

PERSPECTIVES AND PRACTICE IN ANTIRETROVIRAL TREATMENT

APPROACHES TO THE MANAGEMENT OF HIV/AIDS IN CUBA

CASE STUDY



World Health Organization



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Background

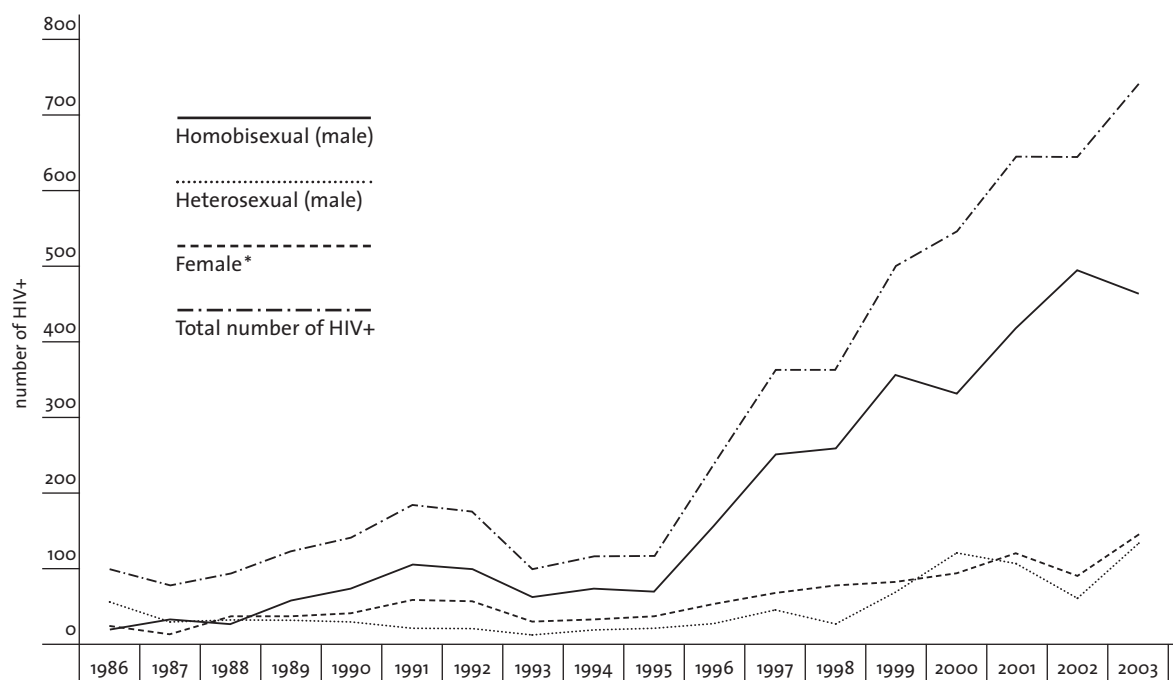
Cuba is one of the few developing countries to provide comprehensive health care for people living with HIV/AIDS. Key to its success has been the political will to act and not wait for external assistance. Their HIV/AIDS programme is based on a comprehensive health care system that has facilitated good control over blood transfusion and blood products as well as prevention of mother-to-child transmission of HIV. Access to antiretroviral drugs has been possible largely through Cuban resources.

The island of Cuba has a population of 11 million inhabitants on approximately 100 000 square kilometres. The infant mortality rate is 6.5 per 100 000 births, and citizens enjoy a life expectancy of about 75 years. A well-developed epidemiological and surveillance system ensures that most infectious diseases are well under control; malaria, lymphatic filariasis, cholera and yellow fever have long been eradicated.

Cuba has the lowest HIV prevalence at 0.05% in the Americas and one of the lowest in the world. It has been reported (Castro 2003; Perez-Avila, Perez-Correa, 2003) that of the 5018 infections that have been recorded from 1986 to September 2003, 79% are among men of whom the vast majority have been infected through sex with other men. With 21% of HIV infections occurring among women, the ratio between male and female HIV-positive people is about 4:1 in Cuba.

Despite early and intensive measures to control the epidemic, there has been an increase in the number of people diagnosed with HIV since 1996 (Figure 1). This can be attributed partly to the economic problems experienced during the period 1992-1995, when Cuba lost most of its strategic economic partners from the former socialist countries. In addition, it has been reported (Hsieh et al., 2001) that the growing number of people tested, and diagnosis in people who have multiple sexual partners, mainly men who have sex with men, have also contributed to this increase. For example, due to the recommendation to test *all* sexual contacts of newly detected cases, Cuba now performs approximately 1.5 to 1.6 million HIV tests each year. As a result of these tests, significantly more homosexuals* are being identified as HIV positive.

Figure 1. Number of HIV-infected people, by year of detection, sex and sexual behaviour, 1986-2002



* Note: no homo-bisexual transmission among females detected

In 1983, in response to the first news on AIDS, the Cuban Government established the National AIDS Commission and introduced an epidemiological surveillance system in each hospital to detect clinical manifestations of AIDS.

The main goals of the National AIDS Commission were to:

- ▶ develop a national HIV-prevention programme for the general population and for specific risk groups;
- ▶ develop a national network of sanatoria to admit all persons detected as HIV positive;
- ▶ conduct epidemiological surveillance and control;
- ▶ lead scientific research and biotechnology production in this area; and
- ▶ make sustainable efforts for the prevention of mother-to-child transmission of HIV, the prevention of HIV-related opportunistic infections; and the prevention of AIDS itself.

At the end of 1985, the first AIDS case was clinically diagnosed in a heterosexual male returning from duty travel abroad. From that time on, the Ministry of Public Health applied classic epidemiological procedures as for any other sexually transmitted infection.

Starting in 1986, sexual contacts of people diagnosed with HIV were enrolled in a Partners Notification Programme and tested for the virus every six months for a period of one year after the last sexual contact with the HIV-infected person (Hsieh et al., 2001). While the tests were performed on a voluntary basis, the results were revealed to the respective authorities. Screening for HIV was progressively expanded from 1987 to include specific groups such as blood donors, pregnant women, and adult patients diagnosed with sexually transmitted infections. Also included in screening were prisoners, army recruits and those who had travelled to areas with high endemicity of infectious tropical diseases since 1975 or who had frequent contacts with foreigners. In addition, people who came forward and requested testing because of their own personal interest or following their physicians' advice were tested in anonymous test centres, with the process of testing remaining confidential.

The AIDS sanatoria

In April 1986, the Cuban Government announced the death from AIDS of the first Cuban citizen as well as the presence of HIV-infection among people in the country. At the same time, a policy ensuring the care of the infected in AIDS sanatoria was introduced. The aim of this policy was to:

- ▶ provide the best medical care to the infected people;

- ▶ understand the natural history of the Cuban epidemic; and
- ▶ contain the spread of the epidemic.

Between 1986 and 1993, HIV-positive persons were cared for exclusively at the 14 sanatoria at various locations in the country (Scheper-Hughes, 1993; Pérez Stable, 1991; Santana, Fass, Wald, 1991; Santana, 1992). These sanatoria are like suburban communities on several acres of land with modern one- and two-story apartment duplexes that are surrounded by lush vegetation and a small garden. In each apartment lived two persons, who could be friends or couples. Medical care was provided by family physicians taking care of the residents. The patients were assessed periodically, and laboratory analysis performed either at the sanatoria, hospitals or the Institute of Tropical Medicine *Pedro Kouri* (IPK). During this period, a group of specialists consisting of public health officials, epidemiologists, psychologists and physicians caring for the sanatoria patients, together with AIDS activists, continuously studied different strategies to improve care for people living with HIV/AIDS (PLWA).

The existence of AIDS sanatoria generated a lively and controversial debate on whether the rights of PLWA were violated by this approach. Nevertheless, in her book *Dying for Growth*, Aviva Chomsky (2000) wrote, "The opinion of United States medical experts who have studied Cuba's AIDS policy is virtually unanimous in arguing that Cuban policies toward AIDS are absolutely consistent with its policies toward other diseases and epidemics and with its health-care system as a whole". In *Pathologies of Power*, Paul Farmer (2003) stated, "No Cuban or international laws were violated by Cuba's Ministry of Public Health when it advanced its controversial AIDS programme" ..

At the end of 1993, following recommendations from the group of specialists, the ambulatory care system was opened for all those who wanted to leave the sanatorium. Currently, an in-patient and ambulatory system is offered to people diagnosed with HIV, but the number of people attending sanatoria has decreased significantly since 1994. As of September 2003, 60% of HIV-positive people were followed in the ambulatory care system, while only 40% remained in the sanatoria.

Those who accept referral to one of the regional sanatoria for the duration of three to six months receive in addition to the necessary medical treatment that has been determined based on the results of their health monitoring, clinical and psychological evaluation and a high-calorie diet. In addition, people attending the sanatorium participate in an eight-week information course (Box 1) and a physical education programme. During this time they are granted their full salary

Box 1. "How to live with HIV"

An eight-week information course tells HIV-infected people about:

- ▶ HIV/AIDS in general
- ▶ progression of the disease
- ▶ safe-sex practices
- ▶ their own rights

tested for all these drugs and they were registered with the Centro para el Control de los Medicamentos, the national regulatory authorities, before being provided to patients. Production of nevirapine (NVP), abacavir (ABC), efavirenz (EFV) and nelfinavir (NFV) is currently being assessed.

Since the introduction of locally produced antiretroviral drugs in 2001, the number of patients who benefit from ART has increased significantly (Figure 2), and 100% HAART coverage was achieved in 2003 (Box 2).

People diagnosed with HIV who opt to continue living at home and receive ambulatory care have to attend a day clinic every day with the same schedule as followed in the sanatoria. To ensure appropriate nutrition, they are entitled to special food rations.

After these first months of close observation either at the sanatorium or in ambulatory care, all HIV-infected people are monitored on an outpatient basis by their family physician.

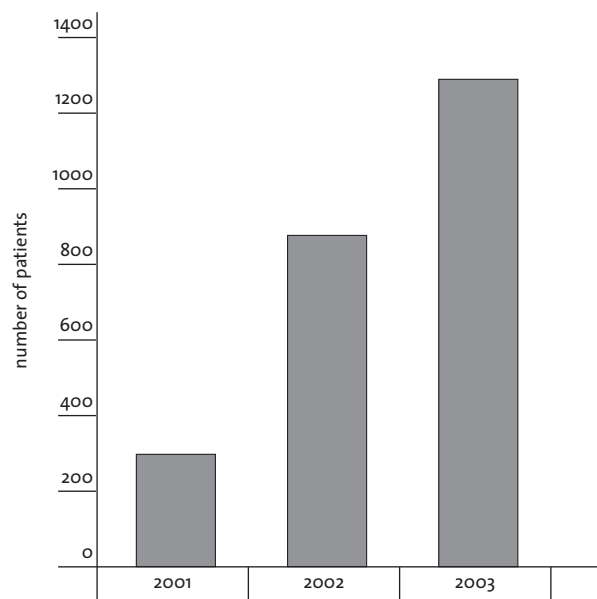
THE ANTIRETROVIRAL TREATMENT (ART) PROGRAMME

History

The use of products that bolster the immune system for all HIV-positive people has been recommended in Cuba since 1986. From 1987, zidovudine (ZDV) was recommended as monotherapy for all those who developed AIDS. In 1996, after the World AIDS Conference and the recommendation of Highly Active Antiretroviral Treatment (HAART) as the treatment of choice, the Ministry of Public Health bought antiretroviral treatment for all children with AIDS and their mothers. Since 1997, HIV-infected pregnant women have been receiving ZDV to prevent mother-to-child transmission of the virus as well as breast milk substitutes (Farmer, 2003; Gonzalez-Nunez, Diaz-Jidy, Perez-Avila, 2000). From 1998 to 2001, 100 AIDS patients were maintained on treatment through donations of antiretrovirals (ARVs).

During the same period, the Government, the National Commission of AIDS, and the Ministry of Public Health explored the possibility of local production of generic antiretroviral drugs. The first drug produced was zidovudine (ZDV) which was followed by the production of lamivudine (3TC), stavudine (D4T), zalcitabine (DDC), didanosine (DDI) and indinavir (IDV). In early 2001, bio-equivalence was

Figure 2. The number of HIV-positive people receiving ART has increased steadily since the production of generic ARVs in Cuba



Source: IPK, 2004

Box 2. Timeline of ARV treatment in Cuba

1987	ZDV monotherapy for AIDS
1996	Government purchase of ZDV, 3TC, SQV (Saquinavir) for HIV-positive women and infants @ US\$ 14 000 ppy ZDV produced on small scale; HAART recommended treatment of choice
Early 2001	ZDV, DDI, D4T, 3TC, DDC, IDV locally produced and treatment indications expanded
April 2001	National Treatment Protocol with generic medications established; roll out of universal HAART begins
2003	100% HAART coverage achieved; NVP, NFV, ABC, EFV production in pipeline

- ▶ ZDV, DDI, IDV
- ▶ D4T, 3TC, IDV
- ▶ D4T, DDI, IDV

These triple combinations are used initially for all patients. However, those who develop tuberculosis during treatment are switched to a dual therapy scheme using two nucleoside reverse transcriptase inhibitors (NRTI), with either nevirapine or nelfinavir as options for second-line treatment. In other patients, second-line treatment possibilities are protease inhibitors, if available.

Criteria to initiate ART

An HIV-infected person will be included in the HAART programme after meeting the following criteria:

- ▶ confirmed diagnosis of HIV (with 2 Elisa + 1 Western blot);
- ▶ CD4 count less than 350 cells per mm³;
- ▶ viral load higher than 55 000 copies per ml; and
- ▶ presence of an opportunistic infection.

Each patient is prescribed one of the four first-line regimens and receives a personal card to collect the ARV drugs at the hospital pharmacy. The physician at the out patient services or at the sanatorium (Box 3) closely monitors the patients. Their clinical histories including the results of continuous monitoring are entered in an electronic database (SIDA/TRAT) that is

Objectives

The ART programme takes advantage of already existing practices, facilities and experiences, and is designed to meet the following objectives:

- ▶ to use existing medical personnel working with HIV/AIDS patients to implement and manage the antiretroviral treatment;
- ▶ to train all physicians working with HIV-positive patients in the use of antiretroviral therapy;
- ▶ to establish a national electronic registry (SIDA/TRAT) that facilitates the monitoring and clinical follow-up;
- ▶ to show that generic drugs produced in Cuba are safe and effective; and
- ▶ to demonstrate that in poor countries HAART can be delivered by harnessing the capacity of the human and technical infrastructure and that barriers to treatment in such settings are not so much a lack of infrastructure but a lack of political will.

Drugs and regimens used

Based on Cuba's production of antiretroviral drugs, first line regimens currently available are:

- ▶ ZDV, 3TC, IDV

Box 2. Checklist for patient monitoring

- ▶ *Every 3 months:* Laboratory tests, including complete blood counts, LDH*, GPT*, GOT*, glucose test, urine analysis, kidney function tests, bilirubin, and CD4 count to assess adverse side effects and the patient's status
- ▶ *Every 6 months, or whenever a drop in the CD4 count is noticed:* Viral load determinations
- ▶ *Every 4-8 weeks:* Patients are seen by their physician and their weight measured; relevant laboratory results are registered in their clinical records

The most sophisticated analyses like viral load and CD4 counts are done at the IPK, while other tests can be performed at the provincial hospital or sanatorium.

* LDH=lactic dihydrogenase; GPT=glutamic pyruvic transaminase; GOT=glutamic oxaloacetic transaminase

centralized at the IPK.

The clinical technical committees supporting the ARV programmes are based at the IPK and the National Technical AIDS Commission. They define guidelines and clinical selection criteria, and determine the treatment scheme for patients starting ART. The selection process is soon to be devolved out to staff at the treatment centres.

Human resources and capacity-building:

The Cuban health care system has three levels through which it provides universal, free and easily accessible health care to all Cuban citizens. This includes primary level care with family physicians, a secondary level care consisting of sanatorium care for HIV and provincial hospitals, and the tertiary level with the research institutes.

Personnel involved in the national protocol for ART are from all levels of the health system. At least four physicians are in charge of ART in each province and they work closely with the team at the IPK. In addition, they are responsible for entering data in the computerized database (SIDA/TRAT). Physicians working at the IPK, the AIDS Sanatorium, provincial and municipality hospitals, as well as family physicians and nurses, prescribe drugs, supervise ARV treatment and follow up patients.

To support the rational use of drugs, the National AIDS Commission, the Ministry of Public Health and the IPK combined their human and financial resources in a country-wide training focusing on ARV therapy, the use of drugs for opportunistic infections as well as logistics and stock management. Training of physicians from all provinces in the country on antiretroviral treatment started at the IPK in 1998 and was conducted by clinicians, epidemiologists, microbiologists, pharmacists, psychologists and nurses.

By early 2001, more than 700 health care workers, a sufficient number to care for the HIV infected in the country, had participated in training courses on the management of HIV/AIDS. The training team at the IPK continues to support further capacity-building of human resources involved in providing care to people living with HIV/AIDS. Likewise, faculty members of all medical institutions in Cuba have been trained to teach HIV/AIDS care in post-graduate medical

courses.

The Ministry of Public Health seeks to ensure that appropriate training materials are developed and that training courses are available for all workers of the health system. Efforts in this area have been quite successful; by September 2003, health workers in each of the more than 169 municipalities in the country had been trained in HIV/AIDS.

Impact

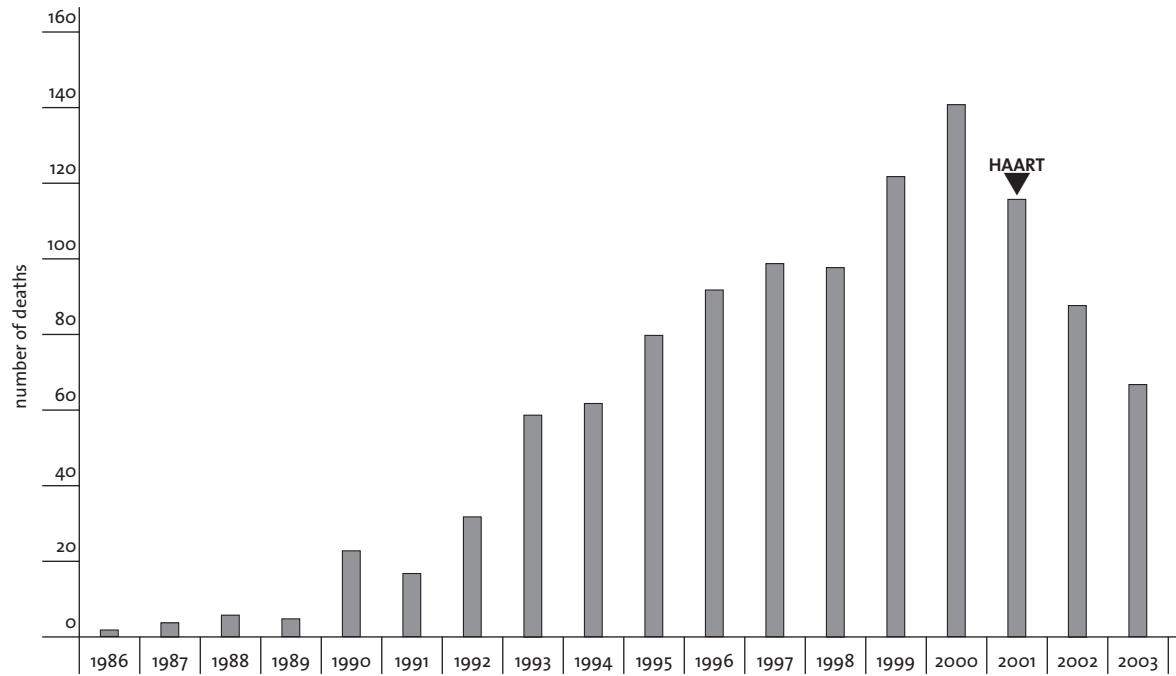
At the end of 2003, a total number of 1292 HIV-positive patients received ART; all but nine who could not tolerate three drugs because of ongoing tuberculosis treatment benefited from HAART.

Since the introduction of HAART in 2001 there has been a decrease in the number of deaths from AIDS and the incidence of opportunistic infections (OIs) related to HIV/AIDS (Figure 3). Since all OIs are treated in the hospital, the reduction in the number of OIs has in turn, resulted in a country-wide drop in hospital admissions; as for the IPK, admissions for opportunistic infections have decreased by almost half (Table 1).

Furthermore, treatment with ARVs showed beneficial effects on survival: from the time people developed AIDS, average survival time for those who did not receive treatment* during 2000-2003 was at 1.2 years while AIDS patients with ARV treatment survived almost four times longer (4 years; $p < 0.001$). Out of the 1292 patients under treatment, only 87, about 7%, died.

* When ART was started, only the most severe cases could be treated because of the limited availability of ARV drugs. In addition, not all patients who qualified for treatment accepted it, and in some cases HIV status was confirmed only after the patient was already deceased.

Figure 3. The number of deaths from AIDS has decreased since the introduction of HAART in Cuba in early 2001



Source: IPK, 2004

Table 1. Opportunistic infections before and after ARV treatment at the IPK

Type of opportunistic infection	Number of infections registered before treatment (January 2000 to June 2001)	Number of infections registered after treatment (July 2001 to December 2002)	Difference in number of infections
Neurotoxoplasmosis	112	74	-38
Candidiasis	107	49	-58
Chronic diarrhoea	105	31	-74
<i>Pneumocystis carinii</i> pneumonia (PCP)	81	27	-54
Mycobacteriosis	76	48	-28
Cryptococcosis	38	14	-24
Cytomegalovirus	21	6	-15
Lymphoma	18	20	+2
Kaposi's sarcoma	18	14	-4
"Slim" disease	17	21	+4
Histoplasmosis	17	7	-10
Rhodococcus equi infection	13	3	-10
TOTAL	623	314	309

Source: IPK Statistics

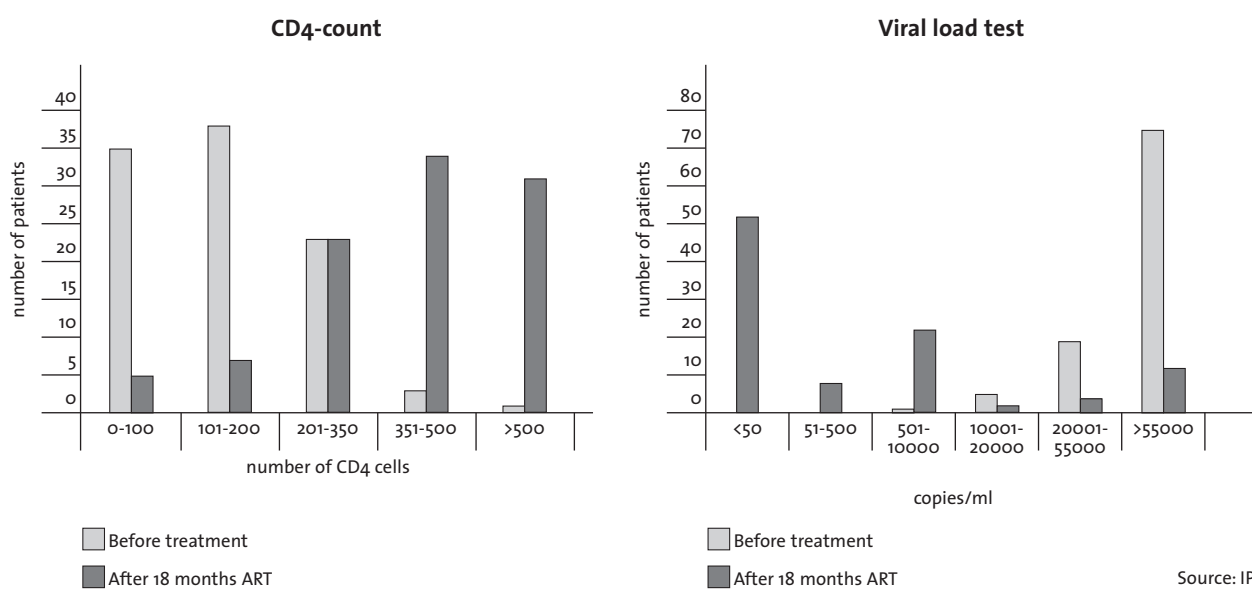
Results after 18 months of treatment

A group of 100 patients on HAART has been followed up with CD4, viral load, and other relevant laboratory parameters. After 18 months of ART, a marked increase of the CD4 count and a decrease of the viral load has been observed (Figure 4). However, adverse reactions to treatment have been recorded for a number of patients, with elevated triglyceride and cholesterol levels and nausea as the most frequently encountered reactions, but none of them leading to serious complications (Table 2). Those patients who present with side effects are regularly evaluated and treatment changed if necessary, depending on the degree and duration (i.e. some of the effects are only transitory) of the reaction.

Table 2. Reported adverse reactions to generic ARVs

Type of reaction	Frequency, in %	Type of reaction	Frequency, in %
Hypertriglyceridemia	37	Anaemia	13
Nausea	31	Elevated indirect bilirubin	13
Hypercholesterolemia	23	Heartburn	10
Abnormal addis count	23	Metallic taste	9
Paresthesias	21	Epigastric pain	9
Lipodystrophy	17	Hypocalcemia	8
Elevated aminotransferase	17	Headache	6
Vomiting	16	Hyperglycemia	4
Hypercalcemia	15	Diarrhoea	4
Paronychia	15	Hair loss	4
Lumbar pain	14	Kidney stone	2
Neutropenia	14	Thrombocytopenia	1

Figure 4. The immunological and virological response of 100 patients after 18 months on ARVs shows the benefits of HAART



Adherence support strategies:

Physicians measure adherence by monitoring viral load and CD4 counts and also by conducting surveys among patients. The results obtained after 18 months of treatment show that most patients adhere well to it. In addition, the decreased mortality, increase of survival time, and the remarkable improvement of the patients' well being have strongly encouraged the AIDS community to adhere to treatment.

Patients on ART exchange their experiences through privately organized meetings, conferences, or gatherings at the outpatient services or AIDS sanatoria. Workshops with HIV/AIDS activists are organized regularly not only to further encourage adherence to treatment but also to address problems affecting the HIV/AIDS community, such as rights issues, news about treatment protocols, prevention and the need for voluntary workers.

For patients with poor adherence, nurses working with the family physician at the community or from the AIDS sanatoria, monitor and support treatment through regular visits either at the community or at the AIDS sanatoria. During these visits, most appropriate ways of taking medication (e.g. with or without food or water, best time schedule, etc.) are

explained to the patients, and intake of medication is checked. In addition to the nurses, community activists and HIV-infected people who are trained in prevention work and supporting others, play an important role in providing counselling and support to those being treated.

DRUG SUPPLY AND MANAGEMENT

In 1996, when the Ministry of Public Health bought drugs (SQV, ZDV, 3TC) to treat HIV-positive children and their mothers, the cost of treatment per person per year was US\$ 14 000. Now, with the production of generic drugs in Cuba, the price varies from 811 to 4388 Cuban pesos (US\$ 31 to US\$ 169) per year (Table 3). These costs are well below that of ARVs in other developing countries, and has been made possible through the Cuban Government's substantial subsidies to treatment.

The price for each CD4 assay is US\$ 15 and about US\$ 88 for the viral load determination. Given their high cost, viral load assays are only performed in patients under treatment or when CD4 counts drop below 350 cells per mm³ or both. All these expenses are borne by the Ministry of Public Health.

Table 3. Price of antiretroviral drugs made available to health facilities in Cuba

ARV Drug	Presentation	Price per unit* in Cuban pesos	Price per pack in Cuban pesos (in US\$)
Lamivudine 150mg (3TC)	Fscos x 60 tab	0.46	27.55 (1.06)
Zidovudine 100mg (ZDV)	Fscos x 100 cáp	0.26	25.94 (1)
Stavudine 40mg (D4T)	Fscos x 60 cáp	0.21	12.90 (0.5)
Indinavir 200mg (IDV)	Fscos x 360 cáp	0.67	240.70 (9.26)
Didanosine 100mg (DDI)	Fscos x 150 tab	0.52	77.97 (3)
Zalcitabine 0.75mg (DDC)	Fscos x 60 tab	0.14	8.29 (0.32)
Nevirapine 200mg (NVP)	Fscos x 60 tab	0.45	27.13 (1)

*Note: Prices in Cuban Pesos (1 USD = 26 Cuban Pesos). Fscos is a Spanish abbreviation for the word Frasco = Bottle

Cuba has recently received a grant from the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM) that will permit purchase of drugs that are not yet produced locally as well as reagents for CD4 count and viral load assays.

The National AIDS Commission and the Ministry of Public Health determine which drugs should be produced. The factory (Novatec Plants) sends the drugs to the IPK, where they are kept in a specially built storage room. Since the central registry of HIV-cases is at the IPK, the distribution of ARV drugs is currently determined there with input from medical specialists working with HIV patients. In the near future however, ARV drugs will be directly distributed by the factory to hospitals and pharmacies through the National Network of Drug Distribution. Distribution is expected every three months based on information on the number of patients and characteristics of individual treatment from the IPK. Drugs acquired with the money granted from the GFATM continue to be stored at and distributed by the IPK. In general, the amount of drugs stored is sufficient to guarantee treatment for 6-12 months.

While the Government and the Ministry of Public Health are in charge of acquiring ARV drugs, the Ministry of Basic Industries carries the responsibility for producing generic drugs. In several of these processes, the HIV/AIDS community, in particular people living with HIV/AIDS, are involved. For example, they participate in the National AIDS Commission where they provide ideas and criteria for implementing strategies for treating AIDS. Also, their contribution to the Ethical Commission is valuable for the approval of therapeutic protocols for ARVs.

ACCREDITATION AND QUALITY ASSURANCE

Since the beginning of the epidemic, the Ministry of Public Health and the National AIDS Commission have taken steps to ensure the quality of clinical services offered in each provincial hospital, at the AIDS sanatorium and the IPK. A commission from the offices of the Department of Hygiene and Epidemiology regularly visits all facilities to ensure the quality of services in the HIV Treatment Network.

The National HIV Treatment Network includes one AIDS sanatorium in each of the 14 provinces, 14 provincial and 52 municipal hospitals, the hospital at the IPK and the family physician clinics. Each family physician attends about 150-200 families from the community. Criteria have been established that qualify a health facility for participation in the network (Box 3).

Box 3. Criteria for inclusion of health facilities in the National HIV Network

- ▶ Setting and achieving targets for comprehensive health-care services as outlined in the health package
- ▶ Existence of a basic physical structure (space for HIV counselling and testing, clinical assessment, drug storage, and laboratory)
- ▶ Availability of personnel with experience in HIV/AIDS management
- ▶ Ability to ensure the provision of follow-up care and support for families of people living with HIV/AIDS and their communities.

OTHER PROGRAMME BENEFITS

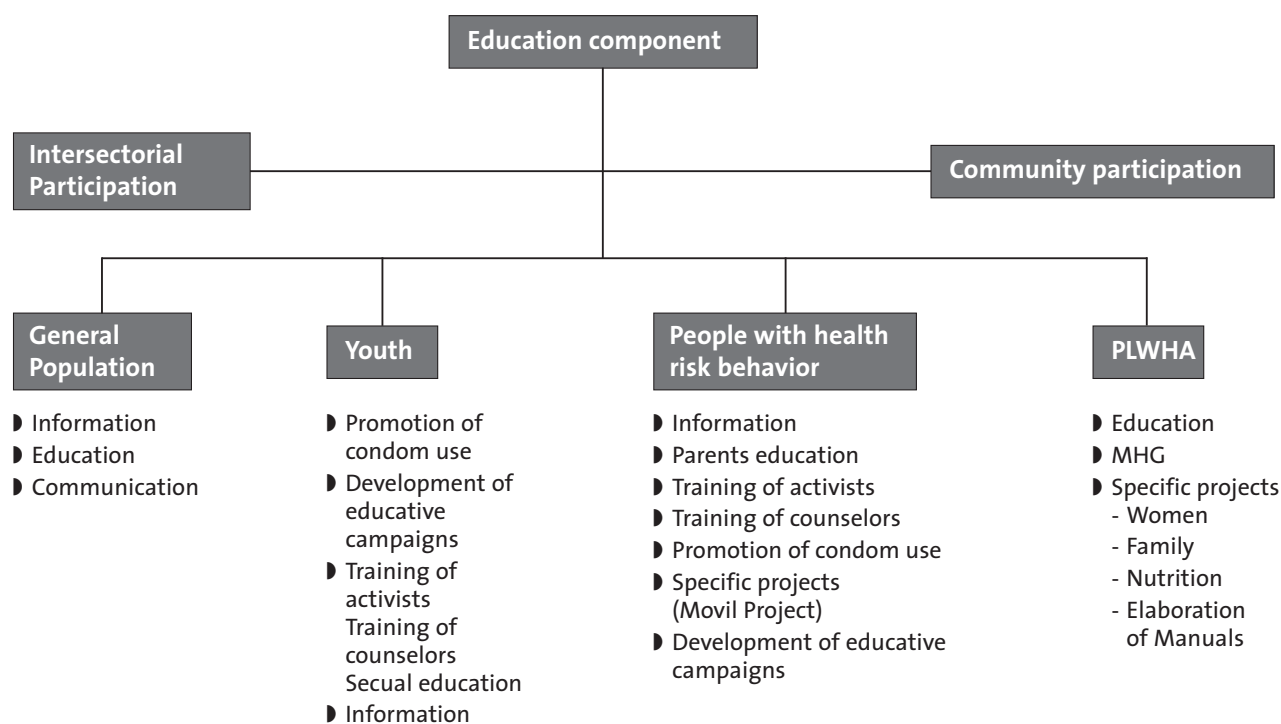
Prevention versus care: a false dichotomy:

Since the beginning of the epidemic, the Cuban National HIV/AIDS Programme understood the importance of preventing HIV, and prevention activities have played a key role in containing the spread of the virus and achieving current results. At the same time, the availability of adequate treatment has contributed significantly to the reinforcement of HIV prevention. For example, during the past few years, people in Cuba have become increasingly more open to discussing HIV-prevention activities. This is so not only because of the wealth of prevention activities at national and province level but also because of the hope for a longer and better life that has become possible through treatment with antiretrovirals.

Participation of PLWA:

The participation of all key stakeholders, particularly of the PLWA community, is key in the Cuban HIV/AIDS prevention strategy (Figure 5). They support those activities that are directly related to prevention (e.g. information, education and communication). They are also involved, for example, in adherence support and drug distribution, international conferences, the telephone hotline, ethical committees and support to people at the time they receive the results of their HIV test. The HIV community, hence, has become an integral player in the Cuban fight against HIV/AIDS.

Figure 5. National program of prevention HIV/AIDS CUBA 2003



Note: 1) Movil project, a minivan that travels to provinces and municipalities to distribute information about HIV/AIDS; 2) MHG (Mutual Helping Group), a group of HIV+ people that support each other

Research and technical development:

This component's objective is to define and develop a research plan that responds to the course and the needs of the epidemic in the country. Multi-centre research comprising areas such as sociology, psychology, social communication, epidemiology, clinical sciences, diagnostic, vaccine and pharmacological product development, is conducted through a network of research centres. These include, for example, the National Biotechnology Centre (CIGB), the National Reference Laboratory (LNR), the Immunoassay Centre (CIE), the IPK, Havana University School of Psychology, Centres for Hygiene and Epidemiology (CPHE), and others.

CIGB has produced a therapeutic vaccine for AIDS, which will be evaluated in a clinical trial at the IPK. The vaccine boosts the immunologic response against the virus, and eventually destroys it when the viral load is not detectable. It is reported (Fink S, 2003; Toledo et al., 2001) that the development of a preventive vaccine against HIV is currently underway at the level of basic research.

CHALLENGES AND SHARING LESSONS LEARNED

Cuba was faced with an economic crisis while establishing a sustainable national HIV/AIDS programme. Nevertheless, they built a programme with a strong prevention and comprehensive care component without external assistance, relying solely on their own resources. This demonstrates that with a government's strong political will it is possible to fight HIV/AIDS in resource-limited countries.

To share their valuable experiences, Cuba has proposed to help countries highly affected by HIV/AIDS in building or strengthening their current primary health-care system and in the use of low-cost generic drugs. Such assistance would be performed as part of Cuba's international development agenda through which it sends doctors and other health-care workers to resource-poor countries as well as trains health care workers in Latin America and Africa (Castro, Farmer, Barberia, 2002)

Despite these accomplishments, the Ministry of Public Health needs to focus on sustaining the low HIV-prevalence rate. At the same time it must reduce the rate of new infection that has been on the incline since the mid-1990s. Particular attention to strategies that address the group of men who have sex with men are expected to achieve improved results.

SCALING UP

The Cuban Government was granted US\$ 26.5 million for the next five years from the Global Fund to fight AIDS, Tuberculosis, and Malaria. With help of these substantial additional funds, the National HIV/AIDS Programme will be able to address the challenges by further increased training and prevention activities. Furthermore, a greater choice of ARV drugs will permit different therapeutic regimens, including for patients who develop resistance to commonly used ARVs. Improved technology and increased accessibility of laboratory analysis, and not at least the greater variety of ARVs will all contribute to providing better care to more patients and hence to improving ethical aspects of care for people living with AIDS.

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