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ABSTRACT

In order to achieve an 'optimal health system' health policies should not only be focused on the supply of health care, but also take cognisance of the demand for health care. Studies of health care demand in South Africa are scarce due to considerable data limitations. This analysis attempts to fill this gap by combining two data sets (specifically, the GHS 2004 and IES/LFS 2000) in order to be able to utilize the wealth of information regarding health care utilization in the General Household Survey. The aim is to inform and encourage debate on how to incorporate demand side considerations in order to arrive at improved public health care in South Africa.

Keywords: health care, demand for health, combining data sets, South Africa
JEL codes: D0, C2, I11, I18

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1. INTRODUCTION

The South African health policy debate is often dominated by supply side considerations, but should consider desirable goals for a health system. Feldstein (2006:1) argues that an optimal system would prevent "deprivation of care because of a patient's inability to pay", mitigate "wasteful spending", and allow care to "reflect the different tastes of individual patients". Health policies aimed at furthering these goals cannot then be designed merely around the organisation of the supply side, but have to take account of the demands[3] of those seeking health care.

It is increasingly recognized that the private sector, even in lower-income countries, plays a major role in the provision of health care. By implication, where demand for private health care outweighs public demand, increases in public sector health expenditures have not resulted in improved outcomes. Secondly, there is general recognition that, as a result of an over emphasis on the supply side of public health, governments have failed to provide effective health services. In fact, international evidence suggests that increased government spending on health has not typically related into improved health outcomes. Quantitative increases in the provision of health care do not necessarily translate into qualitative improvements in the health of ordinary people, as health outcomes are dependent not only on the efficiency of the public sector in supplying health care, but also on interactions between demand and supply within the market for health (Filmer et al, 1998: 11, 18-19; McGuire, 2006).

This analysis sets out to inform and further encourage debate on how to utilize demand side factors in the improvement of public sector health care in South Africa. Empirically oriented studies of this nature for South Africa are rare, given that researchers are seriously constrained by available data. The contribution of this analysis lies therein that it combines and manipulates two data sets in order to arrive at what seems to be consistent and meaningful results regarding the demand for health care in South Africa. It is organised as follows: Section 2 provides a literature review of the economics of health care demand. Section 3 describes the data and methodological aspects of the study, and includes a descriptive analysis of the current state of South African health care usage. Section 4 analyses the findings of formal empirical models of health demand. Finally, Section 5 provides a few concluding comments.

2. ECONOMICS OF THE DEMAND FOR HEALTH CARE

[3] Where demand refers to the "behaviour and inputs of the recipients or intended recipients of these efforts", whilst the supply-side can be defined as all "service delivery inputs such as human resources and supplies provided on the basis of formal sectoral planning by technical planners and managers" (Standing, 2004: 6).

2.1 THEORETICAL REVIEW

Background

Gary Becker revolutionized the sphere of microeconomics by making a distinction between market goods (bought with income earned in the market sector), and fundamental commodities (produced within a household using market goods as well as time inputs) (Grossman, 1972: *xv*). Focusing on individual as well as household characteristics and endowments which influenced productivity, Becker opened the way for inquiry into issues of 'household production' previously considered to fall outside the economic sphere.

One such example of this new approach in microeconomics was the formulation of an economic model of the demand for health and health care by Michael Grossman.[4] Grossman realised that like human capital, health capital is positively correlated with an individual's productivity in both the market and the household sector. Unlike human capital, however, health also determines the time available for productive activity. Furthermore, health (usually defined as healthy hours/days per year) can be produced as well as 'consumed' by individuals. In this manner, it enters the lifetime utility function of the individuals directly as a source of utility when health is 'consumed', and indirectly by determining income/wealth and consumption of other commodities. Given their initial health stock, individuals must (conditional on all other considerations) decide how much to invest in their health by consuming health inputs in order to maximise their utility (Grossman, 1999: 2-3).

Prior to Grossman, the demand for these inputs was set in the framework of demand for any final good or service which is dependent on the individual's tastes and preferences. These were in turn influenced by an exogenous state of health. However, these models of health demand were unsatisfactory since economic analysis could not explain the origin of tastes and thus could not predict the effects of changes in tastes on the demand for health services (Grossman, 1972: *xiv*). As a result, in previous models, the effectiveness of policy proposals could not be simulated. Grossman's insight was to recognize that individuals do not aim to maximise their health *per se*, but rather their overall utility. Thus, the demand for health inputs is a derived demand from the more fundamental demand for health, and explains why disinvestments in health through smoking, etc. may also be rational (Havemann & Van der Berg, 2003: 2; McGuire *et al*, 2001: 129- 130). A highly simplified version of Grossman's model is shown below:

$$\ln H = B_w \ln W + B_P \ln P + B_E E + B_t t + u_1 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

$$\ln M = B_{WM} \ln W + B_{PM} \ln P + B_{EM} E + B_{tM} t + u_2 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

[4] A complete overview of all other types of health care demand models can be found in Skordis (2003).

The disturbance terms u_1 and u_2 may be interpreted as depreciation rates, which are likely to vary even between people of the same age. In short, the model predicts (Equation 1) that health capital (*H*) and educational attainment (*E*), as well as the wage rate/income (*W*) should be positively correlated. However, health capital, the 'price of health' (*P*), and age (*t*) should be negatively correlated. Furthermore, assuming a marginal demand elasticity of less than one, the demand for health care (*M*) should be positively correlated with the wage rate/income as well as age, and negatively correlated with the price of health care and educational attainment (Equation 2)[5] (Grossman, 1999: 24-25, 28, 38-39).

2.2 LITERATURE REVIEW

As a result of the limited data available to researchers, most health care demand studies deviate from the equations outlined above. Nevertheless, the broad predictions of Grossman's theory are generally supported by empirical literature. Table 1 summarises a sample of recent developing country health care demand studies.

These empirical studies show that an individual's grasp of the quality and efficiency of the treatment received at various health centres is often underestimated. For example, several studies found that patients would be willing to pay for quality treatment when seriously ill even though they could consume a free or cheaper substitute at other, usually public, centres. Also, even though travel distance is often a significant determinant of health care demand, Leonard *et al* (2002) revealed an interesting pattern of health care usage in rural Tanzania. Individuals with a serious illness or injury would bypass a low quality facility in order to visit a higher quality facility. On the other hand, individuals with minor illnesses or injuries sometimes bypassed higher quality facilities to visit lower quality facilities, as these are considerably cheaper or even free. Qualitative research by Palmer *et al* (2003) also revealed that South Africans vary the type of health care they consume according to the nature of their illness or injury.

[5] In both models multicollinearity is introduced by theory as education and income are closely correlated in most cases. However, as long as the relationship is not exact, multicollinearity is not a problem (asymptotically at least) (Wooldridge, 2002: 104).

Table 1: Sample of recent developing country health care demand studies

Study	Data sample	Statistical methodology	Findings
Lindelow (2005)	1996/1997 Mozambique National Household Survey on Living Conditions (IAF)	Multinomial logistic regression	Income (proxied by consumption) relatively unimportant determinant of heath care choices; own-time price elasticity similar across quintiles; education and physical access most important barriers to utilisation
Lawson (2004)	1999/2000 Ugandan National Household Survey (UNHS)	Multinomial logistic regression	Travel distance and income have a significant effect on health care demand; educational attainment is negatively correlated with the demand for public health care; males are more likely to utilise private health care whilst females are more likely to utilise public health care
Sahn, Younger & Genicot (2003)	1993 Human Resources Development Survey (HRDS), rural Tanzania	Nested multinomial logistic regression (two levels)	Substantial degree of substitution between public and private health care; quality (proxied by availability of health personnel and drugs, as well as the general condition of the facility like the tidiness thereof etc.) plays an important role in determining health care demand
Havemann & Van der Berg (2003)	1993 South African Living Standards and Development Survey (LSDS)	Multinomial logistic regression	Private health care seems to be preferred over public health care; public health care portrays the characteristics of an inferior good; the nature of the illness/injury plays a significant role in determining health care demand
Leonard, Mliga & Mariam (2002)	Data from the Iringa rural district of Tanzania	Conditional logistic regression	Travel distance and quality of service (proxied by capability of staff etc.) have a significant effect on health care demand, the study reveals a pattern of bypassing dependent on the nature of illness/injury hinting at users' willingness to substitute between providers in order to maximise 'utility'
Gupta & Dasgupta (2002)	1994/1995 NCAER Human Development Indicator Survey (HDIS) and other village level data from rural India	Nested and non-nested multinomial logistic regression (two levels)	Private health care seems to be preferred over public health care; quality indicators significantly influence the demand for health care
Mocan, Tekin & Zax (2000)	1989 Household survey of urban Chinese families	Two-part as well as discrete factor model	Household characteristics and work conditions effect health care demand; demand is price inelastic and elasticity is larger (in absolute value) for poorer households

Akin, Guilkey & Denton (1995)	Household and health facility data from Nigeria's Ogun state	Multinomial probit regression	Income, price and quality indicators play an important and significant role in determining health care demand; urban residents, females and the more educated utilise proportionately more primary health care
Mwabu, Ainsworth & Nyamete (1993)	Household and health facility data from Meru rural district of Eastern Kenya	Multinomial logistic regression	Quality indicators and income have a significant effect on health care demand

Sources: See bibliography

The most recent comprehensive empirical study of the demand for health care in South Africa was undertaken by Havemann and Van der Berg (2003), using the 1993 South African Living Standards and Development Survey (LSDS). Factors which were found to influence the choice of health care consumed can be grouped into three categories: characteristics of the respondent at individual and household level, characteristics of the care received, and lastly, characteristics of the illness or injury suffered (Havemann & Van der Berg, 2003: 8). Public health care was found to portray traits of an inferior good, whilst the demand for private care corresponded to the demand for a normal good (where demand increases with an increase in income). Furthermore, the importance of the private sector in terms of utilisation even by poorer individuals was a central theme. The data set allowed simulation of a price decrease in all health care as it contained price information on all alternatives (public clinic visits were not yet free of charge in 1993). Simulating a decrease of R40.00 in all care options' price resulted in an increased shift out of public and into private care. Havemann and Van der Berg (2003: 22-23) concluded that health policy should take more cognisance of the demand side of health care, by aiming to encourage private sector participation, which might also ease the burden on scarce public resources.

3. DATA AND METHODOLOGY

3.1 ISSUES REGARDING DATA AVAILABILITY

Empirical analysis regarding South African health service utilisation is seriously restricted by available data. None of the household surveys conducted collected sufficient information on both health service utilisation and household income or expenditure. The General Household Surveys (GHS), for example, has higher quality information regarding health service utilisation but income and expenditure variables are restricted to household salary income. Specifically, the 2004 GHS data set could not be used to construct deciles[6] as 32% of the sample reported receiving no salary, and the

[6] For purposes of understanding variations in health care demand between higher and lower income groups, the sample is divided into 10 groups according to percentage, from poorest to richest. The 2004 version of the GHS is the latest available data.

monthly expenditure is captured as eight broad household expenditure categories. This necessity to approximate income, together with the fact that the GHS has no information on the costs incurred for the utilization of health care, serious limit the GHS as data source.

On the other hand, the Income and Expenditure and Labour Force Surveys (IES/LFS 2000) have their own limitations as a data source. The data set contains detailed information on both household income and expenditure, but the only health utilisation information available is via expenditure on health care and this is inadequate because of free public service provision to the poor. Furthermore, the reliability of the 2000 IES/LFS has been questioned by many in the research community. There are various reasons for concern, but most perturbing is perhaps the 38% gap between the income captured by national accounts and the household surveys. Further deficiencies of the IES 2000 have been well documented and include both sampling and data coding problems.[7] Nevertheless, although there are several concerns regarding the reliability of the IES/LFS 2000, it has been shown that analysis of the data set at high enough levels of aggregation can yield robust and plausible results consistent with previous findings in the literature (Burger *et al*, 2004).

Hence, for meaningful inquiry into the demand for health care in South Africa one option is to find a way to combine or link the information from the 2004 GHS and 2000 IES/LFS.[8] The amalgamation of different data sources is not a new idea. Many studies have attempted to play to the strength of different data sources by imputing values for variables between surveys.[9] This process of "out-of-sample imputation" (Alderman *et al*, 2003: 173) requires a sufficient set of corresponding variables to use in the modeling process. Also, it is most plausible if surveys are of the same year – given the implicit assumption that the models estimated in one survey apply to the other survey. If survey years differ one must be willing to make the additional assumption that parameter values for these explanatory variables in the model are constant over time. Finally, if the imputed variable is used to calculate some indicator of poverty or inequality then the imprecision of the indicator must be acknowledged by also computing standard errors (Alderman *et al*, 2003; Elbers *et al*, 2003; Demombynes *et al*, 2002: 2-3).

For this study the aim was to improve on the available salary and expenditure categories in the 2004 GHS. The model selection process and the diagnostics for the selected model are outlined below. These surveys contained enough common variables to facilitate the modeling.[10] However, since the

[7] See Simkins (2003), Poswell (2000) and Van der Berg (2005) for more details.
[8] Simkins (2004) outlines the process that was followed to clean and re-weight the IES/LFS data set that was used for this analysis.
[9] See Elbers *et al* (2000: 2-3) for a short literature review in this regard.
[10] Only variables with identical questions were considered – variables for which question formulation in the relevant questionnaires differed were eliminated as to make the model as transparent as possible.

survey years do not correspond, we had to assume constant parameters over time.[11] Finally, since the imputed values were only employed to construct income deciles in the GHS, the simulation of standard errors did not apply to our modeling.

Specifically, the set of variables available for model estimation fell into six categories. The first category relates to income sources and includes estimated salary income, whether individuals in the household receive any government grants, and information regarding the existence of any other form of financial support. The second category captures the structure of the household, including household size, number of dependents, etc. The third category contained geographical variables, such as rural and provincial dummies. The fourth group described the characteristics of the household head (e.g. age, literacy, educational attainment, race and gender). The last two categories were private assets and community resources.

In the model selection process both income and expenditure models were considered. Options included models for non-salary household income, pre-transfer household income, total household income and total household expenditure. There is also a possibility, not employed here, to use the eight household expenditure categories available in the GHS 2004 to their full advantage by devising a separate model for each of these expenditure categories. In order to choose between these two approaches, two main criteria were employed. The first of these was the correlation between income/expenditure as reported in IES/LFS 2000 and the predicted value thereof, and secondly the overlap when both these were used to construct deciles. Based on these criteria, a series of total household income regression models – matching each of the expenditure categories in GHS 2004 – were selected as the optimal approach. It was attempted to keep models as simple as possible, provided that they could pass statistical tests of robustness.

Although prediction was the ultimate aim for these models, the coefficient signs do not contradict economic intuition. The overall correlation between the estimated and actual per capita household income if the model is applied to the 2000 dataset is 0.86.[12] Furthermore, Table 2 below shows the overlap between the predicted and actual decile allocations. As indicated by the bold values, the model at least assigned most values to the correct or just adjacent deciles. It also appears that the model tends to under predict rather than over predict income. Further analysis of the 2004 GHS dataset proceeded based on the per capita income imputed from this procedure.

[11] Thus estimated household income in GHS with coefficients as modeled in IES/LFS and only adjusted for inflation between 2000 and 2004.

[12] Note that the model predicts **household** income. The per capita conversion occurs after the model has generated predicted values.

Table 2: Decile overlap of actual and predicted household income

Deciles of actual per capita income	**Deciles of per capita predicted income**										
	1	2	3	4	5	6	7	8	9	10	Total
1	**65**	**15**	5	4	3	2	2	1	2	1	100
2	**27**	**45**	**17**	5	2	1	1	1	1	0	100
3	**6**	**27**	**41**	**17**	5	2	1	1	0	0	100
4	1	**9**	**26**	**36**	**20**	5	2	1	0	0	100
5	0	2	**7**	**27**	**40**	**18**	3	2	1	0	100
6	0	1	2	**7**	**21**	**42**	**23**	2	1	0	100
7	0	0	1	2	**6**	**24**	**45**	**19**	2	1	100
8	0	0	0	1	2	**4**	**21**	**56**	**15**	1	100
9	0	0	0	0	0	1	4	**17**	**66**	**12**	100
10	0	0	0	0	0	0	0	1	**14**	**85**	100

Note:
Figures are percentages

Source: IES/LFS 2000

3.2 DESCRIPTIVE ANALYSIS

Information regarding health and health care utilisation in the GHS 2004 can be grouped into two distinct sets. The first set is comprised of general information at household level, including distance to the nearest hospital or clinic, where treatment is usually first sought, and medical aid membership status. The second set is at individual level and is conditional on the individual experiencing illness or injury in the past month. Information in this set includes nature of the illness, whether consultation took place, which health centre as well as health worker were visited, a rating of service delivery, and whether the individual paid for the service.

With respect to the first set, Table 3 summarises where respondents usually go to first when ill or injured, by decile of predicted per capita income.[13] Households throughout the bottom eight deciles prefer to visit public clinics at the outset of illness or injury. These facilities have a relatively large geographical footprint (see Figure 1 below, which even though it includes private clinics serves as a reasonable approximation, since the former are mostly situated in urban areas) and consultations are mostly free of charge. The second favourite alternative of this group is public hospitals. On the other hand, households in the two highest income deciles usually preferred to utilise care from private doctors when ill or injured. However, a significant portion of households in the second highest income decile indicated that they prefer to visit public alternatives first. This corresponds to findings of qualitative research which indicated that individuals sometimes utilise public care for treatment of less severe

[13] This table should be interpreted with care as there is evidence (see Palmer *et al* (2003)) that patients vary care chosen with nature of illness or injury. As a result, asking where households usually seek care first may be quite arbitrary.

illnesses or injuries, as well as chronic conditions, to economise on health care costs. These individuals nonetheless indicated that they would utilise private care if their condition did not improve (Palmer *et al*, 2003: 294).

Table 3: Households' usual first place of consultation when ill or injured

All observations

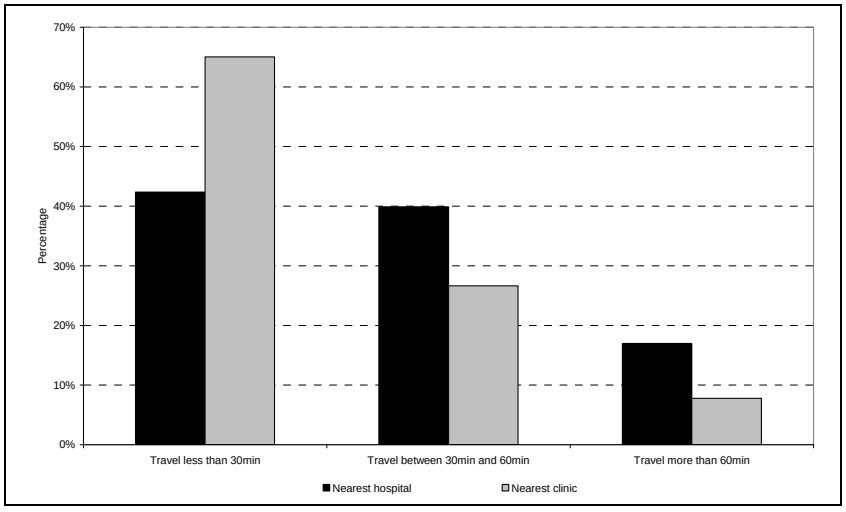
Decile of per capita income	Public hospital	Public clinic	Private hospital/clinic	Private doctor	Other	Total
1	26.6	68.8	1.0	2.8	0.8	100
2	26.9	69.0	1.1	2.8	0.2	100
3	24.2	69.4	1.2	4.8	0.4	100
4	27.0	65.1	1.3	6.0	0.6	100
5	28.2	62.1	1.6	7.1	1.0	100
6	28.4	59.4	2.1	9.3	0.8	100
7	29.8	53.6	2.7	13.2	0.7	100
8	30.4	41.9	5.4	21.2	1.1	100
9	21.6	20.3	14.3	41.5	2.3	100
10	8.4	4.3	25.4	60.4	1.5	100
Total	25.1	51.4	5.6	16.9	1.0	100

Note:
Figures are percentages

Source: GHS 2004 and own calculations employing models for income based on the IES/LFS 2000

Furthermore, it is noteworthy that a sizable number of lower income households choose to visit private doctors at the onset of illness or injury. In order to get a clearer picture of the trends, Table 3 was reconstructed separately for members and non-members of a medical aid benefit scheme (see Table 4 below).[14]

Figure 1: Travelling time to the nearest hospital and clinic



Source: GHS 2004

[14] One should keep in mind that the GHS 2004 question regarding medical aid membership was rather vague in the sense that it could include from a very basic hospital plan to a full benefit comprehensive package. The precise question is: "Is … covered by a medical aid or medical benefit scheme or other private health insurance?" (GHS 2004, Questionnaire: page 14).

As expected, medical aid members usually prefer to visit private facilities whilst non-members utilise public care. However, a significant number of non-members in the second highest income decile prefer private doctors. Also, non-members in the highest income decile strongly prefer private doctors. Interestingly, a significant number of members in the lower income deciles choose to visit public clinics. This could be as a result of having only basic coverage or to avoid member contributions for regular check-ups (see Footnote 14). Also, it corresponds with the discussion above relating to the findings of qualitative research.

Table 4: Households' usual first place of consultation when ill or injured (separated per medical aid membership)

Decile of per capita income	Public hospital		Public clinic		Private hospital/clinic		Private doctor		Other		Total	
	M	*NM*	*M*	*NM*	*M*	*NM*	*M*	*NM*	*M*	*NM*	*M*	*NM*
1	10.5	26.9	52.1	69.0	1.1	1.0	30.3	2.4	6.0	0.7	100	100
2	17.5	27.0	57.5	69.1	10.9	0.9	12.1	2.7	2.0	0.3	100	100
3	29.2	24.1	44.9	69.8	16.7	0.9	9.2	4.7	0.0	0.5	100	100
4	45.5	26.4	44.8	65.7	0.7	1.3	9.0	5.9	0.1	0.6	100	100
5	19.3	28.5	43.8	62.6	8.9	1.3	25.8	6.6	2.2	1.0	100	100
6	26.6	28.5	32.5	60.9	7.9	1.7	32.5	8.1	0.5	0.8	100	100
7	17.0	31.5	37.4	55.7	10.3	1.7	35.2	10.3	0.1	0.8	100	100
8	19.8	33.1	20.9	47.3	11.7	3.7	45.7	14.8	1.9	1.1	100	100
9	13.8	29.0	12.0	28.4	17.6	11.1	54.8	28.8	1.8	2.7	100	100
10	5.8	18.3	3.0	9.2	26.7	20.7	63.3	49.5	1.2	2.3	100	100
Total	12.3	27.9	13.3	59.5	19.6	2.6	53.4	9.1	1.4	0.9	100	100

Note:
M = MEMBERS and NM = NON MEMBERS
Figures are percentages

Source: GHS 2004 and own calculations employing models for income based on the IES/LFS 2000

Of the 97 197 individual observations, 11 139 or 11.46% of respondents reported that they had suffered from illness or injury in the past month. Descriptive analysis of this sub-set now constitutes the second set of available information.

The statistical design of the GHS 2004 allows for the weighting of individuals to be representative of the underlying distribution. Also, because the GHS 2004 is a household survey data set, as opposed to data collected from health centres, one may assume that respondents are ill at random. In support of this assumption Table 5 below summarises the characteristics of the GHS 2004 and the sub-sample of respondents who were ill or injured, indicating that the percentage share or representation with respect to race (although Whites are mildly overrepresented in the sub-sample), gender (here, females are slightly overrepresented in the sub-sample), and location are more or less in line. However, income deciles of the sub-sample highlight the significance of perception when responding, in that individuals in higher income groups are likely to be more sensitive to or aware of illnesses and injury. This

corresponds to the notion of subjectivity when assessing one's own health, as health or illness "means different things to different people" (Gilbert & Soskolne, 2003: 201). This trend was also observed for GHS 2003 with respect to expenditure deciles (Burger & Swanepoel, 2005: 8).

Figure 2 presents the distribution of the nature of the illnesses reported.[15] In correspondence with the findings of Havemann and Van der Berg (2003: 9), flu and blood pressure problems are the most common. The options did not include injury as an alternative, hence the unspecified category probably includes individuals who suffered an injury, those who suffered from illnesses not provided as alternatives, as well as individuals who did not wish to disclose their type of illness.

Out of this sub-sample, 9 676 or 83.5% consulted a health worker or facility. All results hereafter will be conditional on having experienced illness or injury during the past month. The distribution of the specific choices are summarised in Table 6. In order to simplify further analysis chemists, traditional healers, employer facilities and other alternatives were disregarded (these add up to only around 3% of total consultations). Also, since private hospitals and private clinics may be considered as substitutes, these will be treated as one category. This generalisation was also necessitated by the chosen statistical methodology, as the categories are too small on their own.

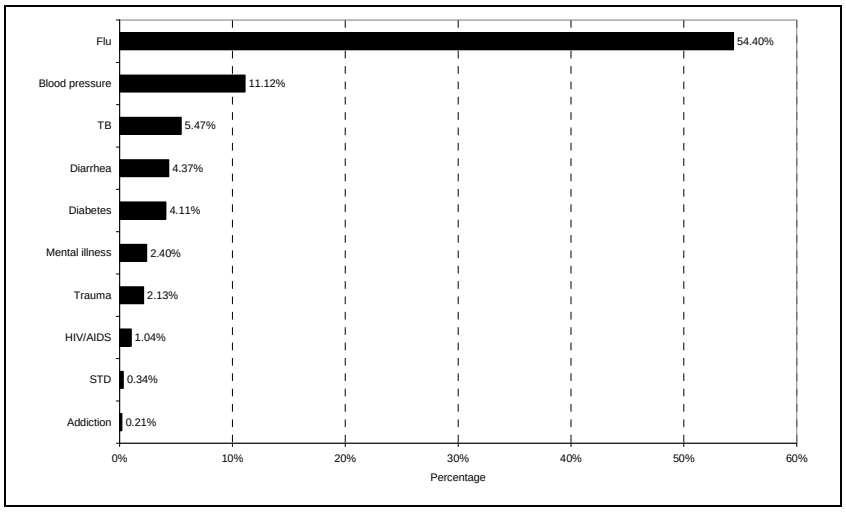
Table 5: Characteristics of the sub-sample

Deciles of per capita income	**Census 2001**	**GHS 2004**	**Sub-sample of individuals who were ill or injured**
1	10.0	10.0	6.9
2	10.0	10.0	7.7
3	10.0	10.0	9.2
4	10.0	10.0	9.8
5	10.0	10.0	9.8
6	10.0	10.0	10.9
7	10.0	10.0	11.1
8	10.0	10.0	11.3
9	10.0	10.0	10.7
10	10.0	10.0	12.5
Race			
Black	79.1	79.2	78.6
White	9.6	9.5	10.8
Coloured	8.9	8.8	8.3
Indian	2.5	2.5	2.3
Gender			
Female	52.3	50.8	56.0
Male	47.7	49.2	44.0
Location			
Urban	56.1	53.6	54.9
Rural	43.9	46.4	45.1

Note:
Figures are percentages
Source: Census 2001; GHS 2004 and own calculations employing models for income based on the IES/LFS 2000

[15] For further analysis, less severe illnesses like flu and diarrhoea were grouped and termed 'general diseases', whilst and TB and HIV/AIDS were grouped as 'serious illnesses'.

Figure 2: Illnesses reported in 2004 round of GHS



Source: GHS 2004

Table 6: Place of consultation – as reported in the 2002, 2003 and 2004 rounds of the GHS

Facility visited	**2002**	**2003**	**2004**
Public clinic	28.3	28.9	31.3
Private doctor	25.6	26.7	26.9
Public hospital	18.7	18.1	17.2
Private hospital	4.1	4.4	2.9
Private clinic	2.6	2.2	2.0
Chemist	0.9	0.9	1.1
Traditional healer	0.8	0.6	0.4
Employer facility	0.3	0.4	0.9
Other public	0.4	0.3	0.1
Other private	0.1	0.3	0.3
Alternative private	0.1	0.1	0.0
Self-treat	18.1	17.1	16.9
Total	100	100	100

Note:
Figures are percentages
Questionnaires for the three rounds of the GHS are identical concerning the section on health

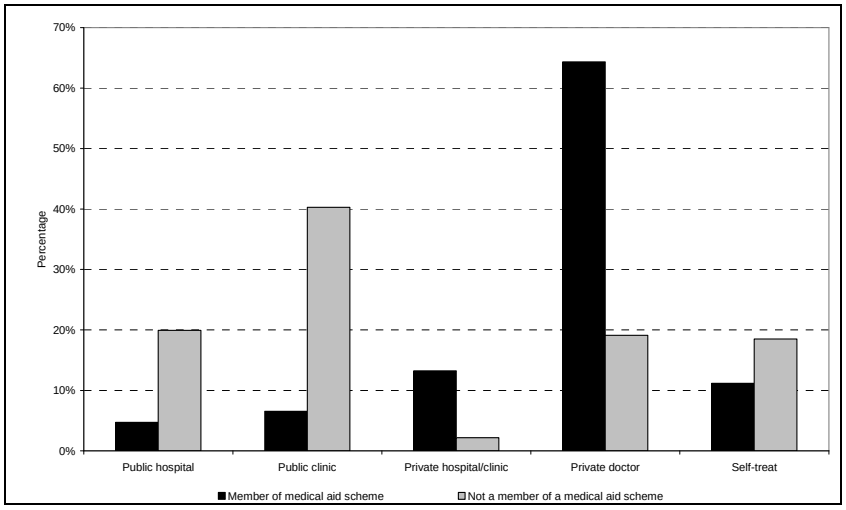
Source: GHS 2004; GHS 2003; GHS 2002

The pattern of utilisation stayed relatively stable between 2002 and 2004. Public sector utilisation dominates with roughly 58.51% consulting public facilities, whilst the corresponding value for private facilities is 38.81%. This is not in line with figures in Havemann and Van der Berg (2003: 2), where private utilisation dominated. However, their study used 1993 data and, as mentioned before, visits to public clinics were not yet free of charge then.

Around 20.97% of respondents who were ill or injured during the past month were covered by some form of a medical aid benefit scheme.[16] In correspondence with the trends observed in Table 4, Figure 3 shows that individuals who are covered by a medical aid scheme are more likely to consult private doctors, private hospitals or clinics. On the other hand, individuals who are not covered by a medical aid scheme dominate public clinic and public hospital utilisation, and are more likely to self-treat. However, it is interesting to note that around 19% of these individuals were willing to pay in order to consult a private doctor.[17]

Figure 4 decomposes choice of health care provider per income decile, and indicates that public care exhibits the property of an inferior good as the demand for public care decreases as income rises. Private care behaves like a normal good. These results are in line with that of Havemann and Van der Berg (2003). It is also noteworthy that more than 10% of individuals in ***each*** decile choose to visit private doctors (see Figure 4).

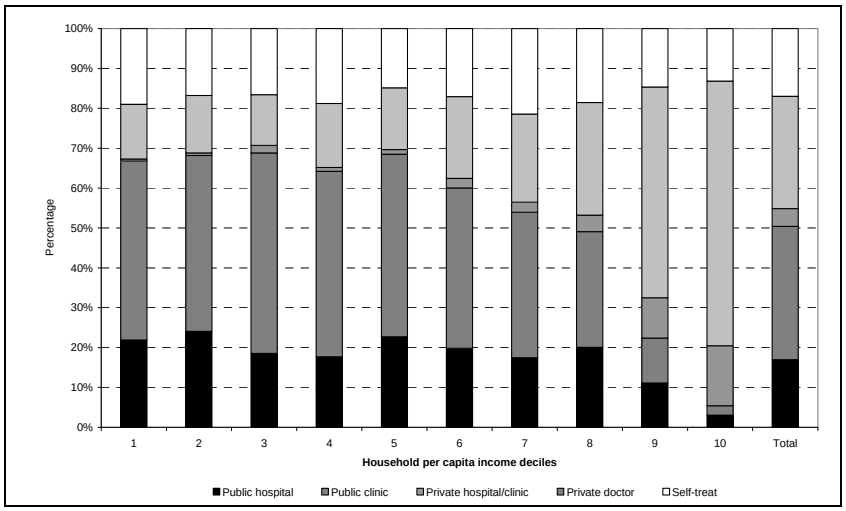
Figure 3: Health care provider choice by medical aid membership status



Source: GHS 2004

[16] For specific GHS 2004 question on medical aid membership, refer to footnote 14.
[17] This trend is in line with the figures reported in Palmer *et al* (2003), where 30% of individuals without medical aid paid to see a private doctor and 20% of these individuals were in the lowest income quintile (Palmer *et al*, 2003: 292). Internationally, it is estimated that 40-50% and 80% of household health expenditure is spent on private health care in Sub-Saharan Africa and India, respectively (Standing, 2004: 9).

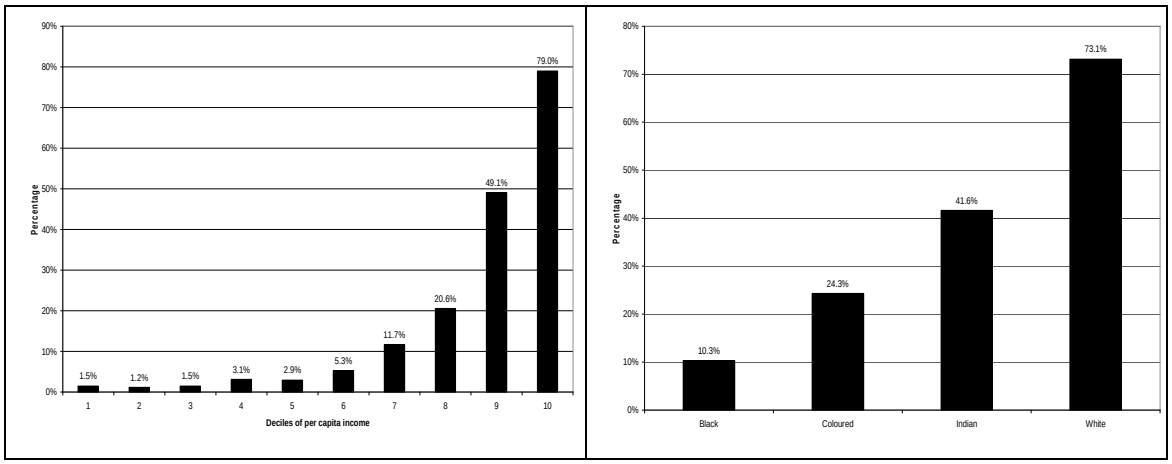
Figure 4: Health care provider choice per income decile



Source: GHS 2004 and own calculations employing models for income based on the IES/LFS 2000

Also, as expected, medical aid membership is dominated by individuals in the top two deciles and membership above 10% is only reported from the seventh decile (as shown in Figure 5). Given the legacy of apartheid, medical aid membership (see Figure 5) and hence also health care utilization patterns differ substantially between races as indicated by Figure 6.

Figure 5: Medical aid membership per income decile and race group

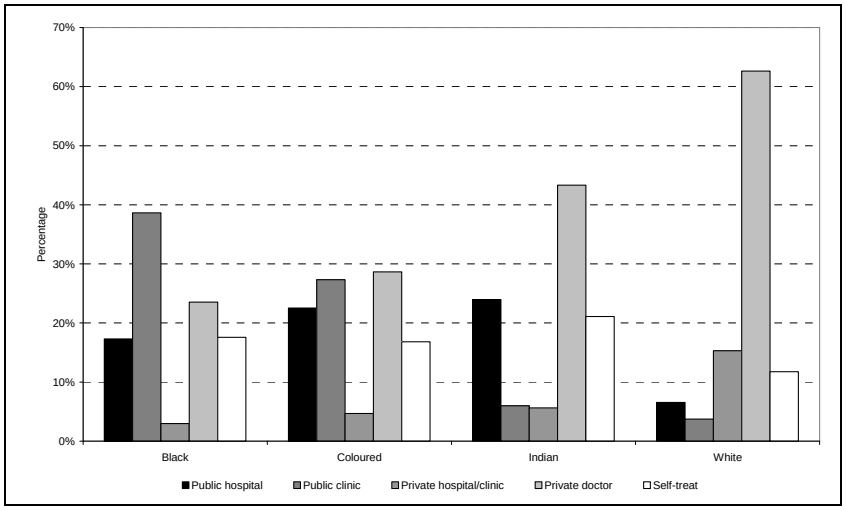


Source: GHS 2004 and own calculations employing models for income based on the IES/LFS 2000

Even though a significant percentage of Africans chose private doctors, most visited public clinics. In all other races the majority consumed care from private doctors however, a substantial portion of Coloured individuals visited public clinics. An interesting trend is that utilization of public hospitals is larger within the Indian and Coloured communities than for African individuals. Lastly, Whites prefer

private health care, with the utilisation of public care being significantly lower for this group. In line with the above, medical aid membership also has a strong racial bias, as is shown in Figure 6. Around 73% of Whites are members of a medical aid scheme whilst the corresponding values for Indians, Coloureds and Africans are 41%, 24% and 10%, respectively.

Figure 6: Health care provider choice per race group

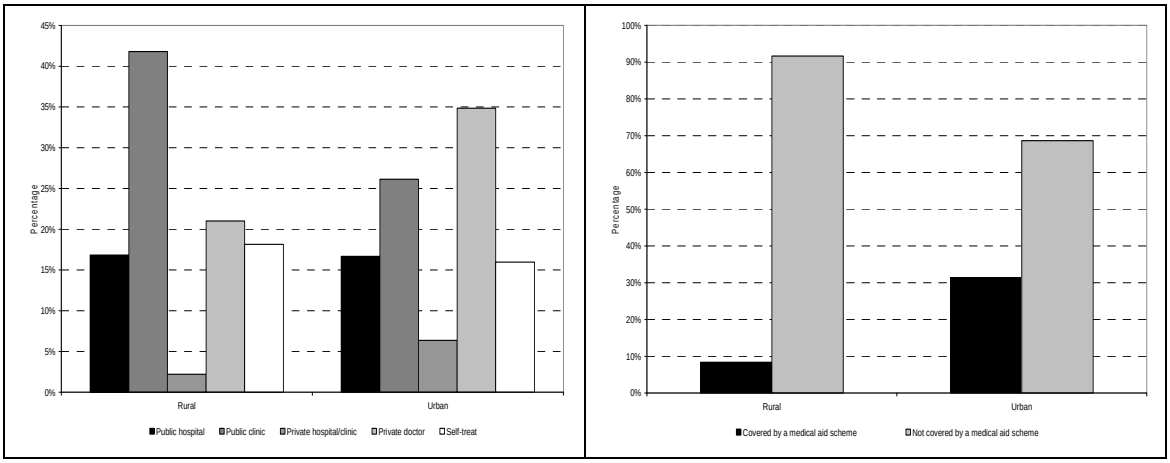


Source: GHS 2004

Trends in health care utilisation and medical aid membership also vary along geographical lines, as shown in Figures 8 and 9 below, respectively. Individuals resident in rural areas are more likely to consume health care from a public facility than those living in urban area. This may be due not only to the fact that public clinics have a large geographical footprint, but also because rural individuals are more likely to fall into lower income groups. Also, many of these individuals chose to self-treat. Private doctors outperformed all other facilities in supplying medical care to urban individuals. However, public clinics were the second most visited facility in these areas. Many individuals again chose to self-treat, but less than in rural areas. Lastly, public hospital utilisation did not reveal any geographical bias.

Furthermore, medical aid membership was more common in urban than rural areas. Roughly 9% of rural respondents reported being members of a medical aid scheme, whilst the corresponding value for urban respondents was about 31% (see Figure 8). Given these trends, it is noteworthy that around 21% of individuals resident in rural areas visited private doctors, as shown in Figure 8.

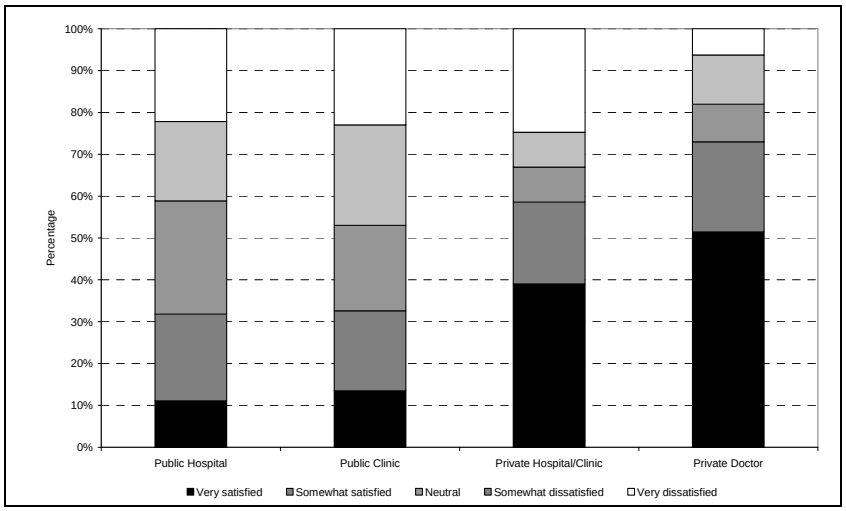
Figure 8: Facility visited and medical aid membership per location



Source: GHS 2004

Individuals were also asked to rate the service they received given the alternative chosen. Figure 9 summarises this per facility.[18] Patients were mostly very satisfied with the service they received. However, this is true for substantially more individuals who utilised private rather than public care. Also, it seems that private care received better ratings in general, and patients of private doctors specifically were the most satisfied with the service they received.

Figure 9: Rating of service delivery per facility visited



Source: GHS 2004

Furthermore, when these ratings are considered from an income decile distribution perspective, a clear trend of increasing dissatisfaction is observable as one progresses from higher to lower income individuals (see Table 7). This is to be expected, given that lower income individuals usually utilise

[18] Hence percentages across the five ratings sum to a hundred for each alternative provider of health care.

public care. Also, these trends correspond to that of the GHS 2003 with respect to expenditure deciles, as described in Burger and Swanepoel (2005: 15).

Table 7: Rating of services per income decile

Decile of per capita income	Very satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Very dissatisfied	Total
1	58.7	23.3	6.7	2.6	8.7	100
2	62.9	23.0	3.0	4.5	6.6	100
3	64.8	23.2	3.0	2.2	6.8	100
4	62.5	21.7	3.3	4.3	8.2	100
5	64.6	22.3	4.7	4.3	4.1	100
6	66.9	17.9	5.1	3.8	6.3	100
7	71.0	15.4	2.3	5.1	6.2	100
8	66.9	20.2	3.2	5.5	4.2	100
9	84.5	9.5	1.7	1.4	2.9	100
10	89.6	6.8	0.7	1.3	1.6	100
Total	70.5	17.6	3.2	3.4	5.3	100

Notes:
Figures are percentages based on individuals who did not self-treat

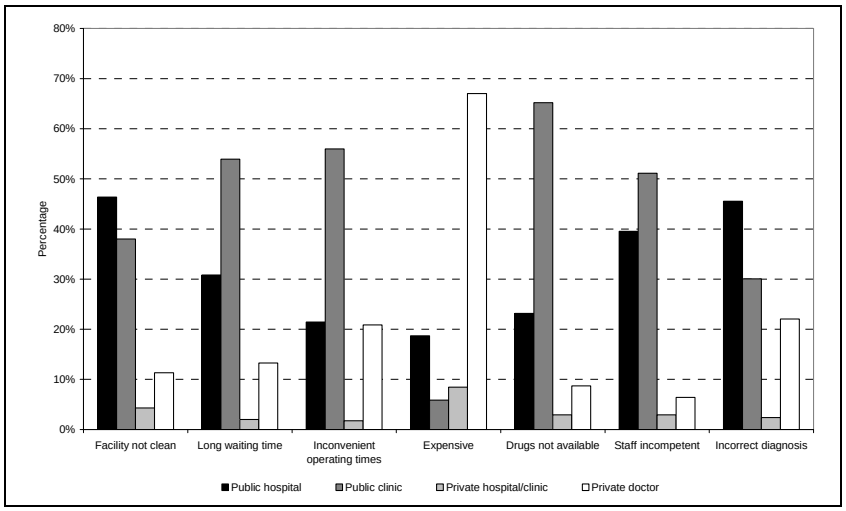
Source: GHS 2004 and own calculations employing models for income based on the IES/LFS 2000

In addition to the above service delivery rating, individuals were asked whether they had any negative experiences. Figure 10 shows that public facilities performed more poorly than private facilities in all respects except expense. More specifically, most individuals who reported the facilities as dirty or unhygienic, or who were incorrectly diagnosed, had visited public hospitals. In addition, more than 50% of all individuals who considered the waiting time too long, the operating times inconvenient, or the staff to have been rude and uncaring, were patients of public clinics. Around 65% of all individuals who found that their prescribed drugs were unavailable had visited public clinics.[19]

The general findings discussed here correspond strikingly with case studies summarised in Palmer (1999: 98-100), whose focus group-type analysis revealed the same motivations behind the trend of poorer individuals substituting private for public care. Palmer (1999) also noted that the likelihood of consulting a doctor played a large part in determining whether an individual made use of a facility. Our study finds that only 11.5% of individuals who visited public clinics consulted a doctor, with the bulk (88.2%) being treated by nurses. Also, chances of seeing a specialist at public sector facilities are slim.

[19] The National Primary Health Care Facilities Survey 2003 found that only 10% of these facilities have all of the 25 drugs on the 'Essential Drug List' in stock (Health Systems Trust, 2004: *x*).

Figure 10: General comments about service delivery



Source: GHS 2004

Table 8: Health worker consulted at the facility visited

Facility visited	Nurse	Doctor	Specialist	Other	Total
Public hospital	22.8	74.9	1.2	1.1	100
Public clinic	88.2	11.5	0.1	0.2	100
Private hospital/clinic	10.0	80.5	7.9	1.6	100
Private doctor	0.7	91.9	6.6	0.8	100

Note:
Figures are percentages based on individuals who did not self-treat

Source: GHS 2004

In regard to patient's criticism of public health care, Palmer's (1999) group interviews revealed that most individuals considered complaints as pointless, and that these could even lead to poorer service in the future. In contrast, the same groups felt that the private sector delivered quality care precisely because payment could entitle patients to better treatment. Respondents also indicated that they would always prefer to utilise care from private doctors if possible (Palmer, 1999: 98-100).

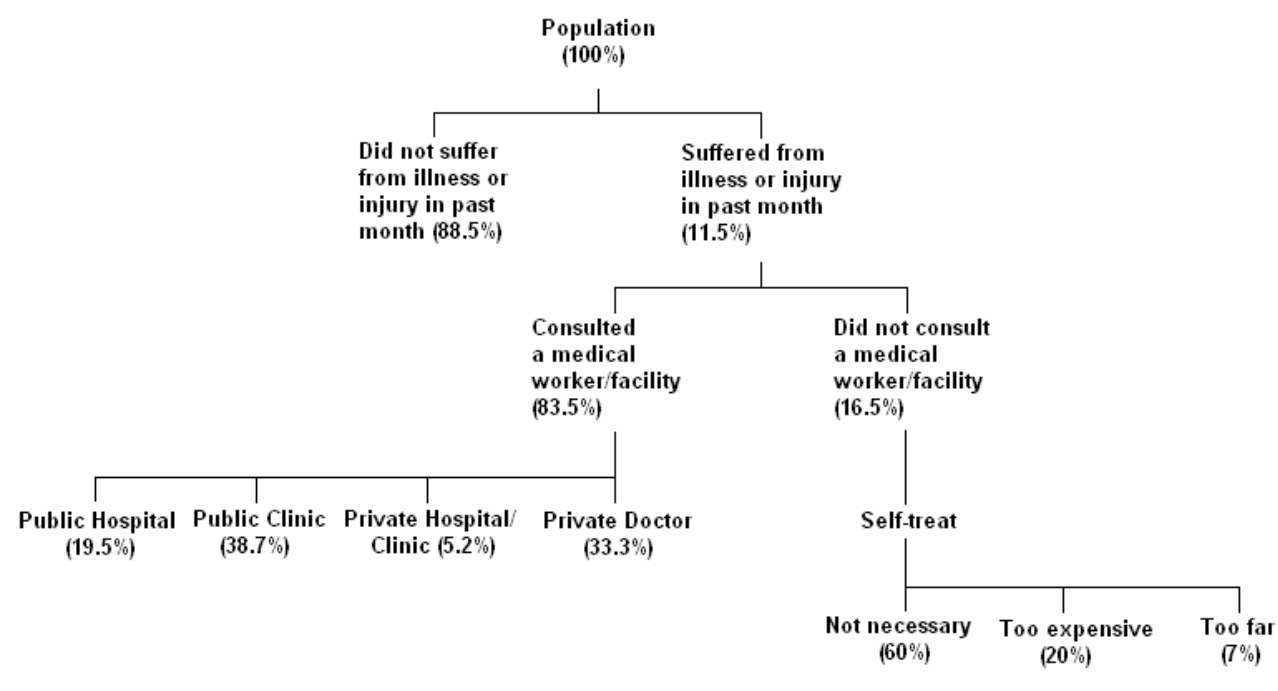
All of the above findings serve to highlight the inferior nature of public care. Even members of the lowest income decile are willing to pay for private health care, and the demand for public health care falls as income rises[20]. The poor quality of customer service in public institutions is the primary obstacle to utilization. This poses an immense challenge to the public sector, as service delivery desperately needs to improve. Unless service improves, increases in public health expenditures will have little effect on health outcomes and equity of access for the poor.

[20] See for example Usdin (1993), Goldstein and Price (1995), Palmer (1999) and Palmer *et al* (2003) for other studies of private care utilisation when the same care could (in theory) be consumed free at a public health centre.

3.3 STATISTICAL METHODOLOGY

An individual's decision to utilise health care is best analysed as the outcome of a multi-stage decision making process (as summarised in Figure 11). Upon awareness of an illness or injury the individual must first decide whether or not to seek treatment, and then which health facility to consult. Modelling health care demand as a set of rational choices is allowed by employing binary response models (Havemann & Van der Berg, 2003: 5; Jack, 1999: 68; Mwabu, 1986: 315). For this analysis the multinomial logistic (MNL) regression model is used.

Figure 11: Health care utilisation decision tree



Source: GHS 2004

The Grossman health care demand model provides an *a priori* case for the inclusion of certain explanatory variables, as discussed earlier. Unfortunately, the data available to the researcher usually shape the group of possible independent variables. Independent variables included in the MNL regression models, can be roughly grouped into six sets. The first relates to household income and includes asset ownership and whether someone in the household receives a government grant. The second captures household demographics and the characteristics of the head of the household. Thirdly, dummies indicating geographical characteristics of the household are included. The fourth set contains individual level characteristics like the age, gender, educational attainment, relation to the head of the household, medical aid membership, as well as whether the individual suffers from certain conditions

like epilepsy and diabetes. The last two sets includes dummies to indicate the nature of the illness or injury experienced and the rating of the service received at facility utilised, respectively.[21]

Two interesting options arise with the modelling of health care demand in this context. The first is to model demand separately for medical aid members/non-members. This was explored, but does not add significantly to our understanding of the trends and is thus not reported here. Secondly, if price data is available one may undertake some policy simulations. The greatest disadvantage of the GHS 2004 is that the data set has no information on prices of services utilised. This implies that no policy simulations, like that of Havemann and Van der Berg (2003) discussed earlier, are possible.

4. EMPIRICAL RESULTS

Models of household behaviour are usually undermined by not only the prevalence of measurement error, but also multicollinearity introduced as part of the underlying theory – like the inclusion of both income and education as independent variables. The predictive power of the model for health care demand constructed in the analysis is not very strong, as indicated by Table 9 below. However, given the data available for analysis, the most sensible statistical model possible was specified (see Table A2 in Appendix A for detailed output).[22] The fact that the model produced reasonable as well as theoretically consistent results was encouraging.

4.1 SIGNIFICANT FACTORS

As expected, income significantly affects the pattern of health care utilisation. In order to get a clearer picture of the trends, Figure 12 shows a graphical representation of utilisation trends. Individuals up until the fourth income quintile still utilise a sizable amount of public health care, whilst private care utilisation dominates in the fifth quintile. Other noteworthy trends include that individuals in each quintile choose to consult private doctors, and that higher income individuals are less likely to self-treat.

With respect to income related variables, individuals from households where a member receives a government pension are more likely to utilise private care. However, in the case of disability and child support grants they are more likely to consult public facilities and public clinics, respectively. The ownership of assets (television sets and motor cars) is correlated with the utilisation of private care.

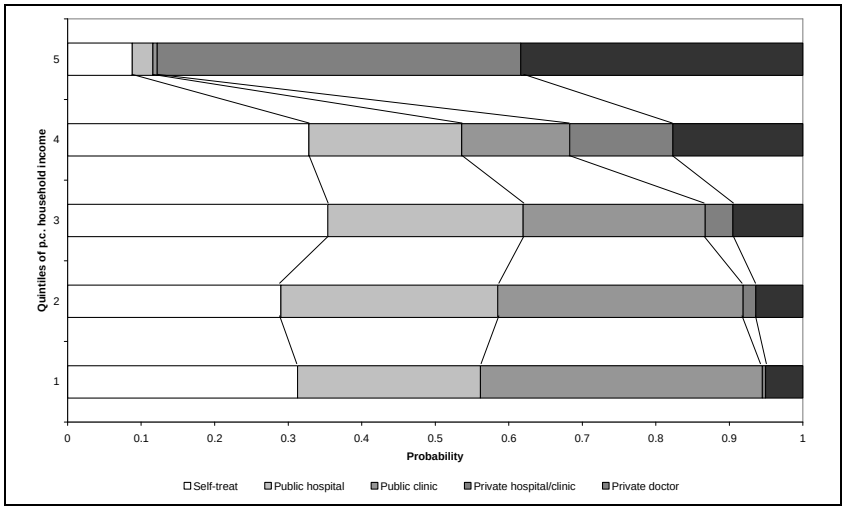
[21] The summary statistics of all relevant variables can be found in Table A1 (Appendix A).
[22] The results of a series of post-estimation tests are also shown in Table A2 (Appendix A). The model passes the basic F-test and rejects the hypothesis that categories may be collapsed.

Table 9: Actual versus predicted choice

Actual choice	**Predicted choice**					
	Public Hospital	Public Clinic	Private Hospital/Clinic	Private Doctor	Self-treat	Total
Public Hospital	**52.1**	20.3	8.4	4.4	14.8	100
Public Clinic	23.7	**44.9**	3.6	4.7	23.1	100
Private Hospital/Clinic	7.7	5.9	**60.8**	15.8	9.8	100
Private Doctor	11.4	15.1	26.1	**32.1**	15.3	100
Self-treat	16.4	22.5	8.9	11.8	**40.4**	100
Pearson Chi Squared (16) = 3.9e+03		*Pr=0.000*				

Note:
Figures are percentages

Figure 12: Conditional probability plot[23] – income quintiles



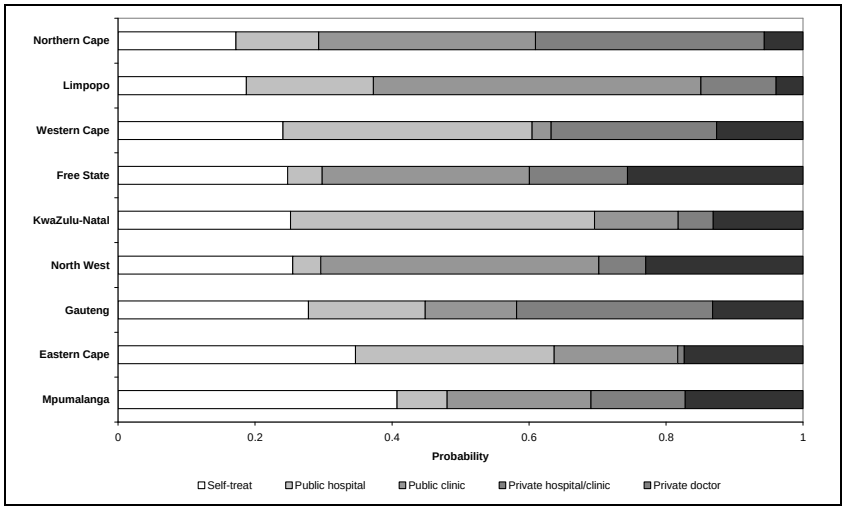
The proportion of working household members seems to be the only household demographic characteristic that significantly influences the demand for health care. Individuals from households with a higher worker proportion are less likely to visit public clinics. The age as well as the education of the household head significantly affects health care decisions. More educated household heads are negatively correlated with public care utilisation as well as self-treating. Also, individual from households with older heads are less likely to self-treat.

Patterns of health care utilisation differ significantly between provinces (see Figure 13). The starkest trends are that private doctor consultations are the lowest in the Northern Cape and Limpopo, whilst these are the most popular in the Free State and the North West. Furthermore, private hospital or clinic utilisation is limited in the Eastern Cape, Kwazulu-Natal and the North West provinces, but common in the Northern Cape, Gauteng and the Western Cape. Also, individuals from the Western Cape are the least likely to visit public clinics. Other provinces where public clinic utilisation is relatively low are

[23] These plots present a graphical representation of the multinomial logistic regression model above, where only the relevant variable changes whilst other independent variables are held constant at their means.

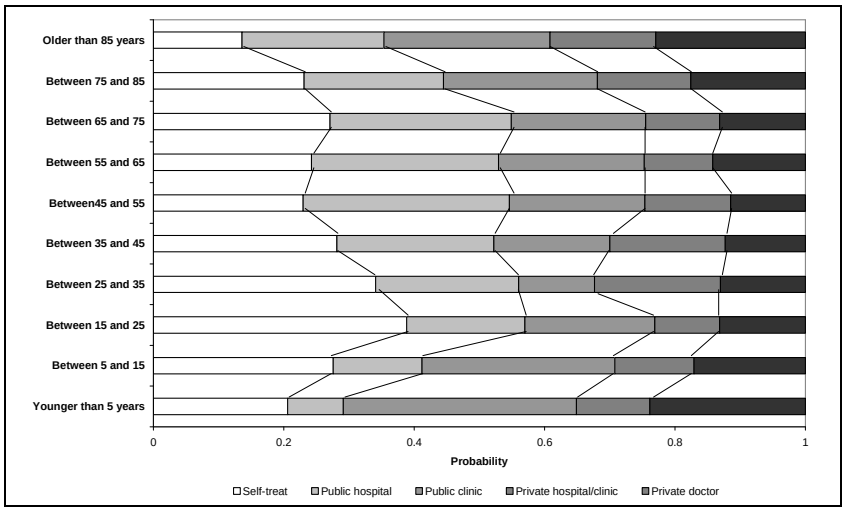
Kwazulu-Natal and Gauteng, whilst it is most prevalent in Limpopo, North West, the Northern Cape and the Free State. Public hospital consultations are the lowest for individuals from the North West, Free State and Mpumalanga. However, these dominate in Kwazulu-Natal, the Western Cape and the Eastern Cape.

Figure 13: Conditional probability plot – province



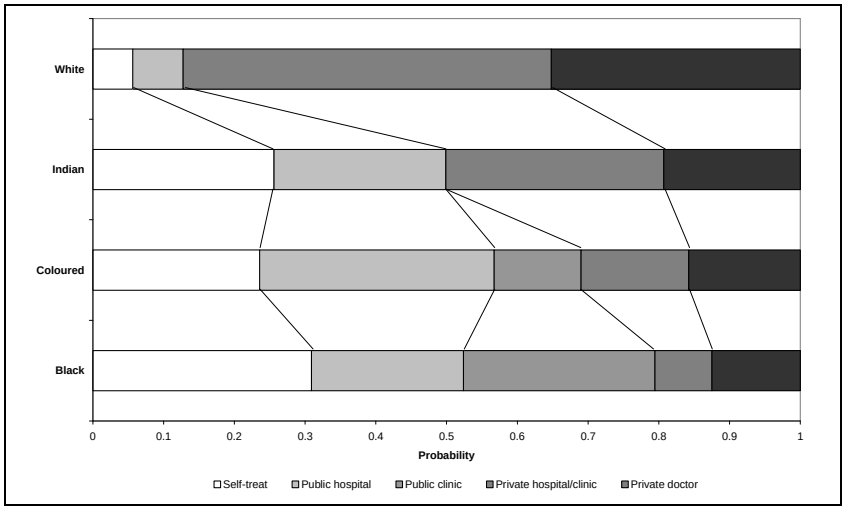
Individual level characteristics which significantly influence health care utilisation are the age of the individual, to a lesser extent the race of the individual, whether the individual has medical insurance, relation to the head of the household, education and the nature of the illness or injury experienced. With respect to age, older individuals are more likely to utilise public care or self-treat – however, also the squared age of the individual is significant. Figure 14 was constructed in order to aid in understanding the relationship between the choice of health care provider and age. Younger individuals (less than fifteen years of age) mostly utilise care from public clinics, with the option of self-treating or visiting a private doctor being the second and third favoured choice, respectively. Individuals between fifteen and twenty are most likely to self-treat; however, if treatment is sought it is mostly at public centres. Private hospital or clinic visitations are highest among individuals between twenty five and forty five years of age. These individuals are also least likely to consult at public clinics. Public hospital utilisation peaks among individuals between forty five and seventy five, with public clinic utilisation also high for this group. Individuals above seventy five are less likely to self-treat and more likely to consult a private doctor. However, public sector utilisation is still high.

Figure 14: Conditional probability plot – age of the individual



With respect to race group, the regression results indicate that the only significant trend – after controlling for other factors – is that Coloured individuals are more likely than the base group (Whites) to utilise care from public clinics. However, Figure 15 provides a more detailed picture of the effect of race on health demand. Clearly, public clinic utilisation is nearly nonexistent within the White as well as Indian populations. Also, Whites are less likely to self-treat and mostly visit private facilities. Public hospital utilisation is highest amongst the Coloured population, whilst public clinic consultations are most prevalent amongst Black individuals. These trends are in line with the descriptive analysis found in section 3.2.

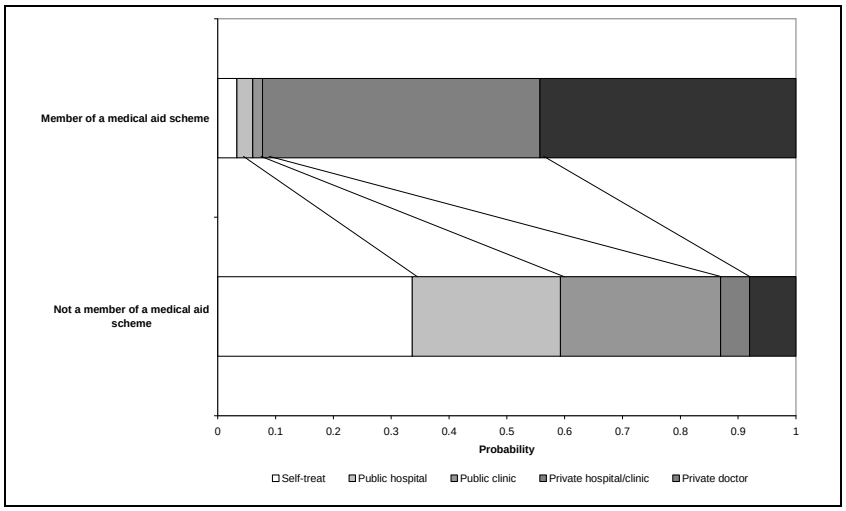
Figure 15: Conditional probability plot – race group



Turning to medical aid membership, regression results show that members of a medical aid benefit scheme are less likely to self-treat or consult public facilities. Figure 16 confirms this trend, indicating

that medical aid membership is one of the key drivers behind private care utilisation. Other noteworthy trends, which are in line with issues discussed in section 3.2, are that non-members do utilise private care – especially private doctors. Also, members do utilise public care, for which possible reasons were discussed earlier.

Figure 16: Conditional probability plot – medical aid membership

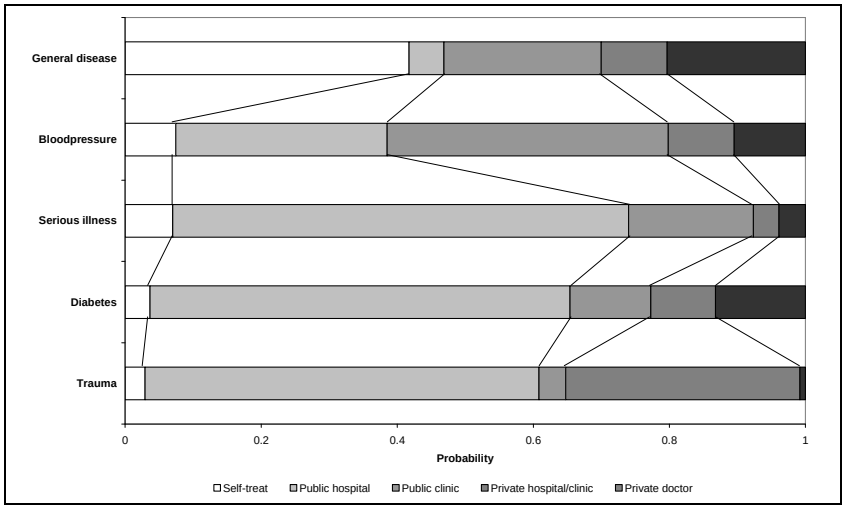


The relation of the individual to the household head also seems to significantly affect trends in the type of health care demanded. Individuals who are either heads of households, or the spouse or child of the head of the household, are less likely to utilise public care or self-treat.

The theory of health demand suggests that education would decrease utilisation of public care, but increase the utilisation of private care. The regression results indicate, as expected, that individuals who have obtained a matric certificate use less public care and are less likely to self-treat, whilst individuals with tertiary education are more likely to consult a private doctor when ill or injured.

With regard to physical conditions, regression results show that individuals who were physically or mentally limited mostly visited public hospitals. The nature of the illness or injury experienced by individuals also significantly influences their demand for health care (see Figure 17). Individuals who experienced general diseases like flu or diarrhoea mostly chose to self-treat. Also, those with blood pressure problems usually utilise care from public facilities (public clinics specifically). Possibly one of the starkest trends was that individuals with HIV/AIDS or TB (grouped as ‘serous illness’) visited public hospitals where treatment was usually free of charge or cheaper. The same trend was found for those who suffer from diabetes. Lastly, as expected, individuals who experienced trauma utilised care from hospitals – public hospitals again dominated.

Figure 17: Conditional probability plot – nature of illness



Independent variables relating to the quality of service received also portray important information. Given that the category of private doctors was chosen as base, other facilities were rated significantly more unclean. Furthermore, waiting times were significantly longer at public centres. However, these centres were considered to be less expensive – as expected.

4.2 NON-SIGNIFICANT FACTORS

Except for variation among provinces, the demand for health care does not seem to vary geographically in terms of urban or rural centres when controlling for other factors. Also certain household demographic variables, like household size and whether the head of the household is female, do not seem to influence individuals' demand for health care significantly. Moreover, the gender of the individual also does not significantly affect where or whether health care is sought when someone is ill or injured[24]. Finally, community level variables like whether the individual's household has electricity or is covered by municipal rubbish removal services do not seem to significantly impact on health demand.

[24] One would expect this to maybe be a significant factor however, Havemann and Van der Berg (2003) also indicates that the gender of the patient is not a significant factor in determining health demand (Havemann & Van der Berg, 2003: 13).

5. CONCLUDING COMMENTS

Individuals value their health for obvious reasons. Therefore it is to be expected that they will, like with the consumption of other goods, aim to maximise a certain health utility function to the best of their ability (in terms of money and time spent) as the penalty may be death. Many health care demand studies stress that patients are not passive participants in the health care seeking process. As demand does not always respond in the way health planners expect, this may lead to a misalignment between the demand and supply of health care (DFID, 2000: 36).

This analysis of the demand for health care in South Africa has again highlighted that users of health care are informed about the quality of care available from different providers and that their behaviour is consistent with this information. The private sector does indeed play an important role in providing health services to many South Africans and not just to a small minority of healthy individuals. Even members of the lowest income quintile sometimes choose private over public health care.

Hence, government should take cognisance of those factors which influence the demand for health care. To simply increase the supply of public health services in South Africa would in itself not improve equity or access unless supply side reforms are responsive to the demands of health care seekers (DFID, 2000: 24). Rather than mere quantitative increases in health expenditures, equity may be achieved by concentrating on the rehabilitation and enhancement of existing services. Improvement of customer care at public health institutions, for example, may go a long way to redressing imbalances in the quantity and quality of health care amongst South African citizens. The introduction of successful commercial clinics (see Palmer *et al*, 2003) and the popularity of these low-cost private alternatives, where low-income users can enjoy courteous and skilled service, have shown that acceptable low cost provision of health care is an achievable objective.

6. REFERENCES

AKIN, J. S., GUILKEY, D. K. and DENTON, E. H., 1995. Quality of Services and the Demand for Health Care in Nigeria: a multinomial probit estimation. *Social Science and Medicine*, Vol. 40(11), pp. 1527-1537.

ALDERMAN, H., BABITA, M., DEMOMBYNES, G., MAKHATHA, N., and ÖZLER, B., 2003. How Low Can You Go? Combining Census and Survey Data for Mapping Poverty in South Africa. *Journal of African Economies*, Vol. 11(2), pp. 169-200.

BURGER, R. and SWANEPOEL, C., 2005. *How Pro-Poor is Public Spending on Health in South Africa?* Paper delivered at the Biennial Conference of the Economic Society of South Africa (ESSA); 'Development Perspectives: Is Africa Different?'. Durban, Kwazulu-Natal, South Africa. Available online: http://www.essa.org.za/download/2005Conference/Burger.pdf

BURGER, R., BURGER, R. P., NIEFTAGODIEN, S. and VAN DER BERG, S., 2004. *Consumption Patterns of South Africa's Rising Black Middle-Class: Correcting for Measurement Errors*. Paper delivered at the conference of the Centre for the Study of African Economies (CSAE) on Poverty Reduction, Growth and Human Development in Africa. Oxford, March 2004.

DEMOMBYNES, G., ELBERS, C., LANJOUW, J., LANJOUW, P., MISTIAEN J. and ÖZLER B., 2002. *Producing an Improved Geographic Profile of Poverty, Methodology and Evidence from Three Developing Countries*. UN-WIDER Discussion Paper No. 2002/39. Helsinki.

DFID, 2000. *Better Health for Poor People, Strategies for achieving the international development targets*. Department for International Development. Available online: http://www.dfid.gov.uk/pubs/files/tsphealth.pdf

ELBERS, C., LANJOUW, J.O. and LANJOUW, P., 2003. Micro-Level Estimation of Poverty and Inequality. *Econometrica*, Vol. 71(1), pp. 355-364.

ELBERS, C., LANJOUW, J.O. and LANJOUW, P., 2000. *Welfare in Villages and Towns*. Tinbergen Institute Discussion Paper TI 2000-029/2. Amsterdam.

FELDSTEIN, M., 2006. Balancing the Goals of Health Care Provision. National Bureau of Economic Research (NBER), Working Paper No. 12279. Available online: http://www.nber.org/papers/w12279

FILMER, D., HAMMER, J. and PRITCHETT, L., 1998. *Health Policy in Poor Countries, Weak links in the Chain*. Policy Research Working Paper No. 1874. The World Bank. Washington, D.C.

GILBERT, L. and SOSKOLNE, V., 2003. Self-assessed health – a case study of social differentials in Soweto, South Africa. *Health & Place*, Vol. 9, pp. 193-205.

GOLDSTEIN, S. and PRICE, M., 1995. Utilisation of primary curative services in Diepkloof, Soweto. *South African Medical Journal*, Vol. 85(6), pp. 505-508.

GUPTA, I. and DASGUPTA, P., 2002. *Demand for Curative Health Care in Rural India: Choosing between Private, Public and No Care*. National Council of Applied Economic Research (NCAER), Working Paper Series No. 82. Delhi. India. Available online: http://www.ncaer.org/WP82.pdf

GROSSMAN, M., 1972. *The demand for health: a theoretical and empirical investigation*. National Bureau of Economic Research (NBER). New York.

GROSSMAN, M., 1999. *The Human Capital Model of The Demand for Health*. National Bureau of Economic Research (NBER), Working Paper No. 7078. Available online: http://www.nber.org/papers/w7078

HAVEMANN, R. and VAN DER BERG, S., 2003. The demand for health care in South Africa. *Journal for Studies in Economics & Econometrics*, Vol. 27(3), pp. 1-27.

HEALTH SYSTEMS TRUST, 2004. *National Primary Health Care Facilities Survey 2003*. Available online: http://www.hst.org.za/uploads/files/phc_survey04.pdf

JACK, W., 1999. *Principles of Health Economics for Developing Countries*. WBI Development Studies. Washington D.C.

LAWSON, D., 2004. *Determinants of Health Seeking Behaviour in Uganda – Is it Just Income and User Fees That Are Important?* Unpublished draft, University of Manchester, Manchester. Available online: http://unpan1.un.org/intradoc/groups/public/documents/NISPAcee/UNPAN018976.pdf

LEONARD, K. L., MLIGA, G. R. and MARIAM, D. H., 2002. Bypassing Health Centres in Tanzania: Revealed Preferences for Quality. *Journal of African Economies*, Vol. 11(4), pp. 441-471.

LINDELOW, M., 2005. The Utilisation of Curative Healthcare in Mozambique: Does Income Matter? *Journal of African Economies*. Vol. 14(3), pp. 435-482.

MCGUIRE, J.W., 2006. Basic Health Care Provision and Under-5 Mortality: A Cross-National Study of Developing Countries. *World Development*. Vol. 34(3), pp. 405-425.

MCGUIRE, A., HENDERSON, J. and MOONEY, G., 2001. *The economics of health care*. An introductory text. Chapters 7 and 8. Routledge. Taylor & Francis Group. London and New York.

MOCAN, H. N., TEKIN, E. and ZAX, J. S., 2000. *The Demand for Medical Care in Urban China*. NBER Working Paper No. 7673. National Bureau of Economic Research. Cambridge. Available online: http://www.nber.org/papers/W7673

MWABU, G. M., 1986. Health Care Decisions at the Household Level: Results of a Rural Health Survey in Kenya. *Social Science and Medicine*, Vol. 22(3), pp. 315-319.

MWABU, G. M., AINSWORTH M. and NYAMETE, A., 1993. Quality of Medical Care and Choice of Medical Treatment in Kenya, An Empirical Analysis. *Journal of Human Resources*, Vol. 28(4), pp. 837-862.

PALMER, N., MILLS, A., WADEE, H., GILSON, L. and SCHNEIDER, H., 2003. A New Face for Private Providers in Developing Countries: What Implications for Public Health? *Bulletin of the World Health Organisation*, Vol. 81(4), pp. 292-297.

PALMER, N. 1999. Patient choice of primary health care provider. Chapter 8 in *South African Health Review 1999*. Durban: Health Systems Trust. Available online: http://www.hst.org/sahr.

POSWELL, L., 2000. *Comments on Income and Expenditure Survey 2000*. Development Policy Research Unit, University of Cape Town. Unpublished Research Note.

SAHN, D. E., YOUNGER, S. D. and GENICOT, G., 2003. The Demand for Health Care Services in Rural Tanzania. *Oxford Bulletin of Economics and Statistics*, Vol. 65(2), pp. 241-258.

SIMKINS, C., 2003. *A Critical Assessment of the 1995 and 2000 Income and Expenditure Surveys as Sources of Information on Income*. Unpublished manuscript.

SIMKINS, C., 2004. *What happened to the distribution of income in South Africa between 1995 and 2001?* A report for National Treasury. Available online: http://www.sarpn.org.za/documents/d0001062/P1175-simkins_Nov2004.pdf

SKORDIS, J., 2003. *Understanding the Demand for Health Services in South Africa: Implications for Health Equity*. Document submitted in support of upgrading from MPhil to PhD. Health Policy Unit, Department of Public Health and Policy. London School of Hygiene and Tropical Medicine. London. Unpublished manuscript.

STANDING, H., 2004. *Understanding the 'demand side' in service delivery: definitions, frameworks and tools from the health sector*. Working Paper, DFID HSRC (Department For International Development Health Systems Resource Centre). London. Available online: http://www.dfidhealthrc.org/shared/publications/ Issues_papers/private-sector/Standing.pdf

USDIN, L., 1993. *Patterns of Health Care Utilisation and factors affecting use of different providers in Alexandra Township, South Africa.* PhD Thesis, Tulane University. Unpublished manuscript.

VAN DER BERG, S., 2005. *Fiscal expenditure incidence in South Africa, 1995 and 2000*. A report for the National Treasury. Available online: http://www.treasury.gov.za

WOOLRIDGE, J. M., 2002. *Econometric analysis of cross-section and panel data*, Cambridge: MIT Press.

7. APPENDIX

Appendix A: Multinomial Logistic Regression Results

Table A1: Summary statistics for independent variables used in regression models

Household level characteristics	**Obs.**	**Weight**	**Mean**	**S. D.**	**Min.**	**Max.**
Log of per capita household income	10969	5018218	9.01	1.14	6	14
Squared log of per capita household income	10969	5018218	82.41	21.76	40	185
Household per capita income in top two deciles? (1=yes, 0=no)	11289	5179659	0.23	0.42	0	1
Member of the household receives a government pension? (1=yes, 0=no)	11274	5174279	0.25	0.43	0	1
Member of the household receives a disability grant? (1=yes, 0=no)	11274	5174279	0.14	0.35	0	1
Member of the household receives a child support grant? (1=yes, 0=no)	11274	5174279	0.34	0.47	0	1
Household owns a television set? (1=yes, 0=no)	11289	5179659	0.63	0.48	0	1
Household owns a motor? (1=yes, 0=no)	11289	5179659	0.24	0.43	0	1
Household size	11271	5172689	3.13	1.84	1	22
Dependents	11271	5172689	2.31	1.92	0	22
Proportion of working to non-working household members	11271	5172689	0.32	0.36	0	1
Female household head? (1=yes, 0=no)	11289	5179659	0.41	0.49	0	1
Age of the household head	11261	5169002	49.86	15.51	12	104
Squared age of the household head	11261	5169002	2726	1644	144	10816
Educational attainment of the household head	11175	5117120	7.02	4.75	0	17
Household equipped with electricity? (1=yes, 0=no)	11289	5179659	0.81	0.39	0	1
Household's rubbish is removed by local government? (1=yes, 0=no)	11289	5179659	0.53	0.50	0	1
Household resident in an urban area? (1=yes, 0=no)	11289	5179659	0.55	0.50	0	1
Household resident in Gauteng? (1=yes, 0=no)	11289	5179659	0.20	0.40	0	1
Household resident in Mpumalanga? (1=yes, 0=no)	11289	5179659	0.09	0.29	0	1
Household resident in the North West? (1=yes, 0=no)	11289	5179659	0.10	0.31	0	1
Household resident in the Free State? (1=yes, 0=no)	11289	5179659	0.09	0.29	0	1
Household resident in Kwazulu-Natal? (1=yes, 0=no)	11289	5179659	0.14	0.35	0	1
Household resident in the Eastern Cape? (1=yes, 0=no)	11289	5179659	0.16	0.36	0	1
Household resident in the Western Cape? (1=yes, 0=no)	11289	5179659	0.08	0.27	0	1
Household resident in the Northern Cape? (1=yes, 0=no)	11289	5179659	0.02	0.13	0	1
Individual level characteristics						
Age of the individual	11277	5174617	33.46	22.97	0	104
Squared age of the individual	11277	5174617	1647	1752	0	10816
Is the individual an African? (1=yes, 0=no)	11289	5179659	0.79	0.41	0	1
Is the individual a Coloured? (1=yes, 0=no)	11289	5179659	0.08	0.28	0	1
Is the individual female? (1=yes, 0=no)	11289	5179659	0.56	0.50	0	1
Is the individual covered by a medical aid benefit scheme? (1=yes, 0=no)	11274	5174279	0.21	0.41	0	1
Is the individual the head of the household? (1=yes, 0=no)	11289	5179659	0.38	0.49	0	1
Is the individual the partner of the head of the household? (1=yes, 0=no)	11289	5179659	0.15	0.36	0	1
Is the individual a child of the head of the household? (1=yes, 0=no)	11289	5179659	0.29	0.45	0	1
Does the individual have a matric certificate? (1=yes, 0=no)	11134	5097768	0.11	0.31	0	1
Did the individual have any tertiary training? (1=yes, 0=no)	11134	5097768	0.03	0.18	0	1
Does the individual suffer from any disability? (1=yes, 0=no)	11289	5179659	0.07	0.26	0	1
Does the individual suffer from epilepsy? (1=yes, 0=no)	11289	5179659	0.02	0.15	0	1
Suffered from a general disease like flu and diarrhoea (1=yes, 0=no)	11289	5179659	0.57	0.50	0	1
Experienced trauma (1=yes, 0=no)	11289	5179659	0.02	0.15	0	1
Suffered from a serious disease like HIV/AIDS or TB (1=yes, 0=no)	11289	5179659	0.06	0.24	0	1
Suffered from diabetes (1=yes, 0=no)	11289	5179659	0.04	0.20	0	1

Experienced blood pressure problems (1=yes, 0=no)	11289	5179659	0.11	0.32	0	1
The facility visited was not clean (1=yes, 0=no)	11289	5179659	0.04	0.19	0	1
Waiting times were long (1=yes, 0=no)	11289	5179659	0.22	0.42	0	1
The facility visited operates at inconvenient times (1=yes, 0=no)	11289	5179659	0.04	0.21	0	1
The facility visited is too expensive (1=yes, 0=no)	11289	5179659	0.07	0.25	0	1
Drugs were not available at the facility visited (1=yes, 0=no)	11289	5179659	0.08	0.27	0	1
The staff were rude or incompetent at the facility visited (1=yes, 0=no)	11289	5179659	0.06	0.23	0	1
The patient received the wrong diagnosis (1=yes, 0=no)	11289	5179659	0.01	0.12	0	1

Table A2: Detailed output of multinomial logistic regression model

Survey multinomial logistic regression

iweight: PersonWeight	Number of obs.	=	10793
Strata: Stratum	Number of strata	=	18
PSU: PSU	Number of PSUs	=	2613
	Population size	=	4925128
	F(204, 2392)	=	1715.99
	Prob > F	=	0

Wald test for whether categories can be collapsed:

Ho: all coefficients except intercepts associated with given pair of outcomes are zero

Categories tested:	*Chi squared:*	*Degrees of freedom:*	*Probability > test statistic:*	*Outcome:*
Public hospital and Public clinic	781.31	51	0.000	against Ho
Public hospital and Private hospital/clinic	815.46	51	0.000	against Ho
Public hospital and Self-treat	731.04	51	0.000	against Ho
Public hospital and Private doctor	1507.19	51	0.000	against Ho
Public clinic and Private hospital/clinic	1215.19	51	0.000	against Ho
Public clinic and Self-treat	663.17	51	0.000	against Ho
Public clinic and Private doctor	1879.69	51	0.000	against Ho
Private hospital/clinic and Self-treat	721.31	51	0.000	against Ho
Private hospital/clinic and Private doctor	322.31	51	0.000	against Ho
Self-treat and Private doctor	844.80	51	0.000	against Ho

Small-Hsiao test for independent alternatives:

Ho: odds are independent of irrelevant alternatives

Omitted:	*L(full):*	*L(omit):*	*Chi squared:*	*Degrees of freedom:*	*P > test statistic*	*Outcome:*
Public hospital	-3919.54	-3761.76	315.57	52	0.000	against Ho
Public clinic	-3258.77	-3095.34	326.85	52	0.000	against Ho
Private hospital/clinic	-5098.65	-5018.42	160.45	52	0.000	against Ho
Self-treat	-4008.62	-3846.13	324.97	52	0.000	against Ho

Results:	*DEPENDENT VARIABLES:*			
INDEPENDENT VARIABLES:	**Public hospital**	**Public clinic**	**Private hospital/clinic**	**Self-treat**
Household level characteristics				
Log of per capita household income	2.04 *	0.68	1.81	-0.66
Squared log of per capita household income	-0.14 **	-0.07	-0.08	0.02
Household per capita income in top two deciles? (1=yes, 0=no)	0.19	-0.24	0.03	-0.36 *
Member of the household receives a government pension? (1=yes, 0=no)	0.20	-0.01	0.58 **	0.23
Member of the household receives a disability grant? (1=yes, 0=no)	0.40 ***	0.29 **	0.50	0.08

Member of the household receives a child support grant? (1=yes, 0=no)	0.16		0.18	*	-0.28		-0.08	
Household owns a television set? (1=yes, 0=no)	-0.37	***	-0.45	***	-0.64	***	-0.38	***
Household owns a motor? (1=yes, 0=no)	0.05		-0.38	**	0.26		-0.19	
Household size	-0.07		-0.11		0.02		-0.18	*
Dependents	-0.03		-0.04		-0.02		0.12	
Proportion of working to non-working household members	-0.37		-0.64	**	0.25		-0.14	
Female household head? (1=yes, 0=no)	-0.02		-0.05		-0.08		0.01	
Age of the household head	-0.04		-0.02		-0.001		-0.09	***
Squared age of the household head	0.0002		0.0001		-0.0001		0.00	***
Educational attainment of the household head	-0.04	***	-0.04	***	-0.001		-0.04	**
Household equipped with electricity? (1=yes, 0=no)	0.06		0.17		0.47		-0.09	
Household's rubbish is removed by local government? (1=yes, 0=no)	0.10		-0.16		-0.06		-0.36	
Household resident in an urban area? (1=yes, 0=no)	0.33		0.18		0.16		0.30	
Household resident in Gauteng? (1=yes, 0=no)	-0.96	***	-0.89	***	-0.22		0.29	
Household resident in Mpumalanga? (1=yes, 0=no)	-1.39	***	-1.03	***	-0.58	*	-0.10	
Household resident in the North West? (1=yes, 0=no)	-1.66	***	-0.94	***	-0.89	**	-0.32	
Household resident in the Free State? (1=yes, 0=no)	-2.13	***	-1.46	***	-0.76	**	-0.63	**
Household resident in Kwazulu-Natal? (1=yes, 0=no)	-0.46	**	-0.94	***	-0.83	**	0.23	
Household resident in the Eastern Cape? (1=yes, 0=no)	-1.00	***	-1.13	***	-1.82	***	-0.03	
Household resident in the Western Cape? (1=yes, 0=no)	-0.66	**	-1.48	***	-0.34		0.70	*
Household resident in the Northern Cape? (1=yes, 0=no)	-1.70	***	-1.30	***	0.27		-0.40	
Individual level characteristics								
Age of the individual	0.05	***	0.03	***	-0.01		0.08	***
Squared age of the individual	-0.001	***	-0.0004	***	0.0001		-0.001	***
Is the individual an African? (1=yes, 0=no)	-0.30		0.46		0.03		-0.22	
Is the individual a Coloured? (1=yes, 0=no)	0.06		1.12	***	-0.43		-0.25	
Is the individual female? (1=yes, 0=no)	-0.12		0.09		-0.17		0.03	
Is the individual covered by a medical aid benefit scheme? (1=yes, 0=no)	-1.62	***	-1.36	***	0.27		-1.01	***
Is the individual the head of the household? (1=yes, 0=no)	-0.78	***	-0.61	***	0.03		-0.88	***
Is the individual the partner of the head of the household? (1=yes, 0=no)	-0.91	***	-0.85	***	0.07		-1.08	***
Is the individual a child of the head of the household? (1=yes, 0=no)	-0.34	**	-0.32	**	-0.44		-0.31	**
Does the individual have a matric certificate? (1=yes, 0=no)	-0.36	**	-0.39	***	0.04		-0.33	**
Did the individual have any tertiary training? (1=yes, 0=no)	-0.92	***	-1.06	***	-0.59	**	-0.05	
Does the individual suffer from any disability? (1=yes, 0=no)	0.58	***	0.13		-0.52		0.28	
Does the individual suffer from epilepsy? (1=yes, 0=no)	0.42		0.25		0.23		-0.38	
Suffered from a general disease like flu and diarrhoea (1=yes, 0=no)	-0.93	***	-0.02		-1.18	***	0.81	***
Experienced trauma (1=yes, 0=no)	1.20	***	0.40		1.54	***	0.45	
Suffered from a serious disease like HIV/AIDS or TB (1=yes, 0=no)	0.68	***	0.45	**	-0.07		-0.005	
Suffered from diabetes (1=yes, 0=no)	0.73	***	0.27		-0.45		-0.02	
Experienced blood pressure problems (1=yes, 0=no)	0.37	**	0.86	***	-0.22		0.04	
The facility visited was not clean (1=yes, 0=no)	1.91	***	1.10	***	1.38	***	*N.A.*	
Waiting times were long (1=yes, 0=no)	1.63	***	1.54	***	-0.05		*N.A.*	
The facility visited operates at inconvenient times (1=yes, 0=no)	-0.47		0.40		-1.33	**	*N.A.*	
The facility visited is too expensive (1=yes, 0=no)	-2.22	***	-4.07	***	-0.37		*N.A.*	
Drugs were not available at the facility visited (1=yes, 0=no)	0.97	***	1.61	***	1.06	**	*N.A.*	
The staff were rude or incompetent at the facility visited (1=yes, 0=no)	1.26	***	0.93	***	1.41	**	*N.A.*	
The patient received the wrong diagnosis (1=yes, 0=no)	0.06		-0.78	**	-1.76	*	*N.A.*	
Constant	-4.22		2.01		-10.38	*	6.99	

Notes:
Private doctors serve as the base category
The reported values are coefficients