

Measuring Equity in Public Health Financing across Provinces in South Africa

by

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Declaration

I, Marumo Vincent Maake declare that this report is my own, unaided work. It is submitted in partial fulfilment of the requirements of the degree of Master of Management (in the field of Public Policy) in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other university.

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ABSTRACT

The post 1994 government in South Africa has been struggling over the years to address the socio-economic imbalances that existed during the apartheid period. In that period public health services were severely fragmented. While efforts were made over the years to address the inequalities, health indicators suggest that huge challenges still exist. Therefore, this research assesses whether the allocation of public health resources are equitably distributed, using expenditure as a proxy.

The methodology used entailed the development of a needs-based formula to measure if the public health expenditure is allocated based population needs across provinces. The formula requires the weighting of the public sector population for its different need factors such as age and sex characteristics, burden of disease and socio-economic indicators such as deprivation indices.

The findings of the research revealed that the distribution of public health resources are skewed towards certain provinces. This means that there is an inequitable distribution of health services across provinces and therefore the health allocations are not based on the needs of the population. Critical priority areas such as medicines, medical supplies and laboratory services are worst affected by the skewed distribution.

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CHAPTER ONE

1. INTRODUCTION AND BACKGROUND

1.1. INTRODUCTION

The post 1994 government has struggled in addressing the social and economic imbalances that existed during the apartheid period (Benatar, 2013). During apartheid social services such as healthcare were severely fragmented across an array of first, second and third tiers of government, many of which were operating separately from one another with their own policies. The health inequalities across many development indicators were high, such as the mortality rates and life expectancy across different population groups (Asbu, 2002).

When the new democratic dispensation was introduced in 1994, there were 17 separate health departments across the country that were argued to be focusing mainly on hospital services, with weak consideration given to primary health care (Coovadia et al., 2009). Therefore, the new government in 1994 put equity high on its agenda, especially as it relates to social services such as health and education (McIntyre & Gilson, 2002). In order to address the inequalities that existed in the health system, government needed to inject considerable resources into the system to level out those disparities (Asbu, 2002)

While efforts were made over the years to address these inequalities, some of the health indicators suggest huge challenges still exist, particularly in the provinces that incorporated the former homeland states. For example, data from the 2016/17 district health barometer reflect significant disparities in critical health indicators between provinces, such as under-5 infant mortality rates, which were higher in provinces like the Eastern Cape (3.7 per cent), Limpopo (2.1 per cent) and North West Province (3.8 per cent), compared to provinces like the Western Cape (0.3 per cent) and Gauteng (1.7 per cent).

Furthermore, the 2016/17 district health barometer suggests improvements in certain health indicators over the past three years, such as life expectancy which has increased from 53.8 years (52.8 for males and 54.8 for females) in 2005 to 62.4 years (59.7 for males and 65.1 for females) in 2016. Also, the number of AIDS (Acquired Immune Deficiency Syndrome) deaths, which peaked at 325 241 in 2006, has more than halved to 150 759 by 2016. However, inter-provincial comparisons show declining outcomes in some provinces, such as Limpopo, compared to the national average. Provinces like the Western Cape and Gauteng had the highest average life expectancy at birth for both males and females compared to provinces like Limpopo and the Eastern Cape according to the 2018 Mid-year population estimates (Statistics South Africa, 2018:13)

Spending on provincial health departments varies between provinces, with the lowest funded ¹provincial departments at approximately 26 per cent, and the highest funded at over 36 per cent of the total provincial budget. There are many possible factors that drive the disparities in funding between provinces, such as the concentration of central hospital services in Gauteng, Western Cape, KwaZulu Natal, Free State and the Eastern Cape.

The above-mentioned indicators suggest that those health departments in provinces that receive higher shares of the provincial budget allocations have better health outcomes compared to those with lower shares. However, there are many factors that would need to be considered in measuring whether the resources are inequitably distributed across provinces, such as the demographic composition of each province as well as other indicators that drive health needs.

1.2. BACKGROUND

1.2.1. Equity in Health Financing

Ensuring that there is equity in the distribution of health resources is one of the governing principles many countries have subscribed to, and these are often institutionalised in their legislation and government programmes (O'Donnell et al., 2008). When public resources,

¹ Funded below the national average.

such as those for health services, are distributed three concepts should be clarified in the policy framework: firstly, the achievement of equity; secondly, the achievement of equal shares in resources; and thirdly, the achievement of equal outcomes (Kazemi, Eekand & Garling, 2017). These objectives are often in conflict. As it relates to these principles, equity in health is defined by Braveman and Gruskin (2003) as a concept that focuses on a process towards a fair redistribution of resources to address the health inequalities that exist among different groups that can be regarded as unfair and unjust. Wagstaff and Van Doorslaer (2000) further argue that equity in health delivery focuses on how delivery systems bring health resource distributions closer to equitable distributions. Equal shares, according to Kazemi, Eekand and Garling (2017), would mean that everyone receives a similar share of the allocation irrespective of need, social status or outcomes. However, equity in health is often explained along two dimensions of equity which are vertical and horizontal. Horizontal equity ensures that healthcare is equally available to people at equal risk and avoidable inequalities are eliminated (Asthana & Gibson, 2008). Vertical equity, on the other hand, relates to unequal treatment for people with unequal needs (McIntyre & Mooney, 2007).

The horizontal equity principle receives most attention within the health space in both policy and research. This principle was also defined by Van Doorslaer and Wagstaff (2000) as the equal treatment of those with equal medical needs, irrespective of other characteristics such as marital status, race, place of residence, etc. Therefore, horizontal health equity focuses on a process of the fair distribution of resources to address the unfair and unjust health needs that exist among different groups.

Furthermore, Braveman and Gruskin (2003) argue that for a health system to be regarded as fair, only small differences in health outcomes should exist among different groups, and services respond fairly to needs without discrimination that is either (for instance) racial or regional. According to Whitehead and Dahlgren (2006), health inequalities are in most cases systematic, unfair and, more importantly, socially produced. They argue that health status differences between population groups fall into this category. This can be seen as mortality and morbidity differences that vary according to social status.

With respect to funding allocations, equity also means that the allocations should be fairly distributed to the population and promote national values (Goertz, 2017). Therefore, in the health context, the achievement of equity can be argued to involve the distribution of health resources, and associated financial allocations, to properly reflect the different needs of different populations within a relevant jurisdiction.

1.2.2. Financing Public Health System in South Africa

The Constitution of South Africa makes health care a basic right of citizens and exists as a concurrent power between the national and provincial spheres of government (Constitution of the Republic of South Africa, 1996). The roles and responsibilities of the two spheres of government in the delivery of public health services are outlined in the National Health Act (Act no 61 of 2003) (National Health Act, 2003). The Act gives the National Department of Health and the health minister the responsibility of formulating national health policies, distributing equitable health services and issuing guidelines on how the policy should be implemented. Provinces are responsible for ensuring that the health policy is implemented according to any nationally legislated norms and standards, as well as other provincial policy priorities that must comply with Schedule 5 of the Constitution. Schedule 5 of the Constitution gives provincial legislatures some exclusive functional areas, which include ambulance services in relation to the delivery of the health function.

Despite the rights-based framework governing access to healthcare, the public health system appears weak on a number of fronts. These include: poor health outcomes; management and governance problems; and also inadequate and skewed resource allocations (Barron & Padarath, 2017). The causes are argued to include unstable political leadership, inadequate funding, poor management, and political decision-making that has compromised health services in the provinces (Coovadia et al., 2009).

With regard to the equitable distribution of resources, this research seeks to analyse the achievement (or not) of horizontal equity within South Africa's public health system. The version of equity to be considered can be stated as: that distribution of health resources that accords with relative need.

Table 1 below shows the percentage shares of the 2018/19 health budgets between provinces against the population shares, including the uninsured. Uninsured populations are often used as a crude proxy of measuring equity in health allocations.

Table 1: 2018/19 Total provincial shares from aggregated provincial health budgets as opposed to uninsured population

Province	Total Health Budgets (R'000)	% Share of Total Health Budget	Total Population	Uninsured Population	% Share of Total Population	% Share of Total Uninsured Population
Eastern Cape	24 025 525	12.2%	6 712 276	5 870 461	11.4%	12.2%
Free State	10 380 370	5.3%	2 887 465	2 475 743	4.9%	5.1%
Gauteng	46 762 330	23.8%	15 176 115	11 199 667	25.8%	23.2%
KwaZulu-Natal	42 547 172	21.7%	11 289 086	9 973 017	19.2%	20.7%
Limpopo	19 801 774	10.1%	5 982 584	5 321 898	10.2%	11.0%
Mpumalanga	13 119 591	6.7%	4 592 187	3 953 866	7.8%	8.2%
Northern Cape	4 854 311	2.5%	1 263 875	1 028 241	2.2%	2.1%
North West Prov	11 543 471	5.9%	4 027 160	3 441 796	6.9%	7.1%
Western Cape	23 099 979	11.8%	6 844 272	4 959 206	11.6%	10.3%
Total	196 134 523	100%	58 775 020	48 223 895	100%	100%

Source: National Treasury data (2019) and Statistics South Africa, GHS data (2018)

The crude share of the health budget appears broadly consistent with the crude shares of the uninsured population in some provinces (Table 1). However, there are significant variations from the expected share in few provinces, with of them all of the significantly less than expected. These occur largely in North West Province, Mpumalanga and Limpopo. The Western Cape and KwaZulu Natal are higher than indicated by the crude population measure.

For those below, North West Province accounts for only 5.9 per cent of the aggregated provincial health budgets, yet their share of the country's total uninsured population is at 7.1 per cent (below by 1.2 per cent). Mpumalanga's share of the budget (which is 6.7 per cent) also deviates negatively by 1.5 per cent from the share of the uninsured population (8.2 per cent). Limpopo accounts for 11 per cent of the uninsured population; yet its share

of the total health budget was only at 10.1 per cent. Eastern Cape, Gauteng, Free State and North West Province compare fairly on both the share of the budget and the uninsured population. Provinces that have a higher share of the budget relative to the share of the uninsured population, amounting to above one per cent, are the Western Cape and KwaZulu-Natal.

Table 2 looks at expenditure per capita on the uninsured population by province as a high-level proxy of measuring equity in public health financing (refer to Table 2) without accounting for more nuanced measures of need. Expenditure for 2018/19 was significantly lower than the national average of R4 052 in three provinces, namely Limpopo, Mpumalanga, and North West Province. The Western Cape and Northern Cape had significantly higher expenditure than the national average.

Table 2: Actual expenditure per capita on the uninsured population by province (figures in Rands) (in nominal prices)

Province	2015/16	2016/17	2017/18	2018/19
Eastern Cape	3 067	3 212	3 808	4 093
Free State	3 682	3 808	4 080	4 193
Gauteng	3 653	3 831	3 866	4 184
KwaZulu-Natal	3 546	3 793	4 114	4 266
Limpopo	2 945	3 260	3 466	3 702
Mpumalanga	2 785	2 852	3 111	3 336
Northern Cape	4 267	4 334	4 484	4 721
North West Prov	2 870	3 046	3 089	3 354
Western Cape	3 987	4 237	4 408	4 658
Total	3 395	3 591	3 828	4 069

Source: National Treasury data (2019); Statistics South Africa, GHS data (2015, 2016, 2017, 2018)

Table 3 below shows a breakdown of expenditure, using the uninsured population as a crude proxy of need in 2019/20; on the main critical health delivery areas (refer to Appendix A for actual numbers). The table compares the provincial expenditure on the uninsured population to the national average in different health priority areas such as clinics and hospitals. This comparison aims to assess how each province deviates from

the national average per capita expenditure on uninsured persons in various health sector priority programmes. The 100 per cent represents the national average expenditure per capita, while each provincial percentage represents the deviation from the national average in each health priority area.

Expenditure on primary health care seems to be comparatively fair in most provinces relative to the national average. However, there are outliers in the form of the Northern Cape, which is significantly higher, and the North West, which is significantly lower. On hospital services, expenditure per capita also varies between provinces.

Table 3: Provincial deviation from average expenditure on the uninsured population on critical health programmes in 2019/20 (main budget)

Province	Total Health Budgets	Total less Grants	Primary Health Care Total	Clinics	Community Health Centres	Community-based Centres	District Hospitals	Emergency Medical Services	Provincial Hospitals	Tertiary Hospitals
Eastern Cape	100.2%	104.0%	106.7%	117.8%	99.8%	113.9%	118.5%	137.7%	92.5%	70.1%
Free State	102.2%	91.8%	93.5%	114.2%	28.7%	213.4%	86.9%	167.8%	80.1%	119.0%
Gauteng	103.0%	101.3%	88.2%	65.1%	83.5%	228.9%	50.1%	77.7%	109.9%	179.9%
KwaZulu-Natal	104.5%	104.3%	115.8%	130.5%	85.5%	47.8%	107.6%	94.0%	149.4%	59.5%
Limpopo	90.8%	98.9%	105.9%	164.1%	50.6%	50.4%	186.4%	83.5%	66.2%	41.9%
Mpumalanga	84.7%	90.9%	90.3%	109.9%	111.2%	5.9%	131.1%	63.7%	51.6%	38.0%
Northern Cape	116.7%	106.0%	126.7%	135.7%	139.0%	0.0%	89.9%	201.9%	52.2%	125.1%
North West Prov	83.4%	83.4%	68.7%	0.7%	149.5%	2.6%	55.1%	68.3%	71.5%	63.2%
Western Cape	112.2%	106.1%	108.0%	76.2%	202.5%	50.9%	100.5%	130.9%	100.5%	152.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: National Treasury data (2019); Statistics South Africa, GHS data (2018)

Both Table 3 indicates that there are possible variations from the expected equitable distribution, based on the crude uninsured population. For instance, North West Province and Mpumalanga's per capita health spending on their uninsured population is significantly below the national average, even after the exclusion of conditional grants, which are nationally determined allocations earmarked for specific purposes. The Western Cape and Northern Cape are much higher, by way of contrast. Total primary

health-care spending² is higher than the national average in the Eastern Cape, KwaZulu-Natal, Northern Cape, Limpopo and the Western Cape. This spending is inclusive of district hospitals, community health centres, clinics and community-based centres. However, as previously indicated, per capita expenditure on the uninsured population suggests possible under-investment in primary health care in provinces such as North West Province.

Regarding emergency medical services, which refer to ambulance services, expenditure per capita on the uninsured population is significantly lower than the national average in Mpumalanga and North West Province. With regard to provincial hospitals, which serve as a referral points for district hospitals, only Gauteng, KwaZulu-Natal and the Western Cape spend above the national average. The same goes for tertiary hospitals, which provide highly specialised services, where only Gauteng and the Western Cape spent significantly more than the other provinces. However, this is because six of the ten central hospitals in the country, reflecting the majority of tertiary hospitals, are found in those two provinces. The significant portion of the allocation to these specialised hospitals comes from the national supplementary/conditional grants, inter alia cross-provincial boundary flows. HIV and AIDS spending is also demand-driven ³and largely funded from the national conditional grants. According to the 2020 Division of Revenue Act, the funding for HIV and AIDS are allocated based on the HIV prevalence, the estimated share of the cases and to some extent the population numbers. Therefore, provinces with higher HIV prevalence and estimated case load receive a higher proportion of the conditional grant based on the expected demand for services in the main.

Despite the large spending variations within the various programmes across provinces, there are strong arguments that the uninsured population alone is not sufficient as a measure of the required allocation of resources (Zere et al., 2007). There are other factors

² Primary health care is defined by the World Health Organisation as a whole of society approach to healthcare and well-being.

³ According to Burström, (2009), demand-driven allocations are based on the demand for services rather than the need.

that need to be taken into consideration when measuring variations in need. These don't replace the crude population, but are required as additional weighting factors which are correlated with needs-based usage. These include:

- Age and sex;
- Mortality and morbidity⁴, and
- Socio-economic status relating to deprivation from certain critical resources that are linked to health outcomes such as access to water and sanitation, and poverty, as well as geographic location. (Rice & Smith, 2001; McIntyre & Anselmi, 2015)

Further explanation is provided in Chapter two on how each these indicator affect the need for a health services among population groups.

Despite been internationally recognised, the needs-based approaches are currently not utilised in the allocation of health resources across provinces in South Africa; hence the need to analyse the data and assess whether the funding of public health across provinces appropriately reflects the relative need for health services. Provincial budgets are currently distributed through a provincial equitable share (PES) formula process, as well as the earmarked conditional⁵ grants from the national government. While the formula includes health as a component (with some risk adjustments accounted for), Provincial Legislatures use their own discretion when making allocations across provincial departments. This budgeting process is described in detail in the next section.

1.2.3. Budgeting Approaches in South Africa

The budgeting approach for public health care in any country can have a significant bearing on access to health services for those who rely heavily on public health systems (Pearson, 2002). Pearson (2002) argues that while the national policies are set to ensure

⁴ The United States National Cancer Institute defines morbidity as amount of diseases within a population.

⁵ Conditional grants are national earmarked transfers to provinces and municipalities with special conditions attached to them in terms of section 214 of the constitution. (Constitution of the Republic of South Africa, 1996; Ajam, 2014)

the equitable distribution of health services for all the citizens, health financing can impact on equity objectives in many ways. This includes ensuring that the health system is budgeted for adequately, and delivered efficiently.

The large variations in per capita spending on the uninsured population, as depicted in Table 2, are attributable to the current allocation approaches. Each province receives an “equitable” share of nationally raised revenue (via the PES), together with supplementary conditional allocations to address national priorities of one form or another. Furthermore, Section 214 of the Constitution of South Africa dictates that the sharing of the nationally raised revenue should be done through an Act of Parliament, namely the annually promulgated Division of Revenue Act (Constitution of the Republic of South Africa, 1996). The Division of Revenue Act outlines the principles that should be followed in distributing each province’s share of nationally raised revenue. Provincial responsibilities, according to which these “equitable shares” should be funding, are also clarified in schedules 4 and 5 of the Constitution (Constitution of the Republic of South Africa, 1996).

The allocative principles mentioned above are outlined in annexure W1 that accompanied the 2019 Division of Revenue Act. According to this annexure W1, the PES formula comprises six components, which include, among others, the health component, with a weighting of 27 per cent of the total provincial allocation.

In determining the share for each province from the health component, the uninsured population is weighted using the risk-adjusted index which is calculated using data from the Risk Equalisation Fund of the Council for Medical Schemes. The risk-adjusted weighted population accounts for 75 percent of the total component’s output while 25 per cent is based on the demand for services. The demand for services is based on primary health care visits and hospital workloads data.

However, the health component weightings do not directly translate to budgets (even on an indicative basis) for health in provinces, as the intergovernmental fiscal system has assigned expenditure allocation responsibilities to provincial legislatures as well as executive committees (Ajam, 2014; Eagar et al., 2014). They make decisions about the level of the allocations for each function or programme without interference from the

national government, apart from conditional allocations. Therefore, in most cases health budgets across provinces are susceptible to historical (incrementally adjusted) budgeting trends. However, as described by Maharaj (2016), incremental budget approaches have a tendency to preserve historical inconsistencies.

Table 4 below shows a comparison between the contributions of the health component's to total provincial allocations against the actual allocations made by provincial legislatures and executive committees towards health in each province. As reflected in Table 1 above, the total allocation made to health amounted to R196.1 billion for 2018/19. Included in the total allocation is an amount of R154.4 billion unconditional allocation that was allocated by the provincial legislatures and executive committees to the health sector (provinces). The contribution of the health component to total provincial unconditional allocations amounted to almost R123 billion. Therefore, approximately R27.4 billion was added to the health component's contribution to make up the total provincial unconditional allocations for health in 2018/19.

Table 4: Comparison of the health component's contribution to PES budget against the actual provincial allocations to Health excluding conditional grants in 2018/19.

Province (R'000)	Health PES Component's Contribution to Provincial Budgets		Provincial Actual Allocations (Excluding Conditional grants)		Differences (Actual minus Contribution)
	Total Contribution	% share	Total Health Allocation less Grants	% share	
Eastern Cape	16,678,682	13.1%	20,034,550	13.0%	3,355,868
Free State	6,631,553	5.2%	7,315,249	4.7%	683,696
Gauteng	28,418,677	22.4%	36,229,753	23.5%	7,811,076
KwaZulu-Natal	27,242,628	21.5%	33,277,137	21.6%	6,034,509
Limpopo	12,957,612	10.2%	17,019,609	11.0%	4,061,997
Mpumalanga	9,432,260	7.4%	10,747,766	7.0%	1,315,506
Northern Cape	2,672,922	2.1%	3,406,956	2.2%	734,034
North West	8,455,416	6.7%	9,150,380	5.9%	694,964
Western Cape	14,483,853	11.4%	17,208,158	11.1%	2,724,305
Total	126,973,602	100%	154,389,558	100%	27,415,956

Source: National Treasury data (2019)

Provinces that added a significant portion of their provincial allocations to supplement the contribution made by the health component towards provincial health budgets in 2018/19 are Gauteng with R7.8 billion, followed by KwaZulu Natal with R6 billion, Limpopo R4.1 billion and the Eastern Cape with R3.3 billion. The actual allocations in the Free State, Northern Cape and the North West are not far off from the contributions made by the health component to their total provincial allocations.

Prior to the intergovernmental fiscal system, which was first introduced in the 1997/98 budget cycle, health allocations were based on a nationally determined function-specific formula, which distributed the public health allocations across provinces.

These allocations were determined by a function-specific committee, made up of provincial representatives, that was established to ensure that the health resources were equitably distributed across provincial departments of health (Philip, 2004). The function committee's formula, despite being crude, made use of population data for each province, which was weighted by an indicator of disparities in per capita income. However, these approaches were abolished in favour of the current intergovernmental fiscal system, which decentralised the discretion to determine health function allocations to provincial legislatures, in line with section 214 of the Constitution of South Africa.

Many in literature have argued that the decentralisation of decision-making in the financing of public health systems could contribute to the widening of inequalities between different geographical areas, if proper norms and standards are not put into place (Minassian, 1997; McIntyre and Gilson, 2002; OECD, 2015). McIntyre and Gilson (2002) have also stressed that the lack of a proper mechanism guiding provincial health allocations in South Africa will contribute to health inequalities when viewed spatially from a national perspective. They also argued that the function committee's population-based formula, despite being crude, was a much better mechanism as it allowed public resources to be directed to populations who were relying heavily on the public health system (McIntyre & Gilson, 2002). However the function committee formula had its own challenges. Doherty and Van den Heever (1997) argues that there were unintended consequences that arose as a result of the formula, which include the shifting large amounts of funds from some provinces to others with limited capacity to spend. As a

results provinces that lost significant portion of their funding incurred budget deficits at the end of the financial year while those that gained had large surpluses (Doherty & Van den Heever, 1997). This may have also led to funds been used in less priority areas. Furthermore, the formula also created rivalries between provinces.

1.2.4. Promoting and Measuring Equity in Public Health Financing Using a Needs-Based Formula

There is general consensus in the literature that achieving and measuring equity in health allocation is a complex exercise and many countries across the world have adopted the use of the needs-based allocation approach as a tool for the equitable distribution of health budgets across sub-nationals (Rice & Smith, 2001).

Needs-based resource allocation is aimed at distributing financial resources for health care across regional spaces equitably, based on the population-based need for health care services. Zere et al. (2007) stress the need to measure the impact of policies on the status of the disadvantaged, marginalised and poor groups and how their status is either improving or deteriorating as a result of these policies. They indicate that firstly there is a need to develop appropriate resource allocation mechanism, using some sort of needs-based criteria.

The use of the needs-based formula for the equitable distribution of health resources was first popularised in the United Kingdom's National Health Service (NHS), after the recommendations of the Resource Allocation Working Party (RAWP) on how funds should be allocated to England's fourteen regional health authorities (Smith, 2008). The formula was phased-in over a period of fifteen years, and the idea was to reduce the unavoidable inequalities that existed in the NHS.

Since the introduction in the NHS, such formula-based approaches are becoming popular in determining the allocations for sub-nationals authorities across many countries (McIntyre & Anselmi, 2015). Zere et al. (2007) have sharply criticized the historic incremental budgeting system, which they believe discounts the change in disease burdens across regions, as well as other socio-economic imbalances. They believe that there is a need for evidence-based planning and population-based resource allocation

approaches. However, needs-based formulae are presently not used in South Africa to determine the relative distribution of health services between and within provinces. There is also no substantial domestic literature that explicitly addresses this issue.

1.3. PROBLEM STATEMENT AND RATIONALE OF THE STUDY

Though South Africa has a strong legislative framework that requires the equitable distribution of health resources, there is presently no standardised official methodology for measuring any inappropriate variations. Variations in resource allocation (based on population-weighted budget allocations), together with variations in health outcomes, suggest the existence of unjustifiable variations in health service access across provinces.

There are neither recent studies in South Africa on the use of needs-based formulae to measure equity across provinces, nor the determination of whether the disparities, if any, are either narrowing or widening over time. There are also no official needs-based indicators that have been agreed upon for use in South Africa to evaluate the fairness of health allocations.

This research aims to address these gaps through the development of criteria that would provide evidence of the fairness of the distribution of public health services in South Africa.

1.4. RESEARCH OBJECTIVES

The primary objective of this research is to develop a quantitative framework that is able to assess the fairness (based on an appropriate definition of equity) of the inter-provincial distribution of health expenditure. In this instance, public health expenditure will be used as a proxy for the distribution of health services.

1.5. RESEARCH QUESTION

Primary research question: Using expenditure as a proxy, are the public health resources equitably distributed across provinces?

In answering the primary question, the research will focus on exploring the following secondary questions:

- What criteria should be used to assess health need spatially (i.e. inter-provincially) within the South African context?
- Using expenditure as a proxy, how are the health resources allocated relative to the health needs across provinces?
- Are any equity disparities widening or narrowing over time?

CHAPTER TWO

2. LITERATURE REVIEW

2.1. INTRODUCTION

The main objective of this chapter is to review the concept of health equity; needs-based allocations including the criteria most aligned with the health need; and the relationship between fiscal regimes and equity in health allocation. Furthermore, experiences from countries that are implementing needs-based allocation approaches are also explored.

A theoretical framework is also developed, which takes into account insights into the international use of needs-based formulae in ensuring that health resources are equitably distributed relative to the need across geographical areas. The theoretical framework also help to clarify the processes that are followed when the needs factors are selected. Diderichsen (2004) has stressed the importance of ensuring that needs factors are chosen in a way that avoids any manipulation from healthcare service-providers.

Given that there is limited recent literature on health equity and the needs-based formulae, there were no annual limits placed on the literature reviewed. Those that are closely linked to the study were selected, irrespective of the year.

2.2. DEFINING EQUITY IN THE CONTEXT OF HEALTH

The definition of equity in health is contested and there is therefore no final consensus. Many authors have come up with different definitions of equity in health. According to Norheim and Asada (2009) and Braveman and Gruskin (2003), equity in health relates to a process for a fair redistribution of resources necessary to address the health inequalities that are deemed unfair and unjust among different groups. The World Health Organisation defines equity as the “absence of avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically”. According to Starfield (2006), the International Society for Equity in Health adopted a working definition of equity in health as the “absence of systematic and

remediable differences in one or more aspects of health across populations”. Whitehead (1991) defined health equity as equal access to resources that are available for those with equal needs - a definition that includes the ideas of *equal* utilisation and *equal* care for all. While the definitions differ, what is common is that they all imply that systematic health inequalities should be addressed and that there should be fair or equal access to health resources for all.

Equity in health is also defined with regard to two dimension. First there’s a need to ensure that healthcare is equally accessible to people at equal risk (horizontal equity). Second, it is important to ensure that avoidable inequalities in public health care are eliminated (Asthana & Gibson, 2008). The idea of horizontal equity is preferred in health as it has been established that people with the lowest need use the health services more often than do those with the greatest need (Sebastián, Mosquera, & Gustafsson, 2017). Horizontal equity prioritises resources based on the equal risks among populations.

In relation to health allocations, they are deemed appropriate if they are both equitable and efficient (Goertz, 2017). In the context of health financing, equity means it is fairly distributed according to the health needs of any population (Goertz, 2017). Efficiency (which is not the focus of this study) relates to maximizing output from the health allocations and minimizing perverse incentives for provinces or districts (Goertz, 2017). Therefore, the distribution of resources based on a population’s needs should incorporate both the aspects of equity and efficiency (Birch & Eyles, 1991).

Equity in health relates to the need to address inequalities that exist in the system. Oates (2005) argues that health inequalities as unnecessary and avoidable in most cases and therefore considered to be unfair and unjust. The view is that the health system should respond fairly to the health need, without discrimination that is either racial or regional (Braveman & Gruskin, 2003). Whitehead and Dahlgren (2006) argue that, in most cases, health inequalities are systematic, unfair and are socially produced.

Litvack, Ahmad and Bird (1998) also indicate that “equity outcomes have two main dimensions: access to services across different groups of the population on the basis of

income, gender and other categories; and inter-regional inequity in terms of disparities in access within and across local government jurisdictions”.

This study focuses on measuring horizontal equity to assess whether there are any disparities in health allocations across provinces in South Africa.

2.3. DEFINING NEED IN THE CONTEXT OF HEALTH

As previously mentioned, equity in health relates to the distribution of resources relative to the needs. Now the question is what the word ‘need’ refers to in this context?

Goertz (2017: 10) has summarised the definition of need in health along two dimensions, which is “medical necessity and capacity to benefit”. This definition originates from Birch and Eyles (1991) who simply defined it as the ability to benefit from healthcare.

This implies that health services should be made available when the use of such services is expected to improve the health status of the people. Acheson (1978) identifies some of the factors related to health needs as the risk of: morbidity; mortality, pain and discomfort, and dysfunction associated with disability and impairment.

Thus, health needs in this context simply relate to the population’s capacity to benefit from the health system in order to improve health outcomes.

The need and demand for health services are however often used interchangeably, causing confusion in the health literature (Jeffers, Bognanno, & Bartlett, 1971). Therefore need for medical services is explained as the estimated quantity of health services that a particular population in a certain geographic location probably ought to consume over a certain period. The demand for health services, on the other hand, relates mainly to consumer preferences for the quantities of medical services they desire to consume over a period (Jeffers, Bognanno, & Bartlett, 1971; Van den Heever, 1991).

There are unmet needs that are often not included in the needs-based factors. Unmet needs often arise due to reduced access to health care due, inter alia, to a specific geographical considerations (Goertz, 2017). Rice and Smith (2001) have distinguished

between general unmet needs and specific unmet needs, with the general unmet needs relating to the services being provided being inadequate to meet the expected standards of the populations due to inadequate funding. On the other hand, specific unmet needs relate to people from certain geographical areas, such as rural areas, being deprived of the health services that they are entitled to in comparison to those in urban areas. Although adjusting health allocations to reflect the need of the population is common across many health systems, there are still challenges relating to adjustments for unmet needs (Aragon et al., 2017).

The main problem with health allocation formulae is that, whilst they seek to model existing determinants of healthcare utilisation, it may not be possible to accurately account for unmet needs as well as unjustified utilisation (Rice & Smith, 2001). Therefore, the focus should not be to maximise the explanation of existing spending patterns, but rather to explain variations caused by legitimate need-related factors.

Measuring health needs can also be a complex and difficult exercise at times. The basic measure of using the uninsured populations within the South African context is not sufficient as it fails to account for other need-related factors. These are the factors associated with different age and sex groups such as the elderly, children and women of child-bearing age (Zere et al., 2007).

2.4. THEORITICAL FRAMEWORK: NEEDS-BASED FORMULA

2.4.1. Background

According to Smith (2008), the needs-based formulae were first popularized in 1976 in the United Kingdom's NHS when the RAWP made some recommendations on how the funds from the system should be allocated across England. At the time the NHS allocations were largely derived from historical incremental budgeting, which was found to have a strong bias towards regions such as London. According to Sheldon (1997), many regions in the southern part of England were receiving higher shares relative to their needs. Therefore, the RAWP made recommendations that the distribution of health resources across those regions should be based on population size, demographic

characteristics, weighting for clinical needs and variations in the input prices of local services (Sheldon, 1997; Smith, 2008). However, with more data becoming available, the RAWP approach was superseded by other comprehensive formulae such as the York model, which suggested indicators such as the standardised mortality ratios, proportion of economically active people who were unemployed, and the standardised limiting long-illness ratio for those younger than 75 years, among others (Smith, 2008).

Since then, many health policy makers across the world have moved towards developing needs-based formulae across various health systems in the world. The aim is to strike a better balance between resource allocations in health and the associated costs of delivering the services to specific population groups (Penno, Gauld & Audas, 2013). The needs-based allocation formulae are becoming popular in determining the targeted health allocations for regions and provinces across many developed as well as developing countries (Ensor et al., 2012; Smith & Rice, 2001).

Those that criticize historic incremental budgeting and are advocating the needs-based formula believe that it discounts the change in the burden of disease patterns across regions as well as other socio-economic imbalances. It then continues to disadvantage those regions that may have been historically disadvantaged (Zere et al., 2007). They believe that there is a need for evidence-based planning and resource allocation based on population needs to address health inequalities and improve the socio-economic status of the disadvantaged.

Furthermore, since the needs-based approach prioritizes the needs of the population, it is found to be useful in avoiding the problem of underfunding (Birch & Chambers, 1993). Birch and Chambers (1993) also argues that, since need-based formulae don't rely on past use of health services by the population, the resource allocation will be both equitable and efficient.

Due to its popularity and its proven records in addressing equity in health allocations, some developing countries in the Eastern and Southern African regions are also moving towards the adoption of needs-based formulae as a way of distributing their limited health resources fairly across their population (McIntyre & Anselmi, 2015).

Experiences from both developed and developing⁶ countries are examined to understand how the indicators are being selected and to establish whether the implementation of the formula has produced the desired results of achieving equity across regions.

2.4.2. The Successes of the Needs-based Formulae

a) Developed Countries

Needs-based formulae that are also known as risk adjustment capitation are commonly used throughout the developed countries. The main reason behind the use of the formulae relates to the need to control expenditure while achieving the equity principles (Gordon et al., 2001).

A needs-based formula was successfully implemented across the health regions in **England**. The objective of the NHS's needs-based formula was to ensure that equal access are secured for people at equal risk. The RAWP recommendations to the NHS were that the health allocations should be based on the critical indicators of population size, demographic characteristics, weighting for clinical needs and variations in the input prices of local services (Smith, 2008). However, according to Smith, with more data becoming available, the RAWP approach was superseded by other comprehensive formulae such as the York model, which suggested that indicators such as standardized mortality ratios (SMR), the proportion of economically active people who are unemployed, and the standardised limiting long-illness ratio for those younger than 75 years of age, be included.

According to Gorsky (2018), the RAWP recommended the inclusion of SMR as the best available proxy for morbidity as well as non-psychiatric care health needs. There were also some adjustments made for the cross-boundary flow of patients, relating mainly to hospital services. However, during implementation the formula received mixed reactions

⁶ Countries classified by their level of development as measured by national income per capita. The groupings are high income, upper middle income, lower middle income and low income (World Bank, 2019)

from different regions that were regarded as ‘losers’ and ‘winners’, with the so-called ‘losers’ arguing that it ignored some factors such as social deprivation (Gorsky, 2018).

The Advisory Group on Resource Allocation (AGRA) was then established to consider the formula on issues such as patient flows, age and sex patterns of utilization and age-specific mortality weightings. In its final report, AGRA endorsed the RAWP’s core principle of “equal access for equal need”, and they urged that ongoing research be undertaken to allow for the fine-tuning of the formula. AGRA also summarised the four important elements of a weighted capitation formula, which are: to first allocate resources on an equal per capita basis, second take into account the differences in demographics (age and sex); third adjust for additional differences in need and fourth take into account unavoidable variations in costs (Bevan, 2008). The risk adjustment formula in England is mainly determined by met needs characteristics, which accounts for 90 per cent of the Clinical Commissioning Group (CCG) budgets. Andersen (1978) suggest that the met needs characteristics relates to the concept of whether people in need of medical care does actually receive it. A further adjustment of 10 per cent is made for tackling health inequalities or unmet needs (Cylus et al., 2018). However, the central government decides on the split between both met and unmet needs. Hendry (1998) lauded the introduction of the RAWP formula and argued that it brought equity into the NHS for the first time and its slow pace of annual budgetary changes was key to its success.

In **Australia**, the New South Wales (NSW) state successfully implemented the Resource Distribution Formula (RDF) since the late 1980s across its 17 geographical area-based health services (Gibbs, 2002). The RDF is based on two sets of measures, which are to estimate the relative health needs of the population as well as the legitimate differential costs of delivering the services. Population is the main indicator which is weighted for age and sex composition. Furthermore, the needs index takes into account premature mortality (SMR<65) and socioeconomic indicators as well as rurality which accounts for the additional costs of delivering services (Gibbs, 2002). In the rurality index, areas are defined as rural by calculating the distance to the health facilities in the given area (Maharaj, 2016). The RDF is periodically reviewed. The principle of the RDF is to ensure that NSW regions are provided with resources to deliver comparable access to health

services based on the health needs of their respective populations (Eagar, 2009). The formula further recognizes the fact that specialized services should only be provided in a limited number of geographical areas due to their high costs and low volumes.

The **New Zealand** Department of Health has successfully implemented the Population Based Funding Formula (PBFF) that was first introduced in 2003. This is an aggregate formula that is used to determine funding allocations to the country's District Health Boards (DHBs) and it is based on the needs of the population living in each area as well as the cost of providing the services (Eagar, 2009). The indicators used for the PBFF are population, which is adjusted for ethnicity, age and sex, as well as other indicators such as rurality, overseas visitors and unmet needs (Chester, Penno & Gauld, 2018). Poor health outcomes have been associated with certain ethnic groups in the Maori and Pacific populations compared to the rest, leading to the country identifying it as a needs factor (Penno, Gauld & Audas, 2013). However, according to Chester et al., there has been some dissatisfaction among the DHBs regarding this allocation process due to its lack of transparency. Penno, Gauld, and Audas (2012) also found that some of the adjustments in the PBFF, such as unmet needs, were purely policy-based adjustments targeted for some groups with poorer health outcomes and the level of such adjustments are not necessarily quantifiable. They were just determined by the government.

In **Scotland**, the Scottish Resource Allocation (SRA) formula is used in the allocation of around 70 per cent of the total health services budget between the 14 territorial NHS Boards in Scotland. The SRA determines equity target shares (percentages) for each health services board, based on a weighted capitation approach. The main formula indicator is population for each NHS Board area, which is adjusted for age and sex composition (Maharaj, 2016). Additional needs indicators include morbidity and life circumstances (including deprivation), as well as the excess costs of providing services in different geographical areas (Rice & Smith, 2001). The morbidity and life circumstances needs indicator prioritizes areas with higher deprivation or higher morbidity levels, as they may require more health care. The rural adjustments are made to cater for the excess cost of delivering services in rural areas as compared to the urban areas, by giving a higher weighting (Maharaj, 2016). The main focus of the rural adjustment is more about

accounting for variations in health input prices or costs, than the health care needs associated with certain areas (Rice & Smith, 2001).

Gordon et al. (2001) reviewed the **Welsh** Resource Allocation formula for the NHS, and the raised challenges brought about by the allocation methodology, which only adjusts the population for the age and sex of those who died prematurely. Their concerns were to make sure that the Welsh NHS delivers services to people who are alive and not those who have died and, in particular, the 'sick' rather than the 'healthy'. They also argued that the system prioritizes people with health conditions that only very rarely result in death. For instance, includes tooth decay, back pain, food poisoning, arthritis, etc. Furthermore, the geographical distribution of health needs and death are not the same. Their recommendation was that Wales should develop an alternative methodology based on directly measured health needs (using actual data on health status), possibly combined with information on the distribution of disease in the population, as well as the variation in the costs of the delivery of services in different geographical areas.

Table 5 below shows other geographically based resource allocation schemes for health that are using needs-based formulae in developed countries. Data used for different indicators in developed countries are collected either at an individual personal level or aggregated level of needs (Rice & Smith, 2001; McIntyre & Anselmi, 2015). Populations that are adjusted for age and sex remain the main indicator for all the systems surveyed in developed countries. Mortality and cost differences in the delivery of services are also popular indicators across many country systems (Rice & Smith, 2001).

Table 5: Resource allocation formulae for health schemes implemented in other developed countries

Country	Scheme Name	Plans	Individual Level Indicators	Aggregate Level Indicators	Other Factors
Canada	Alberta Population Based Funding Model	17 Regional Health Authorities	Age; Sex; Ethnicity Welfare status	Remoteness	Cross-boundary flows; Funding loss protection; Cost variations

France	Regional Resource Allocation	25 Regions	Age		Phased implementation
Italy	Regional Financing Scheme	21 Regional Governments	Age Sex	Mortality	Damping mechanism
Norway	Local Government Finance System	19 County Governments	Age Sex	Mortality; Elderly living alone; Marital status	Tax base
Northern Ireland	Health Boards Allocation Formula	4 Health Boards	Age Sex	Mortality; Elderly living alone; Marital status	Rural Costs
Sweden	Stockholm County Hospital resource allocation formula	26 county councils	Age; Living alone Employment status; Housing tenure; Previous in-patient diagnosis		Phased implementation

Source: (Gordon et al, 2001; Rice & Smith, 2001)

b) Developing Countries using Needs-based Formulae

Many countries in the low- and middle-income categories have started to adopt the needs-based formula approach in funding health services. However, in most cases this has been hampered by the lack of information on utilisation and relative needs (Ensor et al., 2012).

In the SADC regions, countries such as Mozambique, Tanzania, Namibia and Zambia have adopted the needs-based formulae as a way of allocating health resources to their regions and districts (Ensor et al., 2012; McIntyre & Anselmi, 2015). Given the similarities in their economic conditions, indicators used in these countries are most common across these countries. While age and sex, mortality and rurality are the common indicators for most countries, there are others that are being considered in developing countries that are not common in developed countries. This include deprivation of certain resources such as water and sanitation (McIntyre & Anselmi, 2015; Semali & Minja, 2005).

Semali and Minja (2005) have assessed the implementation of needs-based allocation in Tanzania and have found that some progress has already been made in addressing equity in health resource allocation between the districts. However, they advocated for the inclusion of a deprivation index, as their analysis revealed that slightly more resources are allocated to better-off districts than would be expected.

In **Namibia**, Zere et al. (2007) have been advocating the development of a needs-based formula. Their argument was that areas with lower socio-economic status were less prioritized and thus not receiving their fair share of health resources.

In an effort to address equity in health resource allocation, the Ministry of Health in **Zambia** moved from a historical budgeting approach during the 1993/94 budget process to a more population- and activity-based allocation approach (Chitah & Masiye, 2007). The funding formula was reviewed over the years with factors such as deprivation indices being included in the formula. Therefore, the formula resulted in the population size that was adjusted for the deprivation index. The use of other factors such as morbidity and mortality were suggested, but there was no accurate data due to little or no death reporting in rural areas (Maharaj, 2016). Therefore, recommendations were made that the formula be refined over time with the possible inclusion of other popular indicators such as demographic composition and maternal mortality rates.

Ensor et al. (2001) have also advocated the introduction of a needs-based formula in **Bangladesh** as a way of addressing equity and moving away from the capacity and historic normative approaches. Their suggestion was that the allocation formula should look at the sizes and structures of the population for each district, as well as other indicators of need such as SMR and infant mortality rates (IMR). They also suggested that the cost of delivering the services for different districts should be considered, as well as the cross-boundary use of services. However, they acknowledged the complexities that come with determining the differential cost of delivering services, if actual data on staffing cost, transportation costs and variations in the local prices of basic commodities are not easily available.

2.4.3. Key Lessons from other Countries on the Needs-based Formulae

While developed countries have adopted needs-based or risk-adjustment allocation approaches for health, there are still a few developing countries that have considered the proposals to address the equity of health expenditure across the world (Hanson, Worrall & Wiseman, 2007). Even worse, there are few of those that have considered the proposals that fully implemented such approaches.

Challenges with the needs-based resource allocation models relate to the selection of indicators and whether those indicators and modelling strategies will produce credible results (Kephart & Asada, 2009). Currently no gold standard exists for the choice of needs indicators. They should be chosen in a way that avoids any manipulation from healthcare service-providers (Diderichsen, 2004; Kephart & Asada, 2009). Diderichsen argues further that the demographics and socio-economic status of individuals and geographic areas might potentially fulfil this criterion. Arguments are made that bias might arise if diagnostic information is used from the population's previous contacts with health care services, as providers might set diagnoses that will benefit their future resource allocations.

However, there are commonalities for both developed and developing countries regarding the use of the needs factors. The main indicator used (either developed or developing) is population size, which is adjusted for demographic composition in terms of age and sex (Maharaj, 2016). This is due to the fact that groups such as the elderly, women of child-bearing age and very young children (under one year of age) have a greater need for health services than older children and working-age adults (Maharaj, Robinson, & McIntyre, 2018; Shanahan & Gousseau, 1997). The older groups often develop diseases associated with old age and also have compromised immune systems. Infants have a developing immune systems, meaning that they would access healthcare more often than other groupings early on in life – typically within the first year of life. Reagon, Makan and McIntyre (1997) argue for the need to remove the population that depends on private health care from the needs-based resource allocation formulae and only focus on those who rely on the public health services.

Mortality indicators (more especially SMR) are also popular amongst different surveyed schemes in both developed and developing countries. Maharaj, Robinson and McIntyre (2018) caution about using a specific disease indicator to estimate relative health needs for different regions. They argue that one district could have a higher burden of a certain disease than other districts, which could also be having higher burdens for different diseases. It is for this reason that they advise that the overall burden of ill health is used as an indicator of needs, such as the all-cause mortality rates.

Table 6: Summary of popular needs-based indicators used internationally (both developed and developing countries)

Individual level	Aggregate level		Other Factors
Age	Mortality	Morbidity	Cost of Providing Services
Sex	Education Level	Elderly Living alone	Deprivation of Resources (Developing Countries)
Ethnicity	Rurality/Urbanisation	Ethnicity	
Employment Status	Age and Sex	Socio-economic Status	
Welfare Status	Unemployment	Welfare Status	
Homelessness	Disability		
Region			

(Rice & Smith, 2001; McIntyre & Anselmi, 2015)

As shown in Table 6 above, the most-used international indicators are mostly similar to those used by the NHS. These include population weighted by age and sex characteristics, the burden of disease measured by premature deaths relative to a standard life expectancy, and others indicators such as the cost of providing health services, which relates to rurality/sparsity in most countries. Most of the indicators used in both developed and developing countries will be suitable for South Africa, which has a high level of in-equalities as well as sparse rural areas.

2.4.4. Risk Adjustment Approaches in South Africa

a) Health Functions Committee's Formula

Before the introduction of the intergovernmental fiscal system in South Africa in the 1997/98 budget process, public health funding allocations were based on a formula that was centrally determined by the Function Committee for Health (McIntyre et al.,1995). The committee's members included representatives from the national Department of Health, Provincial Health Departments, the Central Economic Advisory Service (CEAS), and the Department of Finance, as well as the Department of State Expenditure. Their role was to advise on health-resource allocation across provinces. The Function Committee formula determined provincial target allocations purely based on weighted proportional population distribution (which was weighted by the inverse of the provincial per capita income; with income given a 0.25 weight). The function committee received some criticism with Doherty and Van den Heever (1997) arguing that there were unintended consequences that accrued as a result of the formula. This include the movement of large amounts of funding from some provinces to others which had not capacity to spend. That consequently resulted in those provinces having large surpluses in their budgets at the end of the financial years while those that lost significant amounts had larger deficits.

With the introduction of the intergovernmental fiscal system, the functions committee approach was abolished in favour of global provincial budgets determined through provincial equitable shares as required by section 214 of the Constitution of South Africa.

b) Provincial Equitable Share Formula: Health Component

As indicated above, provinces receive an equitable share (referred to as the provincial equitable share or PES) of nationally raised revenue to meet their expenditure responsibilities as defined in section 214 of the Constitution of South Africa. The division of the PES is based on a formula that uses objective data and is updated annually. According to the 2019 Division of Revenue Act, the formula has six components which include, among others, the health component with a weighting of 27 per cent of the total

provincial allocation. However, the health component weightings do not directly translate into allocated budgets for health in provinces, as the intergovernmental fiscal system has assigned expenditure allocation responsibilities to provincial legislatures (Ajam, 2014; Eagar et al., 2014). The component has two sub-components. These are the risk-adjusted sub-component, which accounts for 75 per cent of the total component weighting, and a facility output component accounting for 25 per cent according to the 2019 Division of Revenue Act. The risk-adjusted sub-component is only based on the uninsured population, while the facility output takes into account (unaudited) utilisation data reported by health facilities which may be subjected to manipulation (Diderichsen, 2004).

The National Health Act strives to achieve as great a level of equity as possible. Measuring inequalities in health is a complicated exercise as there are no standard prescribed methodologies for doing so. There are however guiding principles, which firstly prescribe that healthcare should be equally accessible to people at equal risk; and secondly, that avoidable inequalities in public health care provision should be eliminated (Asthana & Gibson, 2008). Therefore using the uninsured population alone may not be sufficient to achieve equity objectives if the risk levels among different groupings are not adequately accounted for (Zere et al., 2007).

c) Work on the Risk Equalisation Fund in South Africa

A Risk Equalisation Fund (REF) for medical schemes was proposed in South Africa in 2004 as first a step towards social health insurance. This came as result of the work done by the REF Task Group that was established as a joint initiative by the national Department of Health and the Council for Medical Schemes. The REF aimed to implement a centralised fund to ensure that the cover provided by medical schemes for prescribed minimum benefits is the same across the industry (Leon & Mabope, 2005). The REF was intended to ensure that medical scheme funds did not compete on the basis of risk selection (i.e. the health status of individuals), but rather on the cost-effective delivery of healthcare (McLeod et al., 2004). As a result, medical scheme that would be able to reduce the cost of delivery services would have been expected to retain that benefit for their members, which would have resulted in low contributions for the minimum

benefits. Those that would not be able to lower delivery costs to the industry community rate, determined by REF, would have needed to have higher contribution rates than their competitors.

The risk or needs factors that were analysed for possible inclusion in the REF by task team members were as follows (McLeod & Grobler, 2008:11):

- Age and gender.
- The 25 Prescribed Minimum Benefits Chronic Disease List (CDL) conditions.
- HIV/AIDS (provided the beneficiary is receiving anti-retroviral therapy according to the national guidelines).
- An additional factor for multiple chronic conditions with provision for 2, 3, or 4+ simultaneous chronic conditions.
- A retrospective factor for maternity events, defined as the delivery of a single/multiple foetus, either stillborn or alive.

The indicators were grouped into three categories, namely demographic factors, diagnosis-based risk factors (25 CDL diseases, other chronic diseases, cancer, births/deliveries), and mortality. In deciding on factors for inclusion in the formula, the task group followed two distinctive steps, namely testing individual factors against the principles for the choice of risk factors as well as testing the proposed factors to determine their relative predictive power based on the available data sets (McLeod et al., 2004).

After robust testing of the data through statistical models, the final needs factors chosen for the REF were age, pregnancy/maternity, and 25 CDL conditions plus HIV and AIDS, as well as an adjustment for the number of chronic conditions that a member has. Mortality and ethnicity were dropped, because they proved not to be viable and the latter did not provide significant predictive power based on their models. However, they acknowledged that the principles that guided their choice of needs factors included availability of data, which were collected by medical aid schemes. As stated by McIntyre and Anselmi (2015), relevant data is often in short supply in most of the government funded healthcare systems, especially in the Southern African Development Countries (SADC) region.

On the Prescribed Minimum Benefits, while they are aimed at improving access to affordable healthcare, Perumal-Pillay and Suleman (2020) argues that their structure has been perceived as unsustainable due to their higher base cost of cover. They further argues that they are preventing the medical schemes from designing their own affordable packages/ covers may not be compatible with the future health reforms relating to the implementation of universal health coverage, especially as it relates to exposing user to financial hardships. The same concerned was also raised by Taylor et al. (2007), arguing that there were concerned that have been failing to meet their key objective such as the promotion of efficiencies in the allocation of private healthcare resource as well as being expensive to growth of promote medical schemes.

2.4.5. Motivation for Selection of Indicators for this Study

Equal access, as defined by Rice and Smith (2001), implies that resources should be distributed according to healthcare needs only, and the expenditure allocations should be informed by the needs factors that have a material influence on the needs. Currently there is no gold standard that exists for the choice of needs indicators. The models and needs indicators that researchers use in the formulae vary considerably (Kephart & Asada, 2009).

Rice and Smith (2001: 94) have identified six reasons why the selection of appropriate needs factors for the needs-based formula is such a complex and controversial process (Rice & Smith, 2001: 94):

- Relevant data are often in short supply.
- Research evidence on appropriate need factors is sparse, dated, or ambiguous in its implications.
- It is very difficult to establish the extent to which a particular needs factor is independent of other needs factors, that is, in handling covariance between needs factors.
- It is difficult to disentangle legitimate needs factors from other policy and supply influences on utilization.

- It is often difficult to identify the healthcare costs associated with a proven needs factor.
- The recipients of devolved budgets often feel they have a clear idea about which need factors would favour their plan, and so will seek to influence the choice of factors through the political process.

Therefore, different needs factors are summarised into seven broad categories, namely demography, ethnicity, employment, geographical location, mortality, morbidity and social factors. It has been argued that, when taking a final decision on a needs factor, it should be important to only include those that are universally recorded, consistent, verifiable, free from perverse incentives, relatively invulnerable to manipulation, consistent with confidentiality requirements and, most importantly, plausibly determinative of service needs (Rice & Smith, 2001; Kephart & Asada, 2009; McIntyre & Anselmi, 2015).

The following indicators are most popular, used in many countries and may be suitable to develop the needs-based formula towards establishing equity in public healthcare funding across provinces in South Africa:

a) Population

Population is the primary indicator for health needs (Rice & Smith, 2001; McIntyre & Anselmi, 2015). Population size should however be weighted for the ability of the people to afford health care costs, as well as their dependency on public health services (Zere et al., 2007). The purpose of a capitation system in the context of healthcare funding is to effectively place a set price on every member of a population (Rice & Smith, 2001). Therefore, the relevant population in the public sector context would be people without medical aids or insurance. The 2018 General Household Survey indicates a significant part of the population (83.6 per cent) in South Africa are without medical coverage (Statistics South Africa, 2018:119).

Rice and Smith (2001) have also argued that it is important that data for selected indicators are universally recorded and are plausibly determinative of service needs. The

uninsured population is annually available through data from Statistics South Africa and the Council for Medical Aid Schemes.

b) Age and sex characteristics

Though the uninsured population size is the primary indicator for public health services' needs, as mentioned above, it should also be weighted by a range of other indicators influencing certain critical health needs, based on their characteristics and level of risk (Zere et al., 2007). This needs factor is popular amongst most health schemes in the world, due to the strong patterns of health expenditure with age and sex characteristics (Maharaj, 2016). Health need seem to be very high in under one children as their immune systems are still developing and have to be under the observation of a medical practitioner frequently. This is the same for the older group from 65 years of age and above, due to their compromised immune system as well as other chronic diseases associated with old age. Women of child bearing-age should also have a greater need to access health care services than their male counterparts during the reproduction period.

Furthermore, women in general incur higher costs of healthcare due to their greater use compared to their male counterparts and are likely to be poorer than the latter as a result of gender-based inequalities (World Health Organization, 2009).

c) Burden of Disease related indicators

Morbidity and mortality rates (crude and standardised) are often used as a proxy for burden of disease in many health schemes across the world as a risk-adjustment factor (Rice & Smith, 1999). According to the 2016/17 district health barometer, South Africa has a quadruple burden of disease which includes non-communicable disease, and high HIV prevalence as well as a high levels of injury and interpersonal violence.

Rice and Smith (2001) have rated morbidity as a very reliable needs factor for risk adjustments in terms of data consistency, verifiability and vulnerability to manipulation. Mortality rates (crude and standardised) are rated highly in the study as well and are linked to premature death. Premature deaths are considered to be a measure of population health, are widely used as the needs factors associated with burden of disease

and are frequently defined as death before the average life expectancy rate of a country (Murray, Lopez, & World Health Organization, 1996).

Mortality indicators are often regarded as a good measure of the cumulative social and health experience of people living in an area and a sensitive indicator of general health care need. This indicator is argued to be reliable, accurate and routinely available, and to provide a timelier indicator of relative need than indices derived from census data; and it is independent of suppliers of health services (Mays, 1987; Mays & Bevan, 1987; Sheldon et al., 1993). However, the REF excluded mortality as an indicator in their proposed formula which opted for the 25 PMB CDLs (including HIV and AIDs) as a more viable indicator. This list has since been expanded to 26 PMB CBL (Govuzela, Thsehla, & De Villiers, 2018). The South African Demographic and Health Survey 2016 was recently published, providing information on self-reported chronic conditions by province. There is also statistically available data on the causes of mortality by province in South Africa, which is also linked to chronic conditions.

d) Cost of delivering services (e.g. attraction of staff, etc.)

Adjusting for sparsity in geographic locations is important and is also used in many schemes such as Australia, Canada, Finland and some countries in the SADC region, though it is not directly link to health needs factors, but rather the differential cost of delivery services (Rice & Smith, 2001; McIntyre & Anselmi, 2015; Zere et al., 2007).

The Organisation for Economic Co-operation and Development (OECD) (2015) as well as Eagar et al. (2014) raised issues such as lower density populations, larger distances travelled by both users and providers of services and lack of economies of scale due to small number of people in some locations as the main differentiated cost drivers for delivering services between rural and urban areas. Data from Statistics South Africa on density reflects significant differences in population density with provinces such as Gauteng having a high number of people per square metre at 785 compared to the Northern Cape which has the lowest at just 3 people (Alexander, 2018). The funding formulae should offer means to balance geographic disparities based on legitimate

factors which reflect genuine variation in needs as opposed to the variations from manipulated, supplier induced discrepancies in the expenditure of certain health services (Penno et al., 2013). A study by Kotzee and Couper (2006) on the retention of medical professionals in the rural areas of Limpopo has found that part of the problem is the lack of incentives provided by government to attract these professionals to remain in remote and rural areas. A study by Palmer, Appleby, and Spencer (2019) for the NHS on rural healthcare has also found similar issues in South Africa relating to the cost of providing health services in rural and remote areas, such as difficulty in staff retention, higher travel costs and difficulties in realising the economies of scale.

e) Deprivation indicators associated with health outcomes

McIntyre, Muirhead and Gilson (2002) have found that the deprivation of certain resources in South Africa is concentrated in specific geographical areas and there is also correlation with ill-health. They found that access to piped water is a very important indicator that should be taken into consideration when resource allocation is made to small geographic areas. If people do not have access to clean water, they are likely to be exposed to diseases caused by bacteria and viruses. The South African Human Rights Commission's 2014 investigation on the lack of access to water and sanitation found that there were some health implications for affected communities, such as diarrheal diseases due to poor hygiene. They also found that the vulnerable groups in rural areas are mostly exposed and are at risk due to both lack of proper water and sanitation and are likely to frequent health facilities as a result.

Health schemes that used needs-based formulae in the SADC region, such as Namibia and Zambia, have included access to clean water as an indicator in their formulae (McIntyre & Anselmi, 2015). However, this indicator is not popular in the 20 health schemes of high income countries (Rice & Smith, 2001). The 2018 General Household Survey has shown that approximately 89 per cent of households in South Africa have access to piped water with many provinces comparing fairly to the national average (Statistics South Africa, 2018:41). However, with regard to sanitation, provinces such as Limpopo and Eastern Cape have significantly lower percentages of households with

proper sanitation compared to the national average (83 per cent), at 67.6 per cent and 58.9 per cent respectively (Statistics South Africa, 2018:48).

Herdman et al. (2016) also empathises a stronger negative relationship between poverty and the health status of the people. Poverty is said to increase the chances of poor health which, in turn, traps communities in poverty. However, an adjustment can be made in the formula to include a poverty index, using the households in the lowest deciles. There are schemes such as the Netherlands, Belgium, England and New Zealand that also use employment and disability status such as pension age, permanent illness and inability to work as the risk adjustment indicators (Rice & Smith, 1999; Rice & Smith, 2001). It has become clear that some of these indicators are more vulnerable and exposed to manipulation or misreporting.

2.4.6. Demand-based Services and Cross-provincial Border Flows

Spill-over effects, such as patient flows between provinces/regions, are realities in the health systems across the world (Penno et al., 2013). According to them, not many health systems in developed countries are adjusting for this in their formulae. The problem could be reasonably addressed through other funding mechanisms such as supplementary grants. For example, in New Zealand, the formula makes an adjustment for overseas visitors based on the actual extra cost incurred by the District Health Boards (Chester, Penno, & Gauld, 2018). As previously explained, in this study the burden of disease index in the formula discounts for HIV and AIDS and TB, as funding for these diseases is largely distributed on the basis of actual numbers for treatment through supplementary conditional grants according to the 2019 Division of Revenue Act.

2.5. EQUITY IN HEALTH FINANCING: A LOOK AT THE ROLE OF FISCAL REGIMES (CENTRALISATION AND DECENTRALISATION)

Fiscal regimes have produced ongoing restructuring across the world, especially in relation to how public resources should be better distributed in order to address the regional disparities (Jimenez & Smith, 2005). These systems range from the full centralisation to full decentralisation of functions and, therefore, resource allocations are expected to consider how functions are allocated across different levels of the health

system (Sreeramareddy & Sathyanarayana, 2013). They argue that centralisation allows for greater control over resources and direction adopted by hospitals, while decentralisation places this control in the hospitals and clinics. They indicate that a health system can combine both centralised and decentralised characteristics, where regional authorities have complete authority over the primary healthcare functions despite the central government been responsible for resource allocation.

The intergovernmental framework in South Africa is outlined in schedule 4 of the Constitution and assigns the health function to the three spheres of government, with the central government responsible for national policymaking while the majority of health functions are assigned to provinces in terms of the National Health Act of 2003. The assignment of functions guides the allocation of public resources in terms of section 214 of the Constitution. The intergovernmental fiscal system, also referred to as fiscal decentralisation, is a public finance structure with more than one tier of government with both revenue raising and expenditure allocation responsibilities allocated among these levels (Ajam, 2014). Arguments have been raised in the literature that the distribution of the publicly funded healthcare system may not be equitably allocated within such systems if proper norms and standards are not put in place. Given that there is a lack of proper mechanisms in South Africa to guide provincial legislatures and executive committees in allocating funding across functions in the provinces, there is a need to develop a framework that will consistently measure whether the resources are equitably distributed (McIntyre & Gilson, 2002).

McIntyre et al. (1999) also stresses that the adoption of the intergovernmental fiscal system in South Africa sort of reversed the gains made with the distribution of health resources, as the most under-resourced provinces such as Limpopo, Eastern Cape and North West Province failed to negotiate for a fair share of the health budgets from their provincial legislatures and executive committees; hence the need for guiding norms and standards that would promote equity in public health funding. They further argued that the abolished function committee's population-based formula, which was a sector specific needs-based formula, despite being crude was a much better mechanism, since it

allowed public resources to be directed to populations that rely heavily on the public health system.

The OECD (2015) argues that expenditure on health priorities in fiscal decentralisation is often dependent upon the budgetary decisions taken by the sub-national governments, which might distort efforts for the equitable distribution of health services across regions. They emphasise the need to strengthen the system so that central government retains some ability to influence how resources are allocated at regional level.

The argument for fiscal decentralisation emphasises that sub-national governments are closer to the people and, therefore, have a better understanding of their need for services with accountability being at that level (Oates, 2005). Ter-Minassian (1997) also acknowledges that there is broad consensus in the literature that the decentralisation of spending responsibilities can generate many gains in efficiency, as well as effective distributions of resources to communities.

McLure (1995) argues that the issue should not be about the functions or responsibilities that are better centralised or decentralised, but rather about intergovernmental cooperation being strengthened through various mechanisms such as service level agreements, formal agreements between the levels of government, the issuing of guidelines and enforceable norms and standards. Mitchell and Bossert (2010) have taken a conservative approach to the issue of decentralisation and resource allocation. They argue that from a governance perspective, it may be the right thing to do to implement certain policies such as health in a decentralised system, but only if good governance is embraced. However, they indicate that there may be a need to earmark resources for certain areas to ensure equity, and that the central government should provide the necessary support and mechanisms as guidance to sub-nationals with regard to resource allocations.

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. RESEARCH APPROACH

A quantitative approach was used in the study in order to develop a framework to answer both the primary and secondary questions of this research. The research approach to this study employed statistical techniques to analyse secondary data that were gathered for each of the needs-based indicators selected. The objective of this research is to develop a quantitative framework that will be used to measure the distribution of health resources across provinces. The aim is to attempt to answer the primary question of whether public health services are equitably distributed in South Africa when public expenditure is used as a proxy.

Needs-based formulae have been touted in literature as the reasonable, accurate measures that can be used to measure equity in the distribution of health resources across geographical regions (Rice & Smith, 2001; Ensor et al., 2012; McIntyre & Anselmi, 2015). Therefore, the needs-based formula approach was adopted in the study as a quantitative framework for developing the criteria that were used to measure whether resources are allocated relative to the needs and, should there be disparities, whether these are narrowing or widening over the 2019 Medium Term Expenditure Framework (MTEF) period.

The literature also suggests that there are no standard ways of choosing the needs factors/indicators that are included in the formula. However, they should be selected in such a way that perverse incentives are not created, or rather the bias of each indicator towards certain regions is avoided. Therefore, for the purpose of this study the selected needs-based indicators will first be tested based on the following (Rice & Smith, 2001):

- To determine whether there is a significant difference or pattern of healthcare expenditure for each risk factor.

- Then to consider whether such a factor can be reliably and consistently measured with the data available.
- To determine whether there are significant differences between provinces with regard to that factor.
- To analyse which incentives were created by including each risk factor in the formula.

3.2. PROCESS FOR DEVELOPING THE QUANTITATIVE FRAMEWORK

3.2.1. Selection of Needs Indicators and Justification

Selecting appropriate indicators for the formula has generated considerable debate among stakeholders in the health schemes, with some arguing for the inclusion of indicators that would particularly favour their area (McIntyre & Anselmi, 2015). Rice and Smith (2001) have stressed the importance of avoiding the selection of indicators that can be manipulated, while also ensuring the availability and reliability of the data used. This section provides the selected indicators as well as the criteria applied. Furthermore, the motivation for the selection of each indicator that would be suitable to develop the quantitative framework, is provided (refer to Table 7).

The selection of indicators was guided by the literature with regard to those that are popular in different formulae among health schemes internationally. Population which is discounted by the insured persons, is the main indicator across all the formulae. The other common indicator is the weighting of the population by the age and sex characteristics of the different groupings. Other indicators that were chosen, are standardised mortality rates which represent a burden of disease, as well as access to water as a single indicator representing the deprivation index. Motivations for the selection of these indicators are provided below. Rice and Smith (2001) further stressed that data on the indicators chosen should be centrally collected, verifiable and not be subjected to manipulation. Therefore, Table 7 below reflects the process that was followed in selecting the indicators of need.

Table 7: Process followed for the selection of needs indicators for this study

Aggregated indicators/ Main formula components	Needs factors chosen	Justification (supported by the literature)	Data availability and sources	Is data centrally collected?	Can the providers manipulate the data?
Population	Total uninsured population by province	Primary indicator of health needs. Common across all the surveyed schemes. Insured population is discounted as suggested by the literature.	Data annually through General Household surveys	Yes- by Statistics SA	No
Age and sex	Age and sex	The literature supports that health needs vary according to age and sex, e.g. infants, the elderly and women of child-bearing age have higher health needs compared to their counterparts.		Yes- by Statistics SA	No
Burden of Disease (BoD)	Standardised Mortality Ratio (SMR)	Mixed reactions in literature on the use of mortality as a proxy for burden of disease. Those that argue for it indicate that it is reliable and data are always available. This is mainly linked to premature deaths.	Mortality and causes of death in SA - 2016 report	Yes- by Statistics SA	No
	Chronic Diseases List (CDL)	The REF task group strongly recommends the inclusion of CDL instead of mortality as the main indicator representing BoD. This is a very good indicator as it takes into account the actual number of people who are consuming the health services. However, the reliable data are not readily available by age and sex. Data that are available are crude and based on self-reported cases.	Demographic and Health Survey 2016	Yes- National Department of Health, Statistics SA and SAMRC	No
Socio-economic or Deprivation indicators	Access to clean water and sanitation	Deprivation of clean water and proper sanitation has been linked to poor health	2018 GHS	Yes- by Statistics SA	No

a) *Population-related needs indicators*

Population, age and sex are the most obvious criteria that have been adopted universally across many health schemes due to their stronger association with expenditure (Penno et al., 2013). Data on the uninsured population, as well as the age and sex groups, are universally recorded through Statistics South Africa's General Households surveys, as well as the Council for Medical Aid Schemes, in terms of those who are insured. Therefore, this data is readily available and would be reliable for measuring equity between provinces.

b) *Burden of Disease indicators*

The health system in South Africa is confronted with serious challenges relating to the double burden of infectious and chronic diseases. Both communicable and non-communicable diseases, coupled with injuries as well as trauma, continue to prevent faster development and affect human development in general (Makube, 2012). Therefore, the burden of disease remains one of the cost drivers for provincial health budgets, as well as their capacity to cope with the pressures. However, in order to avoid creating unintended incentives within this needs factor, there is a need to preclude the effect of the prevalence of certain diseases such as HIV and AIDS, as well as TB, from the indicator as they are demand driven based and are therefore funded from the earmarked conditional grants as per the 2019 Division of Revenue Act.

Standardised mortality ratios (SMR) are often regarded to be the reasonable measures of mortality. SMR is the number of observed deaths in a population group as compared to the number that would be expected if the population group had similar specific rates as the standard group (Indrayan, 2012). According to Health (2008), the ratio is calculated as follows:

$$SMR = \frac{\text{observed number of deaths}}{\text{expected number of deaths}} \times 100$$

The expected deaths are obtained by applying the national age-specific death rate (ASDR) to populations in different age groups. The ASDR is determined by looking at the deaths in each age group per 1000 persons (Indrayan, 2012). Death from certain causes

such as HIV and AIDS, and TB will be discounted in order to avoid double counting since they are funded from the earmarked allocations. In terms of the calculation of the SMR for South Africa, data is available from the latest statistical release for 2016 on mortality and causes of death in the country, which was released by Statistics South Africa in 2018.

Due to the high prevalence of disease burden, the Medical Schemes Act makes it mandatory for medical funds to cover costs related to the PMB, regardless of the benefit option (Govuzela, Thsehla, & de Villiers, 2018). Prescribed Minimum Benefits include medical conditions that are regarded as an emergency, as well as the 26 CDL. Therefore, the inclusion of the CDL instead of mortality as an indicator that represents the burden of disease, does make significant sense due to the fact that it takes into account the actual number of people who are consuming the health services on a long-term basis. However, there is an unavailability of data by age and sex groupings per province, so therefore the SMR was used as a single indicator representing the disease burden.

c) Socio-economic and deprivation related indicators

The literature has found that there is a stronger correlation between certain socio-economic and deprivation indicators and health outcomes. Poverty and access to critical services such as water and sanitation have been linked to health outcomes and were found to be concentrated in certain geographical areas in South Africa (McIntyre et al., 2002; Herdman et al., 2016; McIntyre & Anselmi, 2015). The determination of deprivation indices requires that a principal components analysis (PCA) be conducted, where different socio-economic variables are summarised into one index that would represent the level of deprivation present in each province (Maharaj, 2016).

There are calculated deprivation indices available from the Health Systems Trust for each of the nine provinces (Maharaj, 2016), though the indicator data used come from the 2007 Community Survey and the General Household Survey, which are the latest available exercise conducted. However, a less complicated indicator of socio-economic status was developed by McIntyre et al. (2002). Their study examined the development of a composite deprivation index in order to inform the way in which resources should be allocated in small geographic locations. The study identified a way of developing a single indicator of deprivation that could be used instead of a composite deprivation index using

PCA methods. They found access to piped water in households to be the variable that is highly correlated to the composite deprivation index. The strong argument is made that people who lack access to clean piped water are likely to carry disease-causing micro-organisms on their hands and are likely to spread viruses and bacteria to others in the same households

Furthermore, data on access to piped water is easily available through General Household surveys, and they are more recent and can be easily verified. Therefore, the access to clean/piped water indicator will be used as socio-economic indicator for each province.

d) Adjusting for differential cost of delivering services (e.g. attraction of staff, etc.)

Needs-based formulae should also aim to balance geographic disparities. However, it has been found in the literature that there are often difficulties of distinguishing appropriate factors that reflect genuine variations relating to supplier induced discrepancies in expenditure (Penno et al., 2013). They assessed various schemes in developed countries and found only five where the formulae adjust for geographic sparsity. In order to make provision for differential costs of services, the proposed formula could make provision for a subjective allowance of 5 per cent of the total health allocation to address the problem or adjust the formula by the sparsity index or rurality index, as rural areas are often experiencing the higher costs of delivering the services (Palmer, Appleby, & Spencer, 2019). Other practises such as the Welsh resource allocation formula which uses, amongst others, the road length per 1 000 population to make adjustments for the sparsity index, were explored in the study (Gordon et al., 2001). There are many associated costs relating to sparsity in the delivery of health services

According to the United Kingdom Department of Health's 2011, seventh edition, paper on resource allocation, the weighted capitation formula makes provision for Market Force Factors (MFF) to allow for regional variations in costs that are unavoidable. The MFF has various components such as the cost of staff, cost of land and buildings and general practitioners' pay, and uses actual recorded data to calculate the differentiated costs. Currently there are no meaningful data available that measure the impact of geographic

locations in expenditure for health services in South Africa (McIntyre & Anselmi, 2015). However, data from the 2016/17 district health barometer support the fact that the delivery of health services in sparse populations may be expensive, compared to those in the highly densified areas. Data have shown that the per capita expenditure on the uninsured population in less densified health districts such as the Central Karoo, Namakwaland and uMzinyathi, among other small districts, is almost three times more than that of highly densified areas such as the Johannesburg, Ekurhuleni and eThekweni Metros. Despite the indicator being important, given the uncertainties with regard to the availability and reliability of the data, at this stage it will not be considered in the formula.

3.2.2. Weighting of the Uninsured Population by Selected Indicators of Need

The study employed the formula also applied by the NHS to derive the equity targets for the provinces. This was used to assess and measure how public resource allocation from health in the provinces deviates from each of the equity targets. A separate index was generated for each of the selected indicators, which is age and sex, disease burden, and deprivation indices (Department of Health, England, 2008). Each province was given an index value on the adjustment, relative to the national average which is equivalent to one. Index values above one show estimated need above the national average while below one show the opposite. The computation of the formula according to AGRA was as follows (Textbox 1):

Textbox 1: The computation of the formula according to AGRA was as follows

- ***Weighted uninsured population = Uninsured population multiplied (x) by age and sex index multiplied (x) by burden of disease (SMR) index multiplied (x) by deprivation index.***

The Scotland Resource Allocation Committee defined an index as the estimated cost per head for healthcare in an area or region divided by the national average cost per head. An example of the age-sex index in this case is the projected costs per head in a province, taking into account the age and sex characteristics of the provincial population, divided by the national average costs per head.

McIntyre and Anselmi (2015) have also developed guidelines on how needs-based indicators can be weighted and applied in a formula which was considered to be an alternative option. Their option of calculating the indices or the overall equity targets uses the outpatient utilisation data for each province instead of projected costs per head. They also indicate the importance of dividing the provincial utilisation rates by the national utilisation, as this could be used to estimate the provincial utilisations if there is comparable access to healthcare across regions. The calculation of equity targets for provinces using McIntyre and Anselmi's approach is expressed in **Textbox 2** below:

Textbox 2: Calculations of equity targets according to McIntyre and Anselmi (2015)

Calculating the weighted population for each province

- Step 1: Obtaining age and sex disaggregated population and national average outpatient utilisation rate data for each province.
- Step 2: Normalising the average national outpatient by dividing the rate for each of the group (age and sex) by the lowest rate.
- Step 3: Thereafter the weighted population is calculated by multiplying the population for each group by the normalised utilisation rate relevant to that group.

Weighted population for burden of disease.

- Step 1: Obtain standardised mortality ratio (SMR) for each province.
- Step 2: Normalise the SMR by dividing the ratio for each of the group (age and sex) by the lowest ratio.
- Step 3: Thereafter multiply the weighted age and sex population for each province by the normalised disease SMR for that province.

Weighted population for deprivation indices is calculated as follows.

- Step 1: Determine the deprivation index (access to clean water) for each province.
- Step 2: Then normalise the deprivation index for each province by dividing it by the lowest index.
- Step 3: Then multiply the weighted age and sex population for each province by the normalised deprivation index for that province.

The equity target allocation for each province is then calculated by dividing each province's weighted population for age and sex, SMR and deprivation by the total national weighted population.

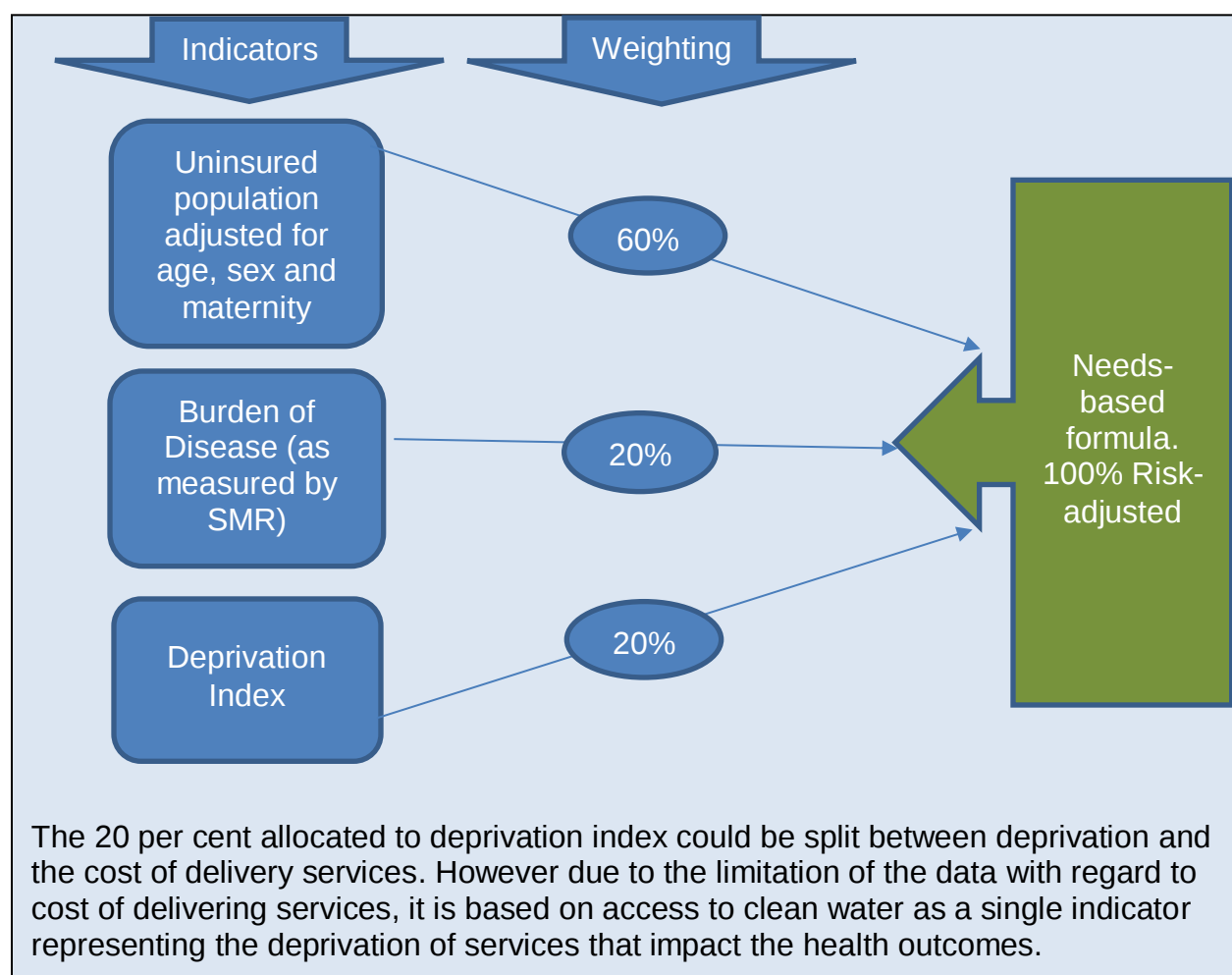
3.2.3. Weights Attached to Selected Needs Factors

Some of the challenges with needs factors, other than selection, include the weighting of each indicator in order to arrive at an appropriate formula that would promote equity and fairness. Smith (2008) stresses the importance of the continued refinement of the formulae if the funding principles are to continue to receive the necessary public and political support.

Holtham's (2010) report on the independent commission on funding and financing for Wales acknowledged the difficulty in the choice of weights to attach to each of the selected needs factors/indicators. Holtham argues that the choices are often based on statistical analysis or merely judgement and/or negotiations. Holtham continues by suggesting that the statistical techniques also rely on judgement in terms of the data to be used and how they would be analysed. The boundaries between the needs and the state policies should also be considered. In New Zealand, according to the Ministry of Health, the cost of weights is determined through statistical techniques which disaggregate population according to age, sex, ethnicity and deprivation and determine the expected per capita cost using the data from the national health index database (utilisation data).

Maharaj, Robinson and McIntyre (2018) and McIntyre and Anselmi (2015) advise that both the mortality and socio-economic indicators be given a weight of either 0.1 or 0.2 in order to avoid heavily skewed resource allocations across provinces. **Textbox 3** below represent the structure of the need-based formula that was used in this thesis. Both the mortality (SMR) and the deprivation indicators were weighted at 0.2.

Textbox 3: Structure of the formula and the weightings



3.2.4. Adjusting the Uninsured Population by Age and Sex Characteristics

There is currently no utilisation data by age and sex grouping that has been published. Therefore, estimates had to be determined using a combination of the primary health care headcounts, patient-day equivalents and percentages of people who suffered from illnesses by age group during the 2011 census. For example, if 20 per cent of the people who suffered from illness were coming from age band 0 to 5 years, then that percentage was used to estimate primary health care utilisation and hospitals' patient day equivalents for that age grouping. After the estimated utilisation rate was determined, the estimation techniques as presented in **Textbox 2** above were applied.

In adjusting for the sex characteristics, and in particular maternity, the average birth rate per province for age band 15 to 49 was also obtained from the 2011 census data. The 2011 census data was used due to the unavailability of any other recent statistical data containing this information. The rate was used to estimate the health needs related to maternity for each province. The average parity rate was then used to multiply the female uninsured population for age group 15 to 49 to determine their additional health needs related to maternity. **Textbox 4** below indicates the technique used to calculate the utilisation rates and the average parity rates relating to maternity.

Textbox 4: Criteria for determining the utilisation rates and average parity rates (maternity)

Utilisation rates by age and sex

- Uninsured population was divided by outpatient data for each province to obtain the utilisation rates as per McIntyre and Anselmi approach.
- Uninsured population was disaggregated by age and sex using GHS and Council for Medical Aid Schemes data.
- To estimate utilisation data by age group, the 2011 census data was used. This data shows population that suffered illnesses by age group. A percentage for each age group was determined and therefore was used to disaggregate the utilisation data by age group.

Adjusting for sex characteristics (maternity)

- Average parity rate by age group per province was obtained from the 2011 census data.
- The average parity rate were normalised and used to estimate the maternity needs for each province on the female age group 15 to 49

Once all these rates were established, the methodology in **Textbox 2** was applied.

3.2.5. Calculating Standard Mortality Ratio and Deprivation Indices

This sub-section shows the process that was followed in calculating the indices for SMR and deprivation.

Standardised mortality ratios only included death that relates to burden of diseases. Deaths related to natural and other causes were discounted. Data on the chronic conditions list by age and sex grouping are not available and, therefore, the SMR was used as a single indicator representing burden of disease. The SMR was calculated by dividing the observed number of deaths by the expected deaths per province. To obtain the expected deaths per province, the population was multiplied by the age-specific death rate (per 1000 population) of the national population (Naing, 2000). The SMR Index was normalised, taking the lowest rate and then dividing other rates in each age group by this value.

On the deprivation index, access to clean water was used in the study as single indicator of socio-economic status relating to health needs. This data was obtained from the 2018 General Household survey. The index was calculated as a standard deviation from the average of households without clean water per province. Each province's index was calculated and compared to the national average which was given a value of one. The index above one shows the estimated needs above the national average, while a figure below one shows that they were below the national average (NHS, 1999). The Eastern Cape and Limpopo scored an index of 2.06 and 2.01 respectively, which shows that they have a significantly higher number of households without clean water compared to the national average.

Thereafter both the mortality and socio-economic indicators were given a weight of 0.2 in order to avoid heavily skewed resource allocations across provinces. However, as argued in the literature, there are no golden rules for the allocation of the weights and therefore they should be informed by policy decisions. **Textbox 5** summarises the criteria that was used to determine the SMR and deprivation indices.

Textbox 5: Criteria for determining the SMR and Deprivation Index

Standardised Mortality Ratio

- Observed number of death is equals to the total number of death related to burden of disease as provided in the statistical data.
- Expected number of death by age group were calculated by multiplying the population of that group by the national age-specific death rate per 1000 population.
- The average national-age specific death rate per 1000 population was calculated dividing the total population by the number of death and thereafter multiply by 1000.
- Once the data was obtained, the formula as explained above was applied.

Deprivation Index

- The deprivation index was calculated by looking at each provincial deviation from the national average of the number of household without access to clean water. The national average for number of household without access to clean water was 206 688 across provinces and this was indexed at 1.

3.3. PROCESS FOR ASSESSING HEALTH ALLOCATIONS RELATIVE TO THE NEEDS

The calculated equity targets for each province were used to answer two of the secondary questions, which were to assess whether health resource allocations are relative to the needs, and if not whether the allocation disparities are widening or narrowing over the 2019 MTEF. The following process was followed in applying the formula:

- a) With the quantitative framework finalised, total health budgets were determined using the estimates of provincial revenue and expenditure data published by the National Treasury. Some supplementary conditional grants that are currently funding the demand driven services, such as HIV and AIDS, were removed from the total allocation. Central hospitals were also excluded from the analysis, as they only exist in a few provinces and may distort the analysis.
- b) The equity targets determined by the quantitative framework for each province were compared with the 2019/20 adjusted budget to answer the question whether the

health allocations were distributed relative to the needs. The equity targets were also compared to the 2019 MTEF allocations to measure the level of deviations and answer the question whether the allocation disparities are widening or narrowing across provinces.

3.4. DATA COLLECTION AND ANALYSIS

Some of the principles of developing the needs-based formulae encompass the consistency, reliability and verifiability of the data that will be used for the formula. Rice and Smith (1999) highlight the importance of ensuring that the selected indicators rely on data that are universally or centrally recorded, in order to avoid manipulation and the creation of perverse incentives. This section details an overview of the data that was used to complete the study with regard to the sources as well as the availability. Most of the statistical data was sought from Statistics South Africa's surveys and other statistical releases. Budget and expenditure information was sought from the National Treasury databases and publications.

The uninsured population, by age and sex grouping, was obtained by subtracting the 2018 insured population. Data on the insured population was made available to the National Treasury by the Council for Medical Aid Schemes and this data was accessed. Overall population data, by age and sex, was obtained from the raw data of the 2019 Mid-year population statistics available from Statistics South Africa's website. The estimated national utilisation rates were calculated using the 2018/19 primary health care headcounts and patient day equivalents available in the National Treasury databases, as well as the 2011 census data on the number of people who were ill, by age group. The population was first weighted by the primary health care's normalised national utilisation rate by age group and thereafter by the hospitals normalised national utilisation rates using the criteria explained in **Textbox 4**.

Budget and expenditure data were sought from the 2019/20 estimates of provincial revenue and expenditure published by the National Treasury. Further information on medicines, medical supplies and laboratory service budgets was downloaded from the

Vulindlela system on the 18th of February 2019 with permission from the National Treasury to use the information. Permission was sought from the National Treasury to use any unpublished data relevant to the study (refer to Appendix C).

Data analysis was conducted mainly using Microsoft Excel. Expenditure data and statistical surveys come from different sources, as listed above, and these were converted to Excel to generate the graphs and tables used for analysis. The calculated provincial allocations based on the selected indicators are presented in Chapter Four of this study. This helped in demonstrating whether the health allocations are on par, above or below the calculated equity target allocations.

CHAPTER FOUR

4. PRESENTATION OF RESULTS

4.1. INTRODUCTION

This chapter presents the results with reference to the main purpose of the study which was to assess whether public health resources are equitably distributed when expenditure is used as a proxy. The chapter also presents the results of the quantitative framework that was developed to assess public health allocations across provinces relative to the need. Furthermore, the results of the assessment on whether the allocation disparities (if any) are either widening or narrowing over the 2019 Medium Term Expenditure Framework (MTEF) period are also presented.

The methodology used as discussed in chapter three requires that the uninsured population of each province be disaggregated for age and sex groupings. Thereafter, the national utilisation rates for hospitals and primary healthcare is normalised by taking the lowest rate and then dividing other rates in each age group by this value. Then the weighted population is determined by multiplying the population of each province (age and sex grouping) by the normalised rate. The population was also adjusted for maternity using the normalised parity rate per province for ages band 15 to 49 obtained from the 2011 census data. Each province's share of the weighted population was then calculated.

Other indicators of needs such as standardised mortality rates (SMR), as well as the deprivation index (using clean water as the only indicator) were determined and the weighted population adjusted accordingly.

4.2. RESULTS OF THE CRITERIA USED FOR ASSESSING EQUITY IN HEALTH ALLOCATIONS ACROSS PROVINCES

Table 8 below presents the quantitative framework that has been developed in order to assess equity in health allocations across provinces, and attempts to answer the first secondary research question. The needs factors were chosen after a thorough literature

review of the needs-based indicators, as well as the availability of data within the South African context.

The first criterion in line with the methodology used, was to weight the uninsured population by age and sex characteristics, with the latter relating mainly to maternity. The results are that the Eastern Cape's share of the weighted population decreased from 12.4 per cent to 12.2 per cent, while Gauteng decreased from 24 per cent to 22.9 per cent and KwaZulu-Natal's share decreased from 20.3 per cent to 19.9 per cent. Provinces that have gained after the weighting of the population by the expected age utilisation and sex are Limpopo whose share increased from 10 per cent to 11.4 per cent followed by the Western Cape from 10.6 per cent to 11 per cent and Mpumalanga with a slight increase of 0.1 per cent. Some of the driving factors for the decrease in the share of the weighted population in provinces such as the Eastern Cape and KwaZulu-Natal were the fact that they had a lower share of the female population of reproductive age between 15 and 49, relative to their total share of the uninsured population. Gauteng has a significantly lower share of the zero to nine years uninsured population at 18.8 per cent compared to its share of the total population. There are no changes in the share of the weighted population in the Free State, Northern Cape and North West Province.

The standardised mortality ratio was also chosen as one of the needs indicators in the development of the criteria for assessing equity in health allocations. This was weighted at 0.2, in line with the literature suggestions. When the uninsured population is further weighted for age and sex as well as SMR (as reflected in column H of Table 8), there are even more significant changes in the share of the population in most provinces. Eastern Cape's share of the weighted population decreases further to 12.1 per cent, representing a decrease of 0.3 per cent. Gauteng has the biggest decline on the share of the weighted population at 21.5 per cent compared to the initial share of 24 per cent. Western Cape's share declines slightly from 11 per cent to 10.8 per cent. All the other provinces' shares increase compared to the share of the initial uninsured population. Free State increases from 5 per cent to 5.5 per cent, Limpopo from 11.4 per cent to 11.6 per cent, North West Province from 7.2 per cent to 7.5 per cent and Mpumalanga from 8.2 per cent to 8.7 per

cent. The SMR were significantly higher than the national average of one (see column F) in provinces such as the Free State, the Northern Cape, Mpumalanga and North West Province. Hence, the share of the weighted population increased in those provinces.

The last needs factor that was added to the assessment criteria is the deprivation index, with access to clean water used as a single indicator of deprivation (refer to column I of Table 8). This was also weighted at 0.2 in line with the literature review. Eastern Cape, Limpopo and KwaZulu-Natal have significantly higher deprivation indices relative to the national average. The deprivation index in the Eastern Cape was at 2.06, Limpopo 2.01 and KwaZulu-Natal 1.91, deviating significantly from the national average of one. As a result, when all the selected indicators are applied in the equity assessment criteria the shares of the weighted uninsured population deviate significantly from the initial share of the uninsured population.

As a result of the deprivation index, the Eastern Cape's share of the weighted uninsured population, when all the selected indicators of needs are applied, increases from 12.4 per cent to 14.1 per cent, representing an increase of 1.7 per cent. KwaZulu-Natal's share increases from 20.3 per cent to 22.8 per cent and Limpopo from 10 per cent to 13.4 per cent. All other provinces have been affected negatively with their shares decreasing from the initial share of the uninsured population. Gauteng has a higher decrease with a weighted share of 19.4 per cent compared to the initial share of 24 per cent. This is followed by the Western Cape which decreases from 10.6 per cent to 8.5 per cent and Free State from 5 per cent to 4.6 per cent. Mpumalanga, Northern Cape and North West Province also experienced slight decreases (refer to column K of Table 8). Column K of Table 8 shows the final equitable share percentages that will be used to assess if the health resource allocations are equitably distributed based on the criteria presented above.

Table 8: Criteria developed for assessing equity in health allocation taking needs indicators, i.e. age and sex, SMR and deprivation indices, into account.

Columns	A	B	C	D	E	F	G	H	I	J	K
Provinces	Total Uninsured Population	% Share of Uninsured Population	Weighted Uninsured Population (Age and Sex)	% Share of weighted Uninsured Population (Age and Sex)	Standardised Mortality Ratio (SMR)	Normalised Standardised Mortality Ratio Index	Uninsured Population Weighted for Age and Sex, & SMR (Weighted at 20 %)	% Share of Uninsured Population Weighted for Age and Sex, & SMR (weighted at 20%)	Deprivation Index (Water)	Uninsured Population Weighted for Age and Sex, SMR (weighted at 20 %) and Deprivation Index (Weighted at 20 %)	% Share of Uninsured Population Weighted for Age and Sex, SMR (weighted at 20 %) and Deprivation Index (Weighted at 20 %)
Eastern Cape	6 067 276	12.4%	11 523 386	12.2%	0.97	1.28	12 178 537	12.1%	2.06	14 760 003	14.1%
Free State	2 426 465	5.0%	4 692 482	5.0%	1.43	1.89	5 523 774	5.5%	0.39	4 853 946	4.6%
Gauteng	11 713 116	24.0%	21 586 505	22.9%	0.76	1.00	21 586 505	21.5%	0.70	20 271 274	19.4%
KwaZulu-Natal	9 906 086	20.3%	18 732 657	19.9%	1.04	1.37	20 118 188	20.0%	1.91	23 784 165	22.8%
Limpopo	4 877 080	10.0%	10 724 415	11.4%	1.08	1.43	11 647 781	11.6%	2.01	13 995 467	13.4%
Mpumalanga	4 024 187	8.3%	7 743 293	8.2%	1.24	1.64	8 739 271	8.7%	0.85	8 484 646	8.1%
Northern Cape	1 065 875	2.2%	2 103 605	2.2%	1.39	1.84	2 457 423	2.4%	0.08	2 004 724	1.9%
North West Prov	3 504 160	7.2%	6 768 524	7.2%	1.17	1.55	7 516 241	7.5%	0.88	7 334 631	7.0%
Western Cape	5 180 272	10.6%	10 353 051	11.0%	0.93	1.23	10 827 535	10.8%	0.12	8 921 447	8.5%
Total (SA)	48 764 518	100%	94 227 918	100%		1	100 595 255	100%	1.00	104 410 304	100%

4.3. RESULTS OF THE ASSESSMENT OF HEALTH ALLOCATIONS RELATIVE TO THE NEEDS ACROSS PROVINCES

This section presents the results of the assessment made to compare the 2019/20 health budgets across provinces relative to the needs. The equity targets for each province are based on the uninsured population weighted for age, sex, and the SMR and the deprivation index as presented in column K of Table 8 above. The 2019/20 health budget is based on the 2019/20 adjusted estimates for each province Central Hospitals and HIV and AIDS will be excluded from the total health allocations for fair comparisons.

Table 9: Comparisons of the 2019/20 health allocations with the equity targets (Rands in thousands)

Columns	A	B	C	D	E (E= A-C-D)	F	G	H (H=F-G)
Province	2019/20 Total Adjusted Health Budgets	% Shares of the Adjusted Budget	Central Hospital Budget	HIV and AIDS Budget	2019/20 Adjusted Allocation (Excluding Central Hospitals and HIV and AIDS)	% Shares of the Allocations (Excluding Central Hospitals and HIV and AIDS)	Determined Equity targets	Deviations from Equity Targets
Eastern Cape	25 766 388	12.2%	1 251 004	2 399 693	22 115 691	13.6%	14.1%	-0.5%
Free State	11 250 345	5.3%	1 744 739	1 361 235	8 144 371	5.0%	4.6%	0.4%
Gauteng	51 578 819	24.4%	14 695 214	5 002 190	31 881 415	19.6%	19.4%	0.2%
KwaZulu-Natal	45 151 836	21.4%	2 501 712	5 840 628	36 809 496	22.6%	22.8%	-0.1%
Limpopo	20 912 484	9.9%	0	1 973 510	18 938 974	11.6%	13.4%	-1.8%
Mpumalanga	14 280 909	6.8%	0	2 020 620	12 260 289	7.5%	8.1%	-0.6%
Northern Cape	5 230 191	2.5%	0	638 370	4 591 821	2.8%	1.9%	0.9%
North West Prov	12 325 784	5.8%	0	1 505 271	10 820 513	6.7%	7.0%	-0.4%
Western Cape	24 852 039	11.8%	6 037 095	1 772 204	17 042 740	10.5%	8.5%	1.9%
Total	211 348 795	100%	26 229 764	22 513 721	162 605 310	100%	100%	

As previously mentioned, the HIV and AIDS budget is allocated based on demand while central hospitals exist in only four provinces, which may distort the comparisons if included.

The total 2019/20 adjusted budgets for health sectors across provinces amounted to R211.3 billion (refer to column A of Table 9). Gauteng accounted for a bigger share of 24.4 per cent, followed by KwaZulu-Natal at 21.4 per cent, Eastern Cape 12.2 and Western Cape at 11.8 per cent. Those with the lowest shares were the Free State with 5.3 per cent and the Northern Cape with 2.5 per cent. After the exclusion of Central Hospitals and HIV and AIDS, the percentages changed for most provinces (refer to column F of Table 9). Eastern Cape's share of the total allocation increases from 12.2 per cent to 13.6 per cent, followed by KwaZulu-Natal increasing from 21.4 per cent to 22.6 per cent and Limpopo from 9.9 per cent to 11.6. All the other provinces' shares are increasing, with the exception of Gauteng and the Western Cape. These two provinces account for six of the ten central hospitals that exist in the country.

Column G of Table 9 presents the equity targets that were determined after the weighting of the uninsured population by the selected indicators of health needs as reflected in Table 8. In Column H of Table 9, the equity targets (Column G) are compared with the proportional shares of the total 2019/20 budgets (Column F) for each province to determine the level deviations. Eastern Cape's share of the total health budget is at 13.6 per cent compared to the calculated equity target of 14.1 per cent, which represents a negative deviation of 0.5 per cent. Limpopo has a negative deviation of 1.8 per cent, followed by Mpumalanga with a negative deviation of 0.6 per cent, North West Province with a negative deviation of 0.4 per cent and KwaZulu-Natal with a negative deviation of 0.1 per cent. The negative deviations from equity targets show that these provinces are underfunded relative to the needs of the population.

Provinces that have higher shares compared to the equity targets are the Western Cape, with a share of 10.5 per cent compared to the determined target of 8.5 per cent. The Western Cape has a positive deviation of 1.9 per cent, followed by the Northern Cape

with 0.9 per cent, the Free State with 0.4 per cent and lastly Gauteng with 0.2 per cent. Provinces with positive deviations are adequately or highly funded relative to the needs of their populations.

Table 10 below further presents the implications of the calculated equity targets on the total budget for health in the 2019/20 financial year. The table also shows the levels of deviation from the expected equity in monetary terms for each province (refer to Column F).

Table 10: Impact of the equity targets on the 2019/20 allocations (Rands in thousands)

Columns	A	B	C	D	E (E= Total Budget X C)	F (F= E-A)
Province	2019/20 Adjusted Allocation (Excluding Central Hospitals and HIV and AIDS)	Proportional Shares of the Allocations	Determined Equity Targets	Deviations from Equity Targets	2019/20 Adjusted Budget based on the New Formula	Difference
Eastern Cape	22 115 691	14%	14.1%	-0.5%	22 986 763	-871 072
Free State	8 144 371	5%	4.6%	0.4%	7 559 381	584 990
Gauteng	31 881 415	20%	19.4%	0.2%	31 569 841	311 574
KwaZulu-Natal	36 809 496	23%	22.8%	-0.1%	37 040 708	-231 212
Limpopo	18 938 974	12%	13.4%	-1.8%	21 796 099	-2 857 125
Mpumalanga	12 260 289	8%	8.1%	-0.6%	13 213 720	-953 431
Northern Cape	4 591 821	3%	1.9%	0.9%	3 122 094	1 469 727
North West Prov	10 820 513	7%	7.0%	-0.4%	11 422 723	-602 210
Western Cape	17 042 740	10%	8.5%	1.9%	13 893 980	3 148 760
Total	162 605 310	100%	100.0%		162 605 310	0

Column E of Table 10 shows the ideal allocations for each province after the equity targets have been used to distribute the total health budgets. There are two provinces that are significantly affected when the equity targets are used, namely Limpopo and the Western Cape. With a negative deviation of 1.8 per cent from its equity target, the Limpopo health

budget deviates from its expected needs-based allocation by R2.8 billion. The Western Cape's current allocation is R3.1 billion more than expected when the equity target is applied. Northern Cape's share of the budget is also R1.5 billion higher than the calculated share based on its equity target.

Other provinces that show funding below the expected needs-based allocation are Mpumalanga with a shortfall of R953 million, followed by the Eastern Cape with R871 million, North West Province with R602 million and KwaZulu-Natal with the small amount of R231 million. Other provinces that are funded higher than their equity targets are the Free State by an amount of R585 million and Gauteng by the small amount of R311 million.

Thus, the results shows that the biggest trade-offs are between the Western Cape and Limpopo, with significant deviations from their equity allocations compared to other provinces. In all, the results also suggest that there are indeed levels of inequalities in the distribution of health resources across provinces. However, the deviations from equity in provinces such as Gauteng, KwaZulu-Natal, Free State and North West Province were not very significant compared to their current allocations.

4.3.1. Results of the Impact of the Equity Targets on Health Services

This sub-section presents the impact of the determined equity targets on health priority areas such as primary health care and hospital allocations, as well as critical items such as medicines, medical supplies and laboratory services. .

Table 11 shows the results of the analysis of how the equity targets impact the primary health care allocations across provinces. Provinces spend on aggregate R41.7 billion on primary health care, with the exclusion of HIV and AIDS expenditure. Provinces with the highest share of this spending are KwaZulu-Natal and Gauteng, followed by the Eastern Cape and Limpopo (refer to column C of Table 11).

With regard to deviations from equity, Limpopo has the highest shortfall at R991.7 million or a negative deviation of 2.4 per cent, followed by KwaZulu-Natal with R486.8 million

(or 1.2 per cent), Mpumalanga with R226.1 million (0.5 per cent) and the Eastern Cape with R148.7 million (0.4 per cent) (refer to columns D and F of Table 11).

Provinces that are funded above the calculated equity targets are Western Cape with an amount of R981.3 million, which represents a positive deviation of 2.4 per cent from the equity target. This is followed by North West Province with an amount of R475.4 million or a positive deviation of 1.1 per cent, the Northern Cape with R306.5 million (0.7 per cent) and lastly Gauteng with R173 million (0.4 per cent). Despite having an overall underfunding compared to its equity target, North West Province has managed to fund primary health care above the expected target.

Table 11: Impact of the equity targets on 2019/20 Primary Health Care allocations

	A	B	C	D	E (E=Total X A)	F (F=E-B)
Province	Equity Targets	Primary Health Care (PHC)	% Share of PHC	Deviation from Equity	Expected PHC based on Equity Targets	Deviations from Equity (in Rands)
Eastern Cape	14.1%	5,749,798	13.8%	-0.4%	5,898,516	-148,718
Free State	4.6%	1,856,946	4.5%	-0.2%	1,939,774	-82,828
Gauteng	19.4%	8,274,010	19.8%	0.4%	8,100,976	173,034
KwaZulu Natal	22.8%	9,018,012	21.6%	-1.2%	9,504,827	-486,815
Limpopo	13.4%	4,601,240	11.0%	-2.4%	5,592,985	-991,745
Mpumalanga	8.1%	3,164,612	7.6%	-0.5%	3,390,705	-226,093
Northern Cape	1.9%	1,107,615	2.7%	0.7%	801,144	306,471
North West	7.0%	3,406,505	8.2%	1.1%	2,931,127	475,378
Western Cape	8.5%	4,546,579	10.9%	2.4%	3,565,263	981,316
Total	100%	41,725,317	100%	0%	41,725,317	0

Table 12 analyses the impact of applying the equity targets on the 2019/20 budget allocations for hospitals. This includes the budget for district, regional and provincial tertiary hospitals. As previously mentioned, central hospitals were excluded from the analysis as they only exist in a few provinces.

Provinces have budgeted approximately R89.5 billion for hospital services in 2019/20. Provinces with the highest share of the total hospitals budget are KwaZulu-Natal with 24.6 per cent, Gauteng with 19.5 per cent, Limpopo with 13.3 per cent and the Eastern Cape with 13.2 per cent.

When the equity targets are applied to the total health budgets, there are significant deviations in some provinces when the current allocations are compared with the expected allocations based on these equity targets. North West Province has the highest shortfall in the hospitals budget compared to the equity target of R1.2 billion, which represents a 1.3 per cent negative deviation from the expected equitable share. However, as explained above, the province funded primary health care above the expected equity targets. Mpumalanga follows with a shortfall of R874.5 million or 1 per cent deviation from the expected equitable share and the Eastern Cape with a shortfall of R840.9 million or 0.9 per cent.

Table 12: Impact of the equity targets on the 2019/20 total Hospital allocations (Rands in thousands)

	A	B	C	D	E (E= Total X A)	F (F=E-B)
Province	Equity Targets	Total Hospitals excluding Central Hospitals	% Share of Hospitals (Excl. Central Hospitals)	Deviation from Equity	Expected Hospitals Budget based on Equity Targets	Deviations from Equity (in Rands)
Eastern Cape	14.1%	11 809 229	13.2%	-0.9%	12 650 152	-840 923
Free State	4.6%	4 043 832	4.5%	-0.1%	4 160 104	-116 272
Gauteng	19.4%	17 413 872	19.5%	0.0%	17 373 620	40 252

KwaZulu-Natal	22.8%	22 027 574	24.6%	1.8%	20 384 366	1 643 208
Limpopo	13.4%	11 931 432	13.3%	-0.1%	11 994 902	-63 470
Mpumalanga	8.1%	6 397 287	7.1%	-1.0%	7 271 819	-874 532
Northern Cape	1.9%	2 235 094	2.5%	0.6%	1 718 161	516 933
North West Prov	7.0%	5 121 963	5.7%	-1.3%	6 286 191	-1 164 228
Western Cape	8.5%	8 505 213	9.5%	1.0%	7 646 181	859 032
Total	100%	89 485 496	100%		89 485 496	0

Provinces that have funded hospitals above their expected equity targets are KwaZulu-Natal with an amount of R1.6 billion or 1.8 per cent above equity, followed by the Western Cape with R859 million (or 1 per cent above equity) and the Northern Cape with R516.9 million (or 0.6 per cent) (refer to columns D and F of Table 12). In KwaZulu-Natal there is a trade-off between the funding for primary health care and hospitals.

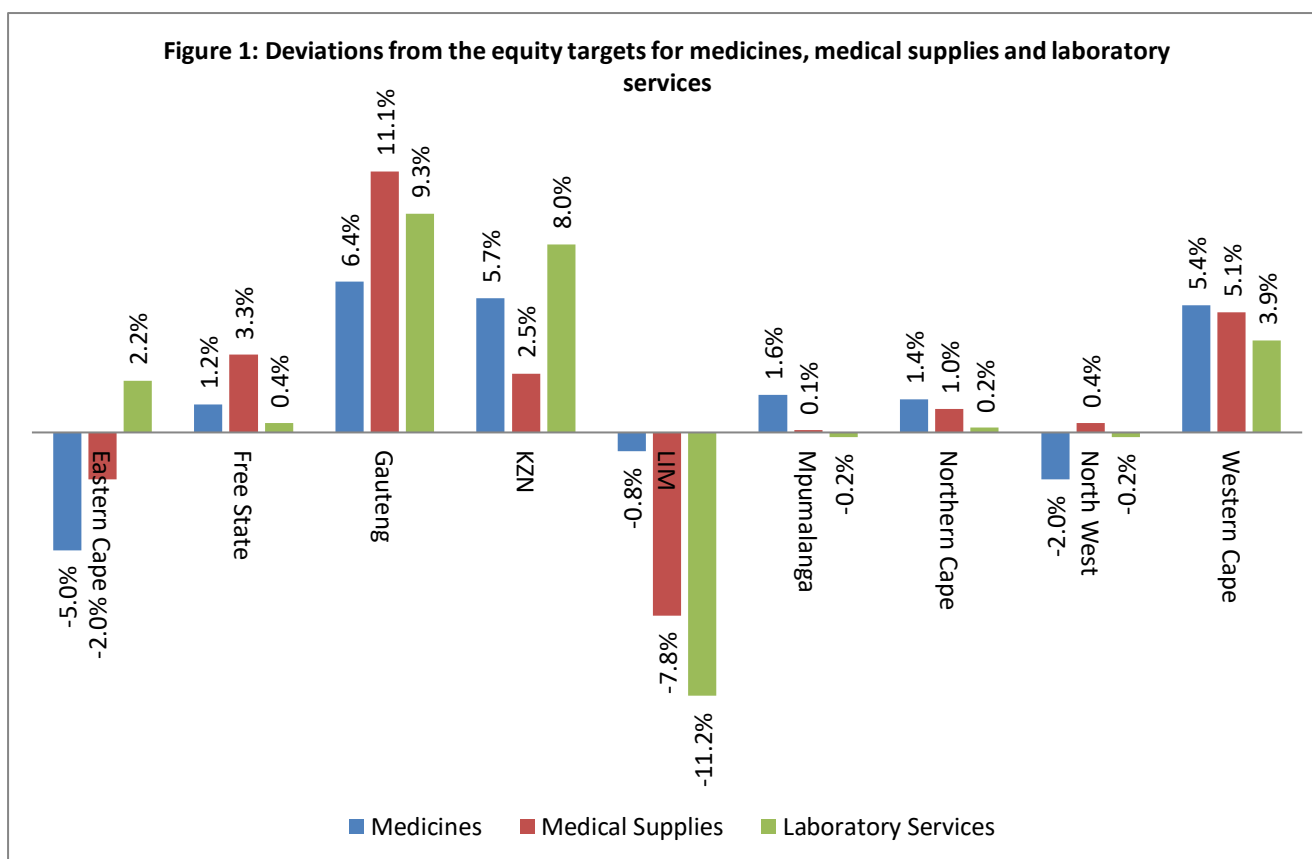
Figure 1 illustrates the deviation of the 2019/20 adjusted budget from the equity targets for essential line items for the delivery of the health services, namely medicines, medical supplies and laboratory services. Once again, the budgets for HIV and AIDS-related line items, as well as central hospitals, have been excluded from the analysis. A positive deviation from the equity targets represents the levels of over-funding, while a negative deviation reflects shortfalls against the expected equitable shares.

The medicines budgets for the Eastern Cape, Limpopo and North West Province are the only ones deviating negatively from their equity targets. Eastern Cape's medicines budget deviates by a negative of 5 per cent from the expected equity target, followed by North West Province with 2 per cent and Limpopo with 0.8 per cent. Gauteng, KwaZulu-Natal and the Western Cape deviate positively from their equity targets for medicines at 6.4 per cent, 5.7 per cent and 5.4 per cent, respectively.

For medical supplies, Limpopo has the highest negative deviation of 7.8 per cent from the equity target, followed by the Eastern Cape with 2 per cent. Gauteng has the highest positive deviation at 11.1 per cent followed by the Western Cape with 5.1 per cent and the Free State with 3.3 per cent.

For laboratory services, Limpopo has the highest negative deviation of 11.2 per cent again, followed by Mpumalanga and North West Province with insignificant deviations of 0.2 per cent for each province. Gauteng has the highest positive deviation of 9.3 per cent, followed by KwaZulu-Natal with 8 per cent and the Western Cape with 3.9 per cent. All other provinces have smaller positive deviations from their equity targets.

Figure 1: Deviations from the equity targets of the 2019/20 budget for medicines, medical supplies and laboratory services



4.4. RESULTS OF WHETHER THE ALLOCATIONS ARE NARROWING OR WIDENING AWAY FROM EQUITY TARGETS OVER THE 2019 MTEF

Figure 2 presents the assessment of provincial shares of health allocations over the 2019 MTEF against the equity targets. The purpose of this trend analysis is to answer the third

secondary question of whether resource allocation is narrowing or widening against the equity targets in each province. There is a noticeable declining trend in the Eastern Cape, while other provinces are showing smaller increases in their shares of the sector budget. Limpopo still remains way below the equity target; however, there is a small increase in their share of the budget in 2021/22. KZN's share of the budget is almost on par with the equity target. In Gauteng, the share of the budget surpasses the equity target from 2019/20 onwards. Northern Cape continues to enjoy a significantly higher portion of the sector budget relative to the equity target.

Figure 2: Assessment of budget allocations over the 2019 MTEF against equity targets

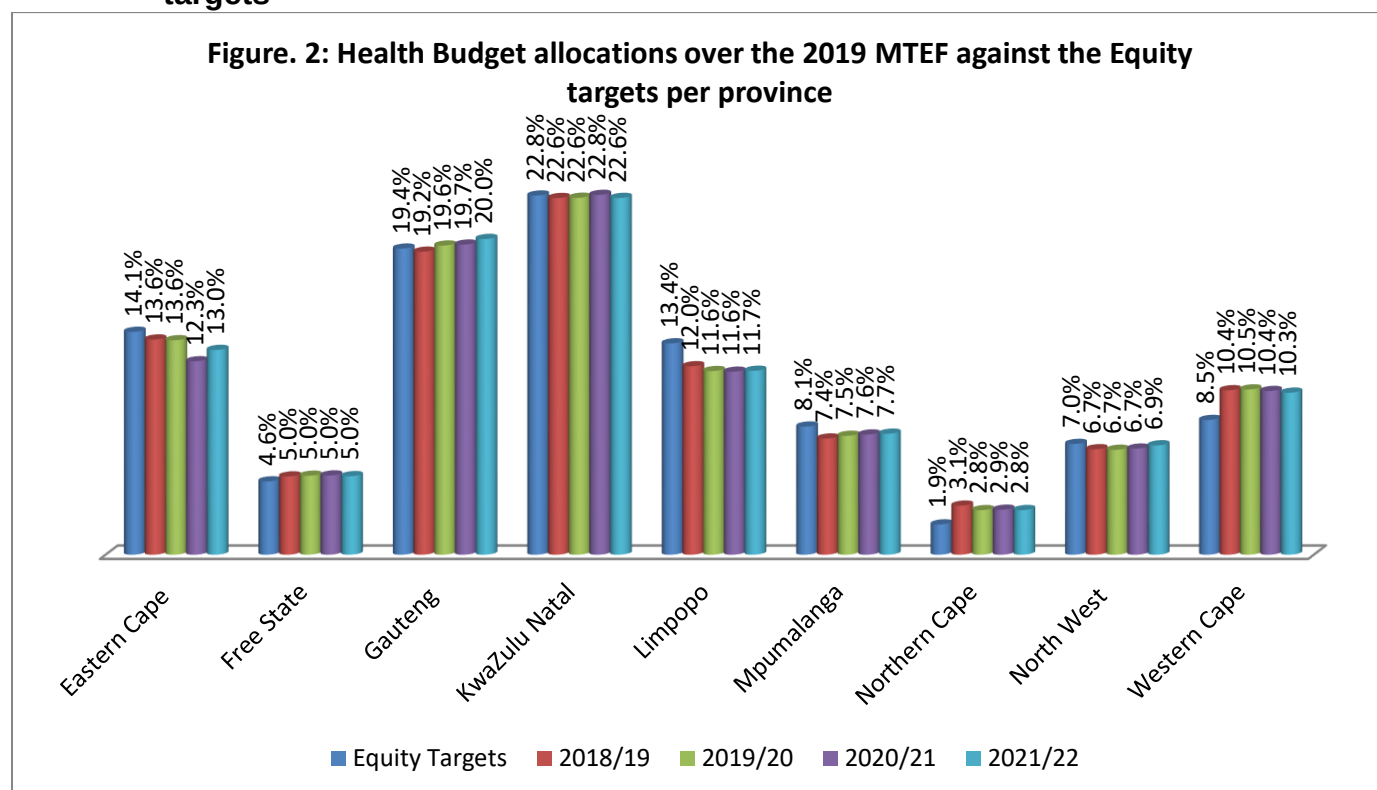


Table 13 below presents the results of whether the deviations from equity are increasing or narrowing in actual amounts. The table compares the actual allocations, based on the 2019 MTEF tabled budgets with the distribution of the total budget, using the determined equity targets for each province. The deviations from equity are presented in column C for 2018/19, column F for 2019/20, column I for 2020/21 and column L for 2021/22.

There is a significant deviation from equity in the Eastern Cape in both 2021/21 and 2021/22. The province has shown a negative deviation or shortfall of R3.2 billion in 2020/21 and R2.1 billion in 2021/22. This is significantly higher than the shortfall of just R741 million in 2018/19. In Limpopo the shortfall has grown steadily from R2.8 billion in 2019/20 to R3.1 billion in 2020/21 and R3.2 billion in 2021/22. As shown in Figure 2 above, there has been a slight increase in the province's share of the total health budget from 11.6 per cent in 2019/20 to 11.7 per cent in 2021/22.

KwaZulu-Natal's deviation from the needs-based allocation (based on equity targets) moved from a negative amount of R231 million in 2019/20 to positive amount of R69 million in 2020/21. However, this dropped again to a negative amount of R278 million in 2021/21. KwaZulu-Natal's deviation amounts are very insignificant compared to the actual allocations. Mpumalanga has shown some improvements towards equity targets with the deviations decreasing from R1.1 billion in 2018/19 to R827 million in 2021/22. North West Province has also shown some improvements with the shortfall decreasing from R513 million in 2018/19 to only R160 million in 2021/22 financial year.

With regard to provinces whose actual share of the health allocation is higher than the needs-based allocation, Western Cape remains fairly constant at slightly over R3 billion with no significant increases. Northern Cape had R1.8 billion higher than the expected allocation, when equity targets were used in 2018/19. However, due to improvements in provinces such as Mpumalanga and North West, this amount declined to R1.6 billion in 2021/22. However, the province had increasing trends between 2019/20 and 2021/22 (refer to columns F, I and L).

Gauteng had a shortfall of R301 million in 2018/19 when the equity targets were used. This has since changed, with the provincial overfunding increasing from R311 million in 2019/20 to R1.7 billion in 2021/22. Gauteng and the Eastern Cape are the two that had significant increases in their deviations from equity allocations. The Free State's actual allocations remained above the equity allocations over the four year period. Yet, the increases are not significant over the same period.

While the trade-off is between Limpopo and the Western Cape with regard to deviations from equity targets in 2019/20, trends between 2018/19 and 2021/21 show that the Eastern Cape and Gauteng also moved in different directions compared to their equity targets. The results have revealed some slight improvements in the share of the health allocations for provinces such as Limpopo, Mpumalanga and North West Province. However, the equity gaps have not really narrowed significantly over the four year period, and therefore they still show high levels of inequalities in the distribution of the health resources across provinces.

Table 13: Trend analysis on actual allocation against the equity-based allocations between 2018/19 and 2021/22 (Rands in thousands) (nominal prices)

Province	2018/19			2019/20			2020/21			2021/22		
	A	B	C	D	E	F	G	H	I	J	K	L
	Actual Allocation	Allocation Based on Equity Targets	Deviation from Equity	Actual Allocation	Allocation Based on Equity Targets	Deviation from Equity	Actual Allocation	Allocation Based on Equity Targets	Deviation from Equity	Actual Allocation	Allocation Based on Equity Targets	Deviation from Equity
Eastern Cape	20 784 778	21 526 161	-741 383	22 115 691	22 986 763	-871 072	20 957 933	24 154 832	-3 196 900	23 748 610	25 849 501	-2 100 891
Free State	7 557 894	7 079 051	478 843	8 144 371	7 559 381	584 990	8 585 659	7 943 510	642 149	9 107 715	8 500 816	606 899
Gauteng	29 261 917	29 563 862	-301 945	31 881 415	31 569 841	311 574	33 608 057	33 174 059	433 998	36 616 179	35 501 503	1 114 676
KwaZulu-Natal	34 445 269	34 687 105	-241 836	36 809 496	37 040 708	-231 212	38 992 836	38 922 927	69 909	41 374 971	41 653 704	-278 733
Limpopo	18 199 411	20 411 153	-2 211 742	18 938 974	21 796 099	-2 857 125	19 829 190	22 903 665	-3 074 475	21 328 236	24 510 553	-3 182 317
Mpumalanga	11 220 708	12 374 107	-1 153 399	12 260 289	13 213 720	-953 431	13 026 044	13 885 174	-859 130	14 032 270	14 859 338	-827 068
Northern Cape	4 736 100	2 923 713	1 812 387	4 591 821	3 122 094	1 469 727	4 870 597	3 280 742	1 589 855	5 172 813	3 510 914	1 661 899
North West Prov	10 183 236	10 696 912	-513 676	10 820 513	11 422 723	-602 210	11 496 314	12 003 167	-506 853	12 684 423	12 845 292	-160 869
Western Cape	15 883 894	13 011 143	2 872 751	17 042 740	13 893 980	3 148 760	17 738 674	14 600 001	3 138 673	18 790 720	15 624 316	3 166 404
Total	152 273 207	152 273 207		162 605 310	162 605 310		170 868 078	170 868 078		182 855 937	182 855 937	

CHAPTER FIVE

5. FINDINGS AND DISCUSSIONS

5.1. INTRODUCTION

This chapter discusses the results that were presented in Chapter four along key elements, namely what the results mean, and their implications on for the health budget, as well as their limitations.

5.2. DISCUSSIONS

The main objective of this study was to develop a quantitative framework that would be used to measure if public health resources are equitably distributed across provinces based on the needs of the people. The literature strongly supports the use of the needs-based formulae as a way of promoting equity in the distribution of health resources (Rice & Smith, 2001; Kephart & Asada, 2009; Birch & Chambers, 1993; Zere et al., 2007). There are few recent studies that have been conducted locally to assess whether health allocations are distributed in an equitable manner across provinces. This study is answering the question of whether the public health services are equitably distributed, based on the needs of the people. Local studies conducted at a district level in the Northern Cape and North West Province, using the needs-based approach, concluded that this was a reasonable way of measuring equity in health allocations across geographical regions (Philip, 2004; Maharaj, Robinson & McIntyre, 2018)

To answer both the primary and secondary research questions, the study employed the needs-based formula, using the McIntyre and Anselmi (2015) approach, as well as the AGRA to weight the selected indicators. In selecting the indicators, certain principles guided by a thorough literature review, which included amongst others that data should be available and verifiable, centrally collected and not subjected to manipulation by the

recipients, were adhered to (Rice & Smith, 2001). Key lessons from the literature on the needs-based formulae are that the indicators of health needs are quite similar in most countries, whether developed or developing. Uninsured population, age and sex characteristics, burden of diseases and socio-economic indicators, such as deprivation indices, are popular indicators used internationally.

The results of the quantitative analysis, using the developed needs-based formula, reveal that the resource allocation in some provinces is not consistent with the health needs of the population. The study discovered a huge gap between the equity targets for Limpopo and Western Cape in the actual allocation for the 2019/20 adjusted budget. The study shows that Limpopo's 2019/20 adjusted budget is under-funded by approximately R2.8 billion relative to the need, while Western Cape receives R3.1 billion more than its equity target. However, this should not be seen as over-funding of the health system in the Western Cape, as the total budget for the sector is based on individual decisions taken in each province by the provincial legislatures and provincial treasuries with regard to the allocation of funds.

Data from the 2017/18 budget has shown that on aggregate health in provinces received approximately 32 per cent of the total PES allocation (refer to Appendix B). In the Western Cape, health received 36 per cent of the PES allocation while in Limpopo it received 30 per cent. However, it should be noted that there are two central hospitals in the Western Cape, namely, Tygerberg Central Hospital and Groote Schuur Central Hospital while Limpopo did not have any central hospitals. A further comparison was conducted on the PES allocation with the exclusion on central hospitals, the percentage of health budget in the two provinces were at par with each other at 30 per cent. However, the huge deviations from the equity targets between two provinces suggest that Limpopo may need to increase its share of health budget for them to compare fairly with other provinces. This is despite the fact that in Limpopo, the health budget is R4 billion over and above the contribution of the health component to the total provincial allocation with in the Western Cape is only R2.7 billion. This therefore suggest that the province is already prioritising health relative to its contribution to the provincial PES allocation.

In overall with the exclusion of conditional grants and central hospitals allocations, the health allocation accounted for 29 per cent of the total PES allocation to provinces. Provinces that were significantly below the national average, were Free State at 25 per cent followed by Northern Cape at 26 per cent (refer to Appendix B). However the two provinces have positive deviations to their equity targets suggesting that they are not underfunded compared to other provinces. The Eastern Cape was slightly lower than the national average at 28 per cent while its need based allocations were below the equity target by R871 million. An increased share of health allocation to 29 per cent of the total provincial PES allocation (excluding central hospitals) would bring the province closer or slightly above the equity target.

The deprivation index was the indicator that wedged the provinces such as Limpopo away from their equity targets. Before this indicator was added, the allocation for the province was at par with the equity targets at 11.6 per cent. Thus it was found that improvements in access to clean water by the households in the province will have some impact on health services in Limpopo. In fact, before the deprivation index was added the health budget for all provinces compared fairly to the equity targets when age and sex as well as SMR were used as the only indicators of health needs.

Furthermore, in answering the question on whether equity gaps are narrowing and widening, the study revealed that inequalities in resource allocation will continue over the 2019 MTEF period, affecting mostly Limpopo and the Eastern Cape in a negative way. Western Cape, Gauteng and the Northern Cape are funded significantly higher than their equity targets in 2021/22. However, the other provinces have not shown significant deviations from their equity targets overall. Therefore, the results show that the distribution of public health resources will continue to be skewed towards certain provinces over the 2019 MTEF, while some provinces will continue to significantly underfund health relative to the needs of their population. The results mean that the health outcomes may continue to deteriorate in provinces such as Limpopo and the Eastern Cape, as revealed by the 2016/17 district health barometer. As previously indicated, the barometer showed that performance on health indicators such as under-5

infant diarrhoea mortality rates, as well as highest average life expectancy, were lower in the Eastern Cape and Limpopo compared to the Western Cape and Gauteng.

The results of the equity targets were dependent upon the indicators of needs used and the weighting given to those indicators. In this study a weighting of 0.2 was given to both the SMR and the deprivation index. However, when they were given higher weightings the equity targets shifted in favour of provinces such as Limpopo and the Eastern Cape. This would have revealed a far greater inequitable distribution of resources between the rural and urban provinces. McIntyre and Anselmi (2015) advised that the weighting of these indicators should be between 0.1 and 0.2 and most importantly should be agreed upon by the stakeholders, as perverse incentives might be created.

Based on the results, the study concluded that there is an inequitable distribution of health resources across provinces, yet noted that the situation is not bad for most of them. The Limpopo health budget would need to be recalibrated in order to move the province closer to the equity target, as it remains an outlier. Primary health care and hospital services are affected most by the inequitable distribution of the health budget across provinces. These inequalities in the distribution of the health budget also affected critical priority areas such as medicines, medical supplies and laboratory service spending, with Limpopo and the Eastern Cape being affected in a negative way.

Therefore, the current health allocation fails to achieve horizontal health equity which focuses on the fair redistribution of resources to address the health inequalities that exist among different groups.

Furthermore, the results also concur with the arguments in the literature that the adoption of an intergovernmental fiscal system in South Africa somehow resulted in the disparities in the distribution of health resources with under-resourced provinces such as Limpopo, Eastern Cape and the North West Province failing to negotiate for a fair share of the health budgets from their provincial legislatures and executive committees (McIntyre et al., 1999). The literature does not actually argue against fiscal decentralisation, but

stresses the importance of the central government setting the norms and standards that should promote equity in the distribution of resources.

5.3. SUMMARY OF KEY FINDINGS

As previously mentioned, the study assessed whether public health services (expenditure) are equitably distributed across provinces. The research problem that is been being addressed by the study relates to the variations in resource allocation (based on population-weighted budget allocations) together with variations in health outcomes, which suggested the existence of unjustifiable variations in health service access across provinces.

Using the needs-based formula, the study discovered the following:

- The distribution of health resources is indeed skewed towards provinces such as the Western Cape and Gauteng, as was anticipated earlier in the study. This means that there is an inequitable distribution of health services across provinces and therefore the health allocations are not based on the needs of the population. Critical priority line items such as medicines, medical supplies and laboratory services are worst affected. However, in some instances there are trade-offs between the allocations for primary health care and hospital services. For example, a province like the North West has significantly underfunded hospital services relative to the need, but their primary health care funding is above the equity targets.
- The deprivation index was a factor that also contributed to the skewed resource distribution due to lack of access to clean water in Limpopo and the Eastern Cape. When the uninsured population was weighted by age and sex as well as standardised mortality ratio, the deviations from equity targets were not significant across provinces. This suggests careful consideration to the choosing of needs factors in order to avoid significantly skewing the resources. Furthermore, the

study has confirmed that the weighting of indicators also plays an important role in the outcomes of the equity targets.

- When linking the findings of this study and the health outcomes as measured by health indicators, such as under-5 mortality and life expectancy (see pages 1 and 2 of this report), the research has found that provinces that are better resourced are the ones with better outcomes comparatively. Therefore, there seems to be a correlation between equity in health allocation and the outcomes.
- Provincial equitable share funding is allocated to the health function based on the discretion of provincial legislatures and executive committees. This study has revealed that the financing mechanisms may also impact equity in health resource distribution. However, this may need to be explored through further research.

5.4. RESEARCH LIMITATIONS

There are a couple of limitations that impacted the study, which include the availability of data for some of the critical indicators. McIntyre and Anselmi, as well as the AGRA methodologies, require that the projected cost per head or national utilisation rate be used for the age and sex index. However, such data are not available in South Africa and, as explained, the 2011 census results have to be used to estimate the health needs for each age band of the population.

The standardised mortality ratio was used as the only indicator of burden of disease. However, it is also important to consider the inclusion of the index representing chronic conditions, as people who are suffering from these conditions continue to receive the health services over a period of time, due to their prolonged life expectancies. Data that show the number of people suffering from chronic conditions by age and sex grouping, which will be very helping in estimating the health needs of provinces and districts, are currently unavailable.

Data have shown that the per capita expenditure in less densified health districts such as the Central Karoo, Namakwaland, and uMzinyathi is almost three times that of highly densified areas such as Johannesburg, Ekurhuleni and eThekweni Metros. However, due to the unavailability of the data, the study was unable to include an index for the differential cost of delivering the services. However, between 5 and 10 per cent of the total budget could be set aside for those areas that are less densified and are struggling to attract the necessary staffing to deliver the health services. The 20 per cent weighting allocated to the deprivation index could be split between this indicator and the differential cost of delivering the services.

Furthermore, expenditure on health services by local government was not included in the analysis due to the unavailability of the data. The research focused on the allocations made to the provincial sphere of government.

Needs-based formulae alone are not sufficient in addressing equity issues. While this approach is the current acceptable measure of equity in the distribution of health resources, careful planning is very important especially as it relates to the choice of indicators. In this study the choice of indicators was only informed by the statistical availability of data.

CHAPTER SIX

6. CONCLUSION

6.1. CONCLUSION

The study assessed horizontal equity in health financing across provinces and has revealed a reasonably accurate measure of inequity in the allocation of health resources, using the internationally recognised needs-based formula. The objective of this research was to develop a quantitative framework in order to measure the equity levels in public health services using public expenditure as a proxy. The research was informed by the variations that existed in resource allocation (based on uninsured population-weighted budget allocations) together with variations in health outcomes that suggested the existence of inequalities in health service access across provinces.

Guided by a literature review in trying to solve the research problem above, the formula further adjusted the uninsured population for age and sex characteristics as well as other indicators of need, namely standardised mortality ratios and the deprivation index. The deprivation index used only the households that do not have access to clean water as an indicator of socio-economic status. As a result, this favoured rural provinces such as the Eastern Cape and Limpopo, where there are still a significant number of households who do not have access to clean water.

The study revealed that there are still inequalities in how health resources are allocated across provinces, with high levels of variation between provinces. The variations were notably significant between provinces such as Limpopo and the Western Cape in 2019/20, while the Eastern Cape and Gauteng also deviated from their equity targets over the medium term. There were no improvements in the levels of equity over the medium term when the current needs factors were used. However, the inequalities are not very significant in some provinces and with the controlled pace of change in the allocation of resources, they should be able to reach their equity targets. Efforts would need to be made at a national

level to encourage real increases in the total budget for Limpopo and the Eastern Cape health, so that it can compare fairly with the equity targets like other provinces. The budget for the Western Cape can be used as a baseline to ensure that the health services are adequately funded or prioritised appropriately by other provinces in response to the burden of disease.

Frontline health services, such as primary health care, hospital services, medicines, medical supplies and laboratory services, are affected most by the inequitable distribution of the health budgets.

However, the study also revealed that there should be careful consideration when the needs-based factors are chosen and a sensitivity analysis should be conducted on how the inclusion of each factor affects the equity targets. In this study, the deprivation index was the indicator that mainly wedged Limpopo and the Eastern Cape away from the equity targets, even though it was weighted at only 20 per cent. Therefore, improvements in access to water and sanitation could bring the current allocations of these provinces closer to the equity targets. The literature argues that there is a correlation between access to water and health needs.

Provinces take their own decisions on how equitable shares are allocated to functions. Therefore, in the absence of some guiding national norms and standards for the allocation of funds to priority areas, the distribution of health services will remain skewed.

The formula is evolving and will need to be refined over time as more data become available. The inclusion of other critical indicators which are supported by the literature, such as the cost of delivering the services in rural and remote areas, is imperative. Currently there are no available data that could be used to accurately predict the differential cost of delivering services in largely dispersed areas. If the cost of delivering services indicator could be added, the picture may change significantly. A further study to this effect is suggested.

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APPENDICES

Appendix A: 2019/20 (main budget) per capita spending on uninsured population

Provinces	Total Health Budgets	Total less Grants	Primary Health Care Total	Clinics	Community Health Centres	Community- based Centres	District Hospitals	Emergency Medical Services	Provincial Hospitals	Tertiary Hospitals
Eastern Cape	4 233	3 542	749	412	220	104	824	234	687	609
Free State	4 319	3 126	657	399	63	194	605	285	595	1 035
Gauteng	4 349	3 452	620	228	184	208	349	132	817	1 565
KwaZulu-Natal	4 414	3 551	814	456	188	44	749	160	1 110	517
Limpopo	3 838	3 367	744	574	111	46	1 297	142	492	364
Mpumalanga	3 579	3 097	634	384	245	5	912	108	383	330
Northern Cape	4 928	3 611	890	475	306	0	625	343	388	1 088
North West Prov	3 525	2 842	483	2	329	2	383	116	531	549
Western Cape	4 739	3 614	759	267	446	46	699	223	747	1 327
Total	4 224	3 406	703	350	220	91	696	170	743	869

Appendix B: Shares of health budget from total provincial allocations- 2017/18

Provinces (R'000)	Health Total Allocations	Health Conditional Grants (CGs)	% share of conditonal grants	Health budgets less CGs	Central Hospitals PES Allocations (Excl. Provincial Tertiary Hospitals)	Total Health Allocations excluding Central Hospitals	Health Allocations as % of Total PES	Health Allocations as a % of Total PES (excl. Central Hospitals)
Eastern Cape	21,707,165	3,778,750	10%	17,928,415	679,242	17,249,173	29%	28%
Free State	9,737,892	2,884,563	8%	6,853,329	739,418	6,113,911	28%	25%
Gauteng	40,207,046	9,664,962	26%	30,542,084	6,857,366	23,684,718	35%	27%
KwaZulu-Natal	39,548,473	8,030,060	21%	31,518,413	1,475,588	30,042,825	34%	32%
Limpopo	18,042,777	2,360,492	6%	15,682,285	0	15,682,285	30%	30%
Mpumalanga	12,020,037	1,731,807	5%	10,288,230	0	10,288,230	29%	29%
Northern Cape	4,433,893	1,348,327	4%	3,085,566	0	3,085,566	26%	26%
North West	10,461,340	2,241,762	6%	8,219,578	0	8,219,578	27%	27%
Western Cape	21,679,806	5,479,669	15%	16,200,137	2,664,692	13,535,445	36%	30%
Total	177,838,429	37,520,392	100%	140,318,037	12,416,306	127,901,731	32%	29%

Appendix C: National Treasury's Approval for the Use of unpublished Data



national treasury

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Prof D Everatt
Head of School
Wits School of Governance
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Dear Prof Everatt

PERMISSION TO USE NATIONAL TREASURY DATA FOR MASTER OF MANAGEMENT RESEARCH

Mr Marumo Maake is currently employed as Director: Provincial Budget Analysis in the National Treasury's Inter-governmental Relations Division.

In fulfilment of his Master of Management in the field Public Policy at your school, he needs to complete a research which is titled "*Measuring Equity in Public Health Financing across Provinces in South Africa*". Part of his research requires using data from the National Treasury's databases and systems. This data includes budget, expenditure and other non-financial information from the systems such as Vulindlela as well as budget databases.

Permission is hereby granted for Mr Maake use the National Treasury's Vulindlela and databases data on budget and expenditure, as well as any relevant data needed to complete the study with a condition that my office must be consulted before the outcome of any such research is published into the public domain, in order to ensure that any sensitive source information is not included.

Yours sincerely

DONDO MOGAJANE
DIRECTOR-GENERAL

DATE: 04/10/2019