

# **HOW PRO-POOR IS PUBLIC SPENDING ON HEALTH IN SOUTH AFRICA?**

**Ronelle Burger<sup>1</sup> and Christelle Swanepoel**

The aspiration towards universal access to satisfactory health care is motivated by a respect for human life. In the health literature equity is often understood to refer to equality of opportunity, with access to a doctor arguably representing the most appropriate empirical measure of this.

Di McIntyre (1997) highlights three possible sources of inequity, namely funding, delivery and health status or health outcomes. Whereas the first two dimensions of inequity clearly relate to health services, the last dimension is considerably broader and is also influenced by factors outside the scope of health services including the individual's environment, lifestyle choices, occupational safety, health knowledge and genetics. The focus of this paper is an investigation of the incidence of South African public health spending. It will thus be mainly occupied with the first dimension of equity. However, because access and quality of medical care is so vital, the paper devotes some space to a descriptive analysis of this issue. The third dimension of inequity is considered to fall outside the scope of this paper.

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<sup>1</sup> Assisted by Kara Mackay

Much has been written about the regional bias of health spending<sup>2</sup>, but few have attempted a thorough analysis of the incidence of public health expenditure. This is partly due to data concerns. The next section will describe the limitations of the data sources available and propose a feasible methodology to investigate this question.

## **DATA AND METHODOLOGY**

Empirical analysis regarding health service utilisation is seriously constrained by the data sources available. None of the household surveys conducted collected sufficient information on both health service utilisation and household income or expenditure. The 2003 General Household Survey (GHS) has superior information with respect to health service utilisation but income and expenditure variables are restricted to household salary income, which cannot be used to construct deciles as 42% of the sample reported receiving no salary and the monthly expenditure is captured as eight broad household expenditure categories. Furthermore, health utilisation information in the GHS is restricted to the place of consultation and the type of health worker consulted. No detailed information on the cost of the service is provided.

Unfortunately, the 2000 Income and Expenditure/Labour Force Surveys (IES/LFS) have its 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 and this is inadequate because of free service provision to the poor. Furthermore, the reliability of the 2000 IES/LFS has been questioned by the research community. There are various reasons for concern, but most perturbing is

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<sup>2</sup> See for instance McIntyre, Baba & Bupendra (1998)

perhaps the 38% gap between the income captured by national accounts and the household surveys. The deficiencies of the IES 2000 have been well documented and include both sampling and data coding problems.<sup>3</sup>

In order to employ these available data sources as optimally as possible, attempts were made to model income and expenditure using variables common to both GHS and IES/LFS. The aim was to improve on the available salary and expenditure categories in the 2003 GHS. The model selection process and the diagnostics for the selected model are outlined in Appendix A.

The lack of data available on utilisation complicates the tracking changes in health spending and incidence over time. There are no surveys that would allow a comparison of how the utilisation of public health services has changed from the mid or late nineties. The GHS was only introduced in 2002. The 1993 Project for Statistics on Living Standards and Development data set is often used for descriptive analysis of utilization patterns, but it will not be useful for trends analysis in this case because it does not distinguish between private and public clinics and hospitals.<sup>4</sup> The 1995 and 1997 October household surveys have no information on the utilisation of health services. The 1999 October household survey will not allow a long enough time period for comparison. The 1998 Demographic and Health Survey contains detailed information on the utilisation of

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<sup>3</sup> See Simkins (2003), Poswell (2005) and Van der Berg (2005) for more details.

<sup>4</sup> The data set provides general information on health outcomes including variables on the prevalence of illness and health worker consultation. It also provides some specific quality and cost measures, but because the survey does not distinguish between public and private health institutions this is of little use for tracking trends pertaining to the questions asked here

health services, but cannot be used for this analysis because it does not include income or expenditure data.

There are concerns regarding the reliability of the expenditure data. The Department of Health's hospital and clinic expenditure data set is in a development phase with many seeming discrepancies and irregularities. With a few exceptions, the Department has preferred to not amend or challenge the expenditure figures reported by the provinces. This expenditure data is not available prior to 2000.

The analysis that follows attempts to use the various data sources available in a responsible way - with an awareness of its shortcomings - to provide some indication of who is benefiting from the public expenditure on health. Encouragingly, the available data sets provide plausible answers to the questions posed.

## **1. EQUITY OF HEALTH FUNDING**

### **1.1 THE COST OF PUBLIC HEALTH SERVICES**

Despite hospital utilisation being considerably lower than that of clinics, expenditure on hospitals is a multiple of expenditure on clinics. Approximately 60% of the total health budget is spent on hospitals while expenditure on clinics represents just slightly more than 10% of the budget according to the 2004 Intergovernmental Fiscal Review (South African National Treasury, 2004). The rest of the budget is made up out of minor items – none bigger than 5% - such as health facilities management,

health care support and administration costs. The analysis consequently focuses on public spending on hospitals.

To avoid the distortions introduced by large and variable patterns in capital expenditure, capital expenditure items are removed from hospital cost totals before averages are calculated. According to the 2004 Intergovernmental Fiscal Review, current payments account for almost 90% of expenditure.

To investigate the incidence of health funding, an estimate of the average cost of providing hospital services is required. The hospital expenditure totals reported by the provinces are matched with the National Hospital data base's utilisation statistics for 2000/1 to calculate a unit cost for each hospital over this period.<sup>5</sup> The unit cost measure used is the actual current expenditure<sup>6</sup> per inpatient day. Outpatient days were not included in the calculation because it was unavailable for a large number of hospitals in the sample.

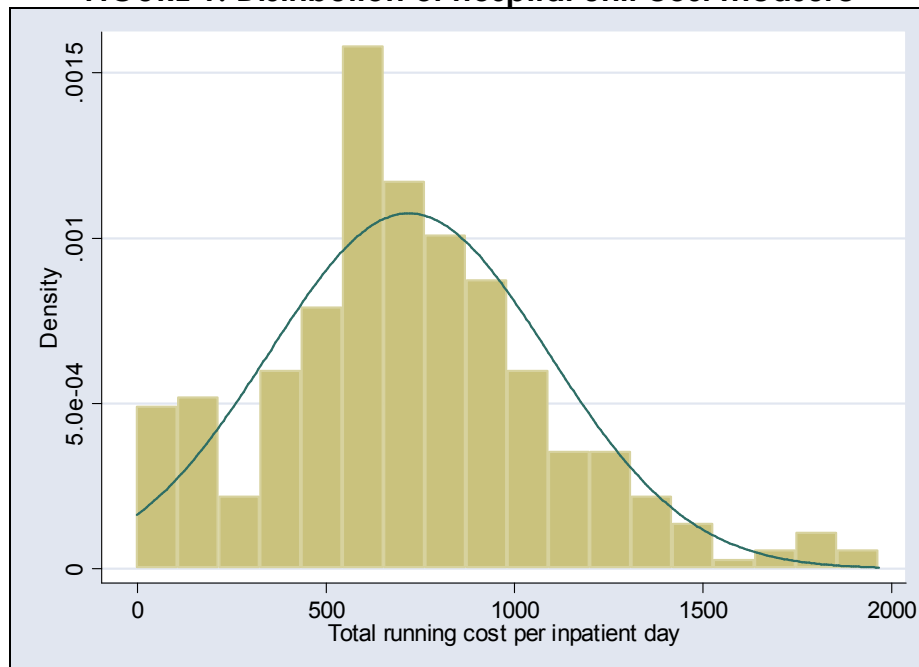
An average unit cost is calculated for each province, using the total number of inpatients as a weighting factor. Specialised hospitals were excluded from the sample for the calculation of the average. Figure 1 below displays the distribution of hospital current expenditure per inpatient day and Table 1 shows the average unit cost per province.

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<sup>5</sup> The matching was manual as the data bases were not designed for this purpose. Although there were 51 cases where utilisation information could not be located for hospitals with expenditure information, these items represent only 5% of total hospital expenditure

<sup>6</sup> Here actual recurrent expenditure was estimated by excluding any expenditure identified as capital expenditure or expenditure on land and buildings from the total. "Actual" is used here to distinguish what was spent by the institution from budgeted expenditure.

**FIGURE 1: Distribution of hospital unit cost measure**



Source: DoH's National Hospital data base, Expenditure per hospital data base

<b>Province</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Observations</b>
Eastern Cape	772	402	67
Free State	1118	723	29
Gauteng	1132	394	28
KwaZulu-Natal	886	324	68
Limpopo	725	235	42
Mpumalanga	1147	1123	26
NorthWest	698	220	23
Northern Cape	425	268	24
Western Cape	1251	803	37
<b>Total</b>	<b>960</b>	<b>551</b>	<b>344</b>

Source: DoH's National Hospital data base, Expenditure per hospital data base

Note: Unit cost is the reported current expenditure per

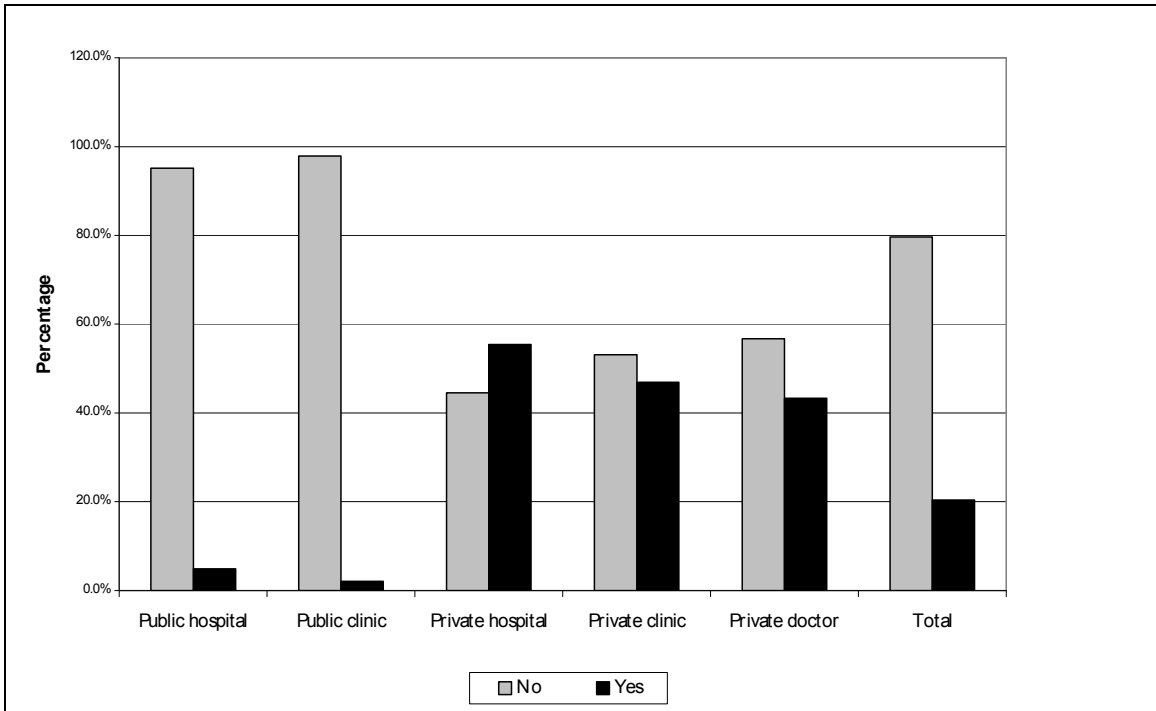
inpatient day. Unit costs are driven by tertiary hospitals and specialized hospitals to a large extent

## **1.2 UTILISATION OF PUBLIC HEALTH SERVICES**

The GHS 2003 is used to examine utilisation patterns by population groups, area and expenditure deciles. Appendix A details the construction of expenditure deciles. A model is constructed with the 2000 IES/LFS to estimate distributions for the household expenditure categories provided in the 2003 GHS.

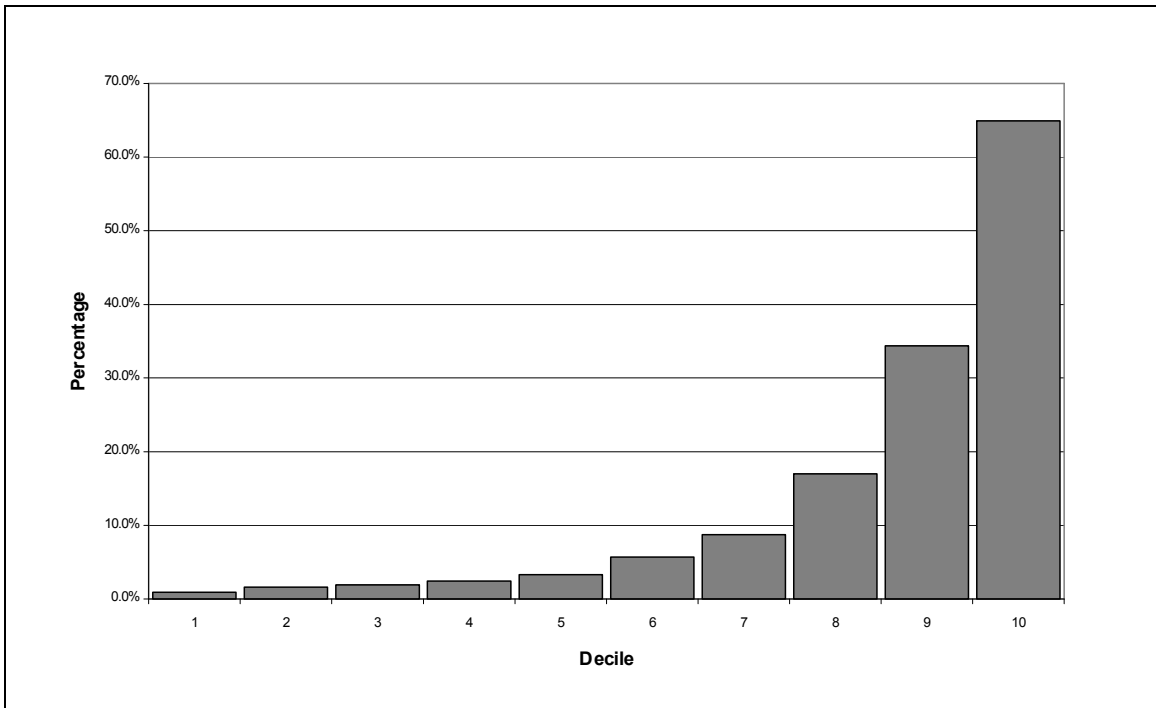
It is clear from Figure 2 that most of public hospital and clinic patients do not have medical aid. According to the GHS 2003 73% of medical aid patients who reported having utilised hospitals during the previous month chose private hospitals. As would be expected, Figure 3 and 4 shows that medical aid membership is more prevalent among white households and households with higher expenditure levels.

### **FIGURE 2: Medical aid membership for individuals by facility utilised, 2003**



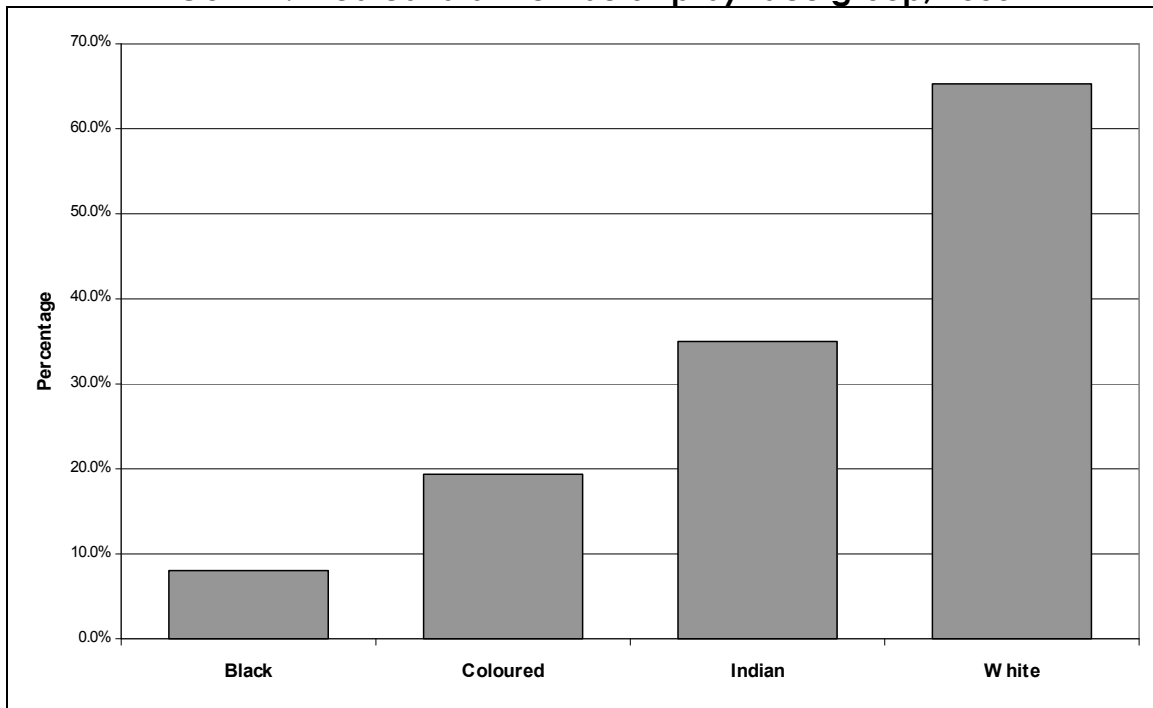
Source: GHS 2003

**FIGURE 3: Medical aid membership per household expenditure decile, 2003**



Source: GHS 2003

**FIGURE 4: Medical aid membership by race group, 2003**

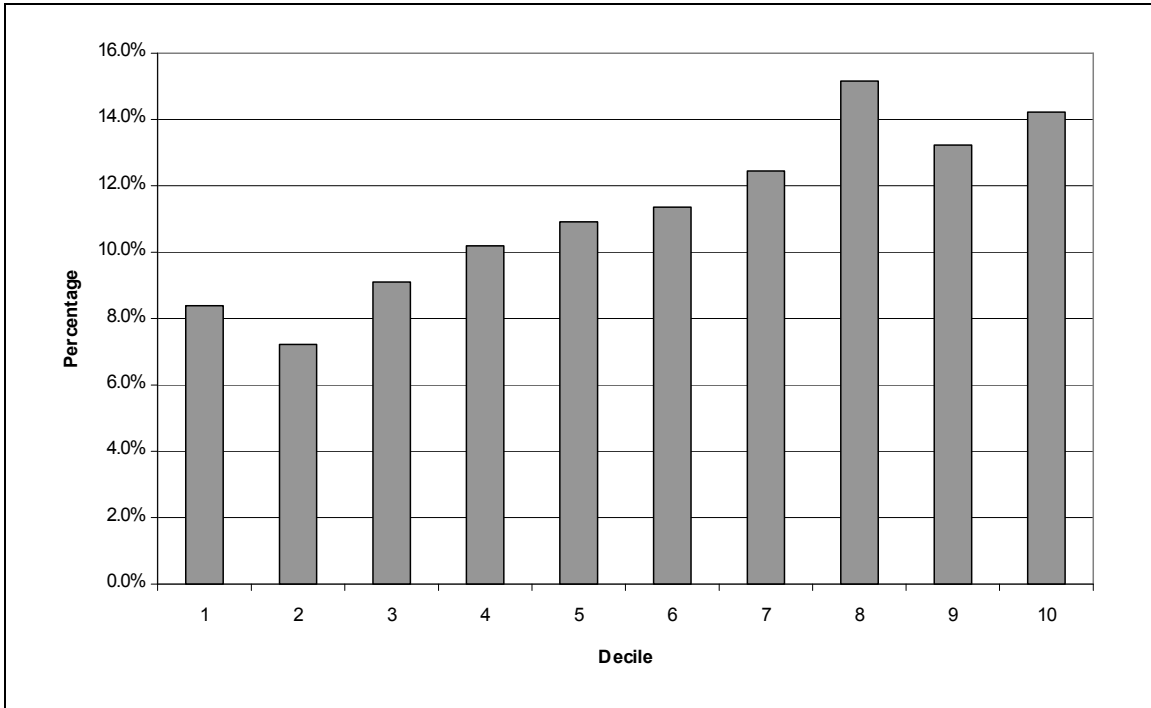


Source: GHS 2003

According to Figure 5 the occurrence of reported illness varies between 7.2% and 15.2% between expenditure deciles. Reported illness and injury are notably higher for the top expenditure deciles. This pattern could reflect the significance of perception in answering this question. It is likely that the higher incidence of reported illness and injury among richer individuals can be attributed in part to a lower threshold for discomfort and pain.

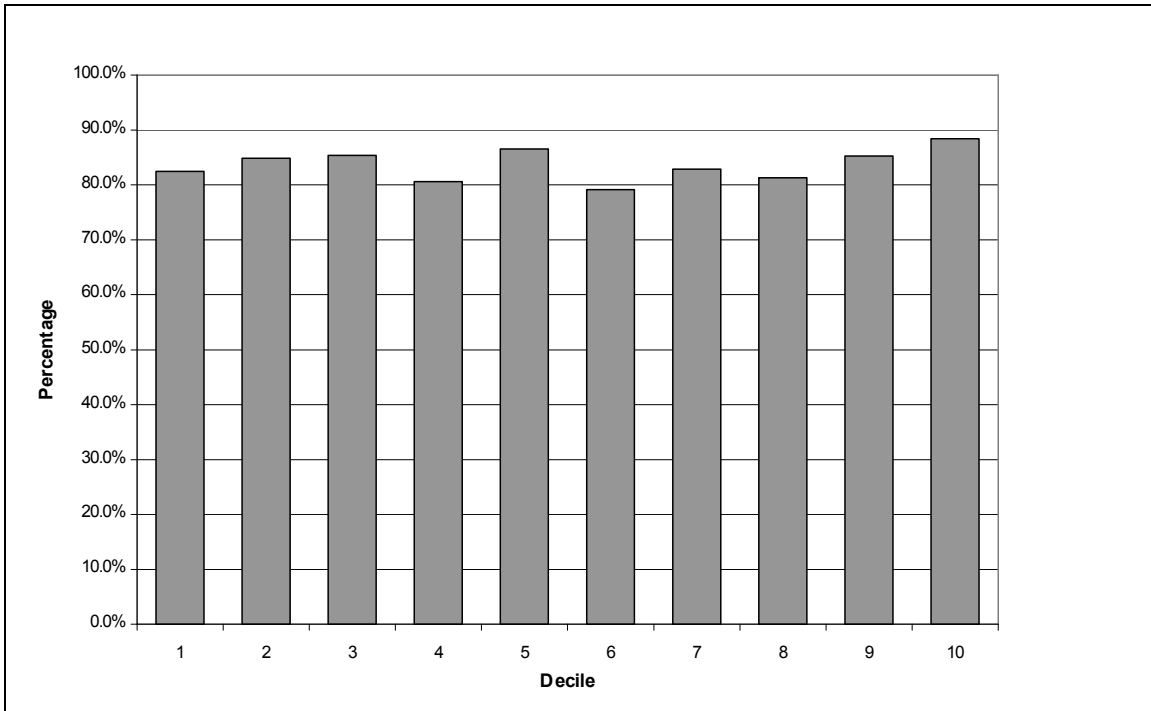
According to Figure 6 there does not appear to be a steady linear relationship between the decision to consult a health worker when ill and the expenditure categories. The instability could be partly due to smaller cell sizes. The analysis looks at a subgroup - those reporting illness and injury - that represents just more than 10% of the sample.

**FIGURE 5: Reported illness and injury by household expenditure decile, 2003**



Source: GHS 2003

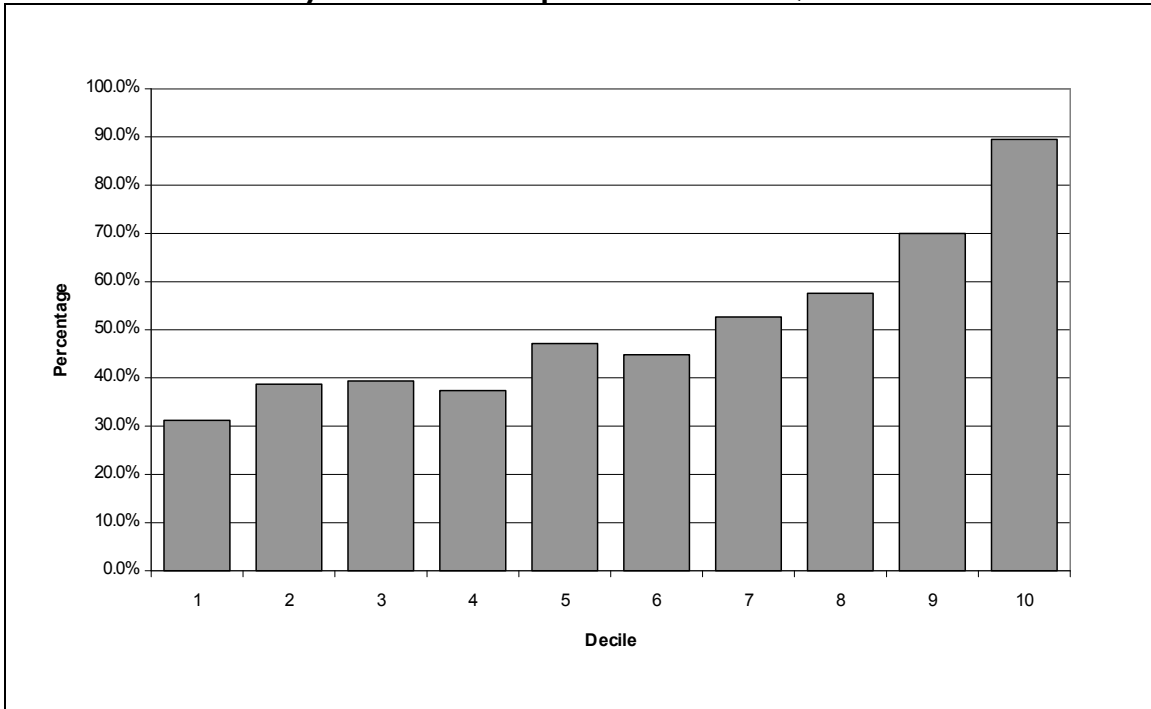
**FIGURE 6: Consulted health worker as result of illness and injury by household expenditure decile, 2003**



Source: GHS 2003

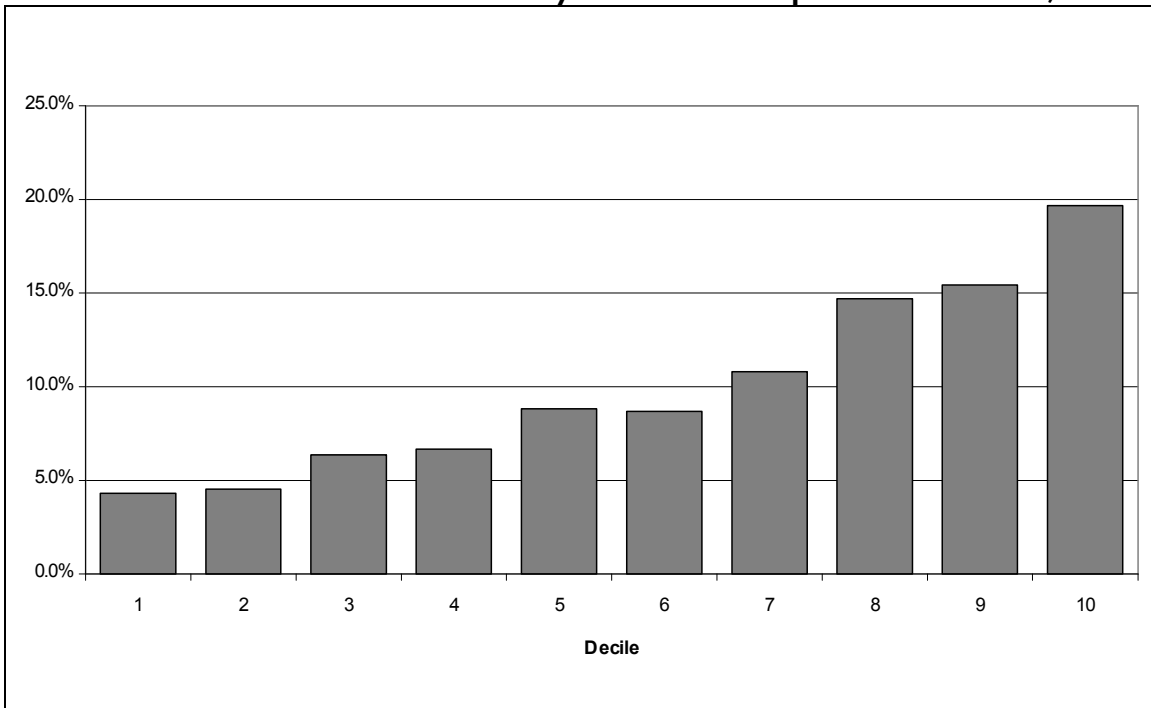
The progressive fee structure for health services is evident from Figure 7: a noticeably smaller proportion of those who report low per capita household expenditure paid for their health worker consultation. However, according to Figure 8 those in the bottom expenditure deciles are less likely to have access to doctors and are thus consuming a less costly medical service. Utilisation of doctors is considerably lower for individuals in the bottom two expenditure deciles.

**FIGURE 7: Payment for health worker consultation by household expenditure decile, 2003**



Source: GHS 2003

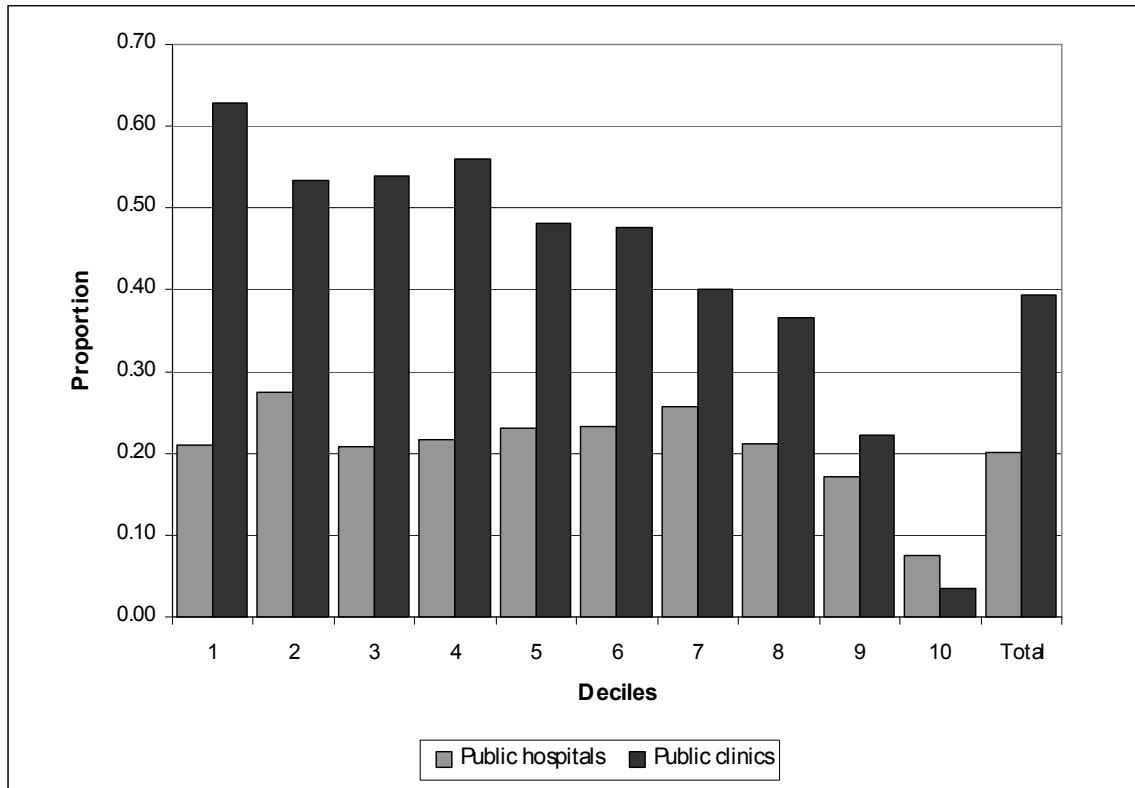
**FIGURE 8: Cross-tabulation of proportion GP consultation as proportion of total health worker consultations by household expenditure decile, 2003**



Source: GHS 2003

Figure 9 shows how the consumption of public health services varies by expenditure decile. Public hospital use is considerably lower for the top two expenditure deciles. As expected the use of public hospitals is more stable across the deciles while the use of public clinics decline rapidly. These results confirm findings that indicate that public health services may be an inferior good (Haveman & Van der Berg,, 2003). Various studies have investigated why poor households chose to pay between R50 and R100 for a private clinic consultation while public clinic consultations are free. There appears to be consensus that access to doctors and the perceived higher quality of diagnosis that public clinics offered were important motivating factors (Goldstein and Price, 1995; Usdin, 1993; Palmer, 1999; Palmer et al, 2002)

**FIGURE 9: Place of consultation as proportion of total by household expenditure decile, 2003**



There does not appear to be any noteworthy differences in the share of rural and urban residents that chose to consult a health worker when they are ill or injured (84.0% and 83.5% for urban and rural residents respectively). However this may be driven by noticeable gap between illness reported by geography. 12.1% of urban residents and 10.1% of rural residents reported that they were ill or injured in the previous month. One explanation is that this geographical gap is the result of the association between reported injury and expenditure. If, as suggested in the discussion of Figure 5, richer individuals have a lower threshold for pain and discomfort, reported illness is expected to be lower in rural areas where there is a higher concentration of poor people. If we remove all individuals who reported being ill, but claimed that it was not necessary to see a health worker, the picture changes drastically. 92.7% of urban households who required medical care, consulted a health worker, while only 88.6% of rural residents who needed to consult a health worker, did so. Excluding this group who reported being ill, but who did not consider it necessary to consult a health worker does not eliminate the rural-urban gap in reported illness, but it does decrease the gap. If this group of respondents is excluded, 9.6% and 11.1% of rural and urban residents respectively report being ill or injured.

The rural-urban shares of public hospital utilisation are very close (1.8% each). There may be two offsetting forces at work here: fewer available alternatives may increase the public hospital's share of health worker demand, while the increased likelihood of remoteness and thus higher average travel times to hospitals will decrease the demand. The public share of hospital use is considerably higher in rural areas (90.1%) than in urban areas (75.0%) providing support for such an interpretation.

### 1.3 SUBSIDISING HEALTH SERVICES

To enable a comparison of health subsidies across household expenditure deciles an average expenditure per hospital visit is calculated for each group. The IES 2000 is used to calculate the average hospital expenditure for those households that reported expenditure on public hospitals.<sup>7</sup> The use of average reported expenditure will mean that systematic differences between groups in the use of hospital services will also be captured by this method. Although the IES 2000 estimate is a household level variable it is expected to be an adequate estimate of the average individual hospital expenditure because the GHS shows that there are not many instances where more than one member of a family reported visiting the hospital.

The GHS 2003 is used to estimate the individual subsidies that hospital users received. Each respondent who reported hospital utilisation is assigned a hospital expenditure estimate. This estimate will be zero if the respondent claimed that he or she did not pay for the consultation. The IES cost estimates will be assigned to those who reported paying for hospital services in the GHS 2003. For each of the respondents reporting hospital utilisation their estimated expenditure is subtracted from the cost associated with a hospital visit in his or her province.<sup>8</sup> The results of this

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<sup>7</sup> Note that the expenditure category in the IES 2000 is defined as "Public sector hospitals, nursing-homes, clinics, etc., including ambulance services". The category thus also includes non-hospital health expenditure.

<sup>8</sup> A hospital visit is interpreted as being equivalent to our unit cost measure of inpatient days. The average length of stay for an inpatient is approximately 6.6 days (calculated from the National Hospital data base, excluding outliers and specialised hospitals), but according to the Intergovernmental Fiscal Review (2004) the ratio of outpatients to inpatients is 5.5. For the purpose of this approximate calculation the unit cost measure of inpatient day is thus considered sufficiently close to that of a hospital visit. Although it is

method is highly sensitive to the provincial use patterns due to the low incidence of public hospital use and the large variation of average hospital unit costs across province. According to a second method the average hospital unit cost is assigned to each individual. The individual level data is then aggregated to calculate an average subsidy per hospital visit and average subsidy for each decile.

The table below reports estimates based on the second method (employing average hospital costs instead of province specific average hospital costs). The table shows that individuals in the richest decile receive a substantially lower subsidy than those in other deciles. This result is due to the much lower incidence of public hospital use for this group. Progressive spending is achieved not by targeting, but by providing a public good that appears to be perceived by users as an inferior good.

**TABLE 2: Average subsidy per household expenditure decile, 2000**

	<b>Average expenditure for public hospital visit if paid (IES 2000)</b>	<b>Proportion that paid for their public hospital visit</b>	<b>Average subsidy if visited hospital</b>	<b>Proportion visiting public hospital</b>	<b>Average subsidy</b>
<b>1</b>	38.47	0.55	938.75	0.014	10.11
<b>2</b>	39.33	0.62	935.44	0.016	12.39
<b>3</b>	62.53	0.57	924.44	0.016	11.59
<b>4</b>	69.53	0.55	921.86	0.017	13.25
<b>5</b>	60.07	0.62	922.74	0.021	16.77
<b>6</b>	88.18	0.54	911.97	0.020	16.55
<b>7</b>	71.76	0.60	916.62	0.026	19.01
<b>8</b>	93.87	0.62	902.15	0.026	20.91
<b>9</b>	140.98	0.59	876.60	0.019	14.52
<b>10</b>	169.32	0.85	815.30	0.009	6.75

clear that the incorporation of the per hospital variation of ratios of inpatient to outpatient days and length of stay can influence answers, the loss in sample size (hospitals) that such an exercise would imply is to large to make this option worthwhile.

<b>TOTAL</b>	98.68	0.60	910.35	0.018	14.16
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Source: DoH's National Hospital data base, Expenditure per hospital data base, GHS

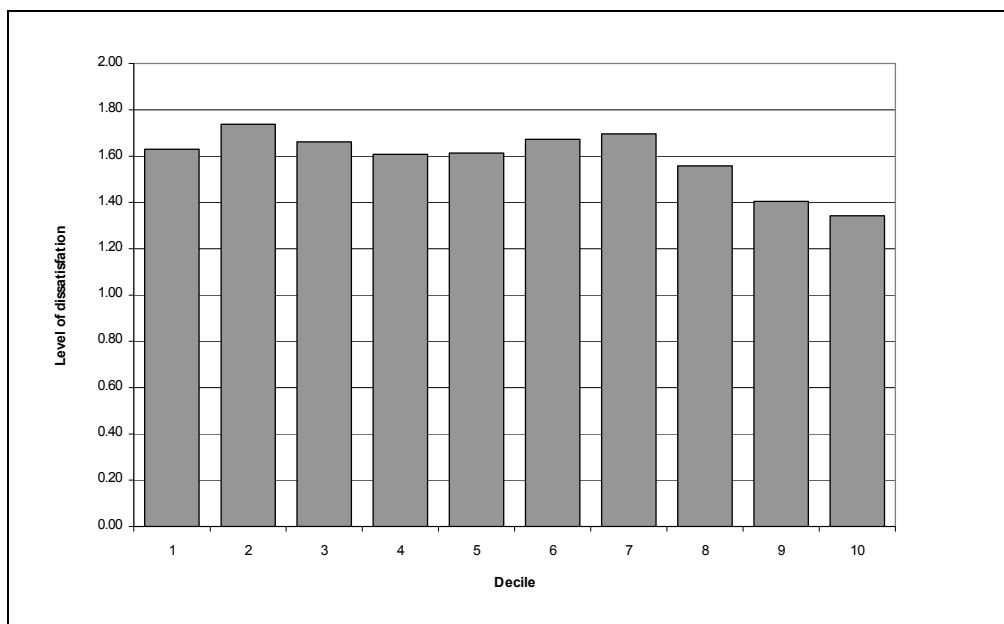
2003, IES 2000

It is encouraging that reasonably similar patterns are obtained when using alternative welfare indicators to compare spending. The sharp spike of the average subsidy in the seventh and eight deciles is not a robust result and could be an artifact of the modeling process.

## **2. EQUITY OF SERVICE DELIVERY AND QUALITY**

Figure 10 shows that average satisfaction with health services is lower among the lowest expenditure groups. The values for the satisfaction variable range from 1 to 5, with 1 representing "very satisfied" and 5 "very dissatisfied". There are noteworthy differences in the approval levels of the four race groups with black levels substantially lower than that of whites. There are however no significant differences in the average satisfaction of rural and urban residents.

**FIGURE 10: Average satisfaction with health services by household expenditure decile, 2003**



Source: GHS 2003

Note that a higher score indicates greater dissatisfaction

Users of public health facilities generally have lower levels of satisfaction than users of private facilities. Table 4 shows that users of public health facilities were considerably more likely to complain about long waiting times, unavailable drugs, incorrect diagnosis and rude staff, but users of private facilities were more likely to be dissatisfied with the price of the service.

<b>Place of consultation</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Frequency</b>	<b>Observations</b>
Public hospital	1.76	1.21	833 355	1 884
Public clinic	1.81	1.25	1 649 370	3 566
Other public	1.09	0.29	14 821	29
Private hospital	1.27	0.88	198 460	397
Private clinic	1.51	1.13	115 379	238
Private doctor	1.23	0.68	1 410 367	3 162
<b>Total</b>	<b>1.56</b>	<b>1.09</b>	<b>4 336 866</b>	<b>9 538</b>

Source: GHS 2003

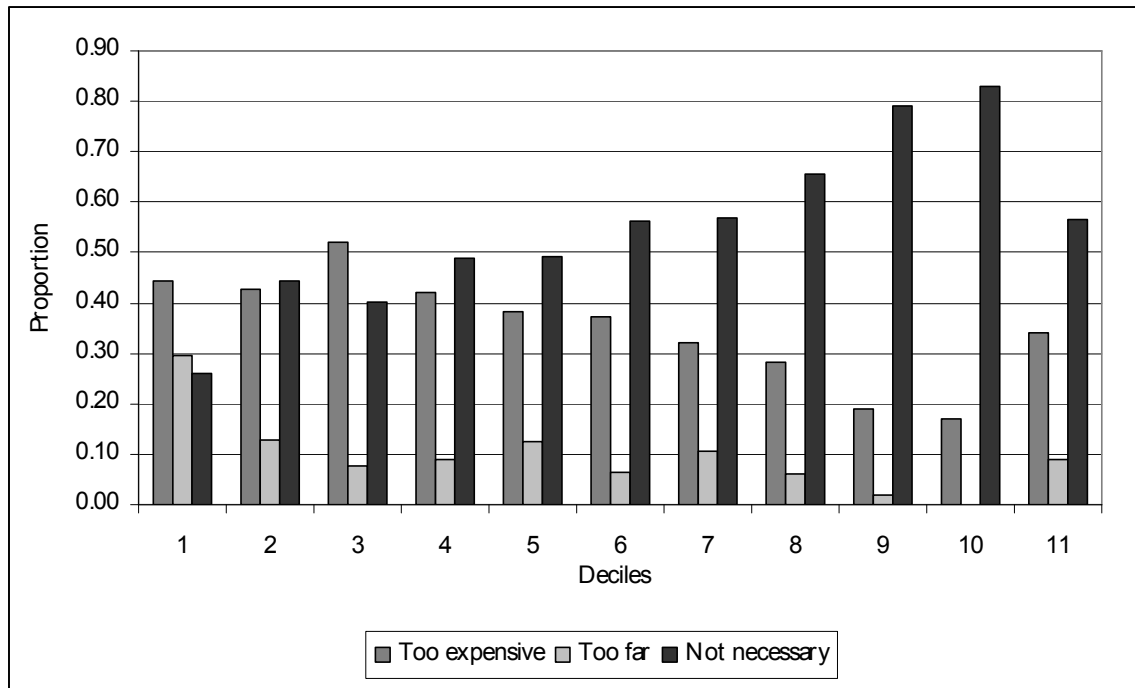
Note that a higher score indicates greater dissatisfaction

<b>TABLE 4: Frequency of complaints for private and public health facilities, 2003</b>		
<b>Complaints</b>	<b>Public health facilities</b>	<b>Private health facilities</b>
Long waiting time	37.34%	10.09%
Drugs not available	14.05%	3.14%
Rude staff	12.46%	4.33%
Incorrect diagnosis	2.39%	1.28%
Expensive	6.24%	3.13%

Source: GHS 2003

The reasons given for not consulting a health worker vary by expenditure category and provide an indication of factors constraining use for the different expenditure groups. In most cases when individuals in the top expenditure brackets chose to not consult a health worker it was because the illness did not necessitating it. Figure 12 shows that those in lower expenditure deciles are considerably more likely than those in the top brackets to cite distance to the health facility and prohibitive costs as reasons for not consulting a health worker. In the bottom expenditure decile 44.4% of respondents who did not consult a health worker when they were ill or injured claimed health costs to be prohibitive. 29.6% of individuals in this decile said traveling distance to the facility prevented them from consulting a health worker.

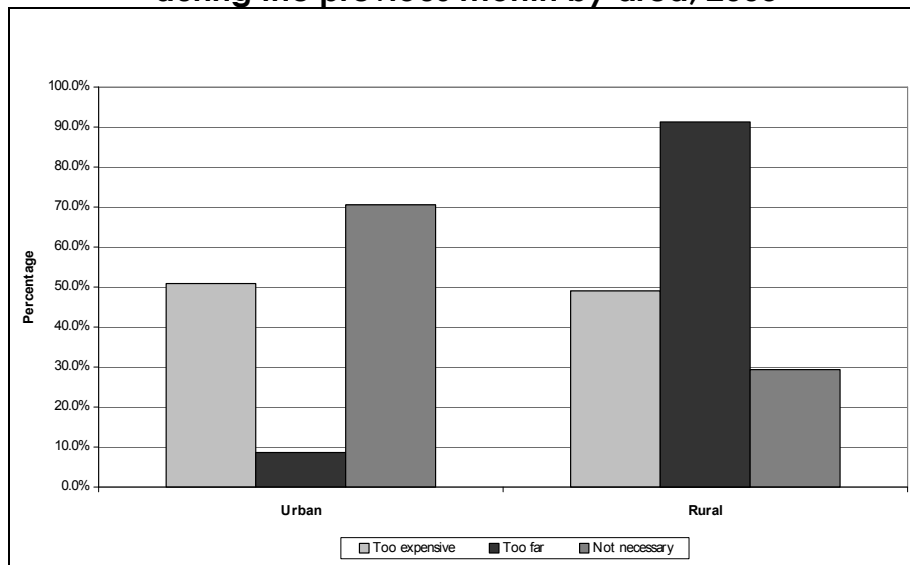
**FIGURE 12: Reasons for not consulting health worker when ill during the previous month by household expenditure decile, 2003**



Source: DHS 2003

As expected travel time appears to be an important consideration for rural residents when making decisions about seeking medical care. According to Figure 13 the number of rural residents reporting that they decided to not consult a health worker because the facility was too far away is much higher than then that for urban workers. Table 5 shows that the average travel time to the closest clinic or hospital was considerably higher for rural residents. Rural residents were also less likely to consult doctors. 68.4% of urban residents and 42.0% of rural residents consulted doctors.

**FIGURE 13: Reasons for not consulting health worker if ill during the previous month by area, 2003**



**TABLE 5: Time to travel to closest hospital or clinic by area, 2003**

	Mean	Std. Dev.	Observations
Urban	17.3	7.8	38 893
Rural	27.2	12.6	29 298
<b>Total</b>	21.3	11.2	68 191

Source: GHS 2003

## CONCLUSION

The analysis shows that health spending is progressive. Poorer individuals pay lower hospital fees and make more frequent use of public hospitals than those at the top of the expenditure scale, who often prefer to use private hospitals.

Service satisfaction is notably lower for the users of public vs. private health services. The most frequent complaints regarding public hospitals are long waiting times (37.4% of users) and drugs that are out of stock

(14.05% of users). Dissatisfaction with health services is highest those in the lowest expenditure groups.

Access to health facilities also remain an issue: individuals in the bottom expenditure group cite costs (44.%) and travel to the health facility (29.6%) as factors that prevent them from seeking help when they are ill. For these reasons rural residents are less likely to consult health workers when they require medical attention. The survey also indicates that rural residents have lower access to doctors.

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## **APPENDIX A: Using the IES/LFS 2000 to develop a model to estimate a money metric welfare measure for the GHS 2003**

The IES/LFS 2000 is used to estimate a money-metric welfare measure for the GHS 2003. Although there are several concerns regarding the reliability of the IES/LFS 2000, it has been shown that aggregated analysis of the data set yields robust and plausible results that are consistent with previous findings in the literature (Burger, Burger, Nieftagodien & Van der Berg, 2003). Simkins (2004) outlines the process that was followed to clean and reweight the data set that was used for the analysis.

Only variables that were generated through identical questions<sup>9</sup> and response categories were in GHS 2003 and IES/LFS 2000 were used as explanatory variables in the model. 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, e.g. household size, dependents etc. The third category contained geographical variables, such as rural and provincial dummies. The fourth group describes 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. For each of these two categories the variables were combined to calculate an asset index using principal component analysis. The calculated asset indices

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<sup>9</sup> Variables for which question formulation in the relevant questionnaires differed were eliminated as to make the model as transparent as possible.

were added to the list of variables available along with the individual variables from the categories.

In the model selection process both income and expenditure models were considered. Options included models for

- non-salary household or individual income
- total household or individual income
- total household or individual expenditure

There is also a possibility to use the eight household expenditure categories available in the GHS 2003 to its full advantage by devising a separate model for each of these expenditure categories.

The main criterion used for choosing between these different approaches was the proportion of households correctly predicted per decile. For our purposes it was also vital that misallocated observations should be as close as possible to the correct decile, preferably in neighbouring deciles. The adjusted R-squared was used as maximisation criterion in order to limit the effect of multicollinearity.

Based on these criteria, a series of expenditure models – matching each of the expenditure categories in GHS 2003 - were selected as the optimal approach. 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 expenditure is 0.66.<sup>10</sup> The table below shows the overlap between the predicted and actual decile allocation. The clean diagonal trend is

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<sup>10</sup> Note that the model predicts household expenditure. The per capita conversion occurs after the model has generated predicted values.

attributed partly to a procedure that assigned category boundaries to all predicted values exceeding these boundaries.

Deciles of	Predicted expenditure per capita										Total
Expenditure per capita	1	2	3	4	5	6	7	8	9	10	Total
1	<b>85.9%</b>	13.4%	0.2%	0.5%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
2	13.9%	<b>69.4%</b>	16.0%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
3	0.1%	17.1%	<b>62.5%</b>	19.3%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
4	0.0%	0.0%	21.1%	<b>59.0%</b>	19.5%	0.4%	0.0%	0.0%	0.0%	0.0%	100%
5	0.0%	0.0%	0.1%	19.1%	<b>62.4%</b>	17.7%	0.7%	0.0%	0.0%	0.0%	100%
6	0.0%	0.0%	0.0%	1.2%	17.0%	<b>61.2%</b>	20.3%	0.3%	0.0%	0.0%	100%
7	0.0%	0.0%	0.0%	0.0%	0.1%	20.6%	<b>62.0%</b>	17.2%	0.0%	0.0%	100%
8	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	17.0%	<b>72.7%</b>	10.3%	0.0%	100%
9	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.2%	<b>79.9%</b>	9.9%	100%
10	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	9.5%	<b>90.5%</b>	100%

The explanatory power is low for some of the household expenditure models and this causes clustering among predictions, especially at the bottom of the distribution. Consequently the first and second deciles contain 11% and 9% of survey observations. This is viewed as the main shortcoming of this approach.

To calculate GHS expenditure deciles using an IES/LFS-generated model is a risky venture, but estimates appeared to be reasonably accurate and enabled more sophisticated analysis of the rich service delivery variables available in the GHS 2003.