

Establishment of a Public Antiretroviral Treatment Clinic for Adults in Urban Botswana: Lessons Learned

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(See the editorial commentary by Ronald and Sande on pages 162–5)

Countries in sub-Saharan Africa are under significant pressure to open large-scale, public antiretroviral treatment clinics. Many lessons have been learned in Botswana, where the first public antiretroviral treatment clinic in Africa was established. The availability of core, well-trained medical staff will be the primary factor that limits a rapid scale-up of antiretroviral treatment programs.

Because of the World Health Organization's "3 by 5" initiative, developing countries are under mounting pressure to develop comprehensive public antiretroviral treatment programs [1–3]. Convincing preliminary evidence has documented that the rates of response to HAART among individuals in sub-Saharan Africa who are infected with an HIV-1 non-B subtype are comparable to the rates of response to HAART among cohorts in the United States and Europe who are infected with an HIV-1 B subtype [4–16]. Data are lacking, however, regarding the practical issues of establishing antiretroviral treatment clinics in the developing world.

Background. Botswana, a country with one of the highest documented HIV-1 seroprevalence rates, has demonstrated strong political will in mounting a public response to the HIV/AIDS epidemic. Efforts toward HIV education began in 1987, and a program for the prevention of mother-to-child trans-

mission of HIV was initiated in 1999. Voluntary HIV counseling and testing services are available at district health clinics and hospitals, and 16 free-standing centers for voluntary HIV counseling and testing have been established to provide such services to >175,000 clients as of January 2005 [17]. In 2000, the government of Botswana entered the African Comprehensive HIV/AIDS Partnership (ACHAP), a public-private collaboration with The Merck Company Foundation/Merck & Company, and the Bill and Melinda Gates Foundation, to assist in the launching of an antiretroviral treatment program. In 2001, the government of Botswana committed itself to providing free HAART to all qualifying citizens through the national antiretroviral treatment program referred to as "Masa" (*Masa* is a Setswana word that means "new dawn," signifying hope). The present report summarizes the key lessons learned from the establishment of the first large public HAART clinic in Botswana.

Princess Marina Hospital (PMH). PMH is a tertiary referral hospital that serves southern Botswana in the capital city of Gaborone. The wards of PMH consistently operate at nearly twice their intended capacity, and recent data estimate that up to 80% of all admissions to the medical and pediatric wards of PMH are associated with HIV/AIDS. A nursing deficit of 47% has resulted in significant overburdening of the staff, and morale is exceedingly low among the staff of the medical ward, where 20–25 patients are admitted to a single house officer each night, and where 3–5 patients, on average, do not survive until the morning after admission.

Infectious Disease Care Clinic (IDCC). As the number of patients in dire need of HAART significantly increased, space was made available for the creation of the IDCC, a clinic dedicated to the care of adult and pediatric outpatients with HIV/AIDS. Because of the presence of on-site HIV physician specialists and a fully operational laboratory capable of performing HIV-1 ELISAs, toxicity-monitoring chemical analyses, complete blood counts, HIV-1 DNA PCR analysis, plasma HIV-1 RNA quantification, and CD4⁺ cell counts, the government decided to begin a pilot program of antiretroviral treatment that would enable local medical officers to work alongside HIV physician specialists. The pilot program was instrumental in preparing medical officers to deal with rapidly escalating patient demands.

Enrollment of patients into the pilot program lasted 8 months. During that time, local medical officers, nurses, pharmacy staff, and counselors received practical training; patient education tools and materials assessing patient adherence to treatment were made available; and laboratory requisition materials, tracking forms, and clinic-based medical records were

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developed. Treated patients primarily received stavudine and didanosine with either nevirapine or efavirenz, because of the low cost and availability of these drugs.

After the pilot program was completed, the first national site for antiretroviral treatment was opened at the IDCC on 21 January 2002. Because of the huge demand for treatment, the names of patients were placed on waiting lists, and many patients waited for as long as 4–5 months to initiate HAART. One screening clinic that measured CD4⁺ cell counts was initially established using the existing infrastructure within Gaborone. Within the next year, 3 additional screening clinics that measured CD4⁺ cell counts, all of which provided pre-referral care that consisted of disease prophylaxis (with isoniazid and trimethoprim-sulfamethoxazole used for prophylaxis of tuberculosis and *Pneumocystis jiroveci* [formerly “*carinii*”] pneumonia, respectively), primary medical care (i.e., nonantiretroviral therapy), social support, and nutritional services, were opened in Gaborone. Regular communication between the staff at the screening clinics that assessed CD4⁺ cell counts and the staff at the IDCC ensured that patients with CD4⁺ cell counts of <50 cells/mm³ were given top priority for referral.

Challenges and lessons learned regarding space. Limited clinic space presented the first challenge. Initially, space was mainly needed for consultation while these often significantly ill patients underwent screening and initiated HAART. As the numbers of patients rapidly escalated, there soon became a need for adequate space to provide counseling on adherence to treatment. Given the overcrowded hospital conditions, the only available clinic space was an unused isolation ward located on the grounds of the hospital. Initially, 4 consulting rooms, 3 counseling rooms, a waiting room, and an administrative room, as well as secure pharmacy space with a dispensing area, were made available. This facility soon reached its capacity (4000 patients), even as more administrative space and 2–3 more consulting rooms were made available. At present, to accommodate the >10,000 adult patients and 1000 pediatric patients who are receiving longitudinal care, adjacent structures have been added. These structures include an ~6100–m², prefabricated outpatient clinic for adult patients and the state-of-the-art Botswana–Baylor Center of Excellence for pediatric patients.

The next main objective is to decentralize the IDCC by establishing the capacity to provide antiretroviral treatment at existing peripheral city council medical clinics. Decentralization will significantly reduce patient volumes at the IDCC. Peripheral city council medical clinics are in closer geographic proximity to patients, which allows patients to receive comprehensive care at one clinic; this is in contrast to the present system, in which patients receive preventative therapy or treatment for tuberculosis, as well as social services and routine medical care, at peripheral clinics, although they attend the IDCC to

receive HAART. This decentralization project is still in the very early stages of development.

Challenges and lessons learned regarding staffing. Initially, hospital administrators sought to rotate medical officers from the inpatient medical wards to the clinic, so that each medical officer would be responsible for providing 1–2 half-days of outpatient care per week. This decision was ultimately modified to allow for the creation of a core team of HIV physician specialists dedicated to providing care for outpatients with HIV infection. These HIV physician specialists are critical to program success because they (1) allow for continuity and consistency of care for large numbers of patients, and (2) are dedicated to intensively training other “junior” medical officers as care providers for patients with HIV infection, thus ensuring the sustainability of the program. The concept of a core team may have initially restricted the numbers of medical officers involved with providing antiretroviral treatment, but this dedicated core team has subsequently been integral to training medical officers during the rollout of the national program.

The directorship of the clinic has been fully transferred from expatriate HIV physician specialists to fully trained local Botswana HIV physician specialists. The initial core team consisted of 4–5 full-time physicians and 8–10 nurses. These nurses are presently paired with medical officers and focus primarily on adherence counseling, education, translation, and problem identification. These experienced nurses can and should play a

Table 1. Theoretical and practical training required of all staff involved in the care of patients receiving treatment with HAART.

Theoretical training topics	
	HIV virology/pathophysiology
	Laboratory diagnostics
	National antiretroviral treatment program
	Antiretroviral toxicity
	Opportunistic infections
	Prevention of mother-to-child transmission of HIV
	Postexposure prophylaxis
	Concepts of pediatric HIV infection
	Antiretroviral dosing
	Drug resistance
	Adherence
Practical (“hands-on”) training of medical officers who have completed the KITSO theoretical training course, by stage	
	Shadowing involves trainees following a preceptor during patient visits (minimum number of visits, 30)
	Clinical mentorship involves trainees conducting patient visits under direct supervision (minimum number of new visits, 10; minimum number of follow-up visits, 20)
	Independent patient consultation involves trainees conducting patient visits independently and presenting complicated cases to the preceptor (the criteria for presentation and numbers of patients are at the discretion of the preceptor)
	Evaluation and certification

key role in caring for stable patients who are receiving anti-retroviral therapy; the role of nurses is especially important in this region with preexisting shortages of medical officers. Allowing antiretroviral treatment clinics to be primarily run by nurses would significantly enhance the capacity of such clinics, because nurses could care for the majority of patients with minimal supervision.

At first, the concept of a core team was met with criticism, because all hospital-based medical officers wanted to take part in this new program. Administrative staff addressed this issue by having core teams assigned to the IDCC on a rotational basis; to ensure that training was adequate, the teams were to serve for at least 6–9 months.

Challenges and lessons learned regarding training. All staff involved in the care of patients receiving treatment with HAART, including physicians, nurses, counselors, and pharmacy staff, were required to receive standardized theoretical training. KITSO theoretical training consists of a 12-lecture series that includes presentations and case-based learning supplemented by relevant scientific articles and a CD-ROM that provides additional reading (table 1).

Medical officers at all antiretroviral treatment sites participating in the national program receive on-site supportive training that is led by mentors who are called “preceptors.” Medical officers at the IDCC were paired with HIV experts from the Botswana–Harvard School of Public Health AIDS Initiative Partnership for HIV Research and Education, the World Health Organization, and the ACHAP, to receive intensive practical training. Within 1 month of initiation of training, the medical officers were able to work independently, with ongoing support provided via the preceptorship program that was established in the clinic (table 1).

Conclusions. The availability of a core team of well-trained medical staff continues to be the main challenge to providing sustainable antiretroviral therapy in this urban Botswana antiretroviral treatment clinic. In the program reported here, the lack of adequate clinic space was a significant initial constraint that was overcome either through the construction of new clinics by public-private partnerships or by government purchase of prefabricated structures. In addition, given that patient survival depends on the experience of the patients’ physicians in treating HIV-infected persons [18], preceptorship programs and continuous medical education deserve continued attention. Experienced nurses should also play a significant role as primary caregivers; however, this will require time and flexibility in a system that is rigid in terms of structure, responsibilities, and salary scales.

In Botswana, many lessons have been learned that are relevant for others who are contemplating similar initiatives. Despite many difficulties, we have witnessed the exceptional effectiveness of HAART, even among individuals with very

advanced disease [14, 15]. The political will and foresight of the government of Botswana are definitely worthy of praise and imitation throughout sub-Saharan Africa. The many committed governmental and external funding bodies, however, must act together decisively to hire urgently needed health professionals and to circumvent the bureaucracy that hampers more-rapid expansion of this program. This concerted effort will enable Botswana and other countries to successfully provide antiretroviral therapy to the public on a large-scale basis and curb the AIDS epidemic that threatens the lives and endangers the future of so many individuals in this region of the world.

Availability of training materials. All KITSO AIDS training program materials used for the theoretical and practical training of health professionals in Botswana who are providing antiretroviral medications are available on written request. Please address these requests to Christine Bussmann or KITSO AIDS Program Coordinators, Botswana–Harvard School of Public Health AIDS Initiative Partnership for HIV Research and Education, Gaborone, Botswana (e-mail: cbussmann@bhp.org.bw).

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