

Financing and Decentralisation Reforms in Zambia: Is there evidence that district autonomy makes a difference to health outcomes or outputs?

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Abstract

For developing countries, such as Zambia, health reforms have not been associated with an appropriately designed framework for evaluation of health sector performance. A lack of systematic theoretical and evidence based methodologies to resolve emerging constraints in the health systems has existed. Zambia's decentralisation has been embedded in the macro – organisation framework that tried to address financing and principal agent behaviour through performance based accountability for determining health status. Outputs in the health system such as immunisation have not shown corresponding response to the objectives of improving equity and accessibility. Financing deficits between demand as defined through the formulation of a costed basic health care package and supply through inputs correspondingly required to address demand on the basis of health needs clearly emerged. This examines the relationship between demand, a function of immunisation coverage and supply as defined by human resource and expenditures. Correlation and regression results show some level of relationship between resources in terms of staff and the lack of improvement in immunisation coverage. This cannot be attributable to decentralisation per se as other issues pertaining to the poor economy and the associated decline in resource allocation to district heath services.

Key words: Decentralisation, basic heath package, resource allocation, immunization

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1.0 Introduction

Infectious diseases continue to constitute the highest proportion of the disease burden in Zambia. In addition, the country experiences rather unusually high rates of mortality among children and women. The official infant mortality rate (IMR) is estimated to be 109 per 1000 births, child mortality (under five) is 210 per 1000 births and maternal mortality is 649 per 100,000 live births (Demographic Health Surveys, 1992,1996; CBoH Annual Reports, 1997, 1998,1998, 2000). Furthermore, the estimated IMR increased from 97 per 1000 births in 1980 to the current 109. The high mortality rates that are experienced may be understated due to probable under reporting of overall mortality in the country, especially that is partly experienced in the rural areas. Estimates on disease burden and disability adjusted life years lost attribute 80% of all child mortality to malaria, diarrheal, acute respiratory infections and pneumonia (CBoH Annual Report 1998, Disability Adjusted Life Years, Working Group, 1997). The period covering 1980 to 2000, has experienced a decline in immunisation coverage. This decline has been from an estimated 80% average coverage to about 65%. The decline in coverage has been simultaneously been associated with an increase in IMR and CMR, thus generating an inverse relationship. The reduction or worsening in the indicators that continue to be registered is a challenge for the performance of the public health systems – in terms of access, efficiency, effectiveness, quality and equity.

Zambia has in the last half of the previous decade pursued vigorous and strategic health reforms. Central to the reform objectives were considerations of equity and accessibility. These concerns, form part of health system performance assessment. These are variables attributable to the determination of changes in health status. Resource allocation changes were made as part of the financing and payment mechanisms necessary for developing an accountable and performance oriented system within decentralisation. Assumptions made about the re-allocation of resources based on the premise of financial resources following the patient or consumer are now under consideration in terms of the efficacy of the policy and its impact in leading to viable, systematic and sustainable change and gains in the health system. The development of a contractual system for financing a basic package of care, in which these services are provided either free or at minimal cost and where the community health needs are the basis for resource re-distribution, was intended to lead towards the decentralised health system attaining greater equity in service provision and equal opportunity in accessibility.

Governance of the health system has been dependent on decentralised, autonomous district units which are responsible for all functions within the responsibilities of purchasing and providing health services. Hence, we see that the fundamental assumptions of improved health care reform being embedded in:

- a. The financing of health services
- b. The autonomy of the health services providers and purchasers
- c. Accountability and performance of the agents and principal

Analysis of decentralisation performance and use of resource inputs in term of expenditures relates to the interaction of resources that the DHMT controls. Discretionary funds are available for recurrent and some capital expenditures to the districts which comprise an estimated 30% of total expenditures. Non-discretionary funds include human resource related expenditures commonly called personnel emoluments. These comprise wages, salaries, per diems, and other benefits such as leave allowances and pensions and constitutes the remaining 70% of expenditure (CBoH, 2001). The ability of the DHMT to control expenditures of the discretionary funding therefore relates the degree of performance of the DHMT.

In developing countries such as Zambia, the country's measures or indicators of health performance represent an indication of consumers' limited access to health resources and health services. Accessibility limitations are associated with limitations in equity of resource distribution and service delivery. This paper tries to determine the prevalence of accessibility and equity limitations in the Zambian health system. It further tries to relate this to the health system performance, by drawing on selected child health and reproductive health issues of immunisation experiences.

The economic performance of the country has consequential macro and micro implications. Of more direct concern in this regard are issues pertaining to productivity, employment, total output and distribution of goods and services. Inter-sectoral factors relating to health status such as education and nutrition are consequentially impacted following the trends in economic performance. Questions arise as to the impact a slowly growing or stagnant economy over relatively long periods of time will impact of health status. This issue is outside the realm of this paper, nevertheless, it is related and is a key concern of how much health sector performance may go in addressing non – curative functions that are necessary to shift health outcomes.

1.1 Objectives

The distribution of health services is reflected in the availability as defined by relevant variables such as human resources, utilisation, beds, hospital length of stay, per capita health expenditures etc. Distribution of resources for health services and health provision is discussed in terms of vertical and horizontal equity. Vertical equity relates to the financing of health care. Horizontal equity relates to the distribution in the provision of health services. Consequently, the performance of the health system will be assessed on two principal issues – vertical equity in financing of the health system and horizontal equity in accessibility to health services.

Immunisation is reportedly a powerful preventive strategy for averting some unnecessary child and adult morbidity and mortality. A careful, systematic and sustainable immunisation programme as an integrated programme of the health sector reform is a basic step in the development of accessibility to drugs in particular and health services in general.

In view of this the objectives of this study are designed as follows:

- i. Describe the financing reforms with respect to health systems decentralisation in Zambia.
- ii. Explain how the intended objectives of reforms were to impact on priority programmes vis – a – vis immunisation programme.
- iii. To assess the performance of the programme of immunisation as an evaluation approach to both access and equity in health services provision.

1.2 *Research Questions*

Health systems reform is a difficult process to which outcomes are hardly ever guaranteed or known in advance. Reform under conditions of turbulence and resource constraints are even probably more unpredictable in this regard. The challenge on the reforms relating directly to observable and specific results in terms of positive and expected impact or outcome are perhaps even more difficult issues. Yet these are the areas on which collection and provision of the necessary and needed evidence that is critical to appropriate advancements in the art and science of public health and most of all, for policy reform and decision making must be made available.

This is an exploratory study designed to investigate preliminary issues with regard to fiscal reforms and the impact that has been experienced following these reforms on the health system. Measures of programme performance are considered mainly in the context of intermediate processes. The following constitute output indicators constitute such measures in terms of coverage of the programme. These are: allocation of funds *per capita*, utilisation and consumption of services by income group, resource allocation by region or district and the relationship or effect of the allocation of resources on selected outcome/output measures.

The following issues that pertain to areas of insufficient current levels of knowledge with respect to the impact and outcome of systems changes in health governance in developing countries constitute the basis for continued investigation:

1. What have been the main elements of fiscal reform in health and how have these interacted with structural reform in terms of decentralisation of health services in Zambia?
2. Have the design and objectives of the health reforms deviated from the expected targets and can evidence for or against programme implementation be determined through analysis of the immunisation programme?
3. In reforming the health system, was the re-organisation of the health system structure the cause of the current experiences on health status performance or are there other extenuating factors?

1.4 *Limitations of the Study*

Data constraints in the course of the study have been experienced. For instance, it has not been possible to obtain data on the coverage of vaccines by health centres. Nor has it been possible to obtain accurate data on child population in the districts by health centre and hospital catchment areas. Furthermore, the costs of vaccination programmes are usually estimates. Neither UNICEF nor the Child Immunisation Offices maintain

appropriate cost data and other vaccines data such as quantities issued. Data on human resources is not available for all years prior to 1998. Therefore an average of human resource data has been used.

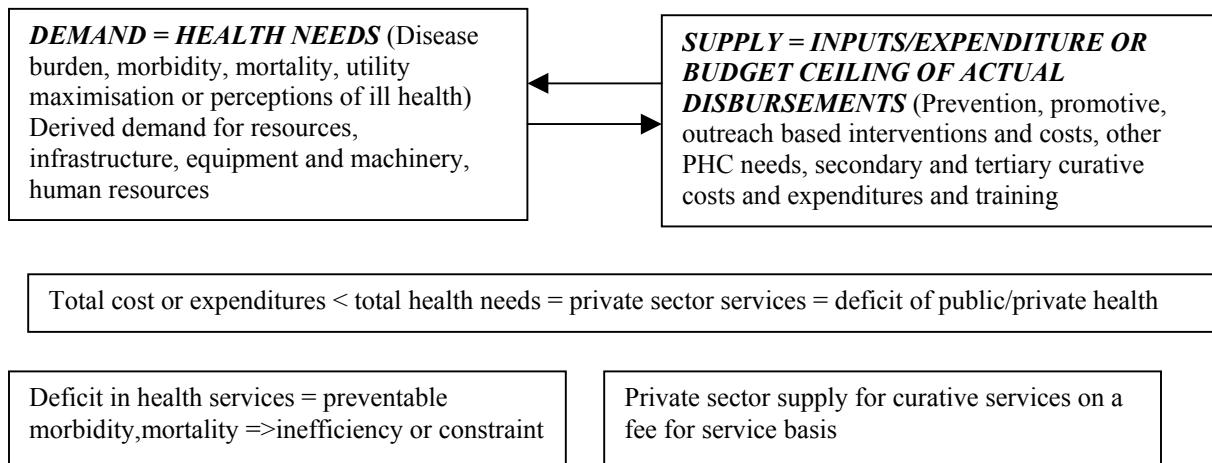
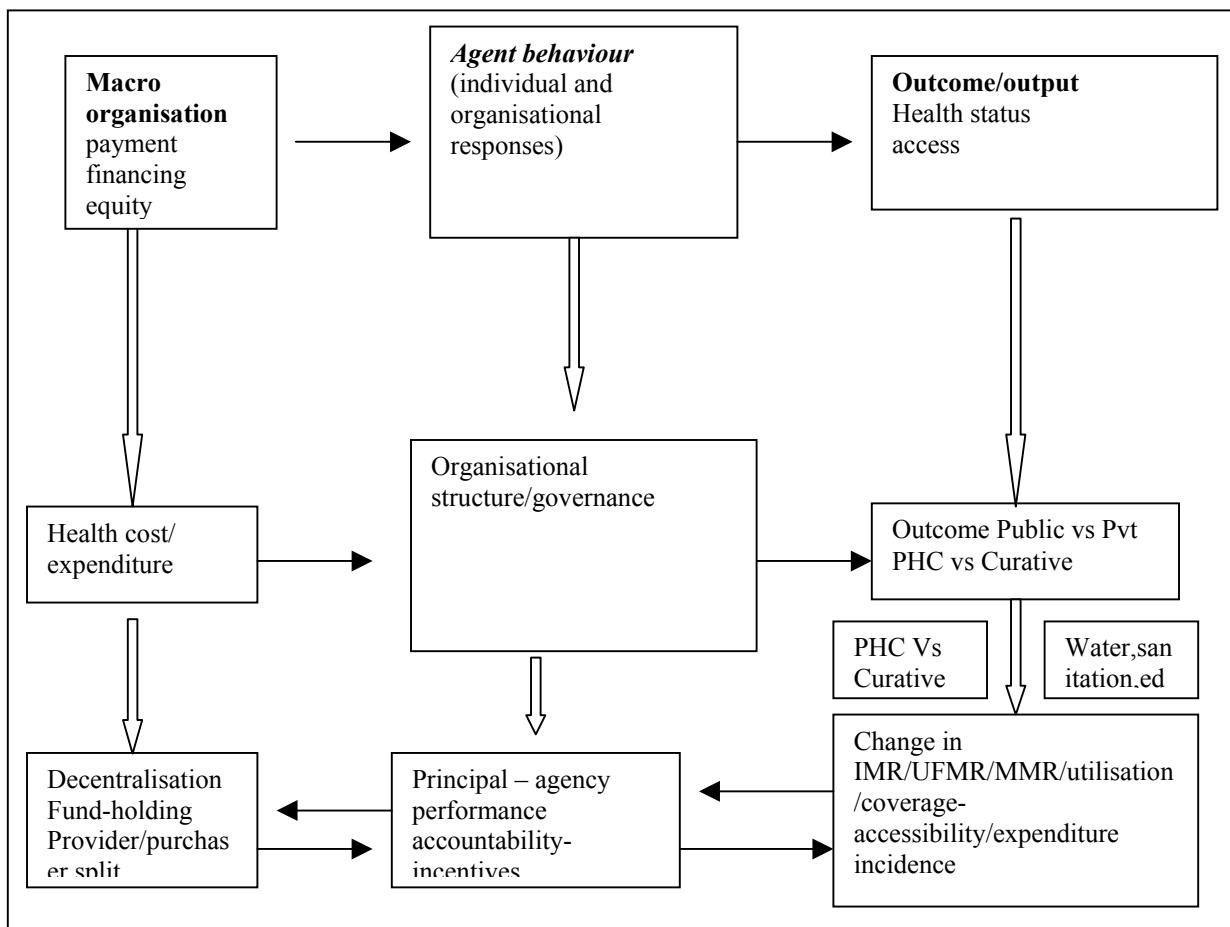
While the reforms focussed on system changes, resources remained severely restricted. During the period of reform, average economic performance as captured by Gross Domestic Product (GDP) growth declined. This limited the overall resources available for allocation to the health sector.

It is difficult to generalise the results in terms of *ante* and *post* reform as there does not exist uniformity in conditions pertaining particularly to inputs into the health sector. Poor pay structures, reduced intakes, reduced funding partly due to declining economic performance and increasing donor support relative to the Government's reduced funding are all factors that limit the scope of clearly separation or isolation of performance factors impacting on results of the health sector.

Lastly, but not least immunisation has been funded extensively by donor agencies including Unicef and JICA in particular, providing for a relatively vertically oriented programme. This factor tends to limit the total functional control of the programme that can be exercised by the District Health Management Team (DHMT). As some resources in the process of immunisation are exogenous to the control and management of such resources by the DHMTs; such as found in the procurement of the vaccines and also in some cases the provision of motor vehicles and the cold chain.

Nevertheless, the organisational responsibility, or management and resource allocation to support the programme do ultimately make the overall programme a function of the DHMT. As such, the performance of the programme will be associated or should be associated closely with the organisational capabilities, priority setting process and resource allocation functions of the DHMT.

Conceptual approach to reforms in Zambia



2.0 Decentralisation and Financing of Health Expenditures

The reform process in Zambia was based on the outline above in which the main macro – economic organisation comprised altering the financing process through the payment mechanism based on a contractual process between the purchasing or fund – holding boards and the health providing facilities or boards. The change in the payment process was based on financial resources that were distributed nationally on a per capita basis. This was a premise designed to attain equity in the resource distribution. Health expenditures were to be allocated and distributed *fairly* subject to the population as a proxy indicator of health needs within the communities. The agent behaviour would be subject to influence through performance - based approaches and focussing on indicators and targets to be attained. Staff would be separated from the civil service and employed by the Boards. The objectives of these reforms were designed towards attaining increased accountability and performance within human resource. Outcomes were anticipated to improve ultimately leading to better health status through better access and provision of services.

2.1 Demand, Supply Constraints and Related Financing Deficit

The imbalance, described further below, between available resources and required or desirable resources was an anticipated factor in the reform process. Changes and shifts in expenditure patterns by source between Government expenditure and donor expenditures and by service level in terms of primary and secondary/tertiary expenditures further aggravated the problem. The financing gap existing between the health needs and the resources available to the DHBs/DHMTs has led to the resource deficit that has been a major constraint in the process of providing for the implementation of health services as defined by the basic package which set the basic objectives for health care.

The process of decentralisation in Zambia comprised the formation of District Health Boards and establishment of the DHMTs, through the Health Services Act (1995) and subsequently by statutory instrument. The District Health Boards were to oversee the policy formulation of district health services to be implemented by the DHMT. A re-organised structure of the DHMT was formed to be responsible for planning, budgeting, accounting and programme implementation. Service delivery was to be provided by the DHB through contracting by the DHMT. Further, the DHMT by being responsible for the budget was to be accountable for all financial transactions in the provision of district health care, as they now constituted an independent cost and revenue centre. Ultimately and over time, it was anticipated that there would be an improvement of health status of the people through the reform of the systems. Underlying reform assumptions focused on the distribution of resources to specifically improve *access of the Zambian people to health services (defined through provision of services to all Zambian families)*.

In the context of the above the evaluation of the health reform process and decentralisation, an evaluation issue is therefore that of the impact decentralisation has had in changing or improving household access to health services. At the same time,

another consideration is to determine the resources available and whether those resources are consistent with the expectations or objectives that were set forth. The decentralisation of health services assumed that the implementation of health programmes would be based on some of the following issues or factors:

- i. *Availability of an affordable basic package of care. This involved the definition of cost-effective interventions assessed on the basis of disability of adjusted life years (DALYs) saved. The package was estimated to be in the region of 12 United States dollars.*
- ii. *Knowledge, by DHMTs, on district epidemiological profile and district disease burden. The knowledge of district disease burden was necessary in order to facilitate the interpretation of the basic package within local district health needs.*
- iii. *District prioritisation of disease burden. The priorities of the district disease burden were to be undertaken to relate to the district specific priorities and not necessarily in conformity with the nationally defined basic package. This was a basis for addressing in an optimal and socially acceptable way, the main causes of morbidity and mortality within the locality.*
- iv. *Budgeting based on priority setting principles established through the evaluation of the district disease burden.*
- v. *Resources including human resource, physical infrastructure, pharmaceuticals and finances would be allocated to reflect the associated health needs related to the burden of disease.*

3.0 Resource Distribution and Allocations to Districts

Table 1 below shows the rankings of the districts by the ratio of district population to the number of staff in the district and these are ranked in ascending order. These districts are also associated with their respective coverage rates of immunisations. The districts with the highest number of staff per population do not necessarily have the highest coverage as is shown in the first top half of the table. District with the highest per capita expenditures as shown in Table 1d do not either have a direct correlation with immunisation coverage nor do they have more favourable staff population ratios. Similarly and to some extent, unexpected, none of the districts with the lowest number of staff relative to their populations show any demonstration of association with poor vaccination coverage, although neither are they part of the category with the leading immunisation coverage. The distribution of the districts centres towards the mean. These results are also illustrated in Tables 1b and 1c. Results emerging show that the differential factor in the resource distribution for expenditures per capita is 8 between the highest per capita spending district and lowest per capita spending districts over the period. In addition the differential factor between the highest and lowest population and staff ratio is 14.5. There is little relationship in terms of correlation with the immunisation rates at the same time as is shown in the tables.

Table 2 shows the expenditures by level of care by sources of revenue or financing. This shows a declining trend in the total disbursements of resources by sources. Although donor disbursements have been increasing particularly as a share of district funding, the overall allocation of resources dipped towards the end of 1998, reducing overall total funding to the health sector.

Table 2 shows the total available discretionary funds to the districts. Table 1 shows human resources for whose total expenditures are mainly determined centrally through the Ministry of Finance. Other expenditures relating to human resources are part of the recurrent or discretionary district expenditures.

Table 1 Immunisation coverage and districts ranked by staff population ratio

Districts ranked by staff population ratio* (the ratio is taken as the district population/staff by district)				
District (10 Highest staff to population)	Staff population ratio	BCG	OPV3	Measles
Livingstone	160	78	81	81
Lusaka	164	107	80	90
Kabwe	282	102	86	80
Ndola	292	98	84	80
Mazabuka	303	106	106	94
Choma	349	112	102	91
Sesheke	356	79	71	68
Chavuma	360	74	61	74
Mwinilunga	406	89	68	72
Kitwe	442	106	84	80
Katete	444	119	106	94
(10 lowest districts with staff to population ratio)				
Serenje	1478	92	70	57
Mufumbwe	1509	84	66	62
Chadiza	1520	86	66	71
Mwense	1525	107	75	72
Chibombo	1748	89	84	79
Isoka	1930	90	55	54
Shangombo	2059	95	69	69
Lukulu	2060	74	71	66
Kapiri-Mposhi	2258	94	94	58
Kazungula	2320	94	65	69

Table 1b Staff correlation with vaccines by antigen coverage type

	<i>bcg</i>	<i>dpt1</i>	<i>dpt3</i>	<i>opv3</i>	<i>Measles</i>	<i>Staff</i>
dpt1	0.7532821					
dpt3	0.394789	0.7555419				
Opv3	0.5810702	0.6890228	0.4935028			
Measles	0.7863167	0.7433804	0.490037	0.7730204		
Staff	0.1919492	0.2901201	0.0359541	0.3234651	0.3188432	
Average expenditure	0.0771009	0.3178079	0.6909927	0.3483237	0.2200527	0.4304125

Table 1c Means of the vaccination coverage by year 1992-1998

Vaccines	Summary Statistics							
	Means							
	1992	1993	1994	1995	1996	1997	1998	1999
BCG (%)	87.5	82.5	113.5	97.7	102.4	89.6	83.8	
DPT1 (%)	79.8	79.3	107	97.4				
DPT3 (%)	94.7				58.6	64.1	85.6	81.5
OPV3 (%)	83.4	73.8	63.9	97		60.3	62.2	
Measles (%)	89	78.7	82.2	75.6	74.6	60.6	63	86.2

Table 1d District ranking by per capita expenditure: Ten lowest and ten highest expenditure district per capita

District	Average per capita expenditure	Coverage immunisation rate			staff-population ratio
		<i>bcg</i>	<i>opv3</i>	<i>measles</i>	
Lowest ten					
Kasempa	548	110	82	83	112
Kazungula	786	94	65	69	89
Mambwe	943	78	83	15	96
Isoka	1078	90	55	54	80
Mufumbwe	1144	84	66	66	46
Mwense	1169	107	75	72	74
Nyimba	1197	55	60	51	34
Livingstone	1242	78	81	81	721
Mkushi	1258	101	79	66	124
Nchelenge	1274	82	49	52	116
Highest ten					
Mporokosso	2038	70	50	49	76
Kalulushi	2170	64	67	64	101
Shangombo	2221				
Mwinilunga	2251	89	68	72	211
Lusaka	2313	107	80	90	4876
Kapombo	2665	115	88	88	110
Masaiti	2689	91	106	94	84
Lufwanyama	3004	74	59	64	84
Itezhi-Tezhi	3406	75	82	60	182
Chavuma	4502	74	61	74	71

Table 2 Total MoH and Donor expenditures by level: 1995 - 1998

MOH HEALTH CARE EXPENDITURE ON LEVEL OF CARE 1995 TO 1998				
Level of Care	1995	1996	1997	1998
Tertiary hospitals	12,600,520,441.00	15,440,928,913.00	17,590,829,251.00	15,283,000,000.00
Secondary	7,442,491,293.00	7,064,508,761.00	10,534,646,595.00	7,895,967,484.00
District	21,708,313,933.00	23,084,583,228.00	23,995,304,468.00	6,268,000,000.00
TOTAL	41,751,325,667.00	45,590,020,902.00	52,120,780,314.00	29,446,967,484.00

DONOR HEALTH CARE EXPENDITURE ON LEVEL OF CARE 1995 TO 1998				
Level of Care	1995	1996	1997	1998
Tertiary hospitals	105,136,643.00	694,174,000.00	105,136,643.00	187,947,000.00
Secondary			124,362,171.00	304,743,886.00
District	770,000,000.00	32,300,000,000.00	52,910,000,000.00	40,113,000,000.00
TOTAL	875,136,643.00	32,994,174,000.00	53,139,498,814.00	40,605,690,886.00

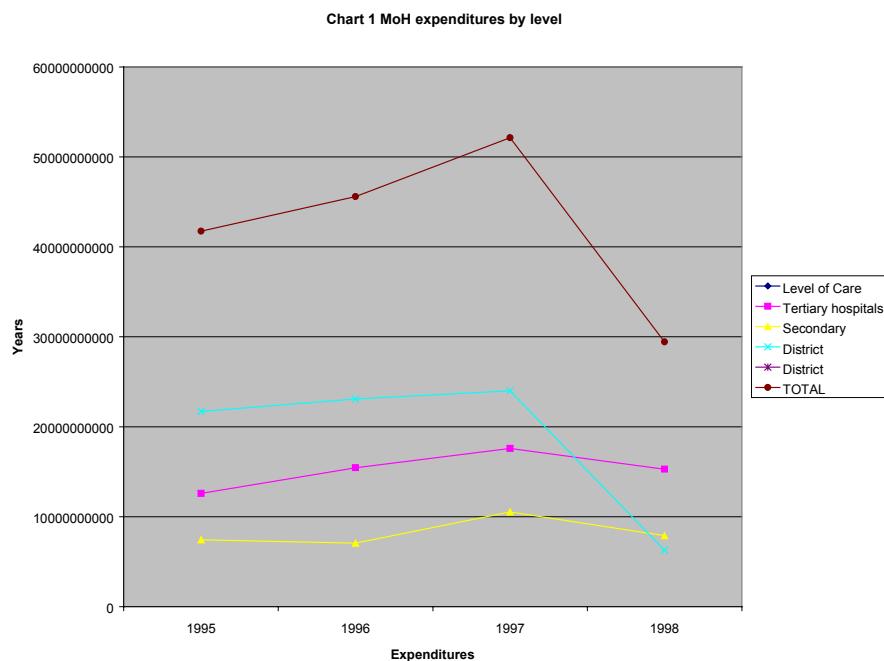
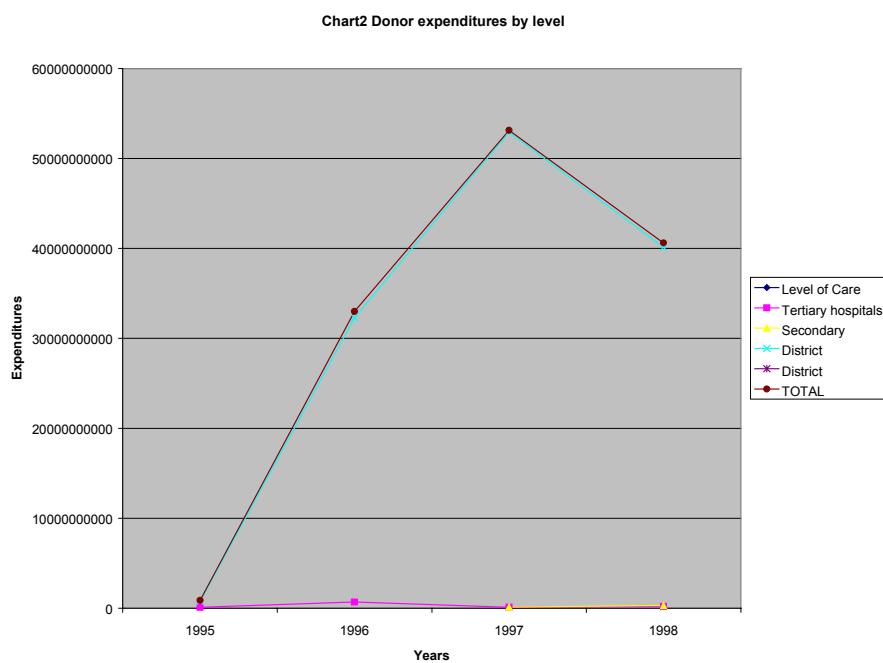


Table 2a Share of district health expenditures in total health expenditures

Year	Percentage share
1995	14
1996	24
1997	25
1998	12

Table 2a requires to be interpreted in relation to Tables 6 and 7a-7d in particular. The resource allocation to district health services for the period between 1995 to 1998 lies in the range of 14% to 25%. This indicates a relatively weak financial structure in terms of directing resources towards primary health services and focussing on prevention, promotion and out-reach programmes as the benchmark strategy for health status change and improvement within the reform process. Clearly irreconcilable demands were placed on district health services and the likely event that the services would fall short of expected objectives is partly reflected in this allocation. From the premise of the basic package, we see that this share of expenditures lies between 3.5 dollars and 6.25 dollars per capita of resources to PHC. This is clearly less than the 12 dollars estimate of 1996 and of the current OPD estimate of 9 dollars for health centre services. Nevertheless this constitutes the total resource that the DHMT was responsible and accountable for in terms of health services delivery for the district.



4.0 Data and Data Analysis

The data sources for the discussion and investigations is from the following sources:

- i. Living Conditions and Monitoring Survey, (LCMS),1996
- ii. Living Conditions and Monitoring Survey, (LCMS),1998
- iii. National Health Accounts, 1995-1998
- iv. Human Resource Survey, 2000
- v. Health Management Information System, CBoH
- vi. Universal Child Immunisation (UCI) records and returns to CBoH, 1988 – 2001
- vii. District Health Office financial statements, 1995 – 1999
- viii. Financial, administrative and management information system (FAMS), CBoH, 1995 - 2001
- ix. Ministry of Finance/Health financial statements, 1992 - 1995

4.1 Priority Setting

The Basic Package of Health Care determined about 33 conditions and illnesses for curative interventions. Apart from these the package component on preventive interventions included the following five interventions and services:

- child health and immunisation
- maternal health
- communicable diseases
- epidemic preparedness
- information, education and communication (IEC)

Thus the programme on child health and immunisation contained the following activities:

- immunisation of; BCG, DPT, OPV, TT
- vitamin A supplementation
- Integrated management of childhood illnesses (IMCI); ARI, Growth monitoring and diarrhoea

Maternal health includes; family planning, ante-natal, safe motherhood, post-natal, and vaccinations, namely TT and DPT. Against this background a protocol costing exercise based only on recurrent costs (i.e. excluding capital costs such as buildings and other fixed assets) has determined at current prices the following cost structure:

Table 3 Assumptions for Costing of Immunisation Interventions

Disease/service	Dosage	Target population	No. of contacts per year	Unit cost (US\$ intervention/materials)
BCG	0.05 ml/child at birth	0-11 months	1	0.06
DPT	0.5cc 1/4weeks three episodes	0-23 months	3	0.10
Measles	0.5cc/8 months	0-23 months	1	1.13
Vit A Supplementation	1dose of 100000 IU	6-11 months	1	0.02
Vit A Supplementation	1 dose of 200000 IU	12-71 months	2	0.02
Vit A supplementation	>1 year, less than 100000 IU per year	6-61 months	1	0.02
Tetanus toxoid	0.5cc /4 weeks adults/ten years	4weeks to 23 months	1	0.20
OPV – 0	2 – 3 drps once at birth	0-2 weeks	1	0.15
OPV-1,2,3	2-3 drops – 6 weeks; 0-23 months	0-23 months	3	0.15

Source: Derived from Protocol Basic Package of Care; Standard Treatment Guidelines, Zambia Formulary List, Essential Drugs List of Zambia: Basic Package Working Group, 2000.

Table 4 Derived Total Cost of Basic Package of Care: Zambia

	Health centre		District Hospital		District Health Office		Programmes		Total US\$
	US\$	% of total	US\$	% of total	US\$	% of total	US\$	% of total	
Zambia	21420000	35	16973000	27	1211000	2	22217000	36	61861000
<i>Per capita (OPD estimate)</i>									8.86

Source: Derived from Protocol Basic Package of Care; Standard Treatment Guidelines, Zambia Formulary List, Essential Drugs List of Zambia: Basic Package Working Group, 2000

Tables 3-5 show costs based on protocol treatments i.e. the recommended practice as set out by therapeutic committees and based on standard treatment guidelines and incorporating other reference standards such as the essential drugs list and national formulary. This will obviously deviate from actual practice. Furthermore, as has already been pointed out, the tables do not include the capital costs and therefore do not completely capture total or unit costs. However, what they represent is the recurrent cost of programme administration which is able to compare with the resource allocation and show deviations in the process of programme implementation. There is another constraint at this stage which relates to the fact that in the decomposition of costs or expenditures by District Health Boards (DHBs), the current format does not capture expenditure data by programme area and so limits the ability to compare current practice with protocol in this instance. (This has given rise to a supplementary study on current practices to capture this data for comparability purposes and is work in progress as of now).

Nevertheless we see that from Table 1, the unit costs of immunisation programme administration are at a maximum of 20 United States cents or the equivalent of approximately K600 Zambian kwacha or 0.2% of the salary of a state registered nurse in Zambia.

Table 5 shows that immunisation comprises 11% of the total programme costs for promotive and preventive costs in the basic package of care. This is approximately 33% of the total cost of the basic Package.

The basic package constitutes more or less the available services in existence at primary health care level. The resource allocation varies both in terms of actual available funds and all other resources as well as the actual allocation to programme areas by the managers. The existence of the protocol related costs do enable us to assess the deviation or variance with actual available resources at the service delivery level and also in terms of the total and may therefore provide us with indicative or underlying causes of the performance problems that exist. This will be re-addressed in the latter course of the paper. However, we can compare with the budgeted expenditure e.g for the year 2000, the budget for the health sector was US \$ 10.07. This gives some indication of the resource constraint allocated to the health sector and the limitations due in the process of programme implementation.

Table 5 Annual costs of preventive and promotive programmes including immunisation

Programme	Total cost US\$	Proportion of programme cost in percentage terms
Child immunisation	2450133	11
Maternal health	7548411	34
Communicable diseases	9479449	43
Epidemic preparedness	902160	4
IEC	1837080	8
Total	22217233	100
Cost/capita	2.08	

Source: Derived from Protocol Basic Package of Care; Standard Treatment Guidelines, Zambia Formulary List, Essential Drugs List of Zambia: Basic Package Working Group, 2000

Table 6 shows the total health expenditures over time. The share of Government expenditures on health are hardly over US\$10.00 over the time period under consideration. As this represents the total expenditure, it is worth noting at this stage the intended or potential impact that the estimated expenditure for the protocol basic package of US\$8.8 has on total health expenditures. Furthermore, the expenditure estimate of approximately US \$2.08 on immunisation programmes is again over any expected budgetary provisions, given the recorded health expenditures.

4.2 Limits to Resource Allocation Impact on Health Outcomes/Outputs and the Public Health Dilemma of A Resource Constrained System

Table 6 Total Health Expenditures 1994 - 1998

	TOTAL HEALTH EXPENDITURE IN NOMINAL AND REAL TERMS 1995 TO 1998				
	1995	1996	1997	1998	Average Expenditure
Total Health Expenditure (Nominal)	157,160,950,450	231,242,936,914	311,673,588,440	378,461,449,547	269,634,731,337
% change		(32.0)	(25.8)	(17.6)	(25.2)
Total Health Expenditure (Real)	126,335,169,172	105,832,007,741	120,290,848,491	123,599,428,330	119,014,363,433
% change		19.4	(12.0)	(2.7)	1.6
Total Health Expenditure (US \$)	174,623,278	231,242,937	239,748,914	252,307,633	224,480,691
GDP (Nominal)	2,998,300,000,000	3,969,500,000,000	5,155,800,000,000	5,921,100,000,000	4,511,175,000,000
THE % of GDP	5.2	5.8	6.0	6.4	5.9
Total GRZ Expenditure	853,000,000,000	1,079,000,000,000	1,293,000,000,000	1,627,000,000,000	1,213,000,000,000
THE % of GRZ Expenditure	18.4	21.4	24.1	23.3	22
Per capita Total Health Expenditure (ZK)	17,270	24,600	32,131	37,807	27,952
Per capita Total Health Expenditure (US\$)	19.19	24.60	24.72	25.20	23
Share of GRZ expenditure	7.2	9.3	9.3	9.5	8.7

Source: National Health Accounts

Tables 7a to 7d show the shares out of total district expenditures that are allocated towards the various cost centres and functions within the health programme of the District Health Boards and District Health Management Teams. These expenditures are aggregated and averaged over the 72 districts and so denote average district expenditures. Whereas there is a wide variation in the expenditures on a district by district basis, the intention of averaging the expenditures here has been to obtain the trend across the board over time. There is approximately an equal allocation of resources to the various cost centres. This in itself demonstrates some arbitrary resource allocation mechanisms that generalises the priorities of the district health boards at best and at worst simply does provide for any meaningful interpretation of the resource allocation. Nevertheless an attempt will be made to read into the body of available evidence. What is of concern generally is the ratio of expenditures on the district health office. This is purely administrative and so does indicate some skew in priority setting. The share going to health centres is on average slightly less than that allocated to district hospitals which is in itself another issue of concern. The emerging picture is that primary services that are intended to be grounded in the health centre as the focal point for primary health care are not correlated with the required resource allocation. The reason is perhaps that the resources available are probably too inadequate to make a significant impact. However, the emphasis or priorities one may argue should be reflected in the flow of resources towards the implementation of programmes within stated objectives.

Table 7a Average Percentage of Total Expenditures on District Health Office:1995 – 1998

DHO 1995	DHO 1996	DHO 1997	DHO 1998
18.8	18.2	15.8	15.4

Source: Central Board of Health and Ministry of Health

Table 7b Average Percentage of Total Expenditures on District Hospital:1995 – 1998

DH 1995	DH 1996	DH 1997	DH 1998
19.2	18.2	19.1	15.8

Table 7c Average Percentage of Total Expenditures on Health Centres:1995 – 1998

Health centre 1995	Health centre 1996	Health centre 1997	Health centre 1998
19.5	18.2	16.1	15.4

Table 7d Average Percentage of Total Expenditures on Community Health:1995 – 1998

Community health 1995	Community health 1996	Community health 1997	Community health 1998
19.4	17.9	15.8	18.8

Table 8 Average Per Capita District Expenditures Per Annum: 1995 – 1998

Average Per capita expenditure 1995	Average Per capita expenditure 1996	Average Per capita expenditure 1997	Average Per capita expenditure 1998
1788	1757	1727	1498

5.0 Equity and Access as Partial Determinants of (Child) Health in the Immunisation Programme: Rural – Urban Inequalities

Table 9 Obstetric/Delivery Care and Provider Choice by Income Group

Obstetric/delivery care and provider choice								
Income Group	Type of facility							
	Government hospital	Government clinic/health centre	Mission institution	Industrial institution	Private institution	At home	all	No of children
Quintile 1	8.26	9.92	5.54	1.28	0.5	74.24	100	88144
Quintile 2	9.14	9.7	4.34	0.18		76.54	100	117877
Quintile 3	18.23	13.91	4.43	2.78	0.54	59.29	100	1133103
Quintile 4	31.37	23.82	4.31	3.94	0.8	35.59	100	99397
Quintile 5	37.53	23.15	2.28	14.78	0.3	21.96	100	81850

Source: LCMS Data 1996

5.2 Access to Health Services by Income Group

Table 9 has been provided to demonstrate that the pattern that is fairly familiar with respect to how different income groups relate to consultation and contact with health services. The importance of this is that it is, in itself a source for estimating or evaluating access to child and reproductive health services. The pattern in the table shows clearly the level of usage of variation by the different income groups for obstetric

care and child birth deliveries. The ratio in use of public health services is more than 4 times between the lowest income group and the highest income group. This in itself is indicative of the constraints experienced when it comes to immunisation. As also discussed below, the access constraint to immunisation and the barriers experienced by the lower income groups, who have a higher family dependency ratio and fertility ratios, show that the declining immunisation coverage is partially attributable to the health seeking behaviour of the households.

There has continued to persist, the inevitable bias towards the urban areas of the rural-urban gap in access. In 1996, the gap between rural and urban areas in the average distance to the nearest health facility was recorded as 7.5km; in the 1998 survey the observed average distance was 8.3km. With the use of two indicators, namely,

- a. the average distance to the nearest health facility by income quintile and
- b. the proportion of households living in the area where there is a health facility within five kilometers,

we observe that the results reveal yet more information on the levels or extent of inequality between rural and urban areas and among income groups (Table 9). In comparing data from 1996, there were more people living closer to a health facility than in 1998. Urban populations have an advantage of living closer to health facilities; and it is observed that almost all the urban populations live within 5km of a health facility. Yet intra-rural differentials exist among rural populations. We find that the proportion of rural populations living within 5km to a health facility increased slightly from 67.9 to 69.2 percent among the different income groups thus leading to some measure of inequality in access among and within the different income groups. The average distance to the nearest health facility has increased among all rural populations and while some people live closer to a health facility, some people are farther away.

The poorest income groups are shown to be the worst off. This is shown by the fact that there was no measure of improvement in services to this group. The average distance to the nearest facility for the rural poorest quintile shows an actual recorded increase from 8.6km to 10.5km - a 1.9km increase - doubling the average increase of 0.9km for all rural population, the gap in distance between the poor and the better off also widened, from 0.9km to 1.7km.

Table 10 Distance to a nearest health facility by income quintile, 1996 & 1998

Income Quintile	Rural				Urban				Total			
	1996		1998		1996		1998		1996		1998	
	Km	%<5	Km	%<5	Km	%<5	Km	%<5	Km	%<5	Km	%<5
Lowest	8.6	46.1	10.5	50.2	1.5	96.7	1.2	97.0	8.1	49.4	9.6	54.9
2	8.6	48.5	9.1	52.4	1.1	99.3	1.1	97.5	7.4	56.6	7.6	61.2
3	8.6	52.3	8.8	52.5	0.9	99.6	1.0	98.4	6.4	65.8	6.2	67.6
4	7.6	56.7	8.5	53.2	0.7	100	0.9	98.8	4.5	76.3	4.8	75.4
Highest	7.7	55.4	8.8	53.6	0.7	99.9	0.9	99.4	3.1	84.3	4.0	81.3
Total	8.3	51.0	9.2	52.2	0.9	99.7	0.9	98.8	5.7	67.9	6.2	69.2

Sources: LCMS 1996 and 1998.

However, the availability of physical infrastructure does not completely reflect technical capacity and quality of services. Although 69 percent of Zambians in 1998 had access to a health facility within 5 kilometers, many health facilities have deteriorated due to lack of maintenance and poor quality of services provided. Recently, an assessment of rural health centres indicates that more than 70 percent of health centres received no rehabilitation or maintenance in the last five years. At least 23 percent of district or general hospitals in the public sector are in poor condition; most hospitals have low quality water, waste and sewage disposal systems and most hospital equipment is antiquated (GRZ/FIM, 2000). The review further noted that the health sector reform has not yet succeeded in achieving a more equitable distribution of human resource.

Variations in the distributions of health staff are significant. Staff, such as doctors and registered nurses are concentrated in urban areas, particularly Lusaka and the Copperbelt. For example, the Lusaka province has almost 7 times as many doctors per capita as the Northern province and almost 6 times as many enrolled midwives per capita as Luapula. Even within the same province, there are variations in the distribution of staff. However, efforts are being made by the government to address this problem through the process of staff 'de-linkage' i.e. the separation of staff from the Civil Service Commission and redirecting them to the DHBs and HMBs.

In spite of resource constraints, there is a programme to add to current existing physical infrastructure through the construction of health posts in order to improve accessibility. A health post is a smaller facility as compared to a health centre. The catchment population for the health post is supposed to be a maximum of 500 households or a population of 3,000 in rural areas.

A major approach adopted by the government to improve equity in health care is to give priority in resource allocation to district health services and primary health care. Districts have four channels to receive funds: (a) the government's directly allocations, some staff PEs and drugs; (b) the government allocated funds through CBoH to district budgets; (c) district basket funds, mainly donor funds and (d) private out-of-pocket expenditure through user fees and prepayment schemes.

The current formula used to determine resource allocation to districts is largely population based. Poverty, distances, or other socioeconomic conditions do not impact resource allocation. Ability to generate funds from user fees also varies significantly among district and therefore the actual level of expenditures on health in each district varies drastically.

Even though the proportion of self-reporting illness among income groups did not vary significantly, the patterns of health care seeking behavior were very different between rural and urban areas and among the different income groups. Like elsewhere, the poor in Zambia are less likely to use health services when they are ill or injured. One third of the children under 5 in the poorest rural families who reported ill did not receive treatment as compare to only 7 percent in the highest income quintile of urban areas. In general, the urban population is more likely to seek consultation when they are sick. However, the poorest young urban adults have the highest proportion for no treatment (56 percent). More than one third of population who reported sick used self-

medication, the patterns are similar in both rural and urban areas. Among all the age groups reporting sick, children under 5 are more likely to be taken for consultation. These results are shown in Tables 7 and 8.

Among those who seek consultation, the poor are more likely to use health centres than the more better-off (75 percent in the lowest quintile vs. 59 percent in the highest quintile). The higher income groups are more likely and do utilise the hospitals more. The poor also tend to use more traditional healers, clinical officers, and midwives, while the better-off use more of physicians' services (12 percent used doctors in the first quintile as against 33 percent the fifth quintile).

Immunisation data indicate to what extent public health services reach poor households. Children from poorer families (quintiles 1 and 2) were less likely to get vaccinations. The disturbing picture is that the situation was deteriorating as evidenced by the decline in coverage from 1996 to 1998. In 1996, the survey data shows that about 79 percent of 12 to 23 months old children received three doses of DPT, ranging from 76 percent for the children from the lowest quintile to 80 percent in the highest. The overall coverage of DPT3 has dropped to 68 percent with larger gaps between the income groups.

Although immunisation is free of charge, children from poorer households have fewer opportunities to get immunised. Regional variations in immunisation coverage are not significant, except that the Central Region has the highest coverage while the Luapula region has the lowest.

Relationship between health status and expenditures

In designing the required data and data analysis, the relationship being investigated is that immunisation as a proxy or indicator for output is a function of the following variables:

Health status = f{Expenditures, shares of expenditures by levels (PHC vs Secondary and Tertiary services), organisation of the health system (regulation, payment and funding, incentives to providers, accountability of the providers and performance), other inter-sectoral factors(education, water and sanitation, nutrition), changes in access to health services, changes in equity of the health system, Gross Domestic Product, Human resources in the health system)}.

Giving a simplified or reduced form equation discounted for external or non-health system variables such as education, we have the following equation:

Health status =f(health expenditures, share of expenditures by levels in the health system, access to health care services, equity in health care distribution and financing, distribution of health status)

The proxy for health status is immunisation

Total health costs or expenditures = non salary and wages recurrent expenditures plus total salary and wages expenditures. Representation of total salary and wage expenditures is made by the number of human resources available by district.

Immunisation may then be interpreted to reflect or substitute for health status and changes (improvements) in health status. Associating total costs to health status is then postulated in the context of the total outflow of funds and revenue generated in the public health system and is the total expenditure per period of time by the District Health Board through the District Health Management Team. Supply of services is therefore a direct function of the expenditures. Supply of health care is subject to the total expenditure by the DHMT. Demand of health services is a function of the health needs of individuals. In a community the total demand for health services is a function of aggregated or sum of individuals' health needs. Health needs are also interpreted as a function of the state of ill health and perceived ill health for which individuals seek medical care, health care and health services. Medical or clinical care (curative) particularly in primary health services are distinguished from health care, which may be preventative or promotive activities that include and depend on outreach programmes, ambulatory care, education, information and communication within the health facilities and outside of the health facilities.

The degree of effectiveness or impact or quality of primary care is therefore a function of the expenditures on primary health care and the relative expenditures on curative care.

$$Y_i = f(L_i, E_i)^n$$

$$\ln Y_i = \ln L_i + \ln E_i + \mu$$

Where, $\ln Y$ = immunisation coverage rate by district, i = district 1,...,72

$\ln L_i$ = human resources by district per capita = proxy for human resources expenditure

$\ln E_i$ = total non-salary discretionary expenditures by the district

n = constant or technical efficiency term = differences in district performance

μ = error term

5.3 Regression Results

1. Linear regression model

Table 12 Regression output for multiple regression model

Variable	coefficient	Standard error	t-value	r-squared
Equation 1: Dependent variable = bcg				
Staff	.0095	.00831	1.115	0.037
Expenditure	-0.0135	0.03	-0.444	
Constant	88			
Equation 2: dependent variable = DPT1				
Staff	-0.02	0.0245	-0.855	0.043
Expenditure	0.104	0.096	1.085	
Constant	81.5			
Equation 3: dependent variable = DPT3				
Staff	-0.055	0.0079	-6.924	0.294
Expenditure	0.236	0.029	8.115	
Constant	57			
Equation 4: dependent variable = OPV3				
Staff	-0.0059		0.645	0.0552
Expenditure	0.03	1	0.178	
Constant	70			
Equation 5: dependent variable = Measles				
Staff	0.00519	0.431	-0.0078	0.0622
Expenditure	0.00701	0.771	-0.041	
Constant	68.8			

Apart from equation 3, where the dependent variable is DPT3, all the other equations yield results that are statistically insignificant with the multiple linear regression model.

2. Log linear regression model

Table 13 Regression output for the log linear model

Variable	coefficient	Standard error	t-value	r-squared
Equation 1: dependent variable = logbcg				
Logstaff	0.045	0.036	1	0.07
Logexpenditure	0.065	0.052	1.2	
Constant/intercept	3.94			
Equation 2: dependent variable = DPT1				
Logstaff	0.128	0.0449	2.854	0.14
Logexpenditure	-0.0247	0.0646	-0.382	
Constant	3.921		15.244	
Equation 3: dependent variable = DPT3				
Logstaff	-7.5865	3.048	-2.489	0.3986
Logexpenditure	27.9888	4.39	6.376	
Constant	-18.73	17.456		
Equation 4: dependent variable = OPV3				
Logstaff	0.325	-2.34	6.94	0.211
Logexpenditure	0.005	3.141	16.5	
Constant	0.247			
Equation 5 dependent variable = measles				
Logstaff	0.02	0.02	0.2	0.11
Logexpenditure	0.69	-0.11	0.16	
Constant	3			

Equations 2, 3 and 4 are all statistically significant, while the other two are marginally insignificant. The results nevertheless show a positive partial elasticity for all equations other than equation 3, which is somewhat unexpected. All other equations show a

positive percentage increment in the rate of immunisation due to a partial unit change in the staff parameter. This is similar for expenditures.

6.0 Discussion

6.1 Financing and resource allocation

6.1.1 Limitations of the health sector budget

The health sector budget appears to be inadequate to provide basic health services within the framework of the health reforms and as envisaged through the provision of the basic health services package. Initial estimates of the package based on protocol standard treatment procedures and interventions show a clear deficit (divergence) of necessary resource for the provision of the basic primary health care services.

The resources made available for district health services have been limited and inadequate to facilitate appropriate implementation of the basic preventive and promotive interventions strategically with the necessary curative interventions. The districts in general control no more than 25% of the resources. These are resources that however are below what is appropriate in terms of fulfilling the essential primary health care objectives. 94% of the districts spent less than 95 cents equivalent per capita on district health services over the period 1995 – 1998. This allocation distribution creates a resource deficit that in turn has most likely affected the performance of the primary health services.

Elsewhere, we have shown that the levels of Government funding being allocated to primary health care through District Health Boards/DHMTs has been declining over time. Furthermore, it has been shown that donor expenditures have not strictly been increasing, but have nevertheless taken on a growing or substituted for the declining Government share of the funding. The Government funding has in contrast been increasing for curative interventions as shown by the increasing share of allocations to the secondary and tertiary/teaching hospitals.

The limitations in the allocation of resources to the health sector appears to have a limited role on the overall impact in term of improving the health status of society. Programmes such as immunisation which have been isolated for more in-depth show that there exists evidence of human resource have an impact on the overall coverage and performance. The human resource variable has been used as a proxy for total expenditure. It is therefore intended to show the overall response of the health outputs to total expenditures.

Suggestions exist to the effect that health impact under severe resource constraints may be almost impossible to attain in the short term and lead to likely growth of poor performance over the long term.

6.2 Other Constraining Factors on Response to the Health Inputs

6.2.1 Equity and Accessibility in Resource Distribution

There has been a skewness in the resource prevalence in the country as shown by the human resource distribution, skewness in the distribution of health facilities, beds and cots and overall health facilities in the country. Access to health services has been limited through the following factors to more than 50% of the population as found in the LCMS 1996 and 1998:

- a. insufficient facilities
- b. insufficient and poor distribution of human resource – leading to poorly and inadequately staffed health facilities particularly in the rural areas
- c. distances and added expenditures costs for access to health services

6.3 Development of decentralisation and need for continued resource re-distribution

The effort to attain a balance in resource distribution is still far off in terms of the reform goals. Re-distribution of resources is needed to remove the imbalance in health resources which on available evidence does not significantly improve the advantaged areas. It appears that the inefficiency in resource allocation is simultaneously related to ineffectiveness in the ability to generate health gains and impact on health status of society as a whole. The bias in the resource distribution therefore impacts negatively on the whole system. Further evidence of this effect of the inequality identified in the system can be related to the high expenditures on health in the Copperbelt province which had expenditures of more than 10 times than the other regions as shown from the results of the National Health Accounts. However, the health gains of this extremely biased expenditure do not get reflected in any noticeable gains when comparing the Copperbelt Province against the rest of the regions in the country. Imbalances which result in differential factors of 8 in terms of staffing, 14.5 in terms of expenditures require to be addressed in striving towards implementation of primary health objectives. In addition, the expenditures which are less than a dollar at today's value that go towards health care services do not meet 50% of the protocol recommended resource allocation that should go towards primary health care services. This situation is complemented by the overall impact of the non-health determinants of health, which have not been accounted for, eg. Education and nutrition but which have adversely been affected as well within the general economic conditions.

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