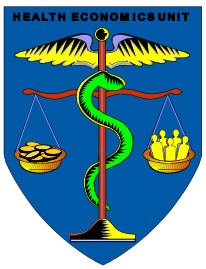
Integrating equity into resource allocation

Report of a methods workshop

26–27 November 2008, Cape Town



The Health Economics Unit, University of Cape Town
with Ministry of Health Mozambique

in the Regional Network for Equity in Health in east and southern Africa (EQUINET)

With support from SIDA Sweden and WHO

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1. Introduction

The Regional Network for Equity in Health in East and Southern Africa (EQUINET) is a network of professionals, civil society members, policy makers, state officials and others within the region that have come together as an equity catalyst, to promote and realize shared values of equity and social justice in health (www.equinetafrica.org). EQUINET gathers people to overcome isolation, give voice and promote networking using bottom-up approaches built on shared values. The members come together in a spirit of self determination and collective self reliance working through existing government, civil society, research and other mechanisms and institutions in the East and Southern Africa region. EQUINET is building a forum for dialogue, learning, sharing of information and experience and critical analysis. We do this to build knowledge and perspectives, shape effective strategies, and strengthen our voice nationally, regionally and globally and our strategic alliances to influence policy, politics and practice towards health equity and social justice.

This workshop was designed to provide the Ministry of Health in Mozambique with support on practical approaches to achieving a more equitable distribution of public health sector resource allocation outlays. Based on communication with officials of the Mozambican Ministry of Health, there have been concerns around the inequitable distribution of public health care resources, with areas of higher socio-economic status and relatively lower levels of disease burden receiving higher health care allocations. The key problems for the Ministry of Health were: how to empirically show that the current resource allocation outlays are inequitable and how to design a formula that allows for the shift of resources to ensure a more equitable distribution. In addition, the Ministry of Health also needed to understand the critical process issues that need to be considered in adopting a needs-based resource allocation formula. The report has been compiled by Okore Okorafor and Di McIntyre from the Health Economics Unit in the University of Cape Town and Rebecca Pointer, TARSC.

2. Participants

The meeting was attended by Gertrudes José Machatine from Mozambique's Ministry of Health (Directorate of Planning and Co-operation), and two colleagues from the Ministry, Laura Anselmi and Dora Polana, as well as Okore Okorafor and Di McIntyre from the Health Economics Unit in the University of Cape Town (see *Appendix 2*).

3. Workshop proceedings

3.1 Overview of workshop, equity and resource allocation

The workshop started with a discussion around workshop expectations, the data for analysis and an overview of workshop activities. The data provided by the Mozambican team did not include most of the relevant variables for constructing a resource allocation formula. However, South African data was available, so participants agreed:

- to do a basic analysis of equity in resource allocation using Mozambican data and once the Mozambican team gets most or all of the required data on relevant variables, the HEU team can provide them with support on how to use them to construct a resource allocation formula;

- to use the data on South Africa as a full case study and provide participants with a spreadsheet of the data including supporting documentation on how each formula was created; and
- that the HEU team must prepare a document that summarises key issues around resource allocation that arose from the workshop and additional resource material for resource allocation – a guide to resource allocation.

Thereafter, workshop participants received a presentation on equity and resource allocation. The presentation focussed on issues around:

- the concept of equity;
- common practices in resource allocation and their drawbacks;
- needs-based resource allocation;
- components of a needs-based resource allocation formula; and
- suggestions for a practical approach to constructing a needs-based resource allocation formula.

The presentation provided a platform for very rich interaction and engagement between participants (see *Box 1*). The main objectives of the presentation were to introduce the audience to the concept of equity in health and discuss underlying issues relating to equity in health such as need, utilisation and access to health care, as well as various approaches to equity-oriented resource allocation and the key issues with each approach. An understanding of the needs-based approach to resource allocation was paramount.

Box 1: Health equity and resource allocation

A lot of confusion exists around the definition of equity, as different groups have their notions of equity. It's important to distinguish between equity and equality. Any definition of equity within the health sector embodies some notion of fairness and justice in the distribution of health care resources and benefits. Equity is about fairness; therefore an unequal distribution may be deemed to be fair.

What is the difference between equity in health and equal health status? Equality in health within the sphere of the health sector is an unrealistic goal because:

- Genetically inherent conditions exist and there is a natural deterioration of health over time.
- No exact definition of good health has been formulated yet.
- It does not allow for informed individual decision making regarding one's health.
- It's not possible (too costly) to raise society's health to a higher level – may result in the reduction in health of some people.

So, the aim of policy for equity in health is not to eliminate all health differences, but rather to reduce or eliminate those differences attributed to factors that are considered to be unfair and avoidable. Different individuals and groups have different capacities to (and hence unequal opportunities) to maximise their health status. Evidence has consistently shown that disadvantaged groups have poorer survival chances than more-favoured groups. They suffer a heavier burden of illness. Those in greater need of health care are least likely to receive a high standard of service (the 'inverse care law'). The most vulnerable groups suffer greater burden of illness and have less access to good quality health care, which is unfair.

The definition of resource allocation is the process of distribution health care resources, particularly financial resources, from a central (regional) level to more peripheral levels. The budgeting process determines how these resources will be used at the peripheral levels. International experience has taught us that budgeting processes are driven by historical expenditure patterns, prevailing supply and demand patterns and the influence of powerful lobbies. Many countries have initiated the geographic allocation of health care resources to achieve equity – using relative need for health care as the basis of resource

allocation. These approaches usually use a formula for allocating health care resources that is based on the population size of regions adjusted for health care needs.

Equal access for equal need is a common operational definition of equity for resource allocation, where access refers to the cost of using a health service – distance, time, financial cost etc. Equal access for equal needs occurs when individuals with the same needs face the same cost for using health services (opportunity is equal). Inequities in access can arise when resources and facilities are distributed unevenly around a country – for example, where there are clustered around urban/more prosperous areas.

The components of needs-based resource allocation formula are:

- population size;
- distribution of morbidity;
- distribution of socioeconomic variables;
- income;
- infrastructure;
- material deprivation; and
- demographics – age and gender.

Please note: Do **not** use indicators of supply, demand and/or utilisation as a proxy for need for health services.

When calculating your formula, estimate the relative need for health services within each region using population size adjusted for cross-border flows and private sector coverage, weighted by demographic composition, morbidity/mortality profile and the socio-economic status of the population. Estimate resource targets by allocating total available funds between areas in proportion to their weighted populations. These targets should be adjusted for extraordinary resource requirements, such as the provision of supra-regional services, extra training, or serving health needs in sparsely populated areas. In determining resource targets, take into account other sources of finance within each district, for example, local government funding or user fee revenue (if retained by district). Then you can gradually redistribute resources to bring the actual allocations to each area nearer their target amounts. The pace of redistribution should be based on realistic assessment of the capacity of health services to absorb resource cuts or increases.

Monitor changes in population distribution between geographic areas, and estimate what the proportional distribution of resources should be in the longer term (say, ten years) based on population growth projections. Recalculate resource targets on a regular basis, refining the formula to include more indicators of need as more accurate data become available.

Some key issues to consider when calculating your formula are the availability of reliable data on variables needed to construct the formula, the frequency with which such data is collected, the complexity of your allocation formula (make it easy to understand and transparent) and make sure you use variables that are contextually and politically relevant.

Where there are problems with getting reliable data on variables that are proxies for health service needs, and there are substantial inequities, go for equity in per capita expenditure.
As you get closer to achieving this benchmark for equity, the formula can then be refined to included other measures of health care need.

The second part of Day 1's activities involved the construction of resource allocation formulae using variables listed in the presentation. Participants were shown how to determine equity targets based on various resource allocation formulae. A full description of data used, methods

and results are included in this report (*section 4*), as per the workshop programme (see *Appendix 1*).

3.2 Resource allocation processes, problems and the way forward

The first part of Day 2's activities was a continuation of analysis on resource allocation from the South African and Mozambican data. Results generated from the analysis formed the basis for discussions around best practices and problems with various resource allocation formulae. Thereafter, the workshop focused on process issues for resource allocation, such as:

- acknowledgement of the political nature of resource allocation;
- garnering political support for shifts in resource allocation;
- setting realistic timelines for achieving equity targets;
- practical approaches to introduce and motivate for change in resource allocation patterns;
- the problem of 'size of weights' to use for variables included in resource allocation formula;
- contextual influence on the choice of variables to use in a resource allocation formulae; and
- absorptive capacity at local levels and its implications for shifts in resources.

In the final activity, we discussed the way forward and agreed:

- the Mozambican team will work to get data on the variables relevant for constructing a resource allocation formula;
- the HEU will provide on-going support to the Mozambican team in reviewing their formula and developing a resource allocation formula (equity-target) based on new data provided by the Mozambican team;
- the HEU team will visit Mozambique to give hands-on support in resource allocation; and
- lines of communication must be kept open for any related queries and support.

4. Analysing the data and constructing a needs-based resource allocation formula

4.1 Analysing the data from Mozambique

Mozambican data was provided at the provincial level (see *Table 1*). Note that HIV prevalence and expected TB cases are not ideal variables to be included in a national resource allocation formula, as TB and HIV are not the only health problems faced in Mozambique, so including them in the formula means that the disease burden arising from other diseases is ignored. More appropriate measures of disease burden or health need include the infant mortality rate and standardised mortality. In the data on Mozambique, only population size was available, so this was the only variable used for setting an equity target for allocating health care resources; the results of the analysis are presented in *Table 1*.

Table 1: Mozambique data for setting equity target for resource allocation

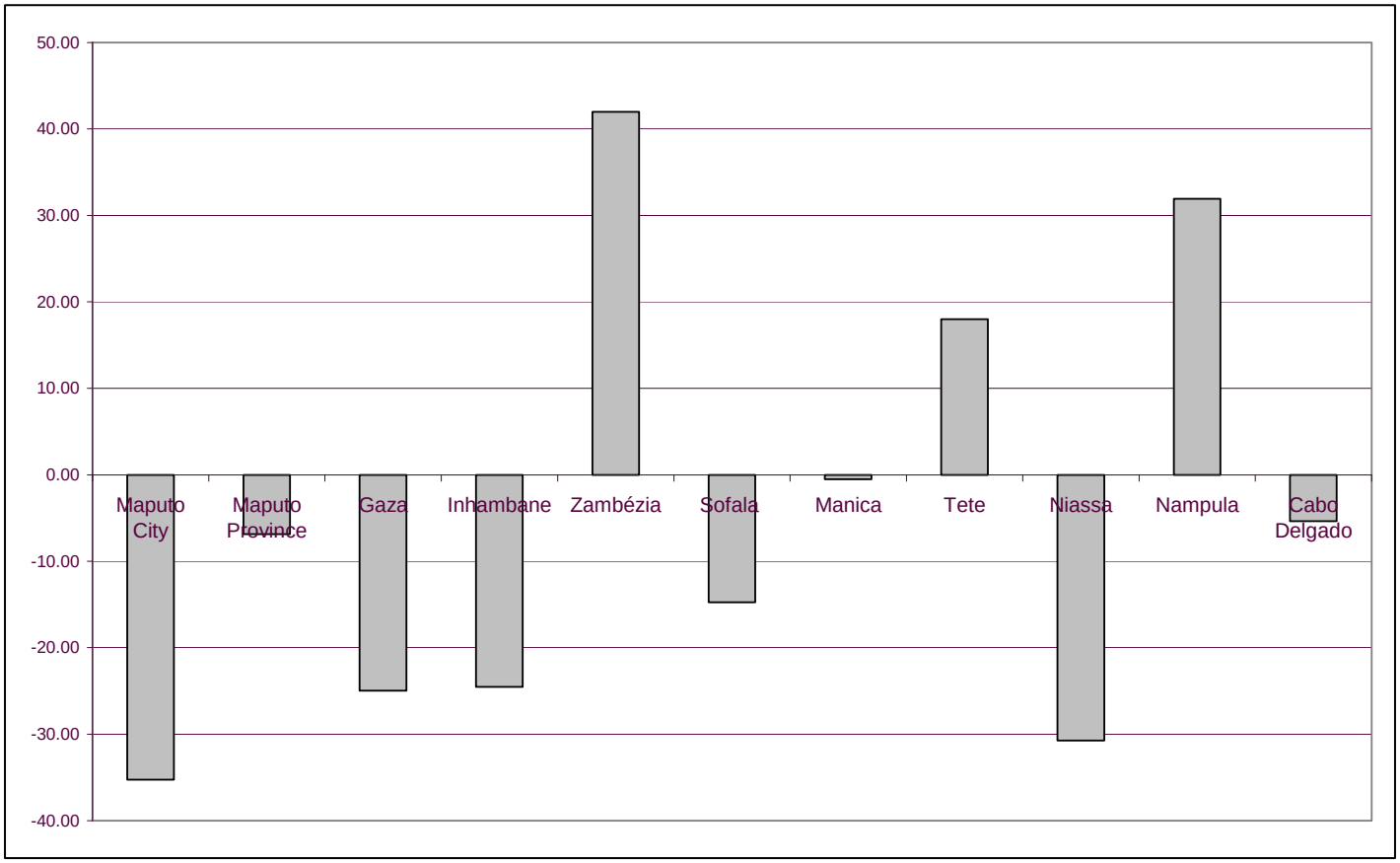
Region	Province	Population 2007	SWAP	State budget	Current allocations	%	Equity target based on population size	Difference
South	Maputo City	1,099,102	21,247	161,984	183,231	5.35	118,657.56	-64,573.44
South	Maputo Province	1,259,713	33,692	112,310	146,002	6.14	135,996.90	-10,005.10
South	Gaza	1,219,013	47,387	127,995	175,382	5.94	131,602.99	-43,779.01
South	Inhambane	1,267,035	65,589	115,674	181,263	6.17	136,787.38	-44,475.62
Center	Zambézia	3,892,854	108,264	187,761	296,025	18.96	420,267.23	124,242.23
Center	Sofala	1,654,163	68,713	140,746	209,459	8.06	178,581.19	-30,877.81
Center	Manica	1,418,927	53,154	100,798	153,952	6.91	153,185.43	-766.57
Center	Tete	1,832,339	43,306	124,335	167,641	8.92	197,816.83	30,175.83
North	Niassa	1,178,117	36,378	147,293	183,671	5.74	127,187.91	-56,483.09
North	Nampula	4,076,642	155,294	178,269	333,563	19.86	440,108.73	106,545.73
North	Cabo Delgado	1,632,809	64,855	121,424	186,279	7.95	176,275.84	-10,003.16
	Average/ Total	**20,530,714**	**697,879**	**1,518,589**	**2,216,468**	**100.00**	**2,216,468.00**	

Region	Province	Total budget	Equity target based on population size	Difference	Increase/ decrease per year (to reach target in 10 years)
Center	Zambézia	296025	420267.23	124242.23	12,424
North	Nampula	333563	440108.73	106545.73	10,655
Center	Tete	167641	197816.83	30175.83	3,018
Center	Manica	153952	153185.43	-766.57	-77
North	Cabo Delgado	186279	176275.84	-10003.16	-1,000
South	Maputo Province	146002	135996.90	-10005.10	-1,001
Center	Sofala	209459	178581.19	-30877.81	-3,088
South	Gaza	175382	131602.99	-43779.01	-4,378
South	Inhambane	181263	136787.38	-44475.62	-4,448
North	Niassa	183671	127187.91	-56483.09	-5,648
South	Maputo City	183231	118657.56	-64573.44	-6,457
	Average/ Total	**2216468**	**2216468**		

Resource allocation based on population size alone is a simple approach; it does not incorporate other measures of relative need such as disease burden, mortality and socio-economic status, but is still useful for identifying areas that need additional resources. Using population size as a basis for resource allocation means that the target is to spend the same amount of money for each individual in the country irrespective of which province they reside in, and to allocate resources to each province based on the population size of the province (calculated by multiplying the total national health budget by the 'the proportion of the total population in each province'). Changes that need to be made to achieve equity are based on the difference between the equity target and the current allocation pattern. Provinces such as Zambezia and Nampula are currently relatively under-funded (based on equity criterion), while

provinces such as Maputo City and Niassa are relatively over-funded. *Figure 1* shows the percentage change required between the current allocation patterns and the equity target.

Figure 1: Percentage change required to meet equity target by province



It is critical to set a reasonable timeline for achieving the equity target. Trying to rapidly shift resources can cause major problems at local levels, as most local authorities find it difficult to cope with large budget cuts or increases. A suitable timeline can be determined by examining the extent of inequities in the current allocation patterns, and the amount of resources that need to be reallocated. The greater the inequity, the more time should be given to achieving equity. The pace of change is also influenced by whether or not the overall budget is increasing in real terms. If the overall health budget is increasing rapidly, it is easier to increase funding of relatively under-resourced areas without decreasing the budgets of relatively over-resourced. If overall health spending is not increasing, it is necessary to slowly decrease the budgets of relatively over-resourced areas, so as not to adversely affect existing health services.

To determine timelines for achieving equity, start with an arbitrary number of years, e.g. ten years. Then, calculate the average budget increase (and if necessary any budget decreases) for each province per year to achieve the equity target. This can give a good idea as to how much money needs to be moved around per year. If for many provinces/districts this amount is considered to be too high, then perhaps a slower rate of change or longer time line is required. There are many models that can be used to determine the budget changes per year. For example, starting with smaller percentage changes (or smaller real amounts) in the initial phase

of redistribution allows provinces/districts to adjust to changes. As local authorities build their capacities to deal with budgets changes, then greater changes in budget allocations can be effected. Stakeholders should agree on the mode of change, based on the context.

Table 1 shows the average provincial budget increase/decrease required to achieve the equity target in ten years. A cursory glance at these figures can give any planner an indication of whether more time needs to be added to the timeline for achieving the equity target. It is also possible to factor in changes in total available budgets to the health sector into projections of changes in provincial allocations.

4.2 Analysing data from South Africa

South African data was also at provincial level; the variables were population size; total district health expenditure; age distribution of the population; gender distribution of the population; average annual utilisation by age and gender groups; crude mortality rates (CMRs); and proportion of provincial population with medical aid schemes. These variables were used to set four different equity targets based on: population size; the population size weighted by average national age and gender utilisation rates; the population size weighted by average national age and gender utilisation rates and standardised mortality ratios; and the population size weighted by average national age and gender utilisation rates, standardised mortality ratios and level of dependence on the public sector (indicated by the proportion of population that are members of a medical aid scheme).

4.2.1 Population size

We used the same method as for Mozambique to calculate an equity target for South Africa, based on population size. The equity target for each province and the difference between the equity target and current expenditure on district health services is shown in *Table 2*. Gauteng, Free State and Western Cape are relatively under-funded, while the rest are relatively over-funded (based on this equity target).

Table 2: Equity targets and current expenditure for South Africa

Province	Population	Total district health expenditure	Provincial population as % of total population	Equity target	Difference
Eastern Cape	6,601,258	3,559,295,000	0.135	3,448,832,815	-110,462,185
Free State	2,899,172	1,377,879,000	0.059	1,514,674,859	136,795,859
Gauteng	10,542,246	3,208,385,000	0.215	5,507,805,323	2,299,420,323
KwaZulu Natal	10,176,307	6,834,483,000	0.208	5,316,620,183	-1,517,862,817
Limpopo	5,304,657	3,344,007,000	0.108	2,771,422,528	-572,584,472
Mpumalanga	3,614,718	1,929,133,000	0.074	1,888,512,471	-40,620,529
Northern Cape	1,133,879	720,448,000	0.023	592,396,041	-128,051,959
North West	3,451,264	1,897,098,000	0.070	1,803,115,790	-93,982,210
Western Cape	5,303,475	2,743,457,000	0.108	2,770,804,991	27,347,991
Total	49,026,976	25,614,185,000		25,614,185,000	

4.2.2 Population size weighted by average national age and gender utilisation rates

The second equity target was set using the population size weighted by national age and gender utilisation rates. The annual national utilisation rate was calculated by age groups for males and females separately. *Table 3* shows how the weights for age and gender are calculated. Infants (0-4) use health care services more because of visits due to vaccinations, etc.). Females of child-bearing age (15-45) would often require reproductive health care services. People that are 60 years old and over (the elderly) generally require more health care services because they are prone to illnesses associated with old age.

The top part of the table contains the population of each province by age group and gender. The second part of the table shows the calculated average annual national utilisation rate for each group. The utilisation rates for each group are used to multiply the age and gender population for each province. The result is shown in the third part of the table. The total population for South Africa is about 49 million. The weighted population is about 209 million; the weighted population figures were then used to calculate provincial populations as a percentage of the total weighted population.

These percentages were then used to determine the equity target for provincial district health service allocations. For example, the weighted population of Eastern Cape is 13.5%, so the Eastern Cape should get 13.5% of the total district health budget (the equity target for Eastern Cape). The equity targets are shown *Table 4*, as well as the difference between current provincial allocations and the equity target. When compared to the equity target based only on population figures, the same provinces (Gauteng, Free State and Western Cape) are under-funded in relation to district health care spending relative to other provinces.

4.2.3 Population weighted by age and gender utilisation and CMRs

Standardised mortality rates are good indicators of relative need. However, the available data for South Africa is on crude mortality rates (CMRs) - calculated from total number of deaths from natural causes. CMRs give an indication of the size and severity of health problems in any given region (province or district). *Table 5a* shows the population size in each province, the number of deaths from natural causes within the year, and the number of deaths in each province as a proportion of the province's population. For the whole of South Africa the proportion of deaths to the population is calculated by dividing total number of deaths by the total population size.

The CMR is the ratio of number of deaths as a proportion of provincial population to the national proportion. This is calculated by dividing the proportions for each province by the national proportion. Based on this calculation, if the CMR for a province is 1.5, the province experienced 50% more deaths from natural causes than the national average – an indication of greater need for health care services. Similarly if the CMR is 0.8, then the province experienced 20% fewer deaths from natural causes compared to the national figure. CMRs for the Free State are exceptionally high, while the Western Cape's value is the lowest (see *Table 5a*).

CMR values can then be used as weights. However, one has to be careful in applying these weights. Using them as they are implies that province A with 200% more deaths than the national proportion should get 200% more funds per capita compared to another province B with 0% more (the same proportion as the national figure) deaths than the national figure. Increasing the province A's per capita allocations by 200% may be more than what is required to reduce its CMR to 1. On the other hand, if the differences between each province's CMR values are relatively small, then the CMR values can be directly applied as weights (as they are).

Table 3: Age and sex distribution in South African provinces

Population figures												
Province	Females					Males					Total	%
	0 - 4	"5 - 14"	"15 - 44"	45 - 59	60+	0 - 4	"5 - 14"	"15 - 44"	45 - 59	60+		
Eastern Cape	338378	757992	1602366	428624	341072	337552	777021	1506470	309852	201931	6,601,258	13.5%
Free State	139631	300416	740983	202755	128595	142306	300247	686394	170126	87719	2,899,172	5.9%
Gauteng	524651	922754	2681097	745423	395262	540841	939860	2785762	700076	306520	10,542,246	21.5%
KwaZulu Natal	517502	1169600	2619906	620367	414271	520231	1181735	2426642	461274	244779	10,176,307	20.8%
Limpopo	308802	651573	1301956	291547	223778	314715	688263	1190050	205065	128908	5,304,657	10.8%
Mpumalanga	203874	428726	908792	201867	122939	206342	429132	856349	172421	84276	3,614,718	7.4%
Northern Cape	53647	124137	268316	80801	55746	54935	125917	259042	69610	41728	1,133,879	2.3%
North West	179956	370968	843555	222451	145697	184074	354487	813447	228300	108329	3,451,264	7.0%
Western Cape	246679	508625	1363165	397954	254630	255928	504869	1255236	327872	188517	5,303,475	10.8%
Total											**49,026,976**	**100.0%**
Average annual national utilisation (per person)												
National	5.4	1.9	4.8	9.2	8.9	6.0	2.0	2.4	5.4	7.1		
Population weighted by age/sex utilisation												
Province	Females					Males					Total	Percent
	0 - 4	"5 - 14"	"15 - 44"	45 - 59	60+	0 - 4	"5 - 14"	"15 - 44"	45 - 59	60+		
Eastern Cape	1835650.4	1410005	7762928.7	3943967.1	3035956.2	2019076	1553239	3600084	1667276	1426801	8,254,983	13.5%
Free State	757477.45	558829.2	3589815.4	1865642.3	1144652.1	851206.8	600183.9	1640309	915427.2	619803.7	12,543,347	6.0%
Gauteng	2846153.8	1716493	12989021	6858980.8	3518313.2	3235054	1878749	6657270	3767023	2165805	45,632,862	21.8%
KwaZulu Natal	2807371.5	2175672	12692571	5708282.8	3687516.4	3111774	2362249	5799063	2482059	1729556	42,556,115	20.4%
Limpopo	1675205	1212046	6307542.5	2682658.4	1991896.7	1882475	1375815	2843920	1103430	910836.4	21,985,825	10.5%
Mpumalanga	1105986.2	797509.4	4402794.1	1857471.4	1094306.8	1234240	857820.7	2046459	927776.3	595476.2	14,919,839	7.1%
Northern Cape	291027.01	230917.7	1299901.5	743487.26	496207.29	328595	251703.9	619045.2	374562.9	294841.1	4,930,289	2.4%
North West	976234.59	690068.9	4086742.6	2046874.2	1296880.7	1101043	708607.8	1943934	1228454	765429.6	14,844,269	7.1%
Western Cape	1338197	946136.3	6604079.7	3661758.3	2266517.1	1530840	1009216	2999698	1764239	1332021	23,452,702	11.2%
Total											**209,120,232**	**100.0%**

Table 4: Weight of age and sex in South African provinces

Province	Population	Total district health expenditure	Weighted population	Weighted provincial population as % of total weighted population	Equity target	Difference
Eastern Cape	6,601,258	3,559,295,000	28254983.16	0.135	3,460,824,236.6	-98,470,763.39
Free State	2,899,172	1,377,879,000	12543346.81	0.060	1,536,377,437.9	158,498,437.86
Gauteng	10,542,246	3,208,385,000	45632861.53	0.218	5,589,361,433.0	2,380,976,432.96
KwaZulu Natal	10,176,307	6,834,483,000	42556115.22	0.204	5,212,504,786.7	-1,621,978,213.26
Limpopo	5,304,657	3,344,007,000	21985824.97	0.105	2,692,943,595.3	-651,063,404.66
Mpumalanga	3,614,718	1,929,133,000	14919839.29	0.071	1,827,463,181.1	-101,669,818.86
Northern Cape	1,133,879	720,448,000	4930288.936	0.024	603,888,643.2	-116,559,356.82
North West	3,451,264	1,897,098,000	14844269.39	0.071	1,818,206,969.3	-78,891,030.73
Western Cape	5,303,475	2,743,457,000	23452702.27	0.112	2,872,614,716.9	129,157,716.89
Total	**49,026,976**	**25,614,185,000**	**209120231.6**	**1.000**	**25,614,185,000.0**	

Table 5a: Crude mortality ratio in South African provinces

Province	Population	Deaths	Deaths as % of total population	CMR	Unity	CMR with reduced weight
Eastern Cape	6,601,258	84,350	0.0128	1.131	1	1.065
Free State	2,899,172	48,901	0.0169	2.337	1	1.669
Gauteng	10,542,246	100,301	0.0095	0.842	1	0.921
KwaZulu Natal	10,176,307	129,107	0.0127	1.123	1	1.061
Limpopo	5,304,657	50,314	0.0095	0.839	1	0.920
Mpumalanga	3,614,718	44,187	0.0122	1.082	1	1.041
Northern Cape	1,133,879	11,501	0.0101	0.897	1	0.949
North West	3,451,264	47,179	0.0137	1.210	1	1.105
Western Cape	5,303,475	38,273	0.0072	0.639	1	0.819
Total	**49,026,976**	**554,113**	**0.0113**			

Table 5b: Weighting CMR values in South Africa by province

Province	Weighted population (by age and gender utilisation	CMR weight	CMR weight × weighted population (BxC)	Weighted provincial population as % of total weighted population	Total district health expenditure	Equity target	Difference
Eastern Cape	28,254,983.16	1.065	30,099,524.79	0.1405	3,559,295,000	3,598,423,476	39,128,476
Free State	12,543,346.81	1.669	20,930,365.19	0.0977	1,377,879,000	2,502,242,743	1,124,363,743
Gauteng	45,632,861.53	0.921	42,023,300.54	0.1961	3,208,385,000	5,023,920,884	1,815,535,884
KwaZulu Natal	42,556,115.22	1.061	45,163,227.64	0.2108	6,834,483,000	5,399,301,807	-1,435,181,193
Limpopo	21,985,824.97	0.920	20,218,224.76	0.0944	3,344,007,000	2,417,105,756	-926,901,244
Mpumalanga	14,919,839.29	1.041	15,528,386.36	0.0725	1,929,133,000	1,856,431,635	-72,701,365
Northern Cape	4,930,288.94	0.949	4,677,464.92	0.0218	720,448,000	559,194,861	-161,253,139
North West	14,844,269.39	1.105	16,399,236.48	0.0765	1,897,098,000	1,960,542,498	63,444,498
Western Cape	23,452,702.27	0.819	19,213,761.59	0.0897	2,743,457,000	2,297,021,340	-446,435,660
Total	**209,120,231.57**		**214,253,492.28**		**25,614,185,000**	**25,614,185,000**	

In the case of South Africa, there are large differences between CMRs - ranging from 0.63 to 2.337 - so the weight of each CMR has been reduced by half. To do this, we take the average of each CMR value and 1, which effectively halves the distance between the CMR and 1 (see seventh column in *Table 5a*). These weights are applied to the provincial populations weighted by age and gender utilisation. This is done by multiplying the weighted (by gender and age utilisation) provincial population by the weights created from CMRs. This is calculated in *Table 5b* – fourth column. The remaining process is similar to what has been done earlier. The new population figure for each province (weighted by age and gender utilisation and CMR) is used to calculate the 'weighted provincial population as a proportion of the total weighted population'. This proportion calculated for each province is the proportion of the total district health budget that it should receive. As in the other cases, the difference between the equity target and the current allocations is calculated (see last column of *Table 5b*).

4.2.4 Population size weighted by national age and gender utilisation, CMR and medical aid ownership

In South Africa, the health system is characterised by a strong presence of the private sector. Most people who belong to some form of medical aid scheme generally use the private sector. Those who do not contribute to these medical aid schemes are more likely to use the public sector as private sector health services are much more expensive. This group of people are more dependent on the public sector than those who belong to medical aid schemes. The proportion of the population that belong to a medical aid scheme in each district and province differs considerably. Therefore the level of dependency on the public sector differs accordingly. This is taken into consideration in the allocation of health sector budgets to provinces. In determining provincial allocations, the South African government gives individuals who do not belong to a medical aid scheme a weight four times higher than the weight given to those that belong to a medical aid scheme.

In this last part of the section, this weight is included in our analysis, with data on medical aid ownership in *Table 6a* and *b*. *Table 6a* shows the population size in each province, including the population of each province that belongs to a medical aid scheme. The weight based on ownership of medical aid is integrated with the previous weights. This is done by using the provincial populations that have been weighted by national age and gender utilisation and CMRs. For these provincial weighted populations, the equivalent proportion of the population with medical aid has a weight of 1, while the proportion without medical aid has a weight of 4. This is based on the assumption that for every visit to a public sector facility by medical scheme members, those not covered by medical aid would make fours visits to public sector facilities.

To make this clearer, we use the Eastern Cape as an example. The population weighted by age and gender utilisation and CMR = 30,099,524.79. The proportions of the population with and without medical aid are 0.09 and 0.91 respectively. The new weighted population based on age and gender utilisation, CMR and ownership of medical aid is calculated as follows:

(0.09x1x30,099,524.79) + (0.91x 4x 30,099,524.79) = 111,996,501.55

Table 6b shows equity targets based on the new weighted population figures. Differences between the equity target and current allocations are shown in the last column of *Table 6b*.

Table 6a: Integration of equity target data with membership of medical aid scheme in South African provinces

Province	Population	Population covered by medical aid scheme	Without medical aid	% with medical aid	% without medical aid	Weighted population (age & gender utilisation and CMR)	Weighted population (age & gender utilisation, CMR and medical aid)	Weighted provincial population as % of total weighted population
Eastern Cape	6,601,258	614,197	5,987,061	0.09	0.91	30,099,524.79	111,996,501.55	0.147
Free State	2,899,172	345,571	2,553,601	0.12	0.88	20,930,365.19	76,236,985.32	0.100
Gauteng	10,542,246	2,732,777	7,809,469	0.26	0.74	42,023,300.54	135,413,171.01	0.177
KwaZulu Natal	10,176,307	1,091,744	9,084,563	0.11	0.89	45,163,227.64	166,117,180.80	0.218
Limpopo	5,304,657	325,811	4,978,846	0.06	0.94	20,218,224.76	77,147,500.77	0.101
Mpumalanga	3,614,718	511,160	3,103,558	0.14	0.86	15,528,386.36	55,525,902.94	0.073
Northern Cape	1,133,879	149,399	984,480	0.13	0.87	4,677,464.92	16,860,962.46	0.022
North West	3,451,264	394,000	3,057,264	0.11	0.89	16,399,236.48	59,980,482.63	0.079
Western Cape	5,303,475	1,157,483	4,145,992	0.22	0.78	19,213,761.59	64,274,840.52	0.084
Total	**49,026,976**					**214,253,492.28**	**763,553,528.00**	

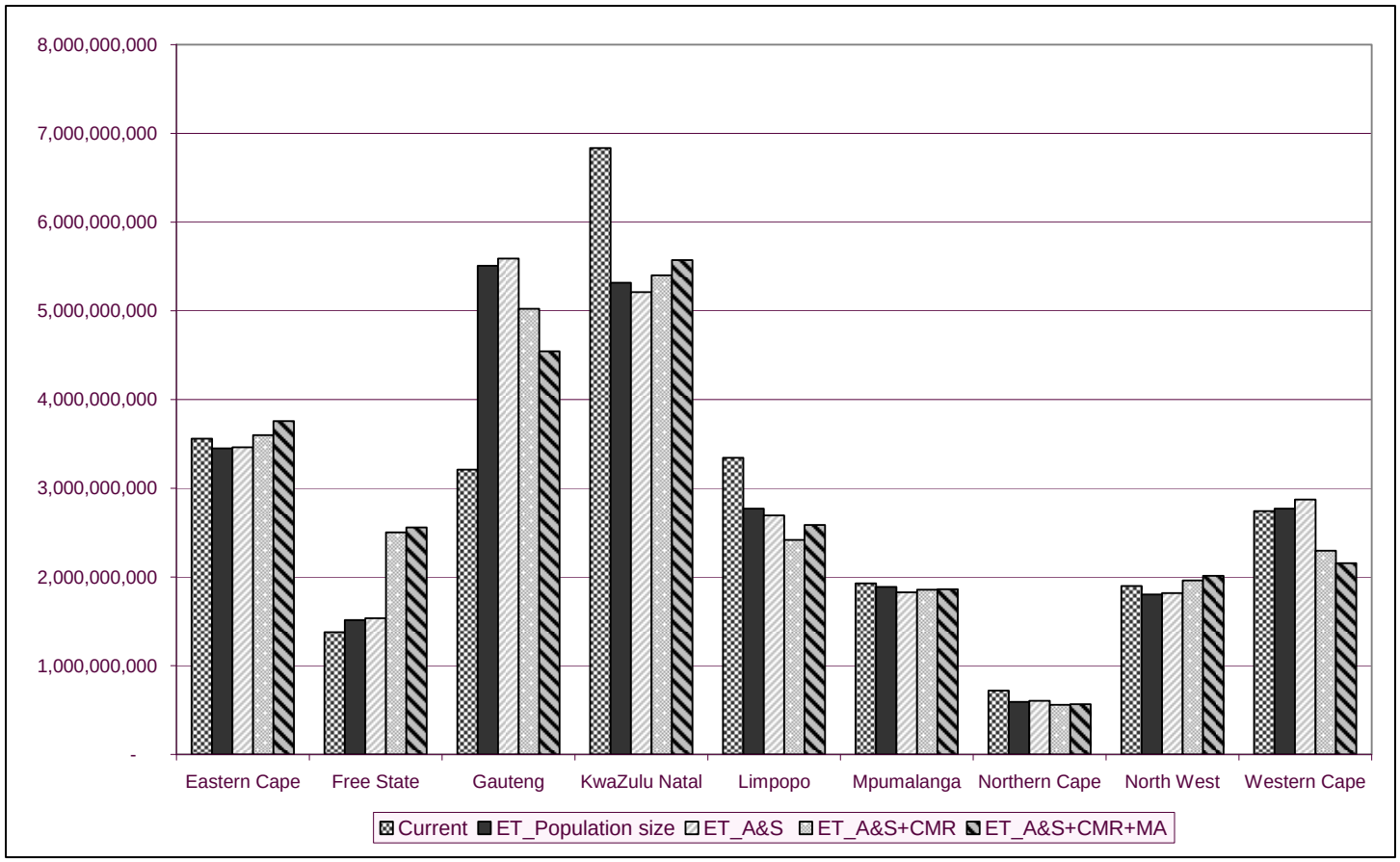
Table 6b: Equity target for South African Provinces based on membership of medical aid schemes

Province	Population	Total district health expenditure	Weighted provincial population as % of total weighted population	Equity target	Difference
Eastern Cape	6,601,258	3,559,295,000	0.1467	3,757,037,333	197,742,333
Free State	2,899,172	1,377,879,000	0.0998	2,557,447,742	1,179,568,742
Gauteng	10,542,246	3,208,385,000	0.1773	4,542,573,489	1,334,188,489
KwaZulu Natal	10,176,307	6,834,483,000	0.2176	5,572,570,939	-1,261,912,061
Limpopo	5,304,657	3,344,007,000	0.1010	2,587,991,915	-756,015,085
Mpumalanga	3,614,718	1,929,133,000	0.0727	1,862,673,275	-66,459,725
Northern Cape	1,133,879	720,448,000	0.0221	565,618,252	-154,829,748
North West	3,451,264	1,897,098,000	0.0786	2,012,106,712	115,008,712
Western Cape	5,303,475	2,743,457,000	0.0842	2,156,165,345	-587,291,655
Total	**49,026,976**	**25,614,185,000**		**25,614,185,000**	

4.2.5 Comparison of results from different formulae for allocating resources

Figure 2 shows the comparison of results based on the different resource allocation formulae.

Figure 2: Comparison of results from resource allocation formulae in South African provinces



NOTE: *ET= equity target; [+]A&S= Age-sex distribution; **CMR= crude mortality rate; [++]MA= medical aid ownership

4.3 Summary

The various analyses and methods presented in this section attempts to aid the understanding of how one can include different variables in a resource allocation formula. The methods employed here are just a few of many ways in which resource allocation formulae can be constructed. Indeed, anyone can come up with some method or formula for resource allocation. The important issues are whether they include variables that are contextually relevant indicators of health need, the variables are 'appropriately' weighted, the formula correctly identifies regions that need more resources and those that are relatively over-funded, and whether the formula is accepted by key stakeholders involved or affected by the use of the resource allocation formula.

5. Some key process issues around constructing and implementing a resource allocation formula

This section deals with key process issues that need to be taken into consideration in the construction and implementation of a resource allocation formula. The first part of this section provides very important tips for constructing resource allocation formulae. The second section highlights the more political aspects of resource allocation.

It is critical to recognise that resource allocation is a *political* process and is always controversial. Those who will 'lose' resources will vociferously oppose efforts to redistribute resources. For this reason, it is critical to secure the 'buy-in' of all stakeholders to the need for equity in the allocation of resources before moving on to discussions of alternative formulae. Only if there is commitment by all key stakeholders to equitable distribution of resources can a resource allocation formula be agreed and a relative redistribution of resources undertaken.

From the outset, we must point out that there is no such thing as a perfect resource allocation formula. This being said, any resource allocation formula should first and foremost be based on the population size of the various geographic areas considered for resource allocation. In some cases, just using population size alone is sufficient for assessing how equitable the current allocation patterns are and which areas need more or less resources. As more variables are included in the allocation formula, the more complex the formula invariably becomes. The advantage of weighting the population sizes of different regions by indicators of need such as mortality rates, socio-economic status and age-gender utilisation patterns is that the formula captures differential needs of the population that are not only defined by the size of the population. The disadvantage is how to incorporate these variables and what weights to give them. Once again, there is no perfect weight for any variable. Indeed, the size of the weight given to any variable is essentially arbitrary. Nevertheless, there are some 'objective' (or at least defensible) ways in which one can assign weights to each variable. One method is to ask all stake holders (community members, policy makers etc) to suggest the weights to be given to each variable. Their responses can then be used as a guide to allocating weights to different variables. In this process, it is assumed that the weights given to each variable is a reflection of the importance of those variables for the population. The advantage of this process is that it fosters buy-in and acceptability.

Variables that are useful in constructing a resource allocation formula are:

- population size;
- demographic composition of the population;
- morbidity or mortality profiles; and
- socio-economic status of the population.

Other considerations such as population density, the differential cost of providing health services in different areas (e.g. the need to pay special allowances to staff working in rural facilities), and cross-border flows can be factored into the allocation process. It is important also to deduct expenditure on special health facilities such as national hospitals or regional hospitals that are not located in each province / district before applying the resource allocation formula.

In the construction of a resource allocation formula, care must be taken to ensure that the data on the variables used in the formula are reliable and are collected frequently. If the data is not reliable it could be the basis for resistance from stakeholders from regions that are likely to

experience budget reductions (both in real and relative terms). Frequency of data collection ensures regular monitoring and evaluation of the redistribution process.

It is important to get consensus and buy-in from all stakeholders for any allocation formula (variables used and the weights attached to each variable). Resource allocation is inherently a political process.

Achieving the equity target on paper (without considering overall budget increases for the health sector) requires budget cuts for some provinces or districts. In reality, it is far easier (in terms of reducing potential resistance from relatively 'over-resourced' areas) to introduce equitable resource allocation when the overall health budget is increasing. It is a good idea to pursue the equity target by maintaining real expenditure in provinces or districts that are relatively over-funded while substantially increasing the budgets for those that are relatively under-funded. In this way, less resistance is encountered from more-resourced provinces or districts. Also, budget cuts could result in loss of jobs and reduction in the quality of services, both of which are undesirable.

The timeline for achieving the identified equity target should be realistic and feasible. In choosing a timeline, the capacity of local authorities to adapt to changes in budget sizes must be considered. If local authorities do not have the capacity to effectively and efficiently utilise additional resources, then building capacity in those areas should precede increases in budgets. A practical way to determine whether local authorities have the capacity to effectively and efficiently utilise additional resources is to ask them to prepare a detailed strategic plan for how they intend to use the additional resources.

To conclude, it is important to monitor changes in population sizes and variables used in calculating the resource allocation formula – for all areas. As the values of these variables change, the equity targets should be recalculated. This exercise should be done regularly.

Appendix 1: Workshop programme

26 November 2008

09.00 – 09.15	Introductions and tea
09.15 – 11.15	Discussion and presentation Topic: Resource allocation and equity
11.15 – 11.30	Break for tea
11.30 – 12.30	Analysis of data from Mozambique
12.30 – 13.30	Lunch break
14.00 – 16.00	Analysis of data from Mozambique and discussion

27 November 2008

09.00 – 11.30	Case study: South Africa
11.30 – 11.45	Break for tea
11.45 – 13.00	Discussion around the results of the case study
13.00 – 14.00	Break for lunch
14.00 – 16.30	Discussion: Process issues for resource allocation

Appendix 2: List of participants

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Equity in health implies addressing differences in health status that are unnecessary, avoidable and unfair. In southern Africa, these typically relate to disparities across racial groups, rural/urban status, socio-economic status, gender, age and geographical region. EQUINET is primarily concerned with equity motivated interventions that seek to allocate resources preferentially to those with the worst health status (vertical equity). EQUINET seeks to understand and influence the redistribution of social and economic resources for equity oriented interventions, EQUINET also seeks to understand and inform the power and ability people (and social groups) have to make choices over health inputs and their capacity to use these choices towards health.

EQUINET implements work in a number of areas identified as central to health equity in east and southern Africa

- Protecting health in economic and trade policy
- Building universal, primary health care oriented health systems
- Equitable, health systems strengthening responses to HIV and AIDS
- Fair Financing of health systems
- Valuing and retaining health workers
- Organising participatory, people centred health systems
- Social empowerment and action for health
- Monitoring progress through country and regional equity watches

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