OVERVIEW

THE NATIONAL ACCESS TO ANTIRETROVIRAL PROGRAM FOR PHA (NAPHA) IN THAILAND

Sanchai Chasombat[1], Cheewanan Lertpiriyasuwat[1], Sombat Thanprasertsuk[1], Laksami Suebsaeng[2] and Ying Ru Lo[2]

[1]Bureau of AIDS, TB and STIs, Department of Disease Control, Ministry of Public Health, Thailand; [2]World Health Organization, South-East Asia Regional Office, New Delhi, India

Abstract. To describe the development, components, initial results and lessons learned from Thailand's National Access to Antiretroviral Program for People living with HIV/AIDS (NAPHA), a historical review was conducted and program monitoring was analyzed. The national antiretroviral therapy program at different levels of the public health system was implemented with all major program components; ARV protocol development, health care professional training, drug supply chain management, laboratory network formation, monitoring and evaluation, and multi-sector and PHA involvement since 2001, which was based on elements of research, pilot projects, training, national guideline development, experiences and policy making. A national monitoring system was developed to monitor the progress of the program. From February 2001 to December 2004, the monitoring reports received from implementing hospitals showed that 58,133 cases had received antiretroviral therapy (ART), and 85% (49,477) of them were continuing to take ARV drugs. In conclusion, the NAPHA was implemented nationwide with comprehensive systems. The reports indicate achievement of expansion of the ART program. Lessons learned from the program initiation and scaling up show local leadership, comprehensive training, adherence, and coordination are essential to program effectiveness and sustainability.

INTRODUCTION

In Thailand, sporadic AIDS cases have been reported since 1984. The epidemic situation changed rapidly in the late 1980s, when a rapid spread of HIV was documented among injecting drug users, followed by consecutive waves of the epidemic in high-risk groups: commercial sex workers and male sexually transmitted disease clinic patients, then to the general population; military conscripts, blood donors and antenatal women (Weniger *et al*, 1991; WHO, 2000). In 2004, 572,484 Thais were estimated to be living with HIV/AIDS: of those, 49,452 Thais were estimated to develop AIDS and 50,929 Thais died of AIDS (The Thai Working Group on HIV/AIDS Projection, 2001). With proper antiretroviral therapy and related services, a number of Thais would have survived for years longer. In 2001, Thailand became among the few developing countries to implement a national antiretroviral therapy program. This article recounts the development of the National Access to Antiretroviral Program for PHA (NAPHA), describes major components and use of the program, and offers the lessons learned.

Correspondence: Dr Sanchai Chasombat, Bureau of AIDS, TB and STIs, Department of Disease Control, Ministry of Public Health, Tiwanon Road, Nonthaburi 11000, Thailand.
Tel: 66 (0) 2591-8411; Fax: 66 (0) 2591-8413
E-mail: drsan@ksc.th.com

Generally, the Thai public health system has a general hospital in each province and a community hospital in each district. Excluding Bangkok Metropolitan Administration (BMA), 75 provinces are grouped into 12 regions; each of which has at least one regional hospital. All hospitals provide at least basic HIV/AIDS care, such as diagnosis, counseling, treatment of common opportunistic infections and related services with an established referral system. In addition to Ministry of Public Health hospitals, there are private hospitals and other government hospitals run by the armed forces, Bangkok Metropolitan Administration, the Ministry of Interior and the Ministry of education, where basic HIV/AIDS care is also available.

Since 1997, a comprehensive and continuum of care (CCC) for HIV/AIDS had been implemented at various levels of healthcare services, aiming at increasing quality of life and improving the HIV/AIDS care system. It was focused on comprehensive medical care, psychosocial support, and home and community care (AIDS Division, 2002). Common HIV/AIDS medical care includes medical history, physical exam, routine blood testing, diagnosis and treatment, and referral to proper healthcare services. Antiretroviral therapy (ART), CD4 counts and viral load testing were unaffordable services for most HIV/AIDS patients and were offered at certain limited centers, such as medical university research centers. With the endeavor to develop the best HIV/AIDS care services for PHA, ART became one of the main components of standard HIV medical care for the Thai PHA.

Evolution of the ARV program in Thailand

Following the decision made in 1992 by the National AIDS Committee, a national policy of subsidizing provision of antiretroviral drugs (ARV) free of charge to low income, HIV infected adult patients using the public sector hospital delivery system was initiated. Zidovudine (AZT) monotherapy, 500 mg per day, was implemented from 1992 to1995, covering 150 patients in the first year and increasing to 1,500 patients per year in 1995. Up to the end of 1995, a total of 4,200 patients were participating. However, data on compliance and survival of patients was not systematically collected. In 1995, the recommendation for first line antiretroviral therapy was changed to double nucleoside regimens with either AZT+ddI (didanosine) or AZT+ddC (zalcitabine). AZT monotherapy was still offered as second line therapy. The ARV subsidy was part of the medical supply budget of the AIDS Division, which since 1994 also included drug treatment of opportunistic infections (OI), universal precautions and condom distribution. From 1992 to 1996, the budget for medical supplies increased from 35 million baht (US$ 1.4 million) to about 300 million baht (US$ 12 million). This was accompanied by decreasing prices for ARV due to generic competition and bulk purchase, and generic manufacturing of AZT by the Government Pharmaceutical Organization (GPO). The AZT price decreased from 45 to 8 baht per 100 mg capsule (Kunanusont *et al*, 1999). The total cost of the AZT regimen per patient for one year therapy decreased nearly 6-fold from 80,000 baht per year to 14,240 baht per year, if generic AZT was used (WHO, 2000).

After the existing ARV program was evaluated by the World Bank, World Health Organization(WHO), and the Thai Ministry of Public Health (MOPH) in 1995 and showed its low cost-effectiveness due to low service coverage, which reached less than 5% of the total number of new AIDS cases in Thailand, and low compliance to ARV and were recommended to improve the data monitoring system, the concept of the program was shifted to a more research based agenda, aiming to develop effective ARV therapy and to prepare the health facilities for ART (Kunanusont *et al*, 1996). Consequently, the MOPH decided to set up an HIV/AIDS Clinical Research Network

(CRN) program in 1996. Initially, there were 45 hospitals throughout the country in the CRN, which was then expanded to 58 hospitals in 1999. The principal idea behind the creation of the HIV/AIDS CRN was to establish a more controlled ARV delivery system to solve the obvious patient/physician ARV treatment compliance problems by providing ARV only to selected hospitals and patients through standard protocols. Moreover, it was expected that the development of the HIV/AIDS CRN and its collaboration with leading Thai clinical researchers would ultimately lead to a strengthening of the country's clinical research capacity in the field of HIV/AIDS in many peripheral hospitals, enabling Thailand to participate in international larger-scale multi-center drug and vaccine trials (WHO, 2000).

In 2000, the concept of providing ARV free of charge reemerged under the "Access to Care" (ATC) program, which was initiated based on the principles of equal accessibility to Highly Active Anti-Retroviral Therapy (HAART), quality of service with comprehension and continuation, and multi-sector cooperation, including PHA and community involvement through the CRN (AIDS Division, 2001; AIDS Cluster, 2003). In addition, a co-payment scheme was introduced and conducted along with the free of charge scheme under the ATC because of the high cost of ARV. The co-payment scheme had a few hundred eligible participants. In 2002, there was a significant ARV price reduction. The Thai GPO produced generic medicines, including a fixed-dose combined drug named GPO-VIR (d4T, 3TC and NVP) which was the key factor for bringing down the national cost of ART. It allowed the program to scale-up the target number of patients under treatment from 1,700 patients to 13,000 patients in 2003. A year later, the Thai government committed itself to provide ART for all eligible Thai PHA. The budget of the ARV program was raised to US$ 25 million in 2004 by aiming to give 50,000 patients ARV. The ATC program was reshaped and renamed as the National Access to Antiretroviral Program for People living with HIV/AIDS (NAPHA) to support the rapid scaling up target by reorganizing management and major program components.

The principal idea of the NAPHA was to strengthen the public health infrastructure and provide proper and effective HAART to all patients in need at all government hospitals and its networks. Several main strategies have been conducting, such as access to quality and reasonable prices for ARV and biomedical HIV testing, infrastructures readiness development, and service quality improvement. With the rapid scaling-up of the number of patients to receive ARV, there were a number of challenging tasks for the program administration and the civil organizations involved in the planning and management of the program. Reliable financing for administration of the ARV program was a key factor to ensure the program feasibility.

Several financing sources, namely the fiscal year budget and Global Fund, have been used to support the program. An earmarked fiscal year budget was allocated increasingly, corresponding with expansion of ARV program implementation. In 1992 the Ministry of Public Health received 35 million baht for ARV drugs. This was increased to 300 million baht by 2003, then approximately 800 million baht for the year of 2004.

DEVELOPMENT OF MAJOR PROGRAM COMPONENTS

ARV protocol development

HIV/AIDS treatment and care in the public health system has been provided from various directions and the quality from hospital to hospital depends on its readiness and accessibility to essential medicines and testing reagents. In 1997, to reduce quality of practice diversity, the first national guideline on HIV/

AIDS treatment and care for adults and children was developed as a national recommendation by experts from universities, public health program managers, physicians, scientists, researchers, non- government organization (NGOs) and PHA. The guideline was based on international guidelines and interpretation of the results of research conducted in Thailand, aimed primarily at community hospital physicians and also updated periodically. By 2004 the 8th edition had been developed. The main contexts were comprised of the diagnosis of HIV infection in children and adult, diagnosis and treatment of common opportunistic infections, post-exposure prophylaxis, prevention of mother to child transmission and ART for children and adults, when to start, what to be started, how to monitor and evaluate and when to stop.

In 2000, ART regimens for the ART program and its operational guideline, which was an important implementing tool for the national ART program, were developed. Until the present, there had been 3 ARV protocols implemented in the NAPHA. Regimens in these protocols were adapted from the national guideline on HIV/AIDS treatment and care, and availability and affordability of ARV in Thailand. The first protocol (ATC 1) was comprised of 8 regimens for adults and 12 regimens for children which were delivered in 2000 at the initiation of the ART program. These regimens were provided to a limited number of implementing hospitals within CRN under the supervision of the Office of Disease Prevention and Control (ODPC), a coordinating office which acted as a regional hub for the ART program. The second protocol (ATC 2) was developed and implemented in 2002 during an early scaling-up phase. There were 3 regimens for adults and 6 regimens for children which were those most affordable and manageable at the implementing hospitals. The first-line regimen in this protocol was GPO-VIR. The third protocol (ATC 3) was developed to increase management flexibility and cover more groups of eligible patients and to support the rapid scaling up phase in 2004 (Table 1). Most drugs used in the NAPHA were produced locally by the Thai GPO. In addition to the different of ARV regimens in the three protocols, there were changes in recruitment

Table 1
ARV regimens used in ATC1, ATC2 and ATC3.

ATC1 (2000)		ATC2 (2002)		ATC3 (2004)	
Adult regimens	Children regimens	Adult regimens	Children regimens	Adult regimens	Children regimens
AZT+3TC+NVP	AZT+ddI+EFV	d4T+3TC+NVP (GPO-VIR)	d4T+3TC+NVP	d4T+3TC+NVP (GPO-VIR)	d4T+3TC+NVP
AZT+ddI+NVP	AZT+3TC+EFV	d4T+3TC+EFV	AZT+3TC+NVP	AZT+3TC+NVP	AZT+3TC+NVP
AZT+3TC+EFV	d4T+ddI+EFV	d4T+3TC+IDV/RTV	d4T+3TC+EFV	d4T+3TC+EFV	d4T+3TC+EFV
d4T+ddI+EFV	d4T+3TC+EFV		AZT+3TC+EFV	AZT+3TC+EFV	AZT+3TC+EFV
AZT+3TC+SQV/RTV	AZT+ddI+IDV		d4T+3TC	d4T+3TC+IDV/RTV	d4T+3TC+IDV/RTV
d4T+ddI+SQV/RTV	d4T+ddI+IDV		AZT+3TC	AZT+3TC+IDV/RTV	AZT+3TC+IDV/RTV
AZT+3TC+IDV/RTV	AZT+ddI+RTV				d4T+3TC
d4T+ddI+IDV/RTV	d4T+ddI+RTV				AZT+3TC
	AZT+ddI				
	AZT+3TC				
	d4T+ddI				
	d4T+3TC				

Table 2
Recruitment criteria for ATC1, ATC2 and ATC3.

Recruitment criteria for ATC1		Recruitment criteria for ATC2		Recruitment criteria for ATC3	
Adults	Children	Adults	Children	Adults	Children
Naive 1. CD4 count <250 cells/mm^3 or 2. Symptomatic HIV group or 3. AIDS	Naive 1. Clinical staging A or B or C or 2. Immunological staging 2 or 3 or 3. Age <12 months	Naive 1. CD4 count <200 cells/mm^3 or 2. Symptomatic HIV group with CD4 count <250 cells/mm^3 or 3. AIDS	Naive 1. Clinical staging B or C or 2. CD4 count ≤20% or 3. Age <12 months	Naive 1. CD4 count <200 cells/mm^3 or 2. Symptomatic HIV group with CD4 count <250 cells/mm^3 or 3. AIDS. Experienced 1. GPO-VIR with good clinical signs or 2. dual-therapy with viral load <50 copies/ml or 3. triple therapy with viral load <50 copies/ml	Naive 1. Clinical staging B or C or 2. CD4 count ≤20% or 3. Age <12 months Experienced 1. GPO-VIR with good clinical signs or 2. dual-therapy with viral load <50 copies/ml or 3. triple therapy with viral load <50 copies/ml

criteria for PHA in CD4 counts, clinical staging and previous ART history (Table 2). The third protocol covered both naïve and certain ART-experienced groups to support the national scaling-up objective. The recruitment of HIV-infected patients for the first protocol was stopped after the second protocol became widely implemented. The third protocol has been used for new cases.

Healthcare professional training

Before NAPHA implementation, HIV/AIDS care healthcare professional training programs took place in universities and research centers. HIV counseling and ART were not integrated into the regular curriculum of healthcare programs in Thailand. From 2000 to 2004, 2-day short course training programs on HIV medicine and operational guidelines of program implementation took place, training approximately 8,000 healthcare professionals in 5 key areas: physicians, nurses, counselors, laboratory technicians and pharmacists, in 908 implementing hospitals. It aimed to improve the caliber of health personnel who provide HIV care, conduct the program effectively and enhance ARV drug adherence. The training curriculum was developed by university experts, public health program managers at various levels, physicians, scientists, researchers, NGOs and PHA.

The curriculum was comprised of 2 core components. The first component described common topics, such as global and national policy, trends in ART, general HIV knowledge and HIV care. The HIV care focused on prevention and treatment of opportunistic infections, and ART management for health personnel in all areas. The second component focused on specific healthcare professional areas of interest, for which the contents were suitable for particular professionals, such as drug supply chain management for pharmacists, diagnostic and monitoring laboratory techniques for collecting and sending blood specimens and reagent supply chain management for laboratory technicians, and HIV and ARV counseling for adults and children, and adherence issues for counselors. Each year periodic with update training courses have been provided by the bureau of AIDS, TB, and STIs and the ODPC. There had been multisector collaboration and partnerships for providing training, such as the Department of Health, Department of Mental Health, Department of Medical Services, the Thai AIDS society, NGOs and PHA. Training of Trainer courses has also been developed. Trained healthcare professionals have became consultants at their own sites and surrounding areas.

Drug supply chain management

Strategies have been carried out in a concerted manner to achieve access to essential ARV drugs by multiple organizations. Direct price negotiation with drug companies has been conducted with and without bulk purchasing of ARV drugs available in Thailand by high-level policy makers within the Ministry of Public Health. Generic production of ARV drugs was another crucial strategy for increasing access to ARV. The Thai GPO provides ARV drugs for public health facilities, university research centers and private health care providers. It has also aimed at production of affordable quality ARV drugs, and promoting itself as a reliable source of ARV drugs for the national program. All ARV drugs produced in Thailand, either by the Thai GPO or private pharmaceutical manufacturers, are free to the patent. At present, 9 generic ARV drugs, both NRTI and NNRTI, are available on the market (AIDS Cluster, 2004). The production of GPO-VIR has had a significant impact on increasing access to ARV at the national level through affordably priced, approximately US$ 30 a month per patient, drugs used by the PHA and being administered by health personnel. It has also proven to be safe and effective (Anekthananon *et al*, 2004). GPO-VIR has been recommended as the first line drug in

the national ARV program. Nelfinavir was the first PI drug produced, and there are other PI drugs such as Saquinavir, Indinavir and Ritonavir, in the GPO production pipeline.

The estimated ARV requirements were planned centrally one year prior to the implementing fiscal year based on the target number of the patients to be enrolled in the program, patient retention rate, dropped-outs, consumption records, adjusted for stock outs, expiration of overstocked items, and projected changes in utilization. Collaborative planning for the ARV drug delivery and requirements was performed periodically with the drug companies.

The Department of Disease Control acted as a central procurement agency for all the drugs procured for the NAPHA. The drug procurement was conducted under the government's rules and regulations. Seventy percent of the ARV drugs procured was provided by the GPO. Inventory management and drug delivery to the hospitals used the traditional replenishment system initially, and were run under the Department of Disease Control. The Bureau of AIDS, TB and STIs provided service for central warehousing and distribution of the drugs to local hospitals and to the ODPC, which served as a regional distribution center. With the progressive increase in the quantity of drugs to be inventoried, inventory management and drug delivery was later outsourced to pharmaceutical distributors, including the GPO. A continuous drug replenishment system was introduced and implemented to all participating hospitals in March 2005. The majority of hospitals did not separate the stock of ARV drugs under the NAPHA scheme from the other schemes. All ARV drug dispensing took at the hospital level.

Since 2000, an ARV stock monitoring system has been in place. Its components consisted of a stock status report, drugs requested, and a returned and expired drugs report. The implementing hospitals sent reports and requests to the ODPC once a month, then the ODPC aggregated the data and forwarded it to the Department of Disease Control.

Laboratory diagnostic management

Every hospital, either private or government, provided anti-HIV testing services. There were anonymous anti-HIV testing services available in some areas. All anti-HIV testing used in Thailand had sensitivity and specificity testing by committees designated by the Thai FDA before they were distributed to the market. There were 30 Anti-HIV testing reagents available in Thailand. The average price of an Anti-HIV service was US$ 2-3.

The CD4 cell count was a standard test under the NAPHA. It was recommended that CD4 cell count testing should be performed at baseline and every 6 months after receiving ART. There were 46 dual – platform and 28 single – platform technology CD4 count machines in the Department of Disease Control service network. Their distribution was based on geographical difficulty of access, burden of HIV/AIDS cases, and readiness of healthcare facilities. Ten machines were owned by universities and the private sector. Blood samples in cold packages were sent from distant hospitals to testing centers. In the public health setting, the price of each CD4 testing was US$ 12. Each HIV positive patient had to pay US$ 5 for the screening test to enroll in the NAPHA, after which CD4 testing was performed free of charge as long as the patient remained in the program. Two in-house CD4 cell count tests were successfully developed. External quality assurance evaluations were performed in selected CD4 count testing centers within the network. CD4 count reagents, control reagents and their accessories were procured centrally and distributed through the traditional replenishment system to the testing centers based on the number of cases serviced and status of the stock. Financial subsidies to the testing centers were offered

as incentives, and part-time costs were also provided. A national flow cytometry conference was held annually as a means to manage and update knowledge regarding the CD4 count services network.

Routine laboratory tests in the NAPHA were CBC, chest X ray, and SGPT. A lipid profile, hepatitis profile and blood sugar were optional. Basic opportunistic infection diagnosis was widely available throughout the Ministry of Public Health hospitals. Viral load testing was available in 20 healthcare facilities throughout the country. Ten were owned and operated by the Department of Disease Control service network, the other 10 were owned by the private sector or university. Four in-house tests were under development. The cost per test varied from US$ 50 to 100. Three viral resistance testing centers were established at a university facility with connection to the Department of Disease Control service network. Five in-house tests were under development for clinical use. These were not included as standard tests under the NAPHA. A complete test with RT and PI components costs an average of US$ 250. CD4 count reagents, control reagents, viral load reagents, and resistant testing reagents used in Thailand were not under the committees to approve their sensitivity and specificity.

Monitoring and evaluation

Data collection for the ARV receiving patient visiting the hospital outpatient clinic was routinely obtained monthly. Data obtained in the initial phase of the program was research oriented.

A computerized registration and clinical monitoring system was developed and introduced into the implementing hospitals in late 2003 in order to increase the utilization of data by the implementing hospitals, to reduce the documentation workload, and to get national scaled data for policy planning. Simplified individual data, such as age, occupation, address, baseline CD4, ARV regimen, occurrences of adverse drug reactions, clinical outcome, such as CD4%, CD4 counts, body weight and adherence were included in the standard data set. Each hospital was required to record the patient's treatment profile in the NAPHA software and report the data to the Provincial Health Office (PHO) where the data validation took place. The data was then gathered at the ODPC before being sent to the Department of Disease Control.

Supervision through the network of experts and experienced healthcare providers and site visits by a multi-disciplinary team were a standard process. A regional coordinating mechanism, which consisted of multi-sector representatives, such as the Inspector general, ODPC, PHO, hospitals, NGO, PHA group and community, were established for each region to advocate the implementation and coordination at all levels.

Multi-sector and PHA involvement

Multi-sector and PHA participation in access to care, including ARV, by involvement of access to affordable medicine, policy and media advocacy, and initiation of the national ART program, has played a prominent role since ARV drugs became available in Thailand.

There has been collaboration with international organizations, such as WHO and UN agencies, to promote access to comprehensive care. The WHO played a key role in national access to care activities. The WHO collaborated in initiating ARV research during the initial period of introduction of ARV to Thailand and provided technical support to the development of national guidelines on HIV/AIDS treatment and care, as well as the development of National Access to Antiretroviral Programs for PHA. The Thai MOPH – US CDC Collaboration (TUC) is another example of collaboration that provides technical support on the development of national data management system of the ARV program and the

development of ART services model in upper northern of Thailand.

There were 783 PHA groups and HIV/AIDS NGOs in Thailand. Most of them played important roles in encouraging access to treatment and care of PHA, including ART as well as in HIV prevention activities at community and hospital levels. The Ministry of Public Health has a policy of supporting PHA groups and HIV/AIDS NGOs in theirs involvement and has allocated approximately US$ 1.7 million each fiscal year since 1992 to support their activities. These activities were conducted according to local needs and the caliber of their organizational capacity, such as supporting access to HIV/AIDS services, strengthening related infrastructures, developing PHA potential and capacity in dealing with HIV/AIDS, and conducting policy advocacy.

The participation from various sectors, such as the PHA group, NGOs both national and international, professional societies, community organizations, and non-health sector government organizations was one of the components of the NAPHA. Involvement of the PHA group and the family caregiver was present in a number of hospitals as a crucial means in supporting new and current patients to adhere to the program, providing exchanged information and visiting patients at their homes when the government home visitation personnel were not available.

It was recommended that participation of multiple sectors should be encouraged at all levels. For instance, PHA groups and HIV/AIDS NGOs may join the local hospital committee as board members to recruit new patients to receive ARV, plan to provide proper psychological support and other support activities. There were 129 groups of PHA voluntarily working at outpatient clinics to help healthcare providers in screening new patients, exchanging ARV drug treatment experiences, and helping to monitor certain groups of patients.

Program initiation

The initiation phase of the ART program from 2000 to 2002 had slow enrollment; 3,640 cases of both adults and children were enrolled into the program from 109 hospitals. There were 3 parallel ART schemes in this phase. The first was a support program for research centers conducting ART related research in which 1,143 cases were enrolled. The second was the co-payment scheme in which 748 cases participated. The rest of the cases were enrolled in the third scheme, the ART free of charge service system. The enrollment of cases in the early scaling up phase from January 2003 to December 2003 revealed 19,551 cases were enrolled in the program from 450 hospitals (Fig 1). In the rapid scaling up phase from January 2004 to December 2004, the number of HIV/AIDS patients recruited in the NAPHA had been increasing dramatically with the number varying from 2,258 to 3,780 cases per month (Fig 2). As of December 31, 2004, the cumulative number of HIV/AIDS patients having access to ARV drugs was 58,133, which achieved the goal set by the Ministry of Public Health on increasing access to ART and surpassed the target of the WHO's "3 by 5" initiative for Thailand, which aimed for 43,000 (WHO, 2004). Of these, 91.4% were adults and 8.6% were children. Eighty-five percent were retained in the program, the others dropped out from the program due to death (6.4%), loss to follow-up (2.6%), withdraw from the program (2.0%), adverse drug reaction (1.3%), non-adherence (0.6%) and drug failure (0.5%).

Evaluation of the program was conducted. Outpatient data records for people enrolled in the NAPHA during fiscal year 2003 in 36 hospitals, either provincial hospitals or district hospitals, were randomly selected and reviewed. Of 1,042 patients, one year after initiation of ART, 6.4% had died. Most of patients who died had baseline CD4 counts less

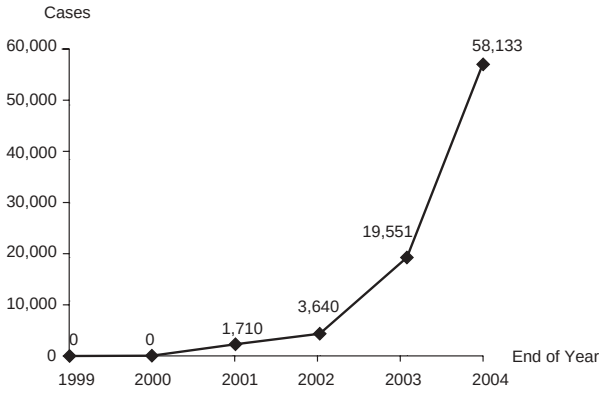

Fig 1–Overall case increase for NAPHA from 1999-2004.

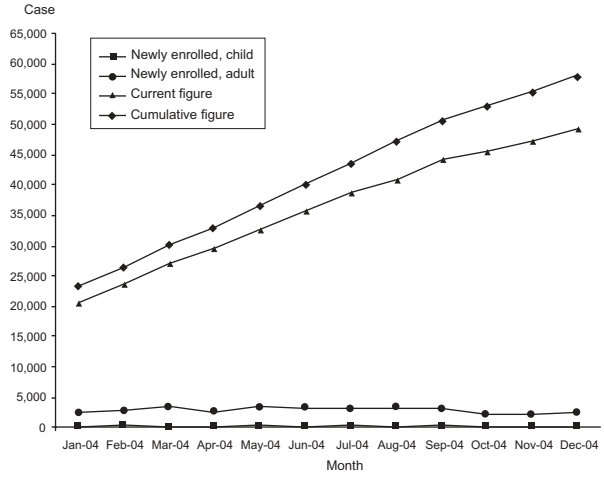

Fig 2–Program case increase for NAPHA in 2004 by month.

than 50 cells/mm^3. Asymptomatic PHA had a one year survival rate of 95%, compared to 90% for those with symptomatic disease or AIDS. The incidence of opportunistic infections in the group with CD4 cell counts less than 50 cells/mm^3 was 10%, compared to 4.6% for those with CD4 cell counts of 200 cells/mm^3 or higher. Tuberculosis was among the most common opportunistic infections. The increase in CD4 cell counts after six months of ART was significant. The mean difference was 112.29 cells/mm^3 (95%CI: 99.90, 124.69).

Adherence to medicine was also reviewed through records and interviews. Self reported adherence of PHA during the past five days was 96.2% with no regional variation. More than half of PHA perceived they had better health and were able to get back to work and have sexual activity after a few months of ART (Community Medicine Sector, 2004).

LESSONS LEARNED AND FUTURE CHALLENGES

Despite differences between Thailand and other countries in health care infrastructure and HIV epidemic patterns that may have contributed to the ability to initiate and carry out national ART programs, several lessons learned from the NAPHA may be useful for starting and implementing a national ART program.

- Initiation of an ART program should be performed on a small scale first. The evolution of the ART program in Thailand involved an initial small size research orientated program, followed by changing to a more a service based program, then moving towards full scale service within a fairly short rapid period with public health care reform and bureaucratic reform. To initiate an ART program, beginning with small scale ART research may be the most feasible method. Use that opportunity to train and prepare related infrastructures and gain potential partners, then develop a more service oriented program targeting larger groups.

- In creasing the goal of those who receive treatment given by partners, such as non-government organizations, research groups, PHA groups, media, and external funding agencies, can catalyze and change program development. Services and targets can be changed or increased, depending on policy, infrastructure and negotiations with relevant partners.

- Multidisciplinary comprehensive peri-

odic trainings with refresher courses on HIV medicine and ART program management are critical for physicians, nurses, counselors, pharmacists and laboratory technicians. Proper understanding of and a positive attitude towards ART service programs can improve program goals. The frequency of training depends on staff turnover, infrastructure change and evolving technical issues.

- Coordination, communication, policy dissemination, clarification of responsibilities and work flow and supervision of all levels substantially influences outcomes, especially during program acceleration and network problem solving.

- ARV regimens, especially first line of regimens, play a critical role in ART programs in terms of administration, at all levels. Initial regimens significantly influence the number of potential patients who receive ARV drugs. Stock and supply management, training, adherence and second or third line regimens are also affected by the first line of regimens.

- Local leadership from policy makers and teams working at implementation, especially hospital directors and outpatient clinic chiefs have a significant impact on staff willingness and encouragement, responsibility delegation, team management, participation of PHA and performance of the implementing unit.

- Clinical registration and monitoring forms, drugs stock reports and data collection in ART programs should be simple easy to collect, easy to use and transfer, and rapidly analyzable, to enhance the accuracy of the information, usefulness of the data, and reduce workload levels.

- Adherence to medicines varies and should be assessed at each visit. A standard adherence strategy should be developed and used. Maintaining individual clinical response to the first line of regimen for at least 5 years is a tangible goal which should be widely disseminated. Low drop-out rates and high follow-up rates are goals to achieve and maintain.

- Integrating multiple service models, such as the Social Security Fund Health Care Scheme, Civil Service Medical Benefit Scheme, and University research projects, for both ART and related services into the national service standard makes program implementation easier to conduct and manage.

- Integrating the ART program into universal health care coverage is necessary in making ART sustainable. A reliable and continuous source of funds and drug supply, along with policy support at all levels, are pre-requisites for a sustainable national ART program.

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