



Resources Allocation for Financing Health Services in the Kingdom of Saudi Arabia

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Abstract:

Public health standards, in Saudi Arabia, are improving rapidly. Health care costs have increased more than consumer price indices. But the public funds for health care are declining. This fact raises a problem related to the prospects of financing health services in Saudi Arabia.

This study aims to review the components and the growth rate of health expenditure. And determine if Saudi Arabia spending is too much or too little on health services.

The study proposes two main hypotheses:

(1) The real health expenditure per capita tends to decline, owing to the population growth, inflation rate, depreciation of assets and declining public funds for health services. The study used time series analysis (1960 - 2000) applying convenient deflators for each variable. A double logarithmic function is fitted. The statistical model used in this part is multiple regression. The specific estimating equation was estimated via ordinary least squares (OLS) regression techniques using SPSS version 10.

(2) Saudi government could optimally reallocate financial resources between public and private health sectors, and the Ministry of Health could introduce fees charges to finance and cover the cost of specific health service. In this respect, two hypotheses are formulated for testing the relationship between governmental financing health service and the outcome of public health services. This is Samuelson rule, which suggests a positive relation between government health sector and private health sector. And another relation between government funds and the outcome of public health services. A

regression model for health expenditure and funds was constructed and used to predict a norm for each sector. The study specifically draws on the economic theory of consumer demand. The main tool of analysis used here is based on normative approach at first, and then combined with a single macroeconomic model.

The study consists of two parts: In part one, an attempt is made to analyze the composition and trends of actual health expenditures; part two, presents a normative approach and the argument for reallocating the financial resources between government and non-government agencies and discusses how user charges could be applied to the impure public health services. The conclusion presents some applicable recommendation.

I - Introduction:

1- 1 Problematic fact:

Saudi people have relied heavily on their government for the provision and financing of health service. Free medical treatment is available not only to Saudi citizens but also to the pilgrims who come yearly to Mecca. Free health service and government involvement in the financing and delivery of health service thus appear to respond to a fundamental concern for equity. Table (1) shows that public health expenditure in Saudi Arabia is increasing rapidly. Health services costs appear to be out of control, they have increased more than consumer prices.

Table (1) Health Expenditure Indicators

	Nomenclature	1965	1997
1	Health expenditure per capita (US\$)	69	221.1
2	Private health expenditure as % of GDP	0.13%	1.6%
3	Public health expenditure as % of GDP	1.4%	6.4%
4	Total health expenditure as % of GDP	1.53%	8.0%
5	Population aged 0-14 years (thousands)	2110	8369
6	Population aged 65 years and above (thousands)	156	559

Source: World Bank table, social indicators,2000.

We become aware of the prospects of health service in Saudi Arabia, for the following grounds:

- 1 - Population growth rate in Saudi Arabia has remained high. It has meant that more total resources are required to deliver health service.
- 2 - The Saudi government has pursued sectoral reform in health service in order to maintain or increase the quality and quantity of health service provided to the population. Private health care does not cover everyone, so to encourage private participation in health service.
- 3 - The public funds for health care are declining. Worldwide, developing economies are feeling the pressure of the global economic slowdown. Saudi economy was hard hit by the world economic recession, facing sluggish economic growth. The country has adopted austerity measures, which combined with lower per-capita government revenue, which have translated into reduction in real per-capita government spending for health care.

1-2 Purpose of the study

The main purpose of this study is to examine how Saudi people allocate their income toward health services, and to determine which factors play a significant role in this process. The study aims also to:

- 1 - Review the components and the growth rate of health expenditure, and examine if the government health expenditures did cause an increase in total government expenditures? And determine if Saudi Arabia is spending too much or too little on health. This has been the subject of debate during the past four decades.
- 2 - Reallocate existing resources as necessary or, if this proves impossible, at least allocate any additional resources for the provision of primary health care.

1-3 Importance of the study

The study could be helpful for decision makers and practitioners in choosing among alternative uses for scarce financial resources. It supports authorities to perform two critical tasks in efficient and effective planning for health service: analyses the sources and destinations of financial flows in the health sector, analyses the management of government operated health care facilities. The study also orientates health services towards a more efficient utilization of resources. It is intended to serve the general policy of strengthening national capacities in the finance area. Health sector and beyond in general planning and financial management, may find this study useful in their work.

In the year 2000 alone, health governmental agencies acquired SR 13.1 Billion worth of equipment (Ministry of Finance,1421). Saudi government declared to organize a new system of national health insurance. This system provides financial benefits and medical services to people disabled by sickness or accident⁽¹⁾.

1-4 Literature review

There is a large body of literature that supports the notion that an increase in human capital can make one more productive (both in quantity and quality) in the home and workplace.

- 1 - Brian Abel-Smith (1967) discusses international health expenditures and its relevance for health planning; he focused on the system of financing, and evaluates the health costs in several countries (Abel-Smith Brian, 1967).
- 2 - The world health assembly 1977 decided that the main social target of governments and WHO should achieve health for all by

(1) Similar systems are found in many countries, particularly in Europe and some countries in the Middle East. In other countries like USA health insurance has traditionally been provided by private enterprise on a voluntary basis.

the year 2000. A level of health that will permit then to lead a socially and economically productive life (E.P. Mach & B. Abel-Smith 1983). In 1978, a conference held in Alma Ata (former USSR) declared the same target (Mead Over, 1991)

- 3 - Abdel-Ghany and Foster (1982) found health has income elasticity greater than one. Therefore, private health expenditures appear to be relatively sensitive to income changes.
- 4 - The World Bank (1987), provided a clear statement of the policy instruments of structure adjustment for the health sector and advocated greater reliance on user fees, insurance mechanisms, private sector (World Bank 1987).
- 5 - Andrew L Creese (1991), reviews some recent experiences with increases in user charges and their effect on the utilization of health services. He presents evidence from several countries of differences in utilization between the rich and the poor.
- 6 - Yang (1995) examined health expenditures per capita for private versus government, and found no statistically significant differences between these two groups. Only disposable income was a statistical and positive factor for health expenditure for both groups (j. Bryant,1990)⁽²⁾.
- 7 - Nafis Sadik (1998) used some useful indicators for reproductive health and monitoring goals for development health strategies (Sadiq Nafis,1998)

1-5 Hypotheses and analysis

The study proposes two main hypotheses:

- A - The real health expenditure per capita tends to decline, owing to the population growth, inflation rate, depreciation of assets and declining of public funds for health service. We will use a time

(2) Bryant, W.J. (1990). The economic organization of the household. New York: Cambridge University Press.

series technique (1960-2000) applying convenient deflators for each variable. The base year 1969 is used as the SAMS considered. Then estimates the production function of health services per capita, presenting the income and price elasticities.

- B - The Saudi government could optimally reallocate financial resources between public and private health sectors.

The main tool of analysis used here is based on normative approach at first, and then combined with a single microeconomic model.

- C - The Ministry of Health could introduce fees charges to finance and cover the cost of specific health services. In order to test this hypothesis, the study will develop a normative model, and apply it to actual data relating to health services, and then analyse the contingency correlation between the proposed and the actual site. The study also draws on the economic theory of consumer demand, specifically, using a modified Engle function that expresses the level of private health expenditure (PHE). The study depends on public economic analysis, which appears in the work of Musgrave (1982).

1- 6 Variables and sources of data

Appendix (A) shows the variables under consideration. The data has been derived from, the Ministry of Finance, Health, IMF; Government finance statistics, World Bank; Global Development Finance 2000, UN; Yearbook of National Account Statistics, and SAMA.

1-7 Plan of Study

The study consists of four parts and is organized as follows: In the first part an introduction covers the problematic, Literature review, hypothesis, methodology, and analysis. In the second part, an attempt is made to analyze the composition and trends of actual health expenditures. The third part presents a normative approach and the

argument for reallocating the financial resources between government and non-government agencies, and discusses how user charges could be applied to the impure public health services. In the fourth part, the conclusion presents some applicable recommendation.

II -Allocation of Financial Resources

The national income is divided between the government and private sectors; each of them allocates its share to a variety of goods and services. Thus the total expenditure on health care will depend in part on the way the national income is divided between the government and private sectors, and in another part on the way each of these sectors divided its share between health care and other goods and services⁽³⁾.

2-1 Total health expenditure (THE)

THE is the sum of government and private health expenditures. It may be related to the percentage of GDP devoted to health services, as it is often used to compare relative spending on different sectors or across time, and to measure the growth or decrease in the share of national resources devoted to each sector over time. (THE) as a percent of GDP, can be used for rough international comparisons, bearing in mind that most data published so far only covers expenditures by the Ministry of Health. Figure (1) shows the relationship between (THE)

(3) It should be worked from the existing information and data derived from accounting system, which needs some adjustment. Roughly estimates (if they are made on rational basis) of the data are mostly satisfactory for our purpose. Also the informed "guesstimates" is better than a large hole (missing data) in a table of figures. It is necessary to consider three cautions:(1) Ensure that all major items of finance and expenditure are included, (2) Use the figures for expenditure that actually incurred rather than financially budgeted which may not have been allocated, of if allocated, but not spent, and (3) Because the financial resources may be classified that funds transferred from one source to another, they may be counted twice. To avoid any double counting of money transferred from one source to another before it is spent which thus appears in more than one account.

per capita and GDP per capita. On the whole, it is believed that comparisons of GDP tend to be fairer⁽⁴⁾. The logarithm of (THE) is regressed on the percentage of government budget devoted to health service, household health expenditure as the percentage of gross household consumption and disposable income.

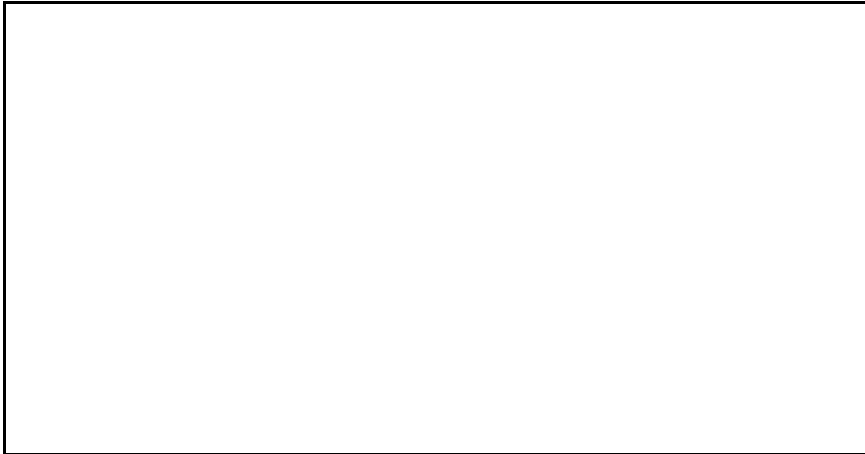


Fig.1 Per capita Total health expenditure and Per capita GDP

$$\begin{aligned} \text{Log}(\text{THEc}) = & 4.93 - 1.12\text{Log}(\text{GHE}/\text{TGE}) + 0.77 \text{Log}(\text{phe}/\text{C}) \\ & + 0.09 \log(\text{DI}) \dots\dots\dots (1) \\ & (7.424) \quad (-19.759) \quad (0.7744) \quad (1.829) \\ & "0.000" \quad "0.000" \quad "0.000" \quad "0.013" \end{aligned}$$

(Values in parentheses are t-Student, and between inverted comma are P-value⁽⁵⁾).

$$\begin{aligned} R^2 &= 95.4 & F &= 264.01, \text{ P-value} = 0.000 \\ \text{D.W.} &= 1.874 & \text{SEE} &= 0.016 \end{aligned}$$

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- (4) The aim of giving illustration is to assist official practitioners and planners in choosing which types of analysis would be the most useful in developing health plan finance.
 (5) The same notation is for all regression analysis.

Although the average annual growth rate of per capita real GDP of 8.4% over the 1960-2000 period, estimates for government health expenditure indicate a decrease by 2.5%. Table (2) and figure (2) shows the estimates of per capita health expenditure:

Table 2. Average Annual Growth Rate of Per capita Health Spending

Variables	Growth Rate	R ²	F.Statistic	P. Value	t.Student
GHEcpt	- 0.025	0.23	12.17	0.0128	3.488
PHEcpt	..0.058	0.64	32.598	0.0000	5.709
THEcpt	..0.029	0.29	12.44	0.0011	3.527
TGEcpt	..0.068	0.55	77.513	0.0000	8.804
GDPcpt	..0.084	0.93	509.955	0.0000	22.582

Source: Estimated logarithm function using data in appendix D

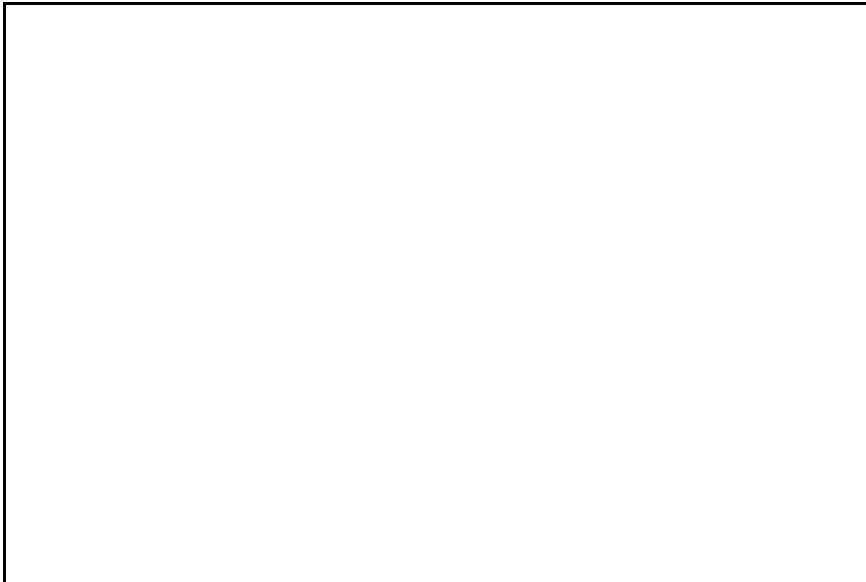


Fig.2 Avg. Ann. Growth Rate of per capita Health spending(1960-2000)

2-2 -Financing Government Health Services

2-2-1 The Ministry of Health

The Ministry of Health normally receives the bulk of funds from the Ministry of Finance. Funds may also be received from external cooperation, special funds and charitable donations.

2-2-2 Other Governmental Agencies

There are health expenditures incurred by governmental departments other than the Ministry of Health. For example, The Ministry of Public Works may provide building for health purposes and support their maintenance. The Ministry of Defense may provide health services for members of the armed forces, and the department responsible for prisons for prisoners. The Ministry of Agriculture may provide veterinary services for the protection of animal health and subsidies to basic foods. It is suggested that meat inspection should be classified under sanitation costs, while expenditure on the control of rabies, brucellosis, and tsetse fly, etc., should be classified under communicable disease control. The Ministry of Education may provide health services for schoolchildren and pay for the specialized education and training of health personnel. The Ministry of Transport, the running costs of the vehicles of the Ministry of Health are born by the Ministry of Transport or a similar agency. The management of public health services has been decentralized and responsibility given to municipalities.

$$\begin{array}{l} \text{Log(GHE)} = 0.42039 + 0.0487 \text{ POP} + 0.5735 \text{Log (TGE)} \dots\dots\dots (2) \\ \quad (10.693) \quad \quad (16.351) \quad \quad (2.632) \\ \quad "0.0000" \quad \quad "0.0000" \quad \quad "0.0112" \end{array}$$

$$R^2 = 93.2 \quad F = 267.4, P\text{-value} = 0.000 \quad D.W = 1.84 \quad SEE = 0.1096$$

Government health expenditure as proportion of total government expenditure (GHE/TGE). This contains the expenditures of The Ministry of Health, other government agencies and compulsory health insurance. One use of this indicator is to compare the health sector's

share of public expenditure with that of other sectors (education, defense) the trend (increase, decrease, or unchanged) can provide an indication of the past policy of government in allocation of funds. Unless there has been a change in policy, this may indicate the level of funding that can be expected from government in the future. Public health expenditure in relation to total government expenditure increased from 4.5% percent in 1960 to 8.5% in 1997, with a slight decrease between the periods of 1980-1990.

$$\text{Log(GHE/TGE)} = -0.3093 - 0.22662(\text{Log GDP}) \dots\dots\dots (3)$$

$$(-11.9411) \qquad (22662)$$

$$"0.000" \qquad "(0.000"$$

$$R^2 = 96.4 \quad F = 514.7, \text{ Pvalue} = 0.000 \quad \text{D.W.} = 1.85 \text{SEE} = 0.1103$$

GHE versus private health expenditure (PHE)

This comparison has a number of possible uses. Firstly, it shows what people are prepared to spend privately on health compared with what is compulsorily collected and allocated for public health. Substantial expenditure may be going on imported drugs. Restricting what is available in the private drug market on the basis of cost-effectiveness is one way of reducing imports. Some private spending might be "captured" by the organized sector by charging for certain services. GHE increased from 1.4 percent of GDP in 1960 to 6.4 percent of GDP in 1997, while PHE increased from 0.13 percent of GDP to 1.6 percent of GDP in the same period. Table 3 shows the relation between private and government health expenditures.

2-3 -Financing Private Health Services

Private health expenditure (PHE) includes direct household (out-of-pocket) spending, private insurance, charitable donations, and direct service payments by Private Corporations.

1- **Employers:** Factories, agricultural estates and mine may provide health care for their employees, either directly or through a welfare fund. Certain categories of employers may be legally required

to provide first aid, hospital services and occupational health services. Sometimes groups of small firms in an area jointly financed such service.

***Table 3. government and private health Spending
In Saudi Arabia 1960 -2000 constant pricesat 1969 =100***

Year	Dicpt SR	PHE/T	THEcpt SR	GHE/TGE	PHE/DI
1960	2847	0.03	264	0.10	0.03
1	3019	0.04	307	0.10	0.04
2	3192	0.04	357	0.10	0.04
3	3183	0.04	378	0.10	0.05
4	3226	0.05	399	0.10	0.05
5	3401	0.04	454	0.08	0.05
6	3621	0.04	475	0.08	0.05
7	3447	0.04	493	0.07	0.05
8	3413	0.03	569	0.06	0.05
9	3491	0.03	660	0.05	0.05
1970	4026	0.03	991	0.03	0.04
1	4455	0.04	1499	0.03	0.05
2	5133	0.05	1471	0.03	0.06
3	5033	0.06	1133	0.03	0.04
4	4766	0.06	1544	0.03	0.06
5	6240	0.13	3297	0.03	0.11
6	7810	0.09	3429	0.02	0.07
7	8100	0.07	3224	0.03	0.08
8	8780	0.07	3181	0.03	0.08
9	11440	0.05	2741	0.02	0.05
1980	12650	0.05	2737	0.02	0.05
1	16400	0.05	3175	0.02	0.04
2	13370	0.08	3561	0.03	0.08
3	11660	0.09	3154	0.03	0.09
4	9860	0.13	3100	0.04	0.15
5	8480	0.12	2434	0.04	0.15
6	7900	0.13	2802	0.04	0.16
7	11010	0.11	2225	0.05	0.13

**Table 3. government and private health Spending
In Saudi Arabia 1960 -2000 constant pricesat 1969 = 100 (cont'd)**

Year	Dicpt SR	PHE/T	THEcpt SR	GHE/TGE	PHE/DI
8	16820	0.09	1838	0.05	0.08
9	16350	0.09	1608	0.05	0.08
1990	16700	0.10	1351	0.06	0.07
1	17460	0.10	1437	0.06	0.08
2	17970	0.08	1372	0.06	0.07
3	17590	0.08	1376	0.06	0.08
4	17050	0.07	1285	0.05	0.07
5	16970	0.06	1108	0.05	0.06
6	17130	0.06	1012	0.05	0.05
7	17150	0.10	1182	0.06	0.08
8	17359	0.09	1169	0.06	0.08
9	16480	0.09	1195	0.06	0.08
2000	17051	0.09	1221	0.06	0.08
1	18975	0.09	1262	0.06	0.08

Sources: estimated from appendix (B)

2-3-2 Direct Private Payments

Households may pay directly for health services. It represent a large proportion of the total expenditure of the health sector, this may include personal expenditure on food, housing or clothing, the value of working time lost by seeking health care, the private cost of transport and accommodation when seeking health care. Schemes may be operated by friendly or mutual benefit societies, and other non-profit organization or by private profit making insurance corporations. Employers, individual or groups, can buy private insurance. Voluntary bodies such as the Red Crescent, women's groups may contribute money, services or donations in kind to health service. Nomadic traditional practitioners practise in part-time, traditional birth attendants, and they may receive substantial payment in kind. They are also geographically widely dispersed and thus difficult to survey. Figure 3 (a) shows the relationship between percentage of private health expenditure and percentage of government health expenditure (budget fund).



***Fig.3(a) Per-capita Government and private Health Spending,
SR Prices of 1995(1960-2000)Figure 3(b) shows the relationship
between (PHE/DI) and (GHE/TGE)***

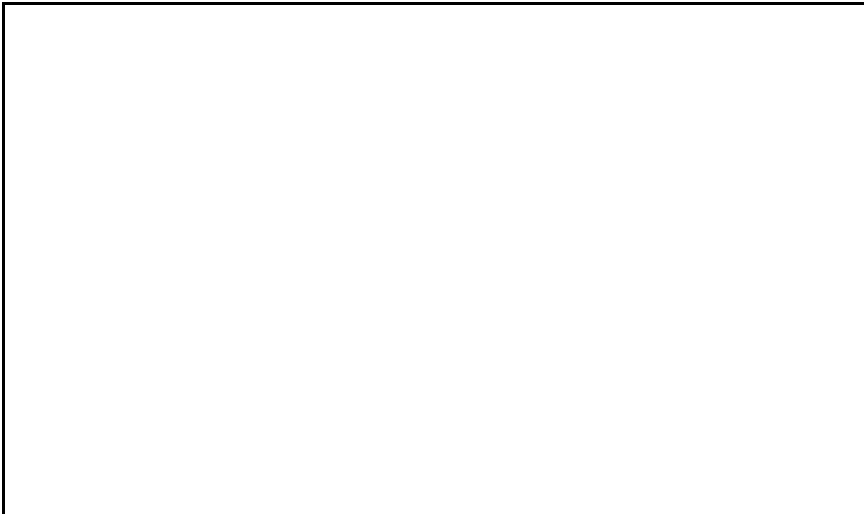


Fig.3(b) PHE/DI and GHE/TGE in KSA 1960-2000

The set of household characteristic variable (POP) used in this model includes family size and age groups. Take it in logarithmic form. For example, the proportion of private resources spent on health

service is often said to be affected by the amount of private resources actually available, which is estimated from the disposable income per capita. Thus to find evidence of a possible relationship, one needs to plot private health spending as percentage of DI (PHDI) against DI.

The statistical model used in this part is multiple linear regressions. The specific estimating equation was estimated via ordinary least squares (OLS) regression techniques using SPSS version 10 and takes the following form:

$$PHE_i = b_0 + b_1 DI_i + b_2 DI_i^2 + b_4 pop_i \dots\dots\dots (4)$$

"i" = 1,...,n for all.

$$\text{Log(PHE)} = -0.58507 + 0.6598 \text{ Log(DI)} - 0.139 \text{ POP} \dots\dots(4)'$$

$$(6.9616) \quad (1.7939-) \quad (2.9837-)$$

$$"0.0000" \quad "0.0806" \quad "0.0049"$$

$$R^2 = 70.3 \quad F = 59.48, P.\text{Value} = 0.000 \quad D.W. = 1.84 \quad SEE = 0.0816$$

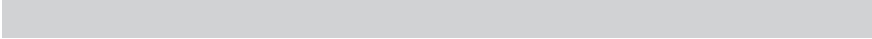
III- OPTIMAL PROVISION OF HEALTH SERVICE

The characterization of the efficient provision of a pure public health service was first published in Samuelson (P.A. Samuelson, 1954) and was followed by a diagrammatic explanation in Samuelson (P.A. Samuelson, 1955). The following analysis will derive the Samuelson rule for a pure public health, with and without free disposal, and for public inputs and public health service with congestion. Health services could be provided by two main Providers: the Ministry of Public Health and the private sector

According to the nature of the health service and its characteristics, some programs could be financed by the government budget; others could be financed through fees charges.

The science and practice of protecting and improving the health of a community, as by preventive medicine, health education, control of communicable diseases, application of sanitary measures, and monitoring of environmental hazards.

The goals of public health are to prevent human disease, injury,



and disability; protect people from environmental health hazards; promote behaviors that lead to good physical and mental health; educate the public about health; and assure availability of high-quality health services. Public health protection and improvement of the health of entire populations through community-wide action are primarily done by governmental agencies.

Public health systems vary in different parts of the world, depending upon the prevalent health problems. In the developing world, where sanitation problems and limited medical resources persist, infectious diseases are the most significant threat to public health. Public health officials devote resources to establish sanitation systems and immunization programs to curb the spread of infectious diseases, and provide routine medical care to rural and isolated populations. In industrialized nations, sanitary food and water supplies and excellent medical resources have reduced rates of infectious disease. Instead, accidents and diseases such as lung cancer, heart attacks, and strokes are among the leading causes of death. In these areas, public health goals include education programs to teach people how to prevent accidents and lessen their risk for disease, and the maintenance of the excellent disease prevention systems already established.

Public health workers may engage in activities outside the scope of ordinary medical practice. These include inspecting and licensing restaurants; conducting rodent and insect control programs; and checking the safety of housing, water, and food supplies. In assuring overall community health, public health officials also act as advocates for laws and regulations-such as drug licensing or product labeling requirements. Some public health officials are epidemiologists, who use sophisticated computer and mathematical models to track the incidence of communicable diseases and to identify new diseases and health trends. Others conduct state-of-the-art medical research to find new prevention and treatment methods.

For the private health sector, the price mechanism, through the market economy, provides a simple and effective method, for determining the level of production of private health services. It provides incentives for firms to produce goods that are valued and it provides a basis for allocating the services that are produced among the various consumers. Equilibrium in private markets is determined at the intersection of the demand curve and the supply curve. In acquiring private health services, individuals reveal their preferences for different private goods. The decision maker in private decisions knows his own preferences.

There was no similar mechanism for revealing for public health services. While individuals may express views about the desirability of one private good versus another by a simple action - they decide either to buy the good or not- there is no comparably effective way that individuals can express their views about the desirability of one public good versus another. The decision maker in public decisions has to ascertain the preferences of those on whose behalf he is making the decision. This is an important difference between public and private resource allocation. Government health service can be distinguished from a private health service by the fact that it can provide benefits to a number of users simultaneously whereas a private health service can, only benefit a single user. If the public service can accommodate any number of users then it is said to be pure. It is impure when congestion can occur. The existence of government health service then leads to a failure of the competitive equilibrium to be efficient. The supply of conventional public health services is determined through a political process (Joseph E. Stiglitz 1988)⁽⁶⁾. It is not determined by market forces, because there is a limitation of market allocation mechanisms. Market tends to offer unsatisfactory outcomes where the health

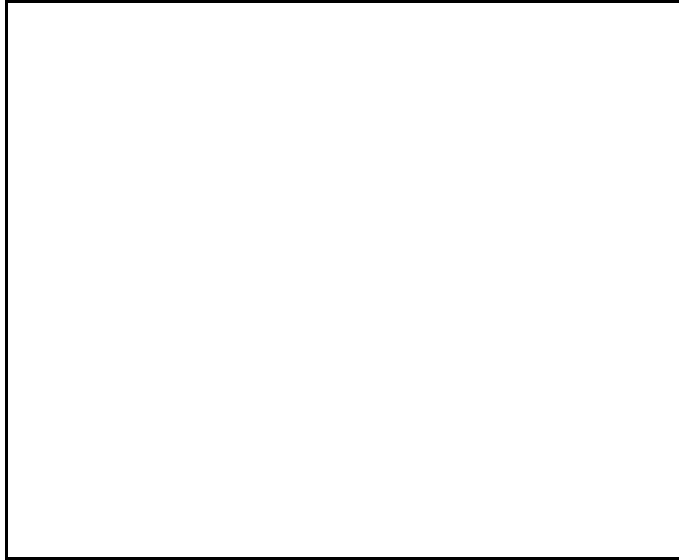
(6) In democratic society the decisions are made by the majority voting, according to the preferences of the citizens.

services have two properties, the impossibility and undesirability of exclusion. When a pure public health service is provided, all households can consume it collectively. Such collective consumption violates the assumption of the rival nature of the goods in a competitive economy. Pure public health services have two main characteristics that influence the method of financing

a) **Non-excludability:** If the public health service is supplied, no household can be excluded from consuming it except, possibly, at infinite cost. The implication of non-excludability is that consumption cannot be controlled efficiently by the price system since no household can be prevented from consuming the public health service if it is provided. It is evident that a good or service satisfying this condition does not fit into the framework of the competitive economy used to drive the welfare economics. Figure (4) shows the ease of exclusion along the horizontal axis, and the marginal cost of an additional patient using the health service along the vertical axes. The lower left-hand corner represents a pure public health service, where the cost of exclusion is prohibitive and the marginal cost of supplying the health service to an additional patient is nearly zero. The upper right-hand corner is a pure private health service, where the cost of exclusion is low and the marginal cost of an additional patient using the health service is high. In the diagram there are several "impure" cases. The marginal cost of usage of an uncongested belgrimes or Umra care is close to zero, but there is a cost of exclusion. For a congested belgrimes, on other hand, there may be a large social marginal cost associated with an additional patient's begriime using the health facilities. Exclusion may be feasible but undesirable or costly.

b) **Non-rivalry:** Consumption of the public health service by one household does not reduce the quantity available for consumption by any other. All households can, if they desire, simultaneously consume a level of the public health service equal to its total supply. If it is possible for households not to consume the public health service, then some

may consume less. In this case, the public service may satisfy free disposal, so that consumption can be reduced at no cost.



***Fig (4) Pure and Impure public health service
that services differ in the ease and desirability of exclusion***

In reality, it is difficult to find any good or service that satisfied both the precise condition of non-excludability and non-rivalry. In practice, public health service tends to eventually suffer from congestion when usage is sufficiently great⁽⁷⁾. Congestion results in a reduction in the return the public health service gives to each user as the use of a given supply by household's increases. Such public health service is termed impure. The utility derived by each household from an impure public health service is an increasing function of the level of supply and a decreasing function of its use. There are several ways of representing the effect of congestion upon preferences and some of these will be described when optimal provision is characterized. Figure

(7) Obvious examples include parks and roads.

(5) illustrates the possible division of the consumption of one unit of a health service between two households for the two extremes and for an impure public health service. With a pure public health service, it is possible for both to consume a maximum of one unit. In contrast, the private health service must be divided between patients. The consumption possibilities for an impure public good lie between these limits.



Fig. (5) Consumption possibilities for unit of health service

3-1. Public Provision of Pure Public Health Service

To provide a reasonably simple derivation of the efficiency rule, it will be assumed that there is a single public health service only and, initially, that disposal is not possible.

The latter assumption implies that all households must consume a quantity of the public health equal to its supply. The extension to many public healths is entirely straightforward.

Public health service congestion is a real phenomenon. Conges-

tion reduces the benefit that all households receive from their use of the public health and therefore modifies the rule for efficient provision.

Two different approaches can be used to reallocate health services among public and private providers.

3-1-1. A MICROECONOMIC APPROACH

The mixture of produced health services reflects the quantities of each that individuals demand when each service is priced at its marginal cost of production. A stylized demand-side model might be represented by:

$$G = ap^b Y^c Q^d T^e D^f \dots\dots\dots (5)$$

Where G is a public health provision, p is a tax price variable (cost of public health service to the government revenue), Y is income, Q is preference and D is demographic factors. If we estimate the equation in log form, the terms b , c , d , e and f would be elasticity values. An equivalent account on the supply side would give emphasis to Baumol's productivity lag argument (W.J. Baumol, 1967). The income can be interpreted in the supply side appearance (G. Thompson 1979).

A statistically precise estimate reveals that, after correcting for the effect of disposable income, if PHE/DI increases by 10 percent, total health expenditure per capita declines by only about 2 percent. Therefore, changes in the share of health care paid directly do not have a large effect on total expenditure once society has had time to adjust to the new situation, although physicians and nurses salaries vary considerably with government revenue level.

On the other hand, if private health care institutions do not exist close to government clinics, it can be included in the general price increase, the law of demand should hold. Other things being equal, a 10 percent increase in government fees result in a percent decrease in attendance, and thus in an 8 percent increase in government revenues from user fees. To derive this result rigorously, let p be the total cost per unit of health care services and t be the proportion of that cost borne

by the private sector. Then tp is the price per unit that the private individual perceives. Figure 6 shows the equilibrium, if the individual's demand for service is given by

$$Q = At p^{-\alpha} y^{\gamma} \dots\dots\dots (6)$$



Fig. (6) Lindahl Equilibrium If the individual patient's must pay the difference between marginal cost and other patients' demands (AB) he will honestly reveal his demand

Where Y is the income, a , (are price and income elasticities and A is a constant, then total expenditure on health care is p times this quantity, or

$$PQ = pA (tp)^{-\alpha} y^{\gamma} = A P^{(1-\alpha)t-\alpha} Y^{\gamma} \dots\dots\dots (7)$$

$$\log THE = \log A + (1 - a)\log p - a\log PHE/C + \gamma\log DI \dots\dots\dots (8)$$

Where PHE/C and DI replace t and Y .

If we had estimates of p , we could estimate α and γ over. However if the correlation of $\log p$ with $\log PhofT$ is small, the omission of $\log p$ from the regression will not greatly bias the coefficient of $\log PhofT$. On this assumption the equation is estimated as follow:

$$\text{Log THE} = -7.8541 - 8.2861 \log \text{PHE/C} + 1.083 \log \text{DI} \dots\dots\dots (9)$$

(16.2031)	(1.1047-)	(6.0545-)
"0.0019"	"0.000"	"0.0016"

$R^2 = .89$ $F = 361.35$, $P\text{-value} = 0.000$ $DW = 1.95$ $SEE = 0.1024$

Note that the estimated price elasticity is different from zero at the 90 percent confidence level, and the estimated income elasticity is greater than one at the 95 percent confidence level. However, the estimated income elasticity may be biased upward by the omission of $\log p$ from the regression.

In order to restrain the growth of health care expenditures, we need to analyse how the size of the government's share affects total health spending. The Saudi government should cut back on its health care activities, raise fees at government health facilities, or encourage the development of private sector health care. The degree to which the Saudi government should allow its citizens to bear the cost of their own health care is measured by Figure 7.

The "law of demand" states that people tend to buy less of something if its price increases without any compensating improvements in its quality. If people reduce their purchases by 5 percent for every 10 percent increase in price, "price elasticity of demand" for health care. -The price elasticity- is said to be 0.5. If people reduce their purchases by only 1 percent for every 10 percent increase in price, then "elasticity" is only about 0.1 percent⁽⁸⁾. Data in table 3 provide the relationship between total health expenditure (THE) and the proportion of that bill paid directly by private individuals (PHE/DI). Figure (7) reveals the relationship of these two variables after the effect of disposable income has been removed both of them.

(8) In order to make a rigorous estimate of the elasticity of demand, it would be necessary to study the behavior through the use of a sample survey. But it is costly and needs more time.

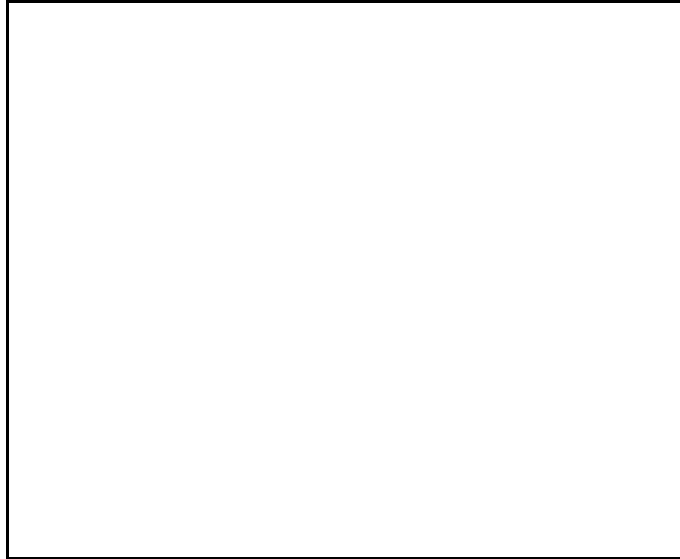


Fig. (7) Insurance and the cost of medical services Insurance lowers cost of medical services to individual patients and increases demand for health services.

3-1-2. A PUBLIC CHOICE APPROACH

Are there better democratic producers for determining the level of public health services, and reflect the preferences of individuals in the society? It is often alleged that government acts in an inconsistent manner, making a series of choices and decisions that appear to be incompatible. One of the essential problems with public health services is that of preference revelation. Decisions about resource allocation in the public health services are made in quite a different manner⁽⁹⁾. It suggests that the one variable the level of public expenditure does not reflect is choices of the public. Three broad source of distortion can be identified in this approach.

(9) Normally, individuals vote for elected representatives, these elected representatives in turn vote for a public budget, and the money itself is spent by a variety of administrative agencies

Political process and government expenditure bias political process bias, favoring an inefficiently large public sector, centers on arguments about consumer-voters who are "rationally ignorant" majority voting mechanisms that create forced riders and permit logrolling, and special interest legislation. In addition, some researchers have models in which consumer-voters are fiscally illuded into underestimating the true cost of public expenditure programmes (Wagner 1976). An implicit agreement to vote favorably on increased public expenditure is also said to raise thin the political process as more and more individuals become dependent upon the public sector for their employment. Governmental process and government expenditure bias. The focus is on the structure and incentive mechanisms in the executive and administrative branches of government. The simplest approach to explaining government expenditure would rely on the incrementalist model of budgetary determination outlined by Wildavsky (A. Wildavsky 1975). The difficulties of government decision-making are further illustrated by what might be termed as a system argument. This approach would argue that rules, processes and procedures take over from people as organizations become more complex. In terms of the growth of public expenditure, this amounts to ascribing the changes that take place to changes in administrative and planning procedures of public expenditure.

3-2.Private Provision of Impure Public Health Service

Public health service may sometimes be provided privately. The first-best outcome is now contrasted to the equilibrium of an economy in which the public health service is funded entirely by the voluntary contributions of individual households. Economies with government provision alone and those with only private provision should be seen as the two extreme cases since in practice, as charitable donations indicate, public health service are usually provided by a combination of both methods. The focus of the analysis will be upon the welfare properties of the private provision equilibrium and the level of public

health supply relative to efficient levels. In addition, the effect of the number of patients on supply and changes in the income distribution should be considered. In order to analyze private provision of public health service, it is necessary to make an assumption about how each patient expects their contribution to the provision of public health service to affect the contribution of others (T. C Bergstrom, L. Blume and H. Varian 1986). But there are at least two sources of inefficiencies that may arise from the private provision of public health service. First, when there is no marginal cost to an additional individual using the service (health education programs) it should not be rationed. But if it is to be privately provided by a firm, the firm must charge for its use, and any charge for its use will discourage individuals from using it. Thus when public health services are privately provided, an under-utilization of these services will result. The second inefficiency that arises with the private provision of public health services is that, if they are supplied at all, they may be supported in too small a quantity. This is seen most clearly in the case for which exclusion is impossible (the raid against mosquito or the fight against (preventing) the infection disease). Individual private enjoyment of the health service may still be sufficient to induce them to purchase some of the public health service.

3-2-1. Equilibrium

The equilibrium with private provision will be derived in the economy used to introduce the Lindahl equilibrium. The economy has H households who each have an endowment of ω^h units of the numeraire, which they supply inelastically. The income of each household is fixed at ω^h . The single private health service is produced with constant returns to scale using the numeraire alone and a unit of output requires one unit of numeraire input. The price of the private health service is equal to one. Production of the public health service is subject to constant returns to scale and each unit requires P_G units of labor. The price of the public health service is constant at P_G each household has a utility function as equation (11) in appendix B.

IV- Conclusion

Public health standards, in Saudi Arabia, are improving rapidly. Health care costs have increased more than consumer prices indices. But the public funds for health care are declining. This fact raises a problem related to the prospects of financing health service in Saudi Arabia.

This study aims to review the components and the growth rate of health expenditure. And to determine if Saudi Arabia spending is too much or less on health.

The study proposes two main hypotheses:

- 1 - The real health expenditure per capita tends to decline, owing to the population growth, inflation rate, depreciation of assets and declining of public funds for health service. The study used time series analysis (1960-2000) applying convenient deflators for each variable. A double logarithmic function is fitted. The statistical model used in this part is multiple regressions. The specific estimating equation was estimated via ordinary least squares (OLS) regression techniques using SPSS version 10.
- 2 - Saudi government could optimally reallocate financial resources between public and private health sectors, and the Ministry of Health could introduce fees charges to finance and cover the cost of specific health service. In this concern, two hypotheses are formulated, for testing the relationship between governmental financing health service and the outcome of public health services, this is Samuelson rule, which suggests a positive relation between the government health sector, and the private health sector. And another relation between government funds and the outcome of public health services. A regression model for health expenditure and funds was constructed and used to predict a norm for each sector. The study also draws on the economic theory of consumer demand, specifically. The main tool of analysis used here is based on normative approach at first, and then combined with a single macroeconomic model

The study consists of two parts. In part one, an attempt is made to analyze the composition and trends of actual health expenditures; Part two, presents a normative approach and the argument for reallocating the financial resources between government and non-government agencies, discusses how user charges could be applied to the impure public health services. The conclusion presents some applicable recommendations.

For the private health sector, the price mechanism, through the market economy, provides a simple and effective method, for determining the level of production of private health services. The decision maker in private decisions knows his own preferences.

For the public health sector, According to the nature of the health service and its characteristics, some programs (pure public health services) could be financed only by the government budget, others (Impure public health services) could be financed through fees charges. If the service has the following characteristics, it may be pure public health service.

1-Non-excludability: If the public health service is supplied, no patient can be excluded from consuming it except, possibly, at infinite cost. The implication of non-excludability is that consumption cannot be controlled efficiently through the price system since no patient can be prevented from consuming the public health service if it is provided. It is evident that a service satisfying this condition does not fit into the framework of the competitive economy used to derive the welfare economics.

2-Non-rivalry: Consumption of the public health service by one patient does not reduce the quantity available for consumption by any other. All patients can, if they desire, simultaneously consume a level of the public health service equal to its total supply. If it is possible for patients not to consume the public health service, then some may consume less. In this case, the public service may satisfy free disposal, so that consumption can be reduced at no cost.

In reality, it is difficult to find any good or service that would satisfy both the condition of non-excludability and non-rivalry

precisely. In this case (i.e. impure public health service.) the government may charge fees for providing the service.

The study discussed two different approaches to reallocate health services among public and private providers. In the first approach, Microeconomic, the study stylized demand-side model that regresses the public health provision versus the percentage of public revenue to the budget (as measure of cost of public health), GDP, POP as demographic factor

A statistically precise estimate reveals that, after correcting for the effect of disposable income, if PHE/DI increases by 10 percent, total health expenditure per capita declines by only about 2 percent. Therefore, changes in the share of health care paid directly do not have a large effect on total expenditure once society has had time to adjust to the new situation, although physicians and nurses salaries, vary considerably with government revenue level. Other things being equal, a 10 percent increase in government fees result in a percent decrease in attendance, and thus in an 8 percent increase in government revenues from user fees.

The study noticed that the estimated price elasticity is different from zero at the 90 percent confidence level, and the estimated income elasticity is greater than one at the 95 percent confidence level. However, the estimated income elasticity may be biased upward by the omission of $\log p$ from the regression.

In order to restrain the growth of health care expenditures, we need to analyse how the size of the government's share affects total health spending. The Saudi government should cut back on its health care activities, raise fees at government health facilities, or encourage the development of private sector health care. The degree to which the Saudi government should allow its citizens to bear the cost of their own health care is measured. This is considering raising fees.

In the second approach "*public choice*" the studies suppose a democratic producer for determining the level of public health services,

and reflect the preferences of individuals in the society. It is often alleged that government acts in an inconsistent manner, making a series of choices and decisions that appear to be incompatible. One of the essential problems with public health services is that of preference revelation. Decisions about resource allocation in the public health services are made in quite a different manner.

This approach would argue that rules, processes and procedures taken over from people as organizations become more complex. In terms of the growth of government health expenditure, this amounts to ascribing the changes that take place to changes in administrative and planning procedures of public expenditure.

In order to analyze private provision of public health service, it is necessary to make an assumption about how each patient expects their contribution to the provision of public health service to affect the contribution of others. But there are at least two sources of inefficiencies that may arise from the private provision of public health service. First, when there is no marginal cost to an additional individual using the service, it should not be rationed. But if it is to be privately provided by a firm, the firm must charge for its use, and any charge for its use will discourage individuals from using it. This is seen most clearly in the case for which exclusion is impossible (the raid against mosquito or the fight against (preventing) the infection disease). Individual private enjoyment of the health service may still be sufficient to induce them to purchase some of the public health service. The equilibrium with private provision will be derived in the economy used to introduce the Lindale equilibrium.

The study concludes that although the average annual growth rate of per capita real GDP of 8.4% over the 1960-2000 period, estimates for government health expenditure indicate a decrease by 2.5%. The Saudi government is advised to introduce a system for financing the impure public health services. It could use a system of health insurance.

Appendices

Appendix (A) Notation Of Variables Used In The Study

Variable	Definition	Variable	Definition
LifXM	Life expectancy male year	NAllien	Number of Alien H
LifXF	Life expectancy femal	sanit	Sanitation access % p
Mrtinf	Mortality infant	GDP	Gross Domestic Product
Mrt5Y	Mortality infant under 5 y	THE	Total health expenditure
BrthAtt	Births attended by staff %	GHE	Govt. health expenditure
HosBed	Hospital beds	PHE	Private health expenditure
ImMsl	Immunization measles % child less 1Y.	TGE	Total Government spending
ImDFT	Immunization DPT % child under 1Y.	Sec.1	Salaries, remuneration
NTech	Number Technician	Sec.2	Operation,maintenance
Phys	Physician per 1000 people	Gercu	Total sec.1 + sec.2
TPop	Total Population	Sec.3	Projects & investment
PopGth	Population Growth %	Sec.4	Capital transfers
Nphys	Number of physician	Gcaptl	Total sec.3 + sec.4
NPhrm	Number Pharmicien	DI	Disposable income
NNurs	Number of Nurses	patient.	outpatient

Appendix (B)

Mathematical Model for allocation Funds

Suppose that the economy consists of H patients, indexed $h = 1, 2, \dots, H$. each household has a utility function

$$U^h = U^h (X^h, G), \dots\dots\dots (1)$$

Where X^h is the consumption of patient h of the vector of private goods and G is the supply of the public health service. The fact that total supply, G, appears in all patients' utility functions indicates that the public health is pure. It is assumed that the combinations of X^h , $h = 1, 2, H$, and G that the economy can produce are constrained by production possibilities. The implicit representation of the production set is written

$$F(X, G) \leq 0, \dots\dots\dots (2)$$

$$X = \sum_{h=1}^H x^h \dots\dots\dots (3)$$

To characterize the set of Pareto efficient allocations, the government chooses x^h , $h = 1, 2, \dots, H$, and G to maximize the utility level of the first patient, constrained by the requirement that patient 2 to H obtain given utility levels and by the requirement that the allocation is productively feasible. Varying the given utility levels for patient 2 to H traces out the set of Pareto-efficient allocations. The Lagrangean for this maximization problem can be written.

$$\zeta = U^1(x^1, G) + \sum_{h=2}^H \mu^h [U^h(x^h, G) - U^{-h}] - \lambda F(x, G), \dots\dots\dots (4)$$

Where U is the utility level that must be achieved by $h = s, H$

$$\frac{\partial \zeta}{\partial x_i^h} \equiv \mu^h \frac{\partial U^h}{\partial x_i^h} - \lambda \frac{\partial F}{\partial x_i} = 0, h = 1, \dots, H, \dots\dots\dots (5)$$

with $\mu^h = 1$ for $h = 1$. at an optimum (5) holds for all $i = 1, \dots, n$.

$$\frac{\partial \zeta}{\partial G} \equiv \sum_{h=1}^H \mu^h \frac{\partial U^h}{\partial G} - \lambda \frac{\partial F}{\partial G} = 0. \dots\dots\dots (6)$$

Solving (5) for μ^h , substituting into (6) and rearranging gives

$$\sum_{h=1}^H \frac{\partial U^h / \partial G}{\partial U^h / \partial x_i^h} = \frac{\partial F / \partial G}{\partial F / \partial x_i}, i = 1, \dots, n \quad (7)$$

To interpret (7) note that each term in the summation on the left-hand side is:

$$\frac{U^h / \partial G}{\partial U^h / \partial x_i^h} \quad (8)$$

Eq. (8) is the marginal rate of substitution between the public health service and the i^{th} private health service for the h^{th} patient (or household). The right-hand side of (7) is the marginal rate of transformation between the public and private health service i . Equation (7) can be written as:

$$\sum_{h=1}^H MRS_{Gi}^h = MRT_{gi} \quad (9)$$

Equation (9) is the Samuelson which states Pareto-efficient provision of the public health occurs when the marginal rate of transformation between the public health and each private health is equated to the sum, over all households of the marginal rates of substitution. The result in (9) should be contrasted to the corresponding rule for efficient provision of two private health j , h and i

$$MRS_{ji}^h = MRT_{ji}, \text{ all } i, j \text{ and } h \quad (10)$$

The difference between (9) and (10) occurs due to the fact that an extra unit of public health increases the utility of all households so that the social benefit of this extra unit is found by summing benefit, measured by the MRS, to individual household (patient). At an optimum, this is equated to the marginal cost given by the marginal rate of transformation. In contrast, an extra unit of private health service only increases the welfare of its single recipient and an optimum

occurs when marginal benefits are equalized across households and to marginal cost.

$$G = \sum_{h=1}^H g^h \text{ and } g^h$$

$$U^h = U^h(x^h, G), h = 1, \dots, H \dots\dots\dots(11)$$

x^h is the quantity of private health service consumed, is the contribution of h. to the public health by all patients other than h, G_k , is defined

Appendix (C) Health services indicators

year	Sec1	Sec2	Curr	Sec3	Sec4	Captl	THE	C	DI	Phys	Nurse	Phr	Allie	Tchn
1960	43	19	62	15	17	32	94	2805	2847	n.a	n.a	n.a	n.a	n.a
1961	53	23	76	18	21	39	116	3003	3019	n.a	n.a	n.a	n.a	n.a
1962	64	28	92	22	25	47	140	3421	3192	n.a	n.a	n.a	n.a	n.a
1963	73	32	105	25	29	54	160	3593	3183	n.a	n.a	n.a	n.a	n.a
1964	81	36	116	28	32	60	176	3821	3226	n.a	n.a	n.a	n.a	n.a
1965	77	34	111	27	30	57	168	4025	3401	n.a	n.a	n.a	n.a	n.a
1966	82	36	118	28	32	61	179	4129	3621	n.a	n.a	n.a	n.a	n.a
1967	75	33	108	26	29	55	163	4621	3447	n.a	n.a	n.a	n.a	n.a
1968	72	32	104	25	28	54	158	5336	3413	n.a	n.a	n.a	n.a	n.a
1969	73	32	106	25	29	54	160	5860	3491	n.a	n.a	n.a	n.a	n.a
1970	72	64	135	9	9	19	154	5569	4026	817	2268	60	868	614
1971	119	78	198	6	24	29	227	5619	4455	1081	3052	78	969	733
1972	150	97	247	7	29	36	283	5353	5133	1268	3179	115	1111	918
1973	85	70	155	4	27	31	186	3131	5033	1900	4234	134	1473	1063
1974	83	78	162	4	99	103	264	4099	4766	2275	4721	153	1584	1186
1975	117	115	232	6	432	437	670	5006	6240	2696	5666	179	1764	1373
1976	115	114	229	10	336	346	575	6649	7810	2820	5067	191	1823	1404
1977	173	120	293	10	328	338	631	8934	8100	3212	6081	242	2117	1381
1978	229	149	379	14	333	347	726	9894	8780	4308	6306	252	2281	1417
1979	188	113	301	1	233	234	535	10109	11440	3793	6859	284	2644	1366
1980	227	64	291	41	248	288	579	11760	12650	4618	9051	323	3309	1505
1981	274	86	360	57	288	345	705	13059	16400	5123	9729	325	3955	1645

Appendix (C) Health services indicators (cont'd)

year	Sec1	Sec2	Curr	Sec3	Sec4	Captl	THE	C	DI	Phys	Nurse	Phr	Allie	Tchn
1982	398	118	516	79	426	505	1021	12919	13370	6453	12367	343	4754	2109
1983	421	198	619	132	345	477	1096	12179	11660	7490	14919	314	5327	2286
1984	421	310	731	150	562	713	1443	11412	9860	9257	20707	340	6771	2108
1985	493	300	793	160	319	479	1272	10886	8480	10359	24528	400	7345	2407
1986	595	169	764	227	257	484	1248	9723	7900	11326	25986	611	7829	2749
1987	669	295	964	218	245	463	1427	13209	11010	11940	27169	660	8342	2899
1988	711	312	1023	202	152	354	1376	14802	16820	12617	28266	831	8569	3134
1989	690	258	948	179	114	293	1241	13715	16350	12959	29124	823	9005	2921
1990	622	249	871	234	107	340	1211	11956	16700	13198	30145	851	11986	3159
1991	652	267	919	314	107	421	1340	13288	17460	13598	31479	747	13469	3245
1992	655	268	923	192	112	304	1226	14997	17970	14554	33373	660	17868	3459
1993	712	276	988	369	97	466	1455	17218	17590	15125	35687	980	18345	3679
1994	588	223	811	265	44	309	1120	15858	17050	15476	35219	934	19039	3495
1995	516	189	706	244	34	278	984	15530	16970	15266	34947	916	19334	3589
1996	482	177	659	228	32	260	919	15730	17130	14717	34739	764	19385	4963
1997	707	302	1009	271	49	320	1329	13035	17150	15085	35607	783	19870	5087
1998	745	318	1063	286	51	337	1400	15761	17359	15915	37566	826	20962	5367
1999	724	332	1056	288	39	326	1383	14673	16480	16631	39256	863	21906	5608
2000	788	280	1068	336	43	379	1447	15532	17051	17629	41612	915	23220	5945

Expenditure at constant prices 1969=100

Sources: extracted from World Bank, (2000) Development Indicator, Ministry of Health

Appendix (D)***Alternative Means of Producing, Distributing and financing
Health Service's Programs (Normative analysis)***

Characteristic of health services		Mean of production	Method of Distribution	Method of finance	Examples of health programs	
					Private	Government
1	PurePrivate, no-externality, low cost exclusion	Private clinic & Hospital	Direct charge	Sales Revenue	Immunization influenza, Curative Medicaid, Medicare, health insurance	Immunization measles, mumps, diphtheria, other childhood infectious diseases,
		Govt. or private contract with govt.	Eligibility to consume, politically	Public Funds or taxes		
2	Impure Private with externality, external benefits when produced or consumed. low cost exclusion	Private firms or Govt.	Market, Direct unit Charge. May be subsidized	Sales Revenue & donation	Clinics centers drug abuse, physical disabilities Accident Compensation Physiology	Provide free or reduced cost medical service to individuals. Pregnant Public hospital, First aid, Public recreation & park
		Govt. or private under contract	No charge, Available at Collectively quantity & quality	Fees charge and taxes		

Appendix (D)
Alternative Means of Producing, Distributing and financing
Health Service's Programs (Normative analysis)

Characteristic of health services		Mean of production	Method of Distribution	Method of finance	Examples of health programs	
					Private	Government
3	Impure public collectively Consumed, benefits Subject to crowding, possibility of exclusion	Private firms of Govt.	Fees for the Right to use Facility in market	Sales Revenue Private Charity	Health Spa, improving physical fitness,	Maternal & child health, disability & rehabilitation, mental health, occupational health, family planning. Nutrition, water, sanitation,
		Govt. or private under contract	No direct charge or Partial charge	Fees charge and taxes	Health insurance for illness expense	
4	Pure public collectively Consumed not Subject to crowding, high-cost exclusion	Private Firms or Govt.	No direct unit charge. Quality depends on Amount collected	Fees and Private Contribution grants	Volunteer fire Department, and Volunteer first aid Disease Tracking	Inspection drug and restaurant. Insect programs Epidemiology, HIV, AIDS Communicable disease control, pollution control and health education
		Govt.. or private under contract With Govt.	No direct unit charge. Quality and quantity are collectively chosen	Taxes, Public funds		

Sources: designed depending on WHO classification,

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