



ART SUPPLEMENT

Health systems' responses to the roll-out of antiretroviral therapy (ART) in India: a comparison of two HIV high-prevalence settings

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The government of India launched the free anti-retroviral therapy (ART) initiative in 2004 and the programme has since scaled up expansion in a phased manner. Programme authorities acknowledge problems in scale-up, yet discussions have been restricted to operational constraints, with little consideration for how local health system responses to HIV/AIDS influence the delivery of ART. This paper draws on the perspectives of key informants and people living with HIV (PLHIV) to compare delivery of ART in two ART centres in the States of Maharashtra and Andhra Pradesh at two distinct points of time. In 2005, data were collected through key informant interviews (KIIs) using interview guides and a survey of PLHIV using a semi-structured interview schedule. Differences were observed in the functioning and resources of the two centres, indicating different levels of preparedness which in turn influenced PLHIV's pathways in accessing ART. We examine these differences in the light of programme leadership, ownership and the roles of public, private and non-governmental organisation actors in HIV care. KIIs conducted during a follow-up visit in 2009 focused on changes in ART delivery. Many operational problems had been resolved; however, new challenges were emerging as a result of the increased patient load. An understanding of how ART programmes evolve within local health systems has bearing on future developments of the ART programme and must include a consideration of the wider socio-political environment within which HIV programmes are embedded.

Keywords: public sector programmes; anti-retroviral therapy; health systems; India

Introduction

In 2004, Indian government launched a phased scale-up programme to provide free anti-retroviral therapy (ART). Initially, ART centres were set up in six high-prevalence States¹ and from January 2005, the programme expanded to include seven more States. The goal for scale-up was to increase the number of ART centres to 100 by end of 2005 and to offer free treatment to 100,000 people living with HIV (PLHIV) through public sector by end of 2007 (Sankaran, 2006).

Initially, ART roll-out in India faced several challenges. Early reports of operational barriers in meeting targets indicated differences across States (National AIDS Control Organisation [NACO], 2008a; PANOS INDIA, 2007). In Maharashtra, problems included drug shortages, weak infrastructure, burnout of counsellors and weak monitoring; while in Andhra Pradesh, the "staggering" numbers of PLHIV requiring treatment combined with the presence of private sector created difficulties for ensuring treatment adherence and monitoring (PANOS INDIA, 2007).

While these well-documented issues partly indicate the growing pains of a new programme, State-wide variability in performance suggests differences in States' capacity to deliver ART through existing health systems. The National AIDS Control Programme (NACP) provides framework for HIV care delivery, yet State-level differences in the epidemiology of HIV, the socio-political and policy responses to HIV/AIDS, affect capacity of local health systems to allocate and absorb the resource requirements of ART delivery into their organisational culture (Cohen, 2004; Steinbrook, 2007). While there is evidence of ways in which local health systems are adapting available health system resources for ART delivery in African countries (Gilks et al., 2006; Harries et al., 2004; Torpey et al., 2009), a health systems "probe" (Blaauw et al., 2004) have not been used to examine the Indian ART experience.

Present paper draws on data from PLHIV and key informant interviews (KIIs) collected in 2005 and 2009 from two high-prevalence districts, *Ajaynagar* and *Vijaynagar* (pseudonyms) in Maharashtra and

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Andhra Pradesh in order to contrast the early evolution of ART roll-out in these States. We examine differences in ART delivery in these districts as a function of physical and human resource inputs in the respective health systems. We attempt to situate some of the differences observed in the context of social and political relations among key actors within the ART delivery scenario (Schneider et al., 2006; Van Damme, Kober, & Kegels, 2008).

Background

India's NACO was established in 1991. It coordinates the NACP at national level and the State AIDS Control Societies (SACS) in the States (Sankaran, 2006). The current phase of the NACP (2007–2011) emphasises the provision of ART (NACO, 2007). Despite the overarching framework of public sector HIV care there is evidence that a sizeable proportion of patients receives private ART and HIV care (MAAS-CHRD, 2006; Ramchandani et al., 2007). Several non-governmental organisation (NGO) and community-based organisations (CBO) work on HIV/AIDS at local, State and national levels.

Study settings

Maharashtra and Andhra Pradesh have an estimated 0.5 million PLHIV each (NACO, 2008b). In January 2006, there were five ART centres in Maharashtra and three in Andhra Pradesh. Based on the HIV Sentinel Surveillance both study districts were listed

as "Category A" districts by NACP with more than 1% HIV prevalence among antenatal clinics (ANC) attendees (NACO, 2007). ART delivery was initiated in December 2004 in *Ajaynagar* and January 2005 in *Vijaynagar*.

Method

Study design

Data collection for the study occurred at two points in time, first round was from November 2005 to January 2006 and second was in March 2009. The first round was undertaken as part of a larger study conducted in 2005 in three high-prevalence districts in the States of Maharashtra, Andhra Pradesh and Orissa (MAAS-CHRD, 2006). This study presented an opportune moment to examine differences in ART service delivery in *Ajaynagar* and *Vijaynagar*, where the ART programme was functional at that time. Data were collected through KIIs using interview guides and a survey of PLHIV using a semi-structured interview schedule. The representative survey sample of 229 PLHIV was derived from NGOs and PLHIV networks in the two study districts, so as to include PLHIV who had experiences in the private sector as well. Thirty-one key informants (KIs) from the public, private and NGO sectors and PLHIV networks were purposively identified through snowballing and interviewed (Table 1). These interviews provided the broader context and underlying dynamics of HIV service delivery in

Table 1. Type of key informants interviewed in 2005 and 2009.

Type of key informants	Ajaynagar		Vijaynagar	
	2005	2009	2005	2009
Type 1 key informants (programme managers, administrators and professionals)				
Nodal officer – ART centre	1	1 ^a	–	1
Medical officer (MO) – ART	–	–	1	1 ^a
MO rural hospital	2	–	–	–
MO (Faculty medical college)	1	1 ^a	–	–
NGO director	1	1 + 1 ^a	4	2 ^a + 1
PLHIV network president	1	1 ^a	1	1 ^a
Private HIV specialist	2	1 ^a	1	1 ^a
Type 2 key informants (front-line staff)				
ART counsellor	1	1 ^a	1	1 ^a
Medical social worker at district hospital	–	1	–	–
TCC counsellor	–	–	1	1 ^a
VCTC counsellors	4	–	4	–
NGO counsellor	–	–	2	–
NGO social worker	1	–	–	–
NGO field coordinator	1	–	1	1 ^a
Total	15	8	16	10

^aKey informants who were also interviewed in 2005.

the study settings. The survey elicited data on HIV care-seeking behaviour, specifically on the first access points and their experiences while seeking ARVs.

In March 2009, researchers returned to spend one week each in the same study sites. They discussed changes with KIs, specifically focusing on ART delivery. The 18 KIs interviewed included: programme managers, administrators, professionals and front-line staff of which 14 were interviewed previously (Table 1).

Data management and analysis

In *Vijaynagar*, the KIIs were conducted in English; interviews with PLHIV were in Telugu. In *Ajaynagar*, all interviews were conducted in Marathi. Field-notes taken during the KIIs were expanded after interview. Open-ended data from PLHIV interviews were recorded as notes in the interview schedule and later expanded. In both rounds of data collection, notes in Marathi and Telugu were translated into English. Translations were verified by field supervisors. After several readings of the textual data, a thematic coding system was prepared which included, “access to ART”, “public sector response” and “health systems interface”, etc. Interviews were coded manually. Retrieved coded segments were used to contrast health systems resources available in the two sites, the socio-political context of ART delivery in 2005 and the significant changes in ART scenario in 2009.

A tale of two clinics in 2005

In the early phase of the ART programme, the care-seeking trajectories of PLHIV were strongly influenced by the presence of private medical practitioners (PMP), NGOs and PLHIV networks in both sites. Almost half (48%, 54/113) of the PLHIV from *Ajaynagar* and more than one-fifth (22%, 26/116) from *Vijaynagar* were on ARVs. More than three-quarters (83%, 45/54) of these PLHIV from *Ajaynagar* and more than two-thirds (69%, 18/26) from *Vijaynagar* had first started taking ART from the public sector. The remaining nine from *Ajaynagar* and eight from *Vijaynagar* had started ARVs in private sector. Ten of these 17 patients eventually switched over to public sector-run ART programme, only after incurring high financial and social costs. For example, RP, a 25-year-old married woman from *Vijaynagar* was first started on ARVs following the advice of a PMP. Her parents had borrowed money on interest and whenever they ran out of money, RP had to stop taking ARVs. By the time RP was enrolled in the district ART centre, her parents had spent Rs. 50,000 (~1170 US\$) on treatment.

In 2005, ART centres in both *Ajaynagar* and *Vijaynagar* were located at District hospitals attached to Government medical colleges. The ART team supervising the functioning of the programme was comprised of faculty from the Department of Medicine and contractual staff. PLHIV were generally referred to ART centres from Voluntary Counselling and Testing Centres (VCTC), ANC, rural hospitals and designated microscopy centres for TB, PLHIV networks, NGOs and PMPs. NACO provided ART centres with treatment protocol and supplied ARVs through an annual procurement mechanism. Most patients were started on ART within a month of their first visit at both centres, however, differences were observed with regard to day-to-day functioning and system resources, indicating the overall system preparedness to address operational issues at both sites.

The centre in *Vijaynagar* functioned on a daily basis while the centre in *Ajaynagar* functioned weekly with space shared with other outpatient clinics. This resulted in long queues and waiting hours, increasing the burden on ART programme staff and on the conduct and functioning of outpatient clinics run by other departments:

I come here in the morning at 8, then stand in queue for making pass and case papers. Three times I have to stand in queue, so my entire day time is spent standing in queues. (Unemployed 57-year-old male, *Ajaynagar*)

Both centres suffered from staff shortages, and relied heavily on NGO staff to help manage their patient loads:

There is problem of time management. ART clinic is held only on Tuesdays . . . 500–600 patients attend this clinic. If each patient is given 10–15 minutes, then it is not possible to counsel every patient on the same day. The workload is huge and there is scarcity of staff. (PLHIV Network Representative, *Ajaynagar*)

In *Ajaynagar*, NGOs and PLHIV networks, with branch offices in rural areas of the district, played a crucial supportive role by directing and guiding PLHIV to ART centre, getting them registered and counselling them. One NGO appointed a staff member full-time at ART centre to coordinate referrals specifically from rural areas. In *Vijaynagar*, a local NGO provided counselling before referring PLHIV to the centre and adherence counselling following initiation of ART. Medical officer at the centre referred 90% of the patients to the adjacent Treatment Counselling Centre (TCC) run by PLHIV network for counselling before initiation of ART as well as for follow-up counselling.

While ART centre in *Vijaynagar* was fully functional in terms of its ability to deliver care, in *Ajaynagar*, the constraints on trained staff and physical resources affected the centre's ability to continue ensuring high standards of care. Basic items like disposable gloves and testing kits were in limited supply (Table 2).

Although CD4 count machine was available, there was no trained technician available to operate it. ART medical officer consequently did not lay emphasis on CD4 count while enrolling PLHIV on ART. He was candid in describing the situation regarding implementation of operational guidelines² for ART:

Before starting ART rollout there was a draft regarding steps to be taken before starting ART ... that draft was not being followed meticulously in *Ajaynagar*. All the required steps before starting ART³ were not being tick-marked ... omitting some important steps, there was a direct jump to the last step of dispensing ARV drugs. (Former medical officer, ART programme, *Ajaynagar*)

In both sites, people responsible for the overall functioning of ART centre viz. senior medical officers and counsellors had received training before the programme was rolled out. In *Ajaynagar*, this training was perceived to be of limited value.

Differences in operational functionality in the two sites were linked to differences in the availability and quality of physical, human and social resources (Table 2). These differences resulted in different patient pathways to HIV care as illustrated:

SD, a 23-year-old widow from *Ajaynagar*, lives 120 km from district headquarter. Following the death of her HIV-positive husband, a villager employed with an NGO working in HIV, advised her HIV test and took her to VCTC. After testing positive, SD started getting sick frequently, NGO worker accompanied her to the ART centre. She was advised to get HIV and CD4 count tests done in a private laboratory. SD received information on HIV from an NGO worker. The doctor elicited SD's family history and after obtaining written consent from her, informed her that it was her responsibility to seek treatment from other sources if drugs were not available at the centre. SD had to collect medicines once a week from the busy ART clinic. She walked two km from her home to reach bus station and waited five–six hours in two separate queues before she received ARVs. She spent Rs. 150 (~3.5 US\$) on travel and food each time she visited the centre. SD wanted to stop ARVs due to severe side effects. The NGO worker from her village convinced her not to do so and accompanied her to

a private HIV specialist in the city, who gave her medicines to relieve the side effects. SD continued her ART in public sector.

PK, a 25-year-old unmarried man from *Vijaynagar*, lives 78 km from district capital. Two years ago, PK started getting sick very frequently. After attending an HIV/AIDS awareness campaign held in his village, he went to get tested at VCTC near his village and was diagnosed as HIV positive. Seeing his illness history, the counsellor at the hospital immediately referred PK to ART centre, where he underwent HIV and CD4 count tests. He was counselled regarding lifelong adherence to ART and enrolled on ART immediately due to his poor physical condition. PK had relatively easy access to the daily ART centre. He was diagnosed with TB a few months after starting ART, because of which he was unable to collect his monthly ARVs. The outreach workers from TCC helped him register for DOTS in a nearby PHC and informed the ART centre regarding PK's TB status.

Differences in patients' pathways highlight the role of resource inputs in local health systems. However, it is important to consider the socio-political context of the two programmes in order to better understand how resource inputs are mobilised by different actors.

The wider context: programme ownership and the role of the State, NGOs and PLHIV networks

State-level leadership, ownership and action

In Andhra Pradesh, SACS provided strong and dynamic leadership to the HIV programme, and was supported by the Chief Minister of the State. The SACS programme manager was lauded in public awareness campaigns for her leadership and political will to address challenges of ART delivery.

In contrast, State-level leadership in Maharashtra was perceived to be weak, almost invisible during ART roll-out. Districts in the State were arbitrarily divided between the SACS and an internationally funded agency, ACTION-HIV (pseudonym) for programme prioritisation and implementation. Lack of a unified line of command for HIV programme activities affected the ART programme; there was little sense of district ownership of the programme in *Ajaynagar*. HIV prevention activities were coordinated by ACTION-HIV, while ART roll-out was SACS's responsibility. ACTION-HIV had good working relationship with NGOs, but not with public sector programme, while SACS failed to provide leadership to the ART programme and in developing partnerships with NGOs. The comments of the director of an NGO involved in HIV prevention,

Table 2. Table showing comparative ART scenario at *Ajaynagar* and *Vijaynagar* in 2005 and 2009.

Sr. No.	ART roll-out scenario	Ajaynagar		Vijaynagar	
		2005	2009	2005	2009
1	ART centre	Located in the general out patient department (OPD) of the district hospital	NGO built new hall for the ART centre on the premises of the district hospital	Located in a single room of the Department of Medicine in the district hospital	Public sector authorities accommodated the ART centre in the newly constructed building of the general hospital
2	Adult PLHIV on ART (approximately)	1000	6000	1100	5000
3	ART OPD	Once a week ART OPD	Every day OPD	Every day OPD	Every day OPD
4	ART centre coverage	Six to eight neighbouring districts	Only Ajaynagar district	Eleven districts throughout the State	Four to five neighbouring districts
5	ART centre cabins/rooms	Temporary table arrangement shared with the hospital OPD	Work of creating separate cabins (rooms) for counsellors, medical officers was underway	Room arrangement shared with the Department of Medicine staff	ART centre now well equipped with necessary cabins/rooms for counsellors, medical officer, data entry operator, etc.
6	HIV testing kits	Second and third kits for confirmation of HIV-positive status not available	Second and third kits for confirmation of HIV-positive status still not available	All essential HIV testing kits available	All essential HIV testing kits available
7	CD4 count machine	Non-functional due to the absence of technician	Functional	Functional	Functional
8	ART centre staff	Post of senior medical officer (SMO) vacant	All required and recommended staff in place	Medical officer had been delegated the responsibility of SMO and the rest of the staff was in position	All the required staff except SMO and medical officers were in place
9	ART counsellor	Not present	Present	Present	Present
10	Trained CD4 machine technician	Unavailable	Available	Available	Available
11	Treatment care and counselling (TCC) project	Not functional	TCC project under-staffed, struggling to function properly	TCC project well functional	TCC project well functional
12	Link ART centre	Not applicable	Programme was in the pipeline	Not applicable	Programme was in the pipeline
13	Paediatric ART programme	Not applicable	Programme was in place	Not applicable	Programme was in place
14	Clinton foundation paediatric initiative to support nutritional needs and transport costs of children living with HIV	Not applicable	Programme was in place, but supposed to end in April 2009; no plans reported for sustaining the programme	Not applicable	Programme was in place, plans to merge this initiative with the ongoing programme of <i>Balasaahyoga</i> ^a

^aBalasaahyoga is project in Andhra Pradesh that translates as "active support to the child", that aims to improve the quality of life of children infected and affected by HIV/AIDS and their families by expanding the coverage of comprehensive HIV/AIDS care, support and treatment services in all the 23 districts of Andhra Pradesh.

treatment and advocacy activities in *Ajaynagar* are revealing:

We really could have had a better system ... I think what happens with a vertical programme is it comes from above not from the local community of doctors or system establishment ... they got the guidelines from the top you know, but they had no ideas as to how to do this properly and then when they had ideas nobody was willing to listen to them. (Director, NGO, *Ajaynagar*)

District-level response

The District Collector of *Vijaynagar* played a key role in paving the district health management system's readiness and response to launch the ART programme. The Department of Health and other social development departments were held accountable through regular monitoring for generating awareness on HIV prevention and treatment programmes. Social mobilisation campaigns undertaken by *ACCESS* (pseudonym) project on STD/HIV prevention around the launch of ART programme were strongly endorsed by the Collector. Further, elected representatives and religious leaders from *Vijaynagar* were sensitised regarding HIV prevention and treatment programmes by bringing them together to address mass awareness campaigns and public meetings held throughout *Vijaynagar*. The district-level PLHIV network, CBOs and other local NGOs were involved in advocacy and social mobilisation campaigns from the launch of the programme and later lobbied for access to ART.

On the other hand, the district administration's efforts to mobilise the district health management in *Ajaynagar* were sporadic and patchy, failing to generate accountability towards the programme. HIV awareness campaigns were in fact, arranged by NGOs with minimal engagement of public sector district health administration. NGO campaigns held prior to the launch of ART programme were supported by ACTION-HIV; however, their reach remained restricted to the organising NGOs' operational areas. In part, this is due to the failure of State-level administration to ensure consistent "control" over the district health management team and its programme activities. As a result, NGOs and PLHIV networks became actively involved during implementation and played an important role in guiding PLHIV to the programme and in supporting programme staff.

The current scenario in 2009

By January 2009, ART provision had rapidly expanded and ART centres had been established in

almost all districts of both States. There were 37 functional ART centres in Maharashtra and 28 in Andhra Pradesh (NACO, 2009).

Over a period of three years, the physical infrastructure of ART centres in both sites had changed drastically (Table 2). The centre in *Vijaynagar* had been accommodated in a newly constructed building. In *Ajaynagar*, a local NGO had helped construct an outpatient hall for the ART centre:

The ART centre did not have ... any kind of infra-structural support ... there were floods in *Ajaynagar* and they were treating or giving ARVs in the *Ajaynagar* civil hospital basement. It was so unhygienic ... so terrible and they were herding this community like sheep. We stepped in ... accessed funds. We built the ART centre for them ... (Director NGO, *Ajaynagar*)

A child-friendly corner, drinking water and toilet facilities were already in place in *Vijaynagar*, while these facilities were still non-existent in *Ajaynagar*. Although the recommended contractual staffs were present at both the sites, *Vijaynagar* had only one medical officer to take care of more than 5000 enrolled PLHIV. The centre had retained its reputation and popularity as one of the oldest hospitals and one of the first to start the ART programme.

The ART clinic in *Ajaynagar* was held on a daily basis as opposed to once-weekly in 2005, and staffing levels had improved. The patient load was manageable, as PLHIV from other districts were sent back to their native districts for follow-up.

In *Vijaynagar*, TCC continued to flourish with support of PLHIV network and had been allotted space within the ART centre. In *Ajaynagar*, TCC was struggling to find its roots, though on the whole, the centre's ability to deliver ART services had improved, largely in response to the pressures of NGOs and PLHIV.

Director of one of the NGOs in *Ajaynagar* used the issue of non-availability of HIV testing kits at ART centres to explain how the pressure from PLHIV demanding better services had forced the government to provide better services:

I think now we can see a lot more government involvement and engagement ... in the initial stages we didn't have kits for testing and NGOs would go on complaining "testing kit nahin hai ...!" (testing kits are not there) ... now when there are no testing kits, the PLHIV are standing out there and shouting and saying "kahan hai testing kit?" (where are the testing kits?) ... initially it was a vertical programme ... it was the interest (initiative) of the State, but now I think ... the response on the ground has forced the vertical programme to change ... to

respond ... to give better services ... (Director NGO, *Ajaynagar*)

Discussion and conclusion

In this paper though we did not set out to conduct health systems analysis of the ART programmes in the two sites, the differences in availability and quality of infrastructure, equipment and trained staff prompted questions pertaining to health system preparedness to deploy resources for ART delivery. ART programmes in both sites were launched within a context of varying levels of political will and leadership, which can be traced partly to the States' autonomy in health systems governance in India (India Ministry of Health and Family Welfare [MOHFW], 2002). In *Vijaynagar*, the ART programme was built on foundations laid by community-level social mobilisation campaigns and district- and State-level interests and programme ownership. In contrast, the programme in *Ajaynagar* was initiated more tenuously through "islands" of NGO and PLHIV network initiatives in a sea of public sector indifference towards the programme.

However, the paper also points to how the functioning of an essentially vertical, compartmentalised programme is "co-opted", in both negative and positive ways, by other actors in the health system. In the profiles presented above, it is not only the presence or absence of counsellors and doctors within the ART centres, but also the links with family members, NGO workers, private specialists and private laboratory technicians outside of the centres that shape the HIV care-related trajectories of these patients. The limited insights gained from these stories point to the importance of future research on the "culture of service delivery" (Schneider et al., 2006) within ART centres in India as well as the informal and formal "working" relationships these centres have with private sector providers and organisations supporting PLHIV.

In the years following the launch of the programme, we saw that many of the initial operational problems faced had been resolved, while new challenges emerged with increasing patient loads (Table 2). This originally unintended "comparison" of two points in time raises questions about the "response time" required for the health system to absorb a new programme. *Ajaynagar* NGO director's comment "... the response on the ground ... forced the vertical programme to change" suggests the importance of close attention to the ways in which ART programme in India – despite vertical implementation – is adapting guidelines and available resources to meet the context-specific needs and constraints of the many

"... concurrent and interrelated HIV epidemics" across India (Steinbrook, 2007).

ART programme performance is influenced by the health system and socio-political environment within which these programmes are embedded; yet to date, there are limited number of studies applying a complex "systems thinking" to examine "performance" of HIV programmes (Atun, McKee, Drobniewski, & Coker, 2005; Schneider et al., 2006; Van Damme & Kegels, 2006). We hope to have contributed some modest insights in understanding the dynamics and future developments of the ART programme in Indian context.

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Notes

1. Maharashtra, Tamil Nadu, Karnataka, Manipur, Andhra Pradesh and Nagaland are the HIV high-prevalence States in which ART was started in eight hospitals.
2. At the start of the programme the operational guidelines for the ART centres were in the draft stage. These guidelines evolved over time and were changed so as to overcome some of the operational problems faced during implementation. They were first made available on the NACO website in March 2007.
3. The guidelines provided detailed eligibility criteria for setting up ART centre, including information on infrastructural requirements, equipment and staffing in addition to the processes for requisition and acceptance of ARV drugs.

References

- Atun, R.A., McKee, M., Drobniewski, F., & Coker, R. (2005). Analysis of how the health systems context shapes responses to the control of human immunodeficiency virus: Case-studies from the Russian Federation. *Bulletin of the World Health Organization*, 83, 730–738.

- Blaauw, D., Gilson, L., Modiba, P., Erasmus, E., Khumalo, G., & Schneider, H. (2004). *Government relationships and HIV/AIDS service delivery*. Johannesburg: Centre for Health Policy, School of Public Health, University of the Witwatersrand. Retrieved from <http://www.hst.org.za/publications/603>.
- Cohen, J. (2004). HIV/AIDS: India's many epidemics. *Science*, 304, 504–509.
- Gilks, C.F., Crowley, S., Ekpini, R., Gove, S., Perriens, J., Souteyrand, Y., ... De Cock, K. (2006). The WHO public-health approach to antiretroviral treatment against HIV in resource-limited settings. *Lancet*, 368, 505–510.
- Harries, A.D., Libamba, E., Schouten, E.J., Mwansambo, A., Salanipni, F., & Mpazanje, R. (2004). Expanding antiretroviral therapy in Malawi: Drawing on the country's experience with tuberculosis. *British Medical Journal*, 329, 1163–1166.
- India Ministry of Health and Family Welfare (MOHFW) (2002). *National Health Policy, 2002*. New Delhi: Author.
- MAAS-CHRD (2006). *Access to HIV/AIDS care: A study among people living with HIV/AIDS*. Dissemination Report. Pune, India. Retrieved from <http://www.maas.org.in/chrd/reports>
- National AIDS Control Organisation (NACO) (2007). *NACP III: To halt and reverse the HIV epidemic in India*. New Delhi: NACP III covers the years 2007–2012, NACO. Retrieved from <http://www.nacoonline.org/upload/Publication/IEC%20&%20Mainstreaming/NACP%20III%20To%20Halt%20and%20Reverse%20the%20HIV%20Epidemic%20in%20India.pdf>
- National AIDS Control Organisation (NACO) (2008a). *Operational guidelines for ART centres*. New Delhi, Government of India: Ministry of Health and Family Welfare. Retrieved from http://www.nacoonline.org/Quick_Links/>Publication/Treatment_Care__Support/Operational__Technical_guidelines_and_policies/Operational_Guidelines_for_ART_Centers/
- National AIDS Control Organisation (NACO) (2008b). *HIV sentinel surveillance and HIV estimation, 2006*. New Delhi, Government of India: Ministry of Health and Family Welfare. Retrieved from http://www.nacoonline.org/upload/NACO%20PDF/Note%20on%20HIV%20Sentinel%20Surveillance%20and%20HIV%20Estimation_01%20Feb%202008.pdf
- National AIDS Control Organization (NACO) (2009). *Statewise list of antiretroviral therapy centres*. New Delhi, Government of India: Ministry of Health and Family Welfare. Retrieved from <http://www.nacoonline.org/upload/Care%20&%20Treatment/functional%20ART%20centres%20July%202009.pdf>
- PANOS INDIA (2007). *Antiretroviral drugs for all? Obstacles in accessing treatment lessons from India*. Retrieved from <http://www.panossouthasia.org/pdf/Antiretrovirals.pdf>
- Ramchandani, S.R., Mehta, S.H., Saple, D.G., Vaidya, S.B., Pandey, V.P., Vadrevu, R., ... Gupta, A. (2007). Knowledge, attitudes, and practices of antiretroviral therapy among HIV-infected adults attending private and public clinics in India. *AIDS Patient Care and STDs*, 21(2), 129–142.
- Sankaran, J.R. (2006). Current situation of HIV/AIDS in India and our response. *Journal, Indian Academy of Clinical Medicine*, 7(1), 13–15.
- Schneider, H., Blaauw, D., Gilson, L., Chabikuli, N., & Goudge, J. (2006). Health systems and access to antiretroviral drugs for HIV in Southern Africa: Service delivery and human resources challenges. *Reproductive Health Matters*, 14(27), 12–23.
- Steinbrook, R. (2007). HIV in India – a complex epidemic. *New England Journal of Medicine*, 356(11), 1089–1093.
- Torpey, K., Lartey, M., Amenyah, R., Addo, N.A., Obeng-Baah, J., Rahman, Y., ... Colebunders, R. (2009). Initiating antiretroviral treatment in a resource-constrained setting: Does clinical staging effectively identify patients in need? *International Journal of STD & AIDS*, 20(6), 395–398.
- Van Damme, W., & Kegels, G. (2006). Health system strengthening and scaling up antiretroviral therapy: The need for context-specific delivery models: Comment on Schneider et al. *Reproductive Health Matters*, 14(27), 24–26.
- Van Damme, W., Kober, K., & Kegels, G. (2008). Scaling-up antiretroviral treatment in Southern African countries with human resource shortage: How will health systems adapt? *Social Science and Medicine*, 66(10), 2108–2121.