CORE

Tuberculosis/HIV Case Study

Integrating TB and HIV Care in Mozambique: Lessons from an HIV Clinic in Beira

September 2005

Health Alliance International

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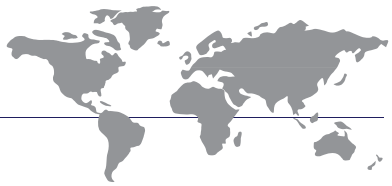

Health Alliance International

Health Alliance International (HAI) is a non-profit, 501(c)(3) nongovernmental organization associated with the University of Washington School of Public Health and Community Medicine. The mission of HAI is to improve the health and welfare of disenfranchised peoples worldwide and work toward more equitable delivery of health services. HAI's country programs focus on support to sustainable local institutions, primarily Ministries of Health. Dedication to putting the needs and priorities of the official health system first, and the belief that health systems should be the best advocate for its citizens, makes HAI unique among nongovernmental groups.

The **CORE Group**, a membership association of international nongovernmental organizations, promotes and improves the health and well being of children and women in developing countries through collaborative NGO action and learning. Collectively, its member organizations work in more than 140 countries, supporting health and development programs.

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Acronyms

AFB	acid fast bacilli
DOTS	directly observed treatment, short course
HAART	highly active antiretroviral treatment
HAI	Health Alliance International
IHN	Integrated Health Network
MHC	Mozambican Health Committee
MOH	Ministry of Health
NGO	nongovernmental organization
OI	opportunistic infections
PLWHA	people living with HIV/AIDS
TB	tuberculosis
VCT	voluntary counseling and testing

Background

Health Alliance International

Health Alliance International (HAI) is a United States-based nongovernmental organization (NGO) affiliated with the University of Washington in Seattle. HAI has a unique history as an NGO that has shaped its philosophy of service around the world. In 1987, a group of Seattle doctors and nurses committed to social justice and equity in access to health care formed the Mozambican Health Committee (MHC) to support the struggling, newly independent people of Mozambique. At that time, Mozambique was embroiled in a brutal "civil war," externally funded by the apartheid regimes of South Africa and Rhodesia (now Zimbabwe) against the progressive government of Mozambique. The government was committed to providing access to primary health care, despite limited human resources as a result of previous Portuguese colonial policies. The early work of the MHC (which later became HAI) focused on building the capacity for health service delivery by placing doctors and nurses in far-flung districts to support the emerging Mozambican health system.

Dr. Stephen Gloyd, the founder and executive director of the MHC, was one such doctor who spent more than four years in rural areas as a district medical officer working alongside Mozambican clinicians. Based on this extensive experience in the field, it became evident that the government, specifically the Ministry of Health (MOH), was committed to its citizens over the long term. This observation served to shape much of the organization's goal of supporting Mozambique's public sector efforts to improve health care access and quality for all its citizens. For HAI, it became clear that the most sustainable way to improve health outcomes was to focus its support on the MOH's efforts to carry out its objectives and develop the necessary infrastructure to achieve its goals.

HAI later expanded its country activities to include projects in Sierra Leone, Ghana, and Nepal. Recent activities in Timor-Leste (formerly East Timor), where a new grant supports HAI's work with the MOH, follow the same model of integration with public sector efforts developed in Mozambique. In Timor-Leste, HAI staff function as the chief advisory group to the Timorese MOH in its efforts to develop quality maternal and newborn care services.

The extent to which HAI's priorities in country programs are guided by Ministries of Health is unusual among NGOs. HAI personnel often work as invisible partners in providing technical assistance to the Ministries it supports. Dedication to addressing the needs and priorities identified by public sector health systems, and believing that such health systems are the best and most continuous advocates for its citizens, makes HAI unique among nongovernmental groups.

In Mozambique, HAI has been working closely with the MOH for more than 15 years to support the development and implementation of MOH programs in reproductive health, the response to HIV/AIDS, and malaria control. HAI is active primarily in the central provinces of Manica and Sofala, where the HIV seroprevalence among adults 15–49 years of age is the highest in the country (Sofala 26.5% and Manica 19.0%). In both of these provinces, HAI works with the MOH to implement the nationally designed model of HIV care (the Integrated Health Network, or IHN, see below), and has supported the implementation of voluntary counseling and testing (VCT) centers, prevention of mother-to-child transmission of HIV (PMTCT) programs, and HIV treatment centers integrated into this public sector model of care.

The city of Beira, in Sofala province, is the second largest in Mozambique (estimated population 500,000) and the site of the first HAI-supported HIV care network to include all components of the MOH's model. The treatment center, or Day Hospital, opened in February 2003 and has been active in the diagnosis and treatment of opportunistic infections and in providing highly active anti-retroviral therapy (HAART). The clinic is located within the MOH's Beira Central Hospital and is fully integrated into the MOH system of care. It is staffed and managed by MOH personnel and follows MOH treatment algorithms. HAI's support to the Beira Day Hospital has included funding for rehabilitation and equipment, trainings, and ongoing technical assistance. A full-time on-site clinical advisor assists with care of opportunistic infections (OI) and HAART, and the integration of care at the Day Hospital with other sites in the IHN.

The city of Beira, in central Sofala province, is the second largest in Mozambique, with an estimated population of 500,000.

Tuberculosis and HIV/AIDS in Mozambique

Mozambique ranks among the top ten nations in the world in terms of the number of people living with HIV/AIDS, with an estimated 1,300,000 people infected with HIV in 2003.[1] The overall estimated sero-prevalence of HIV among adults aged 15–29 years was estimated at 12%,[2] with the central region being the most affected area in the country with an estimated sero-prevalence of 17%. Sofala Province, in central Mozambique, has the highest sero-prevalence of any province at 27%, with some prenatal care sites in Beira city (Sofala's largest city and provincial capital) registering HIV-positive rates as high as 35%.

Mozambique also ranks among the 20 highest tuberculosis (TB) burden countries in the world, with an estimated 81,000 cases and an incidence rate of 436 per 100,000 people in 2002.[3] The incidence of TB has been steadily growing over the last 10 years largely due to the high prevalence of HIV; an estimated 47% of adult TB cases are estimated to be HIV-positive.[3] In 2003 and 2004 in Beira city, approximately 3,200 new cases of TB were registered per year, which corresponds to an incidence rate of 566 per 100,000 people.

The pathophysiological links between TB and HIV are well recognized, as co-infection with HIV significantly increases the chance of developing active TB.[1] In sub-Saharan Africa, TB is felt to be the most commonly diagnosed opportunistic infection, and it is also the most frequent cause of death among those infected with HIV.[4] The immune stimulation caused by TB may also increase the HIV viral load, rate of HIV disease progression, and mortality, particularly among those with higher CD4 counts.[4–7] Because of the large number of patients with both TB and HIV, the World Health Organization (WHO) has encouraged efforts to increase the linkages between TB and HIV programs in sub-Saharan Africa. These linkages could facilitate quick and efficient diagnosis of dual TB-HIV infection, provide beneficial interventions such as prophylactic cotrimoxazole that could reduce mortality among dually infected HIV-TB patients,[8,9] and coordinate the complex treatment issues that may arise with concomitant administration of TB treatment and HAART, where available.

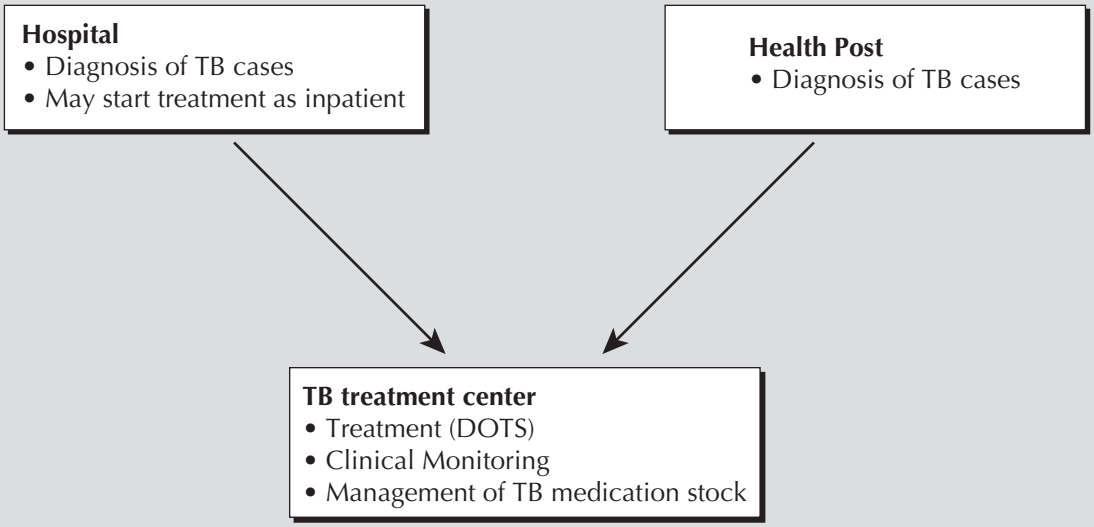
This paper describes one strategy of integrating TB and HIV care during the development of a new MOH HIV treatment center in Beira city, Mozambique.

Mozambique Health System Response to Tuberculosis and HIV/AIDS

Since 1997, TB treatment in Mozambique has been under the direction of the National TB Control Program. The Mozambican TB care model includes the diagnosis of TB at health facilities through clinical evaluations, acid fast bacilli (AFB) sputum-smear testing and chest X-ray, and referral of diagnosed cases to identified health centers with the capacity to start and monitor treatment (see Figure 1). Mozambique adopted the WHO-recommended strategy of directly observed treatment, short course (DOTS) for treatment of TB, using a standard eight-month, WHO-recommended TB treatment regimen that includes two months of isoniazid, rifampin, pyrazidamide, and ethambutol, followed by six months of isoniazid and ethambutol (2HRZE + 6HE). Treatment is under directly observed therapy during the first two months. In 2001, all of approximately 14,000 officially notified new smear-

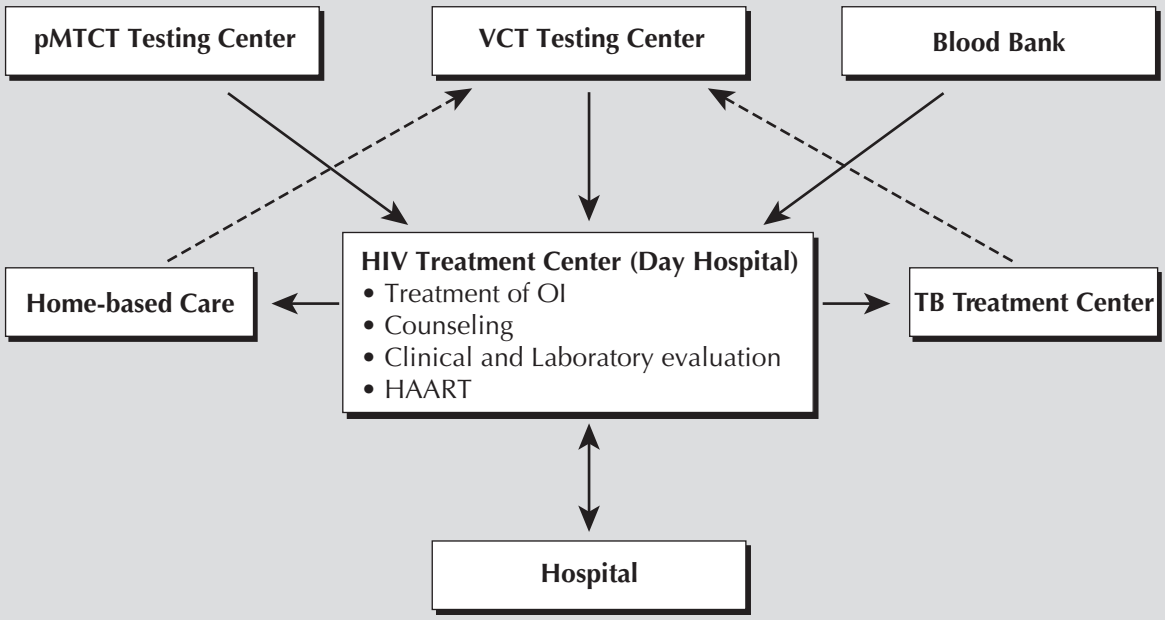
positive TB cases were treated through DOTS, and the treatment cure (75%) and success (77%) rates rank favorably compared with other high-burden African countries.

Figure 1. TB Care Model in Mozambique



Over the past three years, Mozambique's MOH expanded care and support for persons living with HIV/AIDS (PLWHA). The HIV care model is centered on the model of an IHN. At the heart of each IHN is a "Day Hospital", an HIV clinic that provides specialized diagnostic, treatment, and social services for PLWHAs (see Figure 2). The Day Hospital links with other structures as sites of HIV testing and "entry" into the network, including with VCT centers, PMTCT programs, inpatient services, and blood banks. The hospital and other structures, such as TB services and home-based care, serve as sites for referral. Through June 2004, HAART was only available through pilot projects, and activities at the Day Hospitals focused on the management of OIs and the provision of cotrimoxazole prophylaxis. However, in June 2004 access to HAART was extended to all through the MOH national expansion program, funded by the President's Emergency Plan for HIV/AIDS Relief (PEPFAR) (U.S.), the World Bank, the Global Fund to Fight AIDS, Tuberculosis and Malaria, and the Clinton Foundation HIV/AIDS Initiative.

Figure 2. Integrated HIV/AIDS Health Network in Mozambique

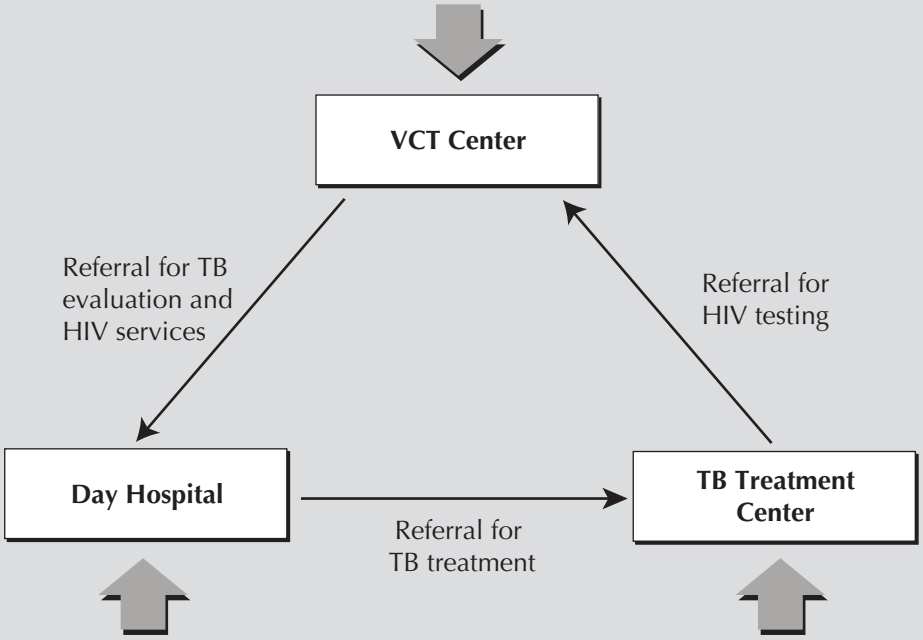


In many ways, the IHN approach to HIV/AIDS care in Mozambique is modeled on the TB control program. In both systems, patients are predominantly diagnosed with the primary illness (TB or HIV) at peripheral sites, and then referred for treatment to a central location. This approach facilitates the control of quality at the centralized location, and also allows the presence of a well-defined and specialized care team whose goal is to follow patients through a long-term or chronic course of treatment. The similarities in treatments between these two illnesses lend themselves to a centralized care approach: both require an organized system of care and high levels of patient adherence to medication over a long period of time, to improve clinical outcomes and avoid the development of resistance. In both, treatment can be complicated and adherence may be compromised by side effects to medication, lack of understanding, and loss of motivation due to clinical improvement. In this context, similar centralized care models for both TB and HIV may facilitate the presence of a "care team" specially trained to handle side effects, provide counseling on adherence, and apply specific strategies to monitor therapy and ensure adherence (i.e. DOTS).

Integration Strategy

Because of the clear and strong epidemiological link between HIV and TB, and the observation that TB is the most common cause of death among HIV patients in Africa, the management of TB was viewed as particularly important in the Beira IHN. The components involved with TB and HIV evaluation and treatment included the VCT centers for HIV testing, the TB centers for TB treatment, and the Day Hospital for TB diagnosis and HIV treatment (see Figure 3).

Figure 3. Existing Strategy for the Integration of TB-HIV Services



TB Treatment at Day Hospitals

As the largest HIV outpatient clinic in Beira, where all enrolled adults are HIV-positive and therefore at a very high risk of developing and dying from active TB, designing interventions to address the burden of TB was seen as an opportunity to reduce the morbidity and mortality among HIV-positive patients, even before the arrival of expanded access to HAART. At the time of opening in February 2003, the MOH had not yet widely articulated or implemented an approach for the treatment of latent TB infection (a stage in which patients infected with the TB organism have not yet developed symptoms) within HIV treatment centers. For this reason, the Day Hospital

focused on aggressive diagnosis and treatment of active cases of TB. Intensive training included a focus on the diagnosis of active TB in an HIV-positive population where AFB sputum positivity and typical cavitary lesions on chest X-ray may be less common.

As an MOH facility, the Day Hospital adopted the standard MOH TB control protocols in regards to diagnosis and referral, which is primarily focused on the identification of cases of active TB. Patients are evaluated for symptoms during Day Hospital visits, and in suspected cases of TB, patients are referred to either a medical officer or doctor at the Day Hospital for further evaluation. A variety of exams may be utilized for TB diagnosis, including sputum for AFB smear, chest X-ray, lymph node biopsy, and abdominal ultrasonography, all performed at on-site facilities in the Beira Central Hospital. Patients diagnosed with TB are sent to local health posts to start TB treatment using standard MOH referral forms and treatment algorithms. All clinical evaluations and treatment are free, although there is a nominal sliding-scale fee for certain laboratory tests (i.e. X-ray, biopsy, and ultrasonography).

HIV Testing and Referral at TB Sites

Because the prevalence of HIV among TB patients in Mozambique is almost 50%, HIV testing of TB patients can be seen as an efficient method to identify HIV-positive patients, and particularly those who can benefit from specific interventions such as cotrimoxazole prophylaxis and HAART. Recognizing this issue, in 2003 the Mozambican MOH defined the policy of recommending HIV testing for all patients in treatment for TB. During this period of time, the process of HIV testing in Mozambique was confined, following MOH norms, to specific centers where the training of the counselors could be assured and the quality of counseling controlled. For this reason, the strategy for HIV testing among TB patients was through referral to local VCT centers, rather than performing the counseling and testing on site. This strategy was also felt to be the most rational in the context of the significant human resource constraints existing in Mozambique, and allowed TB staff to maintain their focus on TB treatment, rather than on the time-consuming and delicate process of HIV testing.

TB Screening and Referral at VCT Sites

The main responsibility of VCT centers is to provide counseling regarding HIV prevention and the benefits and risks of HIV testing, voluntarily test patients for HIV, and refer patients to appropriate services after testing. Referral sites included local home-based care groups, local HIV support groups, and health posts in the case of physical complaints. While the majority of counselors at VCT centers do not have prior clinical training or experience and are not qualified to evaluate or treat specific physical symptoms that patients testing for HIV may have, others with some clinical experience could suspect TB and refer patients to clinical facilities with the capacity for TB diagnosis. With the opening of the Day Hospital in Beira in February 2003, the counselors at the VCT centers within Beira were instructed to send all patients to the Day Hospital, where more thorough clinical evaluations could be offered and specific HIV-related interventions coordinated.

Monitoring and Evaluation

Monitoring Activities at the Day Hospital

Data systems at the Day Hospital include a computerized database that is used to enter sociodemographic and clinical data on all enrollees at the time of their enrollment and at each subsequent visit. The database is an Access-based program developed on-site, and data are entered and analyzed as an integrated part of regular Day Hospital monitoring activities. Data are captured through abstraction from forms used for regular clinical care, and thus are dependent on degree of documentation by the practicing clinicians. When the Day Hospital opened in February 2003, the forms used for clinical care were developed on site, although these were abandoned in favor of MOH forms when they were introduced in April 2004. Clinical data entered into the computer are aimed at monitoring the frequency of WHO-related diagnoses made during visits, and decision-making regarding key medications such as antiretroviral medications.

Monitoring of TB Treatment

While patients receiving treatment from TB centers often continue to receive HIV-related care at the Day Hospital, the distribution of TB medications and TB-related clinical monitoring is done at the TB treatment center. Detailed TB treatment outcomes, such as cure or treatment completion, are monitored by the National TB Control Program and not captured in the Day Hospital data system. At the TB treatment centers, all patients are followed in DOTS for two months, at which time they receive their medications at monthly intervals from the TB treatment center. Sputum smears are done after the intensive phase of treatment and at the completion of treatment (i.e. at two months and eight months for new smear-positive pulmonary TB cases). Patients are given a TB card documenting the date of starting treatment,

follow-up smear times and results, and regimen changes. Clinic-level treatment outcomes are monitored by the TB treatment center through the use of TB registers, and statistics are complied monthly.

Analyses of data

For this analysis, we used the Beira Day Hospital database to identify those patients as having "active TB", defined as either (1) being in treatment for TB at the time of presentation, or (2) being diagnosed with TB after enrolling for care. Those with a past history of TB no longer in treatment were not categorized as having active TB. In order to minimize errors due to chart documentation and data capture, we included only clinical visits through the end of March 2004, when the clinical forms in the Day Hospital were replaced by the new MOH forms. Additional clinical information, such as initial AFB smear results, was obtained from further chart review and abstraction. Certain outcome indicators, such as death or clinical improvement, were recorded in the charts and database, although since no formal death registry was available, the reasons for loss to follow-up are considered to be unreliable and the mortality rates underestimated.

We also used Mozambican MOH TB reports to define the volume of TB diagnoses and treatment recorded by the TB treatment centers in the city of Beira. We selected the TB treatment sites in the same catchments area as the Beira Day Hospital, in order to make estimates of the number of active TB cases also followed at the Beira Day Hospital during the same time period, during 2003 and early 2004.

Results

From the opening of the Beira Day Hospital in February 2003 through the end of March 2004, a total of 2,286 HIV-positive adults aged ≥ 15 years were enrolled into care, for a total follow-up time of 1,246 patient-years. Approximately 60% (1,381) of adult enrollees were female, and the average age was 31 (SD 9.8, range 15–68). 1,755 patients had clinical visits documenting their clinical WHO stage of illness during their initial three months of follow-up at the Day Hospital, and approximately 70% of these patients were in the early phases of illness (assigned WHO stage 1 or 2).

Active TB was diagnosed in 141 patients, and included 115 cases of pulmonary TB, 18 cases of extrapulmonary TB, and eight cases of both types of TB. 65 (46%) of these cases were diagnosed in women. About 53% of these patients (75) were diagnosed with TB after enrollment, making the rate of TB diagnosis among all patients enrolled at the Day Hospital during the follow-up period of approximately 6,000 cases per 100,000 patient-years.

Of those diagnosed with active pulmonary TB at the Day Hospital and having an AFB smear recorded in the chart (n=50), one-half (25) were AFB smear-negative. At least 34 (24%) patients died during follow-up, although this is likely an underestimation due to the lack of a formal system for reporting and recording deaths; an additional 58 patients (41%) were lost to follow-up, defined as not seen beyond 6 months after their date of enrollment at the Day Hospital. Because of the limited availability of CD4 testing during this time, only 456 of these patients had a CD4 test prior to the end of March 2004. The average initial CD4 of patients with either any TB (average CD4=209, n=43) was lower than those without TB (average CD4=363, n=413; $p = .001$). All patients with TB were referred for treatment to local TB facilities or inpatient services (if admitted), and no problems were reported in the system of referrals or treatment.

During the years of 2003 and 2004, a total of 6,377 patients were registered for TB treatment in Beira, corresponding to an average number of 266 patients registered per month. Thus, during the 14-month follow-up period for this analysis (February 2003 through March 2004), we estimate that 3,724 cases were registered for TB. Assuming that 95% of these patients are adults and that 47% are HIV-positive,[3] the total population of TB-HIV adults registered for TB treatment in Beira is estimated at 1,663 patients. During the same period of time, only 141 patients were followed at the Day Hospital during their treatment for TB, 75 of whom were diagnosed at the Day Hospital, and 66 of whom arrived at the Day Hospital while taking TB treatment started prior to their enrollment.

Conclusion

Integration of TB diagnosis and treatment among HIV-positive patients is critical to help reduce the morbidity and mortality of patients with HIV. Our experience at the Beira Day Hospital exemplifies one strategy to aggressively diagnose and treat TB among an HIV-positive population presenting for care at a newly functioning MOH HIV care clinic. TB treatment through referral to the MOH National TB Program prevents a duplication of services and provides a link to the extensive infrastructure of an already existing system of TB care experienced in DOTS and TB treatment and monitoring.

During the 14-month follow-up period analyzed for this paper, TB was diagnosed at the Day Hospital at a rate of 6,000 cases per 100,000 person-years of follow-up. This number is likely an underestimate of the proportion of enrollees diagnosed during this period of time, since some patients may have been referred for hospitalization prior to a formal diagnosis of TB, or have been diagnosed with TB and started on treatment at health centers outside of the Day Hospital.

Despite an aggressive approach to TB diagnosis and treatment, the mortality rate of TB-HIV patients remained high, likely due in part to the lack of universal access to HAART. The lost-to-follow-up rate was also high, possibly due to unrecorded deaths and the lack of perceived benefits of continued attendance at the HIV clinic. Sustained attention to early diagnosis and treatment of TB among HIV-positive patients, and to effective counseling regarding the benefits of HIV care, is needed to continue to retain TB-HIV

patients in HIV care and effectively reduce their morbidity and mortality in resource-poor settings. Improving access to additional clinical interventions, such as treatment of latent TB infection and HAART, are also urgently needed to realize the full benefits of integrated TB-HIV care.

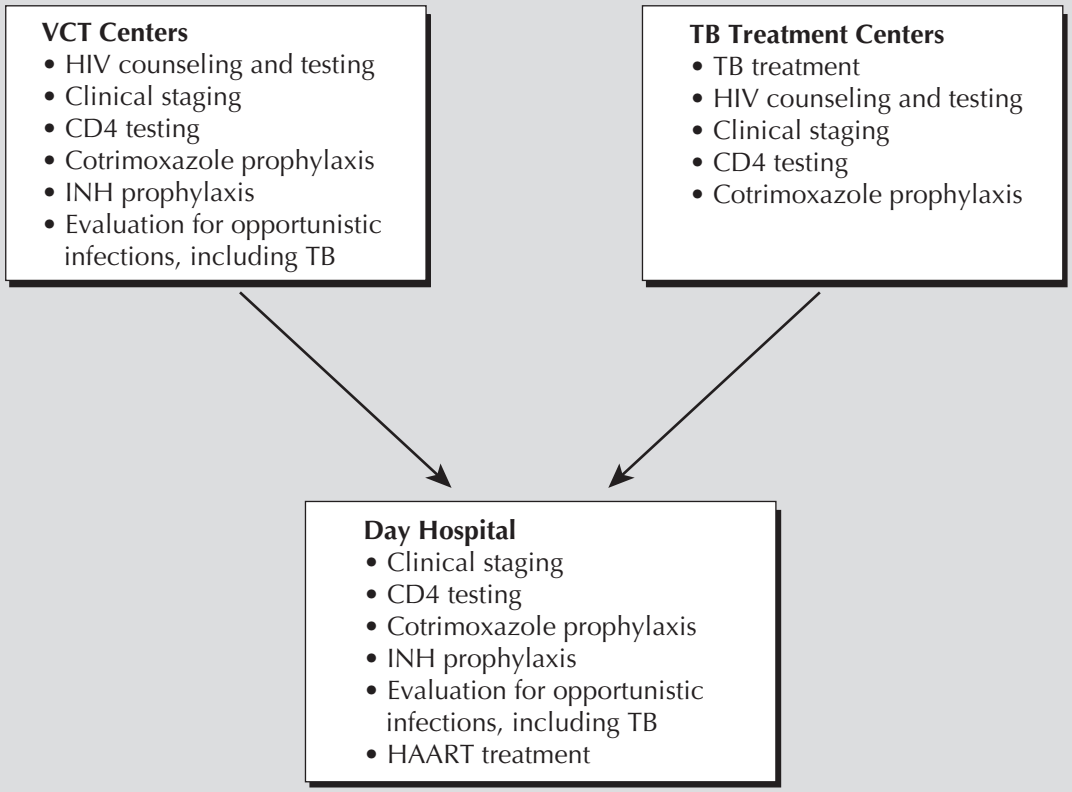
We also note that the number of TB-HIV patients enrolled at the Day Hospital was quite low compared to the estimated number of HIV-positive patients treated for TB at outpatient facilities in Beira during the same follow-up period. This may be because HIV-positive patients enrolled at the Day Hospital are being diagnosed and treated for TB outside of the Day Hospital. However, this likely also indicates either low levels of HIV testing among TB patients treated at TB centers, or the lack of referral of those testing HIV-positive to the Day Hospital, at least while still in TB treatment. Our methods of identifying patients who were in TB treatment at the time that they registered for care at the Day Hospital may not capture all enrollees that were registered for TB treatment during the follow-up period, particularly if they stopped treatment prior to arrival at the Day Hospital. However, the fact that only 66 patients in TB treatment presented for care at the Day Hospital during a period in which an estimated 1,600 people with TB-HIV were identified in Beira city identifies an area where referral activities could be significantly strengthened.

Based on our experiences with TB-HIV integration, it is apparent that new strategies are needed to improve the integration of TB and HIV services to maximize the effectiveness of interventions aimed at reducing the morbidity and mortality of both diseases. In response to this need, HAI is working in coordination with the Mozambican MOH, to pilot a new strategy of TB-HIV integration in Beira city. This new strategy is aimed primarily at improving the utilization of services through integration and decentralization (see Figure 4). For patients being treated for TB, the strategy will seek to improve the identification of HIV-positive patients by offering HIV counseling and testing services on-site at TB centers. For those testing HIV-positive, cotrimoxazole prophylaxis will be initiated and clinical evaluations (including CD4 testing) will be performed and interpreted by TB personnel at the TB treatment centers, in efforts to improve the uptake of these services. For patients needing HAART, referral will be made to the Day Hospital.

Another focus of the new TB-HIV strategy will be to improve the capacity to offer cotrimoxazole prophylaxis, clinical and laboratory assessments for the presence of active TB, and initiation of treatment for latent TB infection following MOH protocols. Patients needing HAART will also be referred to the Day Hospital for further treatment.

While this new strategy maintains some centralization of unique and labor-intensive services to take place in specialized locations—such as DOTS for TB treatment and adherence monitoring for HAART—it decentralizes the implementation of HIV testing to facilitate testing of the high-risk TB population, and also clinical interventions such as cotrimoxazole and INH prophylaxis, that could reduce morbidity and mortality. It is hoped that this strategy will maximize the number of people who will benefit from these public health interventions, particularly in the era of expanded access to antiretroviral medications.

Figure 4. New Strategy for Decentralization and Integration of TB-HIV Services



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