

Who pays and who benefits from health care? An assessment of equity in health care financing and benefit distribution in Tanzania

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Little is known about health system equity in Tanzania, whether in terms of distribution of the health care financing burden or distribution of health care benefits. This study undertook a combined analysis of both financing and benefit incidence to explore the distribution of health care benefits and financing burden across socio-economic groups. A system-wide analysis of benefits was undertaken, including benefits from all providers irrespective of ownership. The analysis used the household budget survey (HBS) from 2001, the most recent nationally representative survey data publicly available at the time, to analyse the distribution of health care payments through user fees, health insurance contributions [from the National Health Insurance Fund (NHIF) for the formal sector and the Community Health Fund (CHF), for the rural informal sector] and taxation. Due to lack of information on NHIF and CHF contributions in the HBS, a primary survey was administered to estimate CHF enrolment and contributions; assumptions were used to estimate NHIF contributions within the HBS. Data from the same household survey, administered to 2224 households in seven districts/councils, was used to analyse the distribution of health care benefits across socio-economic groups. The health financing system was mildly progressive overall, with income taxes and NHIF contributions being the most progressive financing sources. Out-of-pocket payments and contributions to the CHF were regressive. The health benefit distribution was fairly even but the poorest received a lower share of benefits relative to their share of need for health care. Public primary care facility use was pro-poor, whereas higher level and higher cost facility use was generally pro-rich.

We conclude that health financing reforms can improve equity, so long as integration of health insurance schemes is promoted along with cross-subsidization and greater reliance on general taxation to finance health care for the poorest.

Keywords Equity, financing incidence, benefit incidence, Tanzania, progressive, regressive, pro-poor, pro-rich

KEY MESSAGES

- The Tanzanian health care financing system is marginally progressive while benefits are fairly evenly distributed across socio-economic groups.
- Out-of-pocket payments and voluntary contributions to community health insurance are regressive.
- The poorest segment of the population receives a lower share of health care benefits relative to their share of need, whereas other population segments receive a greater share of benefits relative to their share of need.
- Health financing reforms can improve equity, so long as integration of health insurance schemes is promoted along with cross-subsidization and greater reliance on general taxation to finance health care for the poorest.

Introduction

The Tanzanian health system is financed through a mixture of sources, with donors contributing an increasing share of total health financing, and out-of-pocket payments and general taxation contributing most of the remainder of the funds. About 10% of total public expenditure, which includes general taxation and donor funding, is allocated to health care financing. Insurance schemes currently play an insignificant role in health care financing due to their low coverage. In 2008 (at the time this research was conducted), insurance coverage was about 10% of the total population (McIntyre *et al.* 2008). Coverage has been increasing since then and may be as high as 15% currently (Humba 2011).

The government owns about 70% of all health care facilities in Tanzania (MOHSW 2008a). Faith-based and private for-profit facilities each account for about 15% of the total. While faith-based providers are prevalent in rural areas, private for-profit providers are largely concentrated in urban areas. Primary level facilities, which are often under-staffed and short of drugs, are also more prevalent in rural areas, while urban areas have a relatively good network of hospitals and other referral facilities (Mtei *et al.* 2007).

The Tanzanian government has been demonstrating increasing commitment towards achieving universal health coverage by expanding health insurance coverage in the country. However, the relative merits of expanding financial protection through health insurance cover as compared with general taxation are unclear, in terms of promoting health system equity. While tax incidence analyses have been previously conducted in Tanzania, these are now outdated (Huang 1976; Levin 2005). Further, little is known about the distribution of health care benefits across the population, and, for example, the effect that greater health insurance cover might have on health service use among individuals of different socio-economic status. An analysis of the distribution of public sector benefits in Tanzania was previously carried out, indicating a pro-rich distribution of public health care benefits across all levels of health care provision (Castro-Leal *et al.* 2000). However, this study was undertaken prior to the introduction of insurance schemes. Further, faith-based and private for-profit facilities account for a growing share of health care provision (MOHSW 2006; MOHSW 2008a) and are likely to be of increasing importance in the move towards universal coverage, in order to meet the expected increase in the demand for health care. In addition, government subsidies are not limited to public facilities alone. Faith-based and private

for-profit providers also benefit from government support in terms of tax exemptions on health care equipment and supplies, and government training of health workers. The government also contracts private providers, mainly not-for-profit facilities, to provide health services on its behalf in areas with limited supply of higher level public facilities, covering the costs of administration, drugs, medical supplies and equipment. Limiting the analysis of benefit incidence to public facilities might therefore risk misrepresenting the impact of public subsidies and biasing the assessment of benefit incidence. A system-wide analysis of benefits, considering benefits from all types of provider, irrespective of ownership, is urgently needed.

A combined analysis of financing and benefit incidence has never before been undertaken in Tanzania, and yet such analyses can be highly valuable in depicting overall health system equity. For example, a health system that relies heavily on contributions from the rich would not be deemed equitable in terms of benefits if only richer population groups benefit from health services. We carried out a comprehensive assessment of health financing and benefit incidence in order to examine the extent to which the burden of financing is commensurate with ability to pay and the distribution of benefits with need, and discuss the implications of these findings in relation to possible future health financing reforms.

Methods

Evaluating financing incidence

Health financing equity is typically analysed in relation to ability to pay (Wagstaff *et al.* 1989; O'Donnell *et al.* 2008a). A health financing system is deemed progressive (regressive) if the richer groups contribute a relatively higher (lower) proportion of their income to health care financing than poorer groups (O'Donnell *et al.* 2008a). If all groups are contributing an equal share of their income, the system is said to be proportional.

We used the Kakwani index (KI) of progressivity (Kakwani 1977) which is the most commonly used measure of health care financing equity. The index is negative if the financing source is regressive, positive if it is progressive, and equal to zero if it is proportional. We also conducted dominance tests to assess whether the differences between the concentration curve of health care payments and the Lorenz curve of income distribution or the 45 degree line were statistically significant (O'Donnell *et al.* 2008a). A multiple comparison approach and 19 comparison points at 5% significance level was used for the dominance tests as proposed in O'Donnell *et al.* (2007).

The analysis of health care financing incidence in this study was limited to general taxation, out-of-pocket payments and health insurance. Although a significant source of health sector financing, donor funding was not considered separately, as the burden of grants would fall on citizens of the donor country, and interest payments on loans would be paid back through general tax revenue and, hence, this burden would be captured through tax incidence analysis. Analysis of the incidence of health insurance was limited to the two major insurance schemes: the National Health Insurance Fund (NHIF) which covers public employees, and the Community Health Fund (CHF) which is designed for the informal sector (Mtei *et al.* 2007). Financing incidence of the system as a whole was also considered by taking the weighted sum of Kakwani indices for all financing sources. Weights were derived from the share of each financing source in total financing. The year of analysis was 2005.¹

Our estimates of health care financing were triangulated with national reported tax revenue, actuarial reports of the NHIF and the National Health Accounts report of 2008 (MOHSW 2008b) for out-of-pocket payments, and adjusted where necessary. Household consumption expenditure data were also adjusted for consistency with figures reported by the Bank of Tanzania (Bank of Tanzania 2008).

Data sources

The analysis used data from the Tanzania Household Budget Survey (HBS) 2000/2001² administered by the National Bureau of Statistics. This survey is nationally representative and collected information on demographics, educational status, economic activities, consumption, expenditure, income, ownership of consumer goods and assets, housing structure, access to services and facilities, and food security from 22 178 households between May 2000 and June 2001 (NBS 2002). Data were collected through household questionnaires and diaries which compiled detailed consumption, expenditure and income data.

The HBS was used to estimate household contributions to general taxation and out-of-pocket payments. Household reported expenditure in this survey was inflated to the year 2005 using the consumer price index (CPI) (Bank of Tanzania 2008). As the survey was carried out before the widespread introduction of health insurance, a variety of assumptions were used to estimate insurance scheme membership among HBS households for the purpose of financing incidence analysis, as explained below. A household survey conducted as part of the Social Health Insurance for Equity in Less Developed countries (SHIELD) project, primarily for the benefit incidence analysis, was used to estimate CHF membership in the HBS and to quantify the financing incidence of CHF contributions. The survey was administered in four rural districts and three urban councils covering 2224 households and 12 201 individuals. The selection of districts/councils was purposive, to provide an overview of the range of insurance options available in the country. Wards were the primary sampling unit and were stratified into three categories in terms of their distance by vehicle from the district headquarters: nearby (less than 30 minutes), medium (between 30 minutes and one hour) and far away (more than an hour's drive). Two nearby wards were randomly selected, two medium wards and one ward far away.

Members of the available health insurance schemes were purposively selected from these wards. A total of 1155 insured households were interviewed, of whom 523 were CHF members.

Measure of ability to pay

Adult equivalent consumption expenditure was used as the measure of ability to pay. Consumption expenditure is considered a more reliable measure of ability to pay than income, which is often under-reported in developing countries (O'Donnell *et al.* 2008a). In addition, a large part of household consumption, especially in rural areas, is comprised of home production which would not be reflected in income. Household consumption expenditure was adjusted for household size and composition to get an adult equivalent estimate. The number of adult equivalent household members is defined as,

$$AE = (A + \alpha K)^\theta$$

where A is the number of adults in the household, α is the cost of children, K is the number of children and θ is the degree of economies of scale (O'Donnell *et al.* 2008a). The values of α and θ were assumed to be 0.5 and 0.75, respectively (Deaton and Zaidi 2002). The population was ranked by socio-economic status and grouped into quintiles of equal size. Household health care payments were also adjusted for household size and composition to get an adult equivalent estimate. The distribution of health care payments as a share of consumption expenditure was analysed across households arranged in adult equivalent consumption quintiles.

Tax incidence analysis

In higher income countries, studies of income tax incidence have tended to rely on reported income tax payments derived from income and expenditure surveys (Wagstaff *et al.* 1992; Wagstaff *et al.* 1999), but such data are less reliable in lower income settings (Borghesi *et al.* 2009). Consequently, in this study, personal income tax rates were obtained from the Tax Revenue Authority (Appendix Table 1) and applied to household income (as individual income data were not available) to estimate personal income tax contributions. The analysis of income tax was limited to those who were in formal sector employment.

For corporate tax, there is no consensus as to who bears the burden (Bradford 1981; Kotlikoff and Summers 1987). It is generally assumed that shareholders, capital owners and/or consumers bear the burden of the tax through lower profits and higher prices on goods and services, respectively (Martinez-Vasquez 2001). In this study, we assumed an equal distribution of the burden between households consuming domestically manufactured goods and owners of companies through reductions in dividend earnings.

We also applied appropriate consumption tax rates to reported expenditure on respective commodities (Appendix Table 1). We assumed that the incidence of consumption taxes falls exclusively on the consumers of the goods and services bearing the respective tax. For excise tax, which is a function of the quantity of a commodity consumed rather than expenditure on the commodity, we divided reported expenditure by product specific prices (Appendix Table 2) to estimate

the quantity consumed and then applied the appropriate tax rate.

The calculation of import duty was challenging because a number of commodities were both imported and domestically produced, requiring assumptions about the likelihood of the good being imported. Estimates of the total value of imports and domestic production for such commodities, where available, were obtained (Appendix Table 3). The total value of imports of a given commodity divided by the total value of imports plus domestic production of that commodity was used to estimate expenditure on imports. Where such data were not available, the ratio of the total value of all imports of manufactured goods into Tanzania and the total value of all imports plus the total value of domestic production of manufactured commodities was used to allocate consumption expenditure. Certain items were assumed to be fully imported because there are no such industries in Tanzania.³

Incidence of out-of-pocket payments and insurance contributions

The HBS reported total medical expenditure in the previous year, but did not provide a breakdown of expenditure. We assumed that reported medical expenditure reflected total out-of-pocket spending but that it was unlikely to include NHIF and CHF contributions because the two schemes were at the initial stages of establishment in 2000/2001. To estimate the incidence of NHIF contributions, we assumed that all public sector employees contributed 3% of their income to the NHIF, in accordance with national guidelines. The public employer contributions to the NHIF were captured in the tax incidence analysis. For the CHF, a logit model was constructed to identify the key characteristics of CHF members within the SHIELD survey, and predict the likelihood of being a CHF member in the HBS dataset. Variables used in the prediction include assets owned by households, housing characteristics, source of cooking and electricity utilities, and household and household head characteristics. We used the rule of half whereby each household with a predicted probability of above 50% (or 0.5) was considered to be a possible CHF member and was coded as one while other households were coded to zero. This approach predicted 6% coverage while the actual CHF coverage estimate for year 2008 was about 3.8%.⁴ The distribution of coverage across quintiles in the two surveys was also found to be relatively consistent. We assumed each household contributed US\$4.43 per year,⁵ which was the most common contribution rate adopted by districts/councils at the time of the study.

Evaluating benefit incidence

Equity or fairness implies that health care benefits be distributed according to health care need (Wagstaff *et al.* 1989; Culyer and Wagstaff 1993). Within benefit incidence analyses, health care benefits are traditionally defined as the product of health service use and the unit cost of health services (O'Donnell *et al.* 2008a). In order to ascertain whether a benefit distribution for a given provider was pro-rich or pro-poor, we constructed bar charts indicating the relative share of total benefits received by each quintile. If the poorest members of the population receive a higher share of health care

benefits compared with the rich, the system is pro-poor. Further, we compared the distribution of benefits, depicted by the concentration curve, against the 45 degree line of perfect equality. If the concentration curve lies above (below) the 45 degree line, the distribution is pro-poor (pro-rich). As in the case of financing incidence analysis, dominance tests were carried out to ascertain whether the differences were significant.

We analysed benefit incidence for both inpatient and outpatient care by level of care (i.e. primary, hospital and referral level) and ownership of facilities (public, private for-profit, faith-based). We used self-assessed health as a measure of need (O'Donnell *et al.* 2008a).

Data source

It was not possible to use the HBS for the benefit incidence analysis as it did not collect information on utilization rates, but only on whether a particular provider was visited. Further, this information was tied to the reporting of sickness or injury and is likely to have been underestimated. Hence, the SHIELD household survey was used instead, which compiled information on all outpatient visits within the previous month and all inpatient admissions within the previous year, not tied to a specific illness or injury. Information was collected on the type of provider visited and the number of visits to each provider. Monthly outpatient visits were converted into annual visits by means of a seasonal adjustment factor. In the absence of national statistics on the seasonality of service use, we used data from a district hospital in Dar es Salaam to obtain the adjustment factor.

Measures of need and socio-economic status

Within the SHIELD survey, the household head was asked to rank their health status on a scale of 1 to 5 (implying very good health, good health, average health, poor health and very poor health). Those who ranked themselves to be either in poor or very poor health were considered to be in higher need of health care.

Due to the challenges of collecting comprehensive consumption data in the SHIELD survey, an asset index was instead constructed using principal component analysis (PCA) as a proxy measure of socio-economic status (Filmer and Pritchett 2001), based on asset ownership, housing and household head characteristics, utilities and toilet type. The population were ranked by the index and grouped into quintiles of equal size.

Unit costs

We derived unit costs from NHIF data on claims reimbursed and service use for the year 2007/2008. We divided claims by outpatient visits/inpatient admissions to obtain unit costs for each type of provider and level of care.

Results

Distribution of the health care financing burden

General taxation was progressive overall (Figure 1), but income taxes were considerably more progressive than consumption taxes (Table 1). The lower level of progressivity of consumption taxes, especially Value Added Tax (VAT) which accounted for

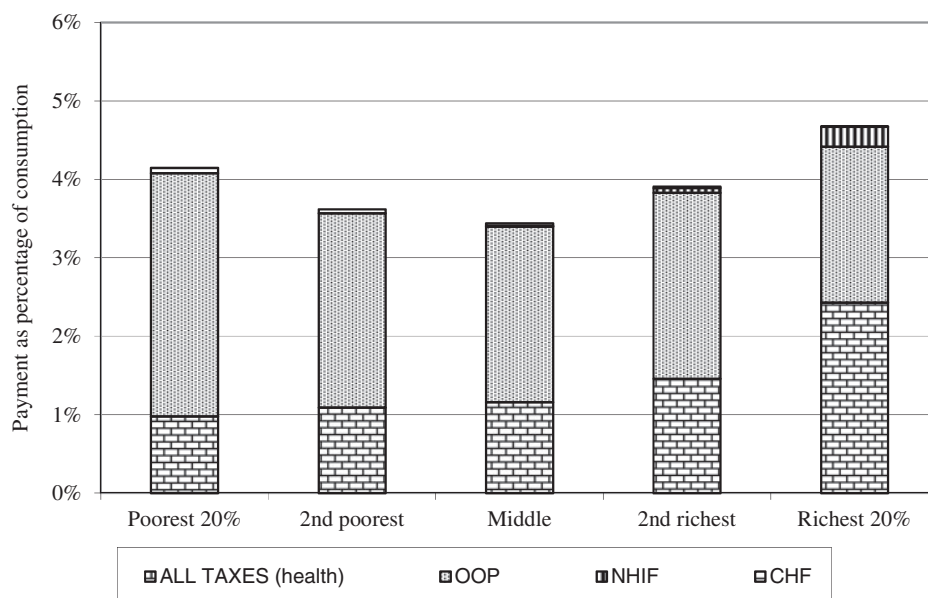


Figure 1 The relative burden of health care financing

Table 1 Progressivity of health care financing sources

Funding source	Concentration index	Kakwani Index (standard error)	Weight (% share of total funding)	Dominance test against 45° line (equality line)	Dominance test against Lorenz curve
Personal income tax	0.95***	0.53 (0.113)	7%	–	–
Corporate income tax	0.84***	0.42 (0.376)	5%	–	–
Total income taxes	0.90***	0.48 (0.128)	12%	–	–
VAT	0.46***	0.03 (0.018)	21%	–	–
Excise taxes	0.55***	0.13 (0.080)	6%	–	–
Import duty	0.57***	0.14 (0.056)	4%	–	–
Total consumption taxes	0.49***	0.07 (0.031)	31%	–	–
Total taxes	0.60***	0.18 (0.092)	43%	–	–
OOP	0.34***	–0.08 (0.036)	53%	–	+
NHIF	0.84***	0.42 (0.087)	3%	–	–
CHF	–0.07	–0.49 (0.053)	1%	+	+
Total insurance	0.70***	0.28 (0.081)	4%	–	–
Total health	0.47***	0.05	100%		

Notes: – 45 degree line or Lorenz curve dominates; + Concentration curve dominates; *** $P < 0.01$; ** $P < 0.05$; * $P < 0.10$.

VAT = Value Added Tax; OOP = Out-of-pocket payments; NHIF = National Health Insurance Fund; CHF = Community Health Fund.

the highest proportion of tax revenue, reduced the progressivity of general taxation overall (KI=0.18) (Table 1).

The NHIF was the most progressive source of financing health care (Figure 1), as indicated by the Kakwani index (0.42) and the concentration curve which dominated the income Lorenz curve (Table 1). However, contributions to the CHF were highly regressive, reducing the progressivity of insurance contributions overall. Health care financing through out-of-pocket payments was also regressive (KI = -0.08) (Figure 1) (Table 1).

Despite both CHF and out-of-pocket payments being regressive, the concentration index of the CHF was

insignificant (Table 1). The concentration indices for all other financing sources were significant at 1%.

Overall, the Tanzanian health care financing system was marginally progressive with a Kakwani value of 0.05.

Distribution of health care benefits

Overall, benefits from public and faith-based providers were almost evenly distributed. For public providers, the concentration index was positive and the 45 degree line dominated the concentration curve, indicating a pro-rich distribution, but

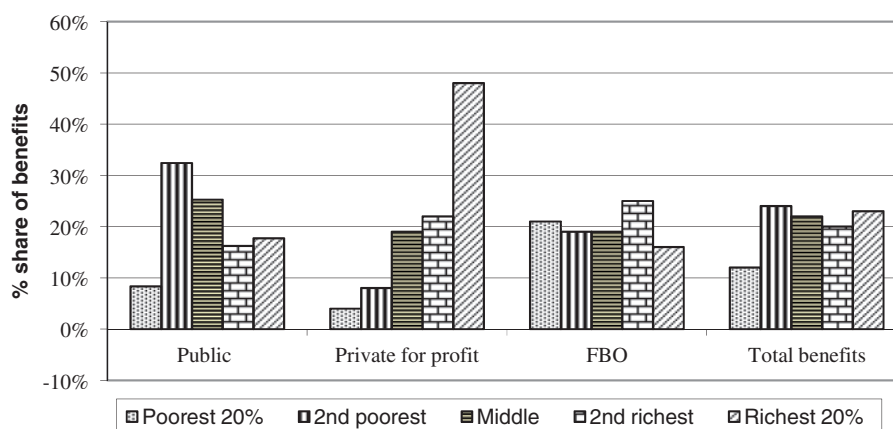
Table 2 Concentration indices and dominance tests between concentration indices of health care benefits distribution against 45 degree equality line by type of care and provider

Type of provider	Outpatient care		Inpatient care		All (inpatient & outpatient)	
	Index	Dominance test	Index	Dominance test	Index	Dominance test
Public primary	-0.10**	+				
District hospital ^a	0.15	-	-0.14	-	-0.13	-
Regional & referral hospitals	0.14**	-	0.29***	-	0.25***	-
Total public	0.01	-	0.027	-	0.03	-
Faith-based primary facilities	0.07	+				
Faith hospitals ^b	0.19*	-	-0.12	+	-0.08	+
Total faith-based facilities	0.15**	-	-0.12	+	-0.06	+
Private facilities	0.37***	-	0.68***	-	0.40***	-
Pharmacy	-0.10	-				
Total private facilities	0.37	-	0.68***	-	0.36***	-
Overall (public, private & faith-based facilities)	0.16***	-	-0.004	Non-dominance	0.06	Non-dominance

Notes: * $P < 0.1$; ** $P < 0.05$; *** $P < 0.01$; - 45 degree line dominates; + Concentration curve dominates.

^aFor public facilities, benefits from district hospitals combined with health centres for inpatient services.

^bFor faith-based facilities, benefits from hospitals combined with health centres for inpatient services.

**Figure 2** Benefit distribution from use of public, private and faith-based providers.

Note: FBO = Faith-based organizations

the concentration index was not significant (Table 2). However, the poorest 20% received less than 10% of total health care benefits from public services, while the second poorest 20% received considerably more than 20% of health care benefits, a greater share of benefits than the least poor households (Figure 2). The concentration index for faith-based providers was negative but not significant and the curve dominated the 45 degree line, indicating a pro-poor benefit distribution (Table 2). In this case, although the poorest 20% received more than 20% of health care benefits, the largest share of health care benefits was consumed by the second richest 20% (Figure 2).

Benefits from private for-profit providers were highly pro-rich, with the poorest 20% accruing less than 5% of total benefit compared with the richest 20% who received more than 45% of total benefits (Figure 2).

The distribution of outpatient benefits from public providers varied with the level of provider. Benefits from public primary

providers (health centres and dispensaries) were pro-poor (CI -0.10). Benefits were pro-rich at public regional and referral hospitals, faith-based hospitals and private for-profit formal facilities (Figure 2; Table 2). Benefits from pharmacies, which in this study were largely small drug shops, were relatively evenly distributed; while the concentration index was negative, it was not significant, and the 45 degree line dominated the concentration curve.

The distribution of inpatient care benefits was relatively even at health centres and district hospitals: the concentration index was negative but not significant, and the 45 degree line dominated the concentration curve. Inpatient care in faith-based facilities was pro-poor (CI -0.12) and the concentration curve dominated the 45 degree line. Inpatient care from private for-profit facilities was highly pro-rich (Table 2).

The overall benefit distribution in Tanzania was almost even, with a concentration index of 0.06 and non-dominance between the concentration curve and the 45

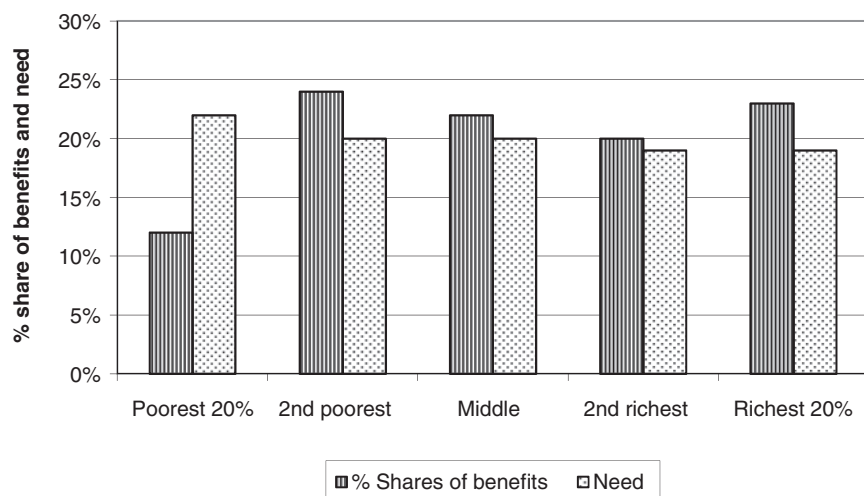


Figure 3 Distribution of total benefits in relation to need for health care

degree line (Table 2). However, while 80% of the population had a higher share of benefits relative to their need (Figure 3), the poorest 20% received a much lower share of benefits relative to their share of need.

Discussion

Overall, the health care financing system in Tanzania is marginally progressive. Consistent with other countries, income taxes in Tanzania contribute greatly to this progressivity, due to the progressive structure of income tax and the focus on the formal sector, which tends to be the better off (Wagstaff *et al.* 1992; Lairson *et al.* 1995; Wagstaff *et al.* 1999; Bilger 2008; O'Donnell *et al.* 2008b; Yu *et al.* 2008).

Consumption taxes have a lower level of progressivity, reducing the progressivity of general taxation and total health financing. Import duty was more progressive than VAT and excise tax. This could be due to higher consumption among the rich of imported items which also tend to be higher in cost than domestically manufactured goods. The progressivity of consumption taxes is consistent with other studies conducted in less developed countries (O'Donnell *et al.* 2008b). In contrast, consumption taxes are usually regressive in developed countries (Wagstaff *et al.* 1992; Wagstaff *et al.* 1999). The progressive nature of consumption taxes in developing countries is due to exemptions attached to commodities which are preferentially consumed by the poorest, such as food items. The progressivity of consumption taxes could also be a result of ineffectiveness in tax collection (Gray *et al.* 2001).

Contributions to the NHIF were progressive since coverage is confined to formal sector workers who are concentrated among higher income groups, and the contribution is proportional to income. In contrast, the CHF targets households in the informal sector in rural areas, who are generally in lower income groups, and contributions to the CHF are at a flat rate. Although the CHF is the most regressive financing source, it currently represents an extremely small share of total household health care financing as contributions are low and coverage is very low. These factors might contribute to the non-significance of

its concentration index, which indicates that it is not increasing inequality between rich and poor. Social health insurance in higher income countries has generally been found to be progressive, as low-income groups are exempted from contributing (Wagstaff *et al.* 1999; O'Donnell *et al.* 2008b). Studies in low- and middle-income countries have also found social health insurance to be progressive (Abu-Zaineh *et al.* 2008; Yu *et al.* 2008). Our study indicates that when community health insurance is not fully integrated within a system of social health insurance, or operates independently of formal sector risk-pooling arrangements, as in Tanzania, it can be a highly regressive system of funding if poorer groups are preferentially targeted and premiums are a flat rate. While relating premiums to income may in theory be desirable, there is little evidence of effective implementation due to the administrative difficulties of measuring income, and the cost of so doing (Macha *et al.* 2012).

Out-of-pocket payments were found to be regressive, despite the existence of waivers to protect vulnerable groups and the poor when accessing health services in public facilities. This finding is consistent with studies elsewhere (Wagstaff *et al.* 1992; Wagstaff *et al.* 1999; Cisse *et al.* 2007; Abu-Zaineh *et al.* 2008; O'Donnell *et al.* 2008b). The cause of regressivity in Tanzania is partially the weaknesses in the implementation of the waiver system, and particularly the appropriate identification of the poor (Mtei and Mulligan 2007). Furthermore, lower level public facilities, which are largely pro-poor, often suffer from stock-outs of drugs and other essential supplies, which lead patients to pay at drug shops and pharmacies or seek more expensive health services elsewhere (Macha *et al.* 2012). In addition, the poorest groups cannot obtain insurance cover for expensive hospital and referral services (such services are currently excluded from the CHF), resulting in their paying out-of-pocket for costly inpatient services.

Overall, the distribution of health care benefits is fairly even. All but the poorest group receive a share of benefits that is slightly greater than their share of need. Unfortunately, our study did not collect data on mortality or another objective proxy for need. The measure of need (self-assessed health)

adopted in this study shows that the poorest households had the highest need for health care services compared with the least poor. This distribution of need was consistent with the one observed for under-5 mortality in the Demographic and Health Survey (DHS). The distribution of infant mortality was relatively evenly distributed across socio-economic groups (NBS and ORC Macro 2010). Public primary providers are the only providers with a benefit distribution which favours the poor, a finding which is consistent with previous studies in Tanzania and other developing countries (Castro-Leal *et al.* 2000; Sahn and Younger 2000; Mangham 2006; Wagstaff 2010). Higher level public facilities were found to be pro-rich. Hence, programmes targeting public subsidies at lower level facilities, such as the Primary Health Services Development Programme,⁶ will benefit the poorest, whereas investments in higher level and referral facilities will be of greater benefit to the rich. Interestingly, faith-based providers are of benefit to the poor for inpatient care. In rural areas, even in districts which have a public district hospital, households that live at a distance often opt for inpatient care at faith-based providers to save on transport costs. Further, such providers sometimes offer flexible pricing policies to poorer households. The government policy of subsidizing faith-based hospitals to act as district hospitals in some areas is, therefore, of benefit to the poor. In Tanzania, public-private partnerships are being increasingly promoted in the health sector (International Monetary Fund 2004; MOHSW 2010). In line with this approach, greater subsidies might be offered to faith-based facilities for inpatient care in rural areas, even when district hospitals are present, so as to increase access to health care for poorer groups.

Private for-profit providers essentially benefit the richest portion of the population. This implies that public subsidies such as tax exemptions allocated to these providers benefit the rich.

This comprehensive equity analysis of the overall health system reveals a relatively even distribution of financing and of benefits overall in Tanzania. While the progressivity of tax and NHIF contributions is encouraging, the regressivity of out-of-pocket payments and CHF contributions, coupled with the low level of health care benefits relative to need of the poorest, is of concern. Moreover, the regressivity of CHF is of concern not only because the poorest groups are contributing to this scheme, but also because the benefits they are getting are too limited; access only to primary public facilities which are often not adequately equipped with essential health care supplies. Since only the poorest join the CHF, the size of the pool is insufficient to provide comprehensive coverage. In this situation, one might argue that health care provision to CHF members is determined by the limited amount of money they contribute rather than by the need for health care. In contrast NHIF members, who are generally higher income individuals, have access to a wider range of benefits from public, private and faith-based facilities of all levels.

One way of reducing the regressivity of out-of-pocket payments and allowing the poorest to benefit from a broader range of health care services would be to expand the CHF benefit package and initiate cross-subsidization between health insurance schemes. Such moves would help to promote a pro-poor health care benefits distribution

(O'Donnell *et al.* 2005). The recent take-over of the CHF management by the NHIF is a positive step in this direction. While the NHIF management is currently concerned about the financial sustainability of cross-subsidizing the CHF, there is a commitment to expand the CHF benefit in the short term to include higher level public providers (NHIF 2009). This will increase the share of benefits from higher level public providers going to the poor. However, if the benefit package were to expand in the absence of cross-subsidization, there is a risk of increases in the premium level which would make the regressivity of the CHF of even greater concern.

An alternative or supplement to cross-subsidization would be to inject further tax revenue into the CHF, whilst also creating incentives for effective implementation of the waiver system by, for example, refunding facilities for lost user fee revenue associated with granting waivers, and instituting a simple and effective means of identifying the poor. A further alternative, which would alleviate the administrative costs associated with managing the CHF and the waiver system, would be to fully tax-fund a package of essential services for all those who are not covered by mandatory insurance through their employment. A similar approach was adopted in Thailand under the universal coverage scheme in order to protect the informal sector from financial catastrophe associated with ill health (Sakunphanit 2006). The advantage of tax funding is that, unlike insurance contributions and out-of-pocket payments, everyone benefits, not just those who pay. However, income tax may not be a viable source of funds due to the limited formal sector (less than 10% of the population). It may be preferable to draw on taxes to which the great majority contributes, such as VAT, as has been done in Ghana with the National Health Insurance Levy (NHIL) (ILO and Republic of Ghana 2006).

Undertaking financing and benefit incidence analyses in countries such as Tanzania is constrained by limitations in the availability of data (Borghi *et al.* 2009). Existing household budget surveys do not collect detailed information on health care utilization rates, out-of-pocket payments and, in Tanzania, on health insurance status. We therefore relied heavily on our own household survey to examine the financing incidence of CHF contributions through a range of assumptions. Although the estimation process for the latter was complex, we were reassured by the consistency of our findings with those from available national data. Triangulation analysis gave us confidence in our financing incidence analysis. For future analyses of health financing equity, the Ministry of Health and Social Welfare should liaise with the National Statistics Office to ensure that appropriate data are compiled during subsequent rounds of the HBS. Further research should also examine the incidence of different components of out-of-pocket payments, to assess which aspects add more to the regressivity of this financing source.

There were two main challenges in the benefit incidence analysis. Firstly, obtaining reliable unit costs was a major challenge. There has been no comprehensive national study of health sector costs, although one is planned for 2011. Secondly, due to the under-reporting of self-reported illness amongst lower income groups in developing countries (Makinen *et al.* 2000), we used a measure of self-assessed health as a proxy for need. It would be of value to develop more refined measures of

need, specifically in terms of disease incidence, to more closely align the analysis of benefits with that of need.

Conclusion

This study in Tanzania has found that the distribution of health care financing is marginally progressive while the distribution of health care benefits is relatively even, although the regressivity of out-of-pocket payments and CHF contributions, and the exclusion of the poorest from accessing needed care, are of concern. The current health financing system is highly fragmented, implying that the rich, who are mainly covered with the comprehensive NHIF, enjoy a wider range of benefits at all levels of facilities, while the poorest rely on out-of-pocket payments or CHF and mainly benefit from services provided in public primary health facilities, which are normally perceived to be of poor quality. Health financing reforms could make the health system more equitable, so long as they are consistent with the principles of universal coverage, reduce fragmentation and promote integration of schemes. Ongoing analyses of health equity should be encouraged to assess the impact of forthcoming reforms on financing and benefit incidence over time.

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Conflict of interest

The authors declare having no competing interests.

Endnotes

- ¹ This was chosen in order to be able to compare with the most recent National Health Account (NHA) data which provided estimates of health sector financing for year 2005 (MOHSW 2008).
- ² Although the Tanzania National Bureau of Statistics had conducted a further household survey in 2007/08, these data were not available for public use at the time of this analysis.
- ³ These commodities were: watches, sunglasses, jewellery, radio/TV, record/cassette-player/tape recorder, records, tapes, cassettes, musical instruments, cars and bicycles.
- ⁴ Estimates using CHF matching funds allocated to districts for year 2008.

- ⁵ Exchange rate 1US\$=1129 Tanzania shillings (Bank of Tanzania 2008).
- ⁶ This programme aims to expand the number of primary facilities across the country, with a dispensary in every village by 2012.

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Appendix Table 1 Income and consumption tax rates for year 2005

Tax source	Rate
Personal Income Tax	
Where total income does not exceed Tsh. 960 000	0
Where total income exceeds Tsh. 960 000 but does not exceed Tsh. 2 160 000	18.5% of the amount in excess of Tsh. 960 000
Where total income exceeds Tsh. 2 160 000 but does not exceed Tsh. 4 320 000	Tsh. 222 000 plus 20% of the amount in excess of Tsh. 2 160 000
Where total income exceeds Tsh. 4 320 000 but does not exceed Tsh. 6 480 000	Tsh. 654 000 plus 25% of the amount in excess of Tsh. 4 320 000
Where total income exceeds Tsh. 6 480 000	Tsh. 1 194 000 plus 30% of the amount in excess of Tsh. 6 480 000
Corporate Income Tax	30%
VAT	20%
Import Duty	
Finished goods	25%
Intermediate goods	10%
Excise Tax	
Soft drinks (Tsh. per litre)	41.50
Beer (Tsh. per litre)	256
Wine (Tsh. per litre)	
With the domestic grape content exceeding 75%	Nil
With domestic grape content less than 75%	820
Spirits (Tsh. per litre)	1216
Cigarettes containing tobacco: (Tsh./1000)	
Cigarettes containing tobacco of length not exceeding 70 mm, with the domestic contents exceeding 75% (cigarettes without filter)	4170
Cigarettes containing tobacco of length equal to 70 mm or more, with the domestic contents exceeding 75% (cigarettes with filter)	9840
Other cigarettes containing tobacco (imported)	17 870
Petroleum products (Tsh./litre)	
Illuminating kerosene	122
Gas oils (GO)	127
Diesel Oil (IDO)	201

Source: Tax Revenue Authority of Tanzania.

Appendix Table 2 Price data for excise tax calculation

Item	Beer (0.5lt)	Spirit (1lt)	Wine (1lt)	Soda/0.350 lt (1lt)	Kerosine (lt)	Diesel (lt)	Petrol (lt)	Cigarettes/20sticks		
								Domestic filtered (Sweet Menthol)	Domestic not filtered (Nyota)	Imported (Embassy) 2009
Price 2007	1550	3505	9000	858	1040	1384	1433	1007	515	2200
Price 2005	1031	2635	6975	381	807	1074	1112	756	386	1705

Data source: Prices for 2007 obtained from National Bureau of Statistics except for wine and imported cigarettes which were based on 2009 current prices deflated to 2005 using average annual inflation rate of 7.5% between 2005–2009.

Consumer Price Index data for 2005 and 2007 (Tanzania economic survey 2007) together with price data from National Bureau of Statistics for 2007 used to estimate prices for 2005.

Appendix Table 3 Assumptions on import allocations and disaggregation of lumped items

Commodities	Household Budget Survey variable	Tax rate	Assumption	Sources
Beer	Beer consumption including imported and domestic beer	Separate for imported and domestic beer	Assumed all beer consumption was domestic as over 99% of beer consumption is domestic	WITS 2005, http://wits.worldbank.org/ ; TRA; Tanzania Breweries Ltd annual report, http://www.sabmiller.com/files/reports/2009_annual_report_TBL.pdf
Wine and spirits	Wine and spirits combined	Separate for wine and for spirits	47% consumption is wine and 53% spirits	WITS 2001 ratio of wine import to spirit import
Wine	Imported and domestically produced combined	Separate for imported and domestically produced wine	87% of wine is imported and 13% domestically produced	Tanzania Revenue Authority (for imports); Domestic production data from the 2 biggest wine companies in Tanzania, namely, http://www.cetawico.com/sw/6-rassegna-stampa/15-/pagina-1/19-.html ; http://alkovintages.com/
Cigarettes	Imported and domestically manufactured combined	Separate for imported and domestic cigarettes	99% domestically produced; 1% imported	WITS, 2001; Tanzania cigarettes company report - income statement for the year ended 31 December 2001, http://www.africanfinancials.com/Report.aspx?afir_year=2001&Country=DOMAINE=12&CshortName=ICC (page 18-19)
Fuel	Filter and non-filter combined	Separate for filter and non-filter domestic cigarettes	86% filtered; 14% non-filtered	http://dacnet.nic.in/tobacco/handbook.%5Ctable_47.htm
	Petrol and diesel combined	Separate tax rates for petrol and diesel	45% diesel and 55% petrol	Based on import of petrol compared with diesel cars in Tanzania (WITS 2001)
Soft drinks	Disaggregated information based on type of drink	Flat tax rate for all soft drinks	We used price of soda to be representative of all soft drinks to calculate the number of litres consumed from the reported expenditure on cold drinks	Author's assumption based on comparison between per litre price of soda and juice
Electric appliances	Refrigerator, electric cooker, radio, radio cassette, tapes, etc.	Flat rate for all finished goods which are not exempted	We assumed all imports because such industries are limited in Tanzania	Author assumption based on his knowledge of the nature of the manufacturing industry in Tanzania
Personal effects	Watches, sun-glasses, jewellery		Assumed all imports (see above)	See above
Clothes	Clothing items		Assumed 49% imports and 51% domestic	WITS 2005 and Tanzania Economic Survey 2007
Roofing materials	Tiles and sheets		Assumed 52% imports and 48% domestic	WITS 2005 and Tanzania Economic Survey 2007
Other manufactured goods where no specific information	Cereals, canned foods, milk and dairy products, matches, candles, furniture, pots, pans, dishes, personal care items (e.g. soaps, toothpaste, etc), cleaning materials (e.g. detergents, insecticides, etc)		We used allocation of total imported manufactured goods and total domestic manufactured goods, i.e. 40:60	WITS 2005 and Tanzania Economic Survey 2007

Note: WITS = World Integrated Trade Solution; online at: <http://wits.worldbank.org/wits/>.