

## CHAPTER 4

### RESEARCH METHOD



#### 4.1 Research Design

This research is a static group comparison of experimental study followed by retrospective evaluation design. Judgments of retrospective evaluation study are made of the extend to which objectives, outputs, effects and impacts of the New Deal have been achieved. The study search for costs and its outcome related to the whole health care services delivery under the New Deal and conventional system for Sotnikum and Kralanh hospitals.

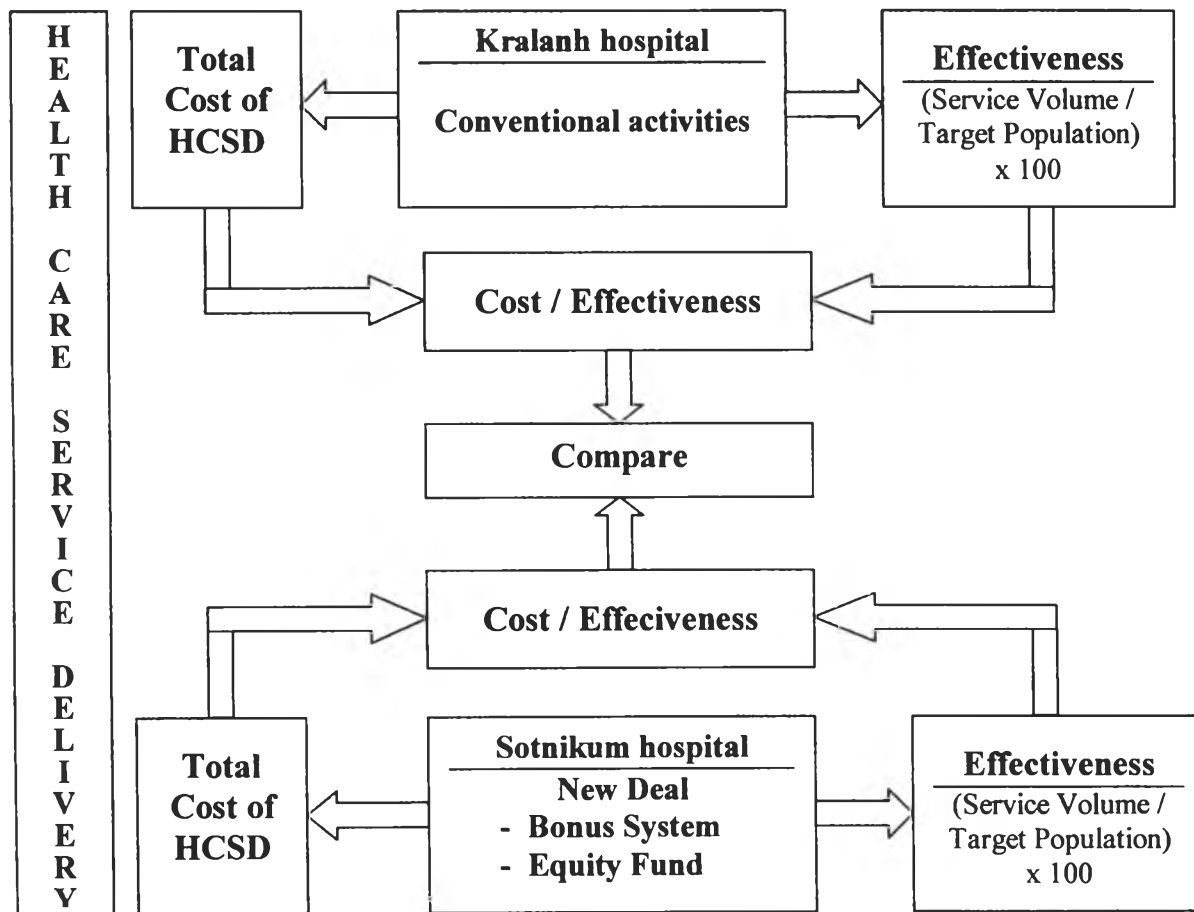
#### 4.2 Conceptual Framework

This study proposed to estimate the total costs of health care service delivery and to find out the outcomes of providing the services to the population in the catchment area of the two hospitals. The method used is the comparison of cost-effectiveness between Kralanh and Sotnikum hospitals under conventional activities and the New Deal using service volume recorded in the year 2002.

The study only focuses on provider's costs. The total cost was calculated from capital and recurrent costs. Capital cost consists of the cost of building, vehicles, and equipment. Recurrent cost includes the cost of staff (salary), drugs and medical supplies, food, water, electricity, maintenance, etc. The unit cost of each cost center includes unit cost per OPD and IPD were analyzed by using step-down allocation method and compare to improve efficient strategies of providing hospital services.

Two effectiveness measures were used in this study. Number of service utilization in both hospitals such as IPD and OPD were considered directly as effectiveness of the services. The effectiveness was also expressed as proportion using service volume mentioned above divided by target population of that catchment area and multiplied by 100. The conceptual framework of health care service delivery for Sotnikum and Kralanh hospital is shown in Figure 4.1.

**Figure 4.1 Conceptual Framework of CEA between New Deal and Conventional System**



Note: HCSD = Health Care Services Delivery

## **4.3 Operational Definition**

### **4.3.1 Costs**

Hornigren et al. (2000) defined cost as a resource sacrificed or forgone to achieve a specific objective. It is usually measured as the monetary amount that must be paid to acquire goods and services. To guide their decisions, managers want to know how much a particular thing (such as a product, machine, service, or process) costs.

Creese and Parker (1994) stated that to estimate a health program's costs, it is necessary to clarify its components. Cost elements can be broken down in several ways, as illustrated below. A good classification scheme depends on the needs of the particular situation or problem, but there are three elements:

- It must be relevant to the particular situation.
- The classes (categories) must not overlap.
- The classes chosen must cover all possibilities.

Economists define cost as the value of resources used to produce something, including a specific health service or a set of services (as in a health program). There are many cost classifications such as classification by inputs, by function/activity, by source, by currency. But, in this study, classification of costs by inputs is a common category has been used in the analysis. Furthermore, it is useful and widely applicable in Cambodia. It groups inputs into categories in which the elements have recognizably similar characteristics (see Table 4.1).

### **4.3.2 Accessibility**

Hardeman (2001) stated that the term of accessibility is concerned with people's ability to access health care, whatever the quality of care provided. Another way, accessibility is the ability of all people to obtain the service, and that no obstacles – geographical, transport, language difficulty or lack of money – stop them receiving the service. According to Almata conference in 1978 on primary health care (PHC) defined four main accessibility constraints to health care services, if we can solve these limitations, the accessibility to the hospital services would increase. These four constraints are: 1) financial constraint, 2) geographic constraint (e.g. distance), 3) Cultural constraint, and 4) Executive constraint/service quality.

**Table 4.1 Classification of Costs by Inputs (with examples of each category)**

<b>Cost Item</b>	<b>Meaning</b>
<b>Capital Costs</b>	
<b>Building, space</b>	Health centers, hospitals, training schools, administrative offices, storage facilities
<b>Equipment</b>	Refrigerators, sterilizers, manufacturing machinery, scales, etc
<b>Vehicles</b>	Bicycles, motorcycles, ambulance, trucks
<b>Training, non-recurrent</b>	Training activities for health personnel that occur only once or rarely
<b>Social mobilization, non-recurrent</b>	Social mobilization activities, e.g. promotion, publicity campaigns, that occur only once or rarely
<b>Recurrent Costs</b>	
<b>Personnel (all types)</b>	Supervisors, health workers, administrators, technicians, consultants, casual labour
<b>Supplies</b>	Drugs, vaccine, medical supplies, small equipment
<b>Building, operation and maintenance</b>	Electricity, water, heating, fuel, telephone, telex, insurance, cleaning, painting, repairs to electrical supply/ appliances, plumbing, roofing and heating
<b>Vehicle, operation and maintenance</b>	Petrol, diesel, lubricants, tires, spare parts, registration, insurance, repairs
<b>Training, recurrent</b>	e.g. short in-service training
<b>Social mobilization, operating costs</b>	Operating costs
<b>Other operating costs not included above</b>	

Source: Creese & Parker (1994).

### 4.3.3 Quality of Care

Hardeman (2001) said that “quality of care is concerned ultimately with health outcomes, but understood here as the degree to which health care provision corresponds to specified standards. Standards of quality of care are not universal, but depend on their affordability and appropriateness in a given context”. Apart from capital inputs that influence quality (building, equipment), many other factors are involved: staff incentive, supplies, regulation, ethics, community participation, as well as the structure and management of the health system.

Roemer & Aguilar (WHO, 1988) defined “quality of care “ as “proper performance (according to standards) of interventions that are known to be safe, that are affordable to the society in question, and that have the ability to produce an impact on morbidity, mortality, disability and malnutrition”. The simplest and most comprehensive definition of quality is that used by advocates of quality management: “doing the right thing right, right away”.

Quality is a concept that involves many aspects to be considered, but which also deals with the total service provided. Quality of care is one part of quality management that is an approach that promotes continuous improvement in the performance of an organization. With the support and leadership of health managers, quality management ensures that the services provided meet the highest professional standards, with the lowest level of risk to staff or patients. As a result of quality management, clients become increasingly satisfied with the service, the health system has a positive impact overall on the community and health status continue to improve.

Evaluation of quality of care depends on the perspective of person who makes the judgement. Different individuals will emphasize different aspects of care. Policy makers will want to see their programs implemented and outcomes achieved. A manager may focus on effectiveness and efficiency in terms of outcomes. A professional colleague will assess the quality of care on whether it meets professional standards. The client will be concerned at how well they were treated, how well the treatment was explained and whether it was effective or not. The target we study here is from patient’s perspective to assess patient’s satisfaction on quality of health services.

The assessment dimensions of patient satisfaction should include:

- a. Availability of services
- b. Facilities, environment, cleanliness, material and equipment
- c. Staff performance (friendliness, courtesy, information provided during consultation and examination)
- d. Drug and medical supplies availability
- e. Management of the hospital (opening hours, staff availability and their presence, bureaucracy)
- f. Price advertised, price list clearly displayed on the wall, transparent payment
- g. Efficacy of treatment

#### **4.4 Data Analysis**

Concerning the long-term sustainability of the program, the total costs of all inputs, even those temporary provided by donors or paid for at below market rates, were estimated. This means that the terms “opportunity cost” or “economic cost” is used in costing. It recognizes the cost of using resources that could have been productively used elsewhere. Analyzes using economic costs do not replace those using financial costs, but supplement them with additional information useful for decision making.

##### **4.4.1 Calculation of Capital Cost**

To calculate the average annual capital costs, the following information was needed:

- Identify all capital items
- Determine its construction or renovation price  $C_t$
- Find-out the interest rate in the period of the study  $r$  (2002)
- Estimate lifetime span of the asset  $n$

##### **1) Cost of Building**

All the buildings that were valued included every building that serves the hospitals and registered in the hospital inventory lists. Costs to be included were the total costs to build the building now and the estimates of the cost per square meter ( $m^2$ ) for the category of building such as wooden or concrete, with or without foundation, single or multistory. The cost of basic furnishings and built-in equipment were not included in this study.

Cost of building space of each hospital is composed of many buildings that have different space, different working life, and also different cost and year of construction or renovation. The total annual costs of building space of each hospital were estimated by using approach described above. This method consists of obtaining an estimate of local private construction cost for similar building space. The estimates were distinguished between concrete and wooden buildings, and between foundation and no-foundation buildings discussed with hospital management.

## 2) Cost of Equipment

All equipment used in these two hospitals was listed in the tables. Some equipment provided by government and some others by donors. It was impossible to get the complete information for equipment at both hospitals. Like building criteria, the critical factors such as lifetime in years and their purchased or received prices. Because of the constraints mentioned earlier, the original receipt vouchers were used in this calculation.

Some of the equipment was evaluated as out-of-work and had no value, and some others were evaluated as in bad condition, but they were still in use and have value at the time of the study. Thus, all equipment in use was used in the calculation to get the annual economic cost of equipment for both hospitals. The working life span of all equipment depends on the experience of the local users. It must be noted that to get annual economic cost of any capital item, two steps of economic cost calculation method were used:

$$(1) \text{ Calculation of Current Value} = C_{2002} = C_t (1 + r)^{2002-t}$$

$$(2) \text{ Calculation of Annual Economic Cost} = \text{Current Value} / \text{Annualization Factor}$$

## 3) Cost of Vehicles and Machinery

Vehicles and machines used in this study include bicycles, motorcycles, cars and ambulances. Costs of vehicles and machinery were the received cost but not the purchased cost because local users did not have any right to purchase capital items by themselves. The sources of costs data were the original receipt vouchers from the suppliers and the local inventory lists kept by those hospitals were used for estimation. The working life span of vehicles and machinery varies considerably, depending on vehicle types, terrain, and use, and

maintenance practice at the local level. A local consensus was reached on the expected working or useful life of each type of vehicle based on their experiences.

#### **4.4.2 Calculation of Recurrent Costs**

Recurrent costs (RC) or operating costs are the main category of resources are used up in the course of a year and are usually paid or purchased regularly (every year). Two main categories of recurrent costs were included in this study - costs of personnel (or labor costs) and material costs.

##### **1) Costs of Personnel (or Labor Costs)**

To estimate the costs of personnel of the two hospitals for year 2002, three main components of personnel costs - salary and allowance for permanent staff, bonuses, and overtime and temporary staff salary - were considered. These cost components were the single largest cost item in health care program. Naturally, the aim of the study would only want to deal with the costs of the staff whose time, in whole or in part, was assigned to the health care service delivery of the two hospitals. The full cost of employing someone was represented by individual's gross earning from at least three main categories mentioned above.

##### **2) Material Cost**

This category is for materials used up in the course of one year, as direct inputs to the principal activities performed by the hospital, and other items purchased during the year. As mentioned above, the material costs represent many items including drugs and medical supplies, operation and maintenance of building, equipment and vehicles, food and patient supplies, stationery and other operating cost items, etc.

There is no formula to calculate the specific amount spent on material cost, only materials consumed were counted. The received cost of supplies from providers/donors as well as the amount spent during the year were included in this study. The costs were that all the materials consumed and the amount spent, that appeared on the monthly and annual income statement of the hospitals. The detailed expenditure records were useful for estimating the specific material costs of the two hospitals.



#### 4.4.3 Measuring Effectiveness

Many different terms are used to describe the “other side of the coin” of an activity or program. We may refer to consequences, outcomes, outputs, benefits, results, impact or effects. These terms are similar, but they cannot all be used interchangeably. A major distinction in economic language is between “*benefits*” which, strictly speaking, refer only to outcomes that can be measured in money terms and “*effectiveness*” or “*effect*” which are outcomes that are not expressed in financial terms.

Choosing an indicator of effectiveness was the very important step in measuring effectiveness. There are a number of indicators or measures of effectiveness that reflect *intermediate changes* rather than *final outcomes*. In this study, the objective of the New Deal is *to promote access and utilization of health services*. Thus, the services provided must be utilized by the population or the communities that must then respond by changing the type of health care, the health or economic status by the quality of care in the hospital.

Because of the difficulty in defining the final outcome of health care service delivery provided by hospital, the intermediate outcome such as number of patients appropriately treated were assumed as the effectiveness measure of the extent to which the objective of the New Deal was achieved.

The intermediate outcomes, such as the number of people exposed to the different quality of care in each hospital or the number of changing their type of health care (number of service utilization) can serve as partial measures of effectiveness. Their chief advantage was the relative ease with which they can be measured and interpreted even when the final health status data are not available. These intermediate measures can usually give some indication of the results. Hospital service outputs, such as number of OPD and IPD appropriately treated, were selected in this study because of measuring changes in health status is a difficult and expensive task and take time.

#### 4.4.4 Patients' Satisfaction Analysis

By using SPSS software, all responses to the research questions interviewed with the respondents provide understanding of data and test relationships that is consistent with the behaviors of the population towards public health services. Furthermore, this analysis

assessed the effectiveness of the new project that has been introduced at Sotnikum hospital. The analysis provided proof to believe that the change in the hospital utilization rate was a result of the resource inputs used in New Deal project. If the result of patients' satisfaction survey significantly improved, that is one way to estimate the effectiveness of this intervention.

Data used were based on face-to-face interviews of respondents who responded to series of questions concerning their knowledge towards Sotnikum hospital before and after New Deal. There were two sets of questionnaires, one for IPD, and another for OPD. Sample size of sixty was selected in this study, thirty for IPD and other thirty for OPD.

The questionnaire set consisted of two parts: one part includes general information of each individual and the other part relates to the dimension of service quality. Scoring system was used to assess the level of satisfaction both before and after New Deal by using the “**Likert Scales**” that researchers often use to measure people's opinion. The most common scale used here is 1-to-5. The scores of each question were analyzed using SPSS software and the results of the analysis were illustrated as frequency, sum, mean and standard deviation of the total score.

## **4.5 Sources of Data**

### **4.5.1 Primary Data**

Primary data were collected and analysed to find out the level of patients' satisfaction on New Deal. A field research was carried out on 05 to 12 March, 2003 to gather specific primary data and information about patients' satisfaction on Sotnikum hospital health care services delivery under New Deal. Quality of service assessment was a critical element in this study.

#### **Steps involved in assessing the service quality from the patient perspective**

##### **1) Objective of assessment:**

To assess the patients' satisfaction on quality of care of Sotnikum hospital under the New Deal. All dimensions of quality of care were used to develop the questionnaires.

## 2) Selecting the sample unit and sampling frame

The selection of the sample units was determined by the objectives of the research. There were many possible sample units that could have been included such as an individual or household, an operational unit, a village or social group, etc. Each of these units was appropriate for a particular interest. In this study, the sample unit was the operational one, that is the Sotnikum hospital, that provides health care services delivery both under the conventional and the New Deal system. The Sotnikum hospital was unambiguously defined and accepted in this study, because of the willingness of the hospital staff to assist in data collection.

## 3) Sampling methods and sample size

The population was defined in keeping with the objectives of the study. In this study, the sampling method used was *judgment sampling* that is a common *nonprobability method*, in particular, for pilot study where the objective was to determine the nature and distribution of variables in a population. Time and resource constraints precluded probability sampling. Thus, it was usually an extension of *convenience sampling*, which makes use of patients available<sup>5</sup> at the time of the visit to Sotnikum operational district where the study was conducted.

A two stage sample was appropriate: in the first stage, the primary units - the patients who have used Sotnikum hospital services before and after New Deal, were selected and put in a list. A second stage sampling of the final sample units was then selected from this list. Data collection instrument was set to assess the patients' satisfaction as they went through the Sotnikum hospital services. It follows that the sample was unlikely to be representative of the population in the catchment area.

The objective of this study was to know whether the quality of care of the hospital had really improved after introducing the New Deal. For this reason, statistical significance was not the issue here, but the sample size was large enough to be sure that they represent the whole unit. Thus, one criteria was that the sample size could not be less than 30. Hence, the total sample size was 60, 30 from inpatients and 30 from outpatients to ensure equity utilization of the two main services.

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<sup>5</sup> Patients who attended the hospital services before and after New Deal were introduced in December 1999.

#### 4) Data collection technique and analysis

Service quality data were collected from direct observations, review of consultation and medical records, and from the patient interview using the “*Likert Scale*” for analysis and interpretation of the result. Structured interview was used in this study. The checklist was used as a guide for interviewing patients by asking their level of satisfaction of the hospital services by using dimensions of quality of care as a guide developed in the questionnaires (see Appendix D1 and D2).

#### 4.5.2 Secondary Data

The population of this study was the public hospitals (Sotnikum and Kralanh referral hospitals). Secondary data needed were collected from all kinds of reports of the hospital such as health information system HO2 form, financial bookkeeping and annual budget plan of the two hospitals from accounting/financial office, personal observation and measurement in terms of building space and other information from the hospital and MSF staff. The secondary data collected includes:

##### 1) Capital Cost (CC)

Estimation of the economic cost of capital inputs can provide useful information, especially from the perspective of national allocation of scarce resources. Information on infrastructures such as space in terms of square meter allocated to the main services in each hospital was used to calculate the cost of building. Capital cost items that have working life span more than one year such as building, equipment, vehicle, etc. were included in this study. All the capital cost items were calculated from the purchase or received prices in year 2002. To calculate the economic cost of capital items on an “*annualized*” basis, the five following approaches were used (Creese and Paker, 1994).

- **Current value:**

$$C_{2002} = C_t (1 + r)^{2002-t}$$

- **Useful life**
- **Discount rate.** A simpler approach would be to accept a “high side” World Bank discount rate of 10%.
- **Annualization factor**
- **Calculation of annual economic cost.** By dividing the current value of the item by the annualization factor got from the table.

$$\text{Annual Economic Cost} = \text{Current Value} / \text{Annualization Factor}$$

Where

AAC = the average annual cost of the capital cost item in year 2002

$C_t$  = the purchase value of buying or spending in year t

r = discount rate during the period of study (10%)

t = year that capital item was bought/completed or renovated

After calculating the average annual capital cost of building, they were allocated to the main services that earned revenues for the hospitals by using a given allocation (step-down method) basis.

## 2) Recurrent Cost (RC)

In this study, we divided recurrent cost into two main parts, labor and material costs, to study specific costs of personnel and other cost components of recurrent cost. Unlike capital costs, recurrent costs of resources purchased and resources used in a given year were not much different, so there was no need to discount.

### (1) Labor Cost (LC)

Total labor costs in year 2002 got from salary, allowance, bonuses, and other expenses associated with personnel were frequently the single largest cost item in hospital program. We should therefore take great care in estimating its value. In most cases, we were interested in both the staff directly involved in the activities we are concerned with (e.g. nurses, health aides, trainers, supervisors) and other support staff (e.g. managers, cleaners, guards, drivers).

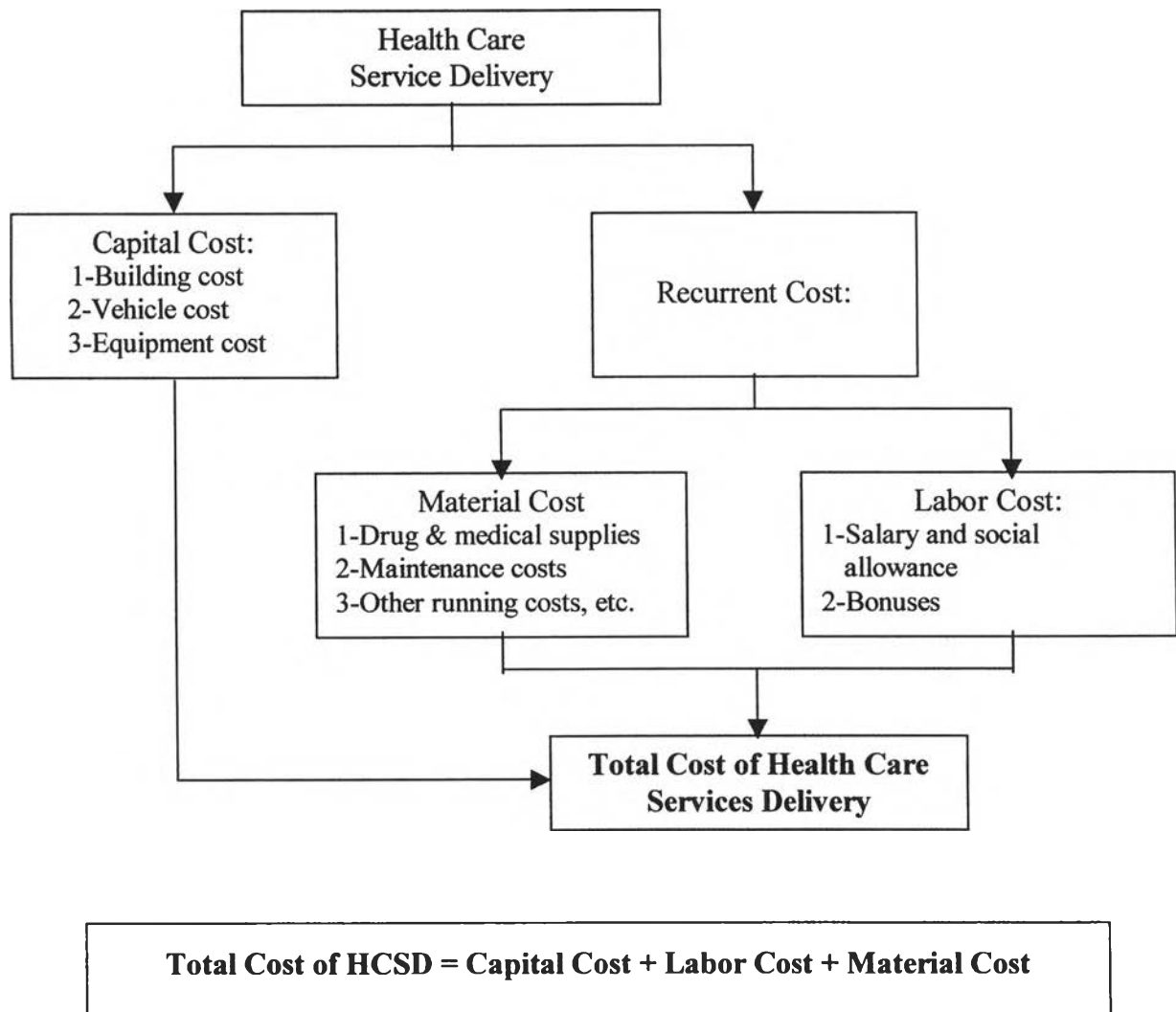
### (2) Material Cost

Material cost is the total cost of materials and supplies spent used in the hospitals in year 2002. Although supplies were a fairly big cost category for each hospital, it was relatively small for some other hospitals and did not justify a large effort. Costs included were the cost of all materials consumed, including any that was lost or wasted - losses resulted from damage (e.g. from water or rodents), pilfering and expiration. These losses had to be paid for by the hospitals as recorded in the financial report were included in the estimates.

### 3) Total Cost

Capital cost and running cost were used to calculate the total cost of the two hospitals that provided all kinds of services - administrative, curative, and preventive services. The field data collection was managed by personal management in collaboration with hospital staff. Information on costs and outputs were collected from all services of the two hospitals. Data on staffing and costs were obtained from MoH salary list, MSF records of bonuses and incentive payments, and user fee reports. The costs of drugs and medical supplies were derived from monthly Central Medical Store report forms; other direct and indirect costs came from hospitals records. The summary diagram of the total costs spent and consumed is shown in Figure 4.2. To facilitate the data collection process, the summary of data and its sources collected is shown in Table 4.2.

**Figure 4.2 Diagram Shows the Summary of Total Cost of Health Care Services Delivery**



**Table 4.2 Data and Its Sources to Be Collected**

<b>Objective</b>	<b>Types of data needed</b>	<b>Sources of data</b>
<b>1</b> To measure the effectiveness in terms of service utilization compare with target population of health care services delivery in Sotnikum and Kralanh referral hospitals in year 2002.	# of total population in the catchment area # of IPD discharges ALOS # of inpatient days # of OPD new cases and # of OPD visits	Hospital Health Information System (HO2)
<b>2</b> To calculate costs of health care services delivery in Sotnikum and Kralanh referral hospitals in year 2002.	Buidings, space Vehicles Equipment Trainings and social mobilization Personnel (all types) Drugs and supplies Vehicles (operation & maintenance) Buildings (operation & maintenance) Other operating costs not included above	Recent government or donor contracts for similar building. Supply records from government and donors, or local dealer prices, Supply records from government and donors, or local dealer prices, Expenditure reports for both programmes and should be included to give a single figure Expenditure records and payrolls. Per diem allowance and overtime. Services, hospital and OD expenditure records both on quantities and prices Expenditure records, information got from interviewing drivers and mechanics (if any) Utilities, maintenance or cleaning, and security expenditure records Other expenditure records
<b>3</b> To evaluate the effectiveness of the New Deal through patients' satisfaction survey.	Percentage of patient satisfaction on New Deal at different levels	Primary data from interview

Note: There are two kinds of training and social mobilization: one for capital cost, and two for running cost.