DETERMINANTS OF HEALTH CARE PROVIDER CHOICE IN KENYA

BY

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DECLARATION

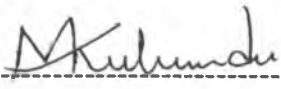This is my original work and has not been presented for a degree in any other university.

Signed------- ~~*PAel*~~ --

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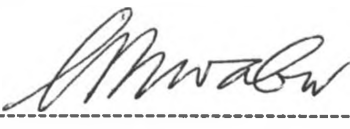
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This project paper has been submitted with our approval as university supervisors.

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DEDICATION

This paper is dedicated to my husband Willis for his encouragements and my sons; Vale,

Dan and Brian for their cooperation and understanding during my absence.

ACKNOWLEDGEMENT

ABSTRACT

Despite the governments' efforts to enhance good health through provision of highly subsidized or free medical care, patients have continued to respond to illnesses in diverse modalities. In Kenya, a large percentage of ill individuals continue to rely on lay care despite the strategies. The practice is obviously dangerous for the general population health considering that some sickness may turn o ut to be different from what the sick think, when diagnosed by qualified medical personnel.

In this study, the determinants of health care provider choice in Kenya have been explored using data from "The Kenya National Health Accounts, Household Expenditure and Utilization Survey, 2003" which was conducted by Ministry of Health. The estimations are based on nested multinomial logit model.

Individuals, households and provider characteristics have been used in the analysis with most of the variables having expected signs. Age of individual/household head and household s ize h ave a si gnificant n egative e ffect o n t he c hoice o f p rovider. S imilarly, monetary and non-monetary costs (total treatment time and distance to the health facility) have also been found to significantly influence the demand for health care negatively. Socio-economic status, education level and having a health insurance all have positive and significant effect on the choice of provider.

Ill individuals are more responsive to changes in total treatment time than changes in cost of treatment at the public facilities. This indicates that quality (total treatment time as a quality measure) is more of a deterrent factor in choosing a public provider than the cost of treatment.

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ABBREVIATIONS

NHA--National Health Accounts

PHC--Public Health Care

WMS---Welfare Monitoring Survey

NHSSP--------------------- --------------------------------National Health Sector Strategy Plan

NGOs--Non-Governmental Organizations

MOH--Ministry of Health

NSS--National Sample Survey

NASSEP---------------------------------National Sample Survey for Evaluation Programme

CHAPTER 1 - INTRODUCTION

1.1 BACKGROUND

Health care is a fundamental human right. The United Nations (UN) through "The Universal Declaration of Human Rights" asserts that, "it is the right of an individual and his family to have access to a standard of living adequate for health, including at least elementary and fundamental medical care and education." In many developing countries, health care is provided free of any charge at the point of delivery or highly subsidized by the government. This demonstrates the commitment of these governments to contributing to health (and education), as a public responsibility of services that are replete with market failures.

Though health care in modern public health units are highly subsidized or free, patients still continue to respond to illness in diverse modalities. The modality that is finally chosen and adopted depends both on cultural and socioeconomic factors and on the perception of the illness (Rene R., 1995). The ways of responding to illnesses can be grouped into three large categories: The first category is of those who seeking attention among specialized agents, medical professionals and paramedics (medical care). The others include those, provided by the sick individuals themselves or by their closest social and family network (self-care); and the healers, midwives and herbalists (lay care).

The factors that may encourage the use of one form of practice or the other in Kenya, therefore, constitute an area of-interest. The propensity to utilize various forms of health care varies from one individual/household to another. The reason for this may be explained by several factors such as accessibility, quality of health facility and socio-economics of the individual/household, among others. Accessibility to health care is one

important factor, where distance plays an important role including means of transport. Quality of health facilities consists of variables like availability of drugs in a facility, staff-patient relationship, and waiting time; while socio-economic background includes, for example, the individual's/household's potential to pay for health care. The decisions individuals/households make upon recognition of ill health are important and have effects on the level of demand for health care (for different types health care providers) as well as on the population health.

Health can be viewed as part of basic human capabilities and an integral part of human welfare (Zweifel and Breyer, 1999). It is a prerequisite for other activities; for instance, poor health limits the productive capabilities of the affected persons including his/her ability to enjoy the goods things of life. Therefore it can be safely said that health is a productive asset that influences economic development. From the efficiency perspective, health is the foundation for work productivity, education (the capacity to learn), and the capacity to grow physically and emotionally. For individuals/households, health brings wealth, which motivates them to avoid bad health. At macro-economic level, good health of the population is a critical input into poverty reduction, economic growth, and long-term economic development (The Commission on Macroeconomics and Health, 2001). This indicates that the health of a nation is very important not only, because people derive utility from being healthy but also because it leads to a healthy nation capable of participating in economic development.

1.2 HEALTH CARE DELIVERY SYSTEM IN KENYA

The health care system in Kenya is composed of public and private sectors. The players in the public health system are the Ministry of health and the Ministry of Local Authorities. The private sector is classified into NGOs, Mission and Private. Health services are delivered through a network of about 4534 health facilities with the public health system accounting for 51 per cent of the total as shown in Table 1.

Table 1: Distribution of facilities by type of provider and sector

Facility type	GOK		PRIVATE		TOTAL
	Number	%	Number	%	
Hospital	114	48.7	120	51.3	234
Health Centre	461	79.8	117	20.2	578
Dispensary	1628	60.7	1055	39.3	2683
Nursing and Maternity Home	5	2.3	208	97.7	213
Health clinics/Medical centres	92	11.1	734	88.9	826
Total	2300	50.7	2234	49.3	4534

Source: MoH, Health Information Systems Department, 2003

An elaborate network of non-governmental health providers supplements the public health system. The Ministry of Health (MoH) is the major financier and provider of health care services in Kenya. Out of the over 4500 health facilities in the country, MoH controls and runs about 51% while the private sector and the mission organizations run the remaining 49%. The public sector controls about 80% of the health centres, and 61% of the dispensaries. The Private sector is dominant in nursing and maternity homes (98%), and health clinics 89%. Both the public and the Private sector have an almost equal representation of hospitals.

The organization of Kenya's health care delivery system in the central government revolves around three levels: The ministry of health headquarters, the provinces and the districts. The headquarter sets policies, coordinates the activities of the non-governmental organization (NGOs) and manages, monitors and evaluates policy formulation and implementation. The provincial tier acts as an intermediary between the central ministry and the districts. It over sees the implementation of the health policy at the district level, maintains quality standards and coordinates and controls all district health activities. The district level concentrates on the delivery of health care services and generates their own expenditure plans and budget requirements based on the guidelines from the headquarters through the provinces.

In addition to ministry of health, the other health care facilities in Kenya are as described below:

- Charitable non-governmental or non-profit organizations (NGOs) mostly located in the rural areas or under-served areas. They provide both curative and preventive services, relying on partial government grants, voluntary donations and user fees. This includes the religious missions as well as international and national organizations.

- Private-for profit practitioners, clinics and hospitals specialize on curative services and offer preventive services to those who can afford. This sector developed vigorously over the past twenty years mainly because of the decision by MoH in the late 1980s to allow clinical officers and nurses employed by the public sector to engage in private practice.

- The local government authorities in the major municipalities run medical services under a medical officer of health appointed by the minister of local government. The services provided by the local authority clinics and health centres are mainly primary and preventive health care services.

The structure of the above health services delivery system is hierarchical in nature. The dispensaries and health centres (predominantly in rural areas) provide the bulk of the services and form the first level contact with the community. These are followed by sub-district hospitals, district hospitals, provincial general hospitals and at the apex, the national referral hospitals. The facilities become increasingly sophisticated in diagnostic, therapeutic, and rehabilitative services at the upper levels. The Provincial and District hospitals both provide referral and outpatient services in addition to their important role of implementing the health programs in the respective regions. Most of the district and provincial hospitals are found at the district and provincial headquarters respectively. There are two national referral hospitals at the apex with Kenyatta National Hospital as the key referral and teaching facility.

The overall mandate for health services is vested with the Ministry under the Public Health Act Cap 242 of Laws of Kenya and various subsidiary legislations dealing with specific areas of health services promotion.

1.3 PROBLEM STATEMENT

Good health of the population is a critical input in poverty reduction, economic growth and long-term economic development. This indicates that the health of a nation is very important not only, because people derive utility from being healthy but also because it leads to a healthy nation capable of participating in economic development. To facilitate

development, one of the development agenda has been poverty reduction. Most developing countries have concentrated on enhancement of good-health through provision of either free or highly subsidized health care services. Despite the strategies, a large percentage of ill individuals in developing countries (Kenya included) have continued to rely on self-care/medication.

In Kenya, the 1994 Welfare Monitoring Survey (WMS) revealed that 74 per cent of the people who fall sick use drugs bought from over the counter. Those who visited health facilities were 21 per cent and 1.4 per cent sought care from herbalists; while 3.7 per cent took no-action. This indicates that during illness, people make different choices concerning health care providers. The reasons why a patient chooses one provider, not the alternative, and the factors that determine the same are therefore an area of concern. From the Welfare report, it is apparent that household members seem to have shifted from making use of professional medical services. This situation is obviously dangerous for the general health of the population considering that some types of sickness turn out to be different from what the sick think, when diagnosed by qualified medical practitioners. Similarly, some types of sickness turn out to be symptoms to other sickness unknown to the affected individuals. This study intends to explore what options are open to an ill individual and the factors that determine the choices he/she makes. Specifically, the question to be answered should be; Is there a possibility of real choice of health care provider open to all or the choice is mainly the privilege of the wealthiest members in the society.

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district in Kenya. This study therefore, intends to broaden the analysis by identifying the factors that influence the choice of health care provider and their effects on the choices people m ake i n K enya (both r ural a nd u rban). In t he a nalysis, t he s tudy a lso s eeks t o establish whether there are disparities in choice behaviour between the rural and urban populations.

1.4 OBJECTIVES OF THE STUDY

1. To identify the factors which influence the choice of health care provider at the household level.
2. To analyze the effects of the factors on the probability of choosing a provider.
3. Draw policy implications.

1.5 SIGNIFICANCE OF THE STUDY AND ITS CONTRIBUTION

Public spending on health care remains one of the most uncontroversial roles of the government in developing countries of the world. Moreover, from development perspective, design of health policy is of utmost importance because health status of the population in developing countries generally is far below that of the developed countries in general. Life expectancy at birth in Sub-Saharan Africa is still only two-thirds the average level in developed world. This is also where the burden of disease is the greatest while the resources to provide care are the lowest. The need to develop a rational criterion for resource allocation is therefore deemed necessary.

What is not clear is whether the governments of developing countries spend appropriately in raising access and use of health care. In Kenya, resources are currently allocated based

on existing facilities. The allocation neither reflects the actual resource requirements nor allocative efficiency needed (NHSSP 1999). As is reflected in the 1999-2004 National Health Sector Strategic Plan (NHSSP), the Ministry is in the process of designing an appropriate allocative mechanism based on population, economic status, burden of disease, proportion of service facilities and the strength of providers. It is expected that the findings of this study will enrich the decision of policy makers on how best the resources should be allocated by taking into considerations the households choice behaviour in relation to health care providers.

CHAPTER 2 – LITERATURE REVIEW

2.1 THEORETICAL LITERATURE

When experiencing an episode of illness the individual decides if health care should be sought or not and where, weighing the potential benefits and costs of utilization against each other. The decision depends very much on the individual's perceptions of the extent to which health care will improve their health status. If the individual seeks care, he or she expects to recover faster and/or for the end result to be better. The action of an individual experiencing an illness is not only a question of how much health care to utilize but also of what kind (individuals choose between self-medication, hospitals, health centres and/or non-scientific medicine). Even if an individual is ill and knows that health care will cure the disease, he or she may not seek care due to high costs incurred for seeking care. The cost of access is a major determinant of seeking care or not (Acton, 1975). The access cost includes time costs (non-monetary cost), which depends on labour income of an individual. Differences in health care utilization between different social groups in developing countries are often explained by access costs (Gertler and Van der Gaag, 1990).

Similarly, education has been shown to have effect on probability of seeking health care (Diop et al, 1998). Education in the long run enhances the efficiency in production of health as well as for knowledge of which investment in health should be made. In the short run, education influences the knowledge of the effects of different health care measures and the possibilities to utilize different types of sources to improve health. The extent to which education influences preferences (including time) will affect how the

benefits and costs of health care are perceived, which may lead to systematic socioeconomic differences (Grossman and Kaestner, 1997). For instance, in Zimbabwe women with cancer delayed seeking medical attention because they did not understand that their conditions were critical.

In developing countries, even if fees are relatively low or in some cases non-existing, the quality of health care may be sufficiently low to discourage use of certain health facilities. In Zambia STDs patients considered provider attitudes as a key determinant to their choice of treatment source.

2.2 EMPIRICAL LITERATURE

A study conducted by Lavy and Germain (1994) measured the quality of health care in Ghana in terms of infrastructure; personnel; basic adult and child health services; and availability of essential drugs. The quality factors were found to have large and significant effect on demand. Improvements in drugs, infrastructure, and services would increase the likelihood that patients would use public facilities by 127 per cent. Part of this change reflected shifts from private sector to the public sector, and part represented a shift from self-care to the modern health care. This finding indicated that quality change alone could be expected to reduce the probability of self-treatment by about 14 per cent. Changes in health care choice involve users who shift between providers, rather than between seeking professional help or doing without care and this is also the case with respect to changes in distance and price (Alderman Harold. 1996). For instance if the average distance to the nearest facility in Ghana were reduced by 50 per cent, demand at those clinics would nearly double while self-care would decline only by 2.6 per cent.

A study of a rural district in Kenya (Mwabu, Ainsworth, and Nyamete, 1993) looked at treatment-related measures of quality, including the availability of a variety of drugs and diagnostic equipment. The study found that the probability of a visit to a public facility was positively related and most sensitive to the availability of a broad number of drugs. For instance, making two additional drugs available in government health facilities led to a 3.6 per cent increase in the use of public providers while a decline of 4.1 per cent was registered in the case of private providers.

These results are similar to Hotchkiss's (1993) findings on the choice of obstetric care in Cebu, Philippines. The study included the following measures of quality: the availability of medical supplies, practitioner training, service availability, facility size and waiting time. Again, the quality of services provided had a significant effect on user's choices. For example, drug availability, waiting time and the availability of doctors to perform deliveries were significant determinants of choice.

Akin et.al (1986) carried out a study to analyze the demand for primary health care namely: outpatient, prenatal, obstetrical, well baby and immunization services using community and household data from one of the poorest regions of the Philippines. Their interest was to understand demand patterns and to analyze how this new information might modify the strategies chosen to implement Public Health Care (PHC) goals. The choice of health care delivery type was estimated using multinomial logit. All-important direct costs of using medical services: visits prices, drug costs, transport costs, travelling and waiting time, were examined. Despite the widely held assumption that these are important impediments to using medical services, the study did not find this to be the case in Philippines. In their demand estimation, quality was statistically significant, but in

quantitative terms, it was not an important factor in determining whether/where medical services was purchased. The study found that it is not the people's poverty that kept them from using modern health services- however; knowledge and habits were important factors in determining the use of modern health care.

Hotchkiss (2000) carried out analysis using data from the Nepal Living Standards Survey, which was administered by Nepal's Central Bureau of Statistics in 1996. In the analysis he estimated the determinants of household health care expenditures. The variables used included individual and household socio-economic and demographic characteristics, which affect provider choice. In overall, the results indicated that a number of household and community level characteristics had significant effect on choice of provider. With respect to household characteristics, income per capita was found to have a positive and significant effect on the probability of choosing a provider. The demographic characteristics of the head of the household were also found to be an important determinant of provider choice. For example, individuals living with older household heads were found to have higher probability of using no care compared to other health care alternatives. This indicated that households in which the head of household is older are more likely to rely on lay care for treatment of their illnesses and injuries.

Hjortsberg (2002) conducted a study on determinants for health care utilization among individuals experiencing illness using 1998 household-based survey data of Zambia. Multinomial logit model was used in explaining the probability of seeking care at a health facility. Income and education of the household head were found to influence the choices positively and were significant. Distance had a negative influence on seeking professional

care while owning a motor vehicle had positive effect on choice. Living in rural areas reduced the likelihood of seeking professional care. The variables indicating which type of illness individuals were suffering from, were found to influence the probability of seeking care negatively compared to if the individual was suffering from malaria (malaria being the reference level).

An empirical analysis was conducted by Gupta (2003) using National Sample Survey (NSS) data on health to understand the possibilities that exist for the poor in India. Specifically, the questions paused in the analysis were:

● What are the determinants of ill health in the population?

● What factors determine where individuals go for care?

● What are the determinants of total expenditure on health?

All these issues were addressed using the household level data from the NSS 52nd round. The estimation of the determinants of choice of facility was carried out based on three broad options: no-care; government; and private facilities. The choice of facility was determined using a multinomial logit (MNL) framework. The MNL estimates for choice of facility indicated that compared to private facility choice (private facility is the omitted variable), higher income tends to reduce the likelihood of seeking care both in government facilities and 'no-care'. Higher education had a negative and significant influence on the option 'no-care'.

A study undertaken in the rural northwest province of Cameroon by Tembon (1994) found that many factors do influence the choice of health care. Quality of care was identified as the most important factor influencing the choice of health care provider. As quality of care increases in government health centres, their choice probability also

increased. Other factors included the time spent seeking treatment; household income and size; distance; and cost of health care. Those with higher income tended to choose private health units while those with large families chose government health units.

2.3 LITERATURE OVERVIEW

The consensus from the literature indicates that the choice of health care provider depends on both individual/household level characteristics, and the characteristics of health facilities. Fees charged and quality of health care are some of the critical variables that have been identified including time spent seeking treatment, household income and size. The individual/household-heads characteristics such as level of education, age and sex also have been singled out as determinants of choice of health care provider.

Though it is acknowledged that these factors affect the choices made by households/individuals, most of the previous studies did not employ all the different categories of variables (individual/household characteristics and the facility attributes) in their analysis. For instance, quality and cost variables were not used in some analysis due to data limitations and in some cases, the scope of coverage was very limited to warrant generalization.

Secondly, the treatment of price of medical care has been varied. Some studies used standard fee schedules as reported by the provider while others used the average expenditures per medical visit as the relevant price. However, these methods can cause misleading results because standard official fees may not reflect the true price of care. The expected amount spent by a person for a specific illness may depend not only on the

standard fees but also on the type of treatment, quality of treatment, and individual characteristics. The measurement of cost is treated differently where it is assumed that the costs of the alternative providers are compared by the individual/household. The provider who is seen to be able to provide the needed services with more benefits to the patient for a given amount is then chosen. The price per visit in the health units, as reported by a patient, is taken as a proxy for the 'cost' of outpatient service. The amounts of money paid by the patients for treatment are then used to compute the average cost of treatment in the different alternative health providers. The provincial average costs are used in the analysis in order to take care of the regional differentials in prices.

In this study, the three types of variables (individual and household characteristics; and health facility attributes) are used in the analysis. The coverage of the analysis is also national to give a nation-wide presentation of the choice behaviour. Unlike the previous study in Kenya, which focused on a rural district, this study analyzes the rural and urban components to assess whether there are disparities in choice behaviour.

Nested Multinomial Logit Model (NMLM) is used to explain the health care provider choice with reference to patient initiated contacts, which presents a departure from the previous study in Kenya where conditional logit method of estimation was used. The approach of analysis clearly separates patient and physician initiated contacts by focusing only on the first visits. In the model, the homoscedasticity assumption is also relaxed unlike in the conditional logit or multinomial logit models. The choice process, therefore, involves choosing among the 4 choice sets and then making specific choice within each structure set.

CHAPTER 3 - METHODOLOGY

3.1 MODEL SELECTION AND SPECIFICATION

3.1.1 Theoretical Framework

Assume that individual 'i' in a given period faces 'j' health care provider alternatives. For each alternative 'j', the individual's utility is given by the conditional utility function:

$$U_{ij} = U(H_{ij}, C_{ij}) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

$$\text{Subject to } Y_i = C_{ij} + P_{ij} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

The function indicates that an individual derives utility from being healthy and consumption of goods other than health care.

H_{ij} = is the expected health status of individual 'i' after receiving care from provider 'j'.

C_{ij} = is the consumption of other goods apart from health care.

P_{ij} = is the price of choosing provider 'j'.

Y_i is the individual income.

The total cost of visiting a given provider includes the monetary price plus the non-monetary price. The non-monetary price represents the opportunity cost of time devoted to traveling and waiting associated with a visit to a given facility 'j'.

The budget constraint is therefore redefined as:

$$Y_i = C_{ij} + P_{ij} + (TT_{ij} + WT_{ij})*w_i \dots\dots\dots\dots\dots\dots\dots (3)$$

Where

w_i = is the opportunity cost of time.

TT_{ij} = is the traveling time to facility 'j'.

WT_{ij} = is the waiting time at facility 'j'.

The expected health status (H_{ij}) after receiving treatment from provider 'j' is expressed as:

$$H_{ij} = E_{ij} + H_{io} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(4)$$

Where: H_{io} = is the initial health status before treatment

E_{ij} = is the expected effectiveness of provider 'j'.

The fact that many illnesses heal spontaneously lends support to the view that the individual is the ultimate producer of his/her health. This implies that the individual, with or without the physician help, can influence the state of health but not to effectively determine it. The expected effectiveness (quality measure) (E_{ij}) may, therefore be represented as a household production function which depends on patient and provider characteristics:

$$E_{ij} = E (B_i, A_j) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

Where

B_i = is a vector of individual/household characteristics

A_j = is a vector of provider characteristics.

Substituting equations (2) to (5) in equation (1) generates the conditional utility function below:

$$U_{ij} = U(H_{io} + E (B_i, A_j), Y_i - P_{ij} - w_i (TT_{ij} + WT_{ij})) \ldots\ldots\ldots\ldots (6)$$

Equation (6) shows that utility depends on the quality of health care received and on consumption of all other goods (net income).

3.1.2 Model selection

3.1.2.1 Introduction

The modelling of the behaviour of patients seeking health care, faced with a number of health care providers, can be done using two main approaches:

1. Constraint-oriented approach or

2. Choice preferences approach.

The constraint –oriented approach models the number of visits by a patient, while the choice-preference approach takes into consideration the choices available to the patient and attempts to model the behaviour taking cognizance of the attributes of the choices (Tembon, 1996).

The choice-preference oriented approach is adopted in this study. Unlike the constraint-oriented approach, one is at ease with one visit when the choice-preference approach is used for modelling provider choice. In order to model the health provider choice-decision between the eight major types of health care providers in Kenya, a discrete model is required.

3.1.2.2 Discrete choice models

There are many discrete choice models that exist and many have been applied to different economic problems (Greene W. 2000). Multinomial logit model is one of the models. It is simple, easy to estimate and interpret, and provides cross-elasticities. Though one of the best, it has the problem of Independent of Irrelevant Alternatives (IIA)—it is assumed that the utility of a choice option is independent of the attributes of other alternatives of the choice set. Therefore, underlying assumption of MNL model is that the ratio of the

probabilities of two alternatives j and k depends only on alternatives j and k and not on the presence of any other alternatives (IIA property). This led to the development of other models like the probit model. The probit model is free of this problem but is conceptually and computationally complex, especially in the presence of more than two alternatives (Greene W. 2000).

The nested multinomial logit (NMNL) model is a generalization of the basic MNL model (Hensher, 1986). The NMNL, like the probit model, is free from the IIA property and is relevant for multidimensional choice sets. The models outlined above are used in scenarios where the decisions are made based on various options (discrete choices). The choice of a particular model depends on the structure of choices and the assumptions made. In this study, the decision structure adopted is multidimensional. The alternative options are grouped into sub-groups that allow the variance to differ across the groups while maintaining the IIA assumption within the groups. This specification defines a **nested logit model.** In the model, the homoscedasticity assumption is relaxed unlike in the conditional logit or multinomial logit models. The choice process involves choosing among the L choice sets and then making specific choice within structure. The decision process therefore produces a tree structure.

3.1.3 Model specification

Based on the theoretical discussion we can formulate a hypothesis regarding, which variables influence an individual's choice of seeking care. 'C' is the individual's choice of care given that he or she is ill (eight options). 'X' is a vector of variables indicating the economic status of the household, 'Z' is a vector of household characteristics, 'I' is a

vector of individual characteristics, and 'A' is a vector of access variables like distance to health facility and cost of treatment.

(1) $C = f(X, Z, I, A)$

The unordered-choice model is motivated by a random utility model

(2) $U_{ij} = \acute{\alpha}_j v_i + \varepsilon_{ij}$

U_{ij} is the level of utility patient 'i' associates with a visit to provider 'j' and 'ε_{ij}' is the error term 'α' is a vector of unknown parameters while 'v_i' is a vector of exogenous variables. 'v_i' vector includes both individual characteristics as well as the choice attributes.

The conditional indirect utility function is specifically defined as:

(3) $V_{ij} = f(Y_i - P_{ij}) + E_{ij}(B_i, A_j) + e_{ij}.$

Duschene (1998) introduced the quality of the service provider in terms of a semi-logarithm specification:

(4) $\text{Log}(E_{ij}) = B_{0j} + B_{1j} v_i$

Where 'v_i' is the vector representing both the individual/household and the health care providers' characteristics.

Sahn, et. al. (2002) specify the consumption of other goods as:

$f(Y_i - P_{ij}) = \alpha_1 \log(Y_i - P_{ij}) + \alpha_2 (\log(Y_i - P_{ij}))^2$

$= \alpha_1 \log(Y_i(1 - P_{ij}/Y_i)) + \alpha_2 (\log(Y_i(1 - P_{ij}/Y_i)))^2$

(5) $= \alpha_1[\log Y_i + \log(1 - P_{ij}/Y_i)] + \alpha_2[\log Y_i + \log(1 - P_{ij}/Y_i)]^2$

Given that price relative to income is very small, the approximation below is adopted:

$\text{Log}(1 - P_{ij}/Y_i) \approx -P_{ij}/Y_i \quad \text{and} \quad (P_{ij}/Y_i)^2 \approx 0$

Equation (5) then simplifies to:

(6) $f(Y_i - P_{ij}) = \alpha_1 \log Y_i - \alpha_1 (P_{ij}/Y_i) + \alpha_2 (\log Y_i)^2 - 2\alpha_2 (P_{ij}/Y_1)*(\log Y_1)$

Equation (6) approximation is adopted to avoid the problem of having similar price-income function across options in the optimization process, as the costs are small relative to income.

In discrete choice models, the logit identifies only the difference in utilities, $V_1 - V_0$ where V_0 is the reference utility.

Equation (6) reduces to:

$$-\alpha_1 (P_{ij}/Y_i) - 2\alpha_2 (P_{ij}/Y_1)*(\log Y_i)$$

The indirect conditional utility function is therefore expressed as:

$$V_{ij} = B_{0j} + B_{1j} v_i + \alpha_1 (-P_{ij}/Y_i) - \alpha_2 (2 P_{ij}/Y_i (\log Y_i)) + e_{ij}.$$

Choice 'j' is made when

$$\text{Prob } (U_{ij} > U_{ik}) \text{ for all } k \neq j$$

Mc Fadden (1973) showed that if and only if the 'j' disturbances are independent and identically distributed with weibull distribution,

$F(eij) = \exp(-e^{-\varepsilon ij})$

Then $\text{Prob } (y_i = j) = \dfrac{e^{\beta' v_{ij}}}{\sum^j_{j=1} (e^{\beta' v_{ij}})}$ $\Big\}$ Conditional logit

where

y_i is a random variable which indicates the choice made.

v_{ij} includes aspects to the individual as well as to the choice alternatives.

$v_{ij} = [x_{ij}, z_{ij}]$

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$$\text{Prob}(y_i = j) = \frac{e^{\beta' x_{ij} + \alpha' z_i}}{\sum^j_{j=1}(e^{\beta' x_{ij} + \alpha' z_i})} = \frac{e^{\beta' x_{ij}} e^{\alpha' z_i}}{\sum^j_{j=1}(e^{\beta' x_{ij}} e^{\alpha' z_i})}$$

In the nested multinomial logit selection model, the selection variable, y_i, takes values 1, 2,..........j for j outcomes. The analysis has eight outcomes: The first level is divided into four sectors namely: public sector, private for profit health facilities, non-profit making health facilities (mission) and the lay care. The second level is the alternative choices that are available to the households. This includes: self care, traditional care, public health centres/dispensaries, public hospitals, mission health centres/dispensaries, mission hospitals, private clinics and private hospitals. The decision considered is sequential and the nested tree structure is as given in figure 1 below.

Figure 1: The decision structure
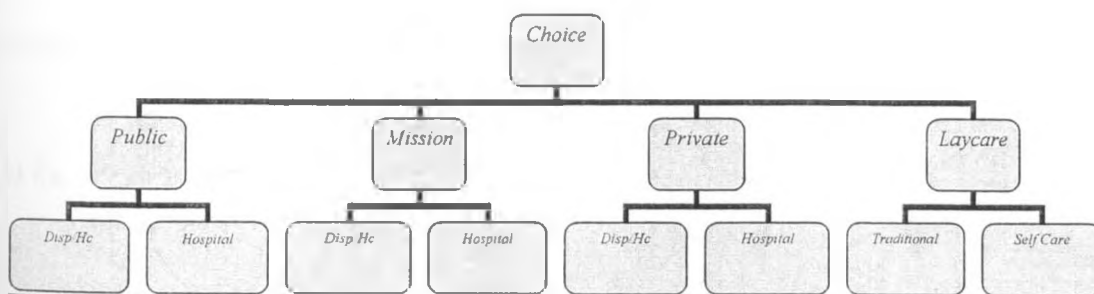
The probability that a person chooses option j is defined as illustrated below:

The probability of choosing alternative 'j' in branch 'L' (P_{jL}) is defined as the product of probability of choosing alternative 'j' given that branch 'L' has been chosen ($P_{j|L}$) and probability of choosing branch 'l' (P_L)

(1) $P_{jL} = P_{j|L} * P_L$ where

P_{jL} = unconditional probability

$P_{j/L}$ = conditional probability

j = alternative choice j

L= branch L

(2) $P_{jL} = \left[\dfrac{e^{\beta' x_{j|L}}}{\sum^{jL}_{j=1}(e^{\beta' x_{j|L}})} \right] * \left[\dfrac{e^{\gamma' z_L}}{\sum^{L}_{L=1}(e^{\gamma' z_L})} \right]$

$= \left[\dfrac{e^{\beta' x_{j|L}}}{\sum^{jL}_{j=1}(e^{\beta' x_{j|L}})} \right] \left[\dfrac{e^{\gamma' z_L}}{\sum^{L}_{L=1}(e^{\gamma' z_L})} \right] \dfrac{\left[\sum^{jL}_{j=1}(e^{\beta' x_{j|L}}) \right] \left[\sum^{L}_{L=1}(e^{\gamma' z_L}) \right]}{\left[\sum^{L}_{L=1} \sum^{jL}_{j=1}(e^{\beta' x_{j|L} + \gamma' z_L}) \right]}$

Where 'x_j' represents choice attributes for alternative 'j' and 'z_L' are attributes specific to branch 'L' (choice set L).
Inclusive value of branch L (I_L) is defined as:

(3) $I_L = \ln \sum^{jL}_{j=1}(e^{\beta' x_{j|L}}) \Rightarrow e^{I_L} = \sum^{jL}_{j=1}(e^{\beta' x_{j|L}})$

Substituting equation 3 into equation 2, equation 4 is obtained

(4) $P_{jL} = \left[\dfrac{e^{\beta' x_{j|L}}}{\sum^{jL}_{j=1}(e^{\beta' x_{j|L}})} \right] \left[\dfrac{e^{\gamma' z_L} * e^{\tau_L I_L}}{\sum^{L}_{L=1}(e^{\tau_L I_L} * e^{\gamma' z_L})} \right]$

(5) $P_{jL} = \left[\dfrac{e^{\beta' x_{j|L}}}{\sum^{L}_{L=1}(e^{\beta' x_{j|L}})} \right] \left[\dfrac{e^{\gamma' z_L} * e^{\tau_L I_L}}{\sum^{L}_{L=1}(e^{\tau_L I_L} * e^{\gamma' z_L})} \right]$

Equation 5 is the nested logit model that is used to determine the probability of choosing

option j in branch L. In fact, the main choice being modeled is between the alternatives in

the second level of the tree. However, the choice process is imagined to consist of first choosing an alternative at level one of the tree and then, conditional on this choice, an alternative at level two.

τ_L is the coefficient of the inclusive value of branch L.

If $\tau_L = 1$, then the equation reduces to conditional logit.

The log-likelihood function that needs to be maximized in order to estimate values of the parameter vector 'β' and 'γ' is defined as below:

(6) $\quad L = \sum_i \log(P_{j|L} * P_L)$

L is the logarithm of the likelihood function.

3.1.4 Variable Selection

Cost of health care, treatment time and distance

Cost is one of the factors that are assumed to influence the choice of health care provider. It affects the choice probability of a health care provider through a budget constraint. It is assumed that the costs of the alternative providers are compared and that a provider who is seen to be able to provide the needed services with more benefits to the patient for a given amount is chosen. The costs of treatment in the different facilities are estimated using sub-sample averages of individuals who sought care at each different provider. The cost ought to include expenses on consultation, drugs, transport, as well as the opportunity cost of time, which is the cost of the time that could have been used to do other (productive) activities. However, due to lack of data, computation of the cost of time is excluded.

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Travel, w aiting a nd c onsultation t imes a s w ell a s d istance a re a lso h ypothesized t o b e important in the choice of provider. The distance and total time for different health providers are also estimated using sub-samples averages of individuals who sought care at each different provider.

Socio-economic status

Instead of examining, one at a time, each of the variables that relates to the social and economic situation of the household, a composite score is used to explain differences in health-seeking behaviour. Taking into consideration the multidimensional nature of socio-economic status, e.g. income, education and occupation (Baker 1972), I specifically intend to use the following basic characteristics:

● Monthly income of the household;

Household expenditure will be used as a proxy for household permanent income. Household expenditure is preferred as no member of a household can be denied health care because of his/her income especially children.

● Housing and its characteristics (housing quality characteristics) namely:

   ● Type of dwelling unit occupied by the household (floor, wall and roof types);

   ● House ownership.

The index is determined by giving scores to the different aspects of the two factors named above. I f the f loor is made up of stone, c ement/bricks or wood a score of two would be awarded otherwise zero. The same procedure is repeated for roof and wall type to obtain the scores. Owner-occupier is scored two otherwise zero. This process generates a maximum score of eight from which the dummy variable is obtained. The socio-

economic status then is regarded as a dummy variable taking the value one for high status (rich) and zero for low status (poor).

Household size

Household size is also considered as an important determinant factor in the probability of choosing a health care provider. It is argued that the more people there are in a household, the less the per capita amount, representing individual welfare, allocated to each member of the household. This implies that a larger family has less income per capita than does a smaller one on the same income. The larger households therefore are expected to behave as people having low income.

Other variables

Other variables included in the estimation are the household head/individuals' age and level of education. Health insurance dummy is also included as one of the variables that determine access to health care.

Table 2: List of variables used in the model

Dependent variable

Choice of the health facility

Explanatory variables

	Socioeconomic status
Income	Household monthly income
Social economic status	Housing characteristics (ownership; and type of floor, roof and walls). '1' for high socio economic status.

Household characteristics

Hhsize	Household size.
Agehh	Age of head of household in years
Educh	Level of education of household head (years of schooling)

Individual characteristics

Agex	Individual's age in years in years
Educx	Individual's level of education (years of schooling)
Sexx	Individual's sex (male dummy)

Access variables

Distance	Distance to the health facility visited (in km)
Total treatment time	Total time for treatment (includes waiting and treatment time).
Cost	Cost of treatment
Insurance dummy	If an individual is covered with health insurance (Yes=1)
Rural dummy	If the household is located in a rural area (Yes = 1).

3.2 DATA SOURCES

3.2.1 Data sources

The data used in the analysis is from "The Kenya National Health Accounts (NHA), Household Health Expenditure and Utilization Survey, 2003". Ministry of health administered the survey where the target population was all the households in Kenya. This nationally representative survey collected information from 8844 households in all

the 70 districts in the country. The survey was conducted between February and March 2003. The Central Bureau of Statistics (CBS) National sampling frame (NASSEP IV) which is stratified by urban and rural was used to draw the sample. The six major towns (Urban) in Kenya namely: Nairobi, Mombasa, Kisumu, Nakuru, Eldoret and Thika, were further sub-stratified into five socio-economic classes. The division was based on incomes to circumvent the extensive socio-economic diversity inherent in them as follows: Upper, Lower Upper, Middle, Lower Middle and Lower income class. Out of the 8844 households in the survey, 6060 were rural households while 2784 belonged to urban households (Table3). This was achieved through coverage of 737 clusters where 12 households were covered in each cluster.

Table 3: Distribution of Clusters and households in the sample by province, Urban/ Rural, 2003

Province	Clusters			Households		
	Rural	Urban	Total	Rural	Urban	Total
Nairobi	0	90	90	0	1080	1080
Central	82	18	100	984	216	1200
Coast	54	36	90	648	432	1080
Eastern	84	16	100	1008	192	1200
North Eastern	34	11	45	408	132	540
Nyanza	81	19	100	972	228	1200
Rift Valley	97	22	119	1164	264	1428
Western	73	20	93	876	240	1116
TOTAL	505	232	737	6060	2784	8844

Data was collected from the selected households, using the interview method where a questionnaire was administered. The household survey included questions pertaining to a wide array of economic, demographic, and health-related behaviours of each member of the household in addition to the household head characteristics. Information collected

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included household income, health status, health-seeking pattern, characteristics of the health provider (distance, travelled time, waiting time to see nurse/doctor, price of services) who had treated the sick person, health expenditures and, housing conditions. The survey captured information on the wide range of health choices that are available in Kenya, from traditional healers to modern hospitals in the cities. The information from all individuals in the sample, who had reported ill during the last four weeks prior to the survey, is used. Thus, all results are conditional on having been sick or injured.

3.2.2 Descriptive statistics

The eight thousand four hundred and twenty three households interviewed during the 2003 Health Survey represented a response rate of about 95 per cent. In the survey the household size varied between 1 and 19 members per household with a mean of 5.2. Out of the 8423 households surveyed, 334 were excluded from the analysis due to some missing information. Of the remaining 8089 households with 37720 members, only 6262 individuals reported to have been ill within four weeks preceding the date of the survey. The 6262 ill/injured individuals represented a 16.6 per cent of the total population interviewed as indicated in Table 4. The figures were slightly higher for urban areas (17.1%) compared to rural areas (16.4%). This indicates that urban individuals were more likely to report illness-related symptoms than their rural counterpart.

Persons who reported an illness were asked whether they consulted a health provider (including Pharmacy/Chemist and Traditional Healers) for the illness/injury and where they went for consultation. Three quarters of those who were ill/injured consulted health provider while one quarter took no action. As indicated in Table 4, the rural individuals

were less likely to consult a health provider than urban individuals (72.7% versus 81.9% respectively). The overall insurance coverage, of those who reported to have been ill/injured, stood at 10 per cent with urban areas having higher coverage (19.1%) than the rural areas (6.9%).

Table 4: Proportion of ill / injured individuals by region and other characteristics:

Variable		Urban/Rural Status	
	Total	Urban	Rural
Number of ill/injured individuals	6262	1622	4640
Proportion of ill/injured individuals	16.6	17.1	16.4
Proportion of ill/injured who sought treatment	75.1	81.9	72.7
Mean age in years of the ill/injured individuals	24.3	22	25.1
Proportion of ill/injured individuals with insurance	10	19.1	6.9
Number of individuals covered in the study	37720	9479	28241

In the survey, the types of health care providers were classified into sixteen categories as shown in figure 2 below:

Figure 2: Distribution of choice of health care providers.
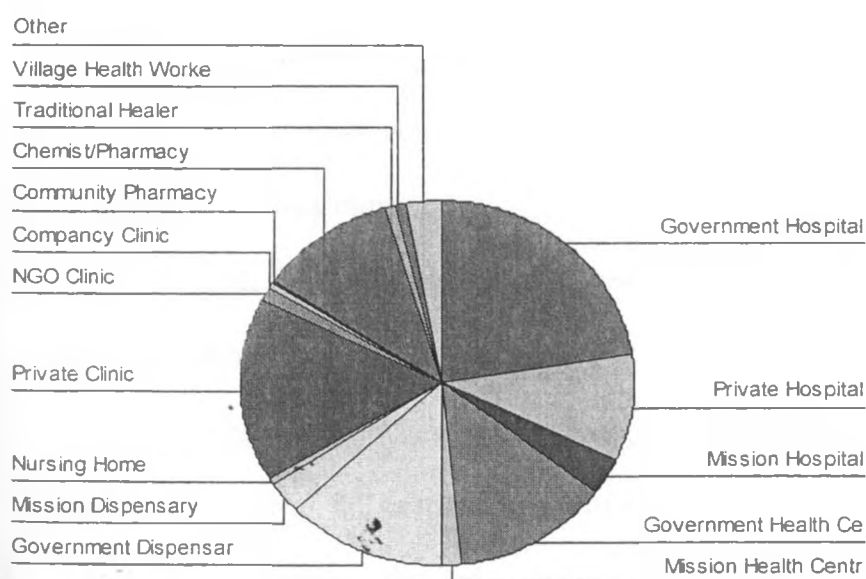
For all the different levels of health facilities (dispensaries/clinics, health centres and hospitals) visited, government facilities had the highest proportion of visits followed by private while the mission facilities had the lowest share. The visits to government health facilities had the highest percentage in the category of hospitals while the visits to government dispensaries and health centres were generally of lower and equal proportions. However, a reverse trend was observed in the visits to private facilities where the majority of the patients sought care from private clinics instead of the private hospitals. The patients did not depict much disparity in their choice behaviour, for the three levels of health care (dispensaries, health centres and hospitals) at the missionary health facilities.

For the purpose of this analysis, the sixteen options have been re-classified into four broad categories namely: Government health facilities, Mission health facilities, Private health facilities and lay-care. The re-classification is grouped as follows:

- Government health facilities include; Government hospitals, Government health centres and Government dispensaries.

- Private health facilities consists of; Private hospitals, Nursing homes, Private clinics and Company clinics.

- Mission health facilities include; Mission hospitals, Mission health centres, Mission dispensaries and NGO clinics.

- Community pharmacy, Chemist/Pharmacy, Traditional healers, Village Health Workers and Others, fall in the category of Lay care.

Each group is further divided into two alternatives; hospitals and clinic/dispensaries/health c entres. The l ay care c ategory i s a lso s plit i nto s elf c are and traditional healers. The structure therefore has a total of eight health care alternatives at

the bottom level (level two options). The distribution of health care provider choice (level one options) is as shown below:

Figure 3: Distribution of choice of health care providers by sectors (level one option).
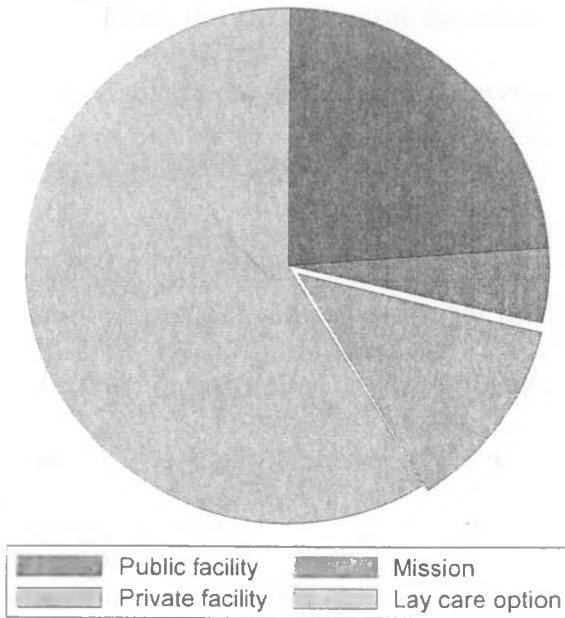
The first three categories fall in the class of modern health care while the fourth category belongs to the group of lay care. The NGO clinic is viewed as a non-profit making institution therefore it is put in the same group with the Mission health facilities. Table 5 shows that among the 6262 ill/injured individuals in the study, 23.7 per cent sought medical care from government health facilities, 12.6 per cent from private health facilities, 4.8 per cent from mission health facilities and 58.8 per cent lay-care. As defined above, lay-care category includes self medication, treatment sought from traditional healers and those who took no action. In overall, 41.1 per cent sought care from medical professionals while 58.8 per cent relied on lay care. Majority of individuals utilizing medical care chose a government health care facilities instead of mission and/or

private health facilities. Similarly, the study found government facilities to be the largely utilized source of health care in rural areas while in urban areas, apart from government facilities, private health facilities are also frequently utilized. The choice pattern could be attributed to monetary cost of treatment and the distance traveled by the ill to the health facilities. The results from the study support the behaviour considering that government health facilities are relatively cheaper (from the survey results) and widely spread across the country than private and mission facilities. Majority of individuals who never sought health care cited lack of money, reliance on self medication and long distance to the facility as the main reasons. For those who sought medical health care, 59 per cent used the nearest facility. This indicates that majority of the people who are ill resort to health facilities that are closer to them. However, those who visited health facilities far away from home did so mainly due to:

- High cost of treatment;

- Unavailability of drugs; and

- Lack of qualified medical staff in the nearer health facilities.

Table 5: Proportion of illness/injury individuals by region and type of care first sought:

	Urban/Rural Status		
Type of provider visited	Total	Urban	Rural
Number of ill/injured individuals	6262	1622	4640
Public Health Facility	23.7	20.7	24.8
Mission Health Facility	4.8	4.6	4.9
Private Health Facility	12.6	16.6	11.2
Lay-Care	58.8	58.1	59.1
Total	100	100	100

CHAPTER 4 – RESULTS AND ANALYSIS

4.1 DESCRIPTIVE STATISTICS OF THE EXPLANATORY VARIABLES

Table 6: The descriptive statistics of the explanatory variables

Explanatory Variables	Obs	Mean	Std. Dev
Age	6246	24.3	21.4
Education	6228	3.4	4.0
Sex	6250	0.45	0.5
Household size	6262	5.2	2.4
Age of household head	5974	44.5	15.2
Education of household head	5940	5.9	4.3
Household income	6009	5730.5	26029.6
Housing condition	5774	0.4	0.5
Distance to the health facility	6262	5.9	24.7
Total treatment time	6262	35.0	78.9
Cost of treatment	6262	196.0	3868.2
Insurance cover	5840	0.1	0.3
Rural	6262	0.7	0.4

The mean age of the ill/injured cases was 24.3 years and 55 per cent of them were females. Below the age of 15 years, there were almost equal proportions of females and males, while for 15 years and above the proportion of ill females (60.4 %) were significantly higher than males (39.6 %). The gender disparity in the adult cases reported could be attributed to:

(a)   Women being more prone to illness because they have obstetrical care needs which are not relevant to men therefore seek treatment more often than men; or/and

(b)   Women may be more likely to accompany children to health care, and thus report and seek treatment for their own conditions at the same time.

The reasons seem plausible given that similar health studies conducted in Meru and South Nyanza districts observed the same gender disparities (Mwabu et al 1991, 1993).

The mean number of years spent in school by the ill/injured individuals was 3.4 years while the head of households where the sick individuals belonged spent averagely 6 years schooling. This implies that the head of the households basically had only attained primary level of education and are averagely 44.5 years old.

On average, household expenditure was Kenya Shillings 5730 though there were a lot of variations in the expenditures. Majority of the rural households (52.9%) lived on less than a dollar compared to only 24 per cent for urban households.

Most of the ill persons were located in the rural areas (74.1%) and the average distance covered to a health facility was 5.9 Kilometers. The housing condition, which was used as a measure of socioeconomic status, indicated that only 40 per cent of the ill individuals belonged to the category of high socioeconomic status.

The response to mode of payment question indicated that 95 per cent relied on cash payments while only 0.4 per cent was exempted from paying. This shows that most of the treatment costs were catered for by the ill individuals/households through out-of-pocket payments.

The average cost of treatment was highest in private facilities (Kshs. 570) while it was lowest for lay-care option (Kshs. 16). Mission and Public health facilities had the mean costs of K shs. 3 35 and Kshs. 2 31 r espectively. S equentially. p rivate h ealth f acilities were found to be the most expensive followed by mission then public facilities while lay-care provided the cheapest mode of treatment for ill/injured individuals.

4.2 ESTIMATION RESULTS

4.2.1 Nested logit model estimates for the choice of health care provider.

As described above, the dependent variable that is modelled is the choice of health care provider using maximum likelihood estimation procedure. Table 7 on the next page, presents the results of the choice of health provider equation with lay care as the reference level:

It is important to note that the estimated parameters of the bottom level variables (cost, distance, total treatment time and net income) do not vary across alternatives. This implies that the marginal utility of the variables; cost, time, distance and net income (a function of costs of treatment in the alternative providers), which are the facility attributes do not vary across alternatives. However, the coefficients of individual/household characteristics are allowed to vary between alternatives. This can be explained by considering that the perceived effectiveness may be different for each provider given the individual/ household characteristics. Econometrically, individual and household characteristics are interacted with the specific sector dummy so that the effect varies depending on which sector an individual chooses. Therefore, for a given individual/household characteristic all the sector specific variables take the same value but in reality these variables are different from each other. In contrast, household consumption (net income) though is one of the household characteristics; it varies across all the health alternatives because cost of treatment, which is a component of the net household income, is different for the different facility options.

All the inclusive value parameters are significant implying that multinomial logit model may not have been appropriate for estimation.

Table 7: Estimated coefficients in nested logit model for the choice of health care provider.

Level	2	Number of obs	42360
Dependent variable	choice	LR chi2(37)	5292.066
Log likelihood	-8364.61	Prob > chi2	0.0000

Variable	Coefficient	SE	t-Value
Service Provider			
Cost	-0.0011422	0.0003873	-2.95*
Distance	-0.0454052	0.0069111	-6.57*
Total time	-0.0310276	0.0015584	-19.91*
Consumption	2.325516	0.4692049	4.96*
Consumptionq	-0.4104415	0.0737018	-5.57*
Public			
Rural	0.5861116	0.0937285	6.25*
Sex	-0.0474157	0.0680361	-0.70
Age_x	-0.0658638	0.0373266	-1.76
Hh_size	-0.0510245	0.015431	-3.31*
Age_hh	-0.1265064	0.056098	-2.26*
Educ_hh	-0.0036292	0.0099089	-0.37
Socec	0.2857759	0.0787125	3.63*
Insurance	0.017363	0.1208265	0.14
Educ_x	0.0163277	0.0118037	1.38
Mission			
Rural	0.2932075	0.1784101	1.64
Sex	-0.1071689	0.140096	-0.76
Age_x	-0.1013062	0.0777955	-1.30
Hh_size	-0.0410356	0.0326425	-1.26
Age_hh	-0.6355144	0.0999396	-6.36*
Educ_hh	-0.0193553	0.0204707	-0.95
Socec	0.0579002	0.1663496	0.35
Insurance	0.4295222	0.2248334	1.91
Educ_x	0.0217035	0.0246935	0.88
Private			
Rural	0.0256439	0.1057858	0.24
Sex	0.0172855	0.0842275	0.21
Age_x	-0.0089419	0.0475968	-0.19
Hh_size	-0.0379393	0.0191416	-1.98*
Age_hh	-0.2716909	0.0604693	-4.49*
Educ_hh	-0.0007528	0.012381	-0.06
Socec	0.1584742	0.0982661	1.61
Insurance	0.004434	0.1453199	0.03
Educ_x	0.0065424	0.014688	0.45
Lay care:			
Reference option			
Sector		**Incl. Value parameters**	
Public	0.1983867	0.0516235	3.84*
Mission	-0.2022344	0.0754916	-2.68*
Private	0.0691569	0.0507924	1.36
Lay care	1.112764	0.2021113	5.51*

LR test of homoscedasticity (iv = 1): chi2(4) = 404.66   Prob > chi2 = 0.0000

Variables marked in asterisks are significant at 1% level of significance

Table 8: Variable definitions

Explanatory Variables	Description
Age_x	Age of individuals in years
Educ_x	Individual's completed years of schooling
Sex	=1 if individual is male , =0 if individual is female
Hh_size	Numbers of persons reported to be usual members of a household
Age_hh	Age of household head in years
Educ_hh	Number of years of schooling completed by household head
Consumption	Total net monthly household expenditure
Consumptionq	Total net monthly household expenditure squared
Socec	=1 if good housing condition, =0 for poor housing condition
Distance	Distance to the health facility in Kilometres
Total time	Total treatment time including the waiting time (in minutes)
Cost	Total treatment cost (consultation fees and treatment costs)
Insurance	=1 if a person has a health insurance cover, =0 if one does not have a health insurance cover
Rural	=1 if household is in rural area, =0 if household is in urban area

Overall, the results indicate that several factors determine the patients' choices for the alternative types of health care. The provider options (level 2), labeled in the table as service provider, are determined by the facility attributes namely; cost of treatment, distance to facility, total treatment time and consumption of goods other than health while the sectors (level 1) attributes are; the individual and household characteristics. Generally, socioeconomic status, individual characteristics, community characteristics and the access variables like cost of treatment, distance to the health facilities all have statistically significant effect on choice of provider. The variables whose t-Statistics are marked with asterisks were found to be statistically significant.

The results of the estimates are discussed below:

Housing condition, which was used as a measure of socio economic status, was found to have a p ositive effect o n t he p robability o f choosing p ublic, m ission o r p rivate h ealth facility in comparison to lay-care. This implies that the poor members of the society are less likely to obtain health care from the formal sector (government, mission or private facilities) c ompared t o l ay-care. T his s upports t he v iew t hat t he r icher segment o f t he respondents prefers professional health care to lay-care. The argument can be extended further to mean that poverty leads to lack of access to basic needs such as housing, therefore obtaining health care from the formal sector is really a luxury. Instead they would opt for lay care from traditional healers or self care, which are relatively cheaper. However the variable was only significant in the choice of public health facilities.

Insurance dummy had a positive effect on the chances of choosing government, private or mission alternatives relative to lay-care, but only significant in the choice of mission health facilities. The positive sign implies that, if an individual has an insurance cover then it increases the probability of using government, mission or private facility as opposed to lay-care. From this result, it can be deduced that insurance cover enhances access to professional health care instead of lay-care. The fact that urban households have higher proportion of those with insurance indicates that the urban households are better-off in terms of accessing professional health care compared to their rural counterparts. The rural dummy variable which was used to assess the effect of rural /urban status of households on the choice of health provider shows that individuals residing in rural areas are significantly m ore likely to choose g overnment health f acilities a s opposed to lay-care. The result implies that individuals in rural areas depend more on government health

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facilities for their medical needs than their urban counterpart. This seems plausible considering that the government health centers/ dispensaries are more predominant in rural areas (MoH, 2003), therefore are more accessible in terms of distance than the other options of health care.

Age of an individual plays a minor role in determining the choice of health care provider. However, it has a negative effect on the choice of government, mission and private. This shows that the older an individual is the less likely that he/she would seek health care from government, private or mission facility compared to lay care as reference level. The observation is in agreement with the widespread belief that as people get older, they seek treatment from traditional medical practitioners, perhaps due to their loyalty to or familiarity with these providers. On the contrary, age of household head significantly determines the choice of provider. The individuals living with older household heads have higher probability of using lay-care as opposed to professional care (public, mission or private health facilities). The result provides an indication that individuals whose head of households are older could be constrained financially possibly because of the low level of involvement in economic activities by the household heads (due to age) or having retired, therefore tend to rely more on cheaper means of health care (lay care).

The coefficient of the male dummy indicates that females are attracted to some health facilities more than the men. In particular being a female makes one more likely to visit government or mission health facilities. This probably reflects the fact that majority of women have only a limited control over the household resources compared to men, therefore, can only afford treatment in relatively cheaper government and mission facilities. For the same reason stated above, the result shows that males prefer to use

private facilities than female. In other words, there is gender disparity in choice behaviour though the effect is not significant in all the three options relative to lay-care. The results are consistent with the findings of a similar study conducted by Mwabu in one of the rural districts in Kenya.

Educated individuals use more of professional care (public, mission or private health providers) than the uneducated. The years of schooling as a measure of level of education shows that chances of choosing public, mission or private instead of lay-care increases with level of education. Even though the effect is only significant in the case of public facilities, the result indicates in general that the higher the level of formal education, the higher the probability of seeking professional care compared to lay-care. This observation is consistent with the results from the previous studies on the effect of education on choice behaviour.

Effect of household size on choice of health care is negative and significant for public, mission or private health facilities compared to lay-care. This observation can be supported by the fact that the more people there are in a family, the less per capita amount, representing individual welfare, allocated to each member in the household. Therefore individuals from such households behave as people having low income, which is likely to lead to a decrease in quantity of health care demanded (income effect). The result shows that as the household size increases, the probability of choosing public, mission or private in relation to lay-care reduces. The persons are less likely to seek professional c are b ecause o f c ompetition f or r esources i n t he h ousehold t hus d irecting demand for health care towards cheaper lay care as opposed to professional care.

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Income, monetary and non-monetary costs are important determinants of provider choice in the demand for medical care. Effects of the three factors are explored through net income (household consumption of goods other than health care), cost of treatment and distance to (and total treatment time at) a health facility. Distance and treatment time are used to capture the non-monetary costs components in the treatment costs. As stated earlier, treatment time includes waiting time and time spent with the medical professionals. The coefficients of both the consumption and consumption squared were found to be statistically significant. Consumption variable coefficient took a positive sign, which implies that the higher the household net income, the higher the chances of seeking health care. Cost was found to significantly affect the choice of provider negatively. This means that the higher the cost of treatment the less likely that an individual will seek health care. The result conforms to the previous studies where increase in price was found to have a negative effect on the demand for health care.

The coefficient of distance variable is negative and statistically significant. In viewing distance as a 'price' variable, the result is in agreement with economic theory on the price effect on demand for health care. The result indicates that the longer the distance the less likely that the services of a provider would be sought. Similarly, total treatment time also has a negative and significant effect on the health care seeking behaviour. This indicates that the longer the total treatment time (waiting and treatment time) the lower the demand for services from the health provider. Higher total treatment time (a non-monetary price) therefore is a deterrent to demand for health service.

4.2.2 SIMULATIONS

Simulation is a useful tool for analyzing the relative magnitudes of the estimation results. It is a necessary tool due to difficulties of directly comparing magnitudes of coefficients in logit estimations. For instance, by simulating a change in the cost of health care variable it is possible determine the magnitude of the effect on provider choice. Simulations of the statistically significant variables are discussed below:

Reduction of treatment cost and time, and distance to the government facilities:

Table 9 on the next page, shows that provision of free medical care in government health centres and dispensaries (removal of fee charges) would lead to 13.4 per cent increase in the use of the same type of facilities and a decline of 11.4 per cent in use of public hospitals. This indicates that lower price in public health centres/dispensaries leads to an increase in their use while on the other hand; it leads to a reduction in use of public hospitals as people substitute the more relatively expensive public hospitals for cheaper public health centres/dispensaries. There is a high degree of substitutability between the public hospital and the public health centres/dispensaries options relative to others as reflected b y t he l ow i nclusive v alue p arameter of t he p ublic se ctor. However, t here i s relatively a small decrease in the use of traditional care as a result of having free medical care in public health centres/dispensaries. Mc Fadden (1978) showed that if the model estimates satisfy the usual axioms of utility maximization the substitution will be more likely between members of a group rather than across groups. In this scenario, a decrease in cost of treatment at a government health centre/dispensary shifts demand more than proportionately from government hospitals to health centres/dispensaries which are in the

same nest. Overall, there are relatively small changes in the use of the other alternatives with major shifts being between public hospitals and public health centres/dispensaries.

Table 9: Simulation of cost, distance and treatment time in government facilities:

Service Provider	100 % Reduction in Treatment Cost in Government HC/Dispensaries		50% Reduction on Distance to Governemnt HC/Dipsensaries		50% Reduction on Total treatment time in Government HC/Dispensaries	
	Probabilities		Probabilities		Probabilities	
	Base	Predicted	Base	Predicted	Base	Predicted
Public Hospital	0.1280	0.1134 (- 11.4%)	0.1280	0.1194 (- 6.7%)	0.1280	0.09026 (-29.5%)
Public H. Centres/ Dispen.	0.1097	0.1244 (13.4%)	0.1097	0.1183 (7.8%)	0.1097	0.14754 (34.5%)
Mission Hospitals	0.0244	0.0234 (-4.1%)	0.0244	0.02496 (2.3%)	0.0244	0.02340 (- 4.1%)
Mission HC/ Dispen.	0.01810	0.01917 (5.9%)	0.01810	0.01762 (- 2.7%)	0.01810	0.01919 (6.0%)
Private Hospitals	0.08420	0.08485 (0.8%)	0.08420	0.08462 (0.5%)	0.08420	0.0840 (- 0.2%)
Private clinics	0.0497	0.0490 (-1.4%)	0.0497	0.04925 (- 0.9%)	0.0497	0.0499 (0.4%)
Traditional	0.1442	0.14029 (-2.7%)	0.1442	0.14172 (- 1.7%)	0.1442	0.1462 (1.4%)
Self care	0.4416	0.4455 (0.9%)	0.4416	0.4441 (0.6%)	0.4416	0.4395 (- 0.5%)

Similar trend is observed in the simulation of 50 per cent reduction of distance to government health centres/dispensaries (Table 9). The results indicate that a 7.8 per cent increase in the use of public health centres/dispensaries would be registered while a drop of 6.7 per cent would be realized in public hospitals. However, the change would lead to only a 1.7 per cent probability decline in the use of traditional healers. On the other hand, the cross effect of distance on the use of private and mission (hospitals and clinics) are negligible. This shows that a policy change on distance to public health centres/dispensaries would mainly affect the selection probabilities of government hospitals and health centres/dispensaries.

A 50 per cent reduction in treatment time in government health centres/dispensaries would lead to 34.5 per cent increase in the use of the same type of facilities. As indicated earlier, the total treatment time refers to waiting time at a facility plus the time the patient spends with the medical personnel. Reduction in treatment time at a government the health centres would increase the probability selection of government health center/dispensaries. This shows a shift from public hospitals to the public health centres/dispensaries with the public hospitals registering 29.5 per cent decrease in its probability selection. Consequently, there would also be a decline in the use of self-care though negligibly (0.6%).

Table10: Simulation of the combined effect of cost, distance and treatment time.

Service Provider	Overall effect of changes the in cost, distance and total treatment time	
	Probabilities	
	Base	Predicted
Public Hospital	0.1280	0.08926 (- 30.3%)
Public H. Centres/ Dispen.	0.1097	0.14859 (35.3%)
Mission Hospitals	0.0244	0.023012 (- 5.7%)
Mission HC/ Dispen.	0.0181	0.01954 (8.0 %)
Private Hospitals	0.0842	0.08563 (1.7 %)
Private clinics	0.0497	0.04828 (- 2.9 %)
Traditional	0.1442	0.14851 (3.0 %)
Self care	0.4416	0.43718 (- 1.0 %)

Table 10 above, indicates that the combined effect of policy changes in cost, distance and total treatment time can approximately be achieved by only implementing the 50 per cent reduction in the total treatment time. The simulation results also show that individuals are more responsive to policy changes in treatment time than getting free medical care or reduction in distance to government facilities.

Tables 11, 12 and 13 represent the probabilities of both level one and level two options (decision structure figure 1). The level two a lternatives is listed in the t able under the heading provider choice while the level one options (sectors) include public, mission, private and lay-care (all appearing in the same order).

Table 11: Urban Rural simulations (Percentage difference from rural in parentheses)

Provider choice	Level two options		Level one options	
	All Rural households	All Urban households	All Rural households	All Urban households
Public hospital	0.1494	0.07995 (- 46.5%)	0.25633	0.17870 (- 30.3%)
Public health centre/dispensary	0.10693	0.09875 (- 7.6%)		
Mission hospital	0.01845	0.03313 (79.6%)	0.04176	0.04301 (3.0%)
Mission health centre/dispensary	0.02331	0.00988 (- 57.6%)		
Private hospital	0.08724	0.09021 (3.4%)	0.12372	0.16012 (29.4%)
Private clinic	0.03648	0.06991 (91.6%)		
Traditional	0.13031	0.13527 (3.8%)	0.57818	0.61819 (6.9%)
Self care	0.44787	0.48292 (7.8%)		

Simulation was used to quantify the differences between rural and urban households as indicated in table 11 above. From the results, it is evident that urban households are 46.5 per cent, 7.6 per cent and 57.6 per cent less likely to choose public hospital, public or mission health centres/dispensaries respectively in comparison to their rural counterparts. On the other hand, they are 91.6 per cent and 79.6 per cent more likely to visit a private clinic and mission hospital respectively. The sectoral level analysis shows that the rural households mainly rely on government health facilities for treatment while the urban dwellers are more likely to use private facilities for health care.

The probability selection of self-care in the two categories (rural and urban) is generally the same. Therefore, the difference in choice behaviour in this scenario represents a shift from use of public to private facility for the urban individuals. In addition, the choice

behaviour as far as mission facilities are concerned, reflects a shift from mission health centres/dispensaries to mission hospitals for the urban dwellers.

Table 12: Insurance simulations (Percentage difference in parentheses)

	Level two options		Level one options	
Provider choice	All with insurance	All without insurance cover	All with insurance	All without insurance cover
Public hospital	0.11554	0.1296 (12.2%)	0.23167	0.2394 (3.3%)
Public health centre/dispensary	0.11613	0.10880 (- 6.3%)		
Mission hospital	0.03356	0.02317 (- 31.0%)	0.05547	0.0411 (- 25.9%)
Mission health centre/dispensary	0.02191	0.01793 (- 18.2%)		
Private hospital	0.09358	0.08404 (- 10.2%)	0.14308	0.13278 (- 7.2%)
Private clinic	0.04950	0.04874 (- 1.5%)		
Traditional	0.15270	0.14193 (-7.1%)	0.56976	0.58774 (3.2%)
Self care	0.41708	0.44581 (6.9)		

Table 12 above shows that the individuals who had no insurance cover were 31 per cent and 18.2 per cent less likely to visit mission hospitals and health centres/dispensaries respectively but 6.9 per cent more likely to rely on self care compared to those who are not insured. In relative terms, having an insurance cover had the greatest effect on the likelihood for choosing mission hospital (31 %) compared to the rest of health care options. On the contrary, having no insurance increases the likelihood of using a government facility by 12.2 per cent and 6.9 per cent for self-treatment. From the simulation it can be deduced that having no health insurance cover increases probability of selecting public health facilities and/or reliance on lay care.

Table 13: Simulations of the households' socioeconomic status (Percentage difference in parentheses)

Provider choice	Level two options		Level one options	
	High socioecon status all hhs	Low socioecon status all hhs	High socioecon status all hhs	Low socioecon status all hhs
Public hospital	0.13984	0.1250 (- 10.6%)	0.24899	0.2306 (- 7.4%)
Public health centre/dispensary	0.10915	0.1056 (- 3.3%)		
Mission hospital	0.02941	0.01979 (- 32.7%)	0.04593	
Mission health centre/dispensary	0.01652	0.02079 (25.8%)		0.04058 (- 11.6%)
Private hospital	0.09405	0.08474 (- 9.9%)	0.14955	0.12392 (-17.1%)
Private clinic	0.05550	0.03918 (- 29.4%)		
Traditional	0.12080	0.14823 (22.7%)	0.55553	0.60493 (8.9%)
Self care	0.43473	0.45670 (5.1%)		

Households with high socioeconomic status were more likely to use government, mission or private facilities compared to those who belonged to the low socioeconomic status. Low socio economic status households rely more on lay-care than the high socio economic status household who depend more on professional care. Being in a low economic status reduces the chances of using mission facility by 11.6 per cent, government facility by 7.4 per cent and 17.1 per cent for private health facility. However, belonging to low socioeconomic status increases the chances of selecting lay-care by 8.9 per cent. In relative terms, the impact of low socioeconomic status is greatest on the choice of private (17.1 % drop) and least in government facilities (7.4 % drop). Though it is notable that the low socioeconomic status households are less likely to choose a mission facility, when mission facilities are disaggregated to hospital and health centres/dispensaries, the chances of choosing mission health centres/dispensaries increases by 25.8% but reduces by 32.7% for mission hospital.

CHAPTER 5 – CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

To determine the effect of individual, household and health facility characteristics on the choice of health provider, a nationally representative household survey data for a study conducted in Kenya in 2003 has been used by adopting a discrete choice model in the analysis (nested multinomial logit model). The study was motivated by the fact that majority of Kenyan people rely on lay care despite the existence of health care services in government facilities which are heavily subsidized. As stated earlier, reliance on lay care may prove to be a dangerous practice as professional diagnosis may prove that the sickness in question is very different from what the patient thinks it could be.

In developing countries, where the individuals' financial resources often are scarce, health care utilization is sometimes not the highest priority. Even when ill, the individual may still choose not to seek health care. The decision to seek care is of course influenced by the individual's perceptions of the care she/he would receive when seeking care at a certain facility. In Kenya, the main reasons reported in the survey for not seeking professional care were: reliance on self-medication; lack of money and long distance while high cost as a reason was ranked fourth.

The following factors have been found to significantly determine the choice of health provider:

- Rural/Urban status
- Socioeconomic status
- Owning a health insurance cover
- Household size

- Age of the household head
- Distance to health facility
- Cost of treatment in a health facility
- Total treatment time at a health facility
- Net income (consumption of goods other than health)

The estimated parameters have the expected signs consistent with the past literature. Net income, monetary (cost of treatment) and non-monetary costs (includes distance and treatment time) are identified as important determinants of provider choice in the demand for health care. The monetary and non-monetary costs have negative effect on the choice while income has a positive effect. The effect of income is positive but with a diminishing rate as reflected in the coefficient of the consumption squared variable.

The findings show that rural households rely more on public (both hospitals and health centres) and mission health centres/dispensaries for their health care needs than the urban households. Similarly, individuals belonging to households with many members are more likely to depend on lay care as opposed to the use of professional care. The more members there are in a household the less per capita allocation to the individual members. This implies that large families can be equated to household with lower income as opposed to a household with fewer family members for the same level of household income. Therefore, large household size acts as a deterrent to use of professional care and the individuals belonging to such households are more likely to rely on lay care (which is relatively cheaper in terms of.cost) than professional care.

Another interesting notable observation is that, health insurance and higher education attainment have similar effects on the behaviour choice. The effect of health insurance or higher educational attainment would lead to a higher likelihood of using private or mission providers compared to those with no insurance or primary level of education

while at the same time it reduces the use of lay care. The findings indicate that people with no health insurance cover, for instance, tend to rely on public sector for treatment or self treat due to comparatively high direct out of pocket costs in private and mission facilities which make the later facilities less affordable.

In the analysis, financial means is also found to be important as economic status of the household is positively related to seeking medical care. The individuals who are better off economically are more likely to seek medical care than to rely on lay care. However, the age variables both for individuals and household head have a negative effect on the choice of provider. This shows that the older individuals or individuals whose household heads are old are less likely to seek medical care than younger group category. Though there was no group-wise age analysis, the general trend still holds in both cases.

5.2 POLICY IMPLICATIONS AND RECOMMENDATIONS

Reduction of total treatment time at government health centres/dispensaries is likely to raise demand in the same type of facilities. The same effect is observed when there is reduction of distance to the government facilities. However, the study indicates that individuals are more responsive to changes in the total treatment time (waiting time plus time spent with the medical personnel) than to changes in cost of treatment in government facilities. For instance, a 100 per cent reduction (free care) in cost of treatment at the public health centres only leads to 1 3.4 per cent increase in their use while 50 per cent reduction in treatment time results in 34.5 per cent increase in the demand for heath care at the same type of facility. This shows that the time spent at the

government health centres is more of a barrier to accessing health care than the treatment cost. This observation, therefore, puts more weight on quality (treatment time as a quality measure) improvement than the cost of treatment in public health facilities.

The analysis also shows that the individuals with health insurance cover have private and mission health facilities as the important source of medical care while the chances of using lay care declines. This has two very significant implications namely:

- It enables the poor to avert from using lay-care a practice that may be dangerous to the population health as earlier stated in the literature.

- It frees some of the government scarce resources for use in maintaining and extending services to other needy areas as congestion at government health facilities would reduce.

In view of the fact that individuals belonging to households with low socio-economic status depend on lay care implies that policies aimed at poverty alleviation needs to be intensified to enhance access to medical care.

Out of those who seek medical care in Kenya, majority of them end up in the public health facilities. The study showed that out of the three types of modern health care, government facilities are the cheapest in terms of cost of treatment (monetary cost). Secondly, health centres and dispensaries (majority of them owned by government) are the main type of facilities which are wide spread in the country. It therefore makes intuitive sense that majority of Kenyan population rely on public facilities for their medical needs considering that cost and distance are deterrent to seeking health care. Similarly, the choice behaviour indicates that rural households are the major beneficiaries of the public health care compared to their urban counterparts. The observations,

therefore, lends support to the need to strengthen government rural health facilities to cope with the demand in those areas while pursuing other long term programmes, such as investment in education, to enhance access to health care for its population.

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