



CHAPTER 2

LITERATURE REVIEW

Literature review of the study was undertaken on the following topics: 1) Economic cost of HIV/AIDS; 2) The impact of HIV/AIDS on the economy; 3) Classification of cost; and 4) Costing methodology.

2.1 Economic Cost of HIV/AIDS

Bloom and Mahal (1993) studied the economic cost of AIDS in four main categories. The first category includes the personal medical care cost associated with AIDS i.e. the cost of detecting, treating and caring for people with AIDS. The second category includes the non personal cost, such as the cost of blood screening, the cost of information, education and communication, and the cost of basic research on AIDS. The third category is the cost of forgone output and lost income because of AIDS morbidity and mortality. The fourth category consists of the psychological cost associated with the epidemic, such as pain and suffering caused by AIDS, and the cost imposed upon people who must behave differently to avoid contacting or transmitting HIV.

Yang (1993) studied the economic impact of AIDS in the Republic of Korea. The study computed lifetime economic cost for representative AIDS patients. The study estimated the outpatient cost as US\$ 2,215 for an average HIV cost of an AIDS patient (given 41st hospital day) was estimated as US\$ 2,010. The study found that the largest component of the cost of the AIDS epidemic was due to work time lost and future earnings foregone rather than to direct medical care expenditure.

Lertchayantee (1998) studied cost analysis on treatment expenditure of AIDS patients in the inpatient department of Phayao Hospital. The objectives were to study the size and cost of components of people with AIDS in IPD of Phayao Hospital in the year 1996-1997. The sample size was 1,880 case. The research was intended to analyze the cost components including 1) provider cost which contains the cost of

medical and non-medical, 2) consumer cost which contains direct and indirect cost of HIV/AIDS patients. The study revealed the components and size of the expenditure on treatment of PWA as medicines 69.0%, other services 12.8%, food and room 11.9%, lab tests 3.9%, X-ray 1.5%, and surgery 0.8%. The expenditure of PWA was characterized into 3 categories: 1) The hospital responsible for all treatment expenditure of PWA was 57.1% 2) PWA's out of pocket expenditure was 10.8% 3) The expenditure shared by hospital and PWA was 32.1% of the total expenditure. The most influential factor was the hospital responsible for treatments of PWA.

Lim et al. (1994) proposed a model of costing based on Singapore experience. The authors estimated direct and indirect cost of AIDS in Singapore. The indirect cost was estimated to be S\$ 32 million and the direct cost about S\$10 million. The ratio of indirect to direct cost was about three times, which is contrast to studies from the West that quoted a ratio of as much as five times. This is probably because the studies might have taken into consideration almost all components of the direct cost. The average lifetime medical cost per AIDS patients while they were living in Singapore was estimated to be S\$ 12,000. The average length of hospital stay was 42.1 days, which was similar to that in the UK and some studies in the USA. However, it is not meaningful to compare the medical cost in term of differences among these countries.

Masaki (1997) analyzed the cost of hospice care for HIV/AIDS patients in Thailand. The purpose of this study was to identify types of care provided for HIV/AIDS patients in a hospice and the cost of hospice care at Wat Prabat Nampu in Lopburi Province. This study focused only on the provider's perspective of cost and indirect cost of care for HIV/AIDS patients. The cost analysis includes 1) capital cost: building, vehicle and equipment, and 2) recurrent cost: personnel, material supply, maintenance and operating cost. Cost data was collected retrospectively from financial records during 1996 and analyzed qualitatively by using economic tools. Other data for identifying types of care in the hospice were collected prospectively by interviewing HIV/AIDS patients as well as their caregivers and observing activities in the hospice from March to May 1997. This study found the total cost of care for HIV/AIDS patients at

the hospice in 1996 was 11,869,574 Baht (US\$ 474,383), with 678 in-patients and 1,392 out-patient visits. The unit cost per in-patient was 16,924 Baht (US\$ 677) with the average length of stay of 8.2 days. The unit cost per out-patient visit was 277 Baht (US\$ 11). The unit cost per day was 2,064 Baht (US\$ 83) for in-patients. The three most beneficial types of care and support identified in the study were mental care, social support and housing, food and material support. The study found that the wide ranges of care and support were provided for HIV/AIDS patients in the hospice with a comprehensive approach.

Kongsin et al. (1992) studied hospital care cost analysis of patients with AIDS/ARC in the hospitals. The objective of this study was to inform decision making in Thailand about the cost implications of AIDS treatment. The research was aimed to analyze hospital care cost of HIV/AIDS patients that includes 1) routine service cost which is the cost per in-patient day, 2) medical care cost and 3) external cost, by using retrospective data from the division of provincial hospitals between 1988-1991. The study found that routine service cost was 341 Baht per in-patient day (US\$ 14), the medical care cost was 4,236 Baht per case (US\$ 169) and external cost was 1,154 Baht per case (US\$ 46). By using these costs and epidemic information, it is possible to help the government in predicting resources needed for AIDS/ARC medical care. The cost incurred by patients and their relatives reflect an economic burden on the family. This study serves as essential data for appropriate resources allocation in the prevention and control of the HIV epidemic as well as to improve the patients' care.

Tin Min (1996) studied the economic burden of HIV/AIDS in Myanmar from the provider perspective. This study emphasized how to estimate the provider direct cost for the treatment and prevention of HIV/AIDS for the next 5 years by using a costing model and Epimodel to calculate the cost. In order to calculate the cost of treatment and investigation, the data was collected from 40 AIDS patients admitted to the Infectious Diseases Hospital, Yangon, Myanmar from April 1, 1994 to March 31, 1995. The calculation of the cost of prevention was based on the information obtained from health personnel at the Central Health Education Bureau, Department of Health,

Myanmar. The economic burden of HIV/AIDS, according to different scenarios, is calculated the cost for each item and activity in each scenario for each year being calculated and compared. The methodology can be applied to all health centers and hospitals in Myanmar. The cost includes: 1) capital cost: building, equipment, and vehicles and 2) recurrent cost: personnel, supplies, maintenance vehicle and building. The total provider cost for HIV/AIDS with and without screening is expected to be 644 and 560 million kyats respectively for the next 5 years in baseline interventions.

Muangsrimumengdee (1994) studied cost effectiveness analysis of the treatment of AIDS related to with Zidovudine (AZT). The purpose of the study was to compare the cost-effectiveness of treating AIDS patients with or without Zidovudine at Chulalongkorn Hospital. The sample of 110 HIV positive patients was divided into two groups i.e. those who received Zidovudine and other did not, based upon matching criteria. The result of the study showed that the annual cost per case of the Zidovudine treatment group was 111,729 Baht. The cost incurred by the provider including medical and non medical cost was 1,234 Baht (1.1%), and the cost incurred by each consumer was 110,495 Baht (96.0%). The average cost incurred by each consumer was 69,300 Baht (62.7%) for Zidovudine drug, 3,244 Baht (2.9%) for other drugs, 9,534 Baht (8.6%) for laboratory cost, 768 Baht (0.7%) for X-ray cost, and 27,647 Baht (25.0%) for other cost. The annual cost per case for patients in the control group without Zidovudine treatment was 52,105 Baht. The cost incurred by the provider was 1,591 Baht (3.1%), and the average cost incurred by each consumer was 3,491 Baht (6.8%), laboratory cost, 10,119 Baht (20.0%), X-ray cost, 1,324 Baht (2.6%) and other cost, 35,578 Baht (70.4%). The results have shown that the use of Zidovudine therapy in AIDS patient is very expensive, particularly the cost of the drugs. In term of percentage effectiveness, Zidovudine therapy helps to delay the onset of AIDS in the ARC group. The life years gained when each patient received the drug for one year were between 0.24 years and 2.13 years which the receipt of continuous treatment.

Prommool (1995)'s survey was done to analyze the medical care cost for patients with AIDS and symptomatic HIV infection attending Bamrasnaradura Hospital between 1993 and 1994. This study indicated that the total year cost of medical care was 60,067 Baht (US\$ 2,402). The in-patients average number of admissions was 3 times a year and average length of stay was about 32 days. The total annual medical care cost was 19,752 Baht per person. For out-patients, the average hospital charge was 3,280 Baht each time. Of these amount patients were able to pay about 45.8% and the average survival time was 7.1 months. The total cost of medical care for AIDS patients in Bamrasnaraduara Hospital was estimated to be 46 to 368 million between 1995 and 1997. The life time medical care cost for AIDS patients in Thailand between 1995 and 1997 was forecasted to be 166 to 599 million Baht and about 125 to 451 million Baht, depending on government support. The estimation of the number of AIDS patients was analyzed by using Epimodel methodology which cost about 524 to 1,794 million Baht. The results have shown that the government has to spend a lot of money on AIDS care.

2.2 The Impact of HIV/AIDS on the Economy

Bloom and Godwin (1997) examined the impact of the AIDS epidemic on the UNDP's Human Development Index (HDI), another measure of economic well-being. They demonstrated that even though the AIDS epidemic will not affect average capital income significantly, it may nevertheless adversely affect the HDI, primarily through its negative effects on life expectancy. Particularly, they found that the HDI is reduced by nearly 0.002 for every increasing in cumulative AIDS epidemic which will reduce Sri Lanka's HDI in 2005 to 0.0019 below its projected level of 0.765.

Bloom and Mahal (1996) used socio-economic and AIDS data from fifty-one countries to examine empirically the question of whether the AIDS epidemic has had a significant effect on economic growth during the past decade. According to their results, the AIDS epidemic has a negative but statistically insignificant effect on the rate of growth of real income per capita. Specifically, they found that an annual average

increases in cumulative AIDS prevalence of 1 per 1,000 adults will reduce the annual rate of growth of real income per capita by a statistically insignificant 0.04 percent. The above result was used to evaluate the impact of the AIDS epidemic on economic growth in Sri Lanka. According to their forecasts, the cumulative AIDS prevalence was expected to increase from its 1994 level of 0.016 per 1,000 adults to about 1.064 per 1,000 adults by 2005, which amount to an average annual increase in cumulative AIDS prevalence of about 0.095 per 1,000 adults. Base on these estimation, from 1994 to 2005, the AIDS epidemic would reduce the rate of growth of real income per capita by 0.0038 percentage points below its trend rate. This confirms that the epidemic's macro economic impact in Sri Lanka was very little.

Viravaidya et al. (1993), studied the economic impact of AIDS in Thailand. The purpose of study was to estimate the direct and indirect costs of AIDS. Direct cost in the study included various costs of prevention and medical care whereas indirect cost mainly included loss in output to the economy. In the year 2000, the study estimated the health care cost for people with AIDS would be between US\$ 658 and US\$ 1,016 per year i.e. 30 to 50 percent of annual household income for the Thai family or more than twenty five times the current annual per capita government health expenditure. The indirect cost to the economy due to the premature death of adults in their prime working years was also estimated as an average of US\$ 22,000 per death. According to the authors, between 1991 and 2000, the 1993 value of the aggregate direct and indirect costs of the projected AIDS cases and AIDS deaths would total between US\$ 7.3 billion and US\$ 8.5 billion.

2.3 Classification of Cost

Cost is defined as the value of a resource used to produce something, including a specific health service or a set of services which may be expressed as a monetary or non-monetary value of actual expenditure for the acquisition of these goods or services (Creese and Parker, 1994).

This classification distinguishes two categories of resources (inputs): recurrent cost and capital cost (see Table 2.1). The distinction between the two categories is

based on life expectancy. Those that are used up in one year and usually purchased regularly are recurrent cost which includes such items as personnel salaries, medicine and supplies, gasoline, electricity, drugs and food. Capital cost is buildings, vehicles, and equipment that last longer than one year.

Table 2.1 Classification of Cost by Input from Provider Perspective

Capital cost	Recurrent cost
Buildings	Personnel
Vehicles	Material supply
Equipment	Maintenance
Long - term training	Short - term training
	Operational cost
	Other operational cost

Source: Creese and Parker, 1994.

Classification by function or activity involves the kind of activity or function for which the resources are used. An MCH program, for example, encompasses a wide range of activities, such as the weighing of children, tetanus toxoid vaccinations for pregnant women, pre-natal care, supervision of deliveries, and the vaccination of children. For each of these activities, groups of physical inputs are required. For example, infant weighing requires personnel to do the weighing and record the results, scales, tables, charts, building space and possibly vehicles.

Activity cost is direct cost which may be defined in relation to a given activity, a medical service or a hospital department. The direct cost of a medical service is the cost relating to the provision of that service alone. For example; the drugs consumed by a patient are a direct cost in the treatment of that patient's disease. The cost of radiology equipment is a direct cost to the radiology department and has nothing to do

with the laboratory department. Direct cost is easy to identify and relatively straightforward to calculate.

Indirect cost is very difficult to identify. These are the cost of goods and services used jointly for several activities or by several departments of the health facility, and that cannot therefore be attributed in their totality to one department, service or activity. For example; the hospital guard does service for the entire hospital. His employment therefore incurs a cost for the hospital as a whole. But this common cost can be distributed between the different departments or services on the basis of these following criteria:

1) Base on the service provided, which may be used more by some departments than others. For example, if the guard spends 50% of his time keeping guard over the equipment of the surgery department, then 50% of the cost of his service can be attributed to that department.

2) It can be decided to spread the common cost evenly between the different services. For instance, if a hospital has five technical departments, 20% of the common cost can be assigned to each departments.

3) The common cost can be distributed in proportion to the volume of activity of the departments. If it is determined that the volume of activity of the surgery department represents 30% of the common cost then they can be assigned to that department. But the problem is that the concept of volume of activity may have several definitions. A department's volume of activity may be defined in term of the volume of work of the personnel; the number of patients admitted by the department; the size of the departments revenue from payment; the amount of its direct cost; other criteria (Carrin and Elvo, 1995).

2.4 Costing Methodology

Several inputs can be used not only for a particular purpose but also for other purposes. People, buildings, vehicles, equipment, and supplies have multiple purposes for using; however, only some of them are used for the prevention and treatment of

HIV/AIDS patients. There is a variety of services, depending on shared inputs, such as the staff who provides various types of care and services to various types of patients (see Table 2.2). The cost is also determined by the quality of resource.

Table 2.2 Allocating Shared Inputs

Input	Dimension Determining Cost
Vehicles	Distance traveled/Time used
Equipment	Time used
Building Space	Time used/Space used
Personnel	Time worked
Supplies	Weight/Volume
Vehicle Operation and Maintenance	Distance traveled/Time used
Building Operation and Maintenance	Time used/Space used
Other Input	Miscellaneous

Source: Creese and Parker, 1994.

There are various methods for cost analysis in the health care program. Hospital costing methodologies are well established and widely used for cost analysis for HIV/AIDS care. The hospital costing methodology developed by the WHO is applied to the costing method in this study. The common cost will be distributed on the basis of the volume of activity of the departments.