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DEMAND FOR HEALTH CARE SERVICES IN UGANDA IMPLICATIONS FOR POVERTY REDUCTION

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Abbreviations and Acronyms

AIDS	Acquired Immunodeficiency Syndrome
GDP	Gross Domestic Product
GoU	Government of Uganda
HC	Health centre
HIPC	Heavily indebted poor countries
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information System
HSD	Health sub district
HSSP	Health sector Strategic Plan
IIA	Independence of Irrelevant Alternatives
Km	Kilometres
LGA	Local Government Act
MoFPED	Ministry of Finance, Planning and Economic Development
MoH	Ministry of health
MoU	Memorandum of understanding
NGO	Non governmental organisations
NHP	National health policy
NMCHP	National Minimum Health Care Package
PAF	Poverty Action Fund
PEAP	Poverty Eradication Action Plan
PHC	Primary Health Care
PNFP	Private not for profit
SSA	Sub-Saharan Africa
SWAp	Sector wide approach
TB	Tuberculosis
UBoS	Uganda Bureau of Statistics
UDHS	Uganda Demographic and Health Survey
UNDP	United Nations Development Programme
UNHS	Uganda National Household survey
UPPAP	Uganda Poverty Participatory Assessment Project

Abstract
Using the 2002/03 Uganda National Household Survey data we empirically examine the nature and determinants of individuals' decisions to seek care on condition of illness reporting. The major findings include: first, cost of care is regressive and substantially reduces the health care utilization for any formal provider by the poorer individuals after controlling for other factors. In other words, even among public facilities cost of care remains a barrier to utilization of these services. Second, there is no doubt that putting in place strategies aimed at increasing the income of the poor will increase their utilization of the health facilities, though the impact will be higher for private care. Third, besides income and cost of care, other factors, in particular quality of services, education and physical access proxied by distance to the facilities are important determinants of health care utilization. Four, as much as it important for the Government to improve provision of services in the public facilities, incentives should be put in place to encourage and strengthen the role of the private sector. At the same time there is need, to put in place a regulatory system, set standards and a monitoring framework to ensure quality of services and control prices in the private sector especially in the private for profit sub-sector. Clearly there is an increasing preference for the sector's services even after the abolition of cost sharing.

Executive summary

Ill health is a major cause and consequence of poverty according to the Uganda Poverty Participatory Assessment Project (UPPAP). This was further supported by the Uganda Demographic and Health Surveys which showed that poor households tend to be less healthy compared to non-poor households. The importance of health is further accentuated in the Poverty Eradication Action Plan (PEAP), which emphasizes improving the quality of life especially of the poor as an essential step in reducing poverty and improving the country's economic development. Additionally, the National Health Policy (NHP) and the Health Sector Strategic Plan (HSSP), emphasize ensuring equity in access to health care for the entire population thus contributing to economic development. Given such emphasis and after six years of implementing the PEAP and three years of implementing the HSSP this paper investigates if the poor and other socially vulnerable groups are being reached, and what factors are affecting their demand for health services.

Previous studies in Uganda have shown that poor health is a major cause and consequence of poverty. There is also evidence showing that poor individuals utilize health facilities less, and their utilization patterns indicate a preference for private health facilities, which are more expensive. This was the basis for the abolition of cost sharing by the government of Uganda in all public health facilities, in 2001.

The study provides new quantitative evidence on the importance of individual, household and community characteristics on individual's health care seeking decisions via a nested multinomial logit model. National household survey data indicates that the reporting of illness has increased by nearly 7 percentage points between 1992/93 and 2002/2003. This change may be explained either by increased health awareness as a result of promotion activities by the Ministry of Health, or by the increased incidence of illnesses from diseases such as malaria, which has shown resistance to commonly used drugs. On the other hand, the poor show significantly lower rates of illness reporting compared to the rich, which may be due to their lower health consciousness.

In line with increased reporting of illness, the rate of seeking healthcare increased from 55% in 1992/93 to 80% in 2002/2003, a result partly explained by the abolition of cost sharing in public health facilities in 2001. Indeed, the highest increase is reported among the poorest quintile, whose rate of seeking health care increased by 16 percentage points between 1999/2000 and 2002/2003. Again, the poor also report significantly lower rate of seeking healthcare compared to their well-to-do counterparts, when sick. Furthermore, orphaned children also show a lower health-seeking pattern compared to non-orphans.

Private clinics remain the most preferred healthcare provider choice even among the poor. However, the poor also show an increased utilization of lower level public clinics and a corresponding reduction in the use of public and private hospital. Turning to health infrastructure characteristics, public health facilities report an improvement in quality of services provided after the abolishment of cost sharing in 2001. For example, the proportions of full time nurses and midwives as a share of all health workers significantly increased in public health facilities while reductions were observed in the private facilities, especially the private for profit sector. This labour shift is partly explained by the improved remuneration in the public sector.

The availability of health facilities has also improved. More communities report increased access to health facilities 3kms from the village centre. However, there are noteworthy regional differences – the eastern region still lags behind other regions in terms of physical availability of health centres. Furthermore, a comparison of the average distances for those seeking care with those reported for the most commonly used facility in the locality indicates that individuals do not use the closest facility.

Self-treatment is a common practice among individuals not seeking formal care. For those self treating and suffering from malaria, the most commonly used drugs are a combination of chloroquine

and panadol (46.7%), while 3.7% uses only painkillers such as panadol and aspirin, and 6.3% uses only herbs.

Despite the abolition of cost sharing, patients still have to pay for drugs in public facilities. This may be partly explained by stock outs of drugs in public facilities and patients being asked to go and purchase drugs from pharmacies/drug shops.

A number of interesting findings also emerge from the regression analysis in this study. There are different educational effects on health care demand between public and private health care providers. In public facilities, the results suggest that having some education is associated with a higher probability of seeking care, though the effect is only significant for post secondary education. On the other hand, there is consistently increasing demand for private health care with increasing education, and the strongest impact is observed for those with completed secondary education and above.

Turning to facility level characteristics, there is greater demand for care in those facilities with higher quality for any provider. The effect seems to be stronger for public facilities and for children, than for the entire sample. Also demand for care increases significantly with increasing proportion of qualified medical staff. For any provider, this effect is stronger for doctors than nurses.

With regard to access, the coefficients for distance are negative and statistically significant, suggesting that the probability of seeking care from any formal provider decreases with the increase in distance to that provider. This significant effect is no surprising since distance is highly related to the travel costs. Further, the magnitudes are more less the same between private and public providers. This suggests that individuals evaluate the opportunity cost of travel equally for both providers.

The responsiveness of health care demand to changes in price of care or to household income is also quite revealing. The responsiveness of demand to increases in price is consistently negative with the exception of the richest income quintile while seeking care from a private provider.

Below are some of the main policy recommendations:

- investing in education will increase the probability of seeking formal care since the probability of not seeking care decreases with increases in education. On the other hand, a preference for private care as education levels increase suggests that the health reforms should not sideline the role of the private sector in the provision of health care.
- cost of care is not the only factor influencing an individual's decisions to seek care. It therefore not surprising that the abolition of cost sharing did not result in a shift in preference from private to public care. Thus, the current Government's decision to reduce costs in PNFP through provision of subsidies should be supported in an effort to increase demand for their services. On the other hand, the MoH has to put in place a monitoring system to ensure quality of service provided by the private providers. In addition, the responsiveness of demand for health to income suggest that strategies aimed at increasing the incomes of the poor should be put in place, and those that are already in place such as under the Plan for Modernization of Agriculture should be strengthened to ensure full participation of the poor.
- bringing health care services closer to the communities might increase utilization of such services. However, this will depend on quality of services provided, as the results indicate that bypassing of the nearest health facilities is a common practice even in the rural areas.
- the prevalence of self-medication suggests that public health authorities need to increase information and health education concerning self-medication.
- improving the basic services such as availability of drugs, oral-dehydration and children immunization services, to name a few will lead to an increase in the utilization of formal care especially public care among children. The estimated positive effect of increasing the proportion of qualified staff especially doctors requires the attention of by policy makers. The plans by MoH to increase the supply of qualified health staff should be supported

1. Introduction

Health is a fundamental dimension of well-being and a key component of human capital development. The Participatory Poverty Assessment study identifies ill-health as the most frequently cited cause and consequence of poverty, a finding that is also supported by the Demographic and Health Surveys (UDHS) showing that poor[1] households tend to produce less health outcomes than non-poor households (Government of Uganda (GoU), 2001a). It is not surprising therefore that health is top on the agenda of Government of Uganda's development strategies. Improving quality of life especially of the poor is one of the key issues addressed in the Poverty Eradication Action Plan (PEAP). Consequently, improving health outcomes is essential for reducing poverty, which in turn affects a country's economic development.

The first PEAP was finalised in 1997 and implementation started. The National Health Policy (NHP) and the Health Sector Strategic Plan (HSSP), which were developed within the overall framework of the PEAP, were launched in August 2000. After six years of implementing the PEAP and three years of implementing the HSSP it is now pertinent to establish whether we are really reaching the poor and other socially vulnerable groups such as women, children and orphans; and what factors are affecting their demand for health services.

Anecdotally, GoU cuts in the provision of social services including health under the auspices of structural reforms is seen to have hit the poor most. At the same time the government's more recent decision to abolish cost sharing in public health facilities is seen not to have improved accessibility to these facilities by the poor. On other hand, empirical evidence so far yields mixed results, for example studies such as Deininger & Mpuga (2003); GoU (2003d) and WHO (2002) report abolition of cost sharing to have increased the poor's access to health facilities. Others such as Mwesigye (2002) report the quality to have worsened in most public facilities. This remains a challenge to GoU of increasing demand for its facilities with a disproportionate improvement in quality especially drugs and qualified staff.

According to the 2002 public expenditure review poor households do not seek health care services and their utilization patterns when they do seek health services showed a preference for private instead of public health units prior to abolition of cost sharing (GoU, 2002a). For instance, the percentage of the bottom 20% utilizing public health facilities marginally increased from 17.2 in 1992 to 18.9 in 2000 comparable to 28.2 to 37.2 for private facilities over the same period.

There are Government efforts to address problems facing the health sector with a bias on the supply side such as construction of new health centres. There is need to think beyond supply and consider how individuals behave during episodes of illness and what is the nature and the magnitude of the factors affecting their health seeking behaviour, especially the socially vulnerable groups. Most fundamentally, the study poses the following questions. Are the health-seeking behaviours different across the poor and non-poor? And what is the health seeking behaviour of the other socially vulnerable groups such a women and children? Among the poor reporting ill health, what characterizes those who seek health care and those who do not? How can the Government ensure access to health services to the entire population and in particular the socially vulnerable groups?

Accordingly, this study seeks to provide empirical evidence on illness incidences and health-seeking behaviour using the Uganda National Household Surveys (UNHS) data. The study provides quantitative evidence on the importance of individual, household and community characteristics on an individual's health seeking decisions during episodes of illness.

[1] . Poor and non-poor categorized based on the wealth indicator generated based on the household's asset profile.

This paper builds on the works of Hutchinson (1999), Lawson (2003) and Deininger & Mpuga (2003). Firstly, a detailed descriptive analysis of the incidence of illness and utilization of health care in Uganda. Secondly, we employ a nested multinominal logit to provide a detailed analysis of the determinants of health care demand. This is in contrast with these aforementioned studies where a standard multinominal logit model was employed. Thirdly, we include more quality indicators at health facility level such as staff composition, availability of other drugs other than antimalarials, children's vaccines to name a few.

The paper is organised as follows: Section 2 a broader overview of the health sector in Uganda, including funding, reforms and health care. The methodology is the subject of section 3 which begins with a review of the related literature followed by model specification and estimation issues. A description of the data and of the variables used in the empirical analysis is also presented. Section 4 presents the empirical results prior to the conclusions and implications for policy in section 5.

2. Overview

Uganda is one of the Sub-Saharan African (SSA) countries that recorded impressive economic growth especially in the 1990s. During the same time the strategies to reduce poverty seem to have been successful. In other words the strong economic growth since 1987 resulted in a drastic decline in poverty levels from 54% in 1992/93, to 44% in 1995/96 and to 34% in 1999/00 (Appleton, 2001). In the same study, real consumption expenditure rose by an average rate of 5.5 percent per year between 1992 and 2000. Notwithstanding, these notable successes in the 1990s, the early 2000's have been so far marked with very modest economic growth and worsening poverty status. The period 1999/00 to 2002/03 has seen an increase in poverty from 34% to 38%, with a modest growth of 2.2% in real consumption per adult equivalent (Appleton & Ssewanyana, 2003). Despite the improvements in the income poverty recorded during the 1990s, the stagnation or even a decline in the health indicators remains a big challenge to the Government. Uganda's population growth stands at 3.4% (UBoS, 2003) one of the highest in the world and records a total fertility rate of 6.9, which is well above those reported by Kenya (4.0) and Tanzania (5.1) (see Table 1). Performance of other indicators portrays a mixed pattern. For instance, Uganda records the highest total fertility rate but the lowest maternal mortality rate among the East African countries. Notably, both public and private expenditure as a percentage of Gross Domestic (GDP) is lower in Uganda compared to her neighbouring countries. The low expenditure may explain the poor indicators (in some areas) for Uganda compared to the neighbouring countries.

By extension, the burden of disease remains high with communicable diseases, which are preventable accounting for over 75% years of life years. Perinatal and maternal conditions account for 20.4%, malaria 15.4%, acute lower respiratory tract infections 10.5%, AIDS 9.1% and diarrhoea 8.4% together account for over 60% of the total national mortality burden. Others at the top of the list include tuberculosis, malnutrition (with 30% wasting among children), trauma and measles. The common non-communicable diseases include hypertension, diabetes, cancer, mental illness and chronic degenerative cardiovascular diseases (GoU, 1995a).

Table 1: Selected socioeconomic indicators, 2001

Selected Indicators	Uganda	Kenya	Tanzania	SSA
Population (millions)	24.2	31.1	35.6	-
GDP per capita (US$)	249	371	271	475
GDP growth rate (%)	**6.1**	3.6	0.4	-0.1
Infant mortality rate (per 1000 live births)	79	78	104	107
Under five mortality rate	124	122	165	172
Maternal mortality rate (100,000 live births)	510	590	530	-
Life expectancy at birth (years)	46.2	44.6	43.3	46.9
Total fertility rate	6.9	4.0	5.1	5.4
Under nourished people (%)	21	44	47	33
Population Share (%) with sustainable:				
- Access to improved water source	52	57	68	57
- Access to improved sanitation	79	87	90	53
Share in GDP (%):				
- Public health expenditures	1.6	2.4	2.2	-
- Private health expenditures	2.4	6.4	2.5	-

Source: UNDP, 2003

Table 2 presents a trend in key health indicators in Uganda. The performance in terms of social indicators and in particular health has not shown significant improvements. Slight improvement is noted between 1989 and 1995 in most of the indicators, although comparisons should be made with some caution, because of the differences in the survey methodology. Between 1995 and 2000, however, the same indicators have either stagnated or declined. Consequently meeting targets for some of these indicators such as maternal mortality and health deliveries supervised by skilled health workers is questionable given the current trends.

Table 2: Key Health Indicators, Uganda 1989-2000

Indicators	1989	1995	2000	GoU Target
Infant Mortality	119	97	88	68 (2005)
Under five Mortality	180	147	152	103 (2005)
Infant Immunisation Rate (%)	31	47	36	-
Maternal Mortality	523	506	504	354 (2000)
Total fertility rate	7.3	6.9	6.9	
Deliveries supervised by skilled health workers (%)	38	38	38	50 (2000)
Nutrition (stunting) (%)	-	38	39	28 (2005)
Population with sustainable access to:				
- safe drinking water[2]	43.9	58.2	64.2	
- improved sanitation[3]		68.2	75.9	

Sources: GoU, various years and UNDP (2000)

2.1 The health sector in Uganda

In the early 60's Uganda had one of the best health care systems in the region, it had a referral hospital, district hospital and a network of health units that were well equipped and staffed. The political turmoil and economic decline of the 70s resulted in a deterioration of health care system. Currently, the health care system is organised at several levels, the National Referral,

[2] These figures refer to the years 1992, 1999 and 2002 based on the national household survey data.
[3] These figures refer to 1999 and 2002 based on the national household survey.

Regional Referral, HSD level (headed by a hospitals or an upgraded HC IV), HC III, HC II[4]. The National referral hospitals provide comprehensive specialist services and, in addition, they are involved in teaching and research. Regional referral provides general curative and preventive services and specialist services. They provide technical supervision to five districts on average. A general hospital provides general curative and preventive services, in-service training, consultation and research to community based health care programmes. A HC IV provides general preventive and curative services, emergency surgery and blood transfusion services. HSDs are the implementation levels within a district and carry out planning, in service training and supervision of lower level health units within their areas of responsibility.

The main challenges remain the inadequate human resource to the extent that some health units have no health workers at all (30 HC IIs); inadequate funding for sector, which has resulted in drugs and supplies stock-outs, inadequate service provision and a disgruntled workforce. Most of the theatres constructed at upgraded HC IV remain un-functional due to lack of staff and other basic inputs (GoU, 2003b).

PEAP, which is the overall development framework for the country, emphasizes provision of basic services with special emphasis on reaching the poor (GoU, 1997b). The NHP, which is developed within the framework of the PEAP, the National constitution and Local Government Act (LGA), is directed at accelerating the improvement of the health of the population. It emphasizes equitable distribution of health services throughout the country and, effective access by all sections of the population to the National Minimum Health Care Package (NMHCP) with emphasis on the poor, women and children. The main objective of HSSP, which lays out the implementation details of the policy, is to reduce morbidity and mortality from major causes of ill-health and reduce the disparity therein thus contributing to poverty eradication and economic development. NMHCP, which was put together after burden of disease and cost effectiveness studies, consist of cost effective interventions that address diseases and conditions prevalent but not entirely exclusive among the poor.

Social services in Uganda experienced severe budgetary cuts and deterioration in performance in the 1970s and early 1980s as a result of political turmoil and poor economic growth. In the health sector, the under funding resulted in persistent drug shortages, demotivated workforce and dilapidated infrastructure and thus provision of poor quality services which were greatly under-utilised by the population. In the late 80s and early 90s, Uganda embarked on rebuilding her social sector with support from the donor community. Initial efforts were focussed on renovating previously existing infrastructure and expansion through construction of more health facilities.

Population per health unit improved from 123,485 in 1970 to 112,957 in 1996, currently this stands at 18,048 (GoU, 2002b). However, the expansion in infrastructure was not matched with increase in the number of trained personnel resulting in a high trained medical person to population ratio; 1:2,346 in 1996 as compared to 1:1,310 in 1970 and currently stands at 1:1,466 (GoU, 2002d). The proportion of approved posts filled with qualified workers improved from 33% in 1999 to 42% in 2002, estimate in 2003 stands at 53% (GoU, 2003c). Majority of the qualified health workers are concentrated in hospitals (54% in 1993) and urban areas. As noted in the NHP, there is still an over dependency on poorly trained personnel in primary health care facilities. Nursing Assistants account for 32% of the health worker force, however, variations exist between districts ranging from 4% for Kampala district to 58% in Kotido (GoU, 2002d). In the recent past, efforts have been invested in improving skills of nursing aides through training, to nursing assistants who are a significant proportion of the work force.

[4] A HSD, which is based at hospital or an upgraded HC IV and located at a country level, serves an average population of 100,000 population. It is a network of community-based health centres, which provides support to the lower-level health centres and manages referral cases. A HC III is located at a Sub country level and serves an average population of 50,000. A HC II is located at a parish level and serves an average population of 25,000.

Although GoU still owns the majority of health facilities, there has been expansion in infrastructure in the Private Not For Profit Sector (PNFP) as well. In 2002 the public sector owned 52% as of all health units compared to 72% in 1996. The corresponding figures in the PNFP sector for the same periods were 48% and 28%, respectively. Geographical access, that is the percentage of the population within 5 km to a health facility (assumed to be one hour walking distance) improved from 27% in 1980 to 49% in 1992 and this is currently estimated at 57% (GoU, 2003a). There are wide variations in access between districts, however, rural communities are particularly affected because facilities are mostly located away from communities and in addition transport is not readily available. In 1993/95, 62% of the population in rural areas lived within 5 km to the a modern health care provider as opposed to 94% in urban areas, corresponding figures for 1995/96 were 67% and 99%, respectively (GoU, 1997a)

Despite these investments in improving geographical access, quality of services continued to deteriorate as a result of under funding. The capital investments did not correspond to improvements in availability of recurrent inputs and as a result, use of the public sector for curative care remained poor. In addition, most of the units were not offering a comprehensive package of services for the given level of care, only 69% of the health units were offering immunisation services while only 40% provided delivery services. These figure improved to 80% and 76%, respectively in 1999/2000 **(**GoU, 2000b). Many government health units were faced with a situation of unused physical capacity, lack of trained staff and supply shortages (Okello *et al.* 1998).

In an effort to reverse this trend, cost sharing was introduced in public facilities in the early 90s but without policy support from the central MoH. Much as guidelines were developed that indicated the level of fees for the different health facilities, population groups and areas; enforcement remained very weak. The autonomous decentralised units (districts), which under the LGA were allowed to charge fees for the services they offered, started charging fees in their facilities. The amount of fees paid varied considerably between and within districts. Implementation modalities were also varied ranging from the closely monitored Bamako Initiative type of schemes with strong community participation in some districts; to the poorly monitored fee for service schemes with very minimal community participation. Revenue collected was supposed to be retained at the facility level to improve quality of services through improved drug and supplies availability, motivation of staff and health facility maintenance. This in turn was expected to increase service utilisation by the population. The exemptions were meant for the poor, under five years, patients with chronic diseases and accident victims. There were no mechanisms to enforce use of guidelines on collection and utilisation of revenue.

Notwithstanding limited sample sizes, previous studies done in Uganda show that there were no significant improvements in the quality of health care overall (Asiimwe *et al.* 1996; Ocom, 1997; Jitta, 1998), staff were most of the time absent and supplies out of stock (Mwesigye, 2002) and exemption and waivers were largely ineffective (Kivumbi, 2000). These findings were also highlighted by the first participatory poverty assessment report which indicated that drugs availability, staff attitude and performance, equipment, range and effectiveness of services have not only not improved but also worsened in many cases (GoU, 1999a**)**. Similarly, Karamagi (2000) reported the utilization of public health services to have declined by about 20% between 1995 and 2000. Mwesigye (2002) reports that although user fee generated a flexible source of revenue, the amounts collected were not substantial to fill the funding gap. On the contrary, small-scale evaluation studies showed quality improvements in districts that implemented Bamako Initiative type of schemes (WHO, 2000). Analysis done earlier from the household surveys conducted by the Uganda Bureau of Statistics (UBoS) showed that the poor and non-poor alike preferred curative care from nongovernmental organizations (NGOs) and private providers to the less expensive government care (Hutchinson, 1999). The study further 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. A large number of women delivered at home without a traditional birth attendant (GoU, 2001a), while a significant proportion of women preferred delivering at a traditional birth attendant as opposed to delivering in health facilities (WHO, 2001).

2.1.1 Health sector funding

The PEAP in 1997, which proposes to half the number of Ugandans defined as poor (living on less than one US Dollar a day) by the year 2015 (GoU, 1997b), emphasized increased investment in social sectors that directly impact on poverty. Uganda has benefited from the World Bank Highly Indebted Poor Countries (HIPC) initiatives since 1997/98 and HIPC funds have been put into the Poverty Action Fund (PAF). This was to ensure that funds were invested into social sectors health being one and as a result, there has been increased funding for social services.

The main sources of funding for the health sector include GoU own resources and donor budget support, donor projects and household out of pocket contributions. In the previous financial years, there has been increasing significance of budget support mode of transfer of funds (basket funding) with diminishing transfers through projects. Project funding reduced from 58% of the health sector budget in 1999/00 to 24% in 2002/03 while budget support increased from 42% to 76% in the same years. This trend will be changed with the inflow of global funds to fight Malaria, HIV and Tuberculosis (TB), which will increase the significance of project funding (see Table 3).

The sector has benefited from budget growth averaging 9% per annum from 2000/01 to 2002/03. Much as allocations to the health sector have increased from 7.6% of total government expenditure in 2000/01 to 9.6% in 2002/03, this still falls below the Abuja Declaration of 15% and worse still; no increase in percentage allocation was registered in 2003/04. In 1999/00, total health expenditure per capita was estimated at US$ 13.41 of which US$ 2.88 was from the government, US$ 3.53 was from donors and US$ 7 was from out of pocket. This expenditure is below the estimated per capita requirement of US$ 28 to deliver a minimum package of services (GoU, 2002d). The Commission on macroeconomics and health estimated a per capita requirement of US$ 38 – 40 to fund a minimum package of services. However, one needs to take note of the fact that this refers to wider package of services (includes Anti retro viral drugs) than that articulated in the HSSP and subsequently costed in the Health Financing strategy.

Table 3 further shows that more funds are being sent to lower levels (districts) for Primary Health Care (PHC) activities. This has increased from 32% in 1999/00 to 54% of the health sector budget in 2003/04. This is intended to target the poor who mainly reside in rural areas and the PHC activities funded at this level mainly capture diseases of the poor. In addition, the resource allocation formula was revised to give more weighting to districts with higher health needs and high poverty indices. Efforts are also being made by MoFPED to address regional disparities through equalisation grants.

Efforts to improve quality of services include increased expenditure on drugs, which currently stands at US$ 1.28 per capita in 2003/04 from as low as US$ 0.8 per capita in 2000/01. This however still falls below the estimated requirement of US$ 3.5 per capita to ensure drug availability. In addition, funding for drugs has been protected through the guidelines, which state that 50% of PHC conditional grant non-wage should be spent on drugs, which are supplemented by central credit line drug funds at the National Medical Stores and Joint Medical Stores. This level of funding does not meet the drug requirements and as a result drug stock outs still persist in health facilities (WHO, 2002). Other efforts have been improving staff morale through salary increases and upgrading skills of nursing aides to nursing assistants through training.

2.1.2 Health sector reforms

A number of reforms have been implemented in an effort to improve service delivery and reflect local priorities. Health sector reforms in Uganda occurred within the broad context of social service reforms. The main components of health reforms included restructuring and organisation of the MoH, decentralisation of health service delivery, health financing reforms, reforms of regulatory structure and greater involvement of the private sector.

The LGA defined roles of central ministries in service delivery. The MoH was restructured and the roles and responsibilities of the different levels were further defined in the policy. MoH has since the advent of decentralisation retained the core functions of; policy formulation, setting standards, quality assurance, resource mobilisation, capacity building and technical support, provision of nationally co-ordinated service, co-ordination of research and monitoring and evaluation of overall sector performance. Districts on the other hand are responsible for implementation of national policies, planning and management of district services, provision of services with emphasis on the minimum health care package, vector control, health education, ensuring provision of safe water and environmental sanitation, vector control and health data management. Organisation reforms resulted in the creation of Health Sub Districts (HSDs) in 1997/98. These are functional subdivisions of the district health system and principal level of service delivery. A HSD is a self-contained health zone that was aimed at further decentralisation of management and routine service delivery to lower levels, improving planning and management, increasing equity and access and foster community participation.

The key health financing reform was the abolition of cost sharing in public health facilities and the introduction of a dual system in public hospitals effective March 2001. This followed a series of welfare monitoring surveys that cited the importance of health in poverty eradication and the negative impact of cost sharing in public facilities on demand and access to services (GoU, 1997b). Abolition of cost sharing resulted in huge, increase in OPD new attendance (these are curative first visits for a given illness episode) from less than 0.4 per capita utilisation to over 1 and in some district to 2.5 (WHO, 2002).

Table 3: Health sector expenditure allocation, 1999/00-2003/04

	99/00	00/01	01/02	02/03	03/04 [E]
Government resource envelope without projects (billion Ug shs)	81.7	110.1	162.9	196.0	213.0
Health sector resource envelope including donor projects (billion Ug Shs)	196.4	207.5	313.6	250.0	352.0
As a percentage of total government expenditure	-	7.6	8.9	9.6	9.6
Percentage sent to lower levels (districts for PHC)	32	44	48	49	54
Subsidies to PNFP (billion Ug Shs)	3.3	5.7	11.6	15.1	17.0

Sources: GoU, 2003c

The NHP acknowledged the significant role played by the private sector in service delivery and the contribution it can make to improve coverage. Efforts to harness this opportunity included the formalisation of the partnership between the public and private sector[5]. A policy for the partnership was developed in a consultative manner and finalised for the PNFP sub-sector. Policies for other groups of the sector are still under development. Co-ordination mechanisms and structures for the partnership, at both national and district level were instituted. Furthermore, as shown in Table 3, subsidies to the facility-based PNFP and selected non-facility based increased from Ug.Shs. 3.3 billion in 1999/00 to Ug.Shs. 17 billion in 2003/04. Subsidies were meant to cover part of the recurrent costs of the PNFP facilities, which in turn would reduce user charges. Evidence from the facility-based PNFP facilities has shown that reduction in fees has increased utilisation (Odaga & Everd, 2003).

The HSSP is being implemented under the Sector wide Approach (SWAp), which involves developing a common policy in a consultative process, agreeing on common funding, accountability, and implementation and monitoring mechanisms. A Memorandum of Understanding (MoU) to guide the implementation of the HSSP through a SWAp was signed between GoU and development partners in the health sector in August 2000 and co-ordination mechanisms have been put in place.

3. Metholodogy

3.1 Review of related literature

Prior to the discussion of the model specification a brief review of related literature is presented and discussed. There is a vast and growing literature on developing countries analysing health care demand decisions of individuals faced with an illness or injury. Examples of empirical studies in the recent past include Akin, *et al*. (1986), Getler *et al*. (1987), Dor and Van der Gaag (1992), Mwabu *et al*. (1993), Ellis *et al.* (1994), Akin *et al.* (1995), Glick, *et al.* (2000), Lindelow (2002) and Sahn, *et al.* (2003). These studies hinge on the concept of utility maximization in the consumption of health and non-health goods, and focus on three decisions. First, the decision whether or not an individual reports illness or injury. Second the decision whether or not to seek formal health care when ill. Third, the choice of health care provider once the decision to seek care is made. For the three decisions, the emphasis is mainly on individuals who report an illness or injury during a specific recall period. Focusing only on individuals, who report an illness, however points to a selection bias (see for example Akin *et al.* 1998). This is because an assumption is made that people who do not report illness do not demand health services. Furthermore, reporting of illness may have much to do with the sensitivities to health than the illness itself.

Previous empirical works have used a variety of specifications to estimate health care demand. These include; the multinomial logit (such as Deininger & Mpuga, 2003 and Lawson (2003) in Uganda; Mbanefoh and Soyibo, 1994 in Nigeria; Akin *et.al* 1986 in Philippines); multinomial probit (such as Akin *et.al*., 1995 in Nigeria); and nested logit framework (such as Lindelow, 2002 in Mozambique; Sahn *et.al*, 2003 in Tanzania; and Mwabu *et.al*, 1993 in Kenya). The multinomial logit model however suffers from the Independence of Irrelevant Alternative (IIA) restriction. The IIA property assumes that all alternative subgroups are not correlated at all and the cross price elasticities are constant across subgroups, and as such it leads to biased estimates. Subsequent studies have employed alternative specifications that are not restricted by the IIA property including the multinomial probit and nested logit. However, the former remains unpopular due to the difficulties involved in its estimation.

[5] The private sector consists of Private Not For profit (facility and non-facility based) private practitioners, traditional health care system, traditional and complimentary medicine practitioners.

Researchers are increasingly adopting the nested multinominal logit model as their framework for estimation of health care demand. This specification is an extension to the simple multinomial discrete choice model. It allows correlation among similar subgroups (for example between private and public health providers) but not with sub-groups of differing alternatives such as no care or self-treatment. Getler *et al.* (1987) applies this model where the utility function is specified to be linear in health status and quadratic in consumption of non-health goods. They argue that this specification is consistent with a 'well-ordered preferences' demand equation. Mwabu *et al.* (1993) also employs the same framework to estimate an indirect utility function of health care demand using data from Kenya.

By extension, the independent variables included in the model seem to vary across the previous works on health demand. Besides individual characteristics, income and characteristics of health provider, the researchers include the price of non-health consumption goods as a determinant of utility. Unlike earlier specifications, utility in this case is dependent on price of health care and not price of improvement in health status. Ellis *et al.* (1994) also utilizes this indirect utility function to estimate the inpatient and outpatient health care demand in Egypt. In their specification, the price and income variables are entered separately and allowed to interact without super imposing restrictions on the kind of interaction.

Akin *et al.* (1995) finds that when quality of care is controlled for, the price of health care is a significant determinant of choice of health care provider. However, as pointed out in earlier studies, the magnitude of this price effect is very small. This low price elasticity is more pronounced for public health care providers than with private health care providers. For instance, Mwabu *et al.* (1993) find that a 10% increase in the price of public health services reduces demand by only 1%. On the other hand, a 10% increase in prices of private medical facilities would reduce demand in private hospitals by 15.7% and 19.4% in private clinics. The low responsiveness to prices for individuals consulting public health care providers suggests that increased user fees could generate addition revenue for the public health system without significantly affecting demand.

Sahn *et al.* (2003), in their study on demand for health services in rural Tanzania, found that as prices of public services rose, there was substantial substitution into private services. Doubling the price of public clinics or public hospitals resulted in a decline in the probability of their use of 0.10, while doubling the price of private clinics was accompanied by a large increase in the use of public clinics. In Ghana, Lavy and Quigley (1993) found that the price elasticity for inpatient visits was –1.82, while only –0.25 for outpatients. At the same time, the magnitude of the price effect is sensitive to the way the price variable is specified. In the cases where the price effect is treated to be independent of income, health is found to be a non-normal good. That is, the demand for health care services does not decrease with increases in price of health services.

Equally important, the responsiveness of the poor and non-poor individuals to changes in prices of health care may be different. Some of the studies find that the poor are not affected any differently from the non-poor, when prices of health services are increased (Dor and Van De Gaag, 1988; Mwabu *et al.,* 1993; Akin *et al.,* 1995). On the other hand, there is evidence that the magnitude of the price effect varies with changes in an individual's welfare status. In particular, demand is more elastic for the lowest or poorest quintile and inelastic for the top quintile (Getler *et al.*, 1987; Lindelow, 2002). In this case, increases in access charges would be regressive since the poor are more adversely affected than the non-poor are.

Supplier specific characteristics – cost and distance: At the level of health care provider, quality of health care is held as one of the key determinants of choice of health care provider. Studies use different indicators of quality such as; total expenditure per person in the population served (Akin *et al.* 1986); presence of well functioning diagnostic equipment such as X-ray machines and number of medical staff (Mwabu *et al.* 1993); drug availability, and

physical infrastructure (Ellis *et al.* 1994). The findings indicate that the availability of essential inputs such as drugs and medical staff is positively associated with the use of medical services. Quality improvements might increase demand for medical care by attracting new users or by increasing the intensity of service use by existing users. Poorly trained or insufficient levels of staff and inadequate drug supplies may inhibit use of care even if services are affordable and geographically accessible. A review of more than 50 user fee experiences in Africa showed that use of health services increased when quality was improved and reduced when quality deteriorated (Wills, 1993). Hallman (1999) found that there were strong positive quality impacts on demand for health care. Availability of drugs and supplies and; staff composition had important positive effects on demand for public and private care services while use of traditional healers was increased if the practitioner had recently attended a health training session. Similarly in Uganda, the 1992/93 integrated Household survey showed that lack of necessary drugs, and drugs being costly were rated as more important than distance, as a reason why people may not use a health unit. The presence of a doctor at a health unit, availability of antibiotics and general upkeep of a facility had a positive impact on whether the poor utilised the nearest modern health facility or not (Hutchinson, 1999). Utilisation will be very low if people including the poor, perceive services as being of low quality (Wills, 1993; Audibert & Mathonnat, 2000; Castrol-Leal *et al.*, 2000)

In addition, the relationship between the quality of public services and the fees charged at public health facilities is also examined. Similarly Akin *et al*. (1986) suggest that if public health facilities provided the same level of quality as private medical providers, they would be able to increase user fees by 87% and still maintain the same level of usage. Other studies reach similar conclusions, justifying the introduction or increases in user fees in public health facilities, if the additional revenue is used to improve quality of medical services (Dor and Van Der Gaag 1988). User fees have been criticised in a number of studies to be a barrier to access especially for the poor. Financial costs are a big hindrance to access especially for the poor (Collins *et al* . 1996; Sjaak Van Der Geest; Macwagn'gi *et al.* 2000; Mwabu, 1995). Several other health care utilisation studies in Ghana (Waddington *et al.,* 1989), Zaire (Bethune *et al.*, 1989), Swaziland (Yoder, 1989) and Lesotho (Bennet, 1989) also showed reduction in utilisation following fee introduction. However, Hutchinson (2001) found the time price for medical care to be less important to the poor than the non-poor.

Gender: Gender disparities in access to health services have been studied in a number of countries. Women in some cases need their husbands' permission to seek health care and in addition do not have easy access to household funds. 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. 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. For Uganda, Lawson (2003) found distance to have a major impact on whether health care was sought. Hutchinson (1999) found that increase in a woman's earning in a household resulted in a decrease in the use of modern curative services, reflecting a greater value for her work than the time spent seeking care. Besides gender differences; age may also play a role in that children are given priority in accessing health services. Attitude differs towards a sick child and an adult. Hallman (1999) found that demand for modern care was high up to the age of six months and there after declined sharply and, utilisation was greater for male children. Lindelow (2002) found that the percentage of infants and children that attended a consultation in response to an illness was higher than older age groups.

Education: An individual's level of education plays a significant role in decision-making regarding seeking health care. In developing countries, a strong relationship has been found between low education and the absence of antenatal care. Wogg *et al* . (1987) found that for both rural and urban mothers, the likelihood of choosing public care as the most frequently used option increases as education level increases. Similarly, preference for private modern

care to public care and traditional care increased with increase in education. Improving the woman's education level was shown to facilitate the adoption of preventive medicine, particularly in more rural communities (Juarez, 2002). Studies that looked at both rural and urban communities had similar finding, individuals in households with women of higher levels of education were more likely to use curative care than the less educated (Hutchinson, 1999).

3.2 Model specification

The model proposed below rests on the assumption that an individual selects a health provider conditional to having reported illness/injury during the last 30 days prior to the survey. The specification we use in this study is a nested multinomial logit model with three options: no care (including self-treatment), care at public and care at private health facility.

The framework used in this study follows that used by Gertler *et al.* (1987) and Mwabu *et al.* (1993). In this framework, the decision to consult a particular health care provider is a discrete choice problem; thus the determination of demand involves estimating the probability that a particular health care provider will be chosen.

In this framework the demand for health is based on the notion of utility maximization. An individual derives utility from consumption of both health goods and non-health goods. Faced with an episode of illness or injury, the individual must first decide whether or not to seek health care. Consulting a formal health care provider increases the individual's health status, but improved health is achieved at the cost of medical expenses and the reduced consumption of non-health goods. Second, conditional on the decision to seek health care, an individual must choose the type of health care provider to consult. Due to different quality characteristics, the consultation of formal health care providers (both public and private) results in different effects on one's health. These effects are a function of both the level of quality provided by the particular health care provider and individual characteristics at the time of illness.

Given the array of health care providers, an individual must choose one alternative, including the option of no-care or self-treatment. Each option provides a given level of quality at a particular cost. The cost may be direct such as access charges or indirect such as travel time and waiting time specific to the provider chosen. Given an individual's severity of illness, cost faced at a particular provider and income, he or she chooses the provider option that maximizes utility. Formally the above scenario can be represented as expressed in equation (1).

$$U_{ij} = U_{ij}(H_{ij}, C_{ij}; T_j) \quad (1)$$

That is, the i^{th} individual's utility is derived from consumption of both health and non-health goods conditional on choosing the j^{th} provider. Here H_{ij} represents improvements in health status of the i^{th} individual consulting the j^{th} provider; C_{ij} represents the consumption of non-health goods possible after meeting health care costs at the j^{th} provider; and T_j represents the indirect individual costs such as travel time incurred by consulting the j^{th} provider. The improvement in health status, H_{ij} is a function of individual characteristics (such as age, sex, type of illness, healthy days and education), household level factors (such as income, household size or composition and the socio-economic characteristics of the household head such as gender), X_i; factors specific to a particular provider such as availability of drugs and qualified health staff, Q_j; and unobservable heterogeneity

characteristics at individual, household and facility level, ε_{ij}, that affect improvement in health. The health status can be expressed as follows:

(2) $$H_{ij} = h(X_i, Q_j) + \varepsilon_{ij}$$

For the no-care or self-treatment option, H_{ij} is equal to zero based on the assumption that there is no improvement in health status for those not seeking care. On the other hand, the disposable income held by the i^{th} individual after consulting a health care provider is a function of her/his individual income, Y_i; and the price, P_j, s(h)e pays at the j^{th} provider representing both direct costs such as user fees and indirect costs such as travel and waiting time specific as expressed in equation (3). For the no-care option, the price paid is equal to zero and hence consumption equals income.

(3) $$C_{ij} = c(Y_i - P_j)$$

Substituting equations (3) and (2) into (1), we get a conditional utility function as expressed in equation (4).

(4) $$U_{ij} = h_{ij}(X_i, Q_j) + c(Y_i - P_j) + \varepsilon_{ij}$$

The utility can be further expressed as follows:

(5) $$U_{ij} = V_{ij} + \varepsilon_{ij}$$

where $V_{ij} = h_{ij}(X_i, Q_j) + c(Y_i - P_j)$ is the deterministic part of the utility. The i^{th} individual chooses the j^{th} provider, which yields the greatest level of satisfaction given all alternatives even the choice of no-care or self-treatment. An individual will choose the no-care option for instance if the utility derived from this option exceeds all other options.

We assume that $h(X_i, Q_j)$ is linear in X_i and Q_j. The coefficient vectors for the X_i are denoted by β_j while those of Q_j as φ_j and these coefficients are allowed to vary across options. On the other hand, a non-linear empirical specification of $c(Y_i - P_j)$ is employed to avoid the responsiveness of prices being independent of income (see Gertler *et al.*, 1987; Gertler & van der Gaag, 1990). We adopt the functional form used in Sahn *et al.* (2003) as expressed in equation (6). In other words, the empirical specification is based on a semi-quadratic utility function, which is linear in health and quadratic in the logs of consumption of non-health goods.

(6) $$c(Y_i - P_j) = \alpha_1 \times \ln(Y_i - P_j) + \alpha_2 \times [\ln(Y_i - P_j)]^2$$

Where the αs are assumed to be equal across provider options and after some manipulations reduces to equation 7 (for details see Sahn *et al.,* 2003).

(7) $$c(Y_i - P_j) \approx \alpha_1 \times [\ln(Y_i) - P_j / Y_i] + \alpha_2 \times [\ln(Y_i)^2 - 2\ln(Y_i)(P_j / Y_i)]$$

However, $\ln(Y_i)$ and $\ln(Y_i)^2$ are constant across provider options. On the other hand, the logit identifies only the differences in utilities, $V_{ij} - V_{i0}$, where V_{i0} is a references utility, which in this case refers to no-care and we normalize it to zero. Thus after taking the difference in utilities we get

$$(8) \qquad V_{ij} - V_{i0} = \beta' X_i + \varphi' Q_j + \alpha_1(-P_j/Y_i) - \alpha_2[2\ln(Y_i)(P_j/Y_i)]$$

Empirical specification

Since the alternatives are discrete choices, determination of demand for a particular alternative involves estimating the probability that a particular provider or alternative will yield the greatest amount of utility. The nested multinominal logit specification, which allows correlation of sub-groups of alternatives (for example between private and public health care providers) and not the base option of no-care/self-treatment, is employed. On conditional of being ill/injured, individuals choose between no care and formal care. When formal care is chosen, the individual faces two alternative provider options, namely private care and public care.

The goal in this empirical specification is to determine the probability of choosing a particular health care provider alternative. From expression (6) the probability of choosing a private health care provider for example, will equal to probability that the utility from private health care is greater than the utility from public health care or self-treatment. Following the health care demand literature, the choice probabilities are expressed as nested multinomial logit. In this case the probability that the j^{th} provider is chosen is expressed as in equation (9).

$$(9) \qquad \Pr(\text{Provider} = j) = \frac{\exp\left(\frac{V_j}{\sigma}\right)\left[\sum_{k=2}^{K}\exp\left(\frac{V_k}{\sigma}\right)\right]^{\sigma-1}}{\left[\sum_{k}\exp\left(\frac{V_k}{\sigma}\right)\right]^{\sigma}}$$

where $\sigma - 1$ is the correlation in the error term/inclusive value coefficient for private and public health care providers. If for instance σ lies outside the range of 0 and 1, it implies that the nesting structure is inappropriate. Else it would imply that the model is consistent with random utility maximization for all possible values of the independent variables.

3.3 Estimation issues

A nested multinomial logit model is used to estimate a behavioural model for health care demand. Demand is proxied as the probability of seeking different types of care conditional on illness, given the relevant individual, household and community characteristics. However, prior to the econometric analysis descriptive analysis is presented and discussed to get a feel for the data and derive insights into the modelling procedure. Separate models were estimated for different population sub-groups, namely adults (individuals 15 years and above) and children under 15 years of age. These separate estimates test whether the determinants of health seeking behaviour were the same across the population subgroups. For each subgroup, we endeavour to estimate the elasticiticies (see Appendix II for details) for the key policy variables.

Other pertinent estimation issues include treatment of zero observations for some variables especially in the community level and sample restricted to conditional of reporting illness in the previous 30 days prior to the survey. In the case of zero observations among exogenous variables the study adopted Battese (1997)'s approach with variables recorded so that a

missing or 0 value is replaced by the median value[6] based on the non-zero observations for a particular variable. Then separate dummy variables, coded as 1 when the corresponding variable is missing and 0 when it is not is included in the model. This approach reduces the potential problem of sample selection bias. On the latter issue, there is no consensus yet as empirical evidence is still mixed. For instance, while Dow (1996) finds no statistical bias on limiting analysis on conditional of reporting illness, Akin *et al.* (1998) reports sample selectivity bias. However, testing for this bias is beyond the scope of this paper.

3.4 Data and variable description

The paper uses UNHS data conducted by UBoS, from May 2002 to April 2003 excluding the month of September. The survey covered all districts in Uganda except the district of Pader and a few enumeration areas in Kitgum and Gulu districts. The survey was a multi-purpose covering three modules including socio-economic, labour force and household level enterprises excluding agriculture. The modules were all administered during the same survey period. Furthermore the survey collected information at both household and community level within the same enumeration area, making the linkage between the two possible for a richer analysis. The econometric analysis focuses mainly on UNHS of 2002/03, hence the demand is for a single period. By extension, the survey did not capture multiple visits to health facilities. Hence, choice of provider is limited to a first outpatient consultation.

Data were collected on demographic, socio-economic and community characteristics. Information on health facility attributes include number of qualified medical staff, drug availability, and availability of such equipment as sterilizing equipment, and syringes. These were collected at a community level independent of the information as reported by households. The information at household level were linked to communities data to create an enriched dataset containing information about facilities characteristics as well as those of individuals.

To have an understanding of the changes in the health-related variables over time, comparable data from previous UBoS household survey rounds especially for 1992/93 and 1999/00 were also analysed. A total of 9,710 households consisting of 48,561 individuals were covered in 2002/03; in 1992/93 46,112 individuals from 9,923 households and 55,605 covered from 10,690 households in 1999/00. The individuals are those who were regarded as usual members[7] at the time of the survey. The descriptive analysis is restricted to the same geographical coverage for all the survey rounds.

The different variables used in the analysis and their sources are discussed below.

Provider choice:

While combining community-level information and household level information enriches one's understanding of the demand for health services, the community data as collected by UBoS are not without weaknesses. The level of detail on physical access to the nearest health facilities differs from that on the quality aspect of the same. The quality aspect is captured for the most commonly used health facilities and fails to distinguish between hospital, health center, clinics, etc. For our econometric analysis we had to restrict ourselves on the broader categorization of the facilities, namely, private and public facilities. In other words, for econometric analysis each individual is faced with 3 options, namely, no care, public or private health facility.

[6] Median values were calculated at the community level, where such information were not readily available they were replace by median values either district or national level.

[7] Usual members are individuals who had lived in the household for more than 6 months prior to the survey including babies born to household members within the reference period.

Access variables: We consider access in terms of physical and financial access. In terms of physical access, we consider distance and time it takes to get to the health facility. The community module captured this information for the most commonly used health facility by public or private provider; and also for detailed information on the nearest health facility disaggregated by provider. Distance is in kilometres (km). On the other hand, time it takes to get to the nearest health facility in terms of minutes. These data are derived from the community module. The other variables of interest would have been the quality of the feeder roads and mode of transport. However, contrary to previous surveys the information on these variables was not collected in the 2002/03.

Individual characteristics: The individual characteristics considered include age, gender, education and healthy days. Age is in number of completed years though enters the models in form of dummies. Gender is taken as a binary variable with female as the base category. Education enters the econometric models in different forms including number of completed schooling years and also considered in terms of highest level attained. Education of the household head is taken for all young members of the households below 15 years. Previous studies (such as Sahn *et al.,* 2003; Lavy & Quigley, 1991) have included the number of days lost due to illness as a measure of health status and others (such as Gertler & van der Gaag, 1990; Gertler *et al.*, 1987) use number of healthy days. We derive the number of healthy days as 30 days minus the number of days an individual reported being restricted to normal activities due to illness during the last 30 days prior to the survey.

Household characteristics: Here we consider the characteristics of the household including income, household structure and gender of the household head. Income is proxied by consumption expenditure per capita. However, in the derivation of this variable adjustments similar to those done for poverty analysis were carried out to ensure consistencies with Appleton & Ssewanyana (2003). The income figures are expressed in 1997/98 prices. The distinction between poor and non-poor is based on the poverty line as derived by Appleton (2001). Household structure includes household size, number of adults and number of children. Household size is considered as a head count of the usual household members. These data were constructed from the socio-economic module.

Facility characteristics: In order to assess improvements (if any) in the quality of health services provided, a score index is constructed for eight quality characteristics as captured in UNHS community survey. These include availability malaria drugs, antibiotics drugs, oral re-hydration, children's immunisation vaccines, needle sterilizing equipment, cooling storage, minimum supply of bandages and sterile needles and syringes. This index assigns a value of one if the particular characteristic is available at the health facility otherwise a value of zero is assigned. Then a cumulative score for quality is computed for each facility. The lower the score, the lower the quality of health services provided in that facility relative to all other facilities with a higher score.

Other quality indicators include the proportion of fulltime doctor and proportion of fulltime nurse/midwives[8] in the total health workforce. Considering proportions controls for facility size. We hypothesize that the higher the proportions the higher the demand for formal modern care. These data derive from the community module.

Apart from the quality indicators, cost of care is also included. We found the information collected on initial consultation in the community module less useful. We instead derived the cost of care based on the information collected in the socio-economic module. We derived the median cost of care per capita by provider at the enumeration level. In some cases, we used median values at levels higher than the enumeration area. We assume zero cost for individuals not seeking care.

[8] Nurse/midwives category excludes nursing assistants.

4. Empirical results

4.1 Descriptive results

4.1.1 Reporting of illness

Table 4 shows the proportion of Uganda's population reporting illness in past 30 days prior to each survey. The proportion reporting illness has increased significantly from 22.5% in 1992, to 27.7% in 1999 and finally to 29.4% in 2002. In other words, the percentage of the Ugandan population sick in any 30-days period increased by nearly 7 percentage points between 1992/93 and 2002/03. Two reasons may be advanced to explain this increasing pattern of illness reporting. First, reporting of illness is likely to increase if individuals are more aware and thus recognise sickness. In fact the MoH has stepped up its health promotion campaign over the years especially in the media and this could have led to increased awareness and consequently reporting of illness. The second reason could be that actually the incidence of illness has increased over the years. This is particularly true for some diseases such as malaria that have shown resistance to the commonly used drugs. Table 4 also shows that the rate of reporting of illness also increases with improvement in welfare. The poor have significantly lower rates of reporting of illness compared to their rich counterparts. For example, only 18.1% of individuals in the poorest quintile report illness in 1992 compared to 26.5% for the richest quintile. The pattern of increased reporting of illness with income level is consistent for all other survey rounds. These lower rates of reporting illness among the poor should not imply that they are less prone to illness than their rich counterparts. Indeed, it may indicate health consciousness, which increases with improvements in standards of living.

In addition to the welfare differences in reporting of illness, there are also significant age differences. Individuals are categorized whether there are infants (aged less than 5), young children (aged 5 to 14), older children (aged 15 to 21), adults (aged 22-49) and those in the retirement (aged 50 and above). First, there is an increase in rates of reported illness across age groups for all the three survey years. Second, reporting of illness is highest among infants and those in retirement, than other age categories. For instance, in 2002, 43.5% of those aged 50 and above report being ill in the past 30 days followed by the under 5 years at 43.2%. This pattern is explained by the fact that infants are more prone to illness due to a weak immune system, while an individual's susceptibility to disease increases as they become older. Controlling for age, the poorest quintile reports significantly lower rates of morbidity than the richest quintile. On the basis of gender, the results suggest that female have a slightly higher rate of illness reporting. However, this difference is not statistically significant. As previously pointed out, orphans were among the socially vulnerable groups identified in the PEAP. Comparing 1999 and 2002, the percentage of orphans reporting ill-health in the past 30 days increases faster than that non-orphans. Similarly, the percentage of poor reporting having been ill increases faster than their non-poor counterparts.

Table 4: Population composition and reporting illness, 1992-2002/03

Sub-groups	Population share (%)			Reporting illness in past 30-days (%)		
	1992	1999	2002	1992	1999	2002
Quintile:						
Poorest 20%	25.0	20.3	20.6	18.1	24.0	27.5
Top 20%	14.4	19.2	18.5	26.5	30.1	32.6
Age category:						
0-4	15.9	17.3	19.4	30.6	43.9	43.2
5-14	33.8	34.7	32.9	16.9	20.4	22.8
15-21	13.5	13.3	13.2	16.9	18.7	21.2
22-49	27.8	26.1	28.1	23.7	26.8	28.3
50+	8.9	8.6	6.3	33.3	41.8	43.5
Gender:						
Female	50.8	50.8	51.6	23.6	29.5	30.5
Male	49.2	49.2	48.4	21.3	25.9	28.2
Children < 18:						
Orphan	-	14.7	13.4	-	21.0	25.7
Non orphan	-	85.3	86.6	-	27.9	29.6
Location:						
Rural	87.2	86.9	86.2	22.4	27.9	29.6
Urban	12.8	13.1	13.8	23.1	26.5	28.2
Poverty:						
Poor	55.4	33.8	38.8	20.4	25.5	30.2
Non Poor	44.6	66.2	61.2	25.1	28.9	28.0
All Uganda	100	100	100	22.5	27.7	29.4
Absolute numbers				3,810,802	5,935,159	6,954,119

Table 5 shows that the six most reported illness include malaria/fever, respiratory infection, measles, diarrhoea, intestinal infection and skin infection, accounting for almost 85% of all the reported illnesses, nationally. The most reported illnesses are malaria/fever, which accounts for more than 56% of the total burden of disease, and respiratory infections, which accounts for over 12%. This finding is consistent with earlier studies that indicate that malaria/fever accounts for over 50% of the burden of disease (World Bank, 1996)**.** Above all the results indicate that communicable diseases remain predominant. Across age categories, the incidence of malaria decreases with increase in age. Notably, malaria accounts for over 60% of reported illness among infants aged below 5 while it accounts for less than 40% of reported illness for adults aged 50 and above. The high prevalence of malaria/fever may be explained by the limited use of mosquito nets especially among children who are more vulnerable to diseases. In 2001 GoU abolished all taxes on mosquito bed nets, in a bid to increase their usage. However, nationally only 12% of the population usually sleeps under a mosquito net (see Table 6), a figure well below that of 15% projected by MoH. Mosquito net use is more that 3 times in urban areas compared to rural areas; and further disparities are observed across regions and age.

Worth noting is the increasing percentage of other symptoms with age, an indication of prevalence of non-communicable diseases such as hypertension. These illnesses are highly skewed among older members. In addition to capturing symptoms at individual level, information on the most three prevalent diseases was captured at the community level. Broadly speaking, similar patterns are observed both at the community and individual levels. Malaria is the most prevalent disease in the locality with 99.2% of the communities, followed by diarrhoea at 57.4 and AIDS at 34.1%.

4.1.2 Decision to seek care

Table 7 shows the results on the decision to seek care for those reporting illness. First, similar to the trend in reporting illness, the proportion seeking care has been on the increase across the three survey periods regardless of social groupings. In particular, the overall rate of seeking care has increased from 55% in 1992 to 69% in 1999 and finally to 80% in 2002, a result partly explained by the abolition of cost sharing in public health facilities between the 1999 and 2002 surveys. Among the poorest quintile, the highest increase is observed between 1999 and 2002, representing a 16 percentage points increase. These findings relate well with the MoH figures which show that new outpatients attendance increased from 40% in 1999/00 to 60% in 2001/02 (GoU, 2002d). In addition, a two-year (2001 and 2002) longitudinal study on effects of abolition of cost sharing in Uganda showed that there were higher increases in OPD utilisation following abolition of cost sharing (WHO, 2002). While the percentage of incidence of illness reporting is higher among rural dwellers than urban dwellers, the proportion of those who actually seek care is significantly higher for the latter than the former.

Table 5: Type of illness for those reporting sickness, 1999-2002 (%)

Type of illness	All		Quintile				Age category									
	99	02	Poorest 20%		Richest 20%		0-4		5-14		15-21		22-49		50+	
			99	02	99	02	99	02	99	02	99	02	99	02	99	02
Malaria/Fever	56.3	55.8	47.7	48.7	60.3	61.2	61.1	63.9	60.7	58.4	61.6	55.3	54.1	54.2	38.0	36.3
Respiratory infection	12.2	14.2	13.4	14.3	12.9	15.3	11.4	12.9	12.5	15.7	10.0	12.6	12.2	13.3	14.6	16.2
Measles	6.2	2.9	7.0	2.6	5.4	2.9	4.2	6.4	5.5	3.8	6.1	1.7	7.6	0.4	9.4	0.3
Diarrhoea	5.2	4.0	9.2	6.9	2.6	1.7	10.2	7.1	3.3	2.5	3.6	2.5	3.3	2.1	2.9	3.4
Intestinal infection	2.9	4.4	3.1	5.6	1.9	3.9	6.1	2.1	3.6	4.0	1.3	4.7	0.5	5.3	0.4	8.3
Skin infection	3.0	3.2	4.3	4.1	2.7	1.8	2.4	2.5	3.9	5.1	4.1	2.3	2.0	1.9	3.5	3.2
Others	14.2	15.4	15.2	17.6	14.1	14.1	4.6	4.9	10.5	10.5	13.2	20.7	20.2	22.7	31.0	32.2
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Table 6: Use of mosquito nets by gender for those reporting illness, 2002/03

Sub-group	Female	Male	All
Quintile:			
Poorest 20%	6.3	5.6	6.0
Top 20%	18.5	19.4	18.9
Place of residence:			
Rural	9.2	9.1	9.1
Urban	28.8	27.8	28.3
Age category:			
0-4	12.0	11.9	11.9
5-14	8.6	9.4	8.9
15-21	11.9	6.9	9.7
22-49	14.5	14.6	14.5
50+	11.6	12.5	12.0
Regions:			
Central	13.5	14.4	13.9
Eastern	17.7	12.8	12.3
Northern	10.9	10.0	10.4
Western	8.6	8.3	8.4
All Uganda	11.9	11.5	11.7

Lastly with regard to age, children significantly have higher rates of seeking care than adults. Specifically children under 5 years of age have consistently higher rates of seeking care compared to individuals aged five and above. This can be explained by the higher incidence of illness among this particular age group due to a weaker immune system and the fact that parents provide more attention to children than adults, when faced with an illness. They are thus more likely to be taken to health facilities than their adult counterparts. Consistently through all the surveys, orphans show lower health seeking care rates than non-orphans in all the surveys, with the former recording a 6 percentage points compared to a 11 percentage points for the latter.

On the other hand, there are no significant changes in gender differences in health care seeking over the survey rounds. Considering seeking care relative to the income of a household, women in the poorest and richest households receive disproportionately less treatment when sick compared to men in 2002/03 (see Figure 1). For both women and men demand for care increases as income rise. Income is also important in raising the health care demand of children. However, boys more likely to seek care when in richer households and less care when in poorer households than girls (see Figure 2).

Among those who did not seek care from a modern health facility include those who were with no care at all and those who preferred self-treatment. Self-treatment accounted for almost 12% (with a 49% reporting of malaria/fever) and no treatment at all accounted for 7.4% in 2002/03. Prevalence of self-medication seems to be relatively high and has implications for health status. Those self treating and suffering from malaria the most commonly used drugs are a combination of chloroquine and panadol (46.7%); 3.7% uses only painkillers such as panadol and asprin; and 6.3% uses only herbs. However, a substantial proportion (19.4%) does not use any kind of medicine. The policy message here could be that public health authorities need to increase information and health education concerning self-medication.

Although the biggest proportion of those reporting illness seek health care, a substantial number do not consult any form of health care provider. Table 8 investigates the key reasons why individuals did not consult any health care provider. The proportion of the population

citing illness being mild as the main reason for not seeking care shows a decreasing trend between 1992 and 1999 for both quintiles. In addition, illness being mild is cited most by the well-to-do. The perception of whether an illness is mild or not and whether to seek care or not is closely related to the education level of an individual and ultimately welfare status; and by the level of awareness of the community on health issues. The intensified awareness campaigns by MoH may have played a role to raise the level of awareness.

After 1992, health services being costly became the dominant reason why individuals did not seek health care. Also the poor and female are significantly affected by cost compared to other groups. However, cost as reason for not seeking health care significantly reduces after 1999 though the percentage remains high despite the abolition of cost sharing in public facilities. However, a further analysis of the specific costs faced by households is required if correct inferences are to made regarding this constraint, as the cost may be in terms of transport costs. Distance (facility is so far) as a reason for not seeking care is highest in 2002 for both quintiles and gender. In other words, the results suggest that distance and cost remain as major reasons for not seeking care.

Table 7: Decision to seek care and health seeking behavior

	Percentage seeking care			Type of health facility visited for those consulting											
	1992	1999	2002	Public Hospital		Public clinic		Private Hospital		Private clinic		Pharmacy		Other	
				1999	2002	1999	2002	1999	2002	1999	2002	1999	2002	1999	2002
Quintile															
Poorest 20%	46.4	57.2	72.9	20.6	9.8	19.7	33.1	7.1	1.3	36.2	36.6	12.8	15.1	3.7	3.9
Top 20%	68.4	79.8	85.4	17.7	8.6	8.5	10.2	10.7	5.9	47.7	53.9	13.7	19.1	1.6	2.8
Gender															
Female	55.2	68.9	80.4	19.0	10.0	14.2	19.1	7.9	3.3	42.3	46.5	14.7	17.9	1.9	2.3
Male	55.1	69.4	80.5	19.2	10.7	14.6	17.9	7.7	3.0	41.4	48.2	14.6	18.4	2.6	2.4
Age category															
Under-5	62.9	74.5	84.8	19.8	9.0	13.6	18.8	7.6	2.9	41.5	51.0	15.0	16.4	2.5	2.7
Above-5	52.5	67.2	78.7	17.2	10.9	16.2	18.4	8.5	3.2	42.8	45.6	13.7	18.9	1.5	1.7
Children <18															
Orphans		68.7	73.9	16.5	10.8	15.5	18.9	7.5	3.1	43.6	44.4	15.0	21.6	1.8	3.1
Not orphans		70.9	81.9	18.6	8.7	14.2	18.2	8.3	1.2	39.5	49.5	17.7	18.6	1.6	1.7
Location															
Rural	53.1	68.3	80.0	19.3	10.2	16.1	20.5	7.8	3.0	39.5	44.8	14.9	18.7	2.3	2.6
Urban	68.8	75.7	83.2	17.7	11.6	3.5	6.0	7.5	4.1	56.9	62.8	12.9	14.5	1.3	0.9
Region															
Central	60.6	77.8	78.3	17.9	12.1	5.6	9.7	9.8	4.7	48.6	59.3	16.2	10.9	1.8	3.2
Eastern	49.4	56.2	78.8	18.2	8.2	16.6	22.1	5.8	2.1	39.8	40.1	17.1	25.3	2.4	2.3
Northern	56.7	70.1	77.9	20.6	11.6	24.8	28.9	7.6	4.1	33.2	38.2	10.4	14.6	3.3	2.6
Western	56.1	79.9	88.2	20.2	10.9	13.5	18.7	8.1	2.5	43.4	47.9	13.1	18.5	1.6	1.3
Education															
None	49.3	62.1	81.7	21.7	9.8	17.4	21.3	7.1	3.1	35.0	46.9	15.6	16.4	3.3	2.5
Primary	54.2	70.2	78.9	18.9	10.6	13.8	17.9	7.9	2.9	42.6	46.2	14.5	19.9	2.1	2.4
Secondary	60.8	73.1	82.0	16.3	11.5	13.4	12.0	8.4	3.9	45.7	52.9	15.1	17.4	1.1	2.3
Higher	67.1	76.1	84.3	17.9	13.1	12.3	6.7	8.3	7.8	47.2	55.3	12.2	15.2	2.1	1.9
Poverty															
Poor	49.7	60.5	74.5	20.6	11.0	18.2	27.3	6.3	2.2	36.3	36.9	15.5	17.4	1.9	2.9
Non-Poor	62.4	73.2	83.8	18.4	10.1	12.9	14.2	8.4	3.7	44.1	52.4	14.3	16.9	3.0	2.2
All Uganda	55.1	69.2	80.4	19.1	10.4	14.4	18.6	7.8	3.2	41.9	47.3	14.6	18.1	2.2	2.4

Table 8: Reasons for not consulting, 1992-2002 (%)

	Reason for not consulting												
	Illness Mild			Costly			Facility to far			Others			Row total
	1992	1999	2002	1992	1999	2002	1992	1999	2002	1992	1999	2002	
Quintile													
Poorest 20%	44.7	24.1	31.1	29.3	59.2	40.6	19.2	11.7	21.1	6.7	4.9	7.1	100
Top 20%	70.8	53.5	50.8	13.6	37.4	26.6	13.4	4.6	14.1	2.1	4.4	8.5	100
Gender													
Female	55.3	35.9	36.5	23.4	49.2	34.6	15.9	10.9	21.2	5.4	4.0	7.7	100
Male	56.4	39.9	42.2	25.2	44.3	33.0	14.4	11.8	16.8	4.1	3.9	7.9	100
Symptoms*													
Malaria/fever	-	42.1	42.6	-	44.6	32.3	-	10.4	17.4	-	2.8	7.6	100
Respiratory Infection	-	43.0	47.5	-	38.6	28.3	-	15.5	21.8	-	2.8	2.3	100
Measles	-	17.5	37.7	-	67.9	44.3	-	11.2	4.5	-	3.4	13.5	100
Diarrhoea	-	19.2	44.3	-	65.8	41.9	-	11.9	5.3	-	2.9	8.4	100
Intestinal Infection	-	14.4	25.7	-	44.2	36.1	-	16.9	32.2	-	24.4	5.9	100
Skin Infection	-	21.0	28.4	-	65.1	35.7	-	9.1	29.3	-	4.7	6.5	100
Others	-	15.7	27.8	-	64.9	40.4	-	11.8	16.8	-	7.5	14.9	100
All Uganda	55.8	34.7	39.2		49.6	33.8		11.6	19.1		4.0	7.8	100
Sample cases	2058	1540	950		2060	812		484	383	197	193	218	100

Note: *Questions relating to the symptoms of illness were not asked the 1992 survey round

4.1.3 Choice of health care provider

Table 7 shows seeking behavior by provider and relates it to income, gender and age categories. Utilization of other providers including traditional healers is relatively low, accounting for less than 3% for all categorizations. In other words, the majority of Ugandans who seek medical attention go to formal health facilities. Utilization of other providers reduces with increasing income.

Furthermore, between 1999 and 2002, there was an internal shift in the use of public health facilities regardless of the income. While the percentage of individuals seeking care at public hospital show a declining trend over the two survey rounds, an increasing utilization of the public clinic is observed. This shift was more pronounced among the poorest quintile where use of public hospitals declined from 21% in 1999 to 10% in 2002 and corresponding figures for public clinics were 20% and 33%, respectively. This trend can be attributed to the improved physical access of lower level health facilities. The HSSP mid-term review indicates that 400 new health centers II have been constructed. At the same time 180 health centers II have been up graded to health centre IIIs. This shift within the public sector from hospitals to use of clinics shows that people are accessing services at the lowest levels possible where unit costs for service delivery are lower.

Private clinics including private not for profit is the most preferred option for those who decide to seek care accounting for 42% in 1999 and 47% in 2002 (overall) of those who seek care. This is also the most preferred option for all groups, in urban and rural areas and in all regions in the two surveys. Notably, even for the poorest 20% in both surveys 36% in 1999 and 37% in 2002 sought care from private clinics. The poor and the non-poor alike still prefer private to public facilities. Both female and male sought more private care over the period of analysis. Disaggregating individuals into adults and children by gender according to income groups reveals some interesting results. Both men and women seek more private health care and less public care as incomes increase. However, the poorest men seek more private health care than government health care unlike poor women who seek more public care; and of the richest men and women, greater proportions of men seek private health care (see Figures 3 & 4). This is still consistent with an earlier study such as Hutchison (2001) that notes that the Ugandan population prefers the expensive private facilities to public health facilities. Indeed Hutchison (2001) argues that this preference may be explained by the differences in quality of services provided particularly staff attitudes towards patients. There is need, therefore to put in place a regulatory system, set standards and a monitoring framework to ensure quality of services and control prices in the private sector given that the majority of the population prefer using them. These have been put in place for the Facility based PNFP sector but not for the private for profit sector.

4.1.4 Facility level characteristics

The community survey collected health information from the most commonly used public and private health facility in the locality. In order to assess the effects of government's abolition of cost sharing in 2001, questions were asked regarding the situation before and after this policy change. This analysis is restricted to only those commonly used facilities that existed before the abolition of cost sharing.

Health personnel: Table 9 shows the shares of three categories of health workers; doctors; nurses and midwives; and other staff, before and after the abolition of cost sharing. The shares of full time nurses in public facilities significantly increased from 48.7% before the abolition of cost sharing to 57.7% after the abolition. This result is consistent with administrative data, which indicates that the proportion of established health position filled with qualified staff increased from 33% in 2000 to 42% in 2002 (GoU, 2003b). Turning to PNFP facilities, the shares of nurses and midwives marginally increased from 51.3% before cost sharing to 52.7 % after. It is only in the private for profit facilities where their shares significantly reduced

from 51.1% to 42.0%, indicating a labour shift to public facilities after the abolition of cost sharing. The major explanation for this shift is that public facilities were offering a better remuneration after the abolition of cost sharing compared to both private and PNFP facilities (Lindelow *et. al.*, 2003). The proportion of doctors remained more less the same after abolition of cost sharing. More noticeable is the very low share of fulltime doctors in private facilities in the northern region. Given that this is a full time private practise, it is very unlikely that doctors would go to a war torn area to engage in activity. The capacity of people to purchase services is very limited given the very low levels of income in these areas, which are also reflected in the relatively low expenditures on health as explained later. The observed higher increases in the proportion of nurses and midwives in public facilities compared to doctors could be explained by that fact that more nurses are being trained and are also easier to recruit compared to doctors.

Table 9: Shares of fulltime health workers before-after abolition of cost sharing (%)

Category of workers	Public		Private		PNFP	
	Before	After	Before	After	Before	After
Doctors:						
Rural	2.7	2.8	3.7	3.6	2.4	2.5
Urban	5.3	5.2	13.3	13.3	5.7	5.6
Central	4.1	4.2	3.9	3.7	5.3	5.5
Eastern	2.2	2.2	3.4	3.4	1.5	1.6
Northern	1.7	1.5	0.0	0.0	1.4	1.4
Western	3.9	4.2	8.6	8.6	6.7	6.7
Nurses/midwives:						
Rural	48.1	57.5	50.9	40.5	51.5	53.2
Urban	53.3	59.1	52.5	52.5	49.3	49.1
Central	57.3	59.3	55.1	51.8	43.1	38.1
Eastern	37.6	43.1	67.1	43.4	53.5	53.2
Northern	45.4	60.5	64.2	64.2	45.8	48.9
Western	53.7	67.7	26.2	26.2	65.7	64.8
Other health workers:						
Rural	46.4	39.7	45.3	55.9	46.0	44.3
Urban	39.3	35.7	34.1	34.1	45.0	45.3
Central	37.9	36.4	41.0	44.6	51.5	56.4
Eastern	58.4	54.7	29.6	53.3	44.9	45.2
Northern	50.1	38.1	35.8	35.8	52.9	49.7
Western	37.3	28.1	65.2	65.2	27.6	28.5
National average:						
Doctors	3.0	3.1	5.0	4.9	2.8	2.8
Nurses/midwives	48.8	57.7	51.1	42.1	51.3	52.7
Other health workers	48.2	39.7	43.9	53.1	45.9	44.4

Quality of services: Apart from health personnel, other facility characteristics also show a positive trend after cost sharing. Table 10 shows that average bed capacity in public health facilities increased from 40.1 to 48.7 after cost sharing. In addition, most health facilities report having adequate supplies of antimalarial drugs. This is to be expected as malaria accounts for over 50% of all reported illness in the country. However, there are no significant differences in antimalarial drugs availability before and after cost sharing. Also the availability of antibiotics is very high in both public and private health facilities although lower than that of antimalarial drugs. The availability of drugs is attributed to the increasing per capita expenditure on drugs from US$ 0.8 per capita in 1999/00 to US$ 1.2 per capita in 2002/03 (GoU, 2003a). Drug funds have been protected through guidelines that stipulate that a given percentage (50% of PHC funds and 40% for hospitals) should be spent on drugs. We however note that this level of expenditure still falls below the estimated requirement of US$ 3.5 per capita as pointed out earlier. On the other hand, the availability of a regular supply of

children's vaccines is twice as high in public health facilities than private health facilities. Specifically, 95% of public health facilities report having a regular supply of children's vaccines compared to 37% in private health facilities. This is because private facilities predominantly engage in curative health services and therefore not actively involved in provision of preventive services like immunization (Lindelow *et al.,* 2003).

Table 10: Quality of service characteristics, 2002/03

Facility characteristics	Public		Private		PNFP	
	Before	After	Before	After	Before	After
Bed capacity:						
Rural	30.5	40.0	12.1	11.8	83.3	81.8
Urban	110.4	112.1	10.5	9.8	103.9	105.2
Uganda	40.1	48.7	11.8	11.4	85.7	84.5
Admitting patients:						
Rural	70.4	70.1	51.2	47.7	82.9	83.9
Urban	84.1	85.3	55.6	50.8	83.4	85.6
Uganda	72.0	72.4	52.3	48.5	83.0	84.1
Availability of drugs:						
i)Antimalarials						
Rural	99.5	97.0	99.2	99.2	98.2	98.2
Urban	99.5	97.8	100.0	100.0	100.0	100.0
Uganda	99.5	97.1	99.4	99.4	98.4	98.4
ii) Antibiotics						
Rural	97.3	91.3	90.3	89.8	98.2	98.2
Urban	98.5	92.1	94.8	94.7	100	100
Uganda	97.4	91.4	91.5	91.0	98.4	98.4
ii) Oral re-hydration						
Rural	97.8	89.1	86.8	86.2	89.9	88.5
Urban	98.1	91.9	96.3	91.0	100	98.5
Uganda	97.8	89.4	89.2	87.4	91.2	89.8
Children's vaccines:						
Rural	95.5	94.8	34.6	34.6	88.1	86.7
Urban	97.6	97.3	43.4	43.4	97.5	97.5
Uganda	95.8	95.1	36.7	36.7	89.3	88.1

As discussed section 4.3, a quality score was constructed including availability of antimalarial drugs, antibiotics, children's vaccines, oral dehydration salts, sterilized needles and syringe, supply of bandages, equipment to sterilize needles and cooling system. The results are presented in Table 11. We focus our attention on patterns within each year than across the years, since across the years is a bit misleading given the fact that the facilities covered between the two periods are completely different. However, public health facilities score highly than their private for profit counterparts in both periods. For example, in 2003 only 4% of public health facilities had a score of less than four compared to 1% for NGO facilities and 9% for private facilities. Broadly speaking, the highest percentages of facilities with a score of 8 in 1999 were public and in 2003 were the PNFP. This better than average performance of NGO facilities may be attributed to the increased public funding to these facilities under

the public-private partnership. However, these results should be interpreted with caution since the number of private facilities considered in 1999 is smaller compared to 2003[9].

Table 11: Score index for quality of health services (%)

Score Index	Public health facilities		Private health facility		NGO health facilities (PNFPs)	
	1999	2003	1999	2003	1999	2003
1	-	-	-	1.0	-	-
2	-	0.8	-	4.2	-	-
3	-	1.7	2.1	3.3	3.7	1.4
4	1.3	3.3	10.9	14.9	17.9	2.4
5	1.2	6.8	14.3	22.2	21.5	10.1
6	6.7	17.2	13.4	22.7	23.0	5.1
7	21.6	24.6	14.1	12.4	12.8	9.9
8	69.1	45.5	45.2	19.2	21.0	70.9
Total	100	100	100	100	100	100
Observations	(741)	(688)	(190)	(306)	(123)	(94)

4.1.5 Access indicators

Physical access: We consider the information on distance to the nearest and most commonly used health facilities; time to the nearest health facilities; and endeavor to relate distance reported by individuals where they actually sought medical attention to the distances reported at community level.

Broadly speaking, since 1992 the availability of health facilities serving the communities within 3km from the village centre has improved a lot especially for the rural areas as presented in Table 12. However, eastern rural still lags behind other regions in terms of physical availability of health centres. This finding is consistent with the official reports of MoH indicating an increase in physical access across the country as result of new infrastructure set up in the districts[10].

[9] The larger 2002 sample is because the survey targeted public and private health facilities separately, which was not the case in 1999.

[10] According to the HSSP mid term review a total of 156 HCIVs have been set up. In addition 180 HC IIs have been upgraded to HCIIIs while 400 new HCIIs have been constructed in the last two and a half years (GoU, 2003a)

Table 12: Communities with health facility within 3km (%)

	Year		
Community location	1992	1996	2002
Place of residence:			
Rural	39.3	47.0	65.3
Urban	95.2	96.6	98.6
Region:			
Central	64.3	69.8	84.0
Eastern	37.6	41.5	56.0
Northern	39.5	50.6	71.5
Western	48.2	55.5	69.7
Region/place of residence:			
Central rural	47.0	55.2	76.1
Central urban	97.7	98.2	99.2
Eastern rural	31.7	35.7	51.1
Eastern urban	88.9	91.9	98.9
Northern rural	34.4	46.4	69.0
Northern urban	99.2	100.0	100.0
Western rural	43.8	51.4	67.0
Western urban	88.5	92.7	94.9
National, average	49.0	55.6	71.0

Table 13 presents the availability within the communities and distance to the nearest health facility by type of provider. Regardless of heath facility, the urban areas are closer to all facilities than rural areas. Traditional healers are most accessible geographically both in rural and urban areas. Over 70% of communities in Uganda report having a traditional healer with in their locality. This figure is highest in rural areas of the central and western region. However, an examination of those reporting illness indicates that less than 1% of those reporting illness consult a traditional healer. Therefore proximity might not directly translate to usage. The non-usage of the closest facility is further revealed by the comparison of the average distances for those seeking care with those reported for the most commonly used facility in the locality. For example, the average self reported distance to private facility is 4.8km compared to 3.6km for the most commonly used private facility. Furthermore in urban areas, the average self reported distance for those seeking care in a private facility is 2.7km compared to 0.9km according to the most commonly used private facility in the community. The possible explanations why individuals bypass nearest health centers include: first, quality of care offered. Second, the range of services provided by the different facilities may influence utilization of a given facility. For example, health care facilities with a laboratory may be used more than those without laboratory services. Third, religious inclinations may also influence utilization. For example, a catholic may prefer using a catholic based health facility as opposed to a muslim owned health facility even when it is nearer.

Table 13: Availability and mean distance (km) to nearest health facility

	Availability with in LC (%)			Mean Distance, km			Mean Time, minutes		
	All	Rural	Urban	All	Rural	Urban	All	Rural	Urban
Uganda:									
Public clinic	5.3	5.1	6.8	5.5	6.0	2.8	4.3	4.7	1.7

Public hospital	0.4	1.0	1.6	26.4	30.2	8.9	65.1	72.5	29.8
Private clinic	21.6	15.7	44.7	8.3	9.3	2.4	4.3	4.8	1.2
Private hospital	0.9	0.2	3.7	27.9	31.9	11.2	68.4	76.6	34.3
Pharmacy	8.2	5.4	20.0	19.2	22.3	3.7	58.7	66.2	20.6
Traditional healer	70.6	70.6	70.5	4.0	4.6	1.3	33.4	36.7	17.8
Central:									
Public clinic	4.7	4.7	4.6	5.5	6.6	2.9	4.4	5.4	2.0
Public hospital	0.1	0.0	0.2	19.7	25.9	8.1	49.7	60.0	60.0
Private clinic	38.1	27.6	56.7	3.1	27.6	56.7	1.7	2.0	1.0
Private hospital	2.0	0.8	3.8	18.4	25.2	6.8	48.9	60.0	30.0
Pharmacy	10.0	5.7	17.1	12.8	18.1	3.0	45.2	60.0	17.5
Traditional healer	78.3	81.4	72.7	2.3	2.9	1.4	25.0	30.0	18.7
Eastern:									
Public clinic	8.7	8.5	10.7	5.6	5.9	2.0	4.5	4.8	1.0
Public hospital	0.6	O.01	6.3	27.6	29.8	9.3	57.1	60.0	60.0
Private clinic	19.2	17.3	30.1	9.1	10.2	1.7	5.4	6.0	1.0
Private hospital	0.6	0.01	5.7	27.6	29.1	14.2	56.9	60.0	30.0
Pharmacy	8.1	5.4	30.8	19.7	20.9	5.5	57.6	60.0	30.0
Traditional healer	64.7	65.6	56.7	4.0	4.4	0.8	28.7	30.0	20.0
Northern:									
Public clinic	5.0	4.3	13.2	6.6	6.7	4.7	4.7	5.0	1.0
Public hospital	0.5	0.4	1.5	31.7	33.6	8.9	112.2	120.0	20.0
Private clinic	4.3	3.9	8.4	15.2	15.8	8.8	7.1	7.5	2.0
Private hospital	0. 1	0.01	0.8	44.8	45.7	34.3	115.2	120.0	60.0
Pharmacy	8.6	7.7	18.3	31.9	34.0	3.8	84.8	90.0	17.5
Traditional healer	59.2	58.3	69.6	3.7	3.9	1.4	42.9	45.0	10.0
Western:									
Public clinic	2.8	2.3	7.8	4.6	4.8	2.1	3.8	4.0	2.0
Public hospital	0.3	0.01	3.2	30.1	32.1	12.2	57.5	60.0	35.0
Private clinic	13.4	11.6	26.5	6.7	7.3	1.4	3.7	4.0	1.0
Private hospital	0.3	0.01	3.0	24.4	25.4	14.8	58.5	60.0	45.0
Pharmacy	5.4	3.3	23.7	17.4	18.5	5.9	57.5	60.0	30.0
Traditional healer	75.6	75.5	76.0	6.6	7.2	1.4	37.7	60.0	5.0

Distances are also reflected in the time spent traveling using the most common means to transport in search of care. As expected travel time is significantly lower in urban areas than in rural areas.

Financial access: We consider what households pay as a proxy for their ability to pay for health services. These expenditures include consultation fees, medicine, hospital/clinic charges, traditional doctor fees and others. It is not clear from the survey data whether transport costs were also captured.

Table 14 shows that the Ugandan households spent Ug.Shs. 24 billion per month in 1999/00 on health care services compared to Ug.Shs. 28 billion in 2002/03 corresponding to a 5.7% annualised growth rate. Taking the full sample as covered in 2002/03 raises the health expenditure to Ug.Shs. 29 billion, corresponding to a 7.3% annualised growth rate. For both survey, the expenditures were significantly higher among rural households than urban households. This is not surprising since the majority of Ugandans reside in the rural areas. On

per capita basis, the household out-of-pocket increased slightly from Ug. Shs. 13,639 (14,478) in 1999/00 to 14,113 (15,853) in 2002/03 in real (nominal) terms per annum, resulting into a 1.2% (3.3%) annualised growth rate. However, we would have expected a decline between these two survey rounds given the abolition of cost sharing.

Turning to expenditures per household some observations do emerge. The expenditures per households are significantly lower for the poorest 20% compared for the richer 20% regardless of geographical location as presented in Table 15. We also examine the distribution of health expenses by socio-economic characteristics of the household head (see Table 16). Households headed by individuals who are self-employed spend on average Ug.Shs. 9,787 per month compared to Ug.Shs. 15,152 by households headed by government employees, Ug.Shs. 10,814 by households headed by private sector employees. Expenditures per household seem to have a positive relationship with the level of education of the household head. In other words, expenditures are highest for households whose head is a male, having university education or employment by government.

Overall, households spent in real per capita terms, on average, Ug.Shs. 1,550 in 1999/00 and Ug.Shs. 1,703 in 2002/03 per month as presented in Table 17. Disaggregating health expenditures by place of residence reveals an increase in expenditure for rural household while a decline was observed for those households in the urban areas. However, households in the urban spend more than one and half times than their counterparts in the rural areas. Regional disaggregation reveals an increased in expenditure between the two surveys except for the central urban. The expenditures on health are relatively lower in the northern region compared to the other three regions. Several reasons could account for this, the relatively low percentage of the population seeking care compared to other regions as shown in Table 7; the presence of a number of NGO's who may provide free health services; the poor physical access (especially for the northern rural as shown in Table 12) compared to other regions which impacts negatively on health care seeking behaviour and higher population living below the poverty line such that they have no money to spend on health care. More importantly, the results seem to suggest that household health-related expenditures are positively related to the household income level in terms of per capita basis (see Table 17). Worth noting is a very wide gap between the lowest and top income quintile.

Table 14: Health expenditures, Ug. Shs

	1999/00				2002/03				2002/03F			
	Total health expenditures (mill)		Health expenditures per capita		Total health expenditures (mill)		Health expenditures per capita		Total health expenditures (mill)		Health expenditures per capita	
	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal
Monthly:												
Uganda	23,992	25,476	1,121	1,190	28,035	31,503	1,160	1,303	29,310	32,936	1,185	1,332
Rural	18,660	19,814	1,003	1,065	22,092	24,825	1,080	1,214	22,985	25,829	1,055	1,185
Urban	5,332	5,662	1,900	2,018	5,942	6,678	1,855	2,085	6,324	7,107	1,819	2,044
Central	9,500	10,088	1,532	1,627	12,606	14,166	1,684	1,893	12,606	14,166	1,684	1,893
Eastern	4,959	5,266	871	925	7,017	7,885	1,012	1,137	7,017	7,885	1,012	1,137
Northern	2,550	2,707	625	664	1,781	2,001	491	552	2,487	2,795	540	607
Western	6,983	7,415	1,283	1,362	6,631	7,452	1,183	1,329	7,200	8,091	1,152	1,295
Annually:												
Uganda	291,905	309,955	13,639	14,478	341,091	383,287	14,113	15,853	356,604	400,719	14,418	16,206
Rural	227,033	241,071	12,203	12,958	268,791	302,043	13,140	14,770	279,656	314,252	12,836	14,418
Urban	64,873	68,884	23,117	24,552	72,300	81,244	22,569	25,368	76,948	86,467	22,131	24,869
Central	115,585	122,732	18,639	19,795	153,374	172,348	20,489	23,032	153,374	172,348	20,489	23,032
Eastern	60,333	64,064	10,597	11,254	85,369	95,930	12,313	13,834	85,369	95,930	12,313	13,834
Northern	31,021	32,939	7,604	8,079	21,669	24,350	5,974	6,716	30,259	34,002	6,570	7,385
Western	84,965	90,219	15,610	16,571	80,680	90,660	14,393	16,170	87,602	98,439	14,016	15,756

Table 15: Monthly real household health-related expenditures per household, Ug. Shs

	All		Rural		Urban	
	1999/00	2002/03	1999/00	2002/03	1999/00	2002/03
Uganda:						
Poorest 20%	3,788	4,196	3,742	4,192	5,397	4,290
Top 20%	28,169	27,336	27,750	34,388	28,677	18,532
All	10,553	10,692	9,503	10,274	17,616	13,226
Central:						
Poorest 20%	4,591	4,474	4,515	4,476	5,468	4,445
Top 20%	32,031	28,801	32,293	44,036	31,880	16,859
All	15,962	13,604	13,883	13,624	20,782	13,548
Eastern:						
Poorest 20%	3,705	4,433	3,597	4,431	8,185	4,487
Top 20%	16,290	26,356	16,377	28,783	16,084	21,227
All	6,799	9,155	6,448	8,926	11,056	11,923
Northern:						
Poorest 20%	2,972	3,301	2,980	3,254	2,636	4,128
Top 20%	20,390	14,645	19,880	13,191	21,677	16,480
All	5,492	5,305	5,282	4,948	9,151	8,793
Western:						
Poorest 20%	5,123	4,690	5,122	4,712	5,241	4,072
Top 20%	29,673	26,120	31,587	25,197	21,762	29,781
All	12,891	12,375	12,769	11,975	15,108	17,107

Table 16: Month health related expenditures per household by characteristics of the head

	1999/00	2002/03
Gender:		
Female-headed	8,491	9,845
Male-headed	11,064	10,910
Education level:		
No education	8,289	7,583
Primary	9,948	9,185
Secondary	10,607	13,907
Post secondary	17,210	13,468
University	18,736	17,450
Not known	25,128	52,299
Employment status:		
Self employed	9,941	9,787
Paid govt. employee	10,934	15,152
Paid private employee	16,164	10,814
Not employed	10,955	18,867

Table 17: Monthly real household health-related expenditures per capita, Ug. Shs

	All		Rural		Urban	
	1999	2003	1999	2003	1999	2003
Uganda						
Poorest 20%	497	562	491	560	707	623
Top 20%	4,547	5,215	4,695	6,171	4,365	4,022
All	1,550	1,703	1,385	1,555	2,663	2,598
Central						
Poorest 20%	581	535	566	523	742	730
Top 20%	4,825	5,524	5,036	7,742	4,704	3,785
All	2,201	2,295	1,819	2,118	3,085	2,772
Eastern						
Poorest 20%	482	577	470	575	969	623
Top 20%	3,251	4,425	3,395	4,518	2,897	4,229
All	1,053	1,291	997	1,215	1,741	2,208
Northern						
Poorest 20%	422	497	422	491	424	593
Top 20%	4,635	4,183	4,978	4,924	3,771	3,248
All	908	965	879	909	1,418	1,509
Western						
Poorest 20%	626	651	626	656	603	528
Top 20%	4,885	5,170	5,160	4,945	3,751	6,064
All	1,917	1,942	1,884	1,839	2,510	3,164

In the survey round in 2002/03, individuals were asked to indicate the mode of payments for drugs and the results are presented in Table 18. Despite abolition cost sharing drugs are still being paid for in public facilities. Reasons for this finding could include; stock outs of drugs in public facilities and patients being asked to go and purchase these from pharmacies/drug shops. Much as the per capita expenditure on drugs is increasing, the current per capita expenditure of US$1.2 still falls far below the estimated requirement of US$3.5 per capita. These results tend to support our earlier finding that cost remains a major hindrance to accessing health facilities. The fact that drugs have to be paid for either partly or fully at public facilities seem to be translated into delays in seeking care, especially for the poor.

Table 18: Payments for Drugs for those consulting, by Health Care Provider (%)

Mode of payments for drugs		Uganda	Regions			
			Central	Eastern	Northern	Western
Free of charge	Health Provider:					
	Public Hospital	49.3	46.9	37.7	63.0	55.4
	Public Clinic	75.3	68.5	68.9	81.6	85.5
	Private Hospital	0.0	0.0	0.0	0.0	0.0
	Private clinic	0.0	0.0	0.0	0.0	0.0
	Pharmacy/Drug shop	0.0	0.0	0.0	0.0	0.0
	Other	20.3	10.7	23.5	20.7	38.7
Some purchased	Health Provider:					
	Public Hospital	30.3	29.2	37.8	23.9	27.9
	Public Clinic	16.1	22.8	20.7	11.9	8.4
	Private Hospital	12.5	10.4	9.4	18.7	8.5
	Private clinic	4.7	3.6	4.4	4.8	6.8
	Pharmacy/Drug shop	3.2	1.8	3.4	0.9	4.8
	Other	8.4	5.7	7.3	6.7	19.3
All purchased	Health Provider:					
	Public Hospital	20.1	23.8	24.5	13.1	16.7
	Public Clinic	8.3	8.7	10.9	6.4	6.1
	Private Hospital	87.5	89.6	90.6	81.3	91.5
	Private clinic	95.2	96.4	95.6	95.2	93.2
	Pharmacy/Drug shop	96.4	97.7	96.2	99.0	94.7
	Other	67.9	83.5	69.1	72.6	42.0

To summarize the key findings so far include: First, the health seeking behaviors of the socially vulnerable groups followed almost similar patterns as those of the less vulnerable groups. However, significant differences in rates of change are observed between these two groups. Second, as much as the governments' efforts to address the supply constraints especially physical access are supported by the data, cost and distance remain major hindrances to formal care accessibility. Third, there are mixed results on the quality of health facility after abolition of cost sharing. While the proportion of fulltime nurse increased in the public facilities, the other facilities recorded a decline; and for any provider the proportion of doctor remained constant. Notably, the availability of oral re-hydration, antimalarials and antibiotics significantly reduced in the public facilities though no significant differences are evident in the other facilities. Four, the out-of-pocket health expenditure remained more less constant between 1999/00 and 2002/03 and patients have continued to pay for drugs in public facilities even after the abolition of cost sharing. In the next section, we go beyond descriptive analysis to provide more insights on how each factor affects demand for health after controlling for other factors in a multivariate framework.

4.2 Econometric results

In this section we present the maximum likelihood estimation results of the nested logit model based on the specifications above. In the descriptive analysis above we were able to present the results for private and public provider divided further into hospital and clinics/health centers. Due to data problems as discussed in sub-section 3.4 we limit the analysis here to broader categorization, that is, private and public. This was purposively done to be able to incorporate facility quality indicators for a richer model specification. In other words, those reporting ill-health are faced with three health care choices, namely public, private and no care. The analysis is based on 13,193 individuals who reported ill-health in the 2002/03 survey round. Of these about 34% sought no care, 24% sought public while 42% sought private care. The results are presented in Table 19 including health care demand for the entire sample, adults and children. The estimated coefficients on the inclusive value are 0.442 for the entire sample, 0.333 for adults and 0.522 for children. These estimates are significantly less than one and significantly greater than zero. This confirms that the nested multinomial logit model is consistent with the utility maximization hypothesis and that the data rejects the standard multinomial logit in favor of the nested multinomial logit model. The value of the inclusive parameter in the adult model is closer to zero than for the other two models. In other words, there is a higher degree of substitutability between public and private care among adults compared to either children or the entire sample. All the estimated parameter coefficients are relative to no care option. There are for the most part consistent with the above descriptive analysis and the available literature on health care demand in developing countries.

There is no doubt that individual characteristics are important as determinants of health seeking behavior. The effect of gender is mixed. Considering the entire sample, while males are significantly less likely to seek care from public facilities relative to no care, no significant gender differences are observed for private care. No significant gender differences are observed in the model for children for any provider, whereas in the model for adults, males are significantly less likely to seek care from public providers. Comparing the entire sample and adults, it is evident that the tendency for female to seek public care is more pronounced among adults. The most plausible explanation could be the fact that women have low education and in turn low earnings and hence more likely to visit public providers.

With respect to the gender of household head, individuals from male-headed households are significantly more likely to seek care from any formal provider compared to their counterparts from female-headed households. However, the level of seeking care is relatively higher for private compared to public care; and the influence is greater for children than for adults.

Relative to the children under 5 years, the age effect is negative and significant, and is relatively greater for private than public provider. Generally the probability of seeking care from a public provider first declines with age and increases in the older ages. The individual aged 50 years and above relative to children under 5 years are the least likely to seek care from any provider compared to the other age groups. This is a group that was found to suffer most from non-communicable diseases, for which most individuals might not seek formal treatment. The negative and significant effect is also observed in the models for children and adults. Fig. 1 shows the mean predicted probabilities for different age groups. A shift away from seeking private care to either no care or public care is observed beyond 50 years of age.

Education enters the models in form of dummies with no education as the base category. While education for adults refers to their own attained level of education, children under 15 years were assigned education of the household head. The effects are mixed for private and public providers. The results suggest that having some education is associated with a higher probability of seeking care, though the effect is only significant for post secondary for public facilities. In other words, the demand for public care for education levels lower than post

secondary education does not significantly differ from that of individuals with no education. More noticeable, however, is the significantly increasing demand for private facility with increasing education with completed secondary education and above level having the strongest impact. While the probability of seeking public care increases significantly with the level of education among adults, no significant effects are observed among children. On the contrary, the probability of seeking private care is positive and significant for adults as well as for children except for those individuals with some primary education level in the latter category. The highly significant association observed between education level and probability to seek private care might be due to the fact more educated individual earn more income and more likely to afford private care. The mean predicted probabilities suggest that as education levels of individuals increases the probability of seeking private care increases in contrast to a declining probability observed for public. More noticeable is declining the probability of seeking no care with increases in education level.

Table 19: Health care demand models, 2002/03

Variable	Entire sample		Adults		Children	
	Coeff.	Chi-sq	Coeff.	Chi-sq	Coeff.	Chi-sq
Public:						
Constant	0.410	5.18 *	0.199	0.72	0.297	1.30
Male dummy	-0.090	4.84 *	-0.199	10.02 **	0.018	0.10
Age in completed years:						
5 – 14	-0.411	54.39 ***			-0.389	45.45 ***
15 – 21	-0.388	25.65 ***				
22 – 49	-0.270	23.45 ***	0.100	1.85		
50 plus	-0.449	31.32 ***	-0.053	0.31		
Education in levels:						
Some primary	0.018	0.10	0.140	3.17	-0.104	1.43
Completed primary	0.002	0.00	0.158	2.07	-0.136	1.49
Some secondary	0.059	0.62	0.095	0.84	0.035	0.10
Completed secondary plus	0.100	1.19	0.302	5.14 *	-0.078	0.35
Number of adults	0.026	3.44	0.012	0.43	0.036	2.78 #
Number of children	-0.022	4.61 *	0.005	0.13	-0.054	13.23 ***
Male-headed household dummy	0.152	10.12 ***	0.122	3.03 #	0.234	11.53 ***
Log. Consumption	2.929	14.93 ***	1.692	3.87 **	4.313	9.87 ***
Log. Consumption squared	-0.127	12.42 ***	-0.076	3.41 #	-0.183	7.71 **
Distance	-0.043	34.59 ***	-0.034	10.21 ***	-0.051	23.73 ***
Proportion of nurses	0.151	4.08 *	-0.018	0.06	0.331	7.25 **
Proportion of doctor	0.614	17.59 ***	0.434	5.69 *	0.777	12.04 ***
Quality score	0.026	6.62 **	0.015	1.74	0.035	5.07 ***
Region/place of residence:						
Central rural	-0.261	8.25 ***	-0.276	4.52 **	-0.266	4.25 *
Eastern rural	-0.426	19.40 ***	-0.444	9.80 ***	-0.442	11.05 ***
Eastern urban	-0.606	45.48 ***	-0.574	22.55 ***	-0.640	23.10 ***
Northern rural	0.058	0.27	0.197	1.39	-0.089	0.35
Northern urban	0.207	3.29 #	0.234	2.09	0.169	1.09
Western rural	0.096	0.99	0.267	3.76 **	-0.084	0.38
Western urban	0.079	0.59	0.289	4.19 *	-0.141	0.88

Variable	Entire sample		Adults		Children	
	Coeff.	Chi-sq	Coeff.	Chi-sq	Coeff.	Chi-sq
Private:						
Constant	0.936	67.44 ***	0.532	11.92 ***	0.948	32.13 ***
Male dummy	-0.060	2.32	-0.131	4.61 *	0.001	0.00
Age in completed years:						
5 – 14	-0.463	73.73 ***			-0.449	66.24 ***
15 – 21	-0.435	34.98 ***				
22 – 49	-0.319	34.81 ***	0.101	1.98		
50 plus	-0.638	63.90 ***	-0.174	3.52 #		
Education in levels:						
Some primary	0.070	1.55	0.136	3.07 #	0.016	0.04
Completed primary	0.153	4.53 *	0.216	4.18 *	0.114	1.27
Some secondary	0.174	6.17 **	0.171	3.03 #	0.187	3.36 #
Completed secondary plus	0.319	15.38 ***	0.411	10.98 ***	0.256	5.22 *
Number of adults	0.009	0.46	0.002	0.02	0.011	0.26
Number of children	-0.002	0.05	0.019	1.79	-0.028	3.89 *
Male-headed household dummy	0.197	18.03 ***	0.167	5.96 **	0.247	14.27 ***
Log. Consumption	7.540	33.07 ***	6.034	9.53 ***	8.729	24.09 ***
Log. Consumption squared	-0.349	30.60 ***	-0.285	9.24 ***	-0.399	21.51 ***
Distance	-0.011	14.76 ***	-0.009	6.15 **	-0.014	8.60 ***
Proportion of nurses	0.132	5.78 *	-0.008	0.02	0.286	9.45 ***
Proportion of doctor	0.158	5.23 *	0.092	1.38	0.218	3.85 *
Quality score	0.014	5.51 *	0.011	2.27	0.016	3.02 #
Region/place of residence:						
Central rural	-0.450	32.14 ***	-0.445	15.82 ***	-0.462	16.65 ***
Eastern rural	-0.709	84.74 ***	-0.714	42.93 ***	-0.709	42.04 ***
Eastern urban	-0.603	51.51 ***	-0.606	27.63 ***	-0.590	23.20 ***
Northern rural	-0.300	10.61 ***	-0.125	0.91	-0.449	11.89 ***
Northern urban	0.044	0.17	0.089	0.34	0.005	0.00
Western rural	-0.099	1.38	0.097	0.67	-0.299	6.25 **
Western urban	0.011	0.01	0.219	2.59	-0.216	2.38
Inclusive parameter	0.442	6.62 ***	0.33	3.34 ***	0.522	5.92 ***
Log likelihood	-13,372		-6,312		-7,020	
Observations	13,193		6,195		6,998	

Note: 1. The original parameter coefficients as estimated using the standard nested logit command in Stata and the estimated for hypotheses testing were rescaled to recover the underlying structural estimates as present in this table.
2. We report z-values for the inclusive parameter
3. Education level for children is that of the household head
4. Significant levels # p<0.10 * p<0.05, ** p<0.01,***p<0.001

The effects of household structure are as follows. Taking the entire sample, demand for public care increases with the number of adult members in the household, on the contrary increases in the number of children members reduces demand. However, none of these variables is significant for private provider relative to no care. In the model for children, the number of adults in the households has a positive and significant effect on the probability of seeking public care, while the number of children has negative and significant effects. This could perhaps be due to that fact that households with higher number of adults are more likely to get time off their normal activity and assist the household head/spouse to take sick children to visit a formal care. Alternatively, more adult members might translate into more time off the domestic chores, which time could instead be used to take sick children visit formal care provider. Although consistencies in the signs are observed for private facilities, the effect is only significant for the number of children in the household in the model for children. Notably, increases in the number of children in the households reduce demand for public care faster than that of private care. Finally, in the model for adults none of these variables is statistically significant.

All the three quality indicators, namely quality index, proportion of nurses and proportion of doctors in total health staff, have the expected signs and are statistically significant in most cases. There is greater demand for care in those facilities with higher quality score index for any provider relative to no care though not significant in the model for adults. However, the effect seems to be stronger for public facilities and also stronger for children than for the entire sample. These findings are consistent with those of Mwabu *et al.* (1993) for rural Kenya. Considering the entire sample, demand for care increases significantly with increasing proportion of qualified medical staff, though the effect is stronger for doctors than nurses for any provider. There are mixed effects, however, for the separate adults and children models. Increasing the proportion of doctors significantly increases demand for public facilities among adults but no significant effects are observed for private care. On the other hand, increasing the proportion of qualified health staff increases demand for both private and public care among children with a stronger effect for doctors than nurses in public facilities and the reverse is observed for private facilities.

The coefficients on distance show statistically significantly negative effects in all the models, suggesting that the probability of seeking care from any formal provider decreases with distance to the provider. The significant effect is no surprising since distance is highly related to the travel costs and is consistent with Hutchinson (1999). The magnitudes are more less the same between private and public provider relative to no care. This suggests individuals evaluate the opportunity cost of travel equally for both providers.

Geographical location to some great extent influence demand for health care relative to individuals residing in Central urban. As expected individuals residing in Central rural, Eastern rural, Eastern urban are significantly less likely to visit a public provider compared to their counterparts in Central urban. A similar trend is observed for private provider in all the models. This is not surprising since Central urban dwellers have higher incomes and more physical access to private facilities/public facilities than their counterparts in other locations. By contrast, for other geographical locations a positive sign though insignificant with the exception of Western rural is observed. In other words, residents in these locations are equally more likely to seek care from a public/private provider, as are their Central urban counterparts. In the model for adults, adults in Western rural are significantly more likely to seek care from a public provider whereas children are significantly less likely to seek care from a private provider.

Elasticities of demand: The factors other than price and income have been shown above to be important determinants in an individual's health seeking behavior. The coefficients on the individual consumption and consumption squared are statistically significant for any provider relative to no care as expected. Notably, the size of the consumption variables varies across formal care options. The significance of the consumption variables implies that cost of care and income, which enter the models via the consumption variable, are also important determinants. The influence of these two variables is explored by the analysis of elasticities. The income and

price elasticities calculated at mean levels for each health care option by income quintiles are presented in Table 20. Notwithstanding, the might be measurement errors in the derivation of the cost of care, the price elasticities are very revealing. As expected, the price elasticities are consistently negative with the exception of the richest income group seeking care from a private provider in the case of the entire sample and adults models. For all income quintiles, the elasticities are significantly higher (in absolute terms) for private providers than for public provider. This finding is consistent with most of the health care demand studies (such as Mwabu *et al.*, 1993 for rural Kenya). For instance, a 10% increase in the cost of care would result in a reduction in demand in public facilities by nearly 1% among the poorest 20% as compared to a reduction of more than 3% in private facilities, other factors remaining constant. It is also important to note that price elasticities for the poorest 20% are almost ten folds larger than those for the richest 20%, for public facilities. A similar pattern emerges for income elasticities as discussed later. The positive price elasticity for the richest 20% implies that richer individuals might be willing to pay a higher price for private care, so long as the services are perceived to be better.

The income elasticities all have the expected signs. More noticeable is the fact that demand is substantially more income and price elastic at lower income levels. In other words, health care demand among the lower income individuals is substantially more income and price elastic than among the richer individuals. We also observe that income elasticities are large relative to price elasticities. This finding suggests that income remains a crucial factor in individuals' decision to utilization health care in Uganda for any formal provider relative to no care. More important, the findings from this paper are consistent with the findings in other developing countries that found health demand care to be price and income inelastic.

In the models for adults and children some observations do emerge. We observe that income and price elasticities follow a similar pattern though children demand for care is more responsive to changes in price and income than that of adults.

Table 20: Price and income elasticities of health care demand

	Own price elasticities			Own income elasticities		
	Entire sample	Adults	Children	Entire sample	Adults	Children
Public:						
Poorest 20%	-0.075	-0.036	-0.125	0.104	0.052	0.169
Lower middle	-0.046	-0.020	-0.080	0.068	0.032	0.115
Middle	-0.033	-0.015	-0.059	0.053	0.026	0.089
Upper middle	-0.025	-0.010	-0.044	0.043	0.021	0.071
Richest 20%	-0.007	-0.001	-0.019	0.018	0.007	0.039
Private:						
Poorest 20%	-0.305	-0.221	-0.369	0.471	0.361	0.554
Lower middle	-0.133	-0.092	-0.162	0.234	0.179	0.273
Middle	-0.078	-0.047	-0.103	0.157	0.113	0.192
Upper middle	-0.037	-0.018	-0.053	0.096	0.066	0.118
Richest 20%	0.004	0.010	-0.003	0.023	0.012	0.034

In Table 21, we present the elasticities of the other factors evaluated at mean levels. For all models the elasticities with respect to proportion of doctors are positive and inelastic, higher the children's demand is relative more responsive than for adults. We observe a similar pattern for nurses with the exception of health care demand by adults, where the parameter coefficient was

negative and insignificant for any formal provider. More noticeable, children's demand for health care is more responsive to the proportion of nurses than to the proportion of doctors, it is nearly 6 folds in the public facilities. Furthermore, the responsiveness to demand from care by children is more elastic for availability of qualified health staff than it is with respect to cost of care in public facilities. Generally speaking, the elasticities with respect to distance are greater for public facilities than for private facilities.

Table 21: Own elasticities of health demand care

	Own elasticities		
	All	Adults	Children
Public:			
- Nurse	0.099	*ns*	0.204
- Doctor	0.027	0.019	0.034
- Distance	-0.117	-0.088	-0.139
Private:			
- Nurse	0.059	*ns*	0.123
- Doctor	0.008	0.005	0.090
- Distance	-0.019	-0.015	-0.022

5. Conclusions and implications for policy

In this paper we have presented a detailed descriptive analysis of the incidence of illness and utilization of health care services in Uganda, limiting the analysis to outpatients. More important, we go beyond descriptive analysis and investigate the determinants of health seeking behavior conditional of illness reporting. While the results base on the descriptive and econometric analyses are broadly consistent with what has been previously reported on health care demand in Uganda, they do yield a number of interesting findings that will presumably be valuable to policy makers and especially in the PEAP revision exercise. While the key determinants of health care demand are similar across sub-groups, the magnitude of their effects differs across sub-groups.

The level of formal education has a positive and significant on the probability of seeking formal care relative to no care. Education of the household head influences the probability of children visiting a private care provider though no significant effects are observed for public care. More importantly, investing in education will increase the probability of seeking formal care, as results have indicated that the probability of not seeking care decreases with increases in education. On the other hand, a preference for private care as education levels was also observed. This finding suggests that the health reforms and any other health-related policies should not sideline the role of the private sector in the provision of health care.

Evidently, quality of services influences the probability of seeking care. Thus improving the basic services such as availability of drugs, oral-rehydration and children immunization services, to name a few will lead to an increase in the utilization of formal care especially public care, among children. The results based on the descriptive analysis indicated that actually the cost of drugs is not free to all in the public facilities. This is not surprising given the existing under funding of drugs in these facilities. This calls for an increase in the budget allocated to drugs, though this needs to be done in a manner that it does not affect other budget allocations within the health sector.

The estimated positive effect of increasing the proportion of qualified staff especially doctors requires the attention of policy makers. Clearly training of more qualified health workers need not be emphasized given the on-going construction of new health centers by GoU. The plans by the Ministry of Health to increase the supply of qualified health staff from current levels of 1:1,466 should be supported. More importantly, the plan to increase the current staffing of qualified health workers of around 42% in 2002 in public facilities need urgent attention.

Household structure comes out as another factor affecting an individual's decision to seek care. With more adults in the household, demand for public care increases for entire sample and in particular that of children however, a decrease in demand was observed with increasing number of children for any formal care provider relative to no care. The latter finding combined with the fact that the over half of Uganda's population is below 15 years (UBoS, 2003) raises more questions than answers.

The price and income elasticities fall (in absolute terms) with increases in the income levels. In other words, the poorer individuals are more sensitive to price and income changes than the richer individuals. Put differently, the poorer individuals' decisions to use any formal provider are more price and income elastic than richer individuals. This implies any increases in the cost of care will reduce poorer individuals' utilization by more than that of richer individuals; whereas any increases in income levels, will increase the demand for the poorer individuals by more than that of richer individuals. Some would argue that with no other protective measures in place, abolition of user fees was in the right direction from the poor individuals' perspective and should be maintained. On the other hand, strategies aimed at increasing the incomes of the poor should be put in place, and those that are already in place such as under the Plan for Modernization of Agriculture should be strengthened to ensure full participation of the poor.

Preference for private care to public care is growing overtime even after the abolition of cost sharing and other efforts by the GoU to provide better services in the latter. The relatively high cost of care in private facilities compared to the public facilities has not deterred individuals from seeking care from them. In other words, cost of care is not the only factor important in individuals' decision to seek care, other factors are also important. It is not surprising that the abolition of cost sharing did not result in a shift in preference from private to public care, instead a shift was observed within public facilities from hospitals to health centers. On one hand, the current government's decision to reduce costs in PNFP through provision of subsidies should be supported in an effort to increase demand for these services. Although this imposes a challenge to MoH of putting in place a monitoring system to ensure quality of service provided by the private for profit providers.

The major reasons cited for not seeking care include cost of care and physical access. The regression-based results have further confirmed that these access factors contract demand for any formal provider care. As much as empirical evidence has indicated that more communities have physical access to public health centers within a radius of 3km, distance remains a hindrance to seeking care from these facilities. Thus, bringing health care services closer to all communities might increase utilization of such services especially those in Eastern region. This, however, will also depend on quality of services provided, as the results have also indicated that bypassing of the nearest health facilities is a common practice even in the rural areas.

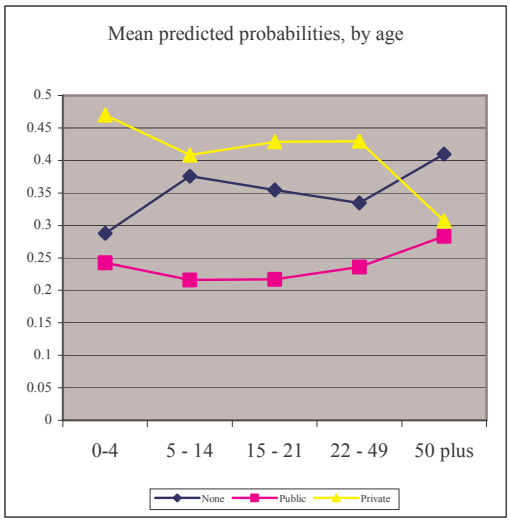
The percentage of individual seeking self-treatment was relatively high (12%), which definitely has implications for health status. A greater percentage of these reported suffering from malaria/fever (49%), of whom 10% used either herbs or painkillers only. The policy message here could be that public health authorities need to increase information and health education concerning self-medication.

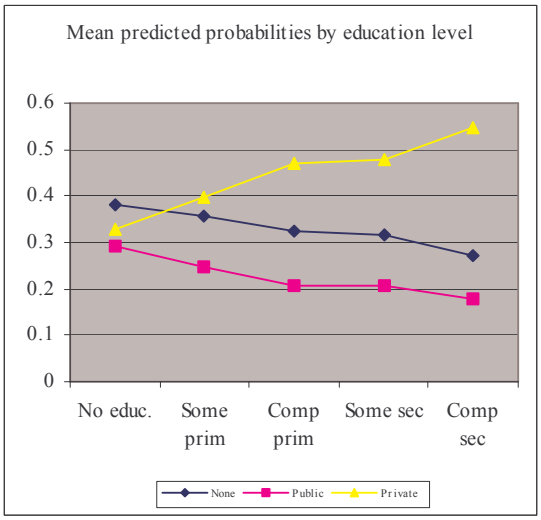
There is no doubt that six year of the implementation of PEAP and three years of HSSP have seen some increases in the utilization of public facilities by the socially vulnerable groups including the

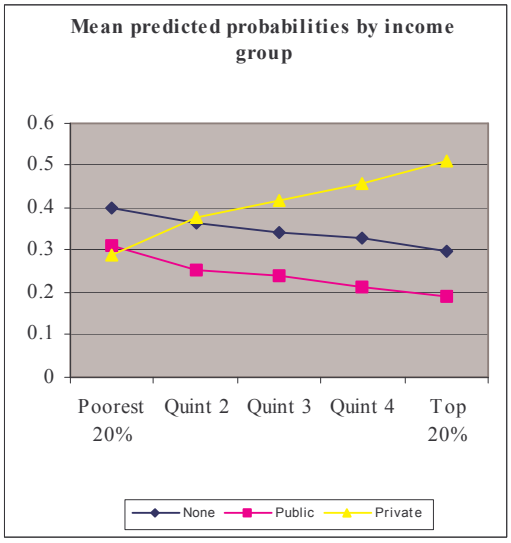
poor, women, children and orphans. The results have confirmed that women are more likely than men to utilise public facilities; children demand for care is more responsive to quality services and physical access for public provider than for private provider. The richer individuals have also benefited from GoU's efforts to strengthen provision of services in the public facilities, though the benefits are proportionately more for the socially vulnerable groups since the richer have a greater propensity to seek care from private provider. Therefore, strengthening of the provision of services in public facilities to meet the needs of socially vulnerable groups should continue to receive support it deserves from all the concern parties.

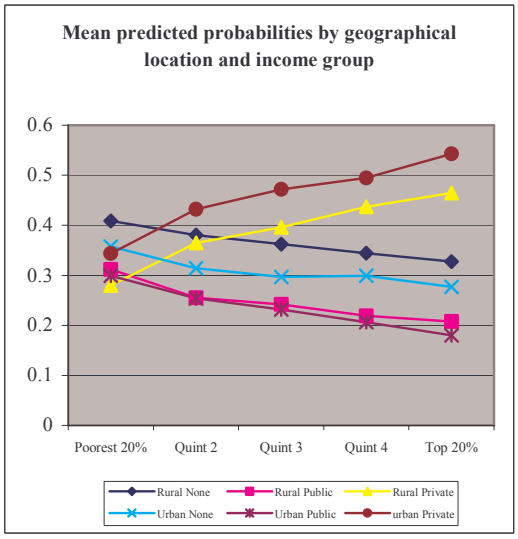
Last but not least, the results above indicated that individuals do not necessary visit the nearest health facility, especially public facilities. This finding, however, needs further investigation. This is especially important when the government is putting more money in the construction of new health centers.

Appendix 1: Mean Predicted probabilities for selected variables









Appendix 2: Computations of elasticities of health care demand

The own elasticity of $\Pr(\text{Provider} = j)$ with respect to the continuous variables affecting the health status and the consumption variable, Z, is expressed as (for details see, Train, 2003)

$$\text{(A1)}\quad E_{jz_j} = \left(\frac{\partial \Pr(\text{Provider} = j)}{\partial Z_j}\right)\left(\frac{Z_j}{\Pr(\text{Provider} = j)}\right) = \left(\frac{\partial V_j}{\partial Z_j}\right) Z_j (1 - \Pr(\text{Provider} = j)$$

The cross-elasticities of $\Pr(\text{Provider} = j)$ with respect to a variable entering alternative k is expressed as

$$\text{(A2)}\quad E_{jz_k} = \left(\frac{\partial \Pr(\text{Provider} = j)}{\partial Z_k}\right)\left(\frac{Z_k}{\Pr(\text{Provider} = j)}\right) \equiv -\frac{\partial V_j}{\partial Z_k} \bullet Z_k \bullet \Pr(\text{Provider} = j)$$

Since the continuous variables in affecting health status are assume to enter the utility in a linear form, $\left(\partial V_j / \partial Z_j\right)$ will be equal to the coefficient of that particular variable of interest. However, for price and income variables that enter the model via the consumption variable and in a non-linear form the $\left(\partial V_j / \partial Z_j\right)$ are given in equations (A3) & (A4), respectively.

$$\text{(A3)}\quad \left(\frac{\partial V_j}{\partial P_j}\right) = \frac{1}{Y}\left(-\alpha_1 - 2\alpha_2 \ln(Y)\right)$$

$$\text{(A4)}\quad \left(\frac{\partial V_j}{\partial Y}\right) = \left(-\frac{P_j}{Y^2}\right)\left(\alpha_1 + \alpha_2 (2\ln(Y) - 2\alpha_2\right)$$

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