A COST-ANALYSIS STUDY OF PRIMARY DIABETES TREATMENT AT DAY-HOSPITALS AND A PROVINCIAL HOSPITAL IN THE WESTERN CAPE

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ABSTRACT

The provision of health care in South Africa is undergoing major restructuring. The aim is to achieve substantial, visible and sustainable improvements to the efficiency and accessibility of primary healthcare (PHC) services for all South Africans.

One of the country's most critical problems is the weak and fragmented public sector PHC system. The most critical problems contributing to this are the maldistribution of resources (financial, physical and human) between hospitals and the primary care system, and between rural and urban areas.

The health sector, therefore, faces the challenge of a complete restructuring and transformation of the national health care delivery system and related institutions. Choices need to be made about which services to cut, which to streamline and where savings can be made. Ways need to be found to use ALL of South Africa's resources optimally. This process of restructuring would be facilitated by the availability of accurate information on resource utilisation in the health sector.

This study estimates the difference in the cost of primary diabetes treatment at day-hospitals and a provincial hospital in the Western Cape in 1992/93. Health economics is in its infancy in South Africa and serious data limitations exist. This study is therefore a pioneering effort in many ways. An appropriate methodological framework in which to conduct the costing had to be developed.

The South African health sector, health spending and the cost of primary diabetes treatment at day-hospitals and the provincial hospital are reviewed. Theoretical perspectives of the health care market and the methodologies of cost analysis are discussed. The cost analysis method of study is chosen, and arguments are advanced for its suitability in the South African context.

A simple method of calculating the direct costs to obtain the average cost is proposed for the purpose of the study. Direct costs consist of staff costs and other related costs, such as medical supplies, non-medical supplies, building operations, equipment etc. These costs are then used to calculate the average costs per diabetic patient at the day-hospitals and the provincial hospital.

The average cost per diabetic patient at day-hospitals amounted to R18.76, while at the provincial hospital the cost was R59.60.

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1. AIMS OF THESIS

1.1 Specific Aim of the study

To conduct a cost-analysis study so as to determine whether it is less costly to treat primary diabetes management at Day-Hospitals (Heideveld, Elsies River and Lotus River Day-Hospitals) than at a Provincial Hospital (Groote Schuur Hospital).

1.2 General Aim of the study

To consider the contribution that economic analysis can make towards improved resource allocation in the health sector towards primary health care at Day-Hospitals instead of resource allocation to Provincial Hospitals, eg Groote Schuur, for expensive curative care.

2. INTRODUCTION

South Africa's health sector is in a serious crisis and requires urgent attention at both regional and provincial level. Health services throughout the country has been crumbling under the combined pressures of drastic budget cuts, reduced staff and soaring patient numbers, especially since free medical care for children under six and pregnant women was introduced.

The new health crisis has therefore added to the problems previously experienced in the apartheid era. The disastrous inequities of the apartheid era persist, and the new crises relates to the nature of the transformation necessary to correct the earlier imbalances. During the apartheid era the health care system was explicitly racist, organisationally fragmented, inefficient, oriented towards ineffective care and dominated by public sector tertiary institutions and a private for-profit sector. This health care system left millions of South Africans without access to basic primary health care.

The Official Policy Document on Health, ***Restructuring the National Health System for Universal Primary Care*** (Department of Health, 1996: 2), states that one of the most pressing problems facing health services is **the relatively heavy concentration of resources within the hospital sector, and the consequent under-resourcing of primary health care services.** According to the Minister of Health, Dr N Zuma, a need exists to " invert the expenditure pyramid". The current situation, inherited from the past, is that more than three-quarters of the public health budget is spent on hospitals, while the peripheral services subsist on the balance. This trend needs to be reversed as the bulk of the budget should be going to the periphery, if the new health plan with the free health programme is to succeed (Cape Argus, 21 Nov 1994).

Section 3 briefly reviews the health sector and health services in South Africa, and puts forward the proposal to redistribute health spending after analysing the cost of primary diabetes treatment at day-hospitals and a provincial hospital. **Section 5**

focuses on the theoretical perspective of the health care market, and the economic characteristics of health care. **Section 6** quantifies and analyses health care expenditure data based on routinely published sources. However, major gaps and deficiencies in health expenditure data are known to exist.

3. BACKGROUND

3.1 South Africa's health status and an international comparison

The health sector, which forms a sizable part of the South African economy, faces acute problems and challenges, many of which are related to the distribution and utilisation of financial resources . In the 1992/93 financial year, South Africa spent R30 billion on health services, equal to 8.5% of all money spent on goods and services in the country in that year (Gross Domestic Product or GDP) . On average, R740 was spent on health care for each person in South Africa. (McIntyre, 1995 : 6).

However, a comparison with other countries at a similar level of economic development suggests that South Africa does not use its resources optimally. All the countries mentioned in the table below appear to use less money on health care per person, but still have healthier populations than South Africa.

Table 1: Comparison between health expenditure and health status of countries at a similar level of economic development

Country	Health expenditure as a percentage of GDP	Infant mortality rate (per 1000)	Life expectancy at birth (years)	Incidence of tuberculosis (per 100 000)
South Africa	8.5	49	63	250
Hungary	3.3	36	68	-
Botswana	6.0	16	70	38
Malaysia	3.0	15	71	67
Venezuela	3.6	34	70	44
Chile	4.7	17	72	67

Note: South Africa: 1992 infant mortality rates and 1992/93 estimate of health expenditure as % of GDP
All other countries: 1991 infant mortality and 1990 estimates of health expenditure as % of GDP
1991 Life expectancy figures; 1990 Statistics for tuberculosis
Source: World Bank Development Report 1993

The comparison between countries in the above table suggests clearly that South Africa spends a very high percentage of its Gross Domestic Product on health care - and that the health status indicated by infant mortality, life expectancy and tuberculosis lag behind countries of a similar level of economic development.

South Africa is in urgent need of improving its health status as it also shows unacceptable disparities between different population groups. The health status of the country is as follows (Slabber,1992:391):

Infant mortality rate: The infant mortality rate in South Africa is 49/1000 live births, but there exists a marked discrepancy between different population groups. In 1990 infant mortality rate per 1000 population for the different groups were: whites - 9, Asians - 12, coloureds - 35, blacks 52.

Tuberculosis: In 1988 the prevalence rate was 489 per 100 000 population, with the Western Cape having the highest rate in the country.The incidence rate in 1990 was 229 per 100 000. The incidence rate per 100 000 of the population also reveals disparities between the different population groups in the country : white - 17, Asian - 61, coloured - 608, black -213.

Life expectancy: The average life expectancy at birth was 63 years in 1991. This is several years shorter than in other countries at similar levels of development. The racial groups have different life expectancies at birth. The life expectancy for Whites was 69 for males, and 77 for females between 1985 and 1990; the value for Africans was 61 for males and 67 for females.

It is therefore clear that South Africa's health status in comparison to other countries of similar economic development needs to improve. The serious disparities in the health status between the different population groups in the country needs to be addressed in the future health care strategy.

3.2 Primary Health Care - a strategy for the future

South Africa, in an effort to reduce these inequalities in health status and health care, is following world trends of a primary health care (PHC) approach, in order to pave the way for a healthier South African population. The philosophy of PHC followed the 1978 Alma Ata Conference and stemmed from the realisation that **modern medicine inspite of its enormous contribution to man's ability to cure disease, had failed to reduce inequalities in health status in many parts of the world** (Segall,1987:p54).

However, it should also be noted that **PHC can end in failure for various reasons**. A declining world economy, rapid urbanisation, lack of trained health workers and failure to involve people has lead to failures in PHC in some developing countries. In the case of South Africa, the existence of a gap between policy and implementation, and a failure to make the necessary budgetary commitments may result in failure to meet priority health needs.

The fundamental question facing health authorities in the country is: **" How can PHC be implemented and monitored successfully in South Africa? "** The government's policy strategy for PHC needs to be matched by a financial commitment. Crude estimates suggest that South Africa has been spending less than 20% of its health budget on PHC.

An analysis of the 1992/93 health budget reveals that a disparity existed between government claims that it was bringing primary health services within the reach of everyone in South Africa and budgetary allocations for PHC care. Approximately 76 percent of total public sector health care expenditure was attributable to acute hospitals in 1992/93, with academic and other tertiary hospitals alone accounting for 44 percent. In contrast, 11 percent was spent on non-hospital primary care services. (Non-hospital primary services include: clinics, community health services, school services, community nursing and district surgeon services). Therefore, a redistribution of resources between levels of care is required, if the government is to improve access

to PHC services for those who who currently do not have access (Department of Health, 1996:2).

To address the health crises in the country it is imperative that there should be a move away from expensive hospital-based services to primary health care programmes. **What is needed is a complete revision of current expenditure patterns, which are largely focused on curative, hospital-based services, and a realignment to more affordable, comprehensive, primary care programmes. This will also serve the broad requirements of the Reconstruction and Development Programme** .
The government's strategy for addressing the health problems of the country is outlined in the Reconstruction and Development Programme (RDP) (African National Congress, 1994:19)

One of major objectives of the RDP is the reprioritisation of government expenditure. This trend of reprioritisation is clearly followed, as the RDP gives priority in the health sector to prevention and the provision of essential curative care to all. Free health care is provided to all children under six, pregnant mothers, the elderly and the disabled. Preventive and promotive activities, ante-natal and delivery services, contraceptive services and curative care for public health problems are provided free of charge in the public sector (African National Congress,1994:10).

However, a major shortcoming for accurate budgetary allocations is the lack of accurate information on the costs of primary health care, to enable the government to make the necessary allocations (Broomberg,1992:279). In an attempt to address this lack of PHC cost data, a detailed cost-analysis of PHC diabetes treatment at Day-Hospitals and a Provincial-Hospital is undertaken in the study.

The three Day-Hospitals that agreed to part-take in the study, and that are also interested in the findings of the study, are Heideveld Day-Hospital, Elsies River Day-Hospital and Lotus River Day-Hospital, while Groote Schuur Hospital is the Provincial Hospital. Each of the hospitals has a diabetic clinic once a week to see

to the diabetic patients. The study is based on the budget period of 1992/1992 for which period the necessary data is available.

3.3 The diabetic clinics and health status of diabetic patients

3.3.1 Diabetic Clincs

Diabetic patients that visit the day hospitals and GSH, have mild, moderate and severe conditions of diabetes. They comprise about 5% of the total patients that visit each day hospital. To ensure and facilitate an efficient and smooth- running system of treatment for diabetes patients, the day hospitals under study, as well as GSH, have diabetic clinics. The diabetic clinics operate for five hours, once a week, at each of the hospitals.

The system of a diabetic clinic has many advantages, both for the patients and the health institutions. Continuity of care exists, and the same doctors and nursing staff attend to the patients at the four weekly visits. Doctors rotate in the diabetic clinic so that they become equipped to handle treatment effectively. For patients, diabetic clinics are user - friendly and convenient. Nursing staff take the blood pressure, weight and urine sample in one central area. This results in less traffic and congestion in the hospitals. Older patients also feel more confident and less confused in the environment of the diabetic clinic (Dr Dyer, Heideveld:1996).

3.3.2 The health status of diabetic patients

The health status or level of illness of diabetic patients is the same at the day hospitals and GSH, as the patients range from mild to severe diabetes. These levels of diabetes are managed and controlled by means of primary diabetes treatment, which is adequately provided at any of the four diabetic clinic under study. In fact, patients attending the diabetic clinic at GSH can also be treated for the same severity of diabetes at the day hospitals (Sister Kader, GSH: 1996).

The two types of diabetic patients are : **Type 1** - patients with a positive family history, and they may become sick at an early age as they are insulin dependent. **Type 11** -

patients are perhaps obese, indulge in excess sweet products, and develop high sugar levels. The treatment for both types of diabetes consists of oral agents and insulin (Dr Dyer, Heideveld: 1996).

If diabetes is properly managed at the primary level, the severity of the illness can be controlled. It is, therefore, imperative that patients understand the importance of regular hospital - attendance and compliance to take prescribed drugs. If any breakdown exists in compliance to taking drugs, the patient's condition deteriorates. This can lead to **Target Organ Damage** (TOD). This means that the patient can develop any of the following: renal failure, blindness, heart failure, poor blood supply or even amputation of the limbs. If the patient is negligent until TOD sets in, then tertiary treatment or hospitalisation will be required (Dr Dyer, Heideveld: 1996). **Patients that develop TOD, and require tertiary treatment are not included in the study.**

The diabetic clinics at day hospitals and GSH, therefore, receive patients with similar severity of illness , and provide equally effective management and treatment for primary diabetic patients.

The idea of the study is mainly to relieve the Provincial Hospital of major clinical burdens and costs, that can be dealt with at Day-Hospitals.

4. COSTING STUDIES AND ECONOMIC EVALUATION OF HEALTH SERVICES

4.1 Costing studies - difficulties and pitfalls

Since the existing literature on cost analysis of health services in South Africa covers a limited range of issues, accurate information as to the cost of PHC services in rural and urban areas is now an urgent priority. For the government's stated commitment towards the development of an adequate PHC to be realized, it will be crucial to know what the expansion of PHC is likely to cost, and therefore what package of services is affordable. Without such information, it is impossible to identify areas of efficiency and inefficiency in order to bring down the cost of health services in the country.

Cost of disease studies could therefore be seen as an attempt to provide much needed information to ultimately bring down the cost of health. **However, cost studies provide a reasonable idea of the resources consumed in the health sector, but they are not without there own difficulties, especially as there are gross limitations on the available data**. Besides the methodological problems such as variations in medical practice, price differences for medication of the same disease, etc., there is the question of reliability of official data. A major contributory factor is that a large percentage of the black population is rural and uneducated, and together with underreporting and a long history of insufficient interest in their health status, data on exact expenditure is simply not reliable.

4.2 Three types of economic evaluation of a disease

Economic evaluation is important as resources - people, time, equipment and knowledge - are scarce. Choices must be made concerning there use, and methods such as "what we did last time", "gut feelings" and even "educated guesses" are not always better than organized facts involved in a decision to utilize resources for one use instead of another.

The following are the main types of economic evaluation, each dealing with costs but differing in the way that the consequences of health care programmes are measured and valued (Drummond, 1989:10).

4.3 Cost analysis

Cost analyses evaluates the costs of alternative ways of pursuing a therapeutic goal of a given nature. The technique assumes that alternative treatments have identical outcomes, which may not be valid at all times. The efficiency evaluation is the least cost alternative. An analysis of this nature is also called a cost- minimization analysis.

4.3.1 Cost-benefit analysis (CBA)

Cost-benefit analysis is a technique that estimates the cost and benefits of alternative treatments in monetary terms. Intangible costs (pains and functional disability) and benefits (reduced morbidity) tend to be ignored in these studies because of the difficulties of their evaluation.

4.3.2 Cost-effectiveness analysis (CEA)

Cost-effectiveness analysis was designed in response to the difficulties inherent in CBA. Costs of achieving outcomes such as "number of years gained" are estimated. A problem with calculating the cost-effectiveness of competing treatments is that the quality of their therapeutic outcomes may differ, making purchasing choices difficult.

4.3.3 Cost-utility analysis (CUA)

Cost-utility analysis was devised so as to introduce a "quality of life" (QoL) measure into economic evaluation. Even if the additional years of life gained from alternative therapies for the same medical condition are the same, the quality of those years in terms of the functional status may differ.

Health economists have devised a unit for the quality of life, viz. a QALY or quality adjusted life year. However QoL and QALY measures are found to be highly subjective, and authors caution against there excessive and untested use (La Puma and Lawlor, 1990:25)

4.4 Choice of Methodology

The economist must decide on the technique appropriate to the project at hand. The method of choice should comply with guidelines for good practice in economic evaluation (Drummond, Stoddart and Torrence,1987:33).

As data problems exist in South Africa in the health sector for a CBA, CEA and CUA to be carried out, **the choice of methodology in the case of this study** - i.e. costing primary diabetes management at day-hospitals and a provincial hospital - **will be a COST ANALYSIS or a COST-MINIMIZATION analysis.** This approach is further discussed in section 3 of the study.

5. THEORETICAL PERSPECTIVES

5.1 Theory of Demand and Supply

Economic theory is an attempt to seek general explanations for certain problems of economic reality. I have chosen demand and supply theories of health, as we know in economics that demand and supply are the two poles upon which economic activity rests.

5.1.1 The Theory of Demand

Instead of estimating a simple demand curve of the familiar form:

$$Qd = f(P)$$

where **Qd** is the quantity demanded and **P** is the market price, in the health market it is necessary to take account of variables that will contribute to shifting the demand curve for health care.

Theoretical discussions suggest income (Y), insurance cover (INS), education (ED), age (AGE), and health stock (H) as some of the important influences on the demand for health care. Therefore, the estimated demand curve for health care could take the form of :

Qd = f (P, Y, INS, ED, AGE, H,.....)

However, a major constraint for research purposes is data availability of the variables mentioned.

I have chosen **"the need versus demand" theory for health.** It shows that "free" unrestricted provision will be equitable but inefficient, as treatments that are curing medically trivial complaints at relatively high cost will be demanded when "free" provision exists. In this case, unrestricted provision of diabetes service at G.S.H. will be very costly to the public sector (Cullis, West, 1979:75).

The Need versus Demand Theory

Assumption: The consumer of health care has no information or ability with which to forecast his state of health except that his health will decline with age.

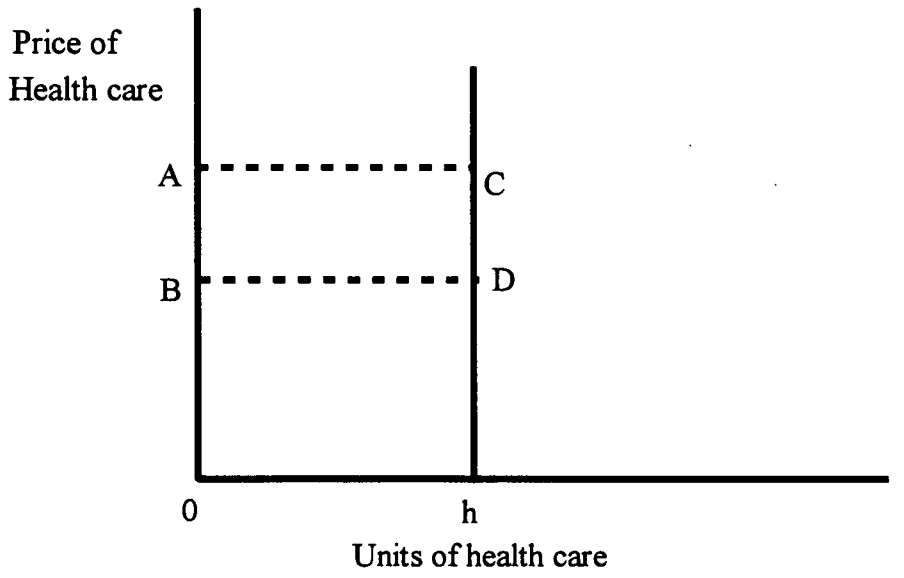
This approach is called the "needs" approach as the consumer does not demand health care through his own judgement. His need for care is assessed by the doctor. Thus the need for health care is defined as "the medical assessment of the treatment necessary to bring the patient to a medically assessed standard of health." The amount of care recommended to the patient will depend on the diagnoses of his condition, the medical technology available and the doctor's choice of treatment.

For ill health, which we define as any pain or restriction of activity, the individual seeks

medical advice to decide on the action he should take. Since he has no knowledge of the treatment needed, the treatment decision lies exclusively with the doctor. The doctor decides on the quantity and type of health care and supplies some or all of the care. The only decision left to the consumer is a take-it-or- leave-it decision. He has to decide how much the relief of ill health and pain are worth to him. If the total value of the benefit of treatment exceeds the cost, then the consumer will purchase the health care recommended. Alternatively, if the value placed on the benefit is less than the total cost then he will decline the treatment.

The implication of the above is that, when suffering from ill health, the individual has a demand curve that is totally inelastic.
In figure 1 below, he "chooses" Oh units of health care because this is his doctor's choice, and will pay up to the amount OACh, i.e. the total value placed on the benefit predicted by the doctor. Thus, if the cost of treatment, price OB X quantity Oh (ie OBDh) is less than OACh then he purchases the course of treatment.

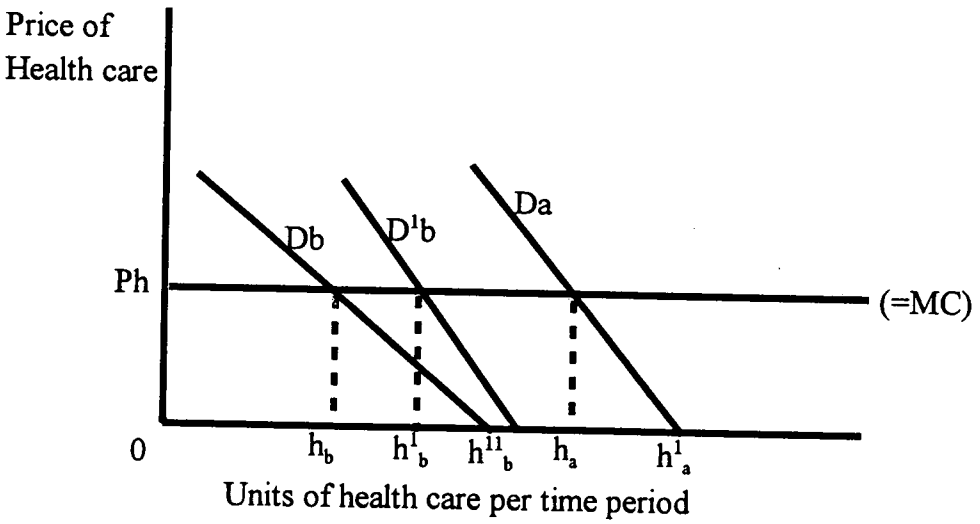
Figure 1: Need as inelastic demand



However, there are individuals whose total valuation of treatment is limited by a budget constraint to a figure lower than the cost of treatment. But free provision of health care to all, although equitable, will encourage consumption until marginal utility of the good to the consumer is zero. That is, to expand consumption of the poor to this level is inefficient.

Figure 2 below, indicates such inefficiency for one rich (A) and poor(B) consumer when demand is elastic. With their own resources they would consume oh_a and oh_b units of health care. If individual B is subsidised to improve his health, his demand curve shifts to D'b and he chooses Oh'_b units of health care. If health care is provided free to all, both increase their consumption, to Oh''_b and Oh'_a Individual A's consumption is inefficiently large as he consumes some health care that he values at less than the marginal cost to society of providing it. B's consumption is also inefficiently high.

Figure 2: Demand responses to zero prices



Therefore, the needs argument can not be regarded as recommendation that free health care is an efficient method of meeting the health needs of the poor as we have failed to establish that demand is inelastic. However, it appears that the consumer, when suffering from a disease, has an inelastic demand for that disease as he accepts

that the course of treatment recommended by the doctor as the correct one. Free provision of public health care will encourage both the rich and poor to demand treatment that was not previously demanded as its value to the consumer was less than its market costs. Many treatments that cure medically trivial complaints at high costs will be demanded when free provision exists.

In summary, the policy implications are that free unrestricted provision will be equitable but inefficient, and that market provision with specific support for the poor will be a more advantageous policy.

Weaknesses of "the needs versus demand" theory

"The needs model" proposed that consumers would purchase the amount of health care prescribed by their doctor, as long as its total cost fell within some total cost constraint. This implies that the supplier of health care can increase the price or quantity to the consumer as long as he does not exceed this constraint. This indicates that the determinants of the budget constraint can be questioned.

In the health market, the supplier of health care can increase the demand for health care by gaining information on the factors that influence the consumers willingness to pay for treatment. "Supplier -induced demand " suggests that physicians can create demands for their services, and that they are held in check only by their knowledge of the patient's ability to pay. These physicians generate demand "needlessly" at the expense of the consumer directly or indirectly through insurance schemes, creating incentives for spiralling medical expense.

Pressure is also generated by what Fuchs calls a " technological imperative", where pressure is put on physicians to prescribe new, more sophisticated and beneficial treatments. The technological imperative removes notions of economic efficiency, concentrating instead on purely technical efficiency. Such innovation is likely to be costly to the patient or his insurance scheme, but in the absence of any clear resistance

some control mechanism (such as control by the insurance company) is required (Cullis, West , 1979: 106).

"The needs model" was discussed in terms of need as inelastic demand indicated by the physician. However, people are often said to be in "need", but it is not often clear what is meant by this term (Cullis, West, 1979: 93).

5.1.2 Theory of Supply

The traditional theory of the firm focuses on the profit-maximising entrepreneur who controls the choice of inputs and outputs and gains profits in excess of other costs. The relation between output and the quantities of input of a factor of production can formally be described by a production function :

$$Q = f(N)$$

where Q denotes (total) output (or TO) and N the quantity of the variable input used.

For the hospital, responsibility for decision-making may depend not only on administrative managers but also on four other groups: doctors (and nurses), trustees (for non-profit-making hospitals) , trade-unionists and politicians. In this case the production function will take the form of:

$$Q = f(N1, N2, N3.....)$$

where output depends on more than one variable input.

In view of the multiplicity of decision-makers (a complication that I do not propose to resolve here), the Theory of Supply that I have chosen to discuss below i.e. "**A theory of non-profit-making hospital behaviour**" , is an abstraction from reality.

However, in order to produce general conclusions of a qualitative kind, the Supply Theory takes the hospital or its medical staff as the sole decision-maker, ignoring conflicts between and within different groups.

A theory of non-profit-making hospital behaviour

According to Newhouse (Cullis, West, 1979:115), the decision-makers of the hospital are assumed to have two objectives which they seek to maximise:

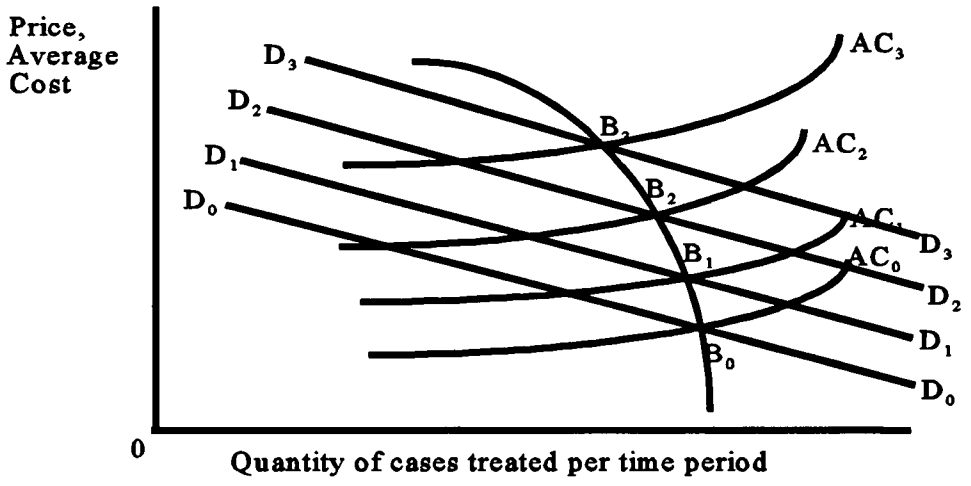
1. The quantity of care delivered , ie the number of cases treated.

2. The quality of care, i.e. the type of treatment as seen by patients and doctors.

Quality of care is assumed to be an objective in addition to quantity because of the key role of quality in medical services. Newhouse links the quality of care to the prestige of hospital staff which replaces profits as a target for the decision-maker.

As quality of care is likely to be of great significance to the consumer, Newhouse assumes that the demand curve for care shifts up as quality rises though this is not a feature of existing demand theory. Figure 1 below shows the possible equilibria for the hospital.

Figure 1: Demand and average cost at various levels of quality



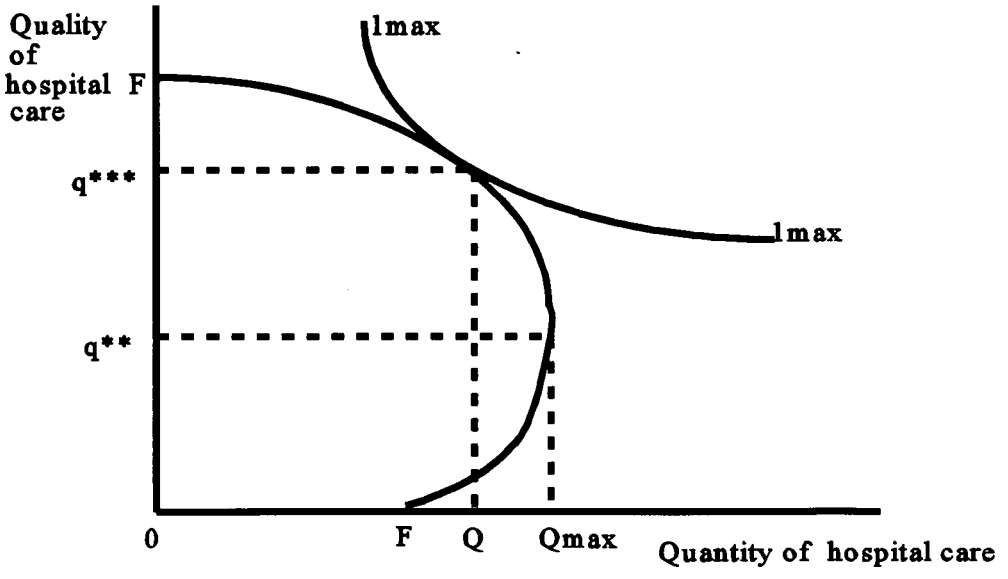
Care of increasing quality (i=0,1,2,3) can be provided at an average cost per unit

indicated by the average cost curve. (The absence of marginal cost reflects the non-profit-making motive. Patient payments only cover average cost so that the hospital breaks even.)

At each quantity level is a demand curve DD which, together with the cost curve, gives the break-even quantity of care of any given quality level. With the break-even points B for each quality level a transformation curve can be formed indicating the possible combinations of quantity and quality that the hospital can achieve.

A key assumption is that beyond some quality level the cost of further increases in quality rises more rapidly than the demand for care. That is, when quality is high, consumers attach less importance to a further increase in quality (declining marginal utility), but the cost of raising quality further is increasing (increasing marginal cost of quality).Therefore, because of the assumed behaviour of demand and cost this curve, in figure 2 below, is backward-bending.

Figure 2: The optimal quality - quantity combination



The decision-maker then chooses the optimal levels of quality and quantity by selecting the combination on the possibility frontier FF that gives him the highest level of utility, i.e a typical tangency between the possibility frontier and highest attainable indifference curve, I max. Thus, with this indifference map , he chooses three-star quality and a quantity of output (ie patients treated or patient days of care) Q that is lower than the maximum.

Clearly, an indifference curve with quantity Q max and a two-star quality could be chosen. However, at the point that the transformation curve turns back on itself, its slope is vertical, which means an indifference curve will be tangential only if it has a vertical slope. This would imply that the marginal utility of quality to the decision-maker is zero, which violates our assumption that both quality and quantity yielded utility to the decision-maker (and by implication from consumer theory, that he can never be satiated (marginal utility=0) with either). Therefore, a solution to the left of Q max is inevitable as long as the decision-maker attaches some positive marginal utility to the quality of care.

In summary, there has to be a trade-off between quality and quantity according to this theory.

Weaknesses of the theory of non-profit-making hospital behaviour.

Quality is assumed to be of paramount importance to non-profit-making behaviour, and leads to higher quality of care in terms of resource inputs. However, the quality of the output - health improvements - is unknown.

Excess capacity of sophisticated capital equipment is another dimension of quality, and may result in high cost and underuse of such facilities.

If high-quality inputs have little or no effect on patient health but merely serve as a magnet to attract patients, it can imply that a misallocation of resources to quality is occurring. Quality bias may raise prices, preventing the poor consuming any health

care. This quality bias can, therefore, be opposed on equity grounds (Cullis, West, 1979:128).

5.2 Economic characteristics of health-care

5.2.1 Public and private benefits of health

Goods and services provided by the health system can be classified with respect to who receives the benefits of them, i.e. a private or public benefit from health provision.

For example, if I break my arm, I am willing to pay to have it set, because I alone benefit from having it fixed. Fixing a broken arm is essentially a private good because the benefits can be **"internalised"** .However, if I completely exterminate mosquitos from my province so that I run no risk of developing malaria, I am providing a service from which every neighbour benefits even though I pay for it. In this case spraying mosquitos is a public good because many benefits are **"external"**.

Consumers, therefore, have a strong incentive to pay for certain types of health care with largely private benefits, but reluctant to pay for programs that benefit others. Thus consumers tend to wait for wait for others to provide public goods - i.e. the free-rider problem.

By failing to make a distinction between public and private goods, governments often find themselves allocating small amounts for public health services (such as mosquito spraying or community sanitation) because of strong demands for curative services. **Moving government expenditure away from curative care to effective public goods provision can have strong positve equity effects** (Griffen, 1988: 9).

5.2.2 The standard competitive market and the health market

Unlike the markets described in competitive market theory, the health-care market is

characterised by more general failures.

The standard competitive theory ,as is well known, makes several critical assumptions:
a) There are many sellers, each of whom is seeking to maximize its profits.
b) The commodity that is being bought and sold is homogenous.
c) The buyers are well informed: they know the prices and qualities of goods being sold
d) The consumers are the buyers ; they pay the full cost of the goods they consume.

However, none of the conditions required for a competitive market is satisfied in the health market, as illustrated in the following table (Stiglitz, 1988:296):

Table 2: Differences between health markets & standard competitive market

Standard competitive markets	Medical market
Many sellers	Only limited number of hospitals
Profit maximising firms	Most hospitals are not-for-profit
Homogenous commodities	Heterogeneous commodities
Direct payments by consumers	Patient covers a fraction of costs

5.2.3 The rationale for government intervention

The health-market which is characterised by market failure, requires government intervention for the following reasons:

Pure-public goods

Market failure arises from the existence of pure public goods in the health market i.e " each individual's consumption of such a good leads to no subtraction from any other individual's consumption of that good." Health goods have characteristics of non-excludability and non-rivalry. In the case of non-excludability, it is technically not possible to exclude individuals from consuming the good, or if technically feasible expensive to apply.

The eradication of malaria, for example, benefits all regardless of payment. Every person in the area is protected, and can only reject the service by moving to an area that is unprotected. Thus in assessing the desirability of spending to remove a disease, free-riders must somehow be taken into account. This means that government intervention is required.

Externalities

Externalities occur when a third party receives some benefit or suffers some loss without explicitly choosing to do so. An individual suffers from an adverse externality if smoke from a new factory affects his health. Similarly, he benefits from an externality if his neighbour is innoculated against some disease as this will reduce his risk of contracting the disease. Therefore, a role exists for government intervention (Fin Health Services, 1992:27).

Externalities, or spillovers of benefits or losses from one individual to another, characterize cases in which a private market might function but would produce too much too little. For example, curing an individual of tuberculosis also prevents transmission of the disease. But an individual's demand to be cured of tuberculosis is probably not affected by consideration of the risk to others. If the externality is not taken into account, treatment will be priced to high in private markets, and too little treatment will be given. Public provision of treatment by the government is, therefore, justified (World Bank Report, 1993 : 55).

6. EMPIRICAL ANALYSIS

6.1 Introduction

6.1.1 Specific Aim of the study:

To conduct a cost-analysis study so as to determine whether it is less costly to treat primary diabetes management at Day-Hospitals (Heideveld, Elsies River and Lotus

River Day-Hospitals) than at a Provincial Hospital (Groote Schuur Hospital).

6.1.2 General Aim of the study

To consider the contribution that economic analysis can make towards improved resource allocation in the health sector towards primary health care at Day Hospitals instead of resource allocation to Provincial Hospitals e.g. Groote Schuur Hospital, for expensive curative care.

6.2 Arguments for redirecting Public sector health expenditure

6.2.1 Significance of Day-Hospitals and General Hospitals (eg G.S.H) -a match between illness and facility

The Day-Hospital Organisation in the Cape Province provides a unique service in South Africa of decentralized outpatient care. It was established to improve and extend the existing service by relieving pressure on hospital and outpatient departments (eg G.S.H.) and to allow a more efficient allocation of resources.

Hospital outpatient departments are in a position to provide specialist medical care, particularly as they employ specialists on their staff to care for inpatients as well as outpatients. In contrast, day-hospitals provide largely general outpatient care for patients that do not require expensive and highly specialized diagnostic facilities.

Ideally, therefore, outpatients not requiring specialist care should be treated at a day-hospital, resulting in an effective cost-saving measure. Firstly, because of the lack of expensive and highly specialised facilities one expects that day-hospitals can treat patients at a lower cost than an outpatient department. Secondly, by reducing the number of patients at these hospital departments each day, the outpatient departments will be able to function more efficiently. Therefore, fewer outpatient staff will be

required, and conditions for both staff and patients will improve by reducing congestion.

To evaluate the role of day-hospitals, one can consider the opportunity costs of day-hospitals. If there were no day- hospitals, their patients would be attending outpatient departments, or, deterred by the distance to the hospitals, or by the waiting time, would be consulting a private doctor - a considerately more expensive option - raising problems of affordability. Patients might also be delaying their visit to the doctor until advanced pathology set in, a further increase in the cost of curing them, increased morbidity and perhaps also death.

At a World Health Organization (WHO) conference as long ago as 1931 (G Raine, 1978:325), the conclusion was reached that health centres, such as day-hospitals should concern themselves with preventive health care, leaving local private physicians and outpatient departments for curative work. **The "health pyramid" concept - that patients should be treated as close to their homes as possible, in the smallest, cheapest and most humbly staffed unit that will adequately care for them - was adopte**d. Bryant sums up the idea as " **illness and facility should not be mismatched** " (G Raine, 1979:326).

Bryant's "health pyramid" concept can be linked to the concept of "centralisation versus decentralisation" that faces the health sector in South Africa. Health services in the country have been so fragmented and inequitably distributed that it is essential to unify them into a single, integrated National Health System (NHS). Health planners now plan to decentralise management of the delivery services to provinces, districts and institutions in order to increase efficiency, local innovation, empowerment and accountability. However, decentralisation without co-ordination and planning could result in a more fragmented, inequitable system.

The Official Policy Document on health gives attention to the question of decentralisation of health care and the use of services at the most appropriate level (Department of Health, 1996: 8). The existing PHC system is regarded as the

foundation of the new health system, and should be integrated with the hospital system. The new health system should aim at the development of district authorities as the lowest level of authority within the health care system. The PHC system is also dependent on the availability of a well organised hospital referral network to ensure that patients are treated at the most appropriate level of care, so that abuse of hospital outpatient departments does not occur.

6.2.2 Public sector health care expenditure in South Africa

6.2.2.1 Changes in public recurrent health expenditure (1983/84-1992/93)

In 1992/93, recurrent public health expenditure was approximately 11.1 billion rands or 273 rands per capita and capital expenditure was 386 million rands. The proportion of total government spending allocated to health (recurrent and capital health budgets) fell from 11 percent in 1991/92 to 10.2 percent in 1994/95 (McIntyre, 1995:34).

The table below shows changes in public recurrent health expenditure for the period 1983/84 -1992/93.

Table 3: Changes in public recurrent expenditure (1983/84-1992/93)

Indicator	1983/84	1992/93	Average annual increase or decrease
Nominal expenditure (rands)	2.5	11.1	18.3%
Real expenditure (1983/4 prices)	2.5	3.2	3.0%
Nominal expenditure (rands)	76	273	15.4
Real expenditure per capita (rands)	76	79	0.5%
Expenditure as % GDP	2.6%	3.3%	2.9%

Note : The consumer price index (CPI) was used as a deflator.
Source: McIntyre, 1995: 34

Public recurrent health expenditure was equivalent to 3.3 percent of GDP in 1992/93.

These percentages are reasonably high compared with other middle and upper-middle income countries. It should be recognised that GDP in South Africa has grown very slowly in recent years which also contributes to the relatively higher proportion of GDP devoted to public health care expenditure. Many of the established economies spend a higher percentage of government expenditure on health, and their public health expenditure averaged 5.6 percent of GDP (Mc Intyre , 1995: 35)

Recurrent expenditure on public health services increased at an annual rate of 18.3 percent a year between 1983/84 and 1992/93, from R2.5 billion to R11.1 billion . However, this was largely due to inflation and the yearly increase was 3 percent in real terms. This was equivalent to an annual increase of 0.5 percent per capita.

During the same period, recurrent public health expenditure grew as a proportion of GDP from 2.6 to 3.3 percent. This was due to the combination of real increase in health care expenditure and a real fall in GDP in the country.

6.2.2.2 Departmental distribution of public sector health care expenditure

The table below summarises the distribution of 1990/91 public sector health care expenditure between the various health departments (McIntyre, 1993:8).

Table 4: Public sector health care expenditure in South Africa (1990/91)

Department	R million	%
Department of National Health and Pop.Dev.	553	6.9
"Own Affairs" Health Departments	660	8.2
Provincial Administration Departments	5 145	63.8
Local authorities ("Own contribution")	137	1.7
"Homelands" (Including SADT)	1 568	19.4
TOTAL	8 063	

Source: McIntyre, 1993:8

In 1990/91, public sector health expenditure was approximately R8 billion. About 64% of this expenditure was allocated to the departments of hospitals and health services of the Provincial Administration, reflecting the relative emphasis on curative hospital care. In comparison, the DNHPD and the " Own affairs" department, received only 15% of public sector health care expenditure, while the homelands departments received only 19.4%. **This information further highlights the relative emphasis on curative hospital-based care, requiring an urgent shift of resources for much needed primary health services.**

6.2.2.3 Public sector health care expenditure per capita in each province (1992/93)

The health sector needs to eliminate inequalities between provinces in the levels of per capita public sector expenditure. In 1992/93, the government spent 3,5 times more on each person in the Western Cape than on each person in the Eastern Transvaal. The table below indicates that public funds allocated to each region (which now form new provinces) vary considerably.

Table 5: Public health care expenditure per capita in each province (1992/93)

Province	Total health expenditure per capita (rands)
Eastern Cape	226.98
Eastern Transvaal	136.60
Gauteng	381.66
Kwazulu-Natal	236.88
Northern Cape	221.15
Northern Transvaal	164.07
North-West	178.91
Orange Free State	266.49
Western Cape	491.13

Source: McIntyre, 1995:40

The provinces with the highest health expenditure per person have academic hospitals, which are a national resource in that they train most health personnel and provide specialist care for other provinces. Residents in provinces with academic hospitals have greater access to their services, while public funds allocated to each region (which now forms new provinces) vary considerably.

Therefore, an urgent need exists for a reallocation of health care resources to address the unfair disparities that exist between provinces in the level of public expenditure.

6.3 Methodology of cost analysis

6.3.1 Method for the Economic Evaluation of Diabetes Treatment

Cost Analyses

In cost analyses of health care programmes, the outcomes or effectiveness are assumed to be identical. For the purpose of this study, we are comparing programmes of diabetes treatment at the three day-hospitals and Groote Schuur Hospital. The diabetic patients have the same health status, and only those requiring primary diabetes treatment are included in the study.

The efficiency evaluation is therefore a search for the least cost alternative, that is the lowest average cost per diabetic patient at Day-hospitals and GSH.

This does not imply that "Cheaper is best", but if the same health outcome could be achieved at less cost, the lower cost option is preferable. This confirms the conventional wisdom in economics about the presence of scarce resources and the use of the best alternative (Hall, Mooney, 1990:39).

In summary, as economics is about efficiency or cost-cutting, in this study "efficiency"

about health care means producing the greatest health gain for the available health rands. Higher cost of primary diabetic treatment, therefore, implies inefficiency.

Costs in Cost-analysis

Cost-analysis assumes the following costs exist: direct costs, indirect costs and intangible costs, and are derived from the concept of the opportunity costs of treating the illness as indicated below (Evans, 1990:11):

Table 6: Types of Costs

Type of cost	Foregone opportunity costs
a. Direct Costs Health services Non-health services	 Resources could have been used in -health services(eg welfare & education). Time and money could have been used in other ways.
b. Indirect costs	A person's labour could have been used productively
c. Intangible costs	A persons' well-being could have been diminished.

Briefly, the three types of costs are defined as follows:

Direct costs - the cost of detection, treatment and the care of those who suffer the illness. They include the health service and non-health service components. Non-health service components include fixed costs, such as transport costs, building operations costs and equipment costs.

Indirect costs refers to the fact that society loses the contribution of many sick persons to economic production as a result of their inability to work. They are the opportunity cost of lost production as a result of premature mortality and morbidity. In the evaluation, I will assume that the indirect costs are the same at all the health institutions because of the difficulty of assigning monetary values. The diabetic clinics of day-hospitals and GSH are are run on the same principles, and they also provide the

same treatment to patients.

Intangible costs measures the diminishing of the quality of life on a psychological and emotional level. By nature they are difficult if not impossible to measure - and will therefore be excluded in the evaluation.

In summary, I will therefore only be looking at direct costs of diabetes treatment at Day-hospitals and GSH, from which I will then calculate the average cost per diabetic patient.

6.3.2 Data collection and Average cost per diabetic patient

Data Collection

Data collection for day-hospitals has been obtained from various sources, namely, the Department of National Health and Population Development (DNHPD), and Heideveld, Elsies River and Lotus River Day-Hospitals. For GSH data has been obtained from the Annual General Report, Annual Expenditure Report and the diabetic department at GSH.

The cost analysis study of primary diabetes treatment is for the period of April 1992 to March 1993 due to availability of data.

The table below represents the admission of patients at the three day-hospitals and Groote Schuur Hospital. The table shows the general patients, non-diabetic patients, diabetic patients and the proportion of diabetic patients to the total patients attending the health institutions.

Table 7: Admission of patients at Heideveld, Elsies River, Lotus River and Groote Schuur Hospital (April 1992 - March 1993)

Health institution	General Admission	Non-Diabetics	Diabetics	%Diabetics
Heideveld day-hospital	94979	91233	3746	3.94
Elsies day-hospital	83054	77768	5286	6.36
Lotus day-hospital	51436	48220	3216	6.25
Groote Schuur Hospital	715795	711039	4756	0.66

Source: Day-Hospitals - Patient Admissions Register
Groote Schuur Hospital - Groote Schuur Hospital Annual Report 1992/93
Diabetic Admissions Register 1992/93

Average cost per diabetic patient

Average cost per diabetic patient was calculated on the basis of staff costs and other related costs associated with diabetic patients. Other related costs consisted of medical supplies, non-medical supplies, transport, building operations, equipment and social welfare.

Average staff-costs

To calculate average staff-costs, it has been possible to calculate fairly accurately average staff-costs as all the institutions have a diabetic club that operate on certain days of the week and for a certain number of hours per week (Creese, 1990:49).

By utilising the information on Diabetic Clinic Staff: Salaries, in the appendix, average staff costs is calculated in the following way:

1. annual salary / 240 days = cost per day
2. cost per day / general hours per day = cost per hours
3. cost per hour x diabetic club hours = cost of diabetic clinic
4. total cost of staff / average patients = average staff cost per diabetic patient

Through the use of the method 1-4 it will be possible to have average staff costs for diabetic patients at Heideveld, Elsies River and Lotus River Day-Hospitals, as well as,

for GSH.

Costs of other related costs

For the other related costs used in the analyses: medical supplies, non-medical supplies, transport, building operations, equipment and social welfare, it is not possible to determine the exact average costs for diabetes as was done in the case of staff-costs. Costs of these related costs for diabetes treatment can not be separated from other costs incurred in the hospitals. For this reason, the proportion of diabetic patients of total patients was used to calculate the average cost of the other components. **Average cost per diabetic patient is obtained by adding average staff costs and the other related costs. That is, average cost per diabetic patient = average staff costs + % of other related costs.**

6.4 Results

According to personal interviews conducted with the staff at day-hospitals and Groote Schuur Hospital, primary diabetic patients receive similar treatments of oral medication and insulin, when the sugar level is greater than ten (Dr Dyer, Heideveld; Sister Jacobs, Elsies River; Dr Badat, Lotus River day-hospitals and Sister Kader, Groote Schuur Hospital).

However, it was stressed that all day-hospitals, and GSH have their own variables and parameters within which they operate. Day-hospitals, such as Heideveld receive referrals from satellite clinics, such as Guguletu clinic. Heideveld day-hospital also provides family planning services, and performs vasectomies and tubiligation for many day-hospitals once a week.

Groote Schuur Hospital has highly specialised staff of consultants, registrars and sisters, but face severe budget cuts. This is in spite of the fact that the specialised staff

is needed for research, consultation and educative purposes of patients and medical students.

According to the guidelines for good economic evaluation, it is not possible to measure each variable facing health institutions. Drummond states, "**All that should be ensured is that the range given be a true reflection of the situation that obtains. The relative magnitudes of the cost of various illnesses are more important than the absolute costs**" (Drummond, 1987 : 39).

6.4.1 Direct Costs and its Components

Table 8 below represents the nominal amounts of rand spent on direct costs for each of the hospitals under consideration.

Table 8: Direct Costs of day-hospitals and Groote Schuur Hospital (1992/93)

HOSPITALS	SALARIES	MED. SUPPLIES	NON-MED. SUPPLIES	TRANS-PORT	BUILDING OP.	EQUIP-MENT	SOCIAL WELFARE	TOTAL
Heideveld	2339	4637	116	64	264	46	11	7477
Elsies River	1945	2310	114	102	318	92	11	4892
Lotus River	827	1890	128	92	196	83	11	3227
TOTAL	5111	8837	358	258	778	221	33	15596
GSH	311211	70660	11853	2575	10409	5312	-	412020

Nominal values : R000's
Source : Department of National Health and Population Development

From Table 8 above, we can see that Heideveld, as expected, has the largest total direct cost expenditure of the day-hospitals i.e. R7 477, while Elsies River and Lotus River, have total direct costs of R4 892 and R3 227 respectively. This trend is in line with the number of patients that visit the day-hospitals.

In comparison, GSH's total direct expenditure amounts to a huge R412 020. This high

expenditure can be related to the fact that GSH is a tertiary and academic institution, and provides a wide range of specialised services, such as, cardiology, neurology, urology and research and training. The number of patients that visit GSH is also very high, and consist of in-patients and out-patients.

6.4.1.1 Percentage Distribution of direct costs

Table 9 below represents a percentage distribution of the direct costs across the hospitals.

Table 9: Percentage Distribution of Direct Costs per hospital

Hospitals	Salaries	Med. Suppl	Non med supp	Trans-port	Buildin op.	Equip-ment	Soc. Welfare	TOTAL
Heideveld	31.3	62	1.6	0.9	3.5	0.6	0.2	100
Elsiesriver	39.8	47.2	2.3	2.1	6.5	1.9	0.2	100
Lotusriver	25.6	58.5	4	2.9	6.1	2.6	0.4	100
GSH	75.5	17.1	2.9	0.6	2.5	1.3	0	100

Source: Own Calculations

From table 9 it is clear that different proportions of total costs is spent on the various components of direct costs at each day-hospital and GSH. In the case of the three day-hospitals (Heideveld: 31.3; Elsiesriver: 39.8; Lotus river: 25.6) an average of 32.2% of total costs is spent on salaries, while at GSH 75.5% of total costs is spent on salaries.

This indicates the high cost of specialist staff at GSH. Table 9 also indicates that high costs can be incurred if primary diabetes treatment takes place at GSH.

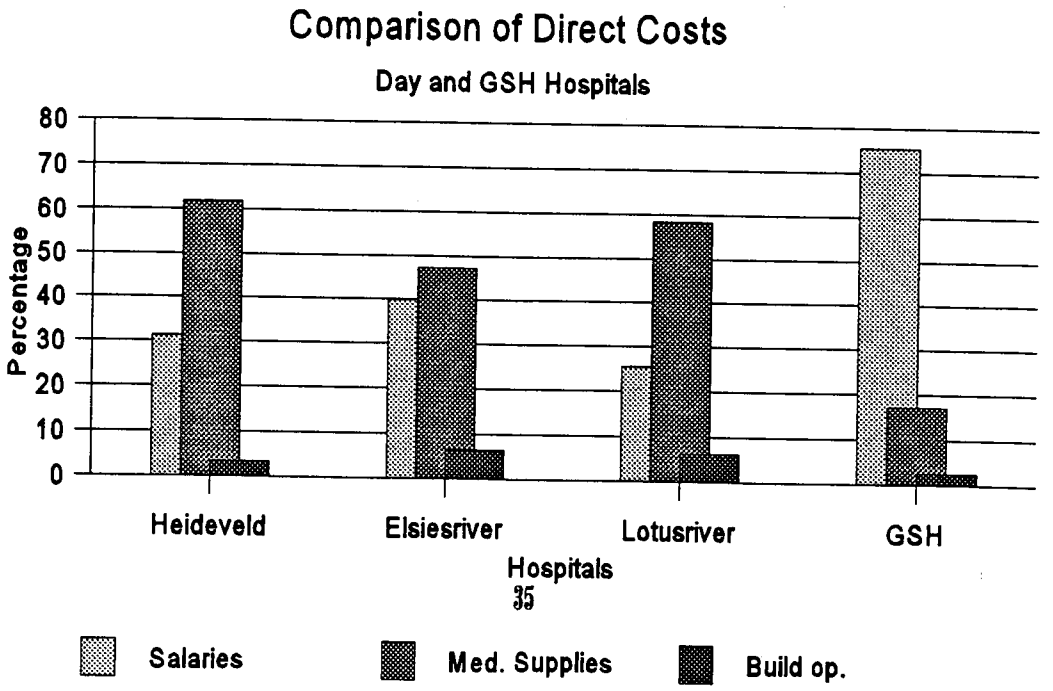
With regard to medical supplies, day-hospitals (Heideveld: 62.0; Elsiesriver: 47.2; Lotus river: 58.5) on average spent 55.9% of total costs , while at GSH only 17.1% is allocated to medical supplies. This contrasts with the high proportion of total costs spent on medical supplies at day-hospitals, and the higher proportion of total costs spent on salaries at GSH.

The high expenditure on medical supplies at day-hospitals can be attributed to a number of factors. Here medical staff consists of a limited number of doctors and nurses with basic qualifications, while a high number of patients are admitted for a variety of treatments. These include patients from satellite clinics that are admitted for "special treatment and services", such as physiotherapy, occupational therapy, vasectomies and tubiligations, which increase medical supply costs considerably.

The high cost of labour at GSH can be attributed to the highly specialised staff that consists of consultants, registrars and highly qualified nurses (Refer to Appendix for a breakdown on total and average staff costs) .

The bar graph below further highlights the total direct cost expenditure patterns across the hospitals.

Figure 1:



6.4.1.2 Average Cost per diabetic patient

a) Average staff cost per diabetic patient

Table 10 below represents the average staff costs for the treatment of a diabetic patient.

Table 10: Average Staff Cost per diabetic patient (1992/93)

Hospital	Average diabetic patients	Total cost of salaries in diabetic clinic	Average staff cost per diabetic
Heideveld	39	591.2644	15.16063
Elsies River	57	409.9656	7.19238
Lotus River	43	495.1319	11.5147
Groote Schuur	50	1619.238	32.38475

Nominal Values : Rands
Source :Diabetic patients - Diabetic Register
Staff salaries - Department of National Health and Population Development
- Groote Schuur Hospital Annual Report 1992/93

As explained under the section "Methodology", it has been possible to calculate fairly accurately, the staff costs as all the institutions have a diabetic club that operates on certain days of the week, and for a certain number of hours per week.

By applying the method explained under "Methodology", it has been found that the average staff-costs at day - hospitals (Heideveld: 15.2; Elsies River 7.2; Lotus River 11.5) is R11.28, in comparison to average staff-costs per patient of R32.38 at GSH

Doctors and nursing staff in the diabetic units are adamant that the hospitals are under-staffed, and excess capacity does not exist at all. At GSH, staff attend to general patients or visit wards after the diabetic clinic has closed. Day-hospital staff also attend to general patients, while doctors have to complete administrative work for the efficient running of the day-hospital.

b) Other related cost per diabetic patient

Table 11 below represents the other related cost per diabetic patient.

Table 11: Other related cost per diabetic patient (1992/93)

Hospital	Medical supplies	Non-medical supplies	Transport	Building operations	Equipment	Social Welfare
Heideveld	9.8	0.2	0.1	0.6	0.1	0.0
Elsies River	5.4	0.3	0.2	0.7	0.2	0.0
Lotus River	3.7	0.2	0.2	0.4	0.2	0.0
Groote Schuur	19.0	3.2	0.7	2.8	1.4	0.0

Nominal Values: Rands
Source :Department of National Health and Population Development
Groote Schuur Hospital Annual Report 1992/ 93

For medical supplies, non-medical supplies, transport, building operations, equipment and social welfare, as explained under "Methodology", it is not possible to determine the average costs for primary diabetes treatment with the same method and accuracy as in the case of staff costs. The reason is that it is not possible to separate the costs of these components for diabetes treatment and other treatments provided at the hospitals.

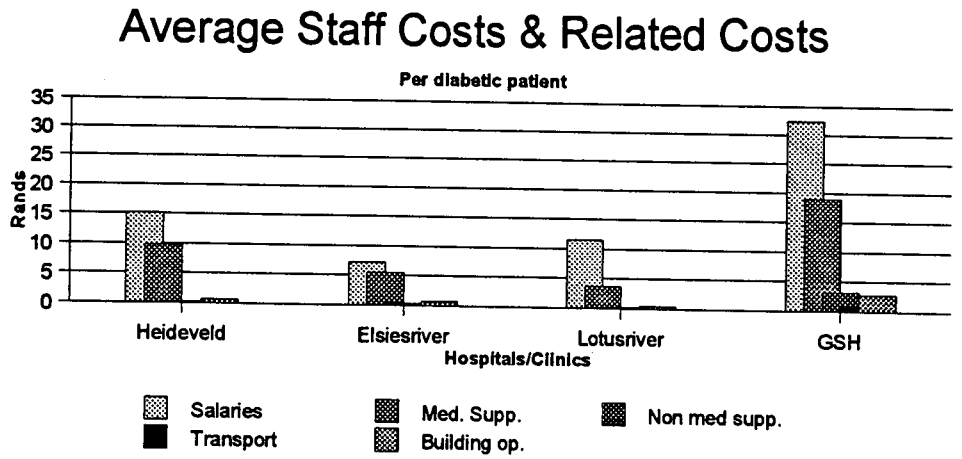
Table 12 below represents average staff costs and other related costs together, as indicated in tables 10 and 11. Table 12, as well as the bar graph that follows, highlight the differences in average staff costs and other related costs per diabetic patient across hospitals for primary diabetes treatment.

Table 12: Average Staff Costs and Related Costs per diabetic patient

Hospitals	Salaries	Medical supplies	Non med. Supplies	Transport	Building op.	Equip-ment	Soc. Welfare	Ave Cost/Di
Heideveld	15.2	9.8	0.2	0.1	0.6	0.1	0.0	26.0
Elsiesriver	7.2	5.4	0.3	0.2	0.7	0.2	0.0	14.1
Lotus river	11.5	3.7	0.2	0.2	0.4	0.2	0.0	16.2
GSH	32.4	19.0	3.2	0.7	2.8	1.4	0.0	59.6

Source: Own calculations

Figure 2:



c) Average diabetic cost per patient

Table 13 below represents the average cost per diabetic patient at each day-hospital and Groote Schuur Hospital.

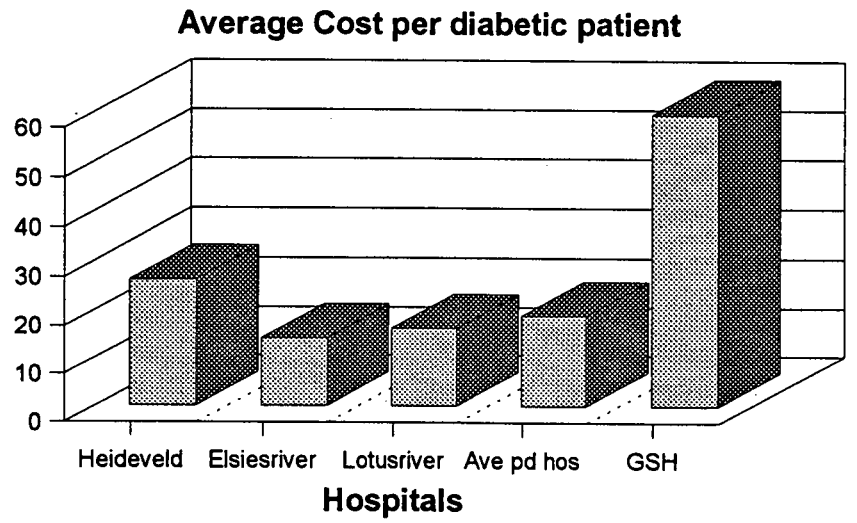
Table 13: Average cost per diabetic patient (1992/93)

Hospital	Average Cost per diabetic patient
Heideveld	26.0
Elsies River	14.10
Lotus River	16.20
Average per day-hospital	18.76
Groote Schuur Hospital	59.60

Nominal Values : Rands

Source: Own calculations

Figure 3:



The average cost per diabetic patient at Heideveld, Elsies River and Lotus River are R26, R14.10, R16.20 respectively, giving an average of R18.76 per diabetic patient at the three day-hospitals.

In contrast, the average cost per diabetic patient at G.S.H. is 59.60 per diabetic patient,

which is virtually three times the cost at day-hospitals.

The bar graph above further highlights the difference in average cost per diabetic patient across the hospitals.

6.4.2 Discussion of results

According to the results above, average costs per diabetic patient at a day-hospital is R18.76, while at G.S.H. it is R59.60. **One can therefore conclude that it costs less to treat a diabetic patient at a day-hospital than at the out-patient department at G.S.H.**

Besides the figures above that highlight the difference in cost for primary diabetes treatment, economic theory can also provide further confirmation and explanation of the need to shift primary diabetes treatment to day-hospital instead of high cost treatment at G.S.H.

6.4.2.1. Significance of Demand and Supply Theories

a) Theory of demand - need vs demand theory

According to the theory of demand, i.e. the need vs demand theory, there are inefficiencies in the consumption of "free" public care, because provision at zero prices not only permits the poor to increase their consumption of health care, but it encourages rich and poor to demand treatment that was previously not demanded.

This means that if "free" provision of diabetes treatment occurs at G.S.H. at a higher average cost (R59.60) instead of day-hospitals (R18.76), then the cost to the public sector will be substantial.

b) Theory of Supply - A theory of non-profit-making hospital behaviour

According to the Theory of non-profit-making-hospital behaviour the decision-maker chooses the optimal levels of quality and quantity by selecting the combination on the possibility frontier that gives him the highest level of utility. He chooses three-star quality and a quantity of output (i.e. patients treated or patient days of care) that is lower than the maximum. In other words, there has to be a trade-off between quality and quantity.

In the South African situation, where financial resources are limited, the danger exists that **increases in quality are associated with reductions in quantity because of the fixed budget.** If the choice of quality and quantity is left to the decision-makers, a high turn out of diabetic patients at G.S.H. instead of day-hospitals will impact on equity considerations, i.e. use of limited resources at G.S.H. for primary diabetic treatment will deprive others that do not have basic primary care at all.

6.4.2.2 The incidence of costs and benefits

In the absence of information for a cost-benefit analyses, if a question is posed, **" Who gains and who loses from the existence of the day-hospitals?",** it is clear that those attending the day-hospital have a clear advantage. The cost of travelling to hospital and the time spent at the hospital are reduced considerably, because of the clinics providing treatment of a high standard for a nominal fee in their own areas (Raine, 1978:353). Those still attending outpatient departments at G.S.H. also gain as the congestion at this institution is considerably reduced.

Assume that day-hospitals do not exist, i.e. that all patients are treated at an alternative public hospital. This will result in considerable social cost to the patient, as well as exacerbating the administrative and cost-containment problems of the health authorities.

Therefore, though information for a cost-benefit analysis is inadequate, from the above analysis it is clear that for the diabetic patient attending the day-hospital the benefit exceeds the cost. **From the patient's viewpoint, the conclusion can therefore be drawn that a mix of day-hospitals and GSH is offering patients a wider and cheaper service than GSH only .**

6.4.2.3 Economies of Scale and the Health Pyramid

An analogy can be drawn between Bryant's **" Health Pyramid"** i.e. a match between illness and facility, and Stigler's "specialization or division of labour in a growing firm" (Raine, 1978:354).

According to Stigler, in the normal goods market firms contract out their high cost operations to other firms specializing in these activities that are able to carry them out at a lower cost. Similarly, in the health pyramid, the larger the area covered and the number of activities carried out, the more efficient it is to treat those which it can at a lower cost, as it is correctly staffed and equipped for a particular activity.

In summary, the analogy suggests that a hospital out-patient department can treat general illness in outpatients, but it does so at a higher cost than a day-hospital. It is thus efficient for the hospital to "contract out" treatment of general illness to the day-hospital which specialises in general illness, and for the hospital to perform those activities -specialist treatment - to which it is suited.

6.4.2.4 Abuse of GSH diabetic clinic for PHC needs

Ideally, the day hospital should provide only general care and act as a referral centre, and the out-patient department at G.S.H. specialist care because of the higher cost involved.

However, patients still insist on attending the out-patient diabetic clinic at G.S.H., in spite of being referred to the day-hospital. Patients give various reasons for preferring to attend G.S.H., such as, adequate transport to GSH, lack of PHC facilities in certain areas, longer ques at day -hospitals, more skilled and qualified staff and better treatment at G.S.H. Many patients are also unaware that diabetic clinics at G.S.H. and the day-hospitals are run on the same principles. Patients that bypass PHC facilities are helped by doctors in the G.S.H. diabetic clinic,but they are referred back to day - hospitals. However, many of them return again to G.S.H. for primary diabetes treatment (Sister Kader, GSH: 1996).

The PHC system requires a more organised hospital referral network. This interdependency requires joint planning and other forms of organisational integration between PHC and hospital services. In addition, where patients bypass PHC facilities and present at hospitals for out-patients services, payment of an additional charge should be required, except in cases of emergencies, or where public facilities are closed or not available. The use of a bypass charge to encourage efficient use of the overall health care system is widely accepted (Deparment of Health, 1996:12).

Its purpose would be to reverse the servere problems of abuse of outpatient departments in hospitals for basic PHC needs.

7. GENERAL CONCLUSION

As indicated earlier, the study shows that the average cost per diabetic patient at day-hospitals (Heideveld: 26.0; Elsiesriver: 14.1; Lotus river: 16.2) is R18.76, while at G.S.H. the average cost per diabetic patient is R59.60.

The general conclusion is that it costs less to treat a diabetic patient at a day-hospital than at an outpatients department at G.S.H.

Moreover, the theories of demand and supply for health care, as well as the principle of economies of scale and the "health pyramid", reinforce the above notion of decentralizing diabetic treatment to day-hospitals as far as possible.

In terms of the health budget, primary diabetes treatment at day-hospitals has considerable advantages over treatment at the outpatients department at G.S.H.

Further cost analyses studies of other primary health treatments are likely to reveal similar results, i.e. that it costs less to provide primary health treatment at day-hospitals than the outpatient department at G.S.H.

In view of the above results regarding primary diabetes treatment and the implication for the health budget, health authorities need to reallocate resources to primary health care to enable "health for all" in South Africa, instead of allocating resources to provincial hospitals for curative care for a minority.

The PHC delivery model

In view of the above results regarding primary diabetes treatment, health authorities need to reallocate resources to PHC to enable "health for all" in South Africa, instead of allocating resources to provincial hospital for curative care for a minority.

The main features of the proposed delivery model for PHC services, according to the Policy Document on health, consist of a significant expansion of services over the next 5 - 10 years (Department of Health, 1996: 15). Because of constrained health resources in the country, expansion of the PHC system has the potential to impact negatively on publicly funded hospital services. Day-hospitals will also have to develop the capacity to expand and deliver services to the great number of patients that will need to attend PHC facilities. A reasonable balance between expansion of PHC and maintenance of the quality and accessibility of hospital services is required. Therefore, careful timing of the expansion of PHC services will be necessary, so as to ensure that redistribution of funds from hospitals to PHC sevices occurs in a controlled and planned fashion.

The PHC delivery model places emphasis on the development of PHC provision, particularly in rural and other underserved areas where services are currently inadequate, and also in urban areas, where existing services are inadequate. These development efforts will focus on several initiatives, including the provision of new health facilities, and the upgrading of existing facilities.

The RDP - Health for all

The trend of allocating resources for PHC through the RDP, is already happening in the Western Cape and the rest of the country. The RDP aims to bring health care within the reach of all people of the country. It aims to do so by changing South Africa's inequitable health spending, which offers the world's best specialist care on the one hand, but denies basic quality care to millions.

To overcome this challenge of inequitable health spending, two major projects are supported by the RDP. Since the **"Free Health Programme"** started, no child under the age of six years and no pregnant woman may be turned away from a hospital or clinic. This has resulted in more patients being treated in rural areas.

In some areas this is already contributing to lowering the rate of serious respiratory diseases, because illnesses are being addressed earlier. There is also a drop in admission of young children to hospitals because of better primary health care (The RDP, 1995:7). The RDP Fund has allocated R472.8 million and R500 million to the "Free Health Programme" in the 1994/95 financial years respectively (The RDP, 1995:8).

The Clinic Building programme supports improved access to primary health care. By 1 April 1996, 172 clinics will be built or upgraded to provide health services for those whose nearest clinic was more than 5 km. The table below shows the clinic and upgrading programme for 1994/95.

Table 14: Clinic building and upgrading programme 1994/95

PROVINCE	PROJECTS				1994/95 FUNDS	
	New Clinic	Upgrade	Equipment	Vehicles	TOTAL	RM
Western Cape	6	8			14	2.79
Northern Cape	4	3	3	4	14	2.78
Free State	1	2		8	11	2.48
Northern Transvaal	3		57		60	2.45
Eastern Transvaal	1				1	2.84
Gauteng	4				4	2.75
North West		19			19	2.79
Kwazulu/Natal	5	2	1		8	2.80
Eastern Cape		18	20	3	41	2.76
TOTAL	24	52	81	15	172	24.46

Source : The RDP : First Year Reviewed, 1995

The Way Forward: A New Vision for South Africa

There is general agreement that South Africa's population should be provided with access to a package of essential services which include preventive programmes, and

both outpatient care and inpatient care. In order to meet this target, health services will have to expand in areas which were previously under-served. A vision for health is formulated in the "National Health Plan for South Africa", with the following as guiding principles (African National Congress, 1994:19):

Equity : The health of all South Africans will be improved mainly through the provision of accessible health care services.

Right to health : Every person has the right to achieve optimal health, and it is the responsibility of the state to provide the conditions to achieve this.

PHC Approach : The Primary Health Care Approach is the underlying philosophy for the restructuring of the health system.

National Health System : A single, integrated National Health System (NHS) must be created to coordinate and deal with national guidelines, priorities and standards.

Coordination and decentralisation : The provision of health care will be coordinated among local, district, provincial and national authorities. Authority and responsibility for and control over funds will be decentralised to the lowest level that is compatible with rational planning and the maintenance of good quality care.

Health information system : Appropriate and reliable data will be systematically collected and analysed, as part of a comprehensive health information system essential for NHS planning and management purposes.

To achieve the above objectives it will be necessary for provinces to formulate strategies. The provincial strategies will have to be based on an analysis of the existing situation, identification of constraints to change, and an assessment of options for overcoming these constraints. Restructuring of the health sector must also involve the active and informed participation of the major stakeholders in order to ensure that health objectives are achieved.

8. REFERENCES

Abel - Smith, B. 1984. Improving Cost - Effectiveness in Health Care. World Health Forum, The World Bank. Volume 5, 88-90.

African National Congress. 1994. A National Health Plan for South Africa.

Barron, P. & Zwarenstein, M. 1991. Managing Primary Health Care in South Africa at the District Level 1991. Medical Research Council.

Broomberg, J. & Rees, H. 1992. Delivering at the right price - the costs of primary care at the Diepkloof Community Health Centre, Soweto. Health Systems Trust.

Cooper, M. H. & Culyer, A. J. 1973. Health Economics. Chaucer Press.

Creese, A. & Parker, D. 1990. Cost Analysis in Primary Health Care. Aga Khan Foundation.

Cullis, J. G. & West, P. A. 1979. The Economics of Health - an introduction. Oxford Press.

Department of Health. 1996. Official Policy Document: Restructuring the National Health System for Universal Primary Health Care.

Drummond, M. & Stoddard, G. & Torrence, G. 1987. Methods for Economic Evaluation of Health Care Programmes. Oxford Press

Equity, Efficiency and Health for all. 1993. Issues in health sector reconstructing. Selected Readings. Health Economics Unit, Dept. of Community Health, Medical School , UCT. Unpublished.

Evans, B. D. 1990. Principles involved in costing. Medical Journal of Australia. Volume 153.

Evans, B. D. 1990. What is cost-effectiveness analysis? Medical Journal of Australia. Vol 153.

Griffen, C. C. 1988. User Charges for Health Care in Principle and Practice. Economic Development Institute of the World Bank. The World Bank.

Griffen, C. C. 1992. Health Care in Asia: A Comparative Study of Cost and Financing. World Bank Regional and Sectoral Studies. The World Bank.

Groote Schuur Hospital Region: Annual Report 1989/ 90. Observatory, Cape, Republic of South Africa.

Groote Schuur Hospital Region: Annual Report 1992/ 93. Observatory, Cape, Republic of South Africa.

Groote Schuur Hospital Comparative Summary of Expenditure against Budget for Financial Year 1993/94. Observatory, Cape, Republic of South Africa

Hall, J. & Mooney, G. 1990. What every doctor should know about economics. Medical journal of Australia. Volume 152.

Health Economics. April 1992. Volume 1. Number 1. Wiley Publishers. West Sussex England.

Hilsenrath, P. E. & Joseph, H. 1991. Health Economics: Issues for South Africa. South African Journal of Economics, 59, 2.

Hurley, S. 1990. A review of cost-effectiveness analysis. Medical Journal of Australia. Volume 153.

Kawachi, I. & Bethwaite, P. J. 1990. The use of quality-adjusted life-years (QALYS) in the economic appraisal of health care. New Zealand Medical Journal.

La Puma, J. & Edward, D. & Lawlor, E. F. 1990. Quality-Adjusted Life-Years: Ethical Implications for Physicians and Policy makers. Special Communication.

Lavy, V. & Quigley, R. 1993. Willingness to Pay for the Quality and Intensity of Medical Care Low -Income Households in Ghana. LSMS Working Paper 94. The World Bank.

Lee, K. & Mills, A. 1983. The Economics of Health in Developing Countries. Oxford Press.

Leese, B. 1988. " The cost of diabetes and its complication: A Review." Discussion Paper 94. The Centre for Health Economics. University of York.

Maynard, A. 1990. The design of future cost-benefit studies. American Heart Journal. Wiley Publishers.

McIntyre, D. 1993. Commentary of the 1993/94 Health Budget. UCT.

McIntyre, D. 1993. Health sector financing and expenditure in South Africa. Working Paper 4. UCT.

McIntyre, D. 1990. Public Sector Health Care Expenditure in South Africa 1970 - 1990. Working Paper 1. UCT.

McIntyre, D. & Bloom, G. & Doherty, J. & Bijlal, P. 1995. Health Expenditure and Finance in South Africa. World Bank and Health Systems Trust.

National Health Expenditure Review. November 1993 .Technical Paper No. 1. Health Systems Trust.

Newhouse, J. P. 1992. Medical Care Costs : How much Welfare Loss? Journal of Economic Perspectives. Volume 6. Number 3.

Phelps, C. E. 1992. Diffusion of Information in Medical Care. Journal of Economic Perspectives. Volume 6. Number 3.

Raine, G. 1979. Cost-effectiveness of Day-Hospitals in Cape Town. Economics of Health in South Africa. Volume 1. Raven Press.

Scanlon, W. J. 1992. Possible Reforms for Financing Long-Term Care. Journal of Economic Perspectives. Volume 6. Number 3.

Scitovsky, A. 1992. Estimating the direct cost of illness. Palo Alto Medical Research Foundation.

Segall, M. & Vienen, M. 1987. Haiko Declaration on actions for primary health care. Oxford Press.

Slabber, C. F. 1992. A new South Africa - a new health care strategy. South African Medical Journal. Volume 82.

Stiglitz, J. E. 1988. Economics of the Public Sector. Second Edition. United Kingdom.

The Cape Argus. 21 November 1994.

The RDP. 27 April 1995. The First Year Reviewed. Compiled by the Ministry in the Office of the President.

Wilson, F. & Wescott, G. 1980. Economics of Health in South Africa. Vol 1 Perspectives on the Health System. Raven Press.

Wilson, F. & Wescott, G. 1980. Economics of Health in South Africa. Volume 2. Hunger, Work and Health. Raven Press.

World Development Report. 1993. Investing in Health. World Development Indicators. The World Bank.

World Bank. November 1992. Financing Health Services in Developing Countries: An agenda for reform. World Bank Policy Study. The World Bank.

World Bank. 1992. Zimbabwe: Financing Health Services. A World Bank Country Study. The World Bank.

Personal Communications:

Dr Badat. June 1994; July 1994. Lotus River Day Hospital.

Dr Dyer. June 1994; September 1995; May 1996. Heideveld Day Hospital.

Sister Jacobs. June 1994; July 1994. Elsies River Day Hospital.

Sister Kader. May 1994; June 1994; September 1995; May 1996. GSH.

9. APPENDIX

ADMISSION OF PATIENTS

Admissions : Heideveld, Lotus, Elsies Day-Hospitals

	Heideveld			Lotus River			Elsies River		
Date	**Total**	**Diabetic**	**Non-diabetic**	**Total**	**Diabetic**	**Non-diabetic**	**Total**	**Diabetic**	**Non-diabetic**
April 1992	7740	205	7535	3865	284	3581	6414	391	6023
May	7469	319	7150	3944	291	3653	6516	463	6053
June	7898	326	7571	4043	225	3818	6566	520	6046
July	8643	305	8338	4489	238	4251	7197	211	6686
August	7768	315	7453	4373	328	4045	6825	424	6401
September	8377	379	7998	4538	291	4247	7291	419	6872
October	8139	408	7731	4486	316	4170	7053	488	6565
November	7776	284	7492	4206	269	3937	7150	515	6635
December	6468	256	6212	3697	184	3513	6510	268	6242
Jan 1993	7371	359	7012	4186	291	3895	6452	312	6140
February	7925	301	7624	4421	265	4156	7079	440	6639
March	9406	289	9117	5188	234	4954	8001	535	7466
Total	**94979**	**3746**	**91233**	**51436**	**3216**	**48220**	**83054**	**5286**	**77768**
% Diabetic patients	3,944			6,252			6,364		

Date: April 1992 - March 1993

Source: Admissions Register
Diabetic Clinic Register

Diabetic Clinic Staff: Salaries

Heideveld DH Ave diabetic pts: 39							
STAFF	**GEN HR.**	**DIAB HR.**	**ANNUAL SALARY**	**PER DAY**	**PER HOUR**	**DIABETIC CLINIC**	**AVE PER DIABETIC**
Pr Med Officer	9	5	81543	339.7625	37.75139	188.7569	
Med. Officer	9	5	62019	258.4125	28.7125	143.5625	
Sen Proff Nurse	10	6	48534	202.225	20.2225	121.335	
Proff. Nurse	10	6	30132	125.55	12.555	75.33	
Staff Nurse	10	6	24912	103.8	10.38	62.28	
						591.2644	15.16063
Elsies DH Ave diabetic pts: 57							
Med. Officer	9	7	60139	250.5792	27.84213	139.2106	
Sen Proff Nurse	10	6	52753	219.8042	21.98042	131.8825	
Staff Nurse	10	6	29518	122.9917	12.29917	73.795	
Nurse Assistant	10	6	26031	108.4625	10.84625	65.0775	
						409.9656	7.19238
Lotus DH Ave diabetic pts: 43							
Med. Officer	9	7	54060	225.25	25.02778	175.1944	
Sen Proff Nurse	10	7	48534	202.225	20.2225	141.5575	
Proff. Nurse	10	8	25248	105.2	10.52	84.16	
Nurse Assistant	10	8	14133	58.8875	5.88875	47.11	
Nurse Assistant	10	8	14133	58.8875	5.88875	47.11	
						495.1319	11.5147
Groote SH Ave diabetic pts: 50							
Consultant: 1FT	9	4	81543	339.7625	37.75139	151.0056	
Consultants:4PT	4	4	163086	679.525	169.8813	679.525	
Registrars: 2	9	4	163086	679.525	75.50278	302.0111	
Sen Proff Nurse:2	10	5	97068	404.45	40.445	202.225	
Proff Nurse: 2	10	5	50496	210.4	21.04	105.2	
Staff Nurse: 1	10	5	29518	122.9917	12.29917	61.49583	
Nurse Assist.: 4	10	5	56532	235.55	23.555	117.775	
						1619.238	32.38475

Year: 1992-93
Source: Day Hospitals : DNNPD; GSH : Annual General Report 1992/93

Recurrent Costs : Heideveld Day-Hospital

	Total annual costs
A. Medical Supplies	
Medical Supplies	
Drugs	4507322
X-Rays	0
Laboratory Tests	17250
Text/Reference Books	23000
Medical/health services	4600
Medical Aid (spectacles)	65550
Other	17250
Sub-total	2300
	0
	4637272
B. Non-Medical Supplies	
Stationary	
Printing	28750
Library/films	7935
Domestic Provision	6900
Linen	34500
Uniforms	3450
Cleaning Materials	5750
Sub-total	28750
	116035
C. Transport	
Government Transport	
Contract Transport	17250
Petrol	17250
Parts	6900
Sub-total	23000
	64400
D. Building Operation and maintenance	
telephone	
water	34500
electricity	43000
workshop materials	78000
furniture and appliances	11500
maintenance services	34500
repair services	11500
specialised services	17250
diverse services	5750
security	5175
Sub-total	23000
	264175
E. Equipment	
Technical equipment	
Hiring of equipment	36250
Labour Saving Devices	5750
Sub-total	4600
	0
	46600
G. Social Welfare	
Social aid	
Sub-total	11500
	11500
TOTAL	**5139982**

Rands : R000's
Date : 1992/93
Source: DNHPD

Recurrent costs : Elsies River Day-Hospital

	Total annual costs
A. Medical Supplies	
Medical Supplies	2125000
Drugs	0
X-Rays	29000
Laboratory Tests	113250
Text/Reference Books	3500
Medical/health services	19250
Medical aid (spectacles)	17250
Medical aid (hearing)	2900
Other	0
Sub-total	2310150
B. Non-Medical Supplies	
Stationary	31500
Printing	4100
Library/films	3500
Domestic Provision	37100
Linen	6000
Uniforms	7500
Cleaning Materials	25000
Sub-total	114700
C. Transport	
Government Transport	25000
Contract Transport	19700
Petrol	29950
Parts	27500
Sub-total	102150
D. Building Operation and maintenance	
telephone	38000
water	33000
electricity	83000
workshop materials	29000
furniture and appliances	34000
maintenance services	17900
repair services	23550
specialised services	26000
diverse services	4550
security	29000
Sub-total	318000
E. Equipment	
Technical equipment	37500
Diverse equipment	7500
Hiring of equipment	7995
Labour Saving Devices	39250
Sub-total	92245
G. Social Welfare	
Social aid	11500
Sub-total	11500
TOTAL	**2948745**

Rands: R000's
Date: 1992/93
Source: PNHPD

Recurrent costs : Lotus River Day-Hospital

	Total annual costs
A. Medical Supplies	
Medical Supplies	
Drugs	1725000
X-Rays	0
Laboratory Tests	23000
Text/Reference Books	103500
Medical/health services	2300
Medical Aid (spectacles)	17250
Medical Aid (hearing)	17250
Other	2300
Sub-total	0
	1890600
B. Non-Medical Supplies	
Stationary	34500
Printing	2300
Library/films	28750
Domestic Provision	31500
Linen	4025
Uniforms	4025
Cleaning Materials	23000
Sub-total	128100
C. Transport	
Government Transport	23000
Contract Transport	17600
Petrol	28750
Parts	23000
Sub-total	92350
D. Building Operation and maintenance	
telephone	34500
water	6000
electricity	33000
workshop materials	23000
furniture and appliances	37000
maintenance services	15500
repair services	21850
specialised services	21850
diverse services	3450
security	0
Sub-total	196150
E. Equipment	
Technical equipment	36500
Diverse equipment	7500
Hiring of equipment	5000
Labour Saving Devices	34500
Sub-total	83500
G. Social Welfare	
Social aid	11500
Sub-total	11500
TOTAL	**2402200**

Rands : R000's
Date : 1992/93
Source: DNHPD

Recurrent Costs: Groote Schuur Hospital

	Total annual costs
A. Medical Supplies	
X-ray equipment	2562556
Laboratory requisites	4737940
Med/surgical requisites	27396269
Dentists intr/requisites	10801
Medicine	24882967
Vaccines	335606
Human blood and preparation	9104186
Artificial aids	488005
Other medical consumables	936491
Laboratory services	205500
Sub-total	70660321
B. Non-Medical Supplies	
Publications	24113
G Printer	219230
Protective Clothing	305893
Uniforms	86612
Linen/Bedding	1178210
Stationer/Printer	1379879
Provisions	4855876
Chemicals	136744
Cleaning	351553
Packing material	2574
Paper products	3246895
toiletries	65964
Sub-total	11853543
C. Transport	
GG Motor Transport	647611
Private Transport	184530
Contract transport	182176
Rail freight	46228
Aeroplane tickets	68837
Rail tickets	99
Transport - other	28517
Transport - taxi	1389204
Transport - air	16214
Transport - train/bus	11022
Escort fees	785
Sub-total	2575223

D. Building Operation and maintenance	
Telephone	1616103
Data modem	30298
Postage	17010
Telegrams	1507
Radio telephones	3444
Rental - post bags	388
Communication	74
Class fees univ/tech	51878
Study-other	15
Regional services	784789
Settlement levy	32649
Bank charges	132601
Advertising costs	1657
Incidental expenditure	21140
Transfer Expenditure	33604
Coal	1383579
Water	441308
Electricity	4386457
Maintenance materials	669769
Batteries	23767
Insecticide	39208
Domestic hardware	299925
Other stores	454052
Sub-total	10409913
E. Equipment	
Surgical/medical equipment	4829746
Hire of computers	167392
Hire of equipment	307692
Audiovisual requisites	8141
Sub-total	5312977
TOTAL	**100811977**

Rands: R000's
Date: 1992/93
GSH
Source: Annual Expenditure Report 1992/3