* 378 (9803): 1643–52. doi:10.1016/S0140-6736(11)61390-1.
- Office of the Global AIDS Coordinator. 2012. *PEPFAR Blueprint: Creating an AIDS-Free Generation*. Washington, DC: Office of the Global AIDS Coordinator. <http://www.pepfar.gov/documents/organization/201386.pdf>.
- One Hundred Eighth Congress of the United States of America. 2003. H.R.1298. Washington, DC: United States Congress. <http://www.state.gov/documents/organization/30368.pdf>.
- Over, Mead, Peter Heywood, Julian Gold, Indrani Gupta, Subhash Hira, and Elliot Marseille. 2004. *HIV/AIDS Treatment and Prevention in India: Modeling the Cost and Consequences*. Health, Nutrition, and Population Series. Washington, DC: World Bank.
- Panchanadeswaran, Subadra, Sethulakshmi C. Johnson, Sudha Sivaram, A.K. Srikrishnan, Carla Zelaya, Suniti Solomon, Vivian F. Go, and David Celentano. 2010. "A Descriptive Profile of Abused Female Sex Workers in India." *Journal of Health, Population, and Nutrition* 28 (3): 211–20.
- Pandey, Arvind, Ram Mishra, Damodar Sahu, Sudhir Benara, Uttpal Sengupta, Ramesh S. Paranjape, Abhishek Gautam, Satya Lenka, and Rajatshurva Adhikary. 2011. "Heading towards the Safer Highways: An Assessment of the Avahan Prevention Programme among Long Distance Truck Drivers in India." *BMC Public Health* 11 (Suppl 6): S15. doi:10.1186/1471-2458-11-S6-S15.
- Parliament of the Republic of India. 1956. *The Immoral Traffic (Prevention) Act*. <http://www.hyderabadpolice.gov.in/acts/immoraltraffic.pdf>.
- Pickles, Michael, Marie-Claude Boily, Peter Vickerman, Catherine M. Lowndes, Stephen Moses, James F. Blanchard, Kathleen N. Deering, et al. 2013. "Assessment of the Population-Level Effectiveness of the Avahan HIV-Prevention Programme in South India: A Preplanned, Causal-Pathway-Based Modelling Analysis." *Lancet Global Health* 1 (5): e289–99. doi:10.1016/S2214-109X(13)70083-4.
- Rao, P.J.V.R. 2010. "Avahan: The Transition to a Publicly Funded Programme as a next Stage." *Sexually Transmitted Infections* 86 (Suppl 1): i7–8. doi:10.1136/sti.2009.039297.
- Seale, Andy. 2015. "Global Fund HIV Investments: MSM, Transgender and Human Rights." PowerPoint presentation. Accessed July 8. [http://www.amfar.org/uploadedFiles/Articles/Articles/Around\\_The\\_World/MSM/HumanRights.pdf?n=135](http://www.amfar.org/uploadedFiles/Articles/Articles/Around_The_World/MSM/HumanRights.pdf?n=135).
- Sgaier, S.K., A. Ramakrishnan, N. Dhingra, A. Wadhvani, A. Alexander, S. Bennett, A. Bhalla, et al. 2013. "How the Avahan HIV Prevention Program Transitioned from the

## REFERENCES, continued

- Gates Foundation to the Government of India." *Health Affairs* 32 (7): 1265–73. doi:10.1377/hlthaff.2012.0646.
- Shannon, Kate, Steffanie A. Strathdee, Shira M. Goldenberg, Putu Duff, Peninah Mwangi, Maia Rusakova, Sushena Reza-Paul, et al. 2015. "Global Epidemiology of HIV among Female Sex Workers: Influence of Structural Determinants." *Lancet* 385 (9962): 55–71. doi:10.1016/S0140-6736(14)60931-4.
- Sharma, Dinesh C. 2015. "Budget Cuts Threaten AIDS and Tuberculosis Control in India." *Lancet* 386 (9997): 942. doi:10.1016/S0140-6736(15)00114-2.
- Shetty, Priya. 2002. "Gates Offers \$100 M Grant to Fight AIDS." *Tribune* (India), November 11. <http://www.tribuneindia.com/2002/20021112/biz.htm#1>.
- . 2005. "Ashok Alexander: Taking on the Challenge of AIDS in India." *Lancet* 366 (November): 1843.
- Subramanian, Thilakavathi, Lakshmi Ramakrishnan, Santhakumar Aridoss, Prabuddhagopal Goswami, Boopathi Kanguswami, Mathew Shajan, Rajat Adhikary, et al. 2013. "Increasing Condom Use and Declining STI Prevalence in High-Risk MSM and TGs: Evaluation of a Large-Scale Prevention Program in Tamil Nadu, India." *BMC Public Health* 13 (1): 857. doi:10.1186/1471-2458-13-857.
- Thilakavathi, S., K. Boopathi, C.P. Girish Kumar, A. Santhakumar, R. Senthilkumar, C. Eswaramurthy, V. Ilaya Bharathy, et al. 2011. "Assessment of the Scale, Coverage and Outcomes of the Avahan HIV Prevention Program for Female Sex Workers in Tamil Nadu, India: Is There Evidence of an Effect?" *BMC Public Health* 11 (Suppl 6): S3. doi:10.1186/1471-2458-11-S6-S3.
- UNAIDS (Joint United Nations Programme on HIV/AIDS). 2002. *Report on the Global HIV/AIDS Epidemic*. UNAIDS/02.26E. Geneva: UNAIDS.
- . 2013. *Global Report: UNAIDS Report on the Global AIDS Epidemic 2013*. Geneva: UNAIDS.
- Vassall, Anna, Michael Pickles, Sudhashree Chandrashekar, Marie-Claude Boily, Govindraj Shetty, Lorna Guinness, Catherine M. Lowndes, et al. 2014. "Cost-Effectiveness of HIV Prevention for High-Risk Groups at Scale: An Economic Evaluation of the Avahan Programme in South India." *Lancet Global Health* 2 (9): e531–40. doi:10.1016/S2214-109X(14)70277-3.
8. Baral et al. (2007, 2012).
9. Izugbara (2007).
10. NACO (2007).
11. Jha et al. (2010).
12. Gordon (2002).
13. NACO (2016); Cole et al. (2012).
14. Over and World Bank (2004).
15. Bill & Melinda Gates Foundation (2008a).
16. *Business Standard* (2003); Shetty (2002); Gezari (2002).
17. Shetty (2002).
18. Cole et al. (2012).
19. Shetty (2005).
20. Cole et al. (2012).
21. Bill & Melinda Gates Foundation (2009).
22. Bill & Melinda Gates Foundation (2008b).
23. Bill & Melinda Gates Foundation (2008a).
24. Bill & Melinda Gates Foundation (2008b).
25. Bill & Melinda Gates Foundation (2008a).
26. Bill & Melinda Gates Foundation (2008a).
27. Bill & Melinda Gates Foundation (2008a).
28. Cole et al. (2012).
29. Bill & Melinda Gates Foundation (2008a).
30. Bill & Melinda Gates Foundation (2008a).
31. Bill & Melinda Gates Foundation (2008a). The figures for female sex workers and men who have sex with men are for Karnataka, Andhra Pradesh, Maharashtra, and Tamil Nadu only. Injection drug user figures are for Manipur and Nagaland only.
32. Mainkar et al. (2011); Deering et al. (2011); Thilakavathi et al. (2011); Lipovsek et al. (2010); Pandey et al. (2011); Armstrong et al. (2013); Goswami et al. (2013); Subramanian et al. (2013).
33. Armstrong, Humtsoe, and Kermodé (2011).
34. Ng et al. (2011); Pickles et al. (2013).
35. Gurung et al. (2011).
36. Ng et al. (2011); Pickles et al. (2013).
37. Pickles et al. (2013).
38. Arora et al. (2013).
39. Ng et al. (2011).
40. Pickles et al. (2013).
41. Pickles et al. (2013).
42. Arora et al. (2013).
43. Bertozzi, Padian, and Martz (2010).
44. Boerma and de Zoysa (2011).
45. Laga and Moodie (2012).
46. Cole et al. (2012).
47. Rao (2010).
48. Vassall et al. (2014).
49. Estimated costs, DALYs averted, and cost-effectiveness are from the *Lancet Global Health* study (Vassall et al. 2014). The extrapolation of study results to the scaled-up scenario in all program districts was done linearly, and a similar cost-effectiveness ratio was obtained. See Mirelman, Glassman, and Temin (2016) for details of calculations and assumptions.

## ENDNOTES

1. Panchanadeswaran et al. (2010).
2. Panchanadeswaran et al. (2010).
3. Kuriakose (2012).
4. See also chapter 2 in this volume.
5. UNAIDS (2002).
6. Bill & Melinda Gates Foundation (2009).
7. amfAR (2013).

**ENDNOTES, continued**

50. Bill & Melinda Gates Foundation (2008a).
51. Bill & Melinda Gates Foundation (2010).
52. Bill & Melinda Gates Foundation (2008a).
53. Cole et al. (2012).
54. Cole et al. (2012).
55. Cole et al. (2012).
56. Sgaier et al. (2013).
57. Shannon et al. (2015); Parliament of the Republic of India (1956).
58. amfAR and Johns Hopkins Bloomberg School of Public Health (2012); Seale (2015).
59. One Hundred Eighth Congress of the United States of America (2003); AVERT (2015).
60. UNAIDS (2013).
61. Office of the Global AIDS Coordinator (2012); Global Fund to Fight AIDS, Tuberculosis and Malaria (2014).
62. Sharma (2015).