



PERSPECTIVES AND PRACTICE IN ANTIRETROVIRAL TREATMENT

# ACADEMIC INSTITUTIONS LINKING ACCESS TO TREATMENT AND PREVENTION

CASE STUDY



World Health Organization



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### INTRODUCTION

No one questions the gravity of the HIV/AIDS crisis that now faces sub-Saharan Africa, though many have raised questions about Africa's ability to mount a meaningful response. Even the most casual glance at most of Africa's health-care infrastructure, budgets and human resources would offer little confidence that the complex issues surrounding modern antiretroviral therapy can be managed effectively for such a large population of patients. Existing medical facilities are not prepared to support the care needs of large numbers of ambulatory patients, especially when the demands for training and research are superimposed.

In the past, the high cost of antiretrovirals (ARVs) made treatment of impoverished HIV-infected patients beyond reach. HIV programmes understandably targeted prevention and palliative care strategies. However, the continuing decline in the cost of antiretroviral drugs combined with ethical concerns about pursuing prevention alone make it clear that treatment is coming to Africa. Nevertheless, if the promise of treatment is to be achieved, cost-effective systems of care must emerge that are capable of ensuring unparalleled levels of patient adherence. Poorly administered ARVs will have no effect on the course of HIV infection, and will only result in a reservoir of drug-resistant strains of HIV. Therefore, demonstrations of models of comprehensive HIV care that have proven effective in countries like Kenya are of the highest priority.

The epidemiological facts of Kenya alone illustrate the conflict between the burden of HIV/AIDS and the immediate need for a response: Kenya has an estimated 2.5 million people, about 15% of the adult population, with HIV, which ranks it the fourth most-affected country in the world (behind India, Nigeria and South Africa).<sup>(1)</sup> HIV/AIDS has been responsible for Kenyans losing 18 years in life expectancy, from 65 to its current value of 47 years;<sup>(2)</sup> and there are estimates that it claims approximately 700 young lives daily. The transmission of the HIV virus from the mother to her infant (MTCT) is an enormous problem; antenatal HIV infection rates range from 8% to 25% in western Kenya. Currently, about 400 000 HIV-positive people in Kenya urgently need treatment with ARVs.

Moi University Faculty of Health Sciences (MUFHS), located in western Kenya, includes the country's second medical school. The faculty fosters community-based education

and service at a number of urban and rural health centres and at Moi Teaching and Referral Hospital (MTRH), a large urban hospital located in Eldoret. Along with their United States collaborating medical schools, Indiana University School of Medicine and Brown Medical School, MUFHS has established an Academic Model of Prevention and Treatment of HIV/AIDS (AMPATH) that provides community outreach and health education, prevention of mother-to-child transmission of HIV (PMTCT), and treatment of HIV-infected individuals at established clinics at Moi Teaching and Referral Hospital and the affiliated Mosoriot Rural Health Centre (MRHC). The Academic Model of Prevention and Treatment of HIV/AIDS may well be a model of care that can be replicated in countries faced with a similar devastating situation.

### OBJECTIVE

The overriding goal of the Academic Model for the Prevention and Treatment of HIV/AIDS is to establish and assess a working model of both urban and rural comprehensive HIV preventive and treatment services. Representing the unique attributes of academic institutions, AMPATH has structured its patient care programmes to simultaneously serve as a virtual laboratory for HIV-related teaching and research.

The Pilot Phase of AMPATH began in November 2001, with the following major objectives:

- Establish adult and paediatric HIV treatment services simultaneously in an urban (MTRH) and rural (Mosoriot Rural Health Centre) setting.
- Demonstrate cost-effective initial workups, treatment strategies and monitoring of HIV-infected adults and children.
- Develop a fully computerized medical record and data repository.
- Train medical school faculty, clinical officers and nursing staff in providing comprehensive multidisciplinary care of HIV-infected patients.
- Establish an HIV reference laboratory capable of providing CD4 counts, viral loads and DNA polymerase chain reaction (PCR).

The cost of initiating the Pilot Phase of AMPATH was borne largely by private donations from the United States of America. As the Pilot Phase expanded its scope, vital support was provided by grants from the Bill and Melinda Gates Foundation, United States Agency for International Development (USAID), the MTCT-Plus Initiative and PVE, a private family foundation in Canada.

## CLIENTS SERVED

AMPATH is currently one of Kenya's largest public-sector ventures providing comprehensive HIV-prevention and treatment services. As of early February 2004, adult and paediatric teams have followed 2561 patients, and this number is increasing daily. Of all patients enrolled, about 75% have at least some source of funding and approximately half of those with funding are on highly active antiretroviral therapy (HAART). Two thirds of all patients are cared for at MTRH and the remainder at Mosoriot. Because of the open acceptance policy for patients, AMPATH serves a mix of self-pay, MTCT-Plus, AMPATH-Pilot (grant and donation support), employer-supported and those awaiting assignment patients (Box 1). The distribution of patients within these categories is quite different in urban compared to rural settings. According to data from the HIV registration system, self-pay patients make up 39% of patients at MTRH but only 3% in Mosoriot. In contrast, those awaiting assignment in MTRH compared to Mosoriot is 11% and 56% respectively (Figure 1). Patients in greatest need move from "awaiting assignment" to AMPATH-pilot as new funds become available.

## Box 1. Patient categories served at AMPATH sites

**Self-pay:** Patients capable of purchasing their own lab tests and, if necessary, buying their own ARVs.

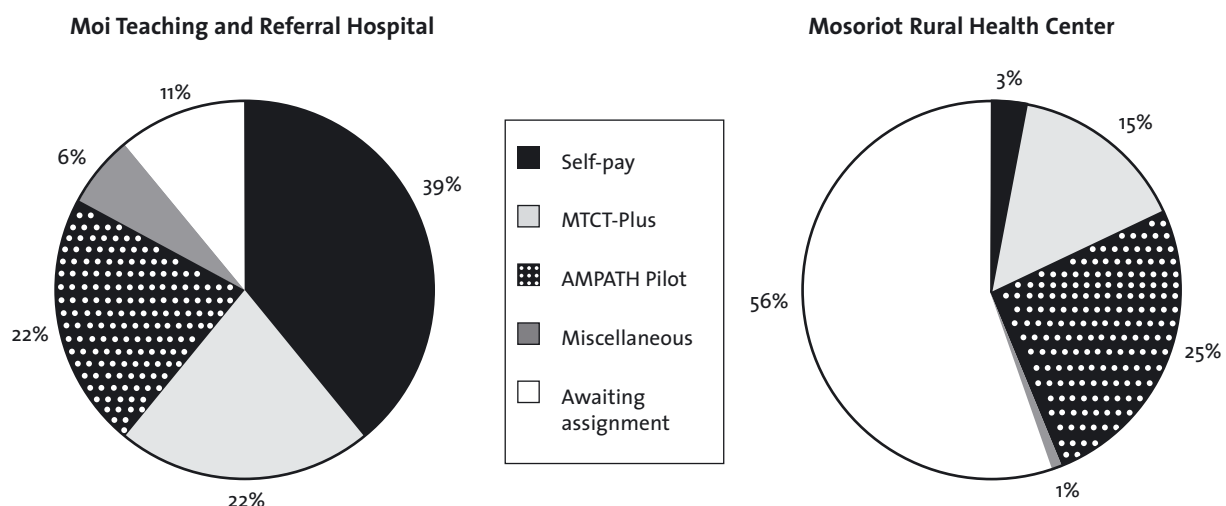
**MTCT-Plus:** HIV-positive pregnant women presenting to the clinics at least once for antenatal care or in labour. They qualify for full care, including all testing and life-long ARVs. This programme covers the mother, the baby, the husband and other members of the immediate family, including co-wives in polygamous families. The grant sets annual limits but it covers about half of all pregnant women attended at AMPATH.

**AMPATH-Pilot:** This represents indigent patients who do not qualify for the MTCT-Plus Programme. The funds come from individual donations, church groups and foundations. This money was hard to find prior to the advent of the scale-up now possible from the President's Emergency Plan For AIDS Relief (US).

**Miscellaneous:** This represents a small group of patients who have employer-support or limited government programmes.

**Awaiting assignment:** These are impoverished patients who present for care from multiple sources. AMPATH performs an inexpensive evaluation (without CD4 count) and supports the patient with opportunistic infection (OI) prophylaxis while waiting for the funding to move them to the AMPATH-pilot group.

Figure 1. The distribution of patients within different categories seen at AMPATH sites varies significantly between urban and rural sites.



## ARV TREATMENT REGIMENS

The antiretroviral treatment of patients is initiated according to World Health Organization (WHO) standard criteria.<sup>(3)</sup> AMPATH uses the nationally recommended initial standard regimen in almost all patients. In the event of contraindications (such as the use of nevirapine while the patient is taking rifampin for treatment of tuberculosis), resistance, or toxicity, a number of other antiretroviral drugs are available as substi-

tutes or as part of secondary regimens (Table 1). Regimens are changed following a detailed protocol; when either clinical or laboratory criteria suggest failure. Due to costs, the decision to change treatment regimens has been based more frequently on falling CD4 -count rather than on expensive viral load tests.

**Table 1. ARVs used for treatment at AMPATH**

Type of regimen	Antiretroviral drugs
Initial standard regimen	nevirapine, stavudine, lamivudine
Second line regimen *	zidovudine, didanosine, lopinavir/ritonavir
Substitute drugs	efavirenz, zidovudine, didanosine, abacavir, nelfinavir, and lopinavir/ritonavir

At start-up of the programme, AMPATH had access only to brand-name drugs but switched to Indian generic drugs (including the 3-in-one pills taken twice daily) as they became available in July 2002. This has resulted in a significant reduction of the monthly patient cost: The first patient cost was approximately US\$ 1000 per month. The cost then dropped to US\$ 75 and now can be as low as US\$ 24 per month for the standard regimen.

## PATIENT SELECTION

From the onset of AMPATH, the decision was made to attempt caring for all patients who seek care in the new HIV clinics in both MTRH and Mosoriot. In most cases, patients come from VCT or PMTCT services, after hospital discharge or because of self referral. In general, care is free except for those patients who are able to pay for it. Patients who have been included in the Pilot or Awaiting Assignment groups have no salary. As incremental increases in funding become available, the Pilot group will be expanded.

Specific grants such as from the MTCT-Plus Initiative have enabled AMPATH to focus on prevention of mother-to-child transmission of HIV, hence on the provision of specialized care to HIV-infected women, their partners, and their children identified in PMTCT. This care includes comprehensive

services as well as access to standardized antiretroviral options when clinically indicated.

Those patients with very low CD4 counts, severe weight loss, and active OIs, in agreement with WHO criteria for initiation of ART, are given priority for ARVs. As of February 2004, there were 2561 patients enrolled in all groups, of whom 1107 have been prescribed antiretroviral drugs.

## LABORATORY MONITORING

For every new patient, a basic medical history is prepared, which further includes a physical examination, a chest X-ray, limited laboratory investigations, including a full hemogram and VDRL,\*\* as well as access to prophylaxis of OIs. A CD4 count and serum alanin transferase (ALT) is added for patients who can pay or if the patient qualifies for a funded AMPATH programme, such as the ongoing MTCT-Plus and Pilot patient group. In the absence of a CD4 count, attention is paid to the absolute lymphocyte count as a general reference to the CD4 count but with full understanding of its limitations.

All patients on ARVs have a repeat haemogram and ALT every three months and CD4 count every six months. Viral loads are expensive and rarely used. HIV DNA PCR is available for children cared for in the MTCT-Plus programme. Patient follow-up is scheduled according to their treatment (Box 2).

\* Second line regimens are complex and may change with donor source and past drug history; zidovudine, didanosine, lopinavir/ritonavir is currently the most commonly used 2<sup>nd</sup> line regimen at AMPATH.

\*\* Venereal Disease Research Laboratory slide test to test for syphilis.

## Box 2. Frequency of follow-up visits

**Patients initiated on ARVs:** bi-weekly for the first several visits, then monthly

**MTCT-Plus patients:** weekly for eight weeks, then monthly

**Patients not on ARVs:** every three months

## THE MULTIDISCIPLINARY TEAM

AMPATH is committed to a multidisciplinary model of HIV care. The physicians are at the centre of a team consisting of clinical officers, nurses, nutritionists, pharmacists and outreach workers (Box 3). A continuous learning process on how better to bring the individual skills to the successful care of large volumes of patients is part of the daily routine of each member of these teams.

## Box 3. Staff needed for taking care of patients—an algorithm for expansion of services

For every 2000 patients, AMPATH requires:

- ▶ 5 clinical officers\* (one for backup, telephone contact, interacting with outreach, and quality management)
- ▶ 4 nurses (2 to manage the clinics and 2 for adherence counselling)
- ▶ 2 nutritionists
- ▶ 4 outreach workers
- ▶ 2 pharmacists
- ▶ 2 outreach drivers

For every 1000 patients one physician is on site one day per week, i.e. 20% of his/her time, but is reachable for the team by mobile at all times. Thus for 2000 patients 2 days of physician time are planned. The physicians will be predominantly internists (caring for adults) with a smaller number of paediatricians, since the majority of infected patients are adults.

\*A clinical officer has four years of training similar to a physician assistant or nurse practitioner

## The key role of clinical officers

Kenya is fortunate to have a long history of training well-rounded clinical officers who are superbly prepared to provide a key role in HIV care. They are well grounded in basic medical knowledge and general practice and comfortable with performing clinical exams and procedures demanded in HIV

care. In the current model, a physician is teamed with a clinical officer. Clinical officers are expected to manage at least 10 visits for every visit provided by a physician. For example, a physician can attend one session per week at a rural health centre but his/her clinical officer remains at the health centre providing daily patient care. While all new patients requiring ARVs are seen jointly by the clinical officer and an internist or paediatrician during their first or second visit, the majority of return visits are managed by the clinical officer. Efforts are being made to schedule complex patients or failing patients to sessions when the physician is in attendance. The physician maintains mobile phone access to the clinical officer for consultation as needed.

While in the case of stable patients joint reviews are undertaken every six to twelve months, there are protocols that define levels of acuity or change (e.g. low blood pressure, falling oxygen saturation, unexplained fever, failing regimens) also demanding a joint visit.

Furthermore, each patient receiving ART is given a mobile number, enabling those with access to a mobile phone to reach an on-call clinical officer or nurse with physician back up during evenings and weekends.

Because of this model and supporting regulations, AMPATH has been able to maintain daily adult and paediatric HIV services with the physician being on site just one-half day per week, for example at the rural Mosoriot site. Hence, scale-up within AMPATH is impossible without the clinical officers carrying the bulk of the clinical load.



A clinical officer consults with a patient.



### Participation of patients

AMPATH has hired some of their HIV-infected patients as a part of the multidisciplinary team. They have proven invaluable in leading outreach into the home, community education and patient support groups. Each outreach worker participates in a comprehensive HIV training course and receives additional training in counselling. The outreach team is supervised by an HIV-positive, former fifth-year medical student who now works full time as the director of outreach. The outreach workers complete detailed locator cards on each patient so that they can be visited in the home as needed. A car and driver is provided. This same outreach group organizes their own support group sessions for HIV-infected patients.

### Training

Over 50 internists, paediatricians, clinical officers, nurses, pharmacists, outreach workers and nutritionists have been formally trained by U.S. collaborating universities and on-site workshops. In addition to the formal training, providers have accumulated many months of mentored experience in treatment and monitoring of AMPATH patients on ARVs and OI prophylaxis.

### ADHERENCE SUPPORT

Before starting antiretroviral treatment, clinical officers or physicians give patients core information regarding the risks (i.e. potential side effects, pill burden and costs if the patient is paying), benefits and adherence issues associated with treatment. New patients and any patient demonstrating adherence problems participate in “adherence classes” that are led by a specially trained nurse. Patients are asked to bring their drugs to every scheduled clinic visit during which the examining clinical officer or physician performs pill counts and makes additional inquiries about adherence. These may be very detailed, addressing issues such as missing a single tablet over the preceding week and vomiting of pills. In order to increase accuracy, this process is repeated at the nurse’s check-out desk, and by the pharmacist dispensing the ARVs. According to staff from AMPATH, “The system has to be near perfect if one is to succeed”.

As part of the admission process to the clinic, patients complete locator cards through which they also give permission for home visits. The outreach team is frequently given a list of patients missing scheduled clinic visits. With the help of the locator cards, the outreach team is able to find the respective patients and visit them in their home. Patients in the MTCT-Plus programme are visited within a day of missing an appointment. Access to scale-up funding will support more frequent and prompt visits to all patients.

### THE OPT-IN OPT-OUT HIV TESTING POLICY

MTRH took the lead in Kenya by writing a new hospital policy that proposes HIV testing for all clients presenting for antenatal care (ANC), unless the client is against being tested (testing done unless patient opts out). When the patient presents to ANC she is informed that MTRH provides HIV testing as a routine part of the antenatal lab work. Counsellors discuss this expectation with the patient and proceed with testing unless the patient refuses (opt out). Soon after the policy was put in place, little if any change was noted in the proportion of ANC clients being tested (ranging from 30% to 60% of ANC visits). However, the cause of the problem was less on the clients’ side (i.e. acceptance of testing) than on the staff’s side (i.e. acceptance and approach to delivery of this service, and delays in getting testing results to the patient). This led to intensive retraining of ANC staff along with onsite rapid testing (immediate patient feedback) and meticulous data-gathering (with twice-weekly feedback for self improvement). The result has been 90-100% HIV testing of all ANC patients at MTRH and, more importantly, nearly 100% success in introducing all HIV-positive women to the adult outpatient clinic long before delivery.

#### Lesson learned from a new policy for HIV-testing at MTRH antenatal care

Patients are ready to accept aggressive policies for HIV testing in the ANC, but little will actually change if the policy is not followed by the day-to-day work necessary to develop staff and a system that refuses to accept less than 100% testing.

### TRANSFORMING PMTCT FROM NEVIRAPINE TO HAART

AMPATH was concerned that single tablet nevirapine (NVP) followed by breastfeeding limited the potential to maximally prevent MTCT in their setting. If done correctly, a single tablet NVP for the mother during labour and a single dose to the baby within 72 hours of delivery reduces HIV transmission by nearly 50%.<sup>(4)</sup> Unfortunately, a significant proportion of the babies spared transmission at birth are subsequently infected from breastfeeding. In addition, actually getting NVP to mother and child at time of delivery is further frustrated by unattended home deliveries or deliveries occurring in other systems. The devastating consequences of failure to interrupt transmission to babies are well known. Moreover, it is a stark contrast to the fact that infected babies have effectively disap-

peared from the developed world. Where infected women are identified before or in pregnancy and have access to appropriate interventions, risk of MTCT is now below 1% to 2%.<sup>(5)</sup>

Given the new capacity to safely administer ARVs and a positive experience with acceptance and safe use of formula feeding, the AMPATH team decided to rethink the PMTCT strategy. They set a goal of limiting MTCT to less than 5% at MTRH and Mosorio, levels seen so far in developed countries. In an effort to reach this goal, AMPATH initiated full HAART therapy in all HIV-positive women starting at the 28<sup>th</sup> week of pregnancy; or if they arrive later than that for their first visit, as quickly as possible. Women who present for the first time less than two weeks before delivery or in active labour are given standard nevirapine PMTCT. If the clinical stage of the mother's HIV infection requires HAART, the drugs are continued indefinitely; otherwise they are stopped during the first week post-delivery.

In order to address the risk of HIV transmission from breast feeding, all mothers are informed of the benefits and the negative implications resulting from it. Those choosing formula are instructed in safe preparation, and AMPATH provides the formula for free.

## IMPACT OF COMPREHENSIVE HIV SERVICES ON THE COMMUNITY

It is difficult to judge community impact in a city like Eldoret. The current size of the pilot patient population is too small to monitor the impact in heavily populated settings. As most urban people in Kenya, the residents continue to identify their ancestral area as home; Eldoret is simply where one goes for work. The city has little sense of community and minimal evidence of a community voice. Perceptions unique to Eldoret will likely be more evident when current construction of the AMPATH Centre of Excellence for HIV care is completed. This will be Kenya's first facility solely dedicated to HIV patient care, teaching and research, and the large patient volumes moving through the facility may enhance the chances of measuring the impact of HIV treatment in an urban setting like Eldoret.

Mosoriot is a completely different story. Community perceptions were evident from the first day the clinic opened in Mosoriot in November 2001. Initially, most of the community around Mosoriot was in denial about HIV. The word 'AIDS' or 'HIV' was never mentioned aloud without the burden of stigma and despair. At start-up, the clinic had to see patients with hypertension or diabetes to gain acceptance. There was no "name" over the clinic door, but soon the

patients began to come. Today the work of the clinic is woven into the very fabric of the Mosoriot community. Since July 2002, over 90 traditional birth attendants (TBAs) have become part of the care team. They have been trained in PMTCT procedures, safety when handling blood products and the importance of patient follow-up in the HIV clinic. TBAs not only assist with PMTCT but represent powerful and informed voices against stigma at the grassroots level.



Traditional birth attendants celebrate their new role

Dozens of *barazas* (community education and mobilization settings performed at the sub-location level) have been held throughout the Mosoriot catchment area in an effort to educate the community and encourage VCT. All chiefs and assistant chiefs participate in many aspects of programme development and may include activities such as:

- picking the TBAs from each sub-location best suited to work with AMPATH;
- choosing the location of food distribution sites in difficult-to-reach locations; and
- setting up and attending barazas.

AMPATH has witnessed the transition from whispered words of stigma when the clinic began, to an outpouring of support for those in their community cared for at the clinic and needing help because of HIV.

Food security is an integral component of comprehensive HIV care. AMPATH began developing a 10-acre farm in November 2002. As of February 2004, the resulting programme, known as HAART and Harvest Initiative (HHI), is capable of producing large volumes of produce, milk, yogurt, eggs, meat and fruit for impoverished HIV-affected patients and their entire family. At the farm, community members regularly turn up in large numbers to meet at *barazas*.



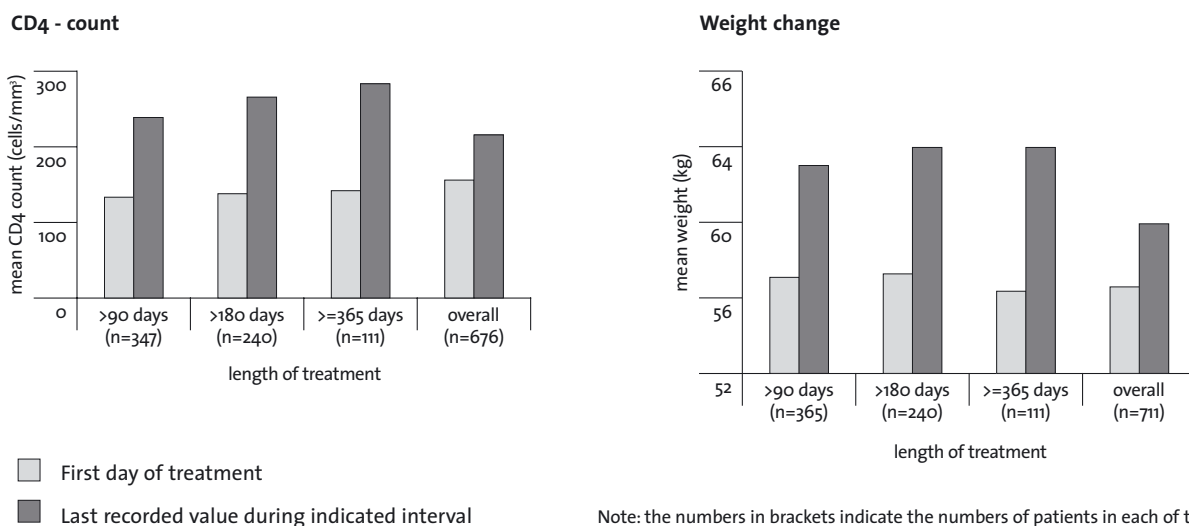
### PRELIMINARY OUTCOMES

#### Analysis of data from patients with more than one visit

Data from the clinical electronic data repository indicate that as of early February 2004, 2561 patients were enrolled at AMPATH. There were 1107 patients on HAART in any of the 3 programmes (MTCT-Plus, AMPATH pilot, self-pay) of whom 714 had at least 2 visits. The analysis is based on these 714 patients and included data on weight (a good indicator of “how the patient is doing”) and CD4 count (an indicator of

immune competency). Data were reported for 3 intervals of treatment (i.e. >90 days, >180 days, >365 days) and for all patients assessed (overall). The analysis illustrates that there was an overall mean increase of weight of about 4 kg and of CD4 cells of 60 cells/mm<sup>3</sup> (Figure 2). Adherence to treatment was found to be almost 100%.

**Figure 2. Data from 714 patients at AMPATH show that HAART has beneficial results at three different treatment time intervals assessed: there has been an increase in the number of CD4 cells and of the patient’s weight**



Side effects of the standard regimen have been infrequent and manageable and were limited mainly to haematologic (bone marrow suppression) and hepatic (liver inflammation) reactions. Although laboratory tests such as blood counts and liver enzyme tests have been performed for further investigation of side effects, interpretation of results (i.e. ascribing an abnormal lab value to the ARV drug) is hampered because of many other reasons why such tests might be abnormal in this population. For example, it has been documented that 80% of the HIV-infected and non-infected men visiting the MTRH and Mosoriot clinics drink enough alcohol to be deemed “hazardous drinkers,” and alcohol shares all of these side-effects, as do many of the other infections that affect these patients. Despite this high rate of hazardous drinking, more than 90% of patients on ARV drugs take all of their pills, according to the assessment of the treating physicians and clinical officers. Decisions to change drugs are clinical decisions that are made patient by patient by the clinicians; of the 714 patients included in the analysis, 57 (8%) have had at least one of their drugs stopped for toxicity.

### MTCT-Plus patients

Current funding by the MTCT-Plus initiative has enabled the outreach team to set up an active outreach/home visit system. The outreach team consists entirely of specially trained HIV-infected persons cared for within AMPATH. Funding limits this vital service solely to MTCT-Plus enrolees, thus more is known at the moment about retention and survival of this cohort of 430 patients (data from HIV registration system). The retention rate at the end of the first year for all MTCT-Plus patients is 94%. Seven MTCT-Plus enrolees have died of whom three were adults and four children. Of the MTCT-Plus patients at MTRH, 48% are on ARVs compared to 40% at Mosoriot. Expansion of outreach funding beyond the bounds of the MTCT-Plus initiative will ultimately enhance adherence for all patients and identify those who have died or who have been lost to follow-up for other reasons.

### IMPORTANT LESSONS LEARNED

- Providing successful HIV treatment services is fundamentally a team effort. Since success with a given individual depends on essentially 100% adherence, far more resources than traditional care are mandatory. Successful adherence is clearly possible but requires access to a well-coordinated multidisciplinary team that is committed to its clients.
- Using ARVs for PMTCT is simple in concept, yet has proven to be a difficult programme to implement. A dedicated staff can provide on-site testing of over

90% of patients and, more importantly, guide patients to state-of-the-art HAART prior to delivery.

- In a land without street names or house numbers, specially designed locator cards must be completed on all clients at the time of initial encounter, to ensure that clients who miss scheduled appointments can be found. Specially trained HIV-infected outreach workers must pursue all missed appointments immediately if it is hoped to lower drop out rates and sustain adherence.
- People living with HIV/AIDS (PLWHA) and currently cared for within AMPATH are capable of establishing a network of successful patient support groups and providing all outreach services.
- Scale-up of urban services is unlikely to have significant impact on rural settings and vice versa. AMPATH will continue to expand its work in rural areas as it continues to enlarge its urban sites.
- Attention must be given to provider morale. Experience in AMPATH suggests that attention to the morale of health-care workers will be critical to successful scale-up of services. At start-up, morale among providers and patients is excellent. The providers feel enormous personal and professional satisfaction as they see hope in the faces of desperate patients and the dramatic positive impact of ARVs. As the volume of patients increases along with the length of time patients have been on ARVs, new pressures emerge. The provider begins to feel the pressure of unending numbers of patients demanding unparalleled levels of productivity and attention to detail. Clinics inevitably extend beyond scheduled hours and maintaining 24/7 telephone access begins to take its toll. These additional patient needs are presented to the exhausted provider who is the sole safety net. If one is not careful, providers face a level of burn out in stark contrast to the early days of exhilaration. Special attention must be paid to patient loads for each provider and the hours they are working. Carefully thought out incentives and other markers of recognition for successful providers are important. In our site, all members of the team have agreed to performance-based incentives to assure that financial gain is tied to client services and the overall success of AMPATH at a time of rapid scale-up.
- It is impossible to overemphasize the importance of the initial antiretroviral regimen. This initial regimen consists of the most cost-effective and most easily tolerated combination of ARVs. Taken properly in treatment-naïve patients one can expect the viral load



to be undetectable and CD4 counts to increase in over 90% of patients. Done casually, the patient will rapidly develop resistance, and the regimen will likely fail. Most systems will not be able to afford the enormous costs of secondary regimens for failing patients, and a growing reservoir of resistant viral strains will begin to be isolated, capable of threatening the most ambitious treatment plans.

- ▶ There is a powerful synergy between simultaneous prevention and treatment programmes. Current prevention efforts in AMPATH have been largely focused on PMTCT, VCT and community meetings. More open discussions of HIV/AIDS are now possible in the Nandi community surrounding the growing ARV programme at Mosoriot. People need hope before they will allow themselves to be tested for an otherwise untreatable, stigmatizing condition. Much remains to be done to leverage greater prevention success in the face of a parallel treatment programme.
- ▶ Food security is an integral component of comprehensive HIV care. In order to feed patients and their families, AMPATH began developing a 10-acre farm in November 2002 dedicated to feeding its patients in greatest need; a local Mosoriot High School donated the land. As of February 2004, the resulting programme, known as HAART and Harvest Initiative (HHI), is capable of producing large volumes of produce, milk, yogurt, eggs, meat and fruit. The HAART and Harvest Initiative provides food to impoverished HIV-affected patients and their entire family. Food is provided to all clients in need, not just those on HAART. The farm has also become a training centre for area farmers and HIV-infected patients preparing to return to farming and eventual food security.
- ▶ MTRH has a catchment area of over 400 000 people; AMPATH will expand the urban patient base at MTRH to 10 000 enrollees.
- ▶ Mosoriot has a catchment area of over 40 000 people; AMPATH will expand the rural patient base at Mosoriot to a maximum of 1500 enrollees.
- ▶ A second health centre at Turbo began in January 2004 and a third rural site at Burnt Forest will be opened. Both of these new sites have catchment areas in excess of 40 000 people. AMPATH will scale each of these new sites to 1500 patients over the ensuing 18 months.
- ▶ Four additional rural sites in western Kenya are to be developed with an additional 15 000 patients; these 8 sites are expected to cover 30 000 patients and will form a network that is built on the same model as AMPATH.

Others activities planned for scaling up AMPATH are to:

- ▶ Pilot an aggressive model of PMTCT and scale up existing MTCT Plus. AMPATH will target a rate of MTCT of <5% at all sites. This will require more aggressive use of ARVs during pregnancy and formula feeding post delivery.
- ▶ Demonstrate the role of nutritional support in the care of HIV-infected families while training these families for food security as they regain their health. The HAART and Harvest Initiative [HHI] will provide a full range of macro-nutrients to families in the Mosoriot catchment area found to need nutritional support. In addition, the farm staff will train our patients in improved farming techniques that will enhance their chances of gaining eventual food security. HHI will be incorporated into each subsequent rural site once its value has been documented.
- ▶ Develop a model programme in micro-enterprise training capable of leading to improved economic security for AMPATH patients. The current ground swell in donor interest and support for HIV care in sub-Saharan Africa must be accompanied by equal enthusiasm for assuring sustainability. With the drop in ARV and monitoring costs, every effort must be made to prepare HIV-infected families to gain some degree of economic security. This is a new, but critical learning area for AMPATH.

### SCALING UP AMPATH

The ground floor of the AMPATH Centre of Excellence now under construction will provide four patient care modules, three for adults and one for children, along with a dedicated pharmacy, lab and VCT. Each patient care module will have four exam rooms along with ample space for counselling, research and teaching. The second floor includes teaching rooms, informatics support space, a reference lab and a series of specialized basic research laboratories.

With the funding AMPATH has been awarded from the United States Government's President's Emergency Plan for AIDS Relief (PEPFAR), the following plans are envisaged for the next four years.

## PERSPECTIVES AND PRACTICE IN ANTIRETROVIRAL TREATMENT

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- ▶ AMPATH has successfully piloted an electronic medical record system that currently supports all patient care at the MTRH and Mosoriot HIV clinics. Next steps include transition to a paperless record, creating web-based access and incorporation of important ancillary services such as a lab and pharmacy. Demonstrating ease of replication in new sites is to be a hallmark of success.
- ▶ Initiate a full range of educational programmes for medical students, post graduate physicians and providers of HIV care. Access to the new Centre of Excellence facility in May 2004 will allow coordination of didactic sessions on the top floor and participation/mentoring in actual ongoing adult and paediatric HIV care on the ground floor.

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