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Roy Havemann & Servaas van der Berg

Stellenbosch Economic Working Papers : 6 / 2002

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[1] The working paper was written while Roy Havemann was doing research work at the University of Stellenbosch, and does not necessarily represent the views of the National Treasury or any related government department.

The Demand for Health Care in South Africa

Roy Havemann & Servaas van der Berg

ABSTRACT

Supply-side solutions to health-care provision dominate the South African debate about health care. These solutions are often premised on views that health resources are too concentrated in the private health sector – which supposedly serves only a small minority of the population – and thus public sector provision needs to be expanded. We argue that this rests on a lack of understanding of the nature of the demand for health services. This paper estimates the determinants of the demand for health care using a multinomial logit estimation. It is found that three categories of factors influence the demand for health care. Firstly, demographic and locational variables are significant (e.g. income group, race and where the respondent lives). Secondly, the characteristics of the care provided are important (e.g. cost and distance from the respondent). Finally, the characteristics of the illness (such as its severity) are important.

Overall, private health care plays a surprisingly large role in the health care decisions of all South Africans – even poor respondents reveal a clear preference for private health care, despite constraints of money and access. This dominance of the demand for private health care is likely to increase with rising incomes, or if all health services were to receive a similar subsidy (e.g. from mooted medical insurance-type schemes). On a policy level, this would indicate that greater attention should perhaps be given to health demand in considering policy alternatives.

I INTRODUCTION

In the debate on how best to provide health care for all South Africans, the suggested solutions are often supply-side ones. It is widely accepted, for example, that more clinics are needed. The second issue in the debate is the role of the private sector. Policy proposals seem to be premised on the view that the private sector uses more than its share of available resources, whilst lack of income and health insurance leave the majority of the population dependent on state health care. This perceived problem is then the source of much debate about how to shift health resources towards the public sector in order to assist the poor.

Such a perception, however, takes too little cognisance of the demand for health care. Our objective in this article is to analyse the factors that influence the demand pattern for health care in South Africa and to establish the reasons for this pattern. This is achieved by building an empirical health demand model using the 1993 South African Living Standards and Development Survey to contribute to a better understanding of the current health care system. To our knowledge no other study has yet attempted to empirically estimate the South African demand for health care services in this way. This study attempts to fill this void. It shows that:

- The demand for health care is indeed dominated by a demand for private health care (almost two-thirds of those seeking health care use private care);
- Public primary health care is clearly an inferior good, i.e. demand for the good decreases as income rises;
- If the cost of both public and private health care visits were to be reduced (e.g. through subsidies or other programmes) then there would be an even greater shift towards using private health care.

These points have substantial implications for the debate about health care options and in particular for the role usually assigned to the public health system as the perceived provider of health care to the poor.

II LITERATURE REVIEW

The nature of the demand for health and the Grossman model

In an early paper on the nature of demand for health, Victor Fuchs was at pains to insist that 'demand' should be seen in terms of its economic definition:

> "When an economist talks about the demand for medical care, or any other good or service, he is talking about a *willingness* and *ability* to pay. The term should not be confused with 'need' or 'want' or 'desire', although these words are frequently used interchangeably with 'demand' by lay persons." (Fuchs (1968), quoted in Cullis and West (1979: 75); our emphasis)

Within a developing country context, it could be added that the demand for medical care is also influenced by *access* to health care.

Demand for medical care is a derived demand. Consumers consume health care not as an end in itself but because they wish to be healthy. Also, as Grossman (1972a: footnote 4) notes, a consumer derives utility not only from health-giving pursuits (e.g. medical care). Economic agents thus do not necessarily want to maximise their health, but their overall utility, and they are often willing to let their health suffer to realise other goals (e.g. by smoking).

In Michael Grossman's (1972a and 1972b) seminal microeconomic papers on health demand he established the theoretical basis for a health demand function. The presentation here is a brief simplification of these papers and a later paper (Grossman 1999), where he extends the model, answers criticism and presents three decades of development of the theory of health demand[2].

The model proceeds from the following assumptions (Grossman 1999: 2):

- Individuals are born with an initial capital 'stock' of health;
- This stock diminishes with age ('depreciates');
- The stock can be increased by investment in health;
- Households are subject to a household production function;
- Households attempt to maximise their utility given income and resource constraints;

[2] A longer summary can be found in Mokan, Tekin and Zax (2000).

- Medical care is one of a number of inputs into a utility function and is subject to the same income and resource constraints as any other.

Grossman's model assumes that individuals assess the benefits from outlays that will improve their health and compare the benefits to those derived from expenditure on other goods or services in order to decide on their optimum health state. Consumers are assumed to have knowledge of their own health state, its rate of depreciation and the production function relating health improvements to health care expenditure.

The inter-temporal utility function of a typical consumer is assumed to be:

$$U = U(\phi_0 H_0 , \ldots, \phi_n H_n ; Z_0, \ldots Z_n)$$

with H_0 the inherited stock of health, H_i the stock of health in period i, ϕ_i, the amount of health care consumed, $h_i = \phi_i H_i$ the total consumption of health services, and Z_i total consumption of other commodities (excluding health). This inter-temporal utility function can be maximised to derive the expected behaviour of the rational consumer. Maximisation within a budget constraint leads the individual to equate the marginal return on the asset (health) with its marginal cost. The return to the j-th individual is made up of the marginal psychic return (a_j) and the marginal monetary return (y_j).[3] The cost of health capital is the rate of interest forgone on other assets (r_j) plus the rate of depreciation (δ_j). Thus,

$$y_j + a_j = r_j + \delta$$

Recent empirical studies

The strong microeconomic basis to the Grossman model provided the point of departure for a series of health demand studies throughout the world. As statistical methodologies have developed, so the modelling techniques utilised have also altered. Table 1 summarises a number of recent studies.

[3] In order to use the same unit of measurement for both, utility is measured here in money-metric terms.

TABLE 1: SELECTED EMPIRICAL STUDIES

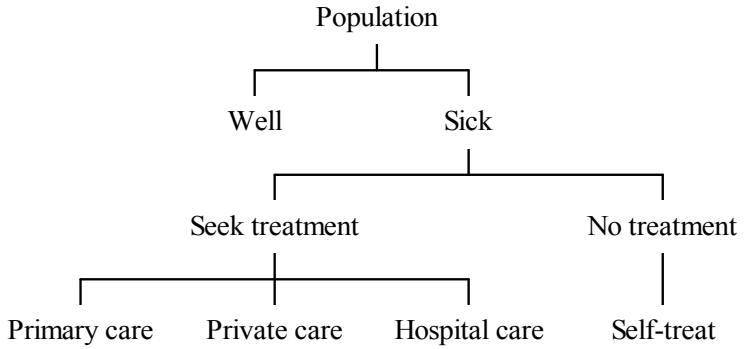
	Study	Sample	Statistical methodology	Objective of study
Theoretical analysis	Grossman (1972a)	Caucasian Americans in labour force	Ordinary least squares (OLS)	Test assumptions of theoretical model
	Mokan, Tekin and Zax (2000)	Urban China	Two-stage	Determinants of demand
Non-monetary factors and the demand for health care	Acton (1975)	New York City	Simultaneous-equation system	Role of non-monetary factors, particularly distance to facility
	Dor, Gertler, van der Gaag (1988)	Côte d'Ivoire (LSMS)	Nested multinomial logit	Non-price health care rationing
The impact of policy measures on health care demand patterns	Akin, Guilkey and Denton (1995)	Ogun State, Nigeria	Multinomial probit	Answer policy questions regarding implementation of user fees
	Gertler, Locay and Sanderson (1988)	Sierra and Lima regions, Peru	Nested and ordinary multinomial logit	Are user fees regressive?
	Heller (1982)	Peninsular Malaysia	Two-stage least squares (TSLS)	Demand for outpatient care
	Ichoku (2000)	Nsukka, Nigeria	Nested logit	Improve local government health care provision

Sources: See bibliography

The type of data used often determines methodological options. OLS is adequate for Grossman's (1972a) application, which uses health care expenditure as the dependent variable. Heller (1982) uses two-stage least squares regression so as to include instrumental variables. But as expenditure is a particularly questionable dependent variable, particularly when care is highly subsidised or free, the binary response class of models (logits or probits) is arguably the most powerful for health demand modelling. They enable the researcher to model health care as a result of rational choices. Given that a given member of the population is sick, he or she makes a

rational decision to either seek treatment or not (Figure 1). Respondents who choose to seek care can effectively select from three options: primary care (usually a government clinic), private care (usually a general practitioner) or a hospital. The multinomial logit and probit approach allows the researcher to model different health choices. The probability of seeking health care according to various group characteristics (be they geographic, demographic, racial etc.) can then be estimated.

FIGURE 1: THE HEALTH CARE DECISION IN A SEQUENTIAL CHOICE MODEL



Source: Adapted from Ichoku (2000: 24)

The predominance of zero expenditures, due not only to free care, but also to the absence of illness or the lack of access, is elegantly sidestepped by a binary model rather than modelling actual expenditure. Also, another problem typically encountered – sample selection bias because samples usually are not random (respondents are already ill) – is reduced by such a model. Monte Carlo experimentation has shown that a two-part model such as the above performs somewhat better than a sample selection model variant, and that ordinary least squares regression will be subject to serious biases and large error variances (Hay *et al.* 1987).

A best-case option would be to use panel data to model the health decisions of a set of households over time. This would allow both incorporating longer time spans and more options in modelling the effects of policy. However, regular health panel surveys are expensive and consequently scarce.[4]

[4] Ichoku (2000) personally obtained a relatively large sample in a small local government authority in Nigeria. His three-level nested logit model is particularly useful in that case, as detailed information had been obtained as to how households make their particular health care decisions. The nested logit allows empirical work to be done using a sequential choice structure and decisions to seek treatment

Findings

The empirical findings of the literature reviewed support Grossman's (1972a) view that health care choice is a derived demand. Households see health care in the same light as other consumption items: it is consumed if it contributes more in net terms to the household's overall welfare than the alternatives. The costs (including opportunity costs) of health care are thus offset against the benefits.

Examples from the literature will demonstrate this point. Acton (1975) was one of the first researchers to point out the important role of non-monetary factors, such as the distance to the health facility and the time taken to receive treatment. Households are loath to consume health care if this consumption is time-consuming: the opportunity cost of that time is simply too high. This result is confirmed by Dor *et al* (1988) in the Côte d'Ivoire. In the absence of user fees, health care is rationed by distance to the care.

The implementation of user fees is an important issue in health care provision. The literature finds health care surprisingly price inelastic. Heller (1982) argues that this indicates that user fees will not have significant welfare implications, but Gertler *et al* (1988) found in Peru that health care is more price elastic for poorer groups, thus rendering user fees regressive. This poses a peculiar dilemma, as the improvement in allocative efficiency and cost recovery that user fees bring is accompanied by redistribution of welfare from poorer to richer income groups

III METHODOLOGY AND DATA

Methodology

The empirical analysis is designed to model the health-care seeking behaviour of individuals who are ill. South African individuals have a number of choices – they can choose not to seek care, they can consult a traditional healer or a doctor, or they

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given illness can be evaluated according to the type of treatment and the sort of treatment sought. His model could, however, be criticised on the basis that it only takes into account health care decisions in the preceding month. In a decision-based model, this is a rather short time span to evaluate and draw conclusions on health-seeking behaviour.

can visit state-subsidised care in the form of a primary health care centre or a government hospital. Theoretically, the rational individual will choose that form of care that maximises his or her utility. After normalising for quality of care, at the margin the individual should be indifferent between health care providers.

A multinomial logit model is used to empirically isolate those characteristics that determine which health care provider an individual will choose. The process can be seen as a simultaneous estimation of binary logits for all possible comparisons among outcomes, with estimates from binary logits providing consistent estimates of the multinomial parameters (Long 1997: 149). Formally, the multinomial logit model can be seen as a probability model, an odds model or a discrete choice model (Long 1997: 152-6).

Akin *et al* (1995) maintain that there are significant reasons for choosing the multinomial *probit* rather than the *logit*. The major reason is that in the logit, the probability of one outcome relative to that of another is not changed by the addition of another option, known as the 'independence of irrelevant alternatives' or IIA. It implies that multinomial and conditional logit models can only be used when categories are "plausibly assumed to be distinct and weighed independently in the eyes of each decision maker" (McFadden 1973, quoted in Long 1997: 185). In the South African situation, self-treatment, public care and private care are indeed independent choices, thus this assumption holds and the multinomial logit can be used.

The data set

The data set used for the analysis is the South African Living Standards and Development Survey (LSDS) of 1993, initiated by the World Bank and carried out by SALDRU. The South African study fits with a number of studies conducted throughout the world, in an effort to have internationally comparable statistics on a number of socio-economic conditions (Deaton 1997). Of the 42 762 individual observations, 3 411 or 7.98% of respondents reported that they had been ill during the preceding 14 days. They were identified as the sub-sample of interest. After cleaning the data the size of the sub-sample used in the model was 3 166 respondents. The size

of this sub-sample compares favourably with that used in the studies quoted in Table 1. Moreover, the advantage of a LSDS type data set is that respondents are ill at random (cf. Akin *et al* 1995 where data was taken from providers of care). Health specific surveys such as the 1998 South African Demographic and Health Survey (DHS) tend to concentrate heavily on health indicators and diseases, and often give only superficial treatment to socio-economic indicators (e.g. the DHS has no income question). Other Living Standards Measurement Studies have also been used in similar papers (Gertler *et al* 1988; Dor *et al* 1988).[5]

Properties of the sub-sample

The sub-sample performs well in terms of underlying characteristics[6]:

- *Race:* 72% of respondents are black, 10% coloured, 5% Indian and 13% white, mirroring the demographics of the country.
- *Location:* 50% of respondents are rural, 21% urban and 29% metropolitan;
- *Gender:* The sub-sample performs less well in terms of gender, with a substantial majority of respondents being female (58%). This may be accounted for by the inclusion of pregnancy-related illnesses;
- *Age:* the modal group is under fives, with 14% of respondents. Distribution is relatively equal across other age categories, tapering off for over 65s.

The statistical design allows for weighting of individuals to ensure that the sample is representative of the underlying population. There is a good spread of reported illnesses, as is shown in Figure 2.

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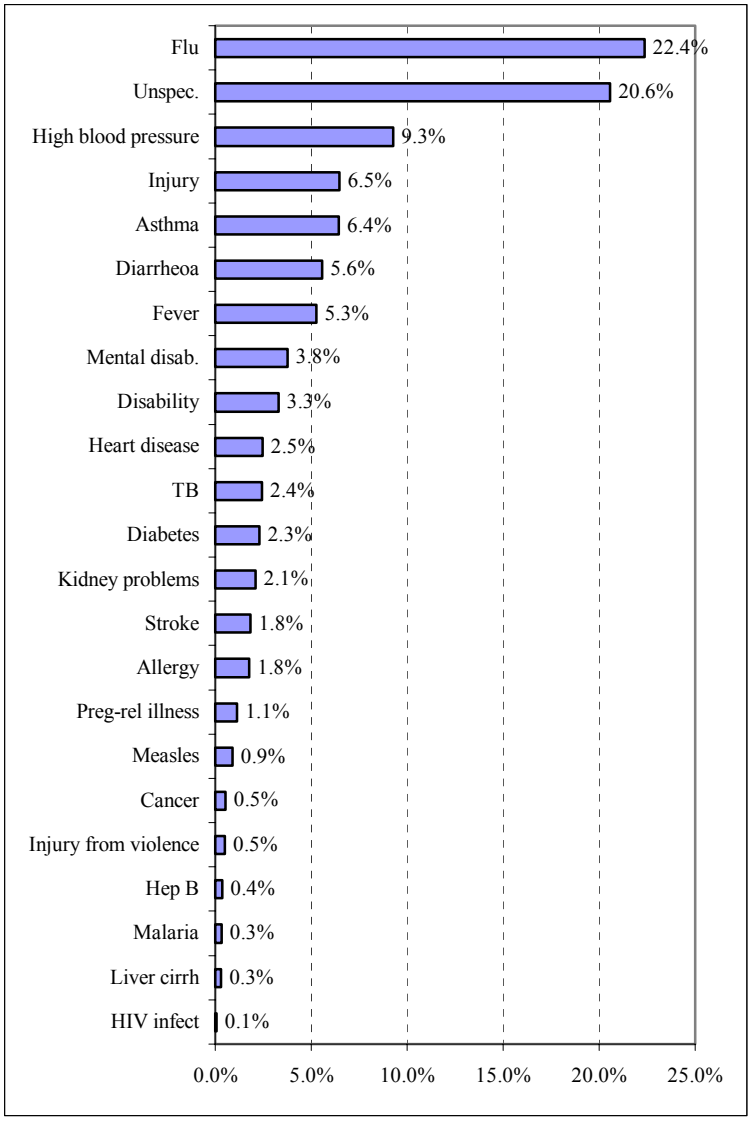
[5] From a health perspective, three additional questions could have been posed:

- What was your perception of the health care received?
- Do you have any form of medical aid or medical insurance?
- What was the cost of treatment, both excluding and including the contribution of your medical aid?

In this paper, proxies are used for these issues, but clearly direct questions would have been better.

[6] Complete descriptive statistics for the variables used in the empirical analysis can be found in Appendix A1.

FIGURE 2: ILLNESSES REPORTED



Respondents also provided information regarding the type of treatment they sought. There were eleven options, which we reclassified into four categories to simplify the analysis and because there is evidence that multinomial models are less accurate when the dependent variable has more than four categories (Breen 1996). The categorical variables created are summarised in Table 2. The majority of respondents chose private care (46%) (mainly a private doctor), followed by a public hospital (22%) and no care (18%). The least common choice was primary health care (13.5%).

TABLE 2: TREATMENT SOUGHT AND RECLASSIFICATION

LSDS response	No of observations (%)	New categorical variable	No of observations (%)
No treatment or other	556 (17.6%)	**Self-treatment**	570 (18.0%)
Family or friend consulted	14 (0.4%)		
Health centre or clinic	441 (13.9%)	**Primary public care**	446 (14.6%)
Visit by primary care worker	5 (0.2%)		
Pharmacy	36 (1.1%)		
Shop or supermarket	12 (0.4%)		
Private doctor	1 326 (41.9%)	**Private care**	1 464 (46.2%)
Traditional healer	68 (2.1%)		
Private nurse	3 (0.1%)		
Other	19 (0.6%)		
Hospital	686 (22.0%)	**Hospital**	686 (22.0%)
TOTAL	**3 166 (100%)**	**TOTAL**	**3 166 (100%)**

This result is not unexpected, given that many of the ailments lend themselves to care by a private physician or one in public service (usually at a hospital). Palmer (1999) finds that these results are consistent with other surveys, with the 1995 October Household Survey, for example, reporting that 31.2% of ill respondents chose private care. However, she is critical of the fact that the survey shows that 326 respondents did not pay to see a private doctor (Palmer 1999), noting that it may be a result of a badly-formulated question, with respondents answering that they had seen a private doctor when actually they had seen the district surgeon. However, private doctors and district surgeons are perfectly substitutable[7], and this free doctor anomaly should not change the results.

[7] They may even be the same person: the district surgeon is usually a private doctor who does additional work for the State.

IV EMPIRICAL RESULTS

The empirical model assumes that choice of health care is a function of three broad groups of variables: characteristics of the respondent, characteristics of the care received and characteristics of the respondent's illness.

Overall statistical evaluation of the model

The overall model can be statistically evaluated by considering whether the unrestricted model provides more information about the response variable than a restricted model with merely a constant term, or expressed differently: do the variables predict the underlying data generating process better than a model with only a constant? The F-statistic for the model is 126.01 and the probability that the variables are not significant less than 1%, confirming that indeed the model adds to our information.

The model assigns most individuals to the correct group. It is particularly accurate in identifying those who decided to self-treat (99% correctly assigned) and those who chose some form of private care (87% correctly assigned), but less accurate in distinguishing between the two forms of state care, namely primary care and hospital care. If no distinction is drawn between primary health care and hospital care, the model has an accuracy of 73% for these two categories combined. It was, however, decided to retain this distinction, particularly in light of the government's strong emphasis on primary care.

TABLE 3: ACTUAL VS PREDICTED CHOICE

Actual choice	**Predicted choice**				**Total**	**Correctly**
	Self treatment	*Primary care*	*Private care*	*Hospital*		**assigned**
Self treatment	**563**	1	6	0	**570**	99%
Primary care	9	**262**	85	90	**446**	59%
Private care	33	53	**1 278**	100	**1464**	87%
Hospital	10	110	231	**335**	**686**	49%
Total	**615**	**426**	**1 600**	**525**	**3 166**	

Pearson χ^2: 3955.95l; p = 0.00
Interpretation: the rows indicate the actual choice made by each respondent in the survey. The columns indicate the choice that the model predicts, given the respondent's characteristics.

Factors that were significant

Independent variables behave differently across different health care choices. Other factors were important, such as how long the person had been ill and in which province he or she was resident. Thus the results can be interpreted in two ways: (a) was a factor significant, and if so, (b) how did it change the probability of a person seeking a certain type of care? Table 4 summarises the results for the first question. The discussion that follows the table answers the second. The Appendix A2 contains a summary table of the respective coefficients and standard errors.

TABLE 4: WHAT INFLUENCES HEALTH CARE CHOICE?

	Would the following factor have changed the respondent's decision to choose…			
	Self treatment	Clinic	Private practitioner	Hospital
Respondent characteristics:				
Household income	***	–	***	*
Race	***	**	***	***
Location:				
Province	**	***	–	*
Metropolitan		**	**	–
Homeland	*	*	*	–
Insured	*	–	–	–
Factors related to care:				
Time to get there	N/A	***	***	***
Charge	N/A	***	***	***
Time to get treatment	N/A	*	*	*
Nature of illness:				
Length	–	*	–	*
Type:				
Serious	–	–	–	*
Flu	*	**	*	***
Tuberculosis	–	**	–	**

* Significant at the 10% level
** Significant at the 5% level
*** Significant at the 1% level
– Not significant
All variables are significant at the 5% level for the model as a whole. The Wald test was used throughout. *t*-statistics are reported in Appendix A2.

Interpretation:
One can read across or down. Reading across and using "serious illness" as an example: we find that, all other things being equal, having a serious illness makes no difference to a respondent's decision to self-treat, seek primary care or seek private care. It is, however, a significant factor in the decision to seek hospital care. This is as expected.
Reading down, one finds that the decision to self-treat is influenced by race, province, time to get to a facility, how much that facility charges, how long the respondent has been ill, and whether the illness is flu or not.

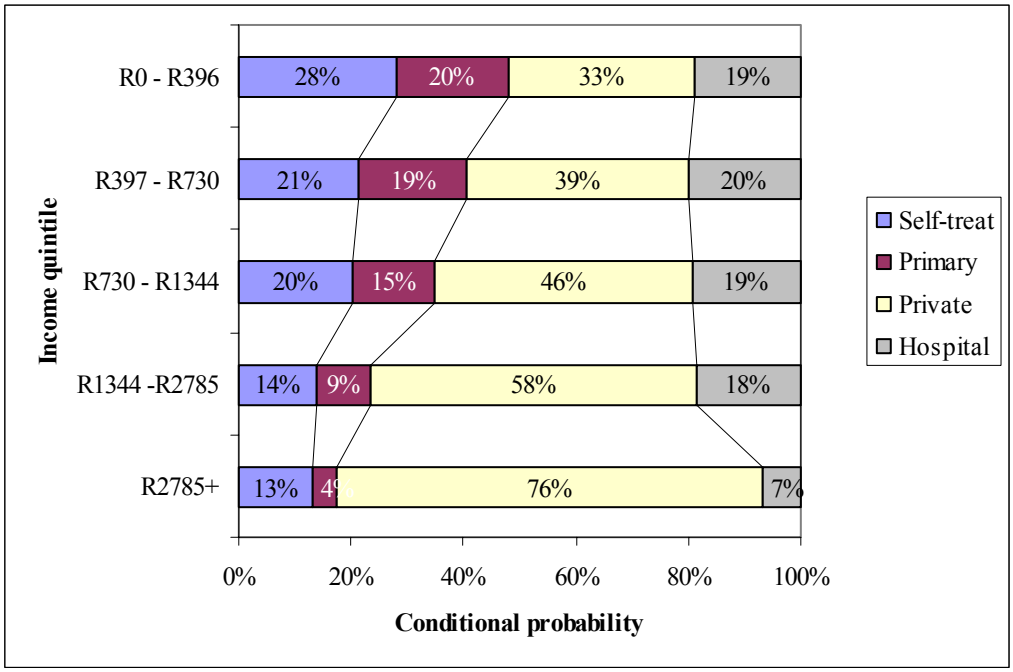
1. Characteristics of the respondent

a. Income

The *a priori* case for the inclusion of a measure of income is clear from the Grossman model. Most theoretical health demand models with a discrete dependent variable include income as an independent variable, as tastes and preferences may differ by income level (see for example Akin *et al* 1995). For historical reasons *a priori*

grounds to assume that the choice of health care differs by income level in South Africa. In this model, respondents were divided into five income quintiles. The results (see Figure 3) indicate a preference for private care as income increases, holding other things constant – as expected. Even the poorest fifth show a preference for private care. The poorest are also most likely not to seek any care at all. The demand for primary health care, unsurprisingly, falls off almost completely among the higher income groups. All these results are as expected. Primary health care is thus an inferior good: a rise in income is associated with decreased demand for the good.

FIGURE 3: CONDITIONAL PROBABILITY PLOT – HOUSEHOLD INCOME GROUP

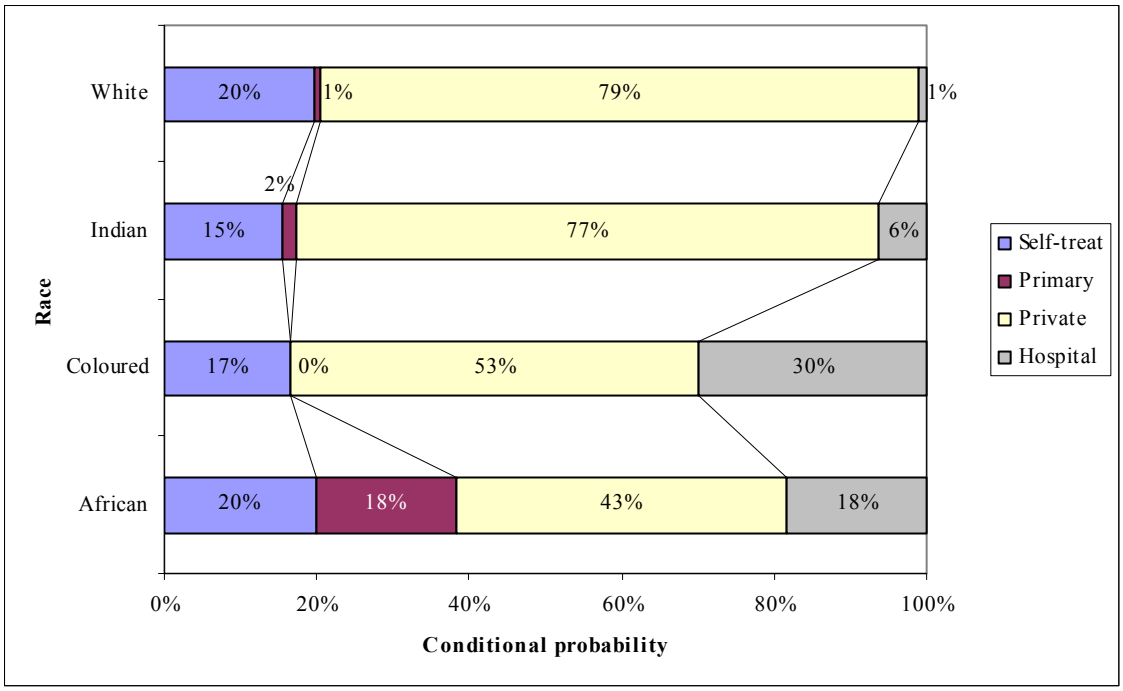


Interpretation: A conditional probability plot graphically presents the results of a discrete choice model such as the one used in this paper. Figure 3, for example, analyses the effect of changing the *income* variable while keeping other variables constant at their means. This separates the effect of income on health care demand from the other factors in Table 4.

b. Race

In the context of the highly fractured South African society, race plays a particularly important role in choice of health care. Dummy variables for the four race groups are thus included in the empirical specification. The model predicts differences in health care choice across race groups (Figure 4) and finds race to be a significant factor in deciding what type of care to seek, keeping all other factors constant. Thus there appears to be an enduring effect from the inequitable provision of health services during the apartheid era on present patterns of choice with regard to health care.

FIGURE 4: CONDITIONAL PROBABILITY PLOT – RACE

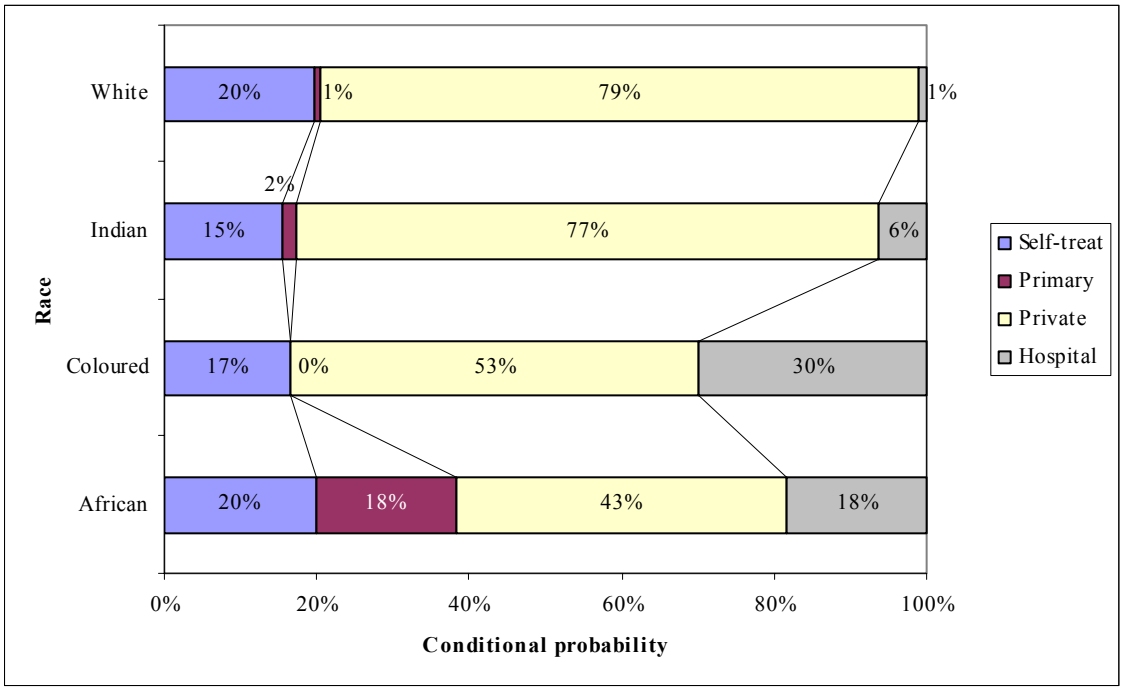


All other things being equal, it is clear that ***private care is the preferred alternative for all race groups***. Preferences do, however, differ by race, with 79% of white South Africans preferring private care compared to 43% of black South Africans. The relevant Wald test does not reject the hypothesis that the decision to self-treat differs between black and white households.

c. Locational dummy variables

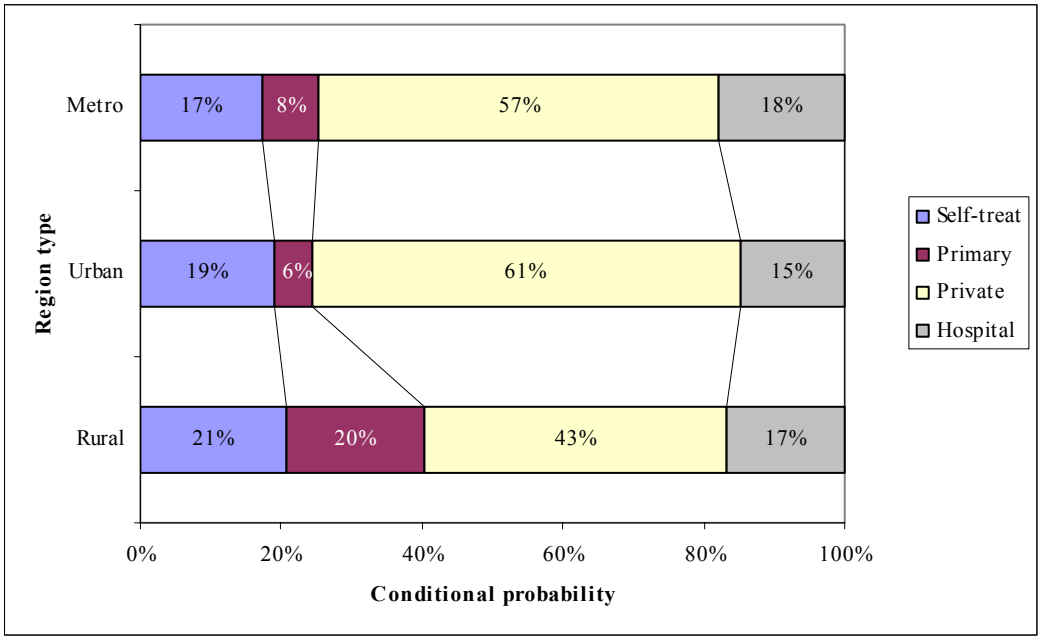
Three locational variables were included, viz. province, former homeland and a categorical variable for region-type (rural, urban or metropolitan). The conditional probability plot in Figure 5 orders the nine provinces from the most likely to self-treat (Northern Province) to the least likely to self-treat (Eastern Cape).

FIGURE 5: CONDITIONAL PROBABILITY PLOT – PROVINCE



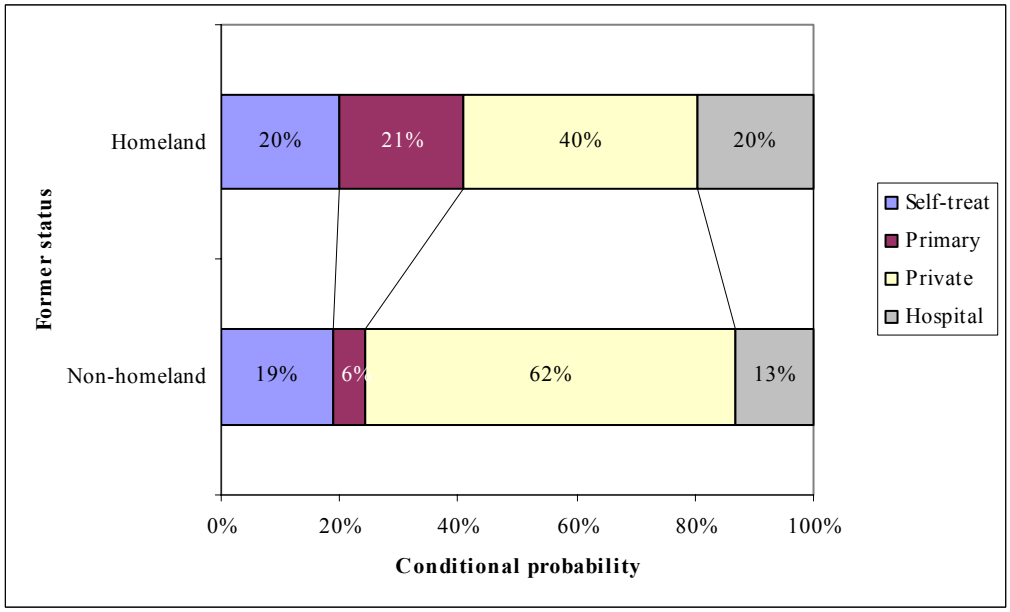
Metropolitan residence should also influence health care choice – in particular since provincial hospitals and private facilities are usually located in metropolitan areas. The results show that there are no large differences in health care choice by location. The only exception is in rural areas, where more respondents choose primary care and fewer choose private care than in other areas.

FIGURE 6: CONDITIONAL PROBABILITY PLOT – REGION-TYPE



Due to the inequitable provision of infrastructure under apartheid, there are *a priori* grounds for believing that former homeland status changes health-care seeking behaviour. The results confirm this. Respondents in former homeland areas are more likely to use primary health care and less likely to use private care (Figure 7).

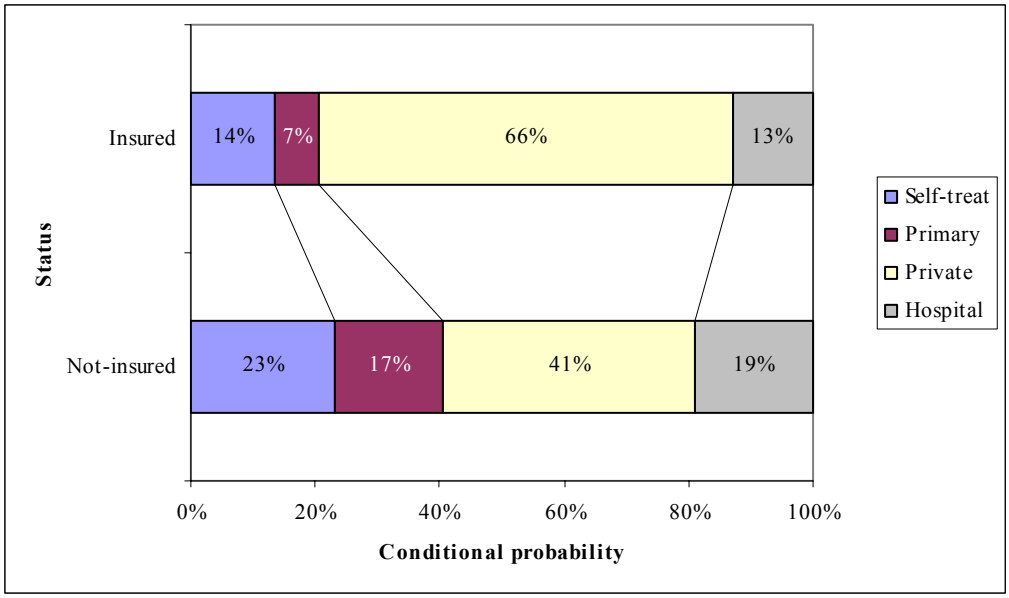
FIGURE 7: CONDITIONAL PROBABILITY PLOT – FORMER HOMELAND STATUS



d. Insurance

Respondents with medical aid should be more likely to use privately provided care. Unfortunately, respondents were not asked whether or not they had medical aid. They were, however, asked the extent of any contributions to an insurance scheme. Assuming that most people who have insurance will also have a medical aid, a new dummy variable was created, reflecting whether or not the respondent had insurance. The results confirm that respondents with some form of insurance (1223, or almost 39%, of the sample) are more likely to choose private care (see Figure 8) and consequently less likely to self-treat, seek primary care or utilise public hospitals.

FIGURE 8: CONDITIONAL PROBABILITY PLOT – INSURANCE STATUS



2. Factors related to care

a. Access

The survey asks how long it took the respondent to get to a health facility. This is commonly used in health demand functions as a proxy for access to health care. There

are, however, problems of selection bias, which the literature does not address. Firstly, the question can only be asked of respondents who actually *used* health care. Secondly, the variable cannot be used to interpret how distance affects decisions, because there are no comparative figures. For example, we cannot say respondent A chose a primary health care facility over a hospital because of distance, because we do not know which one is nearer. The variable is, however, found to be statistically significant and is included merely as a proxy.

b. Amount charged

It was found that the amount charged was statistically significant when entered as a categorical variable, but not significant when included as a continuous one. This is consistent with the theoretical view and empirical findings that health demand is reasonably price inelastic. The amounts charged are grouped into one of five categories, as shown in Table 5.

TABLE 5: AMOUNT CHARGED

Category	Range	Frequency
Free or did not pay	R 0	1 418 (41.6%)
Nominal	R1 – R10	748 (21.9%)
Average	R11 – R30	327 (9.6%)
Above average	R31 – R100	694 (20.4%)
Expensive	R100+	224 (6.6%)

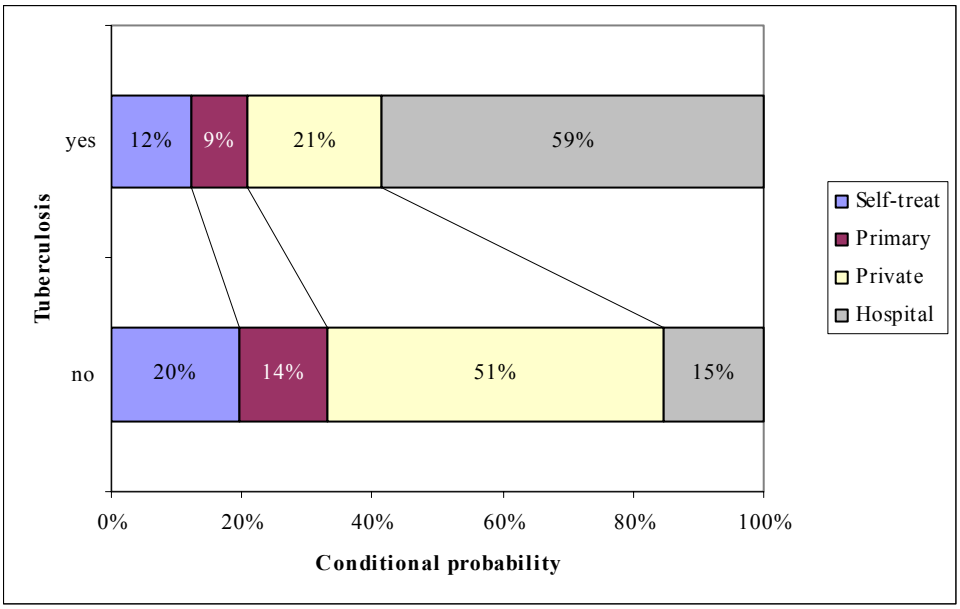
c. Quality

This is a particularly important determinant of health care choice. Unfortunately, it is also most difficult to quantify. The most sensible approach in the literature is that of Akin *et al* (1995), who construct a quality index based on questions posed to the respondents. Since this data is usually not available, the most popular proxy is time taken to get treatment.

3. Nature of the illness

The type of illness should also affect health care demand. The theoretical approach argues that health care is sought because there are significant opportunity costs to being ill (Grossman 1972a). The longer a person is ill, the more he or she should be prepared to pay for health care. The number of days that the person had been ill in the preceding fortnight is thus also included as a dependent variable. Also the nature of the illness should affect the health care choice, particularly since primary health care facilities and hospitals are geared to treat different types of illness. Of the reported illnesses, only flu and tuberculosis affected health care choice individually. Figure 9 reports the predicted probabilities for respondents with tuberculosis. In light of the strong correlation between HIV/AIDS and TB, this conditional probability plot is of particular interest. It finds that, all other things considered, TB sufferers are most likely to choose state hospitals above other types of care.

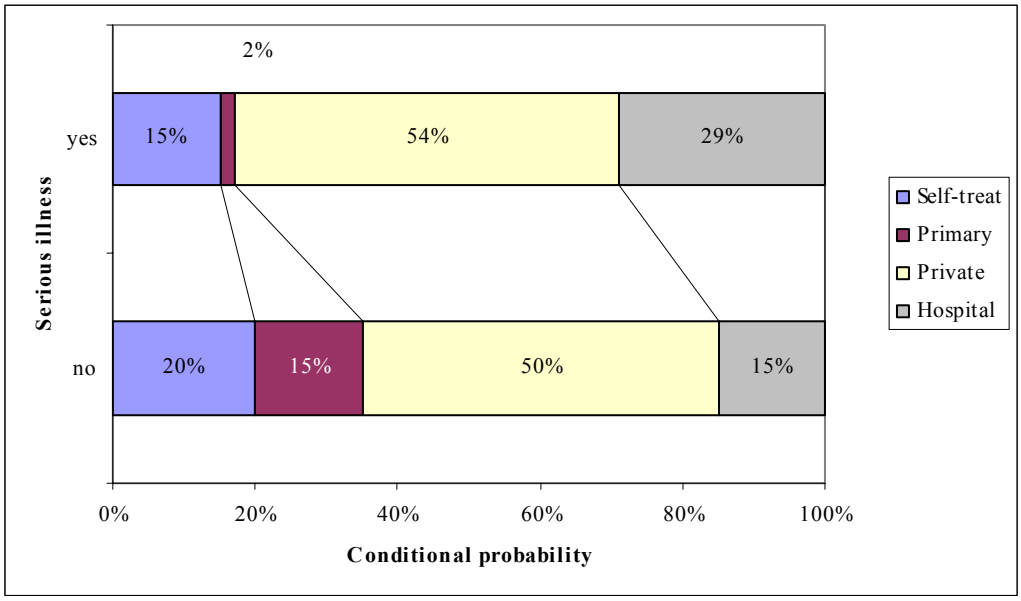
FIGURE 9: CONDITIONAL PROBABILITY PLOT - TUBERCULOSIS



A number of serious illnesses were also significant as a group, these being kidney infections, strokes, cirrhosis of the liver, personal injuries, injury from violence and cancer. The conditional probability plot (Figure 10) finds that respondents with a

serious illness are very unlikely to choose primary health care (only 2%) but will most likely choose private care (50%) followed by state-provided hospital care (28%).

FIGURE 10: CONDITIONAL PROBABILITY PLOT – SERIOUS ILLNESS*



* Kidney infections, strokes, cirrhosis of the liver, personal injuries, injury from violence and cancer

Factors that were not significant

A number of variables initially introduced were later eliminated or re-specified so that only those found to be significant were retained. It is interesting to note those factors that did *not* change health choice significantly:

- *Age:* this variable was included in a continuous form, a non-linear form and in age categories of 5 and 10 years. None were significant.
- *Gender:* health choices do not differ significantly across gender.
- *Cost of medicine:* in theory the cost of prescribed medicine is a function of illness and should not alter health choice. This was found to be the case.

Why did respondents who self-treated choose not to visit a facility?

Responding to a survey question, respondents who self-treated indicated that the prohibitive cost of medical care was the most dissuasive factor in choosing not to visit a facility, followed by no perceived need for health care (see Table 6).

TABLE 6: WHY WAS HEALTH CARE NOT SOUGHT?

	Frequency	Percentage
Too expensive	192	33.7%
No perceived need	224	39.3%
Insufficient money for transport	66	11.6%
Other	88	15.4%
Total	**570**	**100.00**

V POLICY QUESTIONS

What would the effect be of lowering the cost of private care?

The previous section established that private health care is a normal consumer good, i.e. higher levels of income translate to a greater use of the service. Primary care, though, is inferior, with higher levels of income likely to lead to lower use. The cost of care is also a significant determinant of what care is used. Making private care more affordable will improve the use of this type of care, freeing state resources.

One proposal in discussions around a government-financed social health insurance was a subsidy scheme (Doherty *et al*. 2000), envisaged as a tax levied on all employed South Africans, who would then become part of a medical aid-type arrangement where the state effectively subsidises a part of the cost of seeing a private doctor. Whichever way the tax is raised, for purposes of analysis the simplifying assumption is made that the subsidy is available to all who chose health care in 1993[8]. Alternatively, the cost of private care can be lowered by extending the reach of medical aid schemes. [9]

[8] Hypothesising about a possible effect on those who were ill but who did not choose health care (i.e. self-treated) requires heroic assumptions regarding price elasticity, as there is no observed behaviour. It is, however, sufficient to mention that the average charge of a clinic was R21, a private provider R145 and a hospital R89. It is likely that a R40 subsidy would be sufficient to cause a considerable movement from no care to a clinic. A large proportion of those who indicated that they found health care too expensive and therefore self-treated (Table 6) would presumably have shifted from self-treatment to some sort of care, given such a subsidy. Totals in Table 7 correspond to the totals in Table 3 excluding the respondents that were predicted to self-treat.

[9] This intervention could possibly, however, have serious distortionary effects on the market for private care and lead to negative second-round effects (see for example Bisseker 2001).

The model was used to simulate a decrease of R40 in the cost of care. This figure was used because it roughly corresponds to the contribution of an average medical aid to the cost of a visit to the doctor. The response matrix in Table 7 gives an indication of how South Africans would change their health-seeking behaviour. As can be seen, 874 respondents, representing a full 35% of people who had chosen health care in the survey, move off the diagonal (i.e. to other health care options). The net effect of the subsidy is mainly to move people out of primary health care into private care.

TABLE 7: RESPONSE MATRIX – R 40 SUBSIDY

Predicted original choice	**Predicted choice after subsidy**			**Total**	**% change**
	Primary	*Private*	*Hospital*		
Primary	**87**	273	72	**432**	79.9%
Private	66	**1 187**	157	**1 410**	15.8%
Hospital	38	353	**285**	**676**	57.8%
Total	**191**	**1 813**	**514**	**2 518**	

Table 8 summarises the net effect. The proportion of respondents choosing primary health care drops from 17.2% to 7.5%. There is a corresponding increase in the number of respondents choosing private care, with this proportion rising from 56.0% to 72.0%. The net effect on the choice of hospital care is a fall from 26.8% to 20.5%.

TABLE 8: NET EFFECT OF R40 SUBSIDY

Type of care Chosen	**% of respondents who chose care***	
	without subsidy	with R40 subsidy
Primary	17.2%	7.5%
Private	56.0%	72.0%
Hospital	26.8%	20.5%
Total	**100%**	**100%**

* excluding respondents who self-treated

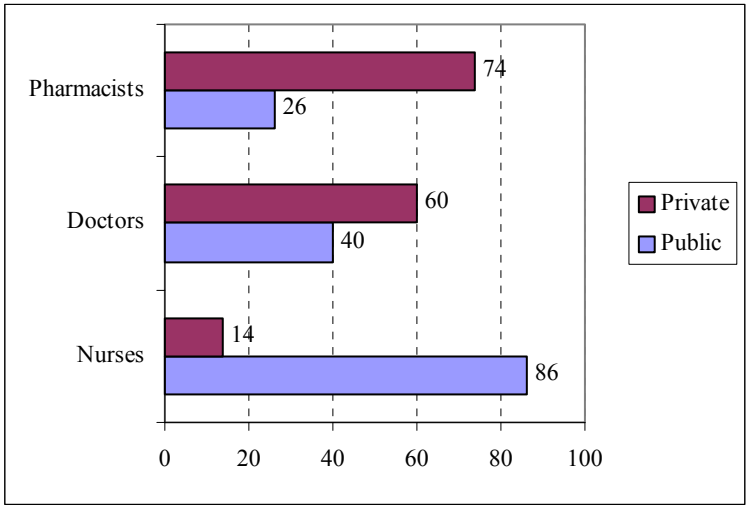
Why is private care preferred?

a. Better resources

Private health care is relatively better resourced than public health care. There are more doctors and pharmacists in private practice (Figure 11), for example. The level of resource allocation is also an important issue. Medical aid expenditure on health

care is approximately R35.5 billion compared to the public sector's R27.2 billion (Bisseker 2001: 34).

FIGURE 11: PERSONNEL DISTRIBUTION: PRIVATE V PUBLIC SECTORS (%)



Source: Makin (1998)

b.Better service delivery

Palmer (1999) ran ten focus group discussions in five rural towns in the Western and Eastern Cape to analyse why people choose private services over public services. She identified four themes from the responses she received:

- *Quality and choice come from paying for a service:* Respondents felt paying for a service meant there was an incentive for good service delivery;
- *Public sector care is not effective:* Respondents felt the public sector did not provide effective care – a number of the respondents claimed that the nurses "merely prescribe pills";
- *Public sector care is not appropriate:* The feeling was that public sector care (particularly clinics) is primarily for pregnant mothers, babies and tuberculosis sufferers;
- *Poor attitudes from public sector staff:* Many felt that public sector health workers (particularly nurses) treat patients badly, in marked contrast to the friendly attitude of private doctors.

How active is the private sector?

It is often asserted that the private sector only provides for a small portion of the population (by implication high wage earners with access to medical aid). The figure most often used is 7 million people (e.g. in Bisseker 2001: 34). But in light of the evidence presented here, which is also supported by the October Household Surveys, this claim is rather doubtful. If nearly half of a large sample of ill South Africans – almost two-thirds of those who did seek treatment – used privately-provided health care, then it would appear that the private sector reaches far more people.

In 1992/3 Valentine and McIntyre (quoted in Soderlund et al. 1998) estimated that approximately 22% of total health care spending was out-of-pocket in 1991. This adds an additional R17.3 billion to the amount spent on health care in South Africa in 2000, assuming that the proportions have remained the same. The breakdown of how this money was spent is given in Table 9.

TABLE 9: APPROXIMATE BREAKDOWN OF HEALTH SPENDING (2000)

Spending by:			**%**	**Value**
State			34%	R 27.2 bn
Medical aid			44%	R 35.5 bn
Out-of-pocket†			22%	R 17.3 bn
consisting of:				
co-payments for medical aid	40%	R 6.9 bn		
cash to general practitioner	24 %	R 4.2 bn		
over the counter medicines	36 %	R 6.2 bn		
Total			100%	R 80 bn

Sources: Soderlund, Schierhout and Van den Heever (1998) and Bisseker (2001).
† 1992/3 percentages

TABLE 10: APPROXIMATE ANNUAL VALUE OF HOUSEHOLD HEALTH CARE SPENDING BASED ON PAST WEEK'S SPENDING OF RESPONDENTS IN 1993 SURVEY

	Consultations	**Medication**	**Total**
Private health care	R 7.9 bn	R 1.7 bn	R9.6bn
Non-private health care	R 2.5 bn	R 0.2 bn	R2.7bn
Total	R 10.4 bn	R 1.9 bn	R12.3bn

Note: 412 people (13% of sample) are charged nothing, but use private care. This is dealt with when discussing Palmer's criticisms of LSDS**.** Anecdotal evidence suggests that this may be as a result of employers paying for medical care of employees.

From this it appears that the state's share of overall spending on health care is approximately in line with its share of the use of health care services by respondents in this survey. Indeed, some medical aid and out of pocket spending are also paid to

state hospitals and clinics, thus contrary to the exaggerated claims to the contrary, the private sector may even get a smaller share of health spending resources than its share in health care provision, as judged from the survey data.

VI CONCLUSION

It was found that health care choices do differ significantly between South Africans, with the characteristics of the respondent (such as household income, race and location), factors related to the care received – both monetary (the charge) and non-monetary (e.g. time taken to get there) – and the nature of the illness all playing a role.

For example, given that they are ill, 16 percent of the poorest income quintile of South Africans will not seek care. In the second poorest income quintile, four percent will not. This finding is consistent with the theoretical microeconomic demand for health function. Both monetary and opportunity costs (such as income foregone due to time spent obtaining care) are considered in the decision process. It is not sufficient to merely implement free care, but also care that is quick and easy to obtain.

For policy, an important finding is that the private sector plays an important role in the provision of health care. Public primary health care was found to be an inferior good, with private care substituted as income increases. Qualitative research elsewhere supports this finding and suggests that private health care is perceived as better than public health care.

South Africa is particularly fortunate in that it has a well-developed private health sector. The nation's public health resources are at present strained and even greater demands will be placed on it as a result of Aids. Encouraging the private sector to play a larger role among lower income groups will ease the government's burden and allow it to spend more of its resources on that part of the health service which cannot, for reasons of access and equity, be left to the private sector.

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APPENDIX A: VARIABLES AND DESCRIPTIVE STATISTICS

Abbreviation	Description	Number of observations	Mean	Standard deviation
totminc	Total household monthly income	3 166 (100%)	2026	3187.5
Irace_2	Race dummy: Coloured	303 (9.6%)	-	-
Irace_3	Race dummy: Asian	162 (5.1%)	-	-
Irace_4	Race dummy: White	406 (12.8%)	-	-
	(Black is the reference population group)	2 295 (72.5%)	-	-
prov_1	Provincial dummy: Western Cape	329 (10.3%)	-	-
prov_2	Provincial dummy: Northern Cape	34 (1.1%)	-	-
prov_3	Provincial dummy: Eastern Cape	508 (16.1%)	-	-
prov_4	Provincial dummy: Kwa-Zulu Natal	878 (27.7%)	-	-
prov_5	Provincial dummy: Free State	145 (4.6%)	-	-
prov_6	Provincial dummy: Mpumalanga	307 (9.7%)	-	-
prov_7	Provincial dummy: Limpopo	276 (8.7%)	-	-
prov_8	Provincial dummy: Northwest	171 (5.4%)	-	-
	(Gauteng is the reference province)	518 (16.4%)	-	-
Imetro_2	Location dummy: Urban	660 (20.1%)	-	-
Imetro_3	Location dummy: Metropolitan	868 (27.4%)	-	-
	(Rural is the reference location)	1 638 (51.7%)	-	-
homeland	Location dummy: Former homeland area	1 637 (51.7%)	-	-
insured	Characteristic dummy: Respondent is insured	1 223 (38.6%)	-	-
time_get	Time taken to travel to treatment	3 166 (100%)	31.35	45.45
Icharg_1	Cost of consultation: R 1 – R 10	748 (21.9%)	-	-
Icharg_2	Cost of consultation: R11 – R 30	327 (9.6%)	-	-
Icharg_3	Cost of consultation: R31 – R 100	694 (20.4%)	-	-
Icharg_4	Cost of consultation: over R 100	224 (6.6%)	-	-
	(Free is the reference cost)	1 418 (41.6%)		
Time_tre	Time waited for treatment	3 166 (100%)	33.65	55.84
Days_sic	Days ill before seeking treatment	3 166 (100%)	7.81	5.02
Serious	Illness dummy: kidney infections, strokes, cirrhosis of the liver, personal injuries, injury from violence and cancer	373 (11.8%)	-	-
flu	Illness dummy: influenza	701 (22.1%)	-	-
tb	Illness dummy: tuberculosis	82 (2.6%)	-	-
_cons	Constant			

APPENDIX B: SURVEY MULTINOMIAL LOGISTIC REGRESSION

Survey multinomial logistic regression

pweight: rsweight — Number of obs = 3166
Strata: <one> — Number of strata = 1
PSU: clustnum — Number of PSUs = 349
Population size = 3032503
F(76, 273) = 126.01
Prob > F = 0.0000

choice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Primary health care						
totminc	.0000318	.0000824	0.386	0.700	-.0001302	.0001938
Irace_2	.3195917	.7291745	0.438	0.661	-1.114552	1.753735
Irace_3	2.162901	.7329454	2.951	0.003	.721341	3.604461
Irace_4	-.1091019	.6708909	-0.163	0.871	-1.428613	1.210409
prov_1	-1.923773	.6036514	-3.187	0.002	-3.111037	-.7365088
prov_2	-3.162251	1.167259	-2.709	0.007	-5.458021	-.8664812
prov_3	-2.579313	.6609163	-3.903	0.000	-3.879206	-1.27942
prov_4	-3.28099	.7394195	-4.437	0.000	-4.735283	-1.826697
prov_5	-.7323548	.6597919	-1.110	0.268	-2.030036	.5653266
prov_6	-2.93903	.7187796	-4.089	0.000	-4.352729	-1.525332
prov_7	-2.326638	.7586977	-3.067	0.002	-3.818847	-.8344281
prov_8	-1.860539	.7789317	-2.389	0.017	-3.392545	-.3285325
Imetro_2	-.4696618	.4687111	-1.002	0.317	-1.391525	.4522012
Imetro_3	-1.155141	.5955297	-1.940	0.053	-2.326431	.0161494
homeland	.8527691	.4930009	1.730	0.085	-.1168671	1.822405
insured	-.3679269	.351943	-1.045	0.297	-1.06013	.324276
time_get	.2619023	.0991495	2.641	0.009	.0668946	.45691
Icharg_1	6.099624	1.370662	4.450	0.000	3.4038	8.795449
Icharg_2	22.19337	.	.	.	.	.
Icharg_3	2.478251	1.301772	1.904	0.058	-.0820792	5.038581
Icharg_4	21.46315	.	.	.	.	.
time_tre	.1465674	.0804639	1.822	0.069	-.0116893	.3048241
days_sic	.0436777	.0239887	1.821	0.070	-.0035033	.0908587
serious	-.4389011	.3502684	-1.253	0.211	-1.12781	.2500082
flu	-.7397411	.3438931	-2.151	0.032	-1.416111	-.0633707
tb	1.265343	.6049559	2.092	0.037	.0755132	2.455173
_cons	-1.695943	.6258221	-2.710	0.007	-2.926812	-.4650733
Private health care						
totminc	.0001606	.0000528	3.041	0.003	.0000567	.0002644
Irace_2	.980477	.5501324	1.782	0.076	-.1015257	2.06248
Irace_3	2.235585	.6414869	3.485	0.001	.9739063	3.497265
Irace_4	.8069496	.4116763	1.960	0.051	-.0027371	1.616636
prov_1	-.3868376	.434523	-0.890	0.374	-1.241459	.4677839
prov_2	-1.940799	.958715	-2.024	0.044	-3.826404	-.0551944
prov_3	-.4527062	.5441157	-0.832	0.406	-1.522875	.6174628
prov_4	-1.263863	.6023788	-2.098	0.037	-2.448624	-.079102
prov_5	-.0331068	.4493069	-0.074	0.941	-.9168055	.850592
prov_6	-.7249424	.5996016	-1.209	0.227	-1.904241	.4543565
prov_7	-.8255314	.6102117	-1.353	0.177	-2.025698	.3746356
prov_8	-.1930066	.5977636	-0.323	0.747	-1.368691	.9826774
Imetro_2	-.5286579	.4502251	-1.174	0.241	-1.414163	.3568468
Imetro_3	-1.386958	.550621	-2.519	0.012	-2.469922	-.3039943
homeland	-.8304538	.429301	-1.934	0.054	-1.674805	.0138971
insured	.4944132	.3060819	1.615	0.107	-.10759	1.096416
time_get	.2702539	.0990577	2.728	0.007	.0754267	.4650811
Icharg_1	3.76506	1.384588	2.719	0.007	1.041847	6.488274
Icharg_2	24.26865	.339824	71.415	0.000	23.60028	24.93702
Icharg_3	5.537142	1.273329	4.349	0.000	3.032752	8.041531
Icharg_4	23.56093	.704952	33.422	0.000	22.17443	24.94743
time_tre	.1413817	.0803246	1.760	0.079	-.016601	.2993644
days_sic	.0291586	.0189044	1.542	0.124	-.0080226	.0663398
serious	.0700297	.2982789	0.235	0.815	-.5166264	.6566859
flu	-.5609492	.3005112	-1.867	0.063	-1.151996	.0300975
tb	.2976995	.4820817	0.618	0.537	-.6504609	1.24586
_cons	-1.644065	.5254041	-3.129	0.002	-2.677432	-.6106985
Tertiary health care						

totminc	.0001169	.0000653	1.790	0.074	-.0000115	.0002453
Irace_2	.9445371	.51586	1.831	0.068	-.0700586	1.959133
Irace_3	1.690007	.6504827	2.598	0.010	.4106351	2.969379
Irace_4	-.0309526	.4327976	-0.072	0.943	-.8821807	.8202756
prov_1	.0382521	.4866043	0.079	0.937	-.9188032	.9953074
prov_2	-1.920956	1.069957	-1.795	0.073	-4.025352	.1834394
prov_3	.573364	.5247449	1.093	0.275	-.4587065	1.605434
prov_4	-.3508304	.6248542	-0.561	0.575	-1.579796	.8781354
prov_5	.8363047	.5443289	1.536	0.125	-.2342837	1.906893
prov_6	-.0036275	.5778839	-0.006	0.995	-1.140212	1.132957
prov_7	.083644	.658872	0.127	0.899	-1.212228	1.379516
prov_8	.6984056	.6570957	1.063	0.289	-.593973	1.990784
Imetro_2	.2385266	.4325026	0.552	0.582	-.6121213	1.089175
Imetro_3	-.013643	.5266217	-0.026	0.979	-1.049405	1.022119
homeland	-.1246275	.4001743	-0.311	0.756	-.9116919	.6624369
insured	-.0333569	.3238896	-0.103	0.918	-.6703842	.6036704
time_get	.2754088	.0991189	2.779	0.006	.0804613	.4703562
Icharg_1	5.259554	1.37115	3.836	0.000	2.56277	7.956338
Icharg_2	22.9623	.3690648	62.218	0.000	22.23642	23.68818
Icharg_3	3.591568	1.296555	2.770	0.006	1.041499	6.141637
Icharg_4	22.27877	.7698696	28.938	0.000	20.76458	23.79295
time_tre	.1482485	.0804538	1.843	0.066	-.0099883	.3064853
days_sic	.0847074	.0211917	3.997	0.000	.0430274	.1263874
serious	.5975572	.3168761	1.886	0.060	-.0256761	1.22079
flu	-1.896617	.3431188	-5.528	0.000	-2.571464	-1.22177
tb	1.609502	.5097568	3.157	0.002	.6069103	2.612094
_cons	-4.153791	.6014162	-6.907	0.000	-5.336658	-2.970923

(Outcome choice == Self-treat is the comparison group)

i.race	Irace_1-4	(naturally coded; Irace_1 omitted)
i.metro	Imetro_1-3	(naturally coded; Imetro_1 omitted)
i.charged	Icharg_0-4	(naturally coded; Icharg_0 omitted)