
Executive Summary

Background

Thailand is in the vanguard of developing countries that are seeking to provide antiretroviral therapy (ART) as the standard of care to large numbers of people with symptomatic HIV disease. As of May 2006, 77,758 people living with HIV/AIDS in Thailand had received ART through the National Access to Antiretroviral Program for People Living with HIV/AIDS (or NAPHA), and approximately 8,000 are estimated to have access to ART through the Social Security Scheme. The Thai government's objective is to provide ART to 82,000 people living with HIV/AIDS by end of fiscal year 2006.

The purpose of this report is to advise the Thai government and Thai society at large about the full range of benefits, costs, and consequences that are likely to result from the decision to expand public provision of ART through NAPHA and to assist with the design of implementation policies that will achieve maximum treatment benefits, while promoting prevention of HIV/AIDS and maintaining financial sustainability within Thailand.

Provision of ART in Thailand

The first case of AIDS in Thailand was reported in September 1984. Since then, more than 1 million Thais have been infected with HIV,

and, of those, more than 400,000 have died. In 2004, an estimated 572,500 Thais were living with HIV/AIDS (table ES.1). Among those people, some 49,500 will develop serious AIDS-related illnesses during the year, and about the same number will die of AIDS-related complications. It is also estimated that 19,500 new infections will occur in 2004 (compared with 143,000 new infections in 1990 and 23,676 new infections in 2002).

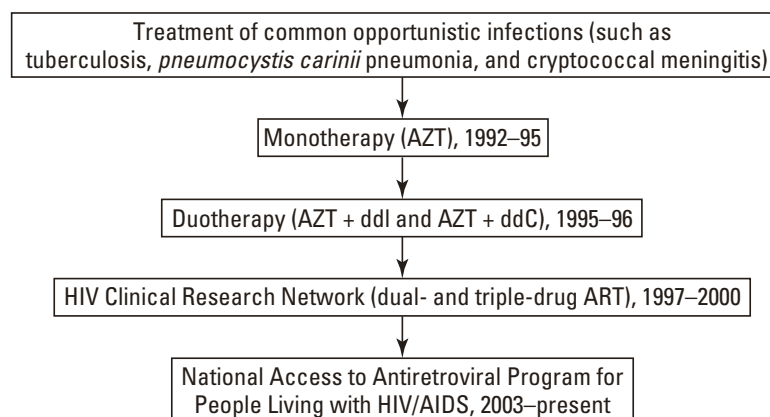
The Royal Thai government and Thai society have demonstrated a strong commitment to providing comprehensive care and support to persons living with HIV/AIDS (PHAs), but it is only recently that they have been able to provide ART to large numbers of people with symptomatic HIV (figure ES.1). The availability of a domestically produced triple-drug combination, GPO-vir,¹ at affordable prices (about B 1,200, or US\$30 per month) has opened the door for many PHAs, who could previously not afford ART, to have access to it, as well as allowing the Ministry of Public Health (MOPH) to roll out a large-scale

Table ES.1 Estimated Cumulative Numbers of HIV/AIDS, 2004

| | <i>Cumulative number</i> |
|--|--------------------------|
| Total HIV infections (adults and children) | 1,074,155 |
| Total deaths (adults and children) | 501,600 |
| People living with HIV | 572,484 |
| Projected new HIV infections in 2004 | 19,471 |
| Projected new AIDS cases in 2004 | 49,542 |

Source: Thai Working Group on HIV/AIDS Projections for 2004.

Figure ES.1 Access to HIV/AIDS Medical Care in Thailand



Source: MOPH 2004.

campaign to provide triple-drug ART as standard care. As a result, the number of PHAs on ART has increased sharply from about 3,000 at the start of 2002 to 27,000 by the end of 2003, rising to 52,593 by February 2005. The program is financed in part by the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM) and, in part, by the government budget. The number of treatment sites increased from 112 in 2001 to 462 in early 2003, rising to 841 by February 2005.

Table ES.2 shows the evolution of estimated cases of PHAs, estimates of AIDS cases, and numbers of people having access to public ART in Thailand. As of the end of 2004, more than 80 percent of those living with AIDS had access to public ART—a remarkable achievement.

Benefits of Prior Prevention Efforts

Successful implementation of NAPHA poses a significant challenge to the Royal Thai government and to Thai society. In a few years, as AIDS patients live longer with ART, the health system will need to provide care not only to 10,000 to 20,000 new cases per year, but also to most of those whose lives have been significantly prolonged by ART. Given the commitment across all segments of Thai society, the country's significant health system capacity, and the availability of internal and external financing, Thailand has good prospects for meeting this challenge. Its ability to even contemplate providing care to all those who need it, however, rests on the success of its past prevention efforts.

In the absence of past successful efforts of national prevention, HIV infections—and, hence, AIDS cases—today would be much higher than they actually are (figure ES.2). We have estimated that without such efforts, Thailand would have 7.7 million HIV cases and 850,000 AIDS cases in 2005, roughly 14 times more of each than exist in reality. If we suppose that Thailand would try to offer ART to all of this much larger number of AIDS patients, its budget requirements would also be 14 times greater and would continue to grow over the next decade. Thanks to its substantial prevention efforts between 1991 and 2002, Thailand has avoided the need to spend an additional US\$18.6 billion (B 745 billion) on treatment over the decade through 2012.

During the 1990s, Thailand spent more than most countries on its HIV/AIDS program. Its total budget expenditure on prevention and treatment combined over this period was a substantial US\$434 million

Table ES.2 Estimated Cases of People Living with HIV/AIDS, AIDS Cases, Reported AIDS Cases in Public Hospitals, and Access to Public ART

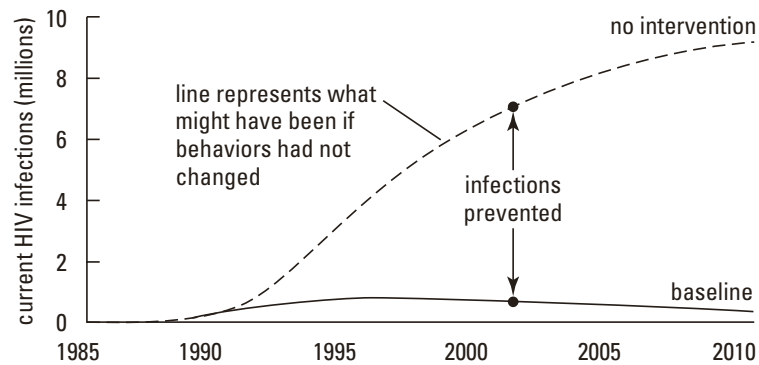
| | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|--|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------|---------------------|
| People living with HIV/AIDS (projected) | 751,235 | 740,349 | 719,765 | 649,564 | 665,344 | 635,057 | 603,942 | 572,484 |
| People living with AIDS (projected) | 59,752 | 65,333 | 68,311 | 68,677 | 67,057 | 64,832 | 62,871 | 61,394 |
| Patients in public ART (projected) | 1,095 ^a | 1,095 ^a | 1,095 ^a | 2,095 ^a | 2,095 ^a | 8,341 ^a | 27,158 | 52,593 ^b |
| Actual persons in public ART as a percentage of projected AIDS cases | 1.8 | 1.7 | 1.6 | 3.1 | 3.1 | 12.9 | 43.2 | 81.4 |
| Actual persons in public ART as a percentage of actual reported AIDS cases | 4.1 | 4.0 | 4.0 | 4.5 | 8.5 | 35.5 | 122.6 | — |

Sources: The Thai Working Group on HIV/AIDS Projection 2001. Projections for HIV/AIDS in Thailand: 2000–2020, Karnsana printing press. Gold and others 2005. The data on Reported AIDS cases accessed to public care are provided by MOPH 2004; UNAIDS 2002.

Note: — = not available.

a. This figure comes from UNAIDS 2002.

b. This figure is for February 2005.

Figure ES.2 Importance of Prior Prevention Efforts

Source: Brown and Peerapatnanapokin 2004.

in 2002 dollars (B 17.3 billion). However, by averting the need to spend US\$18.6 billion (B 745 billion) over the subsequent decade, each dollar (or baht) invested in the 1990s saved US\$43 (or B 1720) in needed treatment expenditure in the subsequent decade. It is doubtful that any other Thai government investment achieved such a high benefit-cost ratio. The finance ministries of countries such as China and India, where the HIV/AIDS epidemic is at an earlier stage, should be aware of the high return to HIV/AIDS prevention campaigns when they make intersectoral allocations of their governments' budgets.

Even in Thailand, however, there is no room for complacency. Although policies have been successful in lowering new infections, prevalence of HIV in high-risk groups is still high—especially among those groups that past prevention efforts did not explicitly target, such as intravenous drug users (IDUs) or male sex workers. There is also evidence that the effect of past prevention campaigns is waning. Recent rounds of the Behavioral Surveillance Survey (BSS) show that the percentage of male conscripts reporting sexual relationships with commercial sex workers, after declining for several years, has started to increase again in 2002 and 2003. The same pattern is visible with other female sex partners and among married conscripts who have extramarital sex. Condom use among those male conscripts is not high: only 59 percent report consistent use of condoms with sex workers, and only 25 percent do so with nonregular female sex partners. New risk behaviors by other groups, such as youth, also need to be addressed.

Measurement of the Effect of ART Policy

Because the objective of ART policy is to lengthen and improve the lives of the recipients, a natural measure of the effectiveness of a policy is the number of life-years that ART adds to the population. Public policy makers need to consider not only the direct effects of ART policy on the patients receiving ART, but also the indirect effects of ART on the creation of new HIV infections. For example, increasing evidence suggests that ART patients are significantly less infectious than they would be in the absence of ART or with only mono- or duotherapy. However, growing evidence also indicates that greater access to ART may lead to complacency and increased risk behavior by people on ART and by people (whether HIV negative or positive) in surrounding communities (Dukers and others 2001; Stolte and others 2001; Van de Ven 2005).

Assessing the spillover effects of ART on people other than the patient is an indispensable part of designing a policy. Table ES.3 provides a classification of the indirect (or external) effects into biological and behavioral effects on transmission. Within each of the categories, the effects could be beneficial by slowing transmission or could be

Table ES.3 Possible Effects of ART on HIV Transmission

| | | <i>Direction of effect</i> | |
|-----------------------|-------------------|--|--|
| | | <i>Beneficial (slow transmission)</i> | <i>Adverse (speedy transmission)</i> |
| <i>Type of effect</i> | <i>Biological</i> | Reduces infectiousness. ART may lower viral loads and may therefore lower the risk of transmission per sexual contact. | Selects for resistance. Imperfect adherence to ART selects for resistant strains of the virus, which can then be transmitted. Longer duration of infectivity. The greater longevity of HIV infected people taking ART has the unintended negative consequence of increasing the period during which the patient can transmit the virus. |
| | <i>Behavioral</i> | Encourages prevention, especially diagnostic testing. ART may increase the uptake rates of prevention activities, particularly voluntary counseling and testing. | Increases risk behavior. People receiving ART, and HIV positives and negatives in the surrounding community, may engage in more risky behaviors than they would if ART were unavailable. |

Source: Over and others 2004.

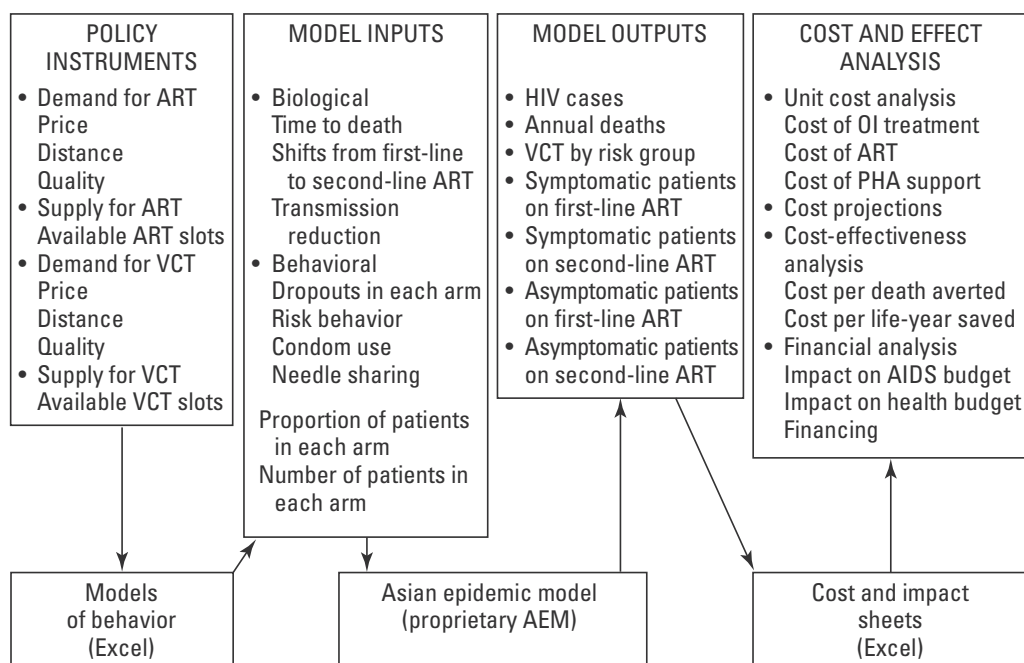
adverse by accelerating it. The measure of the importance of any of those effects is the rate of new HIV infections, or the *HIV incidence rate*.

To project the costs of ART policy, we have adopted the simplifying assumption that most program costs will be related to the individual patient in the form of provider time, pharmaceutical products, diagnostic tests, and disposable paper and rubber products. Therefore, the costs will not vary much with scale or scope. The exception we are making to this rule is the cost of equipping a health care facility that is not a district hospital with the capacity to administer ART. We assume that to qualify to manage one or more ART patients, any facility must train a minimum number of providers in ART protocols, and that to keep providers abreast of the rapidly changing technology of ART, the facility must retrain those staff members every year. This category of costs might be called *recurrent fixed costs*. The costs recur every year as a function of the number of facilities but can be spread over all the patients at the facility.

The Effects of Thailand's ART Policy

To estimate the effect of NAPHA and then of the cost-effectiveness of various modifications of NAPHA, we must model how the specific changes introduced by NAPHA influence the behavior of patients and providers. Our approach is to construct a model of the links between government instruments and policy outcomes. We do this in five steps summarized in figure ES.3.

- First, we model the link from the two primary policy instruments—price and availability (or supply)—to the distribution of patient demand for care.
- Second, we project the evolution of prices and availability into the future, and we then compute the projected distribution of demand across treatment options.
- Third, we apply the expected demand to the Thai population of eligible infected people, as projected by an updated version of the Asian Epidemiological Model (AEM),² in order to deduce the future of ART use.

Figure ES.3 Policies to Epidemiology to Performance

- Fourth, we estimate the direct and spillover effects of ART use on health and HIV incidence.
- Fifth, we apply unit costs to estimate the financial burden of the NAPHA policy.

Projection Scenarios

The effect of a policy choice can be defined only in comparison to what would have happened in the absence of this choice. This alternative scenario, called a *baseline* or *counterfactual*, is a projection of the future course of AIDS treatment if the Royal Thai government had not introduced its expanded NAPHA program. Several alternative baseline scenarios could have been chosen—see cells (a), (b) and (c) in table ES.4. Each of these scenarios corresponds to a different combination of public financing of ART and government subsidization of the production and sale of low-cost ART. The chosen baseline corresponds to cell (a): what would have happened if the government had kept only its previously existing (pre-2001) voluntary program, with only branded drugs available?

Table ES.4 Potential Baseline Scenarios or Counterfactuals to NAPHA

| <i>Government to finance ART publicly</i> | | | |
|--|--|---|---|
| | <i>No (private out-of-pocket only)</i> | <i>Yes</i> | |
| <i>Government to produce and sell low-cost ART (GPO-vir)</i> | No | (A) Baseline scenario: No government intervention takes place. There is a voluntary program only, too small to make a difference. | (B) Government provides subsidized public production with no possibility of alternative supply channels (buyers' clubs and so forth). |
| | Yes | (C) GPO produces and markets GPO-vir at current prices (less than US\$1 per day), but government does not expand public delivery of ART through the public health system beyond the voluntary Access to Care program. | (D) NAPHA: This scenario includes the current form and alternative versions including stimulating VCT for earlier recruitment and introducing demand-side incentives to increase adherence. |

Source: Authors.

The effect of NAPHA is obtained by comparing outcomes from cell (A) to those from cell (D). The total effect could be separated into one part because of the availability of low-cost generic ART and another part as a result of the public finance of ART provision. Such a deconstruction would enable us to attribute some portions of the benefits of NAPHA to each of its two components and another portion to the synergy between them. We do not undertake that deconstruction here.

In addition to the NAPHA policy scenario described above, the report considers two enhancements to NAPHA and a third policy that

Table ES.5 Policy Scenarios for the NAPHA Program

| <i>Encourage VCT and Early Recruitment into ART</i> | | | |
|--|------------|---|---|
| | <i>No</i> | <i>Yes</i> | |
| <i>Encourage adherence through demand-side incentives such as PHA groups, accompagnateurs, and conditional transfers</i> | No | NAPHA (D1): Current implementation of NAPHA program (recruitment of mainly symptomatic HIV through the public health system) | VCT (D2): Earlier recruitment through VCT (at higher CD4 counts), without improved adherence |
| | Yes | Adherence (D3): Improved adherence without earlier recruitment (keep current recruitment of symptomatic HIV through public health system) | VCT and Adherence (D4): Improved adherence and earlier recruitment (recruit earlier through VCT at higher CD4 counts) |

Source: Authors.

would combine those two enhancements (table ES.5). The enhancements are chosen to address what are perceived by knowledgeable Thai and international observers to be potential weak points in the NAPHA program and, indeed, in all publicly financed and publicly provided ART programs worldwide.

Early analyses of the general effectiveness and cost-effectiveness of publicly provided ART assumed that many HIV-infected patients would be recruited to treatment when their immune systems first dropped below an eligibility threshold. As a result, the benefits of ART would be maximized. However, experience in Thailand, as well as in several other countries (for example, Botswana, Brazil, Malawi, and member states of the Organisation for Economic Co-operation and Development), shows that most patients are identified as being ART eligible only when their opportunistic illnesses lead them to the hospital, which is usually when their CD4 counts are already well below the threshold at which they would most benefit from care. Thus, it is useful to analyze an alternative version of NAPHA that would include a much more vigorous promotion of voluntary counseling and testing (VCT) in an effort to attract patients into treatment when they first become eligible for it.

A major challenge for ART programs will be to attain and sustain high levels of adherence among their patients. Ministry-sponsored training programs for public sector ART providers are currently teaching the importance of adherence. However, experience around the world suggests that, as ART treatment is scaled up, it will be increasingly difficult to attain high levels of adherence among new patients and to sustain those levels among all patients. One promising approach with which Thailand has already experimented is both to subsidize and to facilitate the establishment of nongovernmental organizations that provide emotional, physical, and sometimes even financial support to patients. In this report, we refer to public sector delivery that has been strengthened by adding those demand-enhancing programs as augmented public delivery of ART. Our “Augmented (D3)” scenario is intended to capture the incremental benefits and costs of such a program.

We also model a “Both (D4)” program, which includes the costs both of expanded VCT and of augmented adherence and models a synergistic benefit between them.

Costs of ART

Costs of ART can be defined in many ways, such as costs to the public sector, to individual patients, and to society. To evaluate the various policy options for expanding public provision of ART in Thailand, we adopt the perspective of and estimate the costs to the public sector. Average costs of ART per patient are estimated according to the types of treatment regimens (first-line therapy and second-line therapy); modes of service delivery (public, augmented public, and private service delivery); and stages of the disease (asymptomatic and symptomatic HIV). Specific cost components included in estimating average costs of ART per patient are costs of ARV drugs, lab tests, and monitoring; costs of treating opportunistic infections (OIs); and PHA support expenses. Cost data were obtained from existing studies in Thailand, both published and unpublished, and from informal consultations with local and international experts.

Table ES.6 Costs of ARV Drugs per Patient by Types of Regimens in Thailand

| <i>Antiretroviral drugs</i> | <i>Monthly cost</i> | | <i>Annual cost</i> | |
|---|---------------------|-------------|--------------------|-------------|
| | <i>Baht</i> | <i>US\$</i> | <i>Baht</i> | <i>US\$</i> |
| <i>First-line regimens (per MOPH guideline)</i> | | | | |
| (1) 3TC + d4T + nevirapine | 1,200 | 30.0 | 14,400 | 360.0 |
| (2) d4T + 3TC + efavirenz | 2,579 | 64.5 | 30,948 | 773.7 |
| AZT + 3TC + efavirenz | 3,819 | 95.5 | 45,828 | 1,145.7 |
| AZT + 3TC + nevirapine ^a | 2,400 | 60.0 | 28,800 | 720.0 |
| (3) d4T + 3TC + IDV/r | 3,500 | 87.5 | 42,000 | 1,050.0 |
| AZT + 3TC + IDV/r | 4,740 | 118.5 | 56,880 | 1,422.0 |
| Average cost | 1,606 | 40.1 | 19,271 | 481.80 |
| <i>Second-line regimens (per WHO guideline)</i> | | | | |
| ABC + ddl + LPV/r | 22,822 | 570.6 | 273,864 | 6,846.6 |
| ABC + ddl + SQV/r | 22,094 | 552.4 | 265,128 | 6,628.2 |
| Average cost | 22,458 | 561.5 | 269,496 | 6,737.4 |

Sources: Bureau of AIDS, Tuberculosis, and Sexually Transmitted Infections, MOPH, 2004; Duncombe 2004; GPO 2004.

Note: US\$1 = B 40. Costs of ARV drugs are based on the lowest prices available (either generic or branded drugs) in Thailand, as of September 2004.

a. The GPO is currently in the process of producing a fixed-dose combination of GPO-Z (AZT, 3TC, and nevirapine). The cost of GPO-Z is approximately B 1,400 baht (US\$35) per month.

Table ES.7 Annual Cost per Patient by Types of Drug Regimens

| <i>Cost Items</i> | <i>Annual cost per patient</i> | | | | |
|---------------------------------|--------------------------------|--------|-----------------|---------|---------|
| | <i>1st line</i> | | <i>2nd line</i> | | |
| | Baht | US\$ | Baht | US\$ | |
| (1) ARV drugs | 18,847 | 471.2 | 263,567 | 6,589.2 | |
| (2) Lab tests | 1,210 | 30.3 | 1,210 | 30.3 | |
| (3) OI treatment | 4,815 | 120.4 | 4,815 | 120.4 | |
| (4) OPD service | 2,773 | 69.3 | 2,773 | 69.3 | |
| (5) IPD service | 6,041 | 151.0 | 6,041 | 151.0 | |
| (6) ARVs + lab tests | (1) + (2) | 20,057 | 501.4 | 264,778 | 6,619.4 |
| (7) Hospital services (IPD+OPD) | (4) + (5) | 8,815 | 220.4 | 8,815 | 220.4 |
| (8) Total ART cost | (3)+(6)+(7) | 33,688 | 842.2 | 278,408 | 6,960.2 |

Source: Supakankunti and others 2004.

Note: The presented cost per patient is an average cost of provincial and community hospitals.

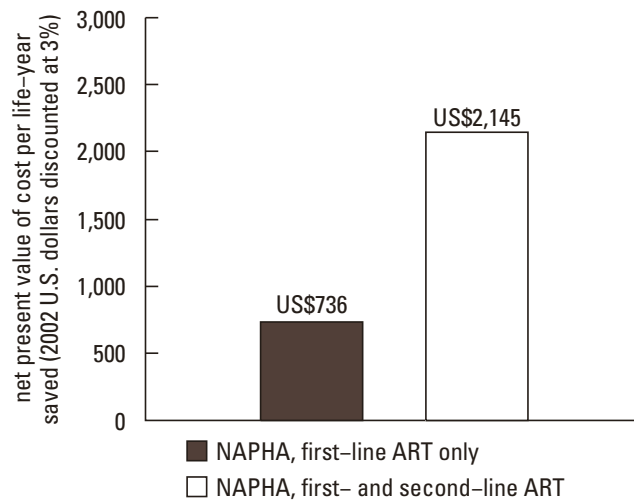
OPD- outpatient department

IPD – inpatient department

Table ES.6 summarizes costs of various regimens currently available and recommended by the Thai Ministry of Public Health (MOPH) and World Health Organization (WHO) in their treatment guidelines. The annual costs of ARV drugs vary significantly between first-line and second-line regimens, ranging from B 14,400 (using GPO-vir) to B 273,864 (using expensive protease inhibitors, or PIs) per patient per year. The average cost of first-line ART regimens is estimated at B 19,271 (US\$481.80) per patient per year, using a weighted average of three categories of ART drug regimens under the MOPH treatment guideline.³ The average cost of second-line regimens is estimated at B 270,000 (US\$6,740) per patient, costing 14 times more than the average cost of first-line regimens.

In addition to the cost of ARV drugs, significant costs are associated with providing and monitoring ART treatment. The costs of outpatient and inpatient services are not negligible because uses of medical services increase at the time of initiating ART treatment. On the basis of the estimates above, the annual average cost of ART using first-line therapy is estimated at B 33,700 (US\$840) per patient (table ES.7). The costs of ARV drugs and lab monitoring represent nearly 60 percent of the total ART expenses when first-line therapy is used, and the costs increase to 95 percent of the ART expenses when patients are on second-line therapy.

Figure ES.4 Cost-Effectiveness of NAPHA with First-Line ART Compared with NAPHA with Both First- and Second-Line ART



Source: Authors' construction.

Main Findings

The study has several significant findings.

Finding 1: NAPHA with First-Line Regimen Only Is the Most Cost-Effective Policy Option of Those Studied

NAPHA with first-line therapy only—at a cost of US\$736 or B 29,440 per discounted life-year saved—is the most affordable and cost-effective policy option modeled in this report. Figure ES.4 presents the cost per life-year saved of NAPHA without second-line drugs when compared to the cost per life-year saved of NAPHA with second-line therapy. The central finding is that the NAPHA program with second-line drugs can save years of life for US\$2,145, (B 85,800), whereas NAPHA with only first-line therapy is far more cost-effective at US\$736 (B 29,440) per discounted life-year saved.

In the absence of significant change in the price of second-line drugs, the cost of saving an additional life-year through second-line therapy is high when compared to the substantial health benefits of first-line policy only. On a pure cost-effectiveness basis, a policy with first-line therapy only would be superior. However, other considerations may weigh heavily on the government's final decision as to

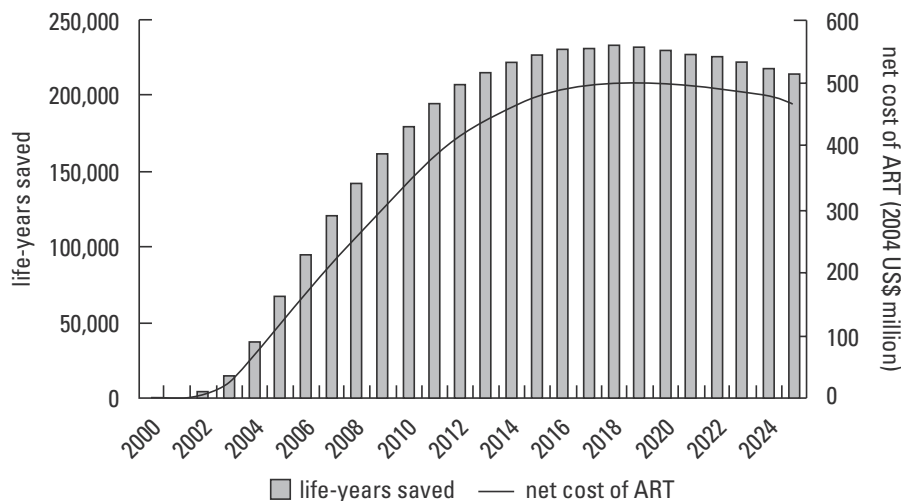
what policy to adopt. From the perspective of this study, affordability and equity are also relevant criteria.

An argument for horizontal equity would compare NAPHA with and without second-line therapy to the cost of saving life-years through subsidized treatment of other adult illnesses, such as cancer, heart disease, or end-stage renal disease. This comparison would show that NAPHA with second-line therapy is cost-effective relative to those other interventions. Advocates of vertical equity would argue that the government should ensure that the bottom of the income distribution has access to care that the top one-fifth will purchase for themselves (including second-line therapy).

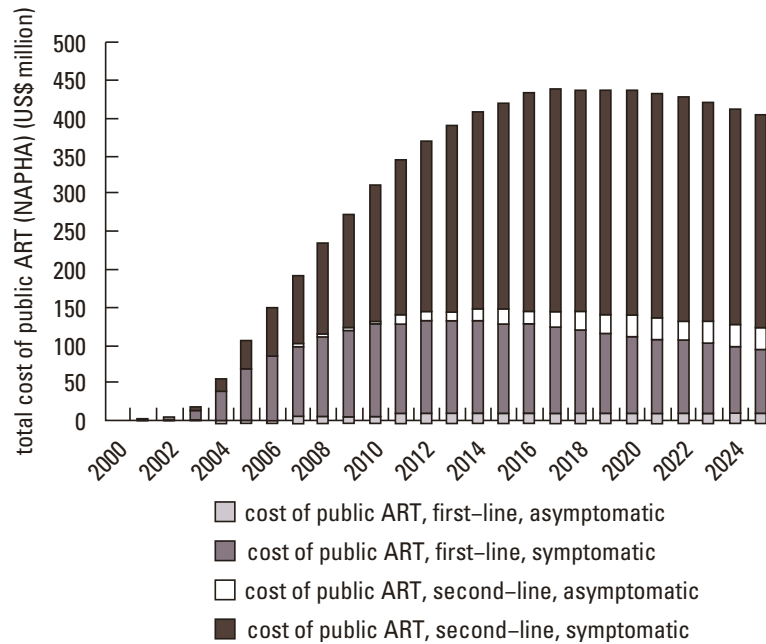
Finding 2: NAPHA with Second-Line Therapy Is Still Affordable and Yields Large Benefits in Terms of Life-Years Saved

By 2015, the current NAPHA policy will have added about 220,000 people per year to the living population. Even at the end of the projection horizon, when the Thai AIDS epidemic is predicted to slow, the NAPHA policy will be saving about 190,000 life-years each year (figure ES.5). Hence, 10 percent more life-years would be saved under the current NAPHA policy than under an equivalent NAPHA without second-line therapy. By keeping people alive longer, NAPHA will be associated with an increase in the number of HIV-infected people

Figure ES.5 Benefits (Life-Years Saved) and Costs of NAPHA relative to Baseline



Source: Authors.

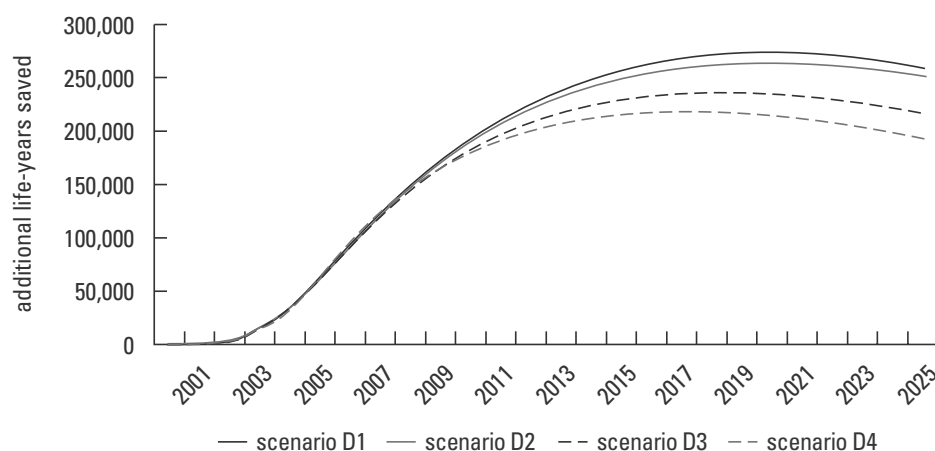
Figure ES.6 After 2010, Most Costs Are for Second-Line Therapy

Source: Authors.

Note: The notation *symptomatic* refers to symptomatic patients whose CD4 counts are below 50 cells per cubic millimeter. The notation *asymptomatic* refers to asymptomatic patients whose CD4 counts are between 50 and 200 cells per cubic millimeter.

in Thailand, as well as with a significant increase in the number of people living with HIV/AIDS who are on treatment. As a result, prevalence rates will no longer be an adequate objective for national HIV strategy (because success in treatment will be tied to an increase in the prevalence rate).

The total cost of NAPHA with second-line therapy reaches a ceiling at US\$500 million or B 20 billion per year in 2020. Beginning in 2008, expenditure on second-line therapy accounts for more than one-half of total ART spending. By the end of the projection, one-fourth of the patients receiving second-line therapy will absorb three-fourths of the treatment budget (figure ES.6). The projected cost of NAPHA will increase Thailand's AIDS spending from its current level of about US\$100 million or B 4 billion per year to more than five times that amount in 2020. However, even at its peak, total spending on AIDS treatment will require increasing the total health care spending by less than 25 percent. We judge this level of expenditures to be affordable to the Thai government.

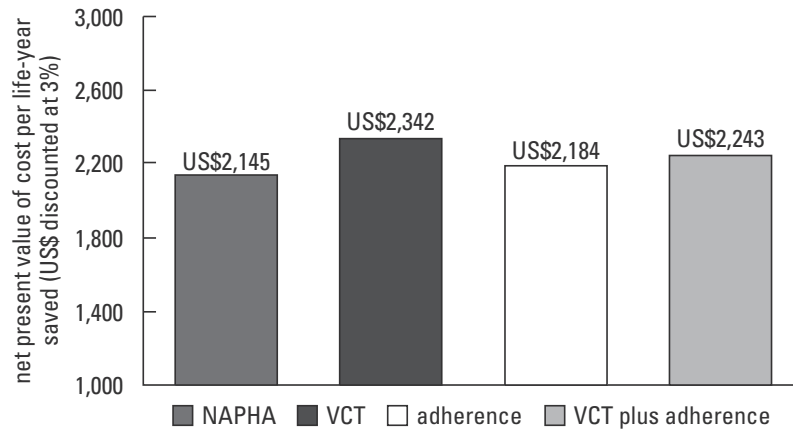
Figure ES.7 Projected Annual Life-Years Saved under Alternative Scenarios Relative to Baseline

Source: Authors.

Finding 3: Policy Options to Enhance Adherence and to Recruit Patients Earlier Are a Good Public Investment

Timely patient recruitment and enhanced adherence buy additional life-years. If initiated now, the expanded VCT, augmented adherence, and “both” policies would benefit more patients each year until the approaches save, respectively, 18,000, 50,000, and 60,000 additional life-years in 2020, on top of the 210,000 life-years saved that were generated by NAPHA alone in that year (figure ES.7). Thus, for 2020, the alternative policies offer the possibility of improving NAPHA benefits by almost 30 percent.

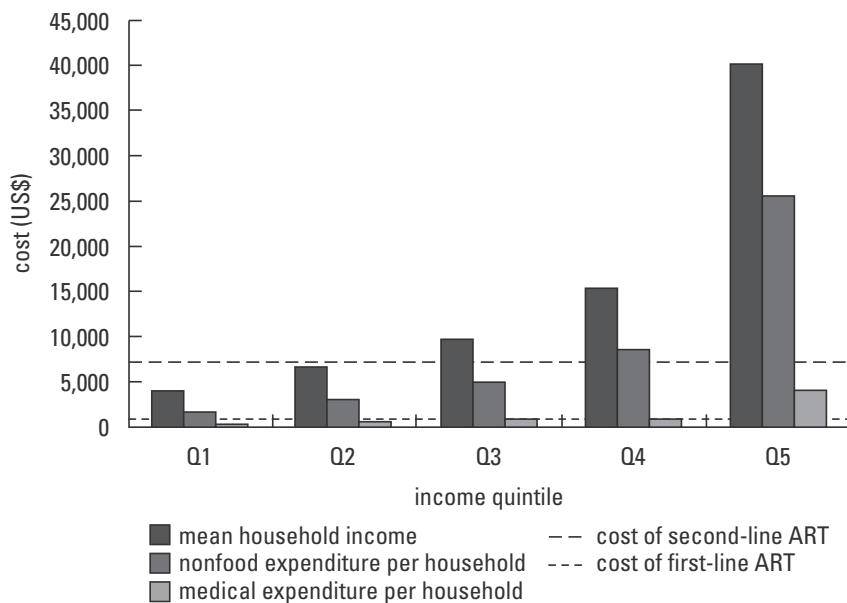
The expanded policies, however, also involve additional costs. Of the four policies considered, the current NAPHA policy is the most cost-effective (figure ES.8). The second-most cost-effective is the augmented treatment policy, which enhances patient adherence. We estimate that systematically adding patient support groups to all treatment sites in Thailand would increase the cost per life-year saved by less than US\$40 (B 1,600), thereby making this approach a good investment. Under the central assumptions of the model, spending the resources on expanded HIV testing in order to recruit patients in a more timely manner would increase the cost per life-year saved by only another US\$60 (B 2,400), which also seems like a good buy. Thus, we recommend that Thailand undertake both of the two analyzed policies to strengthen treatment, bringing the estimated cost per life-year saved to US\$2,243 or B 89,720.⁴

Figure ES.8 Cost-Effectiveness of NAPHA and Alternative Scenarios Relative to Baseline

Source: Authors.

Finding 4: Public Financing Will Help Ensure Equitable Access

Suppose that Thailand had reduced the price of first-line ART by authorizing the production of GPO-vir but had refrained from subsidizing treatment. For the top two quintiles in the income distribution, first-line ART could be affordable through user fees (figure ES.9). Even for the bottom two quintiles, the US\$842 or B 33,680 cost of first-line therapy compares with the medical expenses of the sickest households for a single year. The problems for the poorest households are likely to be caused by two unusual features of the cost of treatment. First, the treatment must continue for the rest of the patient's

Figure ES.9 Affordability of ART by Income Level

Source: Authors.

life. For those households in the lowest 80 percent of the income distribution that are able to raise the resources to pay the US\$842 for one year, the second and third year will become increasingly onerous. Second, poverty-induced laxity in treatment will lead to treatment failure, to development of resistant strains of the virus, to spread of those resistant strains to others, and to the requirement that the patient move to second-line therapy.

Although it is conceivable that the cost of first-line therapy could be partially financed with user fees, second-line therapy is much more expensive, exceeding the total household income of 40 percent of the population. Most people on first-line therapy will eventually need second-line therapy, and they will not be able to afford it without public support.

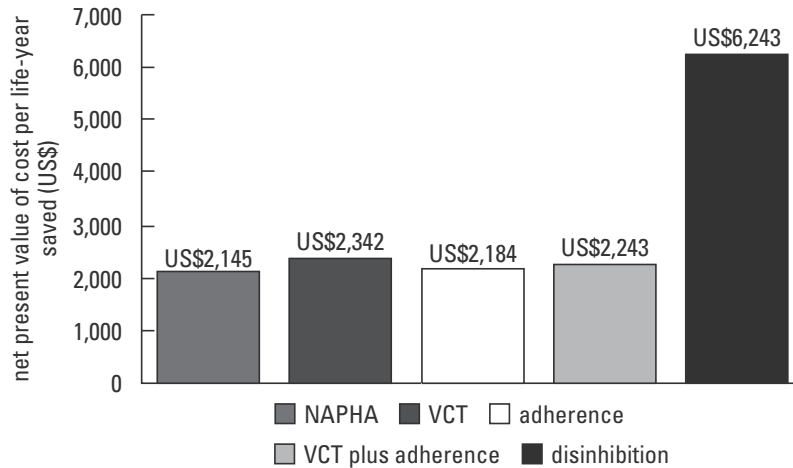
Finding 5: Public Financing Can Strengthen Positive Spillovers and Can Limit Negative Spillovers of ART

ART may be used to increase the effectiveness of prevention activities, especially VCT. But this beneficial effect of ART requires greater integration of treatment and prevention efforts than currently exists in Thailand.

Poor adherence to first-line therapy will speed the development of viral resistance to those drugs and will hasten the day when the patient must move to second-line therapy. Public intervention to support adherence can limit the spread of resistant virus. From a social as well as an individual perspective, adherence support mechanisms such as the augmented public care that we model in this report are likely to be cost-effective as well as therapeutically beneficial.

Finding 6: If the Success of ART Rollout Makes People or the Government Complacent about Prevention, Future Costs Could Rise Substantially

If the availability of ART is accompanied by a sustained government prevention program and if it leads people to reduce risk behaviors such as injecting drugs and having unprotected sex, then the cost-effectiveness of ART is improved by about 9 percent, and future government expenditures on ART will go down by US\$926 million or B 37 billion, or by 14 percent.

Figure ES.10 Cost-Effectiveness of Main Scenarios compared with Disinhibition Scenario

Source: Authors.

Conversely, if the availability of ART crowds out government expenditure on prevention and leads people to increase their risk behavior back to its levels in the early 1980s, government treatment expenditure will increase more than threefold. In such a case, as shown in figure ES.10, the cost per life-year saved would increase nearly threefold, from US\$2,145 to US\$6,243 (from B 85,800 to B 249,720).

Finding 7: Future Government Expenditures on ART and the Lives It Will Save Are Highly Sensitive to Negotiated Agreements on the Intellectual Property Rights for Pharmaceuticals

Because the drugs used in second-line therapy are patented, produced, and sold by multinational pharmaceutical corporations, Thailand must either pay the high prices demanded by those monopolies or exercise its rights under World Trade Organization (WTO) treaties to grant a compulsory license for the manufacture of the drug, subject to negotiated royalties.

Because Thailand stands to gain a great deal from bilateral agreements to reduce trade barriers with trading partners such as the United States, the Royal Thai government may be tempted to relinquish its rights to grant compulsory licenses for AIDS drugs in exchange for proffered trade advantages. The report finds that the cost of such concessions would be large. For example, by exercising compulsory licensing to reduce the cost of second-line therapy by 90 percent, the government would reduce its future budgetary obliga-

tions by US\$3.2 billion discounted (B 127 billion discounted) through 2025 and would cut by more than half the cost per life-year saved of the NAPHA program, from US\$2,145 to US\$940 (or B 85,800 to B 37,600) per life-year saved.

The size of royalty payments that the WTO mandates to accompany compulsory licensing is indeterminate and is subject to negotiation. Thailand could enhance its bargaining power vis-à-vis the multinational pharmaceutical industry by coordinating its negotiations with other middle- and low-income countries.

Conclusions and Recommendations

In its current form, Thailand's NAPHA program is affordable. Under the model's assumptions, it is also cost-effective relative to the baseline scenario. Furthermore, although the two enhanced policies we suggest (early recruitment through expanded VCT and improved adherence through PHA groups) are less cost-effective, they are still a good bargain, particularly if both are enacted.

Much of the cost of ART over the long term is associated with provision of second-line treatment. One way to limit the potential financial burden is for the Thai government to make explicit the scope of its commitment to providing public ART: is it a limited commitment to provide only first-line treatment, or is it a more open commitment to provide whatever level of treatment is required by the patient? Estimates of cost-effectiveness show that a version of NAPHA that includes only first-line drugs is much more cost-effective, at only US\$736 or B 29,440 per life-year saved, than the policy with second-line therapy. However, NAPHA with second-line therapy saves a quarter of a million more life-years.

A second way for the government to limit its expenditures on second-line therapy is to grant compulsory licenses for the manufacture of patented second-line pharmaceutical products. Doing so will require high-level political resolve that is based on an accurate understanding of the costs to Thailand, the health benefits, the budgetary savings, and the trade repercussions of such action.

Another option would be for the government to explore other financing mechanisms for ART, including greater use of user fees and health insurance schemes. In view of the government's commitment

to provide free and universal access to ART through NAPHA, any such plan would have to be carefully designed to avoid excluding people from treatment or discouraging adherence.⁵

Although affordable, expanding ART represents a long-term financial commitment that must be integrated into the budget processes. Once the Thai government begins to finance a patient's AIDS treatment, that access becomes an entitlement that cannot be sacrificed to budget cycles without incurring large political costs. Continuing to support existing ART patients for the rest of their lives and absorbing new ones while maintaining other health programs will require a 24 percent increase in the total health budget by 2013. Because no cure for AIDS is in sight, NAPHA represents a long-term government commitment.

The biggest challenge for Thai health policy makers will be to resist complacency and instead to build a synergistic relationship between treatment and prevention. This approach may require devolution of responsibility for both treatment and prevention to the province level or below so that government units that succeed with prevention will benefit from the saved treatment costs.

Success in rolling out treatment will make achieving the national AIDS strategy objective of less than 1 percent prevalence difficult to attain, because people with HIV will live longer. The first objective of the national AIDS strategy should thus be redefined in terms of HIV incidence, and it should be accompanied by measures to strengthen prevention in the light of expected (and already documented) changes in the risk behavior of both the vulnerable groups and the broader population.

The cost of US\$2,145 or B 85,800 per life-year saved through ART may be much more than Thailand would have to spend to save life-years with other interventions. The study recommends that Thailand accompany its expansion of the ART program with vigorous investigation of other promising opportunities to improve health cost-effectively. Prime candidates among those alternatives would be inexpensive HIV prevention programs, including condom distribution and peer education. Expansion of immunization programs, of traffic safety and trauma management, of nutrition programs, and of water supply are all candidates for cost-effective interventions that would save life-years at probably much less than US\$2,000 or B 80,000 per year.

Notes

1. GPO-vir is a single tablet that has a three-drug combination regimen (d4T + 3TC + nevirapine) and is produced by the Government Pharmaceutical Organization (GPO).
2. The details of the AEM and the model assumptions are described in chapter 4.
3. Weights are distributed by 80 percent, 15 percent, and 5 percent, respectively, for the ARV regimes (1), (2), and (3) as shown in table ES.6.
4. These policies to strengthen ART are independent of and much less costly than the decision to finance second-line therapy. They would be even more affordable and advisable if public finance paid only for first-line therapy.
5. Inclusion of AIDS treatment within the “30-Baht” national health care plan, a policy currently under discussion in Thailand, must take into account both the large cost of NAPHA and its uneven geographic distribution across the country. Space constraints prevent an analysis of alternative financing mechanisms for ART in Thailand.