Determinants of Health Seeking Behaviour in Uganda – Is it Just Income and User Fees That Are Important?

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Abstract

This paper uses Uganda National Household Survey (UNHS) data to investigate, via a discrete choice model, the main determinants associated with seeking private, government and pharmacy based health care, for both adults and children. More specifically, and particularly important given that almost 40% of the Ugandan population are below the poverty line and that policies on user fees have recently changed, we investigate if income and user fees are the main factors which influence health care demand in Uganda. After controlling for endogeneity issues we find that income is strongly associated with increased health care usage, across all age ranges but especially for women, and that user fees are less significant than one might first expect, especially when compared to having a health unit within close proximity. Furthermore, we find significant differences in health seeking behaviour to be related to age and gender, and that increased levels of education are consistently associated with a transfer away from government provided health care, possibly indicating that people regard its quality as inferior.

Keywords: Income, User Fees, Health Care, Discrete Choice, Gender
JEL Classification: I11, I18

1. Introduction

Understanding the main determinants of health care demand can be vital in furthering our knowledge of how changes in government policy will impact on individuals and their demand of heath care services. This is no more evident than in Uganda, where almost 40% of the population are poor and can not afford basic health services, and where health care user fees were introduced in an attempt to recover operating costs and increase allocative efficiency, only for the policy to be recently reversed.[i]

Uganda's health sector is perhaps one of the sectors to suffer most from the turmoil of the 1970s and early 1980s, when civil wars and the 'Amin era' dominated Uganda's world profile.[ii] Since this period and despite the number of public, non-governmental, and private facilities having increased by almost 400% between 1972 and 1996, major problems remain in the quantity and distribution of trained medical staff and general co-ordination of health care delivery.[iii]

Present reforms are largely based around a Health Sector Strategic Plan (HSSP) which commenced in 2000/1, and encompasses a sector wide approach in the attainment of a reduction of morbidity and mortality caused by the major illnesses.[iv] This is to be achieved by enhanced levels of efficiency and better matching of services through further decentralisation of the national health care delivery systems. However, central government continues to tie funding to the upgrading of health centres, thus providing the buildings from which curative care can be supplied but maintaining the high variance in what health units actually have the capacity to deliver. Although user fees had been introduced in the early 1990's, to overcome this problem, the policy was recently reversed in order to try and overturn its current problems.

Current problems are exemplified through evidence from Uganda's Participatory Poverty Assessment Processes (UPPAP), indicating that drug availability, staff attitude and performance, equipment, range and effectiveness of services have recently worsened (Republic of Uganda, 1999). Similarly, Karamagi (2000) reported the utilisation of public health services to have declined by approximately 20% between 1995 and 2000. Analysis undertaken by the Uganda Bureau of Statistics

(UBoS) showed that the poor and non-poor alike preferred curative care from nongovernmental organisations (NGOs) and private providers compared to the less expensive government care (Hutchinson, 1999).

As the health sector is now projected to have the fastest growing share of government expenditure over the next few years, it is extremely appropriate to establish which factors are the key determinants in affecting peoples demand for health care, in order to maximise the benefit impact of future expenditure patterns. This is especially the case, given that beyond removing user fees government policy has generally reflected rather limited understanding of the factors that are important in influencing health seeking behaviour.

Previous, Uganda specific, microeconometric analysis has been largely based on slightly dated household surveys. We extend previous understandings in a number of directions. Firstly by using the robust, and health rich data of 1999/2000 UNHS, we provide a comprehensive investigation, after controlling for endogeneity issues, of how important income is relative to other key health care determinants, in the influence of health seeking behaviour. Understanding such issues are vitally important given participatory evidence (UPPAP 2000) that overwhelmingly suggests income to severely restrict access to health care services.

Furthermore, and secondly, we establish the importance of supplier specific variables such as user fees, but also move well beyond this. By disaggregating the analysis by gender and age we are not only able to provide a thorough understanding of whether income or non income factors are important in the influence of health care demand, but show how determinants vary across gender for both adults and children.

The paper is therefore structured as follows. In the next section we outline the modelling issues before reviewing some of the previous microeconometric evidence and data requirements associated with health care demand analysis. Descriptive statistics are then provided in section three and building on this section four details the econometric analysis, outlining the key determinants associated with adults and children seeking treatment at different health care providers. The final section of the paper concludes.

2. Modelling, Literature and Data

a. Modelling and Estimation

We base the investigation of the determinants of health care on a standard reduced form, which allows for the capturing of both direct and indirect effects of policies, such as health or education, on health care utilisation. The defined prices used are the effective prices paid by the consumer, thus they include travel expenses, etc., and can be included directly as an observed exogenous variable.[v]

In practice, the actual estimation of the demand for health care can be as simple as adopting a binary choice model, where health care is either sought or not. Such an approach fulfils the primary need in analysing health care demand of focusing on whether a sick individual demands health care or not and leads to a largely uncomplicated analysis of the demand for health care. However, for our analysis such a strong simplification neglects the valuable data on the types of health care chosen. Hence, in utilising the Ugandan data, we will adopt a multinomial logit approach that not only focuses on the most important decision (whether medical care was sought) but also on what type of medical care is demanded. Although the multinomial logit approach (Li 1996, Bolduc et al. 1996, and Hutchinson 2001) imposes the property of independence of irrelevant alternatives, it has the advantage of implementation ease and enables comparability with previous work.[vi]

Utility,in this instance, therefore depends upon the attributes of health care choice j which varies with both the choices and characteristics of the individual (what Greene, 2000 calls a mixed model). We assume each individual knows which health care facilities are available together with their prices and proximity, and that everyone has access to government owned hospitals i.e. it is not dependant upon individuals making social security payment.[vii] As such the probability that individual i chooses alternative j can therefore be expressed by the following;

$$\text{Prob}[Y_i = j] = \frac{\exp(\alpha' X_{ij} + \beta'_j Z_i)}{\sum_{j=0}^{j} \exp(\alpha' X_{ij} + \beta'_j Zi)}, \quad j = 0,1,2,....,j \qquad (1)$$

Adopting such an approach for the estimation of a discrete model requires supplier specific data such as the price of drugs and travelling distance may mean that there is

missing data or problems in the actual measurement or definition of the prices. However, such problems can largely be overcome by using the median consultancy fee, for those supplier prices which are missing. Furthermore, to avoid problems of selectivity bias and analysing health demand on sub samples of the sick only (Behrman and Phananiramai 1991), we estimate the full sample by adding a fifth category for Yi, namely, "not sick". Therefore to test the robustness of the main results, we cross reference the main findings which will exclude healthy individuals with samples which also include healthy individuals.

b. Previous Econometric Evidence

Of the previous microeconometric analysis which has looked at the main determinants of health seeking behaviour there is relatively little which focuses on Sub Saharan African countries, and that which does has produced quite mixed results, particularly in regard to the effects of direct costs on health care demand. For example, strong significant price effects have been found by several researchers, including; Litvack and Bodart (1993) for Cameroon; Lavy and Germain (1994) for Ghana; and Gertler and Van der Gaag (1990) for Cote d'Ivoire. Futhermore, Ngugi (1999) for Kenya, all of whom found that the introduction of user fees reduced the usage of public health services, particularly for the poor. However, Lacroix and Alilhonou (1982) for Benin, and non African evidence from Akin et al. (1998) in Sri Lanka and The World Bank (1987) research on The Philippines, has suggested price to have relatively little impact on health care demand.

Evidence on the impact of the other main supplier specific variable, distance to health facility, is less mixed and has commonly been found to be an important factor associated with decreases in health care demand.[viii] For instance, negative impacts of the distance on usage of health services have been found by Lavy and Germain (1994), Lavy and Quigley (1995) in Ghana and also Appleton (1998) for Kenya. The latter of these also found distance to have a significantly large, and negative, effect suggesting that the probability of seeking care would increase significantly if accessibility were easier. For income factors, Akin and Hutchinson (1999), found the bypassing of local facilities in favour of higher quality not to be income group sensitive, and that the more seriously ill were likely to travel further than those less ill.[ix] However, analysis by income groups, by Li (1996) for Bolivia and Alderman and

Gertler (1989) for Pakistan, found wealthier households to be more price inelastic.

Of the other factors influencing health care demand, gender and education have commonly been found to be important determinants. Gender disparities in access to health services have been studied in a number of countries. Generally, the time constraints and opportunity costs faced by women are higher than for men thus deterring them from accessing health services to a larger extent. For example, Mwabu et al. (1993) found that distance and user fee were both factors that reduced demand for health care, but men were less constrained than women.. Furthermore, Li (1996) found that Bolivian women were more likely to use medical facilities than men, whilst Chen, Huq and D'Shouza (1981) found that male children in Bangladesh under five years of age were more likely to receive treatment than their female counterparts. Male bias was also found in other parts of Asia by Das Gupta (1987), for rural Punjab, but rarely in the African context. For education there are mixed findings with Wolfe and Behrman (1984) for Nicaragua and Behrman and Wolfe (1987) finding a positive association with health care demand. However, Akin et al.(1998) and Dor and van der Gaag (1988) found that education had no effect on the decision to choose a doctor.

Of the Uganda specific evidence, Hutchinson (2001) provides the only published microeconometric work. He pooled data from early Ugandan household surveys (1992) and found distance and government ownership all had significant negative relationships with seeking care. More specifically he found that for each extra 1km travelled to the health unit, usage fell by approximately 1% and that the poor were more willing to pay a higher price to reduce the time price, and that children in the lowest income quintiles demanded care the least. Deininger and Mpuga (2003) also found user fees to be particularly important in determining access to health services, particularly for the poor, and concluded that more than just the elimination of fees is required. Our investigation helps establish what such factors might be.

c. Data

When analysing health care demand behaviour in Uganda there are several particularly rich data sources upon which microeconometric analysis can be based. These include two Demographic Health Surveys (DHS) and a series of household surveys since 1989. However, the most useful of these is the 1999/2000 Ugandan

National Household Survey (UNHS), which is particularly rich in community and health care data and interviewed 10,696 households, in addition to a community survey which covered 1,086 communities. Surveys either side of the 1999 UNHS are substantially less robust, in terms of health data.

For the dependant variables, in establishing whether and what type of health care has been sought by sick individuals, self reported data will be used, as the quality should be relatively unaffected by the recall period. For example, Deolalikar (1991) found that the utilisation of different health providers for treatment, was remarkably similar when comparing data from three month and one-week recall period. Demand for health care will be measured by whether a person has sought medical treatment for any illness, over the last 30 days and the types of health care sought will be classified into three categories; 1) Private hospital, 2) Government hospital and 3) Drug Store/Pharmacy/Clinic and the residual action category 0) represents when an individual has sought no care.[x]

Of the explanatory variables, for the income (welfare) measure we will adopt the accepted expenditure per equivalence measure, calculated by Appleton (2001). However, the use of consumption may raise some endogeneity concerns. For example, suppose user fees might be higher in areas where household incomes are relatively high (Gertler and van der Gaag 1990).[1] The analysis might show that higher user fees are associated with higher levels of health care utilisation, because of higher income levels. Using a predicted income measure should help control for such problems.

For the supplier specific attributes, the first will represent whether the distance travelled to the health care provider is 'less than 3km'. Price will be the second supplier specific attribute for the choice of health care provider and relates to the consultation fee charged for health care, and was selected as preliminary regressions (Table A3) found this to be the most robust of all the price variables.[xi] For adults, a dummy variable for there being a consultancy fee will be used, whilst for children, the

[1] Gertler and van der Gaag (1990) for Cote d'Ivoire, "found that only 40% of people reporting sickness in the last month sought medical care at a modern health facility, and they tended to be from higher

actual consultation fee paid by the user for the type of service will be used. Furthermore, as preliminary regressions also indicated that variables relating to the demographic structure of the household might impact on the demand for health care. Given this, it was considered prudent to incorporate variables reflecting household composition such as the percentage of women or young people in the household, in addition to some standard variables such as personal education attainment.

3. Descriptive Statistics

In this section we will review some of the descriptive characteristics associated with health care demand, across all age ranges of adults, school and pre school aged children.

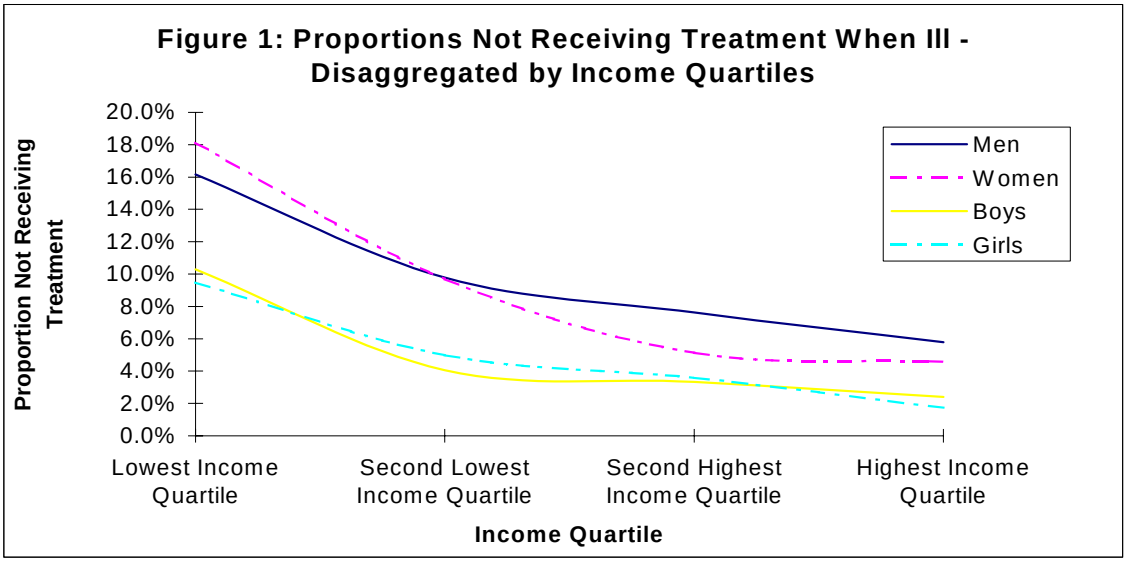
The sample proportions of individuals who, based on their most recent illness, sought health care show that approximately 70% of sick individuals seek health care, rising to 75% for pre school children. Interestingly there are some distinct geographical differences, with an average of seven to 11 percentage points more people seeking health in care in urban areas than in rural areas.

Table 1: Proportion of the Population Seeking Health Care, When Sick.

	Adults		School Aged Children		Pre School Children	
	No	**Yes**	**No**	**Yes**	**No**	**Yes**
All	31.4%	68.6%	30.7%	69.3%	25.3%	74.7%
Urban	25.8%	74.2%	21.5%	78.5%	19.0%	81.0%
Rural	32.7%	67.3%	32.8%	67.2%	26.6%	73.4%
Male	31.3%	68.7%	29.7%	70.3%	25.5%	74.5%
Female	31.4%	68.6%	31.6%	68.4%	25.1%	74.9%

When disaggregating by income levels, both Figure 1 and Table 2 show that higher income levels significantly increase health care demand. This is particularly the case for individuals in the highest income quartile where health care usage is 15-25 percentage points more common than in the lowest income quartile. Furthermore, and as found in Ghana, health care demand by women is disproportionately greater than men, as incomes rise, and appears to indicate that as incomes increase a woman's empowerment in deciding to seek health care also increases.

income household. A similar pattern is observed in many countries" (cited in Strauss and Thomas 1998, p 791).



Increased income levels also appear to be an important influence on the type of health care sought. In particular, traditional health care is used less, and private hospital used more, as an individual's income increases, especially for women in the highest income quartile and for men in the third highest income quartile. For health care usage of children (Table A1), there also appears to be a move away from traditional health care to private as income increases, although this is slightly less pronounced than in the adult samples.

Table 2: Adults - No/Treatment Sought – Reasons and Type of Health Care Used, by Gender and Expenditure Quartile

	Treatment Sought		Reason For No Treatment Sought			Type of Treatment Sought			
Expenditure Quartiles	**No (1)**	**Yes (2)**	**Mild/Other (3)**	**Too Far (4)**	**Too Costly (5)**	**Private Hospital (6)**	**Government Hospital (7)**	**Pharmacy/ Health Centre (8)**	**Traditional /Other (9)**
Male									
1st (Lowest)	39.5%	60.5%	32.8%	12.8%	54.4%	5.4%	27.0%	63.0%	4.7%
2nd	36.6%	63.4%	37.4%	14.2%	48.4%	7.0%	21.6%	68.1%	3.3%
3rd	25.3%	74.7%	44.3%	10.4%	45.3%	10.8%	22.0%	65.0%	2.2%
4th (Highest)	24.6%	75.4%	56.5%	7.0%	36.5%	8.7%	23.2%	66.0%	2.1%
Female									
1st (Lowest)	43.0%	57.0%	30.0%	14.0%	56.0%	7.7%	23.8%	65.3%	3.2%
2nd	34.5%	65.5%	36.9%	8.8%	54.3%	6.1%	21.3%	70.2%	2.3%
3rd	27.3%	72.7%	40.4%	10.4%	49.2%	8.3%	24.4%	65.4%	1.9%
4th (Highest)	20.0%	80.0%	54.7%	5.1%	40.2%	13.7%	14.3%	70.6%	1.4%

Of the reasons for not seeking treatment (Table 2), classifying an illness as being 'too mild' is increasingly stated, the more income an individual has. For example, at least 20 percentage points more people in the highest expenditure quintile classify an

illness as being too mild to seek treatment, compared to individuals in the lowest expenditure quartile. Results which could simply reflect the high opportunity cost of seeking care for high income earners.

Other factors are also important, in particular education appears to have a positive association with seeking health care demand. For both men and women there is a gradual increase in the demand for health care upon completion of some primary education through to university education (Table 3). Men (women) who possess a university education are 11 (18) percentage points more likely to demand formal health care, relative to those with no education. There also appears a quite distinct trend away from government hospital facilities to those privately provided, as the educational attainment of adults increases, potentially supporting Li's (1996) hypothesis for Bolivia, that the educated transfer away from government health care because they regard its quality as inferior.

Table 3: Adults - Treatment Sought? - Reasons and Type of Health Care Used. By Gender and Education

	Treatment Sought		Type of Treatment Sought		
Education Level	**No (1)**	**Yes (2)**	**Private Hospital (3)**	**Government Hospital (4)**	**Pharmacy/ Health Centre (5)**
Male					
All	33%	67%	10%	25%	65%
No Education	39%	61%	9%	32%	59%
Some Primary	34%	66%	10%	23%	67%
Primary Completed	31%	69%	11%	22%	67%
Some Secondary	27%	73%	10%	28%	63%
Secondary Completed	24%	76%	13%	19%	68%
University	22%	78%	14%	17%	69%
Female					
All	32%	68%	10%	24%	66%
No Education	39%	61%	9%	26%	65%
Some Primary	30%	70%	11%	23%	66%
Primary Completed	25%	75%	13%	23%	64%
Some Secondary	25%	75%	11%	21%	68%
Secondary Completed	19%	81%	15%	20%	65%
University	14%	86%	18%	18%	64%

Maternal education is as influential for child health care demand as personal education is for adults, with The completion of maternal secondary education is strongly associated with increases in formal health care demand (Table A2). On average 6 percentage points more children utilise formal health care if their mothers

have some secondary education, compared to children whose mothers have no education.

4. Econometric Results

For the multinomial logit regression results, Tables 4 to 9 provide the findings for all three age samples of adults, school and pre-school children, with the results interpreted in terms of the marginal effects of each variable. Furthermore, as the preliminary results showed some interesting gender differences, and the LR tests rejected pooling, all samples used are disaggregated by gender, with the econometric results for adults being discussed first.

(i) Adults

Focusing firstly on the impact of income and the two supplier specific variables, user fees and distance. In support of the descriptive data we find that increased income levels tend to be slightly more significant in increasing women's demand for health care, compared to men, although the gender differences are only significant for government health care.[xii] Simulations, further compound the appearance that income is particularly important for women. Assuming all individuals below the poverty line have income levels which are at least equal to it, we find that women in particular would increase their demand for government provided care. Re-enforcing the point that women at the lower end of the income appear to be quite restricted to government provided care.

The strength of the income results are furthered when we consider that this predicted income measure passes the tests associated with it being a good measure. Perhaps most importantly the predicted log measure passes the Sargan test (Table A8) which justify the use of the predicted measure of income as opposed to the non instrument approach. In other words sufficiently good instruments have been found to use the predicted measure as opposed to the actual income measure.

Table 4: Health Care Demand for Men - Multinomial Logit Marginal Effects

	No/Self Care (0)		Private Hospital (1)		Government Hospital (2)		Pharmacy/ Health Centre (3)	
Less Than 3km	-0.1029	(-6.155)***	0.0470	(6.155)***	0.0195	(6.155)***	0.0364	(6.155)***
Consultancy Price	-0.0014	(-0.083)	0.0001	(0.083)	0.0003	(0.083)	0.0009	(0.083)
Constant	0.1793	(1.377)	-0.1398	(-3.591)***	-0.2934	(-4.188)***	0.2539	(-0.892)
Age	0.0000	(1.574)	0.0000	(1.831)*	0.0062	(2.212)**	-0.0047	(0.209)
Age squared	-	-	0.0000	(-1.583)	-0.0001	(-1.663)*	-	-
Age of Head	-0.0024	(-1.191)	-0.0008	(0.112)	-0.0007	(0.475)	0.0040	(1.398)
Female Head	-0.0046	(-0.199)	-0.0088	(-0.296)	0.0474	(1.162)	-0.0340	(-0.173)
Household Size	-0.0079	(-3.317)***	0.0018	(2.841)***	0.0008	(2.604)***	0.0054	(3.486)***
Percentage Young	-0.0003	(-0.851)	0.0003	(1.352)	0.0001	(0.751)	-0.0002	(0.557)
Percentage Women	-0.0002	(-0.705)	0.0002	(0.998)	0.0000	(0.517)	-0.0001	(0.521)
Personal Education								
Primary	-0.0019	(-0.671)	0.0010	(0.659)	-0.0001	(0.403)	0.0010	(0.611)
Secondary	-0.0039	(-0.674)	0.0017	(0.655)	0.0035	(0.756)	-0.0013	(-0.494)
University	-0.1570	(-1.787)*	0.0640	(0.048)	-0.0669	(-1.706)*	0.1599	(1.536)
Region								
Urban Central	0.1115	(3.355)***	0.0025	(0.106)	-0.0426	(-1.065)	-0.0714	(-1.499)
Rural Central	0.0728	(3.371)***	0.0276	(1.911)*	-0.0529	(-2.114)**	-0.0475	(-1.545)
Urban East	0.2334	(5.416)***	-0.0233	(-0.886)	0.0225	(0.604)	-0.2326	(-4.611)***
Rural East	0.1915	(6.168)***	-0.0165	(-1.113)	-0.0717	(-3.099)***	-0.1033	(-3.141)***
Urban North	0.0610	(1.493)	0.0099	(0.364)	0.0756	(1.893)*	-0.1466	(-2.666)***
Rural North	0.0487	(2.224)**	-0.0168	(-0.927)	-0.0298	(-1.136)	-0.0021	(-0.064)
Urban West	0.0820	(1.914)*	0.0037	(0.131)	-0.0374	(-0.779)	-0.0483	(-0.837)
Income	-0.0856	(-2.553)**	0.0063	(2.184)**	-0.0217	(1.383)	0.1010	(2.899)***

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level
Defaults: Missed education, rural west; No. of observations - 3126

Table 5: Health Care Demand for Women- Multinomial Logit Marginal Effects

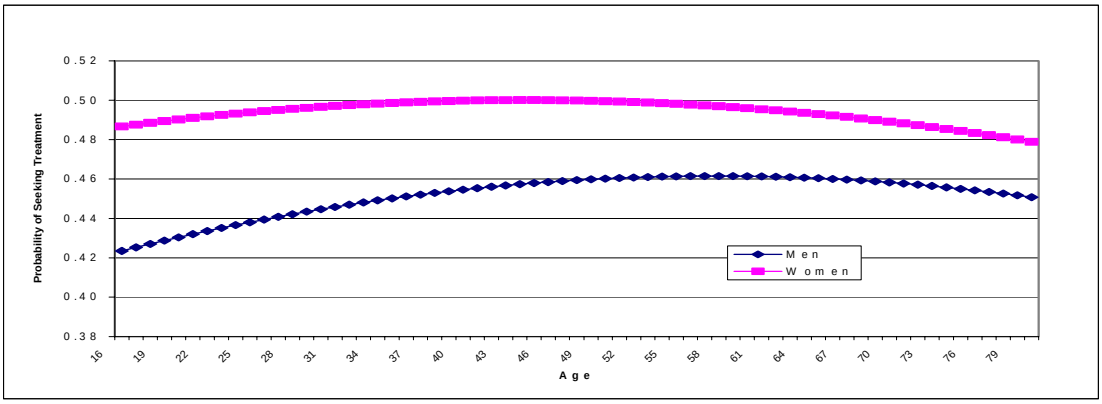
Variable	No/Self Care (0)		Private Hospital (1)		Government Hospital (2)		Pharmacy/ Health Centre (3)	
Less Than 3km	-0.0972	(-6.453)***	0.0413	(6.453)***	0.0191	(6.453)***	0.0368	(6.453)***
Consultancy Price	0.0212	(1.654)*	-0.0016	(-1.654)*	-0.0051	(-1.654)*	-0.0145	(-1.654)*
Constant	-0.0219	(-0.487)	-0.1817	(-3.753)***	-0.0996	(-1.669)*	0.3032	(1.171)
Age	0.0003	(0.475)	-0.0003	(-1.175)	0.0039	(1.844)*	0.0038	(1.664)*
Age squared	-	-	-	-	-0.0000	(-1.915)*	-	-
Age of Head	-0.0015	(-0.931)	0.0019	(1.518)	-0.0035	(-1.244)	0.0031	(1.127)
Female Head	0.0300	(2.489)**	-0.0084	(-1.924)*	0.0218	(1.266)	-0.0435	(-2.928)***
Household Size	-0.0054	(-2.796)***	0.0019	(2.889)***	0.0034	(1.421)	0.0000	(2.491)**
Percentage Young	-0.0004	(-1.866)*	0.0001	(1.252)	-0.0005	(-1.327)	0.0008	(2.274)**
Percentage Women	-0.0001	(-0.582)	0.0001	(0.685)	-0.0004	(-1.073)	0.0004	(0.828)
Personal Education								
Primary	-0.0041	(-1.782)*	0.0032	(2.397)**	-0.0009	(-0.28)	0.0018	(1.672)*
Secondary	-0.0065	(-1.061)	0.0043	(1.332)	-0.0097	(-1.669)*	0.0119	(0.56)
University	0.0447	(0.394)	-0.0052	(-0.167)	-0.1146	(-0.646)	0.0647	(0.213)
Region								
Urban Central	0.1310	(4.319)***	0.0038	(0.232)	-0.0625	(-1.905)*	-0.0723	(-1.817)*
Rural Central	0.0585	(3.266)***	0.0254	(2.357)**	-0.0337	(-1.51)	-0.0502	(-1.904)*
Urban East	0.1766	(5.199)***	-0.0910	(-3.331)***	-0.0158	(-0.496)	-0.0698	(-1.625)
Rural East	0.1821	(6.058)***	-0.0446	(-3.741)***	-0.0510	(-2.462)**	-0.0865	(-2.862)***
Urban North	0.0644	(1.881)*	-0.0501	(-1.6)	0.1030	(2.906)***	-0.1173	(-2.372)**
Rural North	0.0710	(3.756)***	-0.0318	(-2.166)**	-0.0186	(-0.804)	-0.0206	(-0.726)
Urban West	0.0628	(1.783)*	0.0554	(3.548)***	0.0022	(0.059)	-0.1204	(-2.602)***
Income	-0.1058	(-3.367)***	0.0097	(2.632)***	0.0582	(1.891)*	0.0378	(3.483)***

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level
Defaults: Missed education, rural west; No. of observations - 4399

There also appear to be specific gender effects of consultation fees, with women being statistically more likely to reduce health care demand, and increase the likelihood of receiving no care, therefore indicating that access or control over money to get health care by women is particularly important. In contrast, consultation fees appear to have little impact on health care demand of men, as also found by Akin (1986a) for the Philippines. For the second supplier specific variable of whether an individual resides within 3kms of the health care provider results suggest that being close to a health centre is strongly associated with the increased demand for health care. The resulting increase in health care demand is between two percentage points for government hospitals and almost six percentage points for private health. Although empirical work has not always found the relationship to be clear (Akin 1986b),[xiii] such results may at first seem intuitively obvious. In Uganda's case they are also supported by Hutchinson's (1999) findings which used the 1992 Ugandan household data, where it was noted that the majority of the population in rural areas had to walk to the health facility since transport was not readily available. As a result poor families relied more on self-treatment and use of traditional healers.

We also find that other factors, in particular the age of adults, are equally important influencers of health care demand as income and supplier specific variables. For example, Figure 2 highlights how demand for government health care varies across men and women and shows that women have a higher probability of seeking treatment at the cheaper government provided hospitals. More specifically the curves depicting the age effects on government provided health care take the form of an inverse U-shape and the probability of seeking treatment peaks at 44 (57) years for women (men). Most noticeable is the distinct difference in the probability of male and females seeking care prior to old age, and the substantially higher probability of women seeking health care. This is consistent with findings by Appleton (1991) for other African countries (Kenya, Tanzania and Cote d'Iviore) where the probability of females seeking health care increased during the peak child bearing years (16-25 years). However, in this instance it appears that the increase for females also continues into the age ranges when HIV/AIDS incidence is also high (25-40 years), before declining with old age.

Figure 2: Probability of Adults Seeking Government Health Care



Men's demand for government provided health care increases particularly sharply with middle age with the growth out-pacing that of females, hence leading to a narrowing of the gap between genders. As with females, the probability of men seeking government health care starts to decline as they reach old age. Men's demand for private health care monotonically increased with age and possibly reflects that as men age they encounter increasingly serious illnesses that can only be treated by the more 'well equipped' private sector (Figure A1).[xiv]

The effects of personal education appear, at first, to be relatively uninfluential with only six of the 24 coefficients being significant, however, there are some distinct trends worthy of note. For women, increased years of secondary education appears to lead to a shift away from government provided health care towards private health care. Once again, providing support for the proposition made by Li (1996) that the more educated transfer away from government health care because they regard it's quality as inferior. Furthermore, we also find that completing primary education reduces the probability of women not seeking care by 2 percentage points and increases their probability of seeking private health (health centre) care by 2.8 (1.3) percentage points. The results for men also provide support for Li's proposition (1996), with university education significantly associated with decreased demand for both no care or government care (Table 4) and increased usage of health centres.

Spatial variables also capture some interesting gender differences across the geographical regions. For men, the increase in the probability of people not seeking care appears to arise from a reduction in mainly government/health centre provided

care and not private care. For example in the rural Eastern region, a 19 percentage point increase in not seeking care is a result of the 7 (19) percentage point fall in demand for government provided health care (health centre care). For women, the transfer away from government provided services partly consists of decreases in demand for private health care.

b. Children

Analysing both the school and pre-school aged child regression results, Tables 6 to 9 indicate that increased income decreases the probability of school aged boys not seeking care, but not school aged girls, and raises the probability of pre-school boys seeking private care but not pre-school girls. Although this suggests gender differences, and contradicts the philosophy that only 'the wealthy' would have the luxury of 'being equal' to girls, Wald tests show that we can only reject the null, that the boys and girls samples are the same, for individuals not seeking care (school aged children) and for pre-school children seeking private care.

Although the results for the first supplier specific variable indicate that a higher consultation price reduces health care demand, the relationship is not significant and supports Akin's (1999) by-passing hypothesis outlined previously. However, the regression results for living within 3kms of a health centre are more in line with what intuition might suggest with the probability of school aged boys (girls) seeking health care demand, when living within 3kms of the health unit, reducing by up to 12 (11) percentage points. Government health care services are most likely to experience increases in demand with an 8 percentage point increase for boys and a 5 point increase for girls.

Of the non-income and supplier specific variables, and in contrast to the adult results, the effects of age on child health care demand are relatively minor, and the effects of parental education are quite mixed. For example, Table 6 shows paternal education significantly increases private health care demanded for school aged boys but the effects are modest, with each 5 year period of paternal education increasing the probability of school aged boys demanding private health by only 1 percentage point. Maternal education also has little influence on health care demand for boys of both age cohorts.

For pre-school girls, the effect of parental education is dominated by the influence of a mother's primary education, with each additional five year period of maternal primary schooling resulting in a 1.5 percentage point increase in the probability of not seeking care. The effect of increased maternal secondary education on private health care demand, highlighted in the descriptive section, also appears. Each additional year of maternal (and paternal) secondary education increases private health care demand of pre-school girls by approximately 1 percentage point, and adds further evidence which questions the quality of government provided care.

As with the adult regression results there are also some distinct regional variations in the demand for different types of health care. But, in contrast to adults, there are few differences between the results for boys and girls. Perhaps most noticeable is that living in the Eastern region increases the probability of not seeking care by up to 22 (15) percentage points for boys (girls), ceteris paribus. Although the effect is slightly less pronounced for pre-school children, the consequence of increased no/self care is a decrease in demand of all types of formal health care across all child age groups/genders.

Table 6: School Aged Boys - Marginal Effects Health Care Multinomial Logit

Variable	No/Self Care (0)		Private Hospital (1)		Government Hospital (2)		Pharmacy/Health Centre (3)	
Consultancy Price	0.0000	(0.917)	0.0000	(-0.917)	0.0000	(-0.917)	0.0000	(-0.917)
Less Than 3km	-0.0743	(-5.321)***	0.0032	(5.321)***	0.0131	(5.321)***	0.0580	(5.321)***
Constant	-0.8296	(-1.392)	0.3673	(1.244)	0.1964	(0.295)	0.2659	(0.315)
Age	0.1442	(0.761)	-0.1454	(-1.527)	-0.1776	(-0.832)	0.1788	(0.661)
Age squared	-0.0145	(-0.725)	0.0149	(1.501)	0.0206	(0.914)	-0.0210	(-0.739)
Age cubed	0.0005	(0.672)	-0.0005	(-1.453)	-0.0008	(-0.988)	0.0008	(0.813)
Age of head	0.0054	(1.377)	-0.0017	(-0.908)	0.0014	(0.328)	-0.0051	(-0.922)
Female Head	0.0036	(0.155)	0.0010	(0.084)	0.0114	(0.437)	-0.0160	(-0.479)
Age of head squared	0.0000	(-1.044)	0.0000	(0.923)	0.0000	(-0.188)	0.0000	(0.569)
Household size	-0.0001	(-0.047)	0.0030	(2.802)***	-0.0047	(-1.403)	0.0018	(0.454)
Percentage young	0.0004	(0.451)	0.0005	(1.114)	0.0015	(1.518)	-0.0023	(-1.945)*
Percentage women	0.0012	(1.094)	0.0001	(0.177)	0.0026	(2.131)**	-0.0039	(-2.523)**
Parental Education								
Father - Years	-0.0019	(-0.722)	0.0019	(1.641)*	-0.0015	(-0.52)	0.0015	(0.399)
Mother - Years	0.0018	(0.554)	-0.0006	(-0.441)	-0.0011	(-0.335)	-0.0001	(-0.016)
Region								
Urban Central	0.0392	(0.862)	-0.0078	(-0.512)	-0.0220	(-0.538)	-0.0094	(-0.172)
Rural Central	0.0374	(1.312)	-0.0023	(-0.206)	0.0021	(0.077)	-0.0372	(-0.998)
Urban East	0.1548	(3.42)***	-0.0189	(-1.008)	-0.0175	(-0.398)	-0.1184	(-1.994)**
Rural East	0.2220	(6.138)***	-0.0677	(-4.711)***	-0.0766	(-2.751)***	-0.0777	(-1.836)*
Urban North	0.0297	(0.534)	-0.0505	(-1.42)	0.0584	(1.254)	-0.0376	(-0.527)
Rural North	0.0742	(2.456)**	-0.0336	(-1.95)*	-0.0263	(-0.829)	-0.0143	(-0.338)
Urban West	-0.0013	(-0.017)	0.0178	(1.075)	-0.0355	(-0.608)	0.0190	(0.235)
Income	-0.2059	(-3.159)***	0.0322	(1.694)*	-0.0201	(-0.344)	0.1938	(2.748)***

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level
Defaults: Missed education, rural west; No. of observations - 1718

Table 7: School Aged Girls - Marginal Effects Health Care Multinomial Logit

Variable	No/Self Care (0)		Private Hospital (1)		Government Hospital (2)		Pharmacy/Health Centre (3)	
Consultancy Price	0.0000	(1.144)	0.0000	(-1.144)	0.0000	(-1.144)	0.0000	(-1.144)
Less Than 3km	-0.0792	(-6.268)***	0.0041	(6.268)***	0.0128	(6.268)***	0.0623	(6.268)***
Constant	-0.0970	(-0.727)	-0.0420	(-0.578)	-0.1579	(-0.822)	0.2970	(1.432)
Age	0.0065	(0.907)	0.0013	(0.54)	0.0045	(0.145)	-0.0123	(-0.522)
Age of Head	-0.0005	(-0.139)	-0.0022	(-1.019)	0.0006	(0.158)	0.0021	(0.388)
Female Head	0.0278	(1.149)	-0.0180	(-1.244)	0.0408	(1.645)	-0.0507	(-1.504)
Age of Head Squared	0.0000	(0.033)	0.0000	(0.861)	0.0000	(0.379)	0.0000	(-0.635)
Household Size	-0.0023	(-0.829)	0.0024	(1.894)*	0.0010	(0.362)	-0.0011	(-0.277)
Percentage Young	0.0002	(0.201)	-0.0003	(-0.534)	-0.0006	(-0.734)	0.0007	(0.6)
Percentage Women	-0.0003	(-0.273)	0.0007	(1.093)	-0.0030	(-2.502)**	0.0026	(1.624)
Parental Education								
Father - Years	-0.0011	(-0.432)	-0.0013	(-0.908)	0.0026	(0.974)	-0.0002	(-0.051)
Mother - Years	-0.0025	(-0.769)	0.0018	(1.025)	-0.0026	(-0.799)	0.0034	(0.758)
Region								
Urban Central	0.0034	(0.076)	0.0040	(0.211)	0.0059	(0.146)	-0.0132	(-0.236)
Rural Central	-0.0157	(-0.489)	-0.0056	(-0.353)	0.0088	(0.295)	0.0125	(0.305)
Urban East	0.1417	(3.399)***	-0.0539	(-1.787)*	0.0439	(1.157)	-0.1317	(-2.334)**
Rural East	0.2077	(5.771)***	-0.0490	(-3.203)***	-0.0103	(-0.392)	-0.1484	(-3.662)***
Urban North	-0.1167	(-1.581)	0.0017	(0.063)	0.0931	(2.097)**	0.0219	(0.277)
Rural North	0.0789	(2.512)**	0.0018	(0.115)	-0.0413	(-1.187)	-0.0394	(-0.91)
Urban West	0.0193	(0.34)	0.0146	(0.697)	-0.0067	(-0.129)	-0.0273	(-0.387)
Income	-0.0334	(-0.58)	0.0131	(0.603)	0.0621	(1.263)	-0.0418	(-0.569)

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level
Defaults: Missed education, rural west; No. of observations - 1670

Table 8: Pre School Boys - Marginal Effects Health Care Multinomial Logit

Variable	No/Self Care (0)	Private Hospital (1)	Government Hospital (2)	Pharmacy/ Health Centre (3)
Consultancy Price	0.0000 (0.671)	0.0000 (-0.671)	0.0000 (-0.671)	0.0000 (-0.671)
Less Than 3km	-0.0614 (5.289)***	0.0045 (5.289)***	0.0119 (5.289)***	0.0450 (5.289)***
Constant	0.2334 (-3.254)***	-0.0611 (-1.216)	0.0259 (0.318)	0.2690 (3.779)***
Age	0.0305 (2.25)**	-0.0084 (-1.783)*	-0.0225 (-2.415)**	0.0004 (-1.978)**
Age of Head	0.0046 (1.802)*	-0.0030 (-2.305)**	-0.0038 (-2.045)**	0.0022 (1.391)
Female Head	0.0176 (1.03)	-0.0045 (-0.708)	0.0252 (0.091)	-0.0382 (-1.263)
Age of Head Squared	0.0000 (-1.722)*	0.0000 (2.481)**	0.0000 (2.127)**	- -
Household Size	-0.0020 (-0.903)	0.0040 (2.458)**	0.0065 (2.161)**	-0.0086 (0.061
Percentage Young	-0.0001 (-0.196)	0.0009 (1.742)*	0.0000 (0.125)	-0.0008 (-0.096)
Percentage Women	0.0000 (-0.017)	-0.0004 (-0.942)	-0.0016 (-1.781)*	0.0020 (0.818)
Parental Education				
Fathers Primary	0.0003 (0.121)	-0.0041 (-1.481)	0.0026 (0.388)	0.0012 (-0.024)
Fathers Secondary	0.0043 (0.754)	-0.0003 (-0.446)	-0.0082 (-1.248)	0.0041 (-0.509)
Fathers University	0.0365 (0.398)	-0.0160 (-0.021)	0.0951 (0.322)	-0.1476 (-0.609)
Mothers Primary	0.0006 (0.211)	0.0005 (0.077)	-0.0082 (-1.521)	0.0070 (0.228)
Mothers Secondary	0.0061 (0.704)	0.0089 (1.479)	0.0106 (0.186)	-0.0256 (-0.755)
Mothers University	-0.0307 (-1.742)*	-0.0584 (-0.794)	-0.0678 (-1.344)	0.0401 (1.801)*
Region				
Urban Central	0.0501 (1.436)	-0.0498 (-2.119)**	-0.0255 (-1.405)	0.0252 (-1.114)
Rural Central	0.0203 (0.909)	0.0184 (0.441)	-0.0061 (-0.469)	-0.0448 (-1.125)
Urban East	0.0794 (2.399)**	-0.0614 (-2.662)***	-0.0005 (-1.691)*	-0.0184 (-2.251)**
Rural East	0.1351 (5.044)***	-0.0125 (-4.122)***	-0.0634 (-6.302)***	-0.0593 (-6.768)***
Urban North	0.0507 (1.213)	-0.0348 (-1.322)	-0.0534 (-0.143)	-0.0693 (-1.328)
Rural North	0.0561 (2.376)**	-0.0057 (-1.442)	-0.0092 (-1.873)*	-0.0412 (-2.441)**
Urban West	0.0570 (1.128)	0.0062 (-0.503)	-0.0512 (-1.291)	-0.0121 (-1.006)
Income	-0.1558 (-2.595)***	0.1123 (4.532)***	0.0788 (2.786)***	-0.0353 (2.239)**

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level
Defaults: Missed education, rural west; No. of observations - 2251

Table 9: Pre School Girls - Marginal Effects Health Care Multinomial Logit

Variable	No/Self Care (0)	Private Hospital (1)	Government Hospital (2)	Pharmacy/ Health Centre (3)
Consultancy Price	0.0000 (0.315)	0.0000 (-0.315)	0.0000 (-0.315)	0.0000 (-0.315)
Less Than 3km	-0.0608 (-5.351)***	0.0035 (5.351)***	0.0103 (5.351)***	0.0467 (5.351)***
Constant	-0.2435 (-3.29)***	-0.0559 (-1.125)	-0.0719 (-0.791)	0.3713 (3.316)***
Age	0.0100 (2.145)**	-0.0038 (-1.231)	-0.0236 (-1.451)	0.0173 (1.259)
Age of Head	0.0034 (1.408)	-0.0011 (-0.612)	-0.0009 (-0.257)	-0.0014 (-0.328)
Female Head	0.0362 (2.077)**	-0.0128 (-0.897)	0.0402 (1.762)*	-0.0635 (-2.184)**
Age of Head Squared	-0.0024 (-1.009)	0.0035 (2.562)**	0.0075 (2.767)***	-0.0087 (-2.33)**
Household Size	0.0005 (0.952)	-0.0002 (-0.617)	-0.0008 (-1.229)	0.0006 (0.671)
Percentage Young	0.0005 (1.169)	-0.0002 (-0.533)	-0.0004 (-0.697)	0.0001 (0.194)
Percentage Women				
Parental Education				
Fathers Primary	-0.0003 (-0.121)	-0.0053 (-2.639)***	0.0023 (0.617)	0.0034 (0.762)
Fathers Secondary	0.0008 (0.144)	0.0080 (2.232)**	-0.0049 (-0.701)	-0.0040 (-0.453)
Fathers University	0.0259 (0.344)	-0.0431 (-0.687)	-0.0373 (-0.351)	0.0545 (0.418)
Mothers Primary	0.0150 (1.706)*	-0.0150 (-2.472)**	0.0093 (0.185)	-0.0094 (-2.057)**
Mothers Secondary	-0.0083 (-1.184)	0.0122 (2.159)**	0.0031 (1.153)	-0.0070 (-0.562)
Mothers University	-0.1394 (-0.853)	0.1237 (1.522)	-0.1390 (-0.776)	0.1547 (1.428)
Region				
Urban Central	-0.0094 (-0.281)	-0.0072 (-0.347)	0.0211 (0.614)	-0.0045 (-0.095)
Rural Central	-0.0332 (-1.515)	0.0168 (1.265)	-0.0184 (-0.712)	0.0347 (1.059)
Urban East	0.0594 (1.913)*	-0.0818 (-2.308)**	0.0008 (0.022)	0.0215 (0.415)
Rural East	0.1035 (4.561)***	-0.0272 (-1.969)**	-0.0488 (-2.124)**	-0.0275 (-0.876)
Urban North	0.0001 (0.002)	0.0034 (0.125)	-0.0046 (-0.096)	0.0011 (0.017)
Rural North	0.0286 (1.328)	0.0005 (0.032)	-0.0248 (-0.9)	-0.0043 (-0.124)
Urban West	0.0418 (0.954)	0.0334 (1.433)	-0.1386 (-1.767)*	0.0634 (0.781)
Income	-0.1278 (-2.408)**	0.0306 (1.272)	-0.0116 (-0.233)	0.1089 (1.642)

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level
Defaults: Missed education, rural west; No. of observations - 2285

5. Conclusion

Understanding the determinants of health care demand provides a basis upon which governments can reform health policy. This is particularly important in poor countries, such as Uganda, where large proportions of households are below the poverty line and policy changes, such as introducing user fees, can have a huge impact on demand, and government objectives of recovering cost or increasing allocative efficiency. Using Uganda's richest, health orientated, household data this paper investigates the significance of income and user fees in determining health care demand in Uganda, relative to other factors. By analysing such factors across both age and gender we are able to provide the most comprehensive investigation of health seeking behaviour in Uganda, helping move the debate beyond what has commonly been a user fee dominated policy environment.

Overall, the demand analysis suggests that the distance travelled to health centres is just as important as much of the previous developing country literature has highlighted. Suggesting that for Uganda, the use of more localised clinics that offer a higher level of care, may be a feasible alternative to centralised units which cater for large numbers of people and that future policies aimed at lowering travel costs would have substantial marginal benefits.

Although income is strongly associated with increased health care demand, for all age ranges but especially for women, the impact of user fees on health care demand is in line with the rather mixed findings from the general literature. Only for women was the presence of a fee significant in reducing probability of seeking health care, evidence which is supported by provisional findings from the 2002/03 household data, which suggests that the abolition of cost sharing has coincided with an increase in women's demand for government provided health care, more than for men.

However, this paper has also demonstrated that despite the government's main focus on user fee reduction, there are other principal factors that are important in the influence of health care demand. In particular, there are significant gender differences, when considering the impact of age on health care demand. Men increasingly use private care as they age, whilst women have an overall higher demand of government

care than men, especially during the 'HIV/AIDS years'. This partly reflects the importance of income and user fees on women's decision to seek health care, and because of such factors women appear to be somewhat restricted to government provided health care, particularly those in the lowest income quartiles. In spite of this, increased levels of education, for both men and women, are associated with a significant transfer away from government health care, indicating government provided care to be of an inferior quality.

From a broader perspective, and in considering pertinent extensions to this research, given the interesting gender differences associated with health seeking behaviour this deserves further attention. For instance, it would be of particular interest to extend the analysis to include variables which indicate control or access over funds i.e. identify to what extent intrahousehold allocation plays a part in determining health care demand. This is especially interesting, given that preliminary evidence from Uganda's Demographic Health Survey (2000) indicates lack of control over money to be a major factor inhibiting seeking health care. In considering further extensions to this work, we also acknowledge we have not considered price changes or provider fee schedules. Therefore, one extension also be to complement household data with the use of supplier specific data.

6. Appendix

Table A1: School and Pre School Children - No/Treatment Sought - Reasons and Type of Health Care Used. By Gender and Expenditure Quartile

	Treatment Sought		Reason For No Treatment Sought			Type of Treatment Sought			
Expenditure Quartiles	No	Yes	Mild/Other	Too Far	Too Costly	Government/ Hospital	Private Hospital	Clinic/Health Centre/ Dispensary	Traditional/ Other
School Aged Children									
Boys									
1st (Lowest)	41.7%	58.3%	34.1%	14.3%	51.6%	17.3%	3.5%	74.8%	4.3%
2nd	33.7%	66.3%	37.7%	8.7%	53.6%	19.9%	7.0%	69.7%	3.3%
3rd	28.2%	71.8%	49.6%	13.2%	37.2%	21.1%	4.5%	71.8%	2.6%
4th (Highest)	15.8%	84.2%	60.0%	5.7%	34.3%	16.0%	8.8%	73.8%	1.3%
Girls									
1st (Lowest)	44.3%	55.7%	37.4%	11.0%	51.6%	19.7%	4.4%	73.4%	2.6%
2nd	32.4%	67.6%	35.9%	10.6%	53.5%	16.2%	6.1%	75.3%	2.4%
3rd	28.9%	71.1%	52.9%	14.9%	32.2%	18.9%	4.4%	76.1%	0.7%
4th (Highest)	20.5%	79.5%	62.7%	4.8%	32.5%	12.8%	10.0%	76.3%	0.9%
Pre - School Children									
Boys									
1st (Lowest)	34.3%	65.7%	37.6%	15.2%	47.2%	18.5%	7.1%	74.3%	2.1%
2nd	28.5%	71.5%	41.0%	13.5%	45.5%	17.3%	7.1%	75.5%	2.0%
3rd	22.8%	77.2%	45.7%	14.7%	39.5%	21.8%	6.0%	72.3%	1.4%
4th (Highest)	17.0%	83.0%	61.9%	8.2%	29.9%	17.8%	9.1%	73.1%	1.1%
Girls									
1st (Lowest)	32.6%	67.4%	32.4%	15.4%	52.2%	15.6%	7.2%	77.1%	0.8%
2nd	29.1%	70.8%	37.4%	15.2%	47.4%	17.3%	6.0%	76.7%	0.5%
3rd	24.3%	75.7%	47.8%	13.0%	39.1%	17.9%	6.3%	75.9%	1.4%
4th (Highest)	14.7%	85.3%	59.5%	10.7%	29.8%	17.1%	8.8%	74.1%	1.2%

Table A2: School and Pre School Aged Children - No/Treatment Sought - Reasons and Type of Health Care Used. By Sex and Maternal Education

	Treatment Sought		Type of Treatment Sought		
Education Level	No	Yes	Government/ Hospital	Private Hospital	Clinic/Health Centre/ Dispensary
School Aged Children					
Boys					
All	31%	69%	8%	19%	73%
No Education	36%	64%	7%	18%	75%
Some Primary	32%	68%	8%	24%	68%
Primary Completed	26%	74%	9%	18%	73%
Some Secondary	28%	72%	9%	11%	80%
Secondary Completed	21%	79%	8%	10%	82%
University	20%	80%	7%	9%	84%
Girls					
All	32%	68%	7%	17%	76%
No Education	34%	66%	5%	19%	77%
Some Primary	36%	64%	10%	18%	72%
Primary Completed	27%	73%	7%	15%	78%
Some Secondary	29%	71%	6%	16%	78%
Secondary Completed	21%	79%	10%	18%	72%
University	23%	100%	8%	17%	75%
Pre-School Children					
Boys					
All	27%	73%	9%	20%	71%
No Education	30%	70%	8%	22%	71%
Some Primary	27%	73%	10%	20%	70%
Primary Completed	23%	77%	9%	18%	73%
Some Secondary	21%	79%	8%	22%	69%
Secondary Completed	20%	80%	13%	21%	66%
University	19%	81%	10%	20%	70%
Girls					
All	26%	74%	8%	18%	75%
No Education	27%	73%	7%	17%	76%
Some Primary	27%	73%	7%	16%	77%
Primary Completed	25%	75%	9%	17%	74%
Some Secondary	22%	78%	6%	18%	75%
Secondary Completed	24%	76%	10%	22%	68%
University	22%	78%	10%	19%	71%

Table A3: OLS Regression Coefficients of Consultancy Price as a Percentage of Total Health Expenditure – Adults, School Aged Children and Pre School Children.

Variable	Adults Obs 4393 R-squared=.092033		School Aged Children Obs 2092 R-squared=.070723		Children Less Than 5 Years of Age Obs 4536 R-squared=.082033	
Constant	-119741.211	(-17.206)***	-149739.380	(-10.187)***	-65828.052	(-10.884)***
Sex	-955.717	(-1.845)*	215.157	(0.222)	-66.691	(-0.142)
Age	-36.643	(-2.041)**	71.067	(0.378)	-133.908	(-0.912)
Age of head	52.530	(2.487)**	-73.884	(-1.535)	7.434	(0.564)
Female head	-411.723	(-0.665)	-1615.322	(-1.321)	-1156.583	(-1.774)*
Household size	1234.722	(12.616)***	1627.691	(8.639)***	567.324	(6.992)***
Percentage young	30.591	(2.359)**	-0.561	(-0.015)	38.431	(1.952)*
Percentage women	-24.465	(-1.464)	-51.714	(-0.697)	-16.438	(-0.346)
Personal Education						
Primary	13.383	(0.132)	-	-	-	-
Secondary	-134.435	(-0.521)	-	-	-	-
University	-6682.170	(-0.736)	-	-	-	-
Parental Education						
Fathers Primary	-	-	-698.533	(-3.398)***	-264.271	(-2.502)**
Fathers Secondary	-	-	1151.089	(2.711)***	-166.178	(-0.868)
Fathers University	-	-	-14536.203	(-2.11)**	-1426.349	(-0.479)
Mothers Primary	-	-	-169.302	(-0.854)	3.682	(0.036)
Mothers Secondary	-	-	976.131	(1.42)	-918.455	(-3.206)***
Mothers University	-	-	-10928.221	(-0.496)	-3824.521	(-0.746)
Region						
Urban Central	-5076.069	(-3.471)***	5491.399	(1.784)*	-4506.696	(-3.655)***
Rural Central	-2232.696	(-2.791)***	-2539.343	(-1.523)	-3467.051	(-4.222)***
Urban East	-3177.170	(-2.697)***	5989.796	(2.334)**	-1726.901	(-1.462)
Rural East	-5808.116	(-9.091)***	-5701.563	(-4.448)***	-3715.325	(-5.322)***
Urban North	-1442.208	(-0.974)	-7460.016	(-2.519)**	-3714.949	(-2.441)**
Rural North	-1277.928	(-1.518)	-713.408	(-0.412)	-1628.816	(-1.858)*
Urban West	-2872.221	(-1.779)*	1417.777	(0.394)	-5597.167	(-3.007)***
Malaria drugs	-805.703	(-0.282)	-493.035	(-0.108)	7.505	(1.142)
Antibiotics	-1930.338	(-1.691)*	-2086.766	(-0.879)	-7.129	(-1.082)
Malaria price	-1.358	(-3.421)***	-0.663	(-0.886)	-0.365	(-0.853)
Consultancy price (dummy)	210.708	(6.615)***	-	-	-	-
Consultancy price	-	-	1.741	(3.441)***	0.262	(1.213)
Antibiotic price	2.354	(0.324)	-2.371	(-1.322)	0.474	(0.042)
Less Than 3km To Health Unit	1696.079	(2.858)***	775.290	(0.623)	-155.957	(-0.259)
Assets						
Cultivatable Land	289.443	(2.465)**	527.475	(1.263)	-204.557	(-1.237)
Value of Electrical Goods	-0.857	(-3.39)***	-0.148	(-1.879)*	-0.008	(-4.062)***
Bicycle Value	-0.286	(-4.261)***	0.142	(1.038)	-0.006	(-1.358)
Chicken Value	0.521	(7.246)***	0.742	(0.357)	0.017	(1.511)

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

Table A4: Multinomial Logit (Including healthy individuals) Marginal Effects - Male Adults

Variable	No/Self Care (0)		Private Hospital (1)		Government Hospital (2)		Pharmacy/Health Centre (3)		Healthy (4)	
Less3km	-0.2064	(-5.143)***	0.0026	(5.143)***	0.0072	(5.143)***	0.0226	(5.143)***	0.1739	(5.143)***
Consultancy Price	-0.0009	(-0.19)	0.0000	(0.190)	0.0000	(0.190)	0.0001	(0.190)	0.0007	(0.190)
Dummy										
Constant	-0.0933	(-6.053)***	-0.0553	(-6.152)***	-0.1254	(-8.756)***	-0.1706	(-6.882)***	0.4446	(13.726)***
Age	0.0007	(1.437)	0.0009	(2.910)***	0.0021	(4.388)***	0.0025	(2.889)***	-0.0063	(-5.609)***
Age squared	0.0000	(0.584)	0.0000	(-1.818)*	0.0000	(-2.320)**	0.0000	(-0.567)	0.0000	(1.661)*
Age of head	-0.0007	(-1.039)	-0.0006	(-1.488)	-0.0002	(-0.291)	0.0001	(0.119)	0.0013	(0.896)
Female head	-0.0039	(-0.629)	-0.0011	(-0.294)	0.0054	(0.969)	-0.0113	(-1.121)	0.0109	(0.861)
Household size	-0.0040	(-5.979)***	0.0001	(0.208)	-0.0008	(-1.489)	-0.0023	(-2.411)**	0.0071	(5.741)***
Percentage young	-0.0003	(-2.977)***	0.0000	(0.361)	-0.0001	(-1.287)	-0.0004	(-2.794)***	0.0008	(4.029)***
Percentage women	-0.0003	(-2.637)***	0.0000	(0.266)	-0.0002	(-1.623)	-0.0004	(-1.776)*	0.0008	(3.142)***
Personal Education										
Primary	-0.0007	(-0.919)	0.0002	(0.476)	0.0001	(0.113)	0.0012	(0.946)	-0.0008	(-0.467)
Secondary	-0.0043	(-2.587)***	-0.0002	(-0.273)	-0.0011	(-0.791)	-0.0045	(-1.941)*	0.0101	(3.312)***
University	-0.0452	(-1.858)*	0.0138	(1.822)*	-0.0122	(-0.501)	0.0118	(0.319)	0.0318	(0.680)
Region										
Urban Central	0.0202	(2.331)**	0.0001	(0.032)	-0.0091	(-1.243)	-0.0181	(-1.473)	0.0069	(0.425)
Rural Central	0.0156	(2.68)***	0.0035	(1.332)	-0.0105	(-2.273)**	-0.0192	(-2.312)**	0.0106	(0.976)
Urban East	0.0635	(7.855)***	-0.0016	(-0.327)	0.0126	(1.881)*	-0.0134	(-0.982)	-0.0612	(-3.573)***
Rural East	0.0696	(12.408)***	0.0008	(0.276)	-0.0013	(-0.307)	0.0148	(1.939)*	-0.0838	(-8.171)***
Urban North	0.0150	(1.257)	0.0027	(0.547)	0.0169	(2.394)**	-0.0182	(-1.134)	-0.0164	(-0.796)
Rural North	0.0183	(2.837)***	-0.0015	(-0.446)	-0.0013	(-0.266)	0.0087	(0.990)	-0.0241	(-2.046)**
Urban West	0.0041	(0.334)	-0.0003	(-0.064)	-0.0070	(-0.780)	-0.0149	(-0.990)	0.0181	(0.885)
Income	-0.0328	(-2.607)***	0.0038	(0.771)	-0.0004	(-0.092)	0.0115	(1.519)	0.0179	(1.681)*

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

Table A5: Multinomial Logit (Including healthy individuals) Marginal Effects - Female Adults

Variable	No/Self Care (0)		Private Hospital (1)		Government Hospital (2)		Pharmacy/Health Centre (3)		Healthy (4)	
Less3km	-0.2787	(-6.579)***	0.0050	(6.579)***	0.0142	(6.579)***	0.0416	(6.579)***	0.2179	(6.579)***
Consultancy Price	0.0084	(1.731)*	-0.0002	(-1.731)*	-0.0004	(-1.731)*	-0.0012	(-1.731)*	-0.0065	(-1.731)*
Dummy										
Constant	-0.1021	(-5.300)***	-0.0725	(-6.008)***	-0.0969	(-5.044)***	-0.1611	(-4.906)***	0.4326	(10.402)***
Age	0.0013	(2.632)***	0.0007	(2.315)**	0.0025	(4.671)***	0.0056	(6.086)***	-0.0101	(-8.877)***
Age squared	0.0000	(0.248)	0.0000	(-1.339)	0.0000	(-3.171)***	0.0000	(-3.596)***	0.0001	(4.602)***
Age of head	-0.0016	(-2.495)**	0.0001	(0.243)	-0.0015	(-2.137)**	-0.0026	(-2.196)**	0.0056	(3.816)***
Sex of head	0.0133	(2.911)***	-0.0010	(-0.367)	0.0064	(1.344)	-0.0119	(-1.450)	-0.0068	(-0.667)
Household size	-0.0041	(-6.001)***	0.0000	(-0.091)	-0.0009	(-1.518)	-0.0046	(-4.290)***	0.0096	(7.379)***
Percentage young	-0.0003	(-2.355)**	0.0000	(-0.640)	-0.0003	(-2.607)***	-0.0001	(-0.520)	0.0008	(2.785)***
Percentage women	0.0000	(0.014)	0.0000	(-0.091)	-0.0001	(-0.944)	0.0003	(1.032)	-0.0001	(-0.387)
Personal Education										
Primary	-0.0010	(-1.242)	0.0008	(1.746)*	-0.0001	(-0.138)	0.0019	(1.386)	-0.0016	(-0.920)
Secondary	-0.0002	(-0.075)	-0.0011	(-0.977)	-0.0034	(-1.675)*	0.0007	(0.216)	0.0040	(0.955)
University	0.0389	(0.877)	0.0112	(0.624)	-0.0209	(-0.437)	0.0466	(0.807)	-0.0759	(-0.935)
Region										
Urban Central	0.0242	(2.727)***	0.0000	(0.011)	-0.0213	(-2.522)**	-0.0388	(-2.912)***	0.0358	(2.122)**
Rural Central	0.0140	(2.226)**	0.0043	(1.511)	-0.0139	(-2.425)**	-0.0361	(-3.833)***	0.0316	(2.657)***
Urban East	0.0783	(8.568)***	-0.0174	(-2.250)**	0.0110	(1.360)	0.0277	(2.003)**	-0.0995	(-5.370)***
Rural East	0.0866	(12.487)***	-0.0074	(-2.208)**	0.0000	(-0.006)	0.0135	(1.584)	-0.0927	(-8.031)***
Urban North	0.0109	(0.848)	-0.0136	(-1.592)	0.0218	(2.558)**	-0.0324	(-1.775)*	0.0134	(0.581)
Rural North	0.0314	(4.889)***	-0.0088	(-2.180)**	-0.0034	(-0.577)	-0.0087	(-0.880)	-0.0105	(-0.823)
Urban West	-0.0072	(-0.530)	0.0145	(3.531)***	-0.0057	(-0.600)	-0.0434	(-2.560)**	0.0417	(1.938)*
Income	-0.0503	(-4.048)***	0.0085	(1.682)*	-0.0048	(-0.475)	0.0191	(1.876)*	0.0276	(2.249)**

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

Figure A1: Probability of Men Seeking Private Health Care

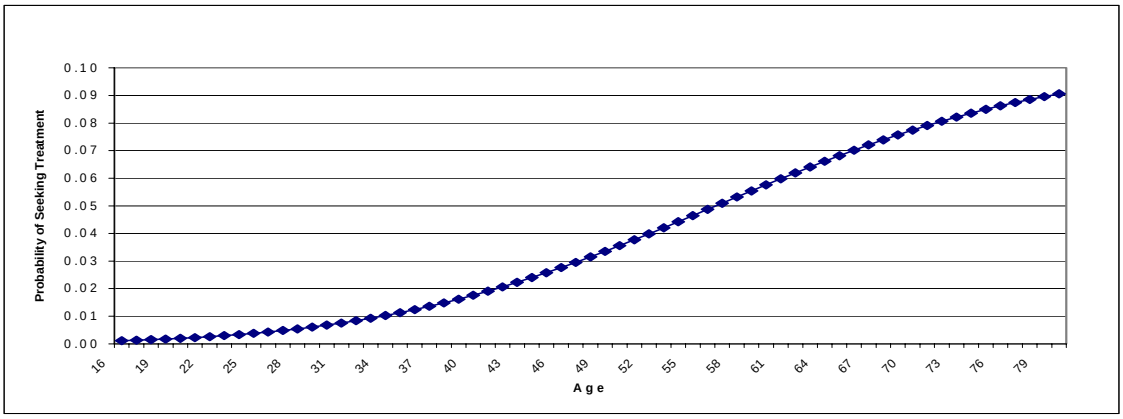


Table A6: Likelihood Ratio (LR) Test – Justification of Adult and Child Split Samples

	Test	p-value	df (x)
Health Care Demand			
Adults	71.4	0.218	63 df
School Aged Children	88.25	0.019	63 df
Children Less than 5 years	96.4	0.049	75 df

Note:- Test statistics asymptotically distributed as chi sq, with x df under the null hypothesis that the samples are equal

Table A7: Wald Tests

	Adults		**School Aged Children Private (No) Health Care**		**Pre-School Children No (Private) Health Care**	
	Test	p-value	Test	p-value	Test	p-value
Consultancy Price	43.904	0	-	-	-	-
Fathers Primary education	-	-	2.825	0.09	2.871	0.09
Maternal Primary education	-	-	-	-	1.163	0.28
Income	-	-	1.15 (3.93)	0.28 (0.047)	0.19 (4.37)	0.66 (0.036)

Note:- Test statistics asymptotically distributed as chi sq, with 1 df under the null hypothesis that the samples are equal

Table A8: Results on Log of Consumption

	Adult
Overidentification Test	9.6 (df=9) (pass)
Hausman Test on log of expenditure	p=7.41
Instruments (10)	Room pae, Cultivatable Land pae, Value of Electrical Goods, Value of Bicycles, Value of Chickens/Livestock, Solar as lighting ,Gas as lighting ,Charcoal as Cooking, Parafin as Cooking, Electricity as Cooking
	School Aged Children
Overidentification Test	6.61 (df=5) (pass)
Hausman Test on log of expenditure	p=5.11
Instruments (6)	Room pae, Cultivatable Land pae, Value of Electrical Goods, Charcoal as Cooking, Parafin as Cooking, Electricity as Cooking
	Pre School Children
Overidentification Test	12.89 (df=6) (pass)
Hausman Test on log of expenditure	p=6.43
Instruments (7)	Cultivatable Land pae, Value of Electrical Goods, Value of Bicycles, Value of Chickens/Livestock, Electricity as lighting, Candle as lighting, Parafin as cooking

Table A9: Descriptive Statistics

	Adults		**School Aged Children**		**Pre-School Children**	
Variable	**Mean**	**St. Dev**	**Mean**	**St. Dev**	**Mean**	**St. Dev**
Age	33.608	16.590	9.809	2.614	28.185	16.876
Age of Household Head	45.793	15.620	45.426	13.657	38.678	13.155
Sex of Household Head	0.214	0.410	0.238	0.426	0.178	0.382
Household Size	6.880	4.197	8.032	3.870	7.162	3.508
Primary	4.092	2.813	-	-	-	-
Secondary	0.626	1.410	-	-	-	-
University	0.005	0.068	-	-	-	-
Father primary	-	-	4.437	2.828	4.654	2.685
Father secondary	-	-	0.747	1.529	0.707	1.494
Father university	-	-	0.020	0.100	0.015	0.079
Mother primary	-	-	3.084	2.938	3.501	2.843
Mother secondary	-	-	0.288	0.963	0.315	0.976
Mother university	-	-	0.013	0.034	0.012	0.025
Urban Central	0.079	0.27	0.068	0.252	0.064	0.244
Rural Central	0.193	0.395	0.208	0.406	0.199	0.399
Urban East	0.057	0.232	0.050	0.218	0.046	0.209
Rural East	0.208	0.406	0.210	0.407	0.255	0.436
Urban North	0.035	0.185	0.031	0.172	0.030	0.170
Rural North	0.130	0.336	0.137	0.344	0.139	0.346
Urban West	0.043	0.203	0.039	0.193	0.031	0.173
Rural West	0.254	0.435	0.258	0.438	0.237	0.425
Distance to clinic	3.951	5.411	3.985	4.904	4.227	5.977

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[i] As at 2002, headcount poverty in Uganda stands at 38.9%.

[ii] Health expenditure fell from 8% of government expenditure in 1977 to 2% in 1986.

[iii] Expansion of the number of health facilities increasing the populations proximity to health centres to 49% of the population being within 5km of a health unit which offered preventative and curative care (Hutchinson 2001). Approximately two thirds of all modern health facilities are government owned, and much of the expansion took place in the latter years of the 1972-96 period.

[iv] The HSSP is estimated to cost US$ 954 million over 5 years. Specific health targets include reducing; IMR from .97 to .68, Under 5 Child Mortality Rate from 147 to .103 per 100 live births, Maternal Mortality Rate from 506 to 354 per 100,000 live births, Levels of HIV (9.7% prevalence as at 2000) by 25%, Total Fertility Rate from 6.9 to 5.4 and stunting due to malnutrition in under 5's from 38% to 28% (HSSP 2000a).

[v] Such a maximisation reveals a health care reduced form which is a function of local infrastructure that affects demand for labour (I), and unosbservables such as ability or school quality (α), regional health

specific variable (u), individuals health endowment (λ), and observable personal characteristics (d) and price characteristics (P), for example $H^i = H(P_c, P_z, T, u, I, d^i, \alpha^i \lambda^i)$ (1).

[vi] That is to say, it implies that if an alternative choice of health provider is introduced, then all the selection probabilities would be reduced proportionately (Bolduc et al. 1996). One alternative to the multinomial logit model which avoids this drawback is the multinomial probit. This type of specification provides the most general framework for the study of discrete choice models as it allows correlation's between all alternatives. However, there is a problem in the dimensionality of the response probabilities and the method is computationally extremely resource intensive. Such a methodology was attempted but the computer did not have sufficient memory capacity to successfully run the regressions.

[vii] "This assumption is crucial in multinomial logit model specification. However, in a survey done in Zaire, Bitran (1990) found that most respondents claimed either not to know anything about alternatives made or to have only a vague idea about the choice characteristics. Bitran said that some respondents, were able to provide some ordinal information about distances and prices e.g. provider X is farther away and less expensive than Y", p9 Li (1996).

[viii] There is relatively little evidence suggesting distance is not of influence on health care demand. Akin et al.. (1995) was one such paper, although they explained the lack of negative significance as being due to their sample probably not reaching the threshold at which distance would become significant.

[ix] The affect of ill people was accentuated for the poor, who were willing to travel even further – in effect substituting less costly time for money by searching a wide area for care. Price and service quality had the expected effects.

[x] For brevity we refer to options (1), (2) and (3) as private and government care and clinic, respectively. In practice option (3) represents care by a mixture of providers, some private and some government – unfortunately the data available does not permit a disaggregation by owner by sector.

[xi] Preliminary regressions included a combination of medical prices such as antibiotics, malaria price and consultation fee which was the most influential.

[xii] It should be noted that we use predicted rather than actual consumption, using instruments whose validity is not rejected by the Sargan tests (Table A8).

[xiii] Akin (1986b), for the Philippines, suggested one possible explanation for distance not being significant was the existence of a threshold distance which was commonly not reached in their sample.

[xiv] For 30-50 year old adult males who seek treatment for malaria, 7% attend private hospital, 16% attend government hospital, and 77% attend health centre. For 51-70 year olds 19% attend private hospital, 17% attend government hospital, and 64% attend the health centre.