RESOURCE ALLOCATION IN THE KENYAN HEALTH SECTOR: A QUESTION OF EQUITY.

BY

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DECLARATION

This project is my original work and has not been submitted for a degree in any other university.

Signed. Signed by candidate

CHUMA JANE.

This project has been submitted for examination with my approval as the university supervisor.

Signed. ...

Prof. Di McIntyre

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ACRONYMS

AIDS:	Acquired Immunodeficiency Syndrome
HIV:	Human Immunodeficiency Virus
GDP:	Gross Domestic Product
GNP:	Gross National Product
KHP:	Key Health Personnel
KNH:	Kenyatta National Hospital
MOH:	Ministry of Health
NGOs	Non Governmental Organisations
RAWP:	Resource Allocation Working Party
WHO	World Health Organisation

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JANE

DEDICATION

This work is dedicated to my dear daughter: Audrey Nyawira.

EXECUTIVE SUMMARY

This study examined the current resource allocation decision-making processes, and the distribution of both financial and non-financial resources in the health sector. The study explored how the current resource allocation process has impacted on equity between provinces (equity being defined as equal resources for equal need). It went further to look at possible alternatives that could lead the Kenyan health sector towards geographical equity. The study focused on the public health sector because it is the largest provider of health care services in Kenya.

The basic argument underlying the study was that, raising additional funds for health care (e.g. through user fees) might not lead to equity, if the additional resources were to be allocated within the current resource allocation process. Instead, the study argues that the first step towards equity in health care in Kenya is to distribute the current resources in a more equitable manner. This can only be done through the development and implementation of a better resource allocation process.

A few findings arise from this investigation:

- The current resource allocation process heavily relies on the historical incrementalism approach to budgeting. In addition the forces of demand and supply are major determinants of budgetary allocation. This means that provinces that have a high number of facilities receive larger budgetary allocation while those with few facilities receive less allocation. Further political powers highly influence the resource allocation process, with provinces that are well represented politically being relatively over-resourced.

- The structure of the Kenyan health sector shows that management of health care services mainly lies at the district level. This implies that health needs are likely to be recognised more easily at the district level rather than the national level. However districts plans and budgets are rarely taken into account in the resource allocation process. Consequently budgetary allocations rarely reflect districts/provincial needs.

- There exists geographical inequity in the distribution of both financial and non-financial resources. Nairobi, Central, Riftvalley and Coast provinces have resource above their equity target (i.e. where each province receives the national average level of resources per person living in that province, weighted for other indicators of need), while Northeastern, Nyanza and Western provinces are below their equity target allocation.

- The major reason behind these inequities in the distribution of resources is the lack of a rational method of resource allocation that addresses the need of provinces.

- The amount of resources allocated to Kenyatta National Hospital (KNH) affects the equity positions of all provinces. It would be important to have a correct estimate of the percentage of the resources allocated to KNH that is used to serve residents from other provinces.

Based on these findings the study highlights the importance of reducing inequities in resource distribution. The study recommends that this could be done through a redistribution of the financial resources from the over-resourced provinces to the under-resourced provinces. This should be done based on the equity targets of each province. However, the study notes that any attempt to redistribute financial resources must be accompanied by a redistribution of personnel. This is due to the fact that personnel consume over 60% of recurrent expenditure in most countries.

Finally, the study notes that equity in health care can only be achieved through a better resource allocation formula. A needs-based formula is recommended for the Kenyan health sector. However, this must be accompanied by policy changes. The Ministry of Health must therefore put the appropriate policies in place if equity is to be achieved.

CHAPTER ONE: PURPOSE AND SCOPE

1.1 BACKGROUND

The distribution of health sector resources is often highly inequitable (Mills, 1998). Evidence from the literature shows that people who are disadvantaged, either socio-economically or by place of residence (e.g. remote rural areas) suffer a higher burden of illness, have higher mortality rates and are least considered in resource allocation decisions (Ohene 1997). These inequalities in health are a major challenge for health policy and planning mainly because a reduction in health problems of the disadvantaged groups plays a major role in promoting the health of the population as a whole, and in increasing the economic growth of a country. It is for this reason that the member states of the World Health Organization (WHO) in the European region adopted a strategy for Health for All (HFA) that had its first target as a reduction in the differences in health status between countries and between groups within countries by at least 25% by the year 2000 (Mills 1998).

In order to achieve this wide spread goal of reducing inequality in health, a few things need to be taken into consideration. Of major importance is improved access to health care services for the disadvantaged groups. One way of trying to achieve this is by allocating resources in a more equitable manner such that each individual has access to basic services regardless of his/her socioeconomic status or place of residence.

Although changing historical patterns of resource allocation is difficult, (Mills 1998) many developed countries are defecting from historical incremental approach to resource

allocation and are adopting other techniques such as the Resource Allocation Working Party (RAWP) formula in the UK and the population based approaches used in Australia and New Zealand (Doherty and Van Den Heever 1996). This, however is not the case in developing countries although recently a few countries like Zambia and Zimbabwe have indicated positive trends in developing a simple resource allocation formula based on population per capita (Doherty and Van Den Heever 1997).

Despite evidence from policy statements that developing countries are committed to achieving greater equity and efficiency in health care, there are some problems that face the health sector in these countries, which act as a barrier to these goals. One of the major problems is the unequal distribution of existing resources and the lack of skilled personnel who can adequately deal with resource allocation issues and perhaps contribute to a reduction in the equity gap. In most countries, the allocation of existing resources has not been looked at as a means to achieving equity in health/health care but rather great emphasis has been put into raising additional revenue which can then be diverted to the poor regions. As a result, little effort is put into considering how a better allocation process can help improve health care in disadvantaged regions. It is partly due to this reason that developing countries have not invested in training personnel to deal with policies that address issues on resource allocation.

1.2: Statement of the problem.

Prevailing supply and demand patterns are the most common determinants of resource allocation decisions (McIntyre *et al* 1990, Green 1992), where resources are allocated on the basis of the previous year's expenditure with an increase for inflation and sometimes adjusted for previous over and under-spending. In other words, developing countries still

rely on historical incremental budgeting as a major method of resource allocation despite the various shortcomings associated with this approach. Of great concern is that this form of budgeting retains the status quo, with the proportion of total budget assigned to each institution or activity and/ or geographical areas remaining the same over a period of time. It ignores changes over time in health care needs like population size, and disease patterns restricting the ability of health care services to respond to these changes which are in turn heavily influenced by existing health service supply patterns.

Due to this, geographical regions that have previously received large amounts of resources continue to benefit from these resources regardless of whether there is need that can account for their use. On the other hand, regions that may have required a low amount of resources in the past, and which may require a larger amount of resources, due to changes in their demographic and disease patterns receive the 'same' amount of resources which can't meet the current needs of the population. The overriding concern is that sections of the population in some areas are prejudiced in their access to essential health care, merely by virtue of their place of residence (McIntyre et al 1990, DHSS 1976).

In addition to problematic budgeting approaches, developing countries rely heavily on capital intensive facilities for the provision of many health care services and once a pattern of supply of these facilities has been established, the future allocation of financial resources tend to perpetuate the historical position (McIntyre 1997). The most costly and capital-intensive facilities (e.g. tertiary hospitals) serve a small percentage of the population, who are well off financially with the poor people, particularly those living in rural areas, having limited (if any) access to such facilities. Primary health care services that are known to

provide treatment for many common illnesses at lower costs than larger hospitals and which, are most likely to benefit the poor, are not given a high priority.

Focusing on the case of Kenya, we find that like many other developing countries, Kenya has been experiencing economic hardships. These include a decrease in GDP per capita accompanied by decrease in expenditure in all sectors (Collins 1995). As a way of addressing the declining economic growth, various ministries, including the Ministry of Health, have suffered from budget cuts and have been forced to identify other sources of finance. For example, the budget allocated to the health sector declined from 9.82 percent in 1980/81 financial year to 6.2 percent in 1995/96 of the national bubget[1].

In a situation where resources are limited, there is no doubt that greater emphasis should be put on prioritising their use. But despite the fact that the health sector is operating under tight budgets, resources continue to be allocated on the basis of demand and supply, and on the basis of previous year's expenditure, with a large and growing share of public resources being devoted to urban areas, which has further limited the scope for expanding services in under-served areas. As Boom (1993, pg 59) states, a ministry official could say with justification: " we agree with you, but what do we do about the hordes of patients showing up at our hospitals? Yes they by pass their rural facilities, but should we turn them away?" In other words, the health services are at the mercy of demand pressures and the resources allocations are simply following that demand. The problem is that the health care supply fuels further demand: the more resources that are allocated to urban hospitals and the less to the rural areas, the more patients will bypass the latter and attend the former. This creates a vicious circle and the existing disparities in health continue to widen. It is in view of these issues that the following questions arise:

1) What is the rationale behind the current resource allocation methods?

2) Are resources equitably distributed and if not how can equity in health care be achieved between regions?

1.3: Objectives of the study.

The objectives of this study are to:

1) Document the current resource allocation decision-making processes.
2) Estimate the relative health care needs of different geographical regions.
3) Quantify the scale of inequity in current health care resource allocation in Kenya.
4) Identify possible causes of inequities in health care
5) Suggest an alternative way of allocating resources in the Kenyan health sector.
6) Provide information to policy makers of the need to develop policies that can redress inequity, especially by promoting resource redistribution.

1.4: Justification of the study.

Results from this study will be of particular importance to the Kenyan health sector, which is currently facing a problem of scarce resources, accompanied by reduced government funding. To be able to cope up with this twin challenge, the Kenyan government has joined the group of other developing countries who are working towards changing/reforming the organisation, financing and management of the health sector. Most if not all of these reforms share common goals of achieving greater efficiency in the provision of health services and ensuring access to health services to all citizens regardless of their income and place of residence. While one can not ignore the fact that additional resources are required for the health sector to provide better services, it is common to find that a large percentage of the resources available to the health sector are concentrated in a few areas serving a small

population. Unless the Ministry of Health adopts a "just" and efficient way of allocating resources, it is unlikely that these policies will meet the stated objectives. Achieving equity and efficiency require more than just collecting additional funds. In particular, achieving equity generally requires first an achievement of equity in the allocation of the available resources before any health sector can consider raising extra revenue as a means of achieving equity.

In addition to finding answers to the stated objectives, results from this study will inform policy makers of the important role played by personnel in the Ministry of Health and hence point out the need for further training especially on matters of resource allocation and equity. Further knowledge of their opinions towards the MOH allocation process will help to highlight the actors' feelings towards the process and highlight some issues which policy makers should address.

1.5: OUTLINE OF THE REMAINING CHAPTERS.

The remaining chapters have been organised as follows:

Chapter two discusses the Kenyan political, economic and social background. It goes further to present a brief discussion on the organisation, structure and management of the Kenyan health sector.

Chapter three contains a literature review. It discusses the major issues surrounding resource allocation and equity in health care. Chapter four examines the methodology used in the study, including data collection methods and data analysis among others.

Chapter five presents the results of the analysis. It examines the geographical distribution of health care resources and attempts to quantify the current inequities in resource allocation.

Chapter six looks at how the use of a needs- based formula can promote equity in the Kenyan health sector to equity. It illustrates how the currently available resources can be redistributed based on each province's "equity target" allocation and considers the pace and process of redistribution.

Lastly, chapter seven summarises the main findings of the study and identifies issues in which the Kenyan health sector should consider as major steps towards equity.

[1] the absolute value for the national budget in fixed prices was K£ 12 billion.

[2] the conversion to the dollar was based on simple exchange rates provided by the central bank (mean rate).

CHAPTER TWO: KENYA'S BACKGROUND INFORMATION.

2.0: Introduction

This chapter presents some background information about Kenya. Section 2.1 discusses the political background, while section 2.2 discusses the social and economic background. Section 2.3 gives a brief overview of the Kenyan health sector. The chapter concludes with a brief analysis of the Kenyan health policy framework.

2.1: Political background

Kenya is a country in East Africa which lies along the equator, and has a varied landscape and vegetation. The greatest changes in Kenya's history happened when the country came under European influence in the 1800s, culminating in the colonisation by Great Britain at the end of the century (Collins et al 1996). According to Maxon (1986) the patterns of authoritarianism, political and economic dependency set by colonialism have not been decisively altered by Kenya's achievement of independence and have continued to be reflected in the country's public administration system.

The political state of Kenya took a turn in 1991 when the then president Daniel arap Moi gave in to democracy and accepted a multiparty system, emerging as the first president to be democratically elected in the country, a position he continues to hold. A lot of political parties based on ethnic grounds have been established. Due to the fact that each ethnic group/groups are found in a particular geographical area, most political parties represent a certain geographical area.

This kind of system has impacted on the resource allocation process in all sectors of the economy with geographical areas that are well represented in the government and which have

powerful/influential political leaders being in a better position to receive a greater share of government resources than those areas that are not well represented politically. Consequently developed regions continue to develop while the poor become poorer. As will be demonstrated in later sections of the study, the MOH has not been spared from this political influence. As Green (1992) notes, resource allocation is more or less a political process, implying that it is difficult to have a resource allocation process that is free from political interests.

2.2: Socioeconomic background.

2.2.1: Macro economic profile

In the first decades after independence, Kenya was one of the most politically stable and economically successful of the sub-Saharan African countries. The Kenyan economy has generally undergone mixed experiences since independence. For example, from 1963 to 1980, its per capita output grew by about 3% each year and the government invested heavily in basic services, including health and education and made good progress in improving the standards of living of its people (Dumm 1992). The real growth rate in gross national product (GNP) between 1965 to 1970 was 8.22% per annum, the domestic rate averaged 15 to 20% of gross output, and the government budget typically showed a surplus of receipts over expenditure (World Bank 1980). However, the first oil crisis of 1972 brought an abrupt halt to this level of achievement. Consequently, the growth rate decelerated to below 4% for much of 1970s. However, the economic growth increased between 1970 and 1980, but slowed gradually in 1980 to 1990. By the end of 1990, the growth rate continued to decline below 4% and fell dramatically to 0.4% in 1992 (MOH 1994). Currently the Kenyan economic growth rate is at –0.9% (World Bank 2000).

Kenya's economic growth has not been sufficient to produce any substantial increase in GNP per capita. According to the World Bank, the current GNP per capita is approximately U S $ 370 which ranks Kenya as a low-income country (World Bank 1992). Real wages of both the public and private sector have fallen sharply in the last decade and are only 70% of the figure for 1970. This slowing down has affected both the agricultural and the industrial sectors with the service sector emerging as the major employer (World Bank 1991).

The Kenyan economy has not escaped inflation. After the oil crisis in 1973, the inflation rate rose to 17% in 1974 and to 19.1 % in 1975. Between 1982 to 1992, the rate went as high as 27.5% recording the highest inflation rate since independence (MOH 1994). While it is true that the inflation rate has been determined by domestic policies and price control regimes, the international economic recession in the early eighties and the second oil crisis in 1980, compounded by a rapid increase in the money supply have also played a major role.

The overall performance of the economy has had both direct and indirect effects on the health sector and the health status of the Kenyan population in various ways. The effects of the poor performance and inflation on government funding have been dramatic. For example the low growth rate and high rates of unpaid debts led international agencies (IMF and World Bank) to freeze aid to the country and to put conditions for further aid. Some of these conditions involved a heavy reliance on the market mechanism and a decrease in budgetary allocations to most sectors of the economy.

The health sector has not been spared from the budget cuts. This implies that fewer resources are available to the health sector now than before despite the increasing health care needs.

2.2.2: Demographic profile.

The Kenyan population increased from 8.9 million in 1963 to 18.4 million in 1984 and to 28.8 million in 1999 (CBS 1999). The growth is mainly due to a rapid decline in the death rate combined with a steady birth rate, and it was not until the 1980s that the birth rate began to decline, resulting in the annual population growth rate falling slightly to the current rate of 3%. The population is expected to double in the next 25 years, which will exert impossible pressure on a labor market weakened by the effects of inflation and international competition (Dumm 2000). Life expectancy increased from 44 years in 1963 to 54 years in 1979 and continued to rise until recently when it started going down due to the wide spread of HIV/AIDS. The total fertility rate declined from 6.7 children per woman between 1984 to 1989 to 5.4 children per woman in 1993 implying that there was a 20% decrease in fertility. This is due to the improved family planning methods and the free provision of oral contraceptives in government facilities.

The crude birth rate decreased form 52/1000 in 1979 to 46/1000 in 1993 whereas the crude death rate declined from 14/1000 to 12/1000 over the same period. Infant mortality rate declined from 104/1000 to 67/1000 in 1993. As a result almost 50% of Kenya's population is under 15 years of age and 10% above 50 years (MOH 1994). There appears to be a tremendous demographic momentum in Kenya despite the impressive decline in fertility, with a large pool of sexually active individuals in the 15-49 year age cohort. This tell us that there is a danger of HIV/AIDS affecting an even higher percentage of economically active people which is bound to have a negative impact on the under-resourced health sector and on the already deteriorating economy.

2.2.3: Epidemiological profile.

The burden of disease in Kenya is not well quantified, and much needs to be done to improve the availability and reliability of information, most of which is derived from reported statistics. There exists marked regional variations in epidemiological patterns but in general, preventable, vector-borne diseases are the most important causes of morbidity and mortality nationwide. Malaria and respiratory disease account for almost 50% of all reported diagnoses in government health facilities, and intensinal parasitic infection and diarrhoea causes about 10% of total deaths (MOH 1994). In the context of this study, the widely accepted regional variation in disease patterns further highlights the importance of allocating resources based on health care needs of each geographical region.

2.3: A BRIEF ANALYSIS OF THE KENYAN HEALTH SECTOR.

Since the attainment of independence in 1963, he Kenyan government has given high priority to the improvement of the health status of all Kenyans. It recognizes that good health is a prerequisite to socio-economic development. Its commitment in the provision of health services is evident from the expansion of the network of health facilities across the country. However, the increasing population and the demand for health care services have outstripped the ability of the government to provide effective health services. The following subsections discuss the provision, structure and organisation of the Kenyan health sector.

2.3.1:Provision of health care services.

Provision of health care services in Kenya is by both the public and private sectors. The government is the main provider. The MOH, the main government agency involved runs about 56% of the country's facilities and employs about 67% of the health personnel. This is despite the tendency for private and mission institutions to pay staff significantly higher

salaries than the government. The Ministry of Local Government, the other government agency involved runs about 3% of health care institutions which are mainly dispensaries and health centers (MOH 1994, MOH 1996). The remaining percentage of facilities is run by the private sector.

The private sector is divided into two parts, namely the private for-profit and the private non-profit services. Private for-profit services have grown in recent years due to the government recognition of their role in health development. They are well equipped with sophisticated diagnostic facilities, but due to their costs, these facilities can only be afforded by a few wealthy patients who mainly live in the urban areas. They are mainly owned by individuals or groups of individuals. There are about 840 of these facilities of which 43 are hospitals (MOH 1995).

Unlike the private for-profit services, private non-profit services are relatively cheap and aim at improving the health of the poor population. They are mainly owned by religious missions and Non-Governmental Organisations (NGOs) and are mainly located in the rural areas. There are about 600 such facilities of which 63 are hospitals, the rest being clinics and dispensaries. Traditionally these facilities provided free services to the poor but due to the reductions in support from the government and donors, they have been forced to introduce fees though their services still remain relatively cheap compared to private for-profit services. Although we have seen that health care services is provided by both private and private services, it is important to point out that this study concentrates on the public sector. As a result the discussion in the next sub-sections will refer to the Kenyan public health sector.

2.3.2 Organisation, structure and management of public sector health care services.

The MOH services are structured in six levels namely:

- The National Hospital
- Provincial hospitals
- District hospitals
- Sub-district hospitals
- Health centers
- Dispensaries.

At the top is Kenyatta National Hospital (KNH), which is the national referral hospital. KNH is an autonomous hospital and is answerable to the Ministry of Health. Below KNH are seven provincial hospitals distributed at a rate of one hospital per province. The remaining are the district and sub-district hospitals, health centers and dispensaries. The district level is responsible for the good performance of district and sub-district hospitals, health centers and dispensaries while the provincial level is responsible for the good performance of provincial hospitals. There are about 4,145 public health institutions nation wide with approximately 420 hospitals, 579 health centers and 3,146 dispensaries (Central Bureau of Statistics 1999). From this structure it is clear that a lot of management of health care services is at the district level implying that the formulation of health plans and budgets should be done at the district level. We will find out whether this is the case or not in later chapter of the study.

The health care system in Kenya has been perceived as being divided into two major divisions namely curative and preventive services. The dispensaries and health centers provide mainly preventive services while hospitals provide curative services. Preventive services play a big role in health development since a large proportion of patients seen in Kenyan institutions

suffer from communicable diseases which can be prevented through simple public health interventions (MOH 1994). The division between preventive and curative services is also reflected in the patterns of financing with preventive services receiving approximately 20% of the recurrent health budget while the remaining goes to curative services (MOH 1994). This shows a high degree of inequity despite the wide recognition and emphasis of the importance of preventive services in the Kenya health policy framework. However the discussion of equity and allocative efficiency in resource distribution between such levels of care, though important issues is beyond the scope of this study. Instead the study concentrates on geographical equity in resource allocation without going deeper into the way in which these resources were put into use.

The Ministry of Health management is divided into four levels: central (headquarters), provincial, district and facility level (Collins et al 1995). The central level is responsible for setting policy, coordinating the activities of non-governmental organization, managing the implementation of policy changes regarding government services and monitoring and evaluating the impacts of policy change (MOH 1996). The provincial level acts as an intermediary between the headquarters and the districts. Its responsibilities include: to oversee the implementation of health policy, to maintain the standard of quality and performance and to coordinate, regulate and control all health services in both the public and private sector. The district level oversees all local health activities in the districts and reports to the provincial level. It acts as a link between the facility and provincial level.

2.3.3: Critical problems facing the Kenyan health sector.

There are several problems that constrain the ability of the Ministry of Health to ensure the delivery of adequate health care services. To start with, the ministry has limited finances and

expenditure has been going down. For instance in the 1980/1981 financial year, real per capital expenditure on health was US$ 9.80, but dropped to about US$ 4.50 in the 1991/92 financial year[2]. The share of the general government recurrent expenditure allocated to the Ministry of Health declined from 9.26% of the government total budget in the 1979/80 fiscal year to 8.51% in 1991/92 and to 7.61% in 1996/97 (MOH 1994). This decline in budgetary allocations has resulted in inadequate funding and shortage f key inputs required maintaining adequate standards of care (MOH 1996).

The maintenance and upkeep of public sector health services has become a burden to the MOH. Although the MOH recognises that many facilities are in need of repair, rehabilitation and replacement of basic capital equipment essential to the effective and efficient provision of quality healthcare, the shortfall in the funds available has lend to the neglect of basic requirements leading to physical deterioration of facilities and equipment (MOH 1996). This situation has been aggregated further because over 70% of the funds allocated to the MOH recurrent budget are used to pay staff salaries and allowance leaving insufficient resources for operational expenses like drugs.

In addition, the Kenyan health sector suffers from a poor referral system. Although he public health services are meant to have a self-regulatory referral system, the system doesn't necessarily work in the right way (MOH 1994). Ideally only those patients needing very specialised care need to be referred to the provincial and national hospitals but due to lack of adequate services at the district and lower levels, a lot of patients seek medical care at these hospitals causing the referral system to fail. This results in congestion of hospitals by patients who should be treated at lower costs in heath centers and dispensaries.

Further, the spread of HIV/AIDS epidemic is a major problem in the health sector. It has made a significant difference in demographic variables including mortality and life expectancy. In addition the cost of caring for AIDS patients is very high, to an extent that it is feared that if all AIDS patients were to acquire the necessary care, the cost of this care would be equivalent to the total recurrent budget of the MOH.

Focusing on health personnel, we find that there is an imbalance in the training of staff between cadres. There is a surplus of staff in the lower cadres and deficits in the professional staff. The geographical distribution of staff is equally poor. There is a concentration of key health personnel in urban areas despite the fact that around 80% of Kenyan population live in the rural areas. In addition about 70% to 80% of key health staff are involved primarily in in-patient curative care with outpatient services having a deficit of about 50% (MOH 1994). This highlights the issue of distributing health personnel equitably not only by geographical locations but also by different levels of care in the facilities.

A major problem facing the health sector is the mass flow of professional staff from the public to the private sector. Despite being trained at public expense, health staff tend to leave government service as soon as they possibly can to join the private sector. This movement has been attributed to low salaries and poor conditions of services in the public sector. At the extreme end are cases where doctors are leaving the country in search of greener pastures in developed and middle income countries where they are bound to get higher pay and better terms of service. Most of those who remain in the public sector engage in private clinics and have a tendency of referring the patients who come to government hospitals to their clinics for treatment. This has led to low quality services in government facilities due to low morale and lack of commitment among health personnel.

Despite the fact that the existing health legislation stipulates that no one should engage in private medical practice without being licensed, there seem to be no laws governing registration of private practitioners. There is evidence to suggest that present licensing arrangements have loopholes and that inspections of those involved in both part time and full time private practice are both inadequate and too infrequent (MOH 1996). Consequently, there are an increasing number of unregistered clinics being run by 'unqualified staff' whose main interest is to maximise profits. These clinics are a threat to the general health of the population.

In an attempt to solve some of these problems and to achieve the stated goal of the health sector, the MOH has identified the following six strategic imperatives. These imperatives are adopted from the Kenya health policy framework.

Summary of the strategic imperatives stated in the Kenyan health policy framework.

The overall goal of the health sector policy until the year 2010 is:

To promote and improve the health status of all Kenyans through the deliberate restructuring of the health sector to make all health services more effective, accessible and affordable.

The following are the six strategic imperatives:

- Ensure the equitable allocation of government resources to reduce disparities in health status.
- Increase the cost effectiveness and the cost efficiency of resource allocation and use.
- Continue to manage population growth.
- Enhance the regulatory role of the government in all aspects of health care provision
- Create an enabling environment for increased private sector and community involvement in health service provision and finance.
- Increase the diversity of per capita financial flows to the health sector.

According to MOH, the realisation of these imperatives will depend largely on the extent to which they can be put into practice at the district level (MOH 1994). The MOH argues that districts should be the focus for efforts to ensure equitable allocation of resources, increased cost-effectiveness and efficiency, greater control of the population growth, and greater private and community involvement in health. This confirms the issue raised earlier that the management of health care services is largely done at the district level and therefore highlights the importance of district health plans and budgets.

2.4: Summary

It is clear from the various issues discussed in this chapter that there are lots of challenges facing the Kenyan government. The fact that the Kenyan economy is experiencing difficulties implies that in addition to the health sector, other sectors are also experiencing some difficulties. In such a situation it is questionable whether the performance of the Kenyan health sector alone will lead to the improvement of the health status of the citizens. Health care is just one determinant of a good health status. Other sectors must work in hand with the health sector towards achieving the stated policy goal.

The structure and management of the health sector has shown that the district level has the largest responsibility in the management and delivery of health care. This implies that the district level is in a better position to understand the health needs of their population and should therefore be involved in the formulation of plans and budgets. The issue of whether districts' plans and budgets are considered in the resource allocation process is considered in later chapters. The other issue will be to see how the structure and management of the Kenyan health sector has contributed towards equity in health care.

CHAPTER THREE: LITERATURE REVIEW

3.0: Introduction

This chapter critically reviews the literature on resource allocation, equity and budgeting. It goes further to discuss the concept of need and the RAWP formula which is widely known for reducing disparities in England.

3.1 Background.

There are wide disparities in the availability of facilities including those of health at the international, national and regional levels (Akter 1994). According to Akter (1994) health care provision is simply a manifestation of society's organisation and distribution of scarce resources. However he argues that the distribution of scarce resources is not as easy as it may sound especially in the context of developing countries. This is because the personnel in developing countries lack the necessary skills to address issues on resource allocation. In most parts of sub-Saharan Africa, the majority of people suffer from excess mortality and morbidity while a few enjoy good health status, almost as good as that of the western world. Health services show imbalances with expenditure concentrated on sophisticated facilities in urban areas where a small proportion of the population live. The noble World Health Organisation slogan 'Health for All by the year 2000' has proven a great incentive to developing countries, many of which have seriously attempted to achieve this commitment (Akter1994).

Health problems in developing countries arise mainly due to socio-economic and environmental conditions, lack of adequate modern facilities and communal ways of life. There is need to devote more attention to ways and means which can help these poor countries to reduce the enormous problems facing the health sector. One possible method of

achieving this, which has received minimal attention, is an improved system of resource allocation which gives priority to the health needs of the poor population. This study argues that developing countries and Kenya in particular can improve the delivery of health services through a better resource allocation process. Further the study maintains that with a poor resource allocation process the health sector in Kenya will continue to provide services to only a limited section of the population. The following sections of this chapter aim to bring out the importance of such an approach by looking at the various issues that surround a resource allocation process and their implications for equity.

3.2 EQUITY WITHIN THE HEALTH SECTOR.

There is a considerable debate in the literature about the definition of health sector equity. There seems to be no single accepted definition of equity. However, there is consensus that equity implies that health care resources should be distributed in a "fair" or "just" way within a society (Mooney 1983). Equity implies that all people are treated fairly in relation to benefiting from health services regardless of their socio-economic status or place of residence. However it should be noted that fairness is a value judgement implying that what one individual views as equitable may not seem equitable to another (Reagon et al 1997).

When discussing the concept of equity in health care, it is important to note that there are two principles of equity: horizontal equity and vertical equity. In an attempt to distinguish the two, Black (1994, pp.22, 23) notes, "in essence horizontal equity accords equal treatment to equals, and vertical equity gives unequal, but appropriate, treatment to individuals or groups who are 'unequal' in specified respects, thereby meriting different provision. In the context of health care, horizontal equity could be regarded as equal access to what is available, vertical equity as the apportionment of care in relation to need." Such a definition

however is not practical because it is difficult to identify people who are equal. Further even in cases where one can identify people who can be termed as equal, it may be difficult to judge as to what equal treatment could be. Although the principle of vertical equity seems to be gaining popularity, this study adopts the principle of horizontal equity by arguing that every Kenyan citizen should have equal access to the currently available resources. However the study notes that it is difficult to measure access and tries to address this difficulty by adopting an appropriate definition of equity (see pg. 26).

Equity needs to be distinguished from equality. The distinction between the two concepts is important because being unequal may be judged to be fair and equitable (Whitehead 1992). Equality implies that all people should have the same health status. It is unlikely that all people will have the same health status, hence it is very difficult to achieve equality. On the other hand, equity implies that all people are treated fairly in relation to benefiting from health services. Given that the barriers to obtaining equal health are immense and cannot be overcome purely by provision of health care resources, achieving equity in resource allocation will not necessarily result in equality of health (Whitehead, 1992). Factors other than health care influence health. Such things include individuals behaviour (e.g. consumption of alcohol and drugs), genetic variations, cultural factors, environment among others.

As stated above, equity implies "fairness" and fairness requires a value judgement therefore one needs to explore the underlying ideologies associated with the resource allocation policy considerations (Culyer et al 1990). The next sub-section looks at the various ideological perspectives and how they influence the health care system.

3.2.1 Overview of the theories of justice as applied to the health sector.

Ideological perspectives profoundly influence the nature of a particular health system. Therefore when considering the concept of equity in health care, it is important to look at the different theories of justice (Gillon 1986). These theories include:

Libertarian theory: This theory argues that everybody is entitled to what they have, provided that they acquired it legally. Under this theory, health care is distributed on the basis of ability to pay, with state involvement restricted to providing a minimum of care for the indigent (Williams 1993). This theory heavily relies on market forces and assumes that the market is a fair way of allocating resources.

Utilitarianism theory:

This theory supports the idea of maximising the utility for the greatest number of people. It is more related to efficiency than equity.

Maximin theory:

This theory aims at maximising the benefit to the least advantaged. Rawls (1972) suggests that if people were operating behind a 'veil of ignorance', where they do not know their position in society, they would prefer to give priority in the distribution of social services to those who are worst off.

Egalitarianism theory:

This theory attaches equal net welfare to all individuals. It is identified as the strictest definition of equity and it implies that all individuals in society should derive equal health within the health sector context.

Marxist theory:

This theory depicts the importance of needs in the distribution of resources. It implies the distribution of health care resources on the basis of need rather than the ability to pay (Wagstaff and Van Doorslaer 1993).

As stated earlier, ideological perspectives influence and shape the nature of a society's health system. The above summary of the various theories of justice clearly shows how this is likely to happen. However it is unlikely that a country will adopt a single ideology on which to base the performance of its health care systems. According to Reagon et al (1997) most countries have a combination of the above mentioned ideological perspectives in their health policies and plans. They argue that the mix of these perspectives may vary over time, particularly with changes in government. For example traditionally there used to be a heavy reliance on the egalitarian theory in the Kenyan health sector but due to the economic hardships facing the country the MOH is adopting the libertarian philosophy where most health care services are offered on the basis of ability to pay.

This study seeks to develop a resource allocation process that relies on the egalitarian perspective where all Kenyan citizens will be in a position to derive equal health within the public health sector context. It is important to point out that modern egalitarianism is very close to Marxism and adopts a broader definition of equal health. In this definition, the attainment of equal health in relation to health care services is where everyone has right to access health services when in need. In other words, everyone has equal rights to health in the context of public health services.

We have seen that the resource allocation process in any health sector relies on the various ideological perspectives. This implies that policy goals and objectives are based on one or more of the above perspectives. Since equity is a major health policy goal in most countries, it is therefore likely to be influenced by the theories of justice. However as stated earlier, equity in health care service provision can be defined in various ways, which are linked to providing resources to overcome various natural obstacles in the way of attaining equal health for the population (Mooney 1983). It is therefore important to look at the various definitions of equity as discussed by Mooney (1983).

3.2.2: Different definitions of equity.

In an attempt to review the definition of equity, Mooney (1983) argues that there are seven possible definitions of equity. They include:

- *Equal expenditure per capita:* This definition is aimed at attaining an equitable allocation of financial resources to each individual in society.

- *Equality of inputs (resources) per capita:* This reflects different price levels and different ability to purchase health care inputs in different areas.

- *Equal inputs for equal need:* This definition considers variations in need (beyond simple population size) for health services.

- *Equal access for equal need:* Alternatively defined as equal costs to patients. It takes into account costs of accessing health care in different regions.

- *Equal utilisation for equal need:* Reflects the consideration of demand and supply in discriminating positively in favour of those who are less willing to utilise health care.

- *Equal marginal met need:* Mainly looks at improving the geographical allocation based on the cost-benefit approach.

- *Equality of health:* While the other definitions focus on equity in allocation of health care resources, this one emphasises equity in health.

Within the context of geographic allocation of resources, the most commonly used definition is that of *equal access to health services for equal need.* This definition implies equal entitlement to the available resources for everyone, a fair distribution throughout the country based on health care needs and ease of access in each geographical area, and the removal of other barriers to access (Whitehead, 1992). However it is difficult to define and measure access. Consequently, geographical resource allocation mechanisms usually have the goal of achieving equity in the distribution of resources per capita adjusted for health care needs (McIntyre, 1997). This study seeks to develop a resource allocation mechanism based on the definition of equity as equal inputs for equal need. However, it is not clear what should be regarded as need for health care. The next section discusses the concept of need in the health care context.

3.3 NEED IN THE HEALTH CARE CONTEXT.

As stated earlier, the equity debate falls under two broad alternatives namely horizontal and vertical equity. This implies that issues pertaining to need for health care fall in these two versions: a horizontal version (persons in equal need should be treated the same) and a

vertical version (persons with greater needs should be treated more favourably than those with lesser needs) (Culyer and Wagstaff 1993). This study adopts the horizontal version of need by arguing that all Kenyan citizens in equal need should be treated in the same way regardless of their place of residence and /or socio-economic status.

However, just like equity, the concept of need has no single definition and different people perceive need in different ways. In particular the issue arises of whose perception of need should be taken into consideration. The concept of need can therefore be viewed from different perspectives.

3.3.1: Need as ill health.

The concept of need for health care is generally related to 'ill-health'. Examples in the literature include Williams (1962) and Gillon (1986), both of whom suggest that persons who are more ill than others have a greater need. Wagstaff et al (1991) also argue that persons with similar health status have the same need and that persons with different health status have different needs. However, it should be recognised that health services may be required or 'needed' by 'healthy' people, and that being ill doesn't necessarily imply a need for health care (McIntyre 1997, Culyer and Wagstaff 1991).

The concept of need as ill health is not sufficient to explain the need for health care services. Preventive care, which has gained popularity over the years, is enough proof that one doesn't have to be sick in order to seek care. Hence an individual may have a need for health care but he/she may not necessarily be sick. A wider approach to the concept of need is therefore required.

3.3.2: Need as capacity to benefit.

Need can be considered as a capacity to benefit. According to this view, an entity can only be needed in so far as it is a necessary condition for some ultimate goal to be attained (Wagstaff 1993). In the context of health care, one may speak of health being needed and the goal might be a flourishing life or a vital purpose (Wiggins 1984). Further one may speak of health care being needed, the principle goal being the improvement of health. Culyer (1993) argues that need as capacity to benefit has two implications: First, if a marginal need is to be asserted, its expected marginal productivity in terms of health must be positive. In other words, there should be an expected capacity to benefit from the consumption of resources. Secondly, a positive marginal product is a necessary but not sufficient condition for a need to exist: There may be another less costly or more productive technology, which fulfils the goal more efficiently (Culyer, 1989).

Further, according to Culyer (1991), a person cannot be said to need health care if no technology is available to improve their health or to prevent its avoidable deterioration. To him, these people may need medical research, they may need comfort and most fundamentally need health, but they may not be in need of health care. An individual may thus be ill and not need health care.

3.3.3:Need as expenditure required to exhaust capacity to benefit.

An alternative definition of need is one adopted by Culyer and Wagstaff (1993) as the minimum resources required to exhaust an individual's capacity to benefit from health care. They argue that need is the expenditure required to reduce an individual's capacity to benefit to zero. If marginal capacity to benefit is zero, need is also zero. In a situation where

3.4: APPROACHES TO RESOURCE ALLOCATION AND BUDGETING.

Within the health care context, resource allocation and budgeting are critical stages of health planning, and are two sides of the same coin (Green 1992). They are the processes whereby the objectives of a service can be translated into action through the financial allocations and the authority to spend. It is therefore difficult if not impossible to consider the issue of resource allocation without giving due attention to the budgeting process. This section therefore considers the alternative approaches to health care budgeting and resource allocation and attempts to bring out the relationship between resource allocation, budgeting and planning.

3.4.1: Resource allocation

Resource allocation refers to the process of distributing health care resources, from a central (provincial or regional) level to more peripheral levels (Green 1992). According to Green (1992), resource allocation decisions should be taken at the national and/or provincial level and budgeting should occur at the periphery/district. He goes further to explain that the process of resource allocation needs to be done within a clear framework of equity thus ensuring that the resources are allocated on the basis of need. Reagon et al (1997) explore the issue further by highlighting the need for a planning approach that involves constant interaction and negotiation between different levels about the decision making process. Just like Green (1992), they maintain that the ultimate responsibility for the resource allocation decisions rests with the central level. However they go further to highlight the important role of the central level in the resource allocation process by arguing that the peripheral/districts level will be concerned with maximising the resources available for service provision in their area. This is because each level would like to deliver good health services to its population and therefore if given the authority to allocate resources each district would prefer to have as

much resources as possible. However it should be noted that health care resources are limited and if such an approach is adopted some districts will acquire a lot of resources while others acquire little or no resources at all. It is for this reason that Reagon et al (1997) note that the central level should play an arbitration role between the competing demand for limited resources from peripheral/district health service administrations. Such an approach ensures that the limited resources are allocated equitably between different areas.

3.4.2: Budgeting

Budgeting is the detailed information of how funds are to be used to meet the stated objectives (Green 1992). Budgeting gives a financial mandate and provides vital information for planning. There are different approaches to budgeting:

- *Institutional budgeting*: In this form of budgeting resources are allocated to the various institutions on the basis of last year's budgets.
- *Programme budgeting*: Programme budgeting attempts to relate resources as inputs to the programme. The rationale for this is that, in planning terms, it allows monitoring of the input-output relationship.
- *Historical incrementalist budgeting*: This approach to budgeting allocates resources on the basis of the previous year's budget with a few adjustments for inflation. This approach maintains the status quo, with the proportion of the total budget assigned to each institution or activity remaining the same.
- *Zero-based budgeting:* Under zero-based budgeting, no past activity is assumed to be sacrosanct. Every year each budget holder is required to justify the whole of his/her budget submission against stated objectives through the use of performance indicators. Failure to provide adequate justification can result in budget cuts.

As stated earlier historical incrementalism is the most widely used approach to budgeting. International experience has shown that the allocation of health care resources is frequently determined in an arbitrary manner and reflects historical inertia and/or the influence of powerful lobbies (Green 1992, Mays and Bevan 1987). Although this study doesn't adopt a particular approach to budgeting, it notes that historical incremental budgeting promotes inequity in health care. Other approaches have shortcomings as well, but programme and zero-based budgeting are generally more appropriate for achieving equity and efficiency goals. Whichever budgeting approach is adopted, the budgets must reflect the different health care "needs" of the population.

3.4.2.1: Linkage of planning and budgeting

The efficient utilisation of resources at the peripheral level requires detailed budgeting and planning at the local level (Reagon et al 1997). To be able to develop good budgets the processes of budgeting and planning should be linked. However in many health systems different people are responsible for planning and budgeting (Green 1992). As a result, planners fail to consider the recurrent expenditure implications of their plans, while those responsible for planning may not adequately translate the objectives of health plans into recurrent budgets. In order to ensure that available resources are used in an efficient manner, there has to be adequate planning and financial management capacity at the local level (Reagon et al 1997).

This study seeks to develop a resource allocation process in the Kenyan health sector where budgeting and planning is done at the district level. However the study notes that there is a possibility that well-resourced districts may have better information on budgeting and therefore have the capacity to develop coherent and impressive budgets and plans which

may once again tend to promote historical inequities (Reagon et al 1997). Consequently the study further highlights the need of a MOH that has a basis for independently assessing the relative need for health services in each district. In addition to the views of Green (1992) and Reagon et al (1997) the adoption of such an approach is based on the earlier discussion on the structure and management of the Kenyan health sector. If a better approach to resource allocation is not adopted, there will be a tendency to continue allocating resources on a historical basis which will drive the health sector further away from the stated health goal.

3.5: GEOGRAPHICAL RESOURCE ALLOCATION

The goal of geographical resource allocation is to promote equity. Among the various definitions of equity, equity in access has become a popular geographical resource allocation goal for which to aim (DHSS 1976). However as stated earlier, it is difficult to define and measure access. A more applicable definition is that of equal inputs for equal need. Even the most famous attempt at redistribution of resources on a geographic basis (the English RAWP process) claimed to have the goal of equal access for equal need but ended up focusing on equal inputs for equal need (Mooney 1983). As stated earlier, a good resource allocation process needs to be integrated with budgeting and planning. According to Reagon et al (1997) the integration of planning, budgeting and resource allocation mechanisms has three important objectives namely:

- To ensure an equitable distribution of resources between districts on the basis of population size and need for health care;
- To ensure improved allocative efficiency between districts.
- To ensure resources are efficiently utilised within districts.

This study seeks to achieve the first objective by exploring a resource allocation process that is based on health care needs for each district/province.

3.5.1: Geographical resource allocation by needs-based formula.

One mechanism that is widely used to evaluate and guide resource allocation decisions is that of a needs-based formula. It encourages health planners at the local level to prioritise health according to their goals (Doherty and Van den Heever 1996). Various formulae have been developed which attempt to distribute resources on the basis of need between geographical areas (Doherty and Van den Heever 1996). The first needs-based formula to be developed, and the best known, is the Resource Allocation Working Party (RAWP) formula. This formula has formed the basis for development of other country specific needs-based resource allocation formulae and will also be the basis of the formula to be developed in this study. Thus the next section briefly discusses the RAWP formula.

3.5.2: The resource Allocation Working Party Formula (RAWP).

The RAWP formula considered ways of redistributing health care resources so as to achieve equal opportunity of access to health care for people at equal risk or equal access for equal need (DHSS 1976). The main indicators of need that this formula took into account were: population size, adjusted by age/sex, morbidity and cross boundary movements.

The size of population in each region was the main determinant that RAWP identified for the provision of health services. It was however noted that people have different needs for health care. For example, the RAWP report found that while men and women aged 65 and over formed 14 percent of the population they occupied more than half of the psychiatric hospital beds. Thus in each region, population was weighted by national utilisation rates of

peoples in different age categories. It was also noted that even after taking account of age and sex differences, the population of regions still showed disparities in morbidity. However the formula couldn't measure morbidity, hence decided to use standardised mortality as a proxy of morbidity.

In addition, the formula accounted for cross boundary movements to ensure that allocations were based on the populations served by a particular service and not simply those residing within a specific administrative boundary. A 'London weighting' was introduced to compensate for the higher cost of health care provision in London. In a later version of the formula (DHSS 1986), the regional population was also weighted by a measure of social deprivation. A cross sectional study comparing morbidity and mortality measures with two scores of social deprivation in England, showed a good correlation between mortality and morbidity, as well as between mortality and social deprivation (Mays and Chin 1989).

Revenue allocation targets were calculated by distributing the total recurrent budget available for the provision of health services in England on proportional basis according to each geographical region's share of the weighted population. Resources were shifted away from those regions which were relatively over-resourced to those regions that were relatively under resourced. This redistribution was done gradually to avoid disruption of the delivery of health care services (DHSS 1976). The redistribution process was closely monitored and a ceiling of 5% growth over the previous year's allocation was set for under-resourced regions, while the maximum annual reduction for the over-resourced regions was set at 2.5% (DHSS 1976).

3.5.2.1: International experiences of needs-based formulae.

Many countries have adopted or are considering adopting a needs-based formula to guide the allocation of health care resources. Formulae have been extensively used in developed nations where data and skills necessary are readily available. However, it has been recommended that needs-based formula even of the simplest kind should be applied in developing countries where the effects of greater equity in resource distribution on health outcomes may even be more dramatic than experienced in developed countries (Bevan 1991). Some of the countries that have used such a formulae include South Africa, Australia, Canada, India, Mexico, New Zealand, Portugal, Spain United Kingdom and Zambia (Doherty and Van den Heever 1996).

Some of the indicators of need that other countries have used and which may be relevant to Kenya include: population size, percentage of people dependent on the private sector, demographic composition of the population, mortality/morbidity rates and socio-economic indicators such as income and housing.

3.5.2.2: Limitations of needs-based formulae.

The needs-based formula has achieved a lot in distribution of resources in England leading to a more equitable health service. However such formulae have some shortcomings which are worth considering. One of the major problems of need based formulae is that distribution of resources is done purely on the basis of need. Yet there is no single indicator of need, thus several indicators must be used (Doherty and Van den Heever 1997). Selecting indicators is difficult and may be influenced by interest groups (May 1995) and may thereby fail to achieve the goal of equity.

A major criticism of the RAWP methodology is that it didn't make adequate provision for allocating resources at the district level (Mays and Bevan 1987). Although the RAWP formula has been successful in breaking the historical inertia in resource allocation between regions, it doesn't give details as to how such a formula can be used in a small geographical region or within a province.

Further, need-based formulae focus only on the distribution of recurrent financial resources (Doherty and Van den Heever 1997). It therefore leaves out important information as to how other resources should be distributed. While recurrent resources contribute significantly to the health sector, one can't ignore the importance of other resources, for example, resources used for capital projects and development and the impact they are likely to have on equity in health care if they were to be distributed in an unjust manner.

Need-based formulae allow redistribution of resources from over-resourced to under-resourced areas (McIntyre 1997). Redistribution of resources be it financial or human always faces opposition from interested parties and especially from those in the advantaged regions. This opposition is not only limited to health service managers but equally expected to arise from residents of these areas (Reagon et al 1997). Political forces are also likely to be a major obstacle to redistribution. As a result it would be important for a health sector that is adopting a needs based formula to pay attention to the process of redistribution and how it can offset opposition from different actors.

Although risk-adjusted capitation formulae are used for provider reimbursement in countries such as the United States to encourage cost containment and efficiency, a formula which focuses on equitable geographic resource allocation does not have a strong impact on

efficiency (Doherty and Van den Heever 1997). For example, needs-based formulae assume that younger, better-off people make less use of public services which is not always the case. Another means of addressing efficiency must be taken into consideration. This indicates that countries adopting a needs-based formula should ensure that equity is not achieved at the expense of efficiency.

The above discussion summarises the approach and limitations of needs-based formulae. However the extent to which the various needs-based indicators can be incorporated in a formula highly depends on data availability in a country. It would be difficult to get accurate data of some of the needs-based indicators that were used in England. Hence the study seeks to develop a simple formula based on data that are available in Kenya, namely population size and infant mortality rates. Bevan (1991) recommends that needs-based formulae, even of the simplest kind, should be applied in developing countries where the effect of greater equity in resource distribution on health outcomes may even be more dramatic than experienced in developed countries. This is the approach of this study; simple needs-based formulae can have a great effect on equity in the Kenyan health sector.

3.6: Framework for evaluating equity in health care.

As stated earlier, equity in health care can be discussed from various perspectives, the main ones being geographic and socio-economic perspectives. This study focuses on geographical equity. The study adopts the egalitarianism theory of justice, arguing that all individuals in the society should have the right to access health services when in need within the public health sector context. As stated earlier there is no one accepted definition of equity. The study therefore adopts the definition of equity as equal inputs for equal needs, inputs being the resources available in the Kenyan public sector. Further the study focuses on need as being ill

health. The indicators of need used in the study are population size per province and infant mortality rates. The study would have incorporated other indicators of need like morbidity, demographic structure of the population and socio-economic status. However this was not possible due to data unavailability.

CHAPTER FOUR: METHODOLOGY

4.0: Introduction

This chapter discusses the fieldwork methodology used in the study. Section 4.1 presents the data sources while section 4.2 and 4.3 discusses sampling and data collection techniques respectively. The chapter ends with a brief discussion on the methodological difficulties.

4.1: Types and sources of information.

This study purely focuses on the public health sector. It uses both secondary and primary data. Some of the information collected include: actual expenditure (recurrent and development), distribution of key health personnel, distribution of facilities, and population distribution.

Data on both development and recurrent expenditure was derived from the appropriations accounts (a government publication) for the 1997/98 financial year. Although data on the distribution of expenditure for the 1998/99 financial year was available, it was not comprehensive enough and its accuracy was questionable, hence the researcher opted to only use the data for 1997/98 financial year.

The data on personnel include the total number and distribution of doctors, nurses, clinical officers and pharmacists. The study concentrates on these cadres because they are the ones who are mainly involved in the delivery of health care services in Kenya. Other cadres are important as well but couldn't be included in the study due to lack of well-disaggregated data. This data was derived from publications by the Central Bureau of Statistics.

Further the study collected information on the distribution of health care facilities and beds. Facilities data included hospitals, health centers and dispensaries. Only information on the distribution of health centers and dispensaries was used in the analysis. This is because the size of hospitals varies and may range from one that has 10 beds to one that has more than 100 beds. As a result, it is difficult to compare the distribution of hospitals and its implications for equity. Instead the number of beds in a province gives more information and was therefore used in the study. This data was derived from the 1998 statistical abstract. Data on the distribution of the population was derived from the Central Bureau of Statistics publication.

Further the study collected information on Kenya's political, social and economic background. Some of the information collected includes: the macro-economic, demographic and epidemiological profile. This information was derived form the Government of Kenya's publications and multilateral agencies such as World Bank and World Health Organisation.

4.2: SAMPLE SIZE AND SAMPLING TECHNIQUE

The study is divided into two parts. The first part involves a detailed analysis of distribution of health care resource within provinces. For this part, the study focuses on all the eight provinces in the country and therefore no sampling was required. Data sources for this part of the study are described above.

The second part of the study looks at the resource allocation and budgeting processes. Due to time and resource constraints, this study couldn't cover all the provinces in the country. This part of the study required views from both the headquarters and the district level. Nairobi province, which hosts the Ministry of Health headquarters, was obviously chosen to be part

of the study. For the purpose of the district level, a representative sample had to be chosen from the remaining seven provinces. Sampling was done in two stages. In the first stage, four provinces were selected using non-random purposive sampling. The reason for this is that the study wanted to concentrate on provinces with certain characteristics. They include Central, Western, Nyanza and Riftvalley provinces. For example Central and Riftvalley provinces were chosen because of their historical, economic and political background. These provinces were original homes of the Presidents of Kenya, the first president being from Central province while the second and current president is from the Riftvalley. Consequently it is perceived, though it has not been documented that these two provinces have received preference in past resource allocation in all sectors. On the other hand it is perceived that Nyanza and Western provinces are relatively under-resourced.

The second stage involved choosing some districts from the four provinces chosen previously. This was to enable the researcher to be able to collect information on the resource allocation process at the district level. Kisumu, Uasin-gishu, Kakamega and Nyeri districts were selected for convenience purposes and also due to their historical and political background. In-depth interviews were carried out with the help of two research assistants. Each of the four districts was visited. The people interviewed included officials in the planning department, the district medical officers and members of the District Health Management Boards. In total ten respondents were interviewed at the headquarter level and eight from the four districts.

4.3: INSTRUMENTS AND TECHNIQUES OF DATA COLLECTION

4.3.1 Interview schedule

Interviews were carried out in two levels namely: the Ministry of Health headquarters and the district level. The study used semi-structured interview schedule. This was to enable the respondent to explain in detail his/her understanding on the resource allocation process. The major focus was at the headquarter level because international information on the resource allocation process notes that resource allocation decisions should be made at the central level. However it was equally important to find out the role of the district in the resource allocation process. This is because of the wide recognition that districts/province should be involved in the resource allocation process mainly through the formulation of district health plans and budgets (Green 1992, Reagon et al 1997).

The same interview schedule was used in both cases with a few adjustments at the district level. Interviewing started off with the headquarters since information acquired at this level formed a base on what was to be collected at the district level. A copy of the interview schedule is attached in the appendix.

4.4: DATA ANALYSIS

Data was analyzed in the following ways:

4.4.1: Expenditure

As stated earlier, the study was based on both development and recurrent data for the 1997/98 financial year. This data excludes expenditure on specialized services (e.g. spinal injury and psychiatrics services). Data on expenditure was disaggregated by type of hospital and for each geographical area. In addition per capita expenditure was calculated.

4.4.2: Health facilities and personnel

The data was analysed according to:

- Distribution by geographical area
- Number of beds per 1,000 population
- Number of personnel per 100,000 population
- Population per facility.

4.4.3: Population and mortality data

Data on population was classified according to geographical area. Data on infant mortality rates was also classified according to provinces. This information was used as an indicator of need and was used to weight the population. The reason for using IMR as an indicator of need is that it was readily available and that there is a correlation between IMR and socio-economic status. However though important data on socio-economic indicators was not available in a disaggregated manner, which further justifies the use of IMR. In addition, IMR are seen as a proxy of the burden of ill-health and are also known to be independent from supply forces (Mays and Bevans 1987). This is in accordance with the characteristics of a needs-based indicator that should be used in a resource allocation formula (Doherty and Van den Heever 1997).

4.4.3.1: Weighting provincial populations to reflect relative need.

Allocating resources on the basis of need requires that the total estimated population within each geographical area be adjusted/weighted to reflect the relative need for health services (McIntyre et al 1997). As stated earlier, due to data limitations, the study uses IMR to reflect the relative need for public health services. This is because population of the same size may experience different mortality patterns.

To adjust the population to reflect IMR, the study normalised the IMR. This was done by dividing the IMR (per 1,000 births) for each province by the lowest level of IMR. This means that the province which had the lowest IMR (Central) had a level of normalised IMR of 1.

The acquired value of normalised IMR for each province was multiplied by the population size of the particular province to estimate the distribution of the weighted population. This was then totalled up. Each province's weighted population was divided by the total weighted population to estimate the percentage distribution of the weighted population per province. The results of these calculations are found in appendix 3.

The weighted population was used to calculate resources per capita, which was later used to show how far each province was from the equity target. The equity target was represented by the national average per capita level.

4.4.4: Social-economic data.

This involved data on the distribution of households per province who have access to piped water, electricity and main sewer as a means of sewage disposal. This information was used as a basis of comparison between provinces regarding their equity positions and their socio-economic status[3].

4.5: Methodological difficulties.

The major problem faced in the study was that of limited data. For example to be able to evaluate equity positions of each province, a need-based formula should take into consideration a range of different indicators of need. Initially the study hoped to incorporate data on mortality, population distribution, demographic composition of the population,

morbidity and social economic indicators. However of these, only data on population distribution, mortality and social –economic indicators was available. Data on social economic indicators though available was appropriately disaggregated and could not therefore be used in the analysis.

Further it was difficult to obtain data on expenditure especially from the district level, therefore the study had to rely on data from the ministry. Some providers lacked complete data on a few facilities. In addition, expenditure data was not as well disaggregated as expected. For example expenditure for health centres and dispensaries was grouped together with the sub-district hospitals. This made it difficult to analyse how it was distributed between type of facility within provinces. The number of personnel and beds per province had also not been allocated to specific facilities where they are located.

It was equally difficult to get information on the resource allocation process because some officials were not willing to discuss in detail how he process take place. In some cases no information was given at all because no one wanted to admit that he/she was involved in the resource allocation process.

The above limitations were however not expected to have any major impact on the findings of this study.

[3] for explanation on how social-economic data is used refer to page 68.

CHAPTER FIVE: EVALUATION OF THE DISTRIBUTION OF HEALTH CARE RESOURCES IN KENYA WITH REGARD TO EQUITY.

5.0: INTRODUCTION

This chapter presents an in-depth analysis of the current health care resources available to the Kenyan health sector and how they are distributed between different geographical areas. It should be noted that the study focuses on the public sector and hence examines the resources provided by the Kenyan government through the MOH. Other sources of finance are beyond the scope of this study. This chapter will discuss the geographical distribution of resources and highlight the differences and inequities between provinces.

5.1 Geographic equity implications of health care resources in the Kenyan health sector.

As stated earlier, this study evaluates geographical equity in terms of equal resources for equal *need*. The study heavily relies on the Resource Allocation Working Party (RAWP) developed in England. It should however be noted that the two approaches differ in the way they define equity. The study on RAWP aimed at achieving equity in access to health care on the basis of need, but ended up on achieving equity in health care inputs on the basis of need (Mooney 1986). However the RAWP formula still remains the best approach to achieving equity in health care.

Wagstaff and Van Doorslaer (1993) highlight the importance of balancing equity and efficiency. They argue that greater equity in health care is usually achieved at lower levels of efficiency. This arises due to the fact that provinces lack the capacity to absorb changes in budgetary allocation. Consequently the study points out that appropriate policies that address

both equity and efficiency, should be put in place before substantive changes regarding equity are implemented.

5.2: Health care expenditure in Kenya.

Total actual health care expenditure for the 1997/98 financial year was Kenyan pound 479,029,022. Of this 437,798,391 Kenyan pounds was used to meet recurrent costs while 41,230,631 was used for development. As expected recurrent expenditure was more than ten times the value of development expenditure. This is because staff salaries, which is part of recurrent expenditure accounts for over 60% of total health care expenditure in most countries.

5.2.1: The resource allocation process: National level resource allocation decision making and the link with district level planning and budgeting.

As stated earlier, resource allocation and budgeting are two sides of the same coin. Therefore when discussing the resource allocation process it is important to first understand how the budgeting process is carried out. According to Green (1992) resource allocation should be undertaken at the provincial level, and budgeting should occur at the periphery/district level. Such an approach calls for constant interaction and negotiation between the different levels about resource allocation decisions. However the ultimate responsibility for resource allocation decisions rests with the central and/or provincial level, while the authority to plan, budget and spend should rest at the district level (McIntyre et al 1997). It is thus important to present information from interviews with the central and provincial/district Health officials on how resource allocation decisions are made and whether or not district plans and budgets influence these decisions.

Results from the interviews at the central and district level indicated that health sector commitment to equity exists in theory but more often than not it doesn't arise in the resource allocation process. For example, at the central level, one interviewee noted that *"Kenya is still far away from equity. We document it, yes but we put it aside when it comes to the resource allocation process."* Asked why equity was put aside, the interviewee said that attempting to achieve equity was a very complicated process. However all the interviewees noted that there is a heavy reliance on historical budgets with an inflationary increase of 4%. In addition to the incremental budgeting approach, other factors taken into consideration are the number of facilities and personnel in a province. This is what is used to indicate the need of a province. Asked about the budgeting process, a senior official noted that *"It is a very easy process. We don't have to bother ourselves, if a province has the highest number of hospitals then it follows that this particular province should get more money than the rest"*. This tells us that resource allocation follows the forces of supply and demand, with provinces which have more facilities getting a larger share of resources at the expense of those provinces that have few facilities. Asked about the district role in resource allocation process, the interviewees maintained that despite the fact that districts develop their budgets which they present to the District Health Management Board, these budgets play no role in the resource allocation process but they have to be formulated as a matter of formality.

Interviews carried out at the district level presented similar results with historical incrementalism coming up as the main approach to budgeting. However they confirmed that health care needs (like disease patterns and mortality) were taken into consideration and were incorporated in the budgets. One thing that came out clearly is that officials at the district level prepare budgets that are based on the health needs of their districts but these budgets are not considered in the resource allocation process. Asked to comment about their views on the

allocation process, a district official who is involved in the budgeting process noted that "*We are not happy. We spend a lot of time trying to make budgets that match with the needs of our people. But those people in the ministry don't recognise our efforts and do the allocation on their own basis. They should give us a hearing because we are the ones who relate with the people and therefore we know their needs better*".

This is evidence that the needs of the population are rarely taken into account in the allocation process. Some interviewees noted that the main reason for not adopting a needs-based formula is that it is complicated and time consuming and it's not worth the effort. When asked to elaborate why he thought that a needs-based formula is not "worth the effort" the interviewee noted that "*you put a lot of time trying to make budgets that meet the needs of a particular province but when it is forwarded other factors e.g. political come into play and the budget is not taken into account*". With such a budgeting process one would not expect much as regarding equity in health care. It would therefore be interesting to look at what this kind of budgeting has achieved in terms of distribution of health care resources and its implications for equity.

5.3: AN OVERVIEW OF THE GEOGRAPHICAL DISTRIBUTON OF HEALTH CARE RESOURCES.

5.3.1: Expenditure allocated to KNH

Before discussing the geographical distribution of health care resources, there are some issues that require attention. Of major importance is the case of resources allocated to KNH (the national teaching and referral hospital) and whether these resources are used to serve Nairobi residents alone, or are also used to offer services to residents of other provinces as well.

According to the structure of the Kenyan health system, KNH is supposed to offer services to people from all parts of the country.

Being a national referral and teaching hospital, KNH has highly skilled personnel, a high staff to bed ratio, sophisticated and expensive equipment and a large number of beds. If it was clear that these resources are used to serve population from all over the country, there would be no cause for concern about the large amount of resources allocated to KNH. Consequently it would be unfair for one to assume that the total allocation to KNH serves the Nairobi population alone. Such an assumption is bound to give a wrong picture on equity positions of all provinces. However if these resources are mainly used to offer basic health care services to the Nairobi residents, then the case of KNH raises a lot of concern and would imply that redistribution of resources from KNH to other levels of care and provinces should be viewed as a matter of priority. Unfortunately, no information is currently available on the amount of resources allocated to KNH that is used to serve population from other provinces.

To be able to deal with this problem, the study gives KNH the benefit of the doubt and assumes that part of the resources allocated to KNH are used to serve the population from other provinces. Firstly, the study assumes that 50% of the KNH resources are used to serve the population in Nairobi while the remaining 50% is used to offer services to people from other provinces. However even after reducing expenditure on KNH by 50%, it is highly likely that Nairobi province is still relatively over-resourced compared to other provinces. The study therefore conducts another sensitivity analysis assuming that only 25% of KNH resources are used to serve Nairobi residents. The implication of these different levels of sensitivity analysis on equity positions is presented in a later section of this chapter.

5.3.2: Distribution of Health care expenditure.

The table below shows the geographical distribution of expenditure. As stated earlier data on specialised services was not included in the study. This explains the difference in total expenditure as compared to the one discussed in section 5.2. As expected Nairobi province (the capital city) has the highest level of expenditure of 114,734,787 Kenyan pounds, which represents approximately 32% of total health care expenditure. At the other end of the scale is Northeastern province which has the lowest expenditure of 9,163,808 Kenyan pounds, a value that is 2.6% of total health expenditure.

Table 5.1. Distributions of health care expenditure for the 1997/98 financial year.

Province	Recurrent expenditure	Development expenditure	total	% of total
Nairobi	88,906,592	25,828,197	114,734,789	32
Central	36,373,573	571,000	36,944,573	10.3
Coast	33,153,836	85,000	33,238,836	9.3
Eastern	41,098,786	110,000	41,208,786	11.5
North Eastern	9,158,808	5,000	9,163,808	2.6
Nyanza	27,801,164	42,500	27,843,664	7.8
Riftvalley	73,364,427	859,600	74,224,027	20.6
Western	19,963,968	1,432,264	21,396,232	6
Total	329,821,154	28,933,561	358,754,715	100

Source: national appropriation accounts 1997/98 financial year.

The total expenditure of the three provinces with the least resources (Northeastern, Western and Nyanza) is 58,403,704 Kenyan pounds approximately 16% of the total expenditure which is half that of Nairobi province alone (approximately 32% of total expenditure).

5.3.3: Distribution of human resources.

The table below shows the geographical distribution of Key Health Personnel (KHP). They include nurses, doctors, pharmacists and clinical officers. These cadres are the ones directly involved in the delivery of curative and preventive services to patients at health facilities.

Table 5.2: Distribution of health personnel for the year 1998.

Province	Nurses	Doctors	Pharmacists	Clinical off'	total	% of total
Nairobi	6,139	1,908	261	359	8,667	21.1
Central	4,645	337	98	456	5,536	13.5
Coast	2,735	449	88	312	3,584	8.7
Eastern	4,653	308	95	528	5,584	13.6
N Eastern	660	32	1	56	749	1.8
Nyanza	3,944	319	194	403	4,860	11.8
Riftvalley	7,165	629	246	687	8,727	21.3
Western	2,830	182	45	298	3,355	8.2
Total	32,771	4,164	1,028	3,099	41,062	100

Source: Health Information System (MOH)

The results portray a pattern similar to that of expenditure with Nairobi and Riftvalley being the leading provinces once again. However Riftvalley province holds the first position with a total of 8,727 that is 21.3% of the total and Nairobi is second with 8,667 (21.1% of total). Northeastern province has the lowest number of personnel in all cadres with a total of 749 approximately 1.8% compared to Nairobi and Riftvalley provinces which have about 21% of KHP each. The situation is especially discouraging in the pharmacist cadre with only one pharmacist in this province as compared to Nairobi that has 261 pharmacists. A possible explanation for this is that Northeastern province is dry, remote, has poor physical infrastructure and experiences frequent attacks from neighboring countries. This makes it

difficult for KHP to work under such circumstances and any attempt to re-allocate staff to these areas is likely to receive high resistance.

The ranking of provinces according to personnel numbers follows a pattern similar to that for expenditure. This similarity in the pattern of these resources is expected however due to the large amount of health care expenditure that goes to salaries. This means that provinces with the highest level of expenditure are likely to have the highest number of personnel.

It would be important to compare the relationship between percentage distribution of personnel and expenditure in more detail. It is interesting to note that Nairobi province has 21% of personnel yet it receives 32% of total health care expenditure. This is due to the type of personnel found in this province. As stated earlier, KNH has highly skilled staff who are likely to be receiving high salaries. For example, 22% of staff in Nairobi are doctors compared with the national average of 10% of staff being doctors. On the other hand, Central province has expenditure of about 10.3% of the total yet it has 13.5% of total staff. This shows that the staff found in this particular province have low skills as compared to those found in Nairobi. For example, 84% of the staff found in Central province are nurses compared to the national average of 80% being nurses.

5.3.4: Distribution of facilities and beds.

The table below presents the distribution of facilities within the country. These facilities include health centers, dispensaries and beds. Riftvalley province has the highest number of facilities once again with a total of 1,111 facilities and 10,401 beds. This explains further why the province has the highest number of personnel. The total number of facilities found in Nairobi is low relative to its share of total expenditure. This is because most of the services in

Nairobi are provided at KNH. This supports the assumption that at least part of the KNH services are directed at basic service provision for Nairobi residents. At the other end of the scale is Northeastern province with less than 2% of total facilities followed by Western which has about 6.5% of total facilities.

Table5.3: Distribution of facilities and beds for the year 1998.

Province	Health centers	dispensaries	total	% of total	Total beds	%of total
Nairobi	36	303	339	9	6,691	12.8
Central	78	345	423	11.4	7,218	13.8
Coast	48	361	409	11	4,227	8.1
Eastern	73	665	738	19.8	6,516	12.5
North Eastern	9	53	62	1.7	1,501	2.9
Nyanza	104	298	402	10.8	9,879	18.9
Riftvalley	148	963	1,111	29.8	10,401	19.9
Western	83	158	241	6.5	5,753	11
Total	579	3,146	3,725	100	52,186	100

Source: Health Information Systems (MOH).

The distribution of beds follows a pattern that is similar to that of facilities with Riftvalley leading with a total of 10,401 beds, a figure that is 19.9% of total beds available. As expected Northeastern has the lowest number with less than 3% of total beds. However this distribution is different from that of personnel and expenditure. For example, Nairobi province which has 21.1% of health personnel and 32% of total expenditure has only 12.8% of beds. This tells us that there is a high staff to bed ratio in Nairobi. This is expected due to KNH being the national referral hospital, but if a large percentage of KNH resources are used to offer basic health care services to Nairobi residents, the efficiency of this staffing level is questionable.

It would be wrong for anyone to judge the equity of resource distribution on the basis of the above information. To be able to conclude whether resources are equitably distributed or not, other factors like indicators of need must be incorporated into the analysis of distribution. The next section looks at the distribution of these resources relative to the population size of each province.

5.4: DISTRIBUTION OF RESOURCES RELATIVE TO POPULATION.

A simple resource allocation formula is one that uses the population size as the main determinant of resources allocated to a particular geographical area. However even such a simple formula is likely to achieve more regarding equity in developing countries as compared to the widely used approach of historical incremental budgeting. This section analysis the distribution of resources relative to population.

5.4.1:Distribution of financial resources relative to population.

The main determinant of need for health care services is the population size. One way of evaluating equity in health care is by analysing resources relative to population size.

Table 5.4 presents the distribution of resources per capita. In simple terms, it shows the number of Kenyan pounds that the government is using in providing health care services per person. Nairobi province has the highest per capita expenditure of 53.70 Kenyan pounds followed by Coast, which has a per capita expenditure of 13.34 Kenyan pounds. These are the only provinces that have their expenditure above the national average. Nairobi province for example has expenditure that is 41.18 Kenyan pounds higher than the national average of 12.51. Even if it was assumed that only 25% of KNH was devoted to providing basic health

services to Nairobi residents, that is, if 75% of KNH expenditure is excluded from the analysis, Nairobi province would still record the highest per capita expenditure (18.43).

Table5.4. Distributions of per capita health care expenditure

Province	Recurr'expenditure	Devt expenditure	Total
Nairobi	41.61	12.09	53.70
Central	9.82	0.15	9.97
Coast	13.31	0.03	13.34
Eastern	8.85	0.02	8.87
North Eastern	9.53	0.01	9.54
Nyanza	6.32	0.01	6.33
Riftvalley	10.49	0.12	10.62
Western	5.95	0.43	6.38
National average	11.50	1.01	12.51

All other provinces lie below the national average with Nyanza being the lowest with a per capita expenditure of 6.33 pounds, which is only 11.79% that of Nairobi. One issue that arises out of expressing resources relative to population is that Northeastern province is now doing relatively well (although it still lies below the national average) with a per capita expenditure of 9.54 Kenyan pounds. Previously this province had the lowest quantity of resources in all categories and it was possible for one to conclude that the province is extremely under-resourced. However, relative to its population size, this province is not as under-resourced as other provinces. Other provinces that have maintained the leading positions are Riftvalley and Central.

5.4.2: Distribution of human resources relative to population.

Table 5.5 shows the distribution of human resources per 100,000 population. Nairobi province has the highest number of 405.57 personnel per 100,000 population.

Table 5.5. Human resources per 100,000 population.

Province	nurses	doctors	pharmacist	Clinical off'	total
Nairobi	287.27	89.28	12.21	16.80	405.57
Central	125.37	9.09	2.65	12.31	149.42
Coast	109.80	18.02	3.53	12.52	143.88
Eastern	100.22	6.63	2.05	11.37	120.27
North Eastern	68.68	3.33	0.1	5.83	77.94
Nyanza	89.70	7.25	4.41	9.17	110.53
Riftvalley	102.49	9.0	3.51	9.83	124.83
Western	84.38	5.43	1.34	8.88	100.03
National average	114.27	14.51	3.58	10.81	143.18

Northeastern province has the lowest number of personnel of 77.94 per 100,000 population, a number that is five times lower than that of Nairobi. It is important to point out that Riftvalley, which had the highest number of human resources, lies below the national average staff to population ratio. This shows how population size can influence the assessment of resource distribution. Nairobi province lies above the national average in all cadres with very wide disparities especially in doctors where it leads with 89.28 which shows a difference of 96.29% as compared to the lowest province. Focusing on the total personnel we find that only three provinces (Nairobi, Central and Coast) are above the national average. This gives the impression that these three provinces are relatively over-resourced in relation to staff, while the remaining five provinces are relatively under-resourced.

It is important to note that compared to other countries with a similar level of economic development, Kenya is doing relatively well in terms of human resources. For example, compared to the Kenyan national average of 14.5 doctors per 100,000 population countries like Ghana and Angola have an average of 6.2 and 7.7 respectively while that of pharmacists is 0.1 for Ghana and 0.2 for Angola (WHO 1997). This tells us that compared to other countries, Northeastern province is not doing as badly (in the case of pharmacists) as it may appear.

5.4.3: Distribution of facilities and beds relative to population.

Table 5.6 shows the geographical distribution of health care facilities. It shows the number of people served by these facilities in each province. The fifth column shows the number of beds per 1,000 population. For convenience purposes the study will concentrate on the combination of both dispensaries and health centers.

The results show that facilities in four provinces serve a relatively higher number of population than the national average. These provinces include Western, Nyanza, Northeastern and Central. Coast province has the lowest population per facility of 6,090 followed by Eastern province which has a population of 6,291 people per facility. The national average tells us that if facilities were distributed equally each province is supposed to have 7,699 people per facility. Northeastern province is the worst hit province with a population of 15,500 people per facility a figure that is more than double that of the leading provinces. The World Health Organisation (WHO) recommends a value of 10,000 people per primary health care facility. This tells us that Kenya is doing relatively well with an average of 7,699 people per facility. However some provinces like Northeastern, Western and Nyanza are all badly off

in relation to international norms. The fact that Kenya overall is within international norms further highlights the need of distributing resource more equitably between provinces.

The distribution of beds per 1,000 population shows different results. If the number of beds were to be distributed equally, we would have 1.82 beds per 1,000 population. However this is not the case hence we find that disparities still exist between provinces. Two of the provinces (Central and Nyanza) which had facilities serving more people than the national average seem to have more beds than the national average with Nyanza being 23% above the average. Nairobi emerges the highest once again with 3.13 beds per 1000 population, a figure that is 72% higher than the national average. Eastern province has the lowest number of beds of around 1.4 per 1,000 population.

Table 5.6. Population per facility and beds per 1,000 population

Province	Health centers	dispensaries	total	Beds/1000 pop
Nairobi	59,361	7,053	6,304	3.13
Central	47,500	10,739	8,759	1.95
Coast	518,956	6,900	6,090	1.70
Eastern	63,603	6,981	6,291	1.40
North Eastern	106,778	18,132	15,500	1.56
Nyanza	42,279	14,755	10,937	2.25
Riftvalley	47,236	7,260	6,293	1.49
Western	40,410	21,228	13,917	1.72
National average	49,532	9,116	7,699	1.82

Having looked at the distribution of resources relative to population, the next step would be to express these results relative to the national average to highlight the extent to which each province is relatively over-resourced or under-resourced.

5.5:EVALUATION OF PROVINCIAL EQUITY POSITIONS USING UN-WEIGHTED POPULATION FIGURES.

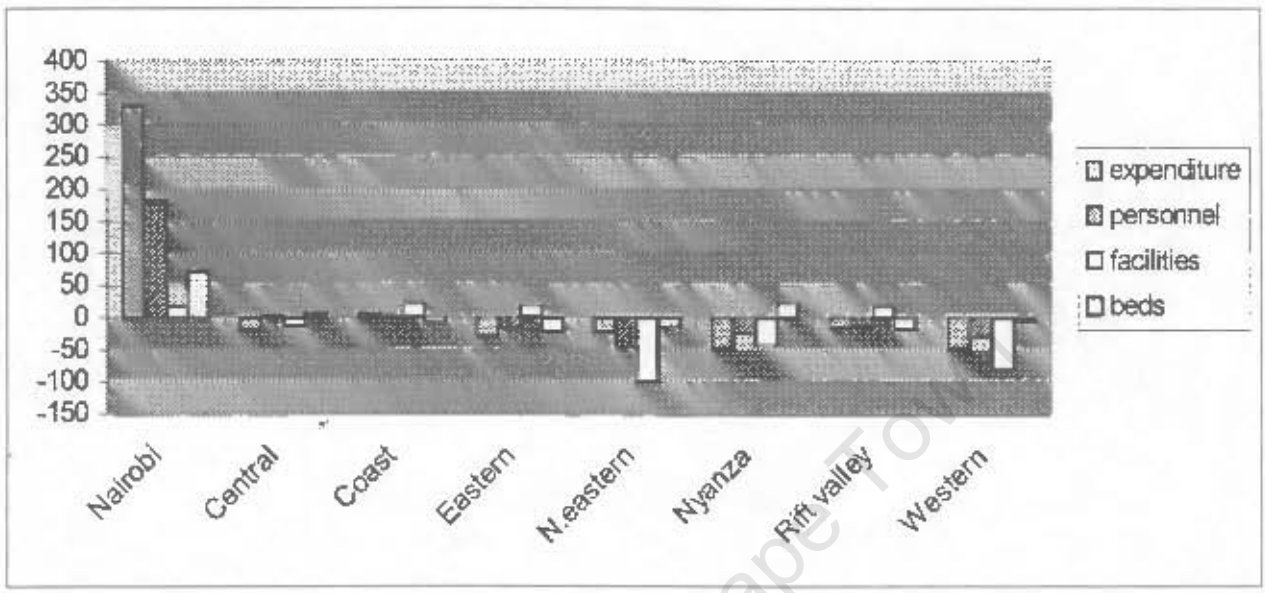
The section below not only compares each province to the national average, it also considers the effect of including the total expenditure of KNH with that of including only 50% and 25% of KNH total expenditure. As stated earlier KNH is the national referral hospital. It should be noted that one issue that arises when evaluating geographical equity of health care services is the number of referral hospitals in a geographical area. In Kenya each province has a provincial hospital which acts as a provincial referral hospital. However KNH in Nairobi is the tertiary referral hospital for all the provinces. This implies that it is not unexpected that Nairobi province has more resources per capita compared to other provinces. However there is a possibility that Nairobi province (being the home of the capital city) has more resources per capita than it should have from an equity perspective. To be able to arrive at a conclusion, a sensitivity analysis will be carried out in a later section.

5.5.1: Evaluation of Provincial equity positions- including 100% of KNH.

Fig 5.1 shows the effect of using un-weighted population figures to derive the relative equity positions of provinces in relation to the national average. It reflects the percentage by which each province is above or below the national average per capita resource levels. Each bar shows how far the particular province's expenditure/resources is from the 'equity target' allocation. The equity target allocation is represented on the graph by zero and is based on the national average per capita.

According to the figure, only Nairobi and Coast provinces have per capita expenditure above the national average with Nairobi having 329% above the average.

Fig 5.1: Provincial resource allocation inequities using un-weighted population- including 100% of KNH



Other provinces are between 20-49% below the average. Nyanza lies the furthest away from the national average, being –49.38% below the average. The extreme case of Nairobi highlights the importance of estimating the proportion of resources in this province that are used to serve the population from other areas. Such an estimate helps in bringing out a clear picture of whether Nairobi is actually over resourced or not.

Results of the distribution of personnel present a similar pattern with Nairobi, Coast and Central provinces being above the national average. Of these, Central comes second with an average of 4.36% above the "equity target" followed by Coast which is only slightly above the national average. Northeastern province lies furthest from the national average being about 45% below average. Other provinces are between 12.8-30% below the average.

The distribution of facilities portrays a pattern similar to that of expenditure and personnel, with four provinces having facilities serving a population below the national average. Northeastern province lies 101.32% below the "equity target". Relating this to development expenditure we find that the provinces which seem to serve a higher population than the national average have development expenditure which is far below the national average. A good example is the Northeastern province which is 99.48% below the national average in terms of development expenditure and which emerges as the province where facilities are serving more people than the national average. This highlights the importance of distributing development expenditure in a more even manner if provinces like Northeastern are expected to provide quality services to their population.

Only three provinces have a figure of beds per 1,000 population that is above the national average. The remaining five provinces lie between 5.7-22.88% below the national average. As expected, Nairobi province is 72 % above the average.

5.5.2: Evaluation of Provincial equity positions- including 50% of KNH.

As stated earlier it is important to consider the effect of excluding a part of KNH resources that is estimated to be serving populations from other provinces. Due to lack of information, the study first assumes that 50% of financial expenditure allocated to KNH serve people from other parts of the country. This includes both financial and human resources.

It should be noted how the reduction of KNH has significantly changed the percentage difference from the equity target. This is because of the value of the national average , which is used to represent the "equity target" has reduced from 11.50 to 10.75.

Table 5.7. Effect of using 50% of KNH on provincial equity positions.

Financial resources						
	Actual per capita expenditure			%from equity target		
province	A1	A2	A3	A4	A5	A6
Nairobi	24.13	6.05	30.18	137	982.1	180.6
Central	9.82	0.15	9.97	-3.7	-72.4	-7.31
Coast	13.31	0.03	13.34	30.5	-93.9	24.04
Eastern	8.85	0.02	8.88	-13.2	-95.8	-17.50
N. eastern	9.53	0.01	9.53	-6.5	-99.1	-11.35
Nyanza	6.32	0.01	6.33	-38	-98.3	-41
Riftvalley	10.49	0.12	10.62	2.8	-78.0	-1.31
Western	5.95	0.43	6.37	-41.6	-23.6	-40.7
National average	10.2	0.56	10.75			

Key to table:

A1- total recurrent expenditure

A4-% of recurrent expenditure from equity target.

A2- total development expenditure.

A5-% of development expenditure from equity target

A3-total expenditure

A6-% of total expenditure from equity target

To start with, Nairobi province whose total expenditure was 329% above the national average has now reduced by around 45% bringing to 181.6% above the equity level. Central province whose per capita expenditure was 20.29% below the equity line is now doing better having moved to 7.3% below the equity line. Other provinces have been affected as well but only two provinces (Nairobi and Coast) as indicated previously, have expenditure above the equity line. However the disparities are not a wide as earlier results had indicated. For example Riftvalley province whose expenditure was 15.13% below the equity target has

improved by 13.82% bringing it to a level of 1.31% below the target line. Expenditure of the provinces below the equity target ranges from 1.31% to 41.14%. Previously the range was between 15.13 % and 49.38 %.

The ranking of the provinces has not been affected since there was no change in the amount of resources allocated to other provinces. Northeastern province still emerges the worst off with an expenditure of 41.14% below the equity target. This effect on the equity levels shows the importance of accurately determining the percentage of resources allocated to KNH that serves population outside this province.

5.5.3: Evaluation of provincial equity positions using positions-including 25% of KNH

So far we have looked at the effect of assuming that only 50% of the financial resources allocated to KNH is used to serve Nairobi residents. However the results using 50% of KNH have shown that Nairobi province is still relatively over-resourced compared to other provinces. The study goes further to look at the provincial equity positions if one assumed that only 25% of the financial resources allocated to KNH is used to provide district and provincial level services to Nairobi residents.

The further reduction of the total expenditure allocated to KNH has a significant effect on the provincial percentage difference form the equity target. Nairobi province whose total expenditure was 181.6% above the national average has now reduced to 86.5% above the national average. Central and Riftvalley provinces which were initially below the equity target now have a per capita expenditure that is above the equity target. The positions of other provinces have been affected as well. However, even making a very generous assumption that

75% of KNH resources are devoted to the national referral level services for residents from other provinces other than Nairobi, Nairobi is still considerably above the national average.

Table5.8: Effect of using 25% of KNH on provincial equity positions.

	Actual per capita expenditure			% from equity target		
province	**A1**	**A2**	**A3**	**A4**	**A5**	**A6**
Nairobi	15.39	3.04	18.43	61.2	807.6	86.5
Central	9.82	0.15	9.97	2.82	-53.92	0.9
Coast	13.31	0.03	13.34	39.4	-89.8	35.03
Eastern	8.85	0.02	8.88	-7.28	-92.91	-10.19
N.Eastern	9.53	0.01	9.54	-0.18	-98.44	-3.5
Nyanza	6.32	0.01	6.33	-33.78	-97.1	-35.91
Riftvalley	10.49	0.123	10.62	9.91	-63.23	7.44
Westren	5.95	0.43	6.38	-37.66	27.67	-35.44
N.average	9.65	0.33	9.88			

Key to table:

A1- total recurrent expenditure

A4-% of recurrent expenditure from equity target.

A2- total development expenditure.

A5-% of development expenditure from equity target

A3-total expenditure

A6-% of total expenditure from equity target

So far we have looked at the distribution of resources using un-weighted population. Although the use of per capita expenditure in a needs-based formula is often preferred than no formula at all, it doesn't give sufficiently detailed information as to whether resources are

distributed equitably or not. There are other indicators of need that could be incorporated in a formula before one arrives at a conclusion as to whether equity in resource allocation has been achieved. Some of these indicators include mortality rates, age/sex of the population and socio-economic status.

Data on some of these indicators is not readily available in developing countries and in this case, many were not available in Kenya. As a result the study uses Infant Mortality Rates (IMR) as the other indicator of need. It would be important to look at how weighting the population by infant mortality rates would affect the distribution of resources and hence the equity positions of the provinces.

5.6: DISTRIBUTION OF RESOURCES RELATIVE TO WEIGHTED POPULATION.

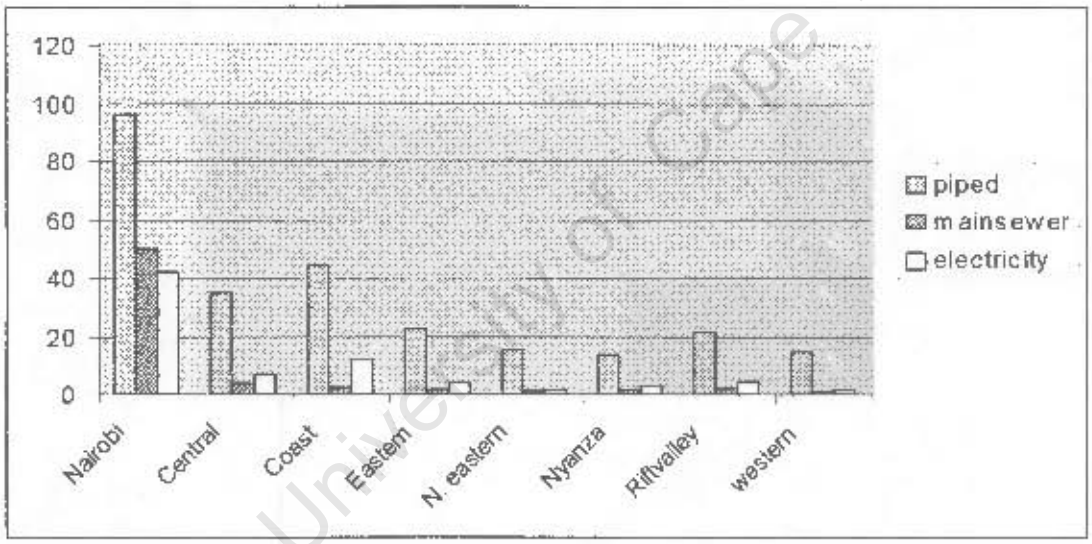
The section below briefly analyses the distribution of health care resources relative to the weighted population. It shows how weighting the population with additional indicators of need affects the provincial equity positions. We have already seen that using the total expenditure of KNH has a high effect on distribution of resources and equity positions of the provinces. We have looked at the effect of using 50% and 75% respectively. Since there is no correct estimate, the study opts to discuss the remaining section of the study using 50% of KNH resources.

These results give a clearer picture on equity positions than when total resources of KNH are used. Although the study uses only infant mortality rates to weight the population, it is important to look at the distribution of other socio-economic indicators. However these indicators couldn't be incorporated in the formula as they could not be obtained in a format suitable for formula computation.

5.6.1: Socio-economic indicators.

In addition to IMR it is important to see how socio-economic indicators vary between provinces. These indicators include the distribution of households by main source of water, sewage disposal and lighting. Piped water, mainsewer and electricity are used as the basis of comparison. The figure below shows the percentage distribution of households who have access to piped water, main sewer as a means of sewage disposal and electricity as a source of lighting.

Fig 5.2: Percentage distribution of households by main source of water, sewage disposal and lighting.



The results show wide disparities in the percentage of households that have access to piped water. Nairobi and coast provinces are doing relatively well with 96.3% and 45% of households having access to piped water. The reason for this is that the largest towns in Kenya namely Nairobi and Mombasa are found in these provinces. The distribution is worse when it comes to sewage disposal. Nairobi province leads with 50.3% of the households having mainsewer as the main source of sewage disposal followed by Central with only 4% of

households having access to main sewer as a means of sewage disposal. There is a wide disparity with two provinces, namely Northeastern and Western having only 1% of the households using main sewer as the source of sewage disposal. The source of lighting is no better. Over 42% of households in Nairobi province use electricity as the main source of lighting. Northeastern and Western provinces still have the lowest level of 2%. This clearly shows the extent of these disparities. Such a comparison is important because it tell us of the characteristics of the people living in each province. It is no doubt that a large percent of those Kenyans with the highest socio-economic status are concentrated in Nairobi province.

5.6.2 Effect of weighting the population.

Table 5.9 shows the differences in the mortality rates and the effect that these differences have on the weighted population distribution. The weighting and adjustment process shows that by using IMR to adjust the population data, Central, Nairobi, Eastern and Riftvalley provinces' relative weighted population is lower than their un-weighted population. This is because the four provinces have the lowest IMR. This makes the regions relatively more over-resourced than using the un-weighted data since the resources are distributed to a relatively smaller weighted population.

On the other hand weighting the population has made Coast, Northeastern, Nyanza and Western province worse off in terms of per capita expenditure and equity positions. These provinces have high IMR compared to the other provinces. In particular Nyanza is the worst hit with an increase from 15.3% of total population to that of 25.7% of weighted population. It is important to note that weighting the population doesn't affect the total population size, rather it shows how the distribution of the relative weighted population changes as compared to the distribution of the un-weighted population.

Table 5.9: Population size before and after weighting.

Province	Un-weighted population	% distribution	IMR	Weighted population	% distribution
Nairobi	2,137,000	7.5	49	1,582,866	5.5
Central	3,705,000	12.9	30	1,680,169	5.9
Coast	2,491,000	8.7	77	2,899,399	10.1
Eastern	4,643,000	16.2	47	3,298,679	11.5
N. eastern	961,000	3.4	77	1,118,556	3.9
Nyanza	4,397,000	15.3	111	7,377,734	25.7
Riftvalley	6,991,000	24.4	53	5,600,912	19.5
Western	3,354,000	11.7	103	5,120,684	17.9
Total	28,679,000	100		28,679,000	100

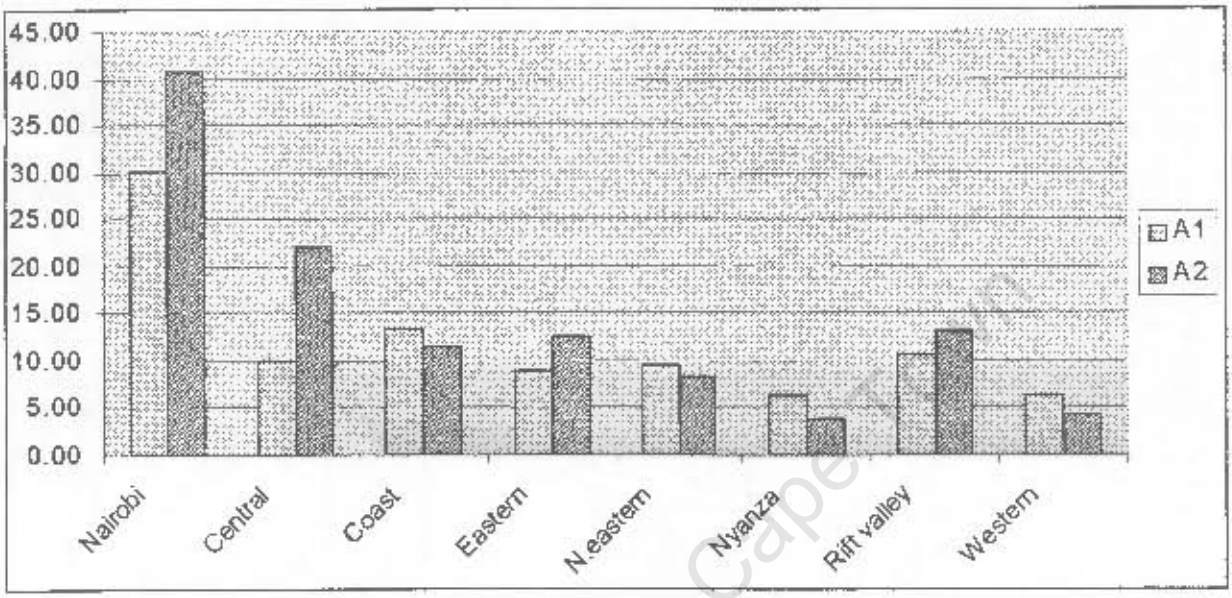
5.6.3: Distribution of financial resources relative to weighted population.

So far we have seen how IMR affects the relative weighted population size of the various provinces. A change in the relative weighted population size of a particular province affects expenditure per capita either positively or negatively depending on the direction of change. This section shows how the change in the relative distribution of weighted population affects provincial per capita expenditure.

Figure 5.3 shows the per capita distribution of resources after weighting the population. It compares per capita expenditure before and after weighting the population. Results show that the level of total expenditure per capita has increased for some provinces while it has gone down for others. The provinces whose per capita expenditure has gone up include Nairobi, Central, Eastern and the Rift valley. It was earlier stated that these provinces are relatively

more over-resourced than before since their expenditure is being distributed to a relatively smaller weighted population.

Fig 5.3: Effect of weighting population on per capita expenditure.



Key:

A1: per capita expenditure before weighting

A2: per capita expenditure after weighting.

Central province registered the highest increase of about 120% given that it has the lowest IMR. Nairobi province is second with an increase of about 35%. Per capita expenditure of Nyanza province went as low as 3.77 Kenyan pounds a value that is 40% below that when using the un-weighted population. The ranking of the provinces has also been affected. Nairobi province still holds the first position with a per capita expenditure of 40.75 Kenyan pounds. Coast province which had previously held the second position has gone down to the fifth position after Central, Eastern and Riftvalley provinces, showed a considerable relative increase in their per capita expenditure levels when IMR are incorporated in the analysis. This

is due to the fact that Coast province had an IMR of about 77, which was higher than in the Central, Eastern and Riftvalley provinces.

There seems to be a large difference in the ranges as compared to earlier results. The values of total per capita expenditure range between 3.77 to 40.75 compared to the range for the un-weighted population of 6.33-30.18. Nyanza province still holds the lowest position. This difference in the values and ranking of provinces shows the importance of incorporating other indicators of need into a resource allocation formula.

5.6.4: Distribution of human resources relative to weighted population.

In addition to changes in per capita expenditure, weighting the population also affects the distribution of human resources per 100,000 population. Table 5.10 shows the distribution of human resources relative to the weighted population. Four provinces namely Nairobi, Central, Eastern and Riftvalley have recorded a relative increase in the number of personnel per 100,000 population. The pattern of change is similar to that of per capita expenditure. These provinces have recorded a relative increase in all cadres. The ranking of the provinces has been affected with Central province having the highest number of personnel per 100,000 (329.5) population followed by Nairobi province with a value of 273.8. Nyanza province has the lowest value of 65.87 unlike with the un-weighted population when Northeastern province had the lowest number of personnel per 100,000 population.

There seems to be a wider disparity than before with the values ranging from as low as 65.5 to 329.4 as compared to earlier results where the values ranged from 77.9 to 202.8 per 100,000 population. Again this highlights the need of having a detailed formula that incorporates other

indicators of need in addition to population size. Such a formula gives a clearer picture on the extent of inequities between provinces.

Table 5.10: Effect of weighting population on human resources per 100,000 population.

	personnel per 100,000 pop before weighting					personnel per 100,000 pop after weighting				
Province	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**
Nairobi	143.6	44.6	6.1	8.4	202.8	193.9	60.3	8.2	11.3	273.8
Central	125.4	9.10	2.6	12.3	149.4	276.5	20.1	5.8	27.1	329.4
Coast	109.8	18.1	3.5	12.5	143.9	94.3	15.5	3.0	10.8	123.6
Eastern	100.2	6.6	2.0	11.4	120.3	141.1	9.3	2.9	16.0	169.3
N Eastern	68.7	3.3	0.1	5.8	77.9	59.0	2.9	0.1	5.0	67
Nyanza	89.7	7.3	4.4	9.2	110.5	53.5	4.3	2.6	5.5	65.9
Riftvalley	102.5	9.0	3.5	9.8	124.8	127.9	11.2	4.4	12.3	155.8
Western	84.4	5.4	1.3	8.9	100	55.3	3.6	0.9	5.8	65.5

Key to the table

A1- nurses A4-clinical officers B1, B2, B3, B4 and B5 show the same cadres after weighting .

A2- doctors A3-pharmacists A5- total personnel.

.5.6.5:Distribution of facilities and beds relative to weighted population.

Adjusting population to reflect pattern of IMR changes not only the distribution of financial resources but also has a great impact on other resources. This section looks at how the distribution of population per facility and number of beds per 1,000 population has been affected by this change.

Table 5.11 shows the effect of weighting the population on the distribution of facilities relative to the population. It is clear that the provinces that recorded a decrease in the weighted population relative to the un-weighted population seem to be relatively more over-resourced as compared to those that experienced a relative increase.

Table 5.11. Distribution of facilities and beds relative to weighted population.

	Population per facility		Beds per 1,000 population	
Province	Before weighting	After weighting	Before weighting	After weighting
Nairobi	6,304	4,669	1.57	2.11
Central	8,759	3,972	1.95	4.30
Coast	6,090	7,088	1.70	1.46
Eastern	6,291	4,469	1.40	1.98
N Eastern	15,500	18,041	1.56	1.34
Nyanza	10,937	18,353	2.24	1.34
Riftvalley	6,292	5,041	1.49	1.86
Western	13,917	21,247	1.72	1.12

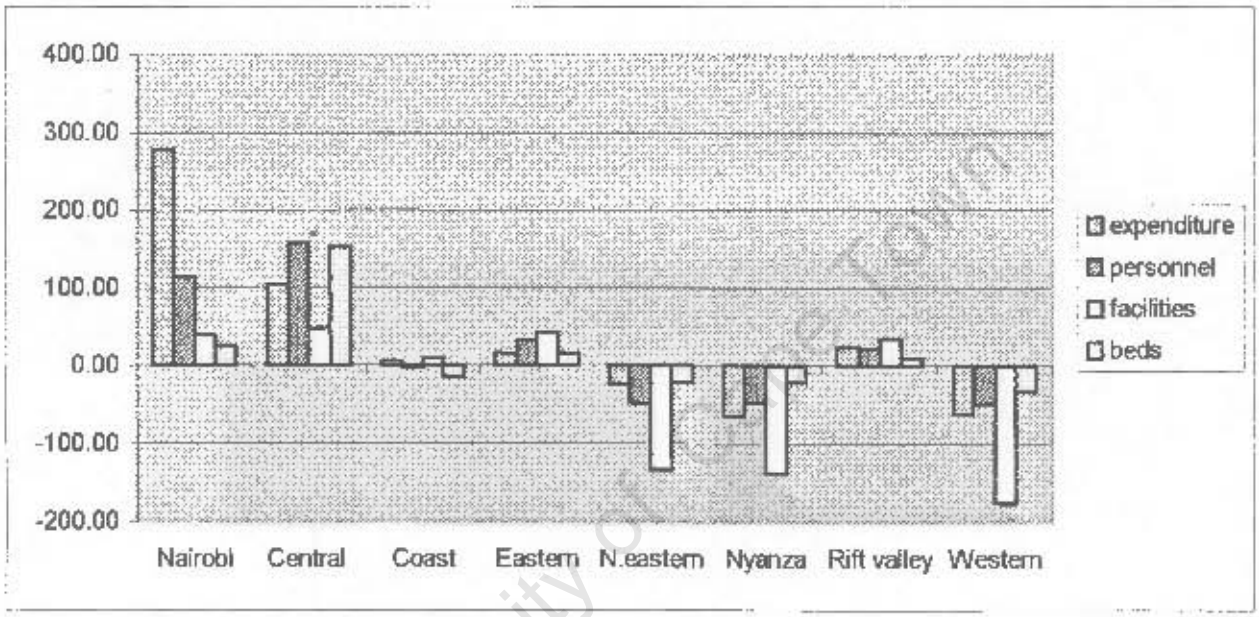
Western, Northeastern and Nyanza province are doing badly with population per facility levels of 21,247, 18,041 and 18,352 respectively compared to Central and Nairobi provinces that have a population per facility of 3,972 and 4,669 respectively. This is a wider disparity ranging from 3,972-21,247 compared to earlier range of 6,090-15,500. The results for beds per 1,000 population show a similar pattern with Central province having the highest number of beds per 1,000 population followed by Nairobi and Eastern. There are wider disparities using the weighted population figures, ranging from 1.12 to 4.30 compared to the earlier range (using un-weighted population) of 1.40-2.24 beds per 1,000 population.

5.7: EVALUATION OF PROVINCIAL EQUITY POSITIONS USING WEIGHTED POPULATION.

The following section shows the effect of weighting the population by IMR on the distance of each province from the national average. Figure 5.4 illustrates the difference between actual and equity target expenditure and other health care resources. It highlights the effect of weighting the baseline population according to IMR. Each bar shows how far the particular

province expenditure/resources is from the "equity target" allocation. The "equity target" allocation is represented on the graph by zero and is based on the national average weighted per capita resource level.

Fig 5.4: Provincial equity positions after weighting the population.



The inequities in the expenditure range from 279% above (Nairobi) to 65% below (Nyanza) the national average. It should be recalled that only 50% of KNH resources are included in the Nairobi estimates in this analysis. Three provinces namely: Nyanza, Western and Northeastern are below the equity target in both financial and other resources. Nairobi, Central Eastern and Riftvalley provinces lie above the equity line in all types of resources.

5.8: Summary

The analysis shows that there exist great geographical inequities in the allocation of health care resources in the Kenyan health sector. By using both weighted and non-weighted population, Western, Nyanza and Northeastern provinces seem relatively under-resourced as compared to other provinces. By using the results of 50% KNH and the relative weighted population we find that, Western province has the lowest number of beds per 1,000 population, the highest number of population per facility and the lowest number of personnel per 100,000 population. Nyanza province has the lowest per capita expenditure.

Western province is significantly below the equity target and there is no doubt that something needs to be done to improve the condition of this province. Nyanza is the second worse off province and also raises cause for concern. It is important to point out that these are the provinces which had low levels of socio-economic indicators implying that there is a relationship between socio-economic indicators and the inequitable health care service provision in the provinces. On the other hand, some provinces seem to be benefiting with resources that are higher than their need. At the top is Nairobi province that has a high per capita expenditure of 40.75 followed by Central with 21.98 per capita expenditure. This also calls for some attention.

With the existing disparities, the main question facing the Kenyan health sector is *how can equity between provinces be achieved?* Given the current state of the Kenyan health sector, particularly in terms of recent declines in the health budget, equity between provinces can only be achieved through a redistribution of the existing resources. The next chapter looks at how resources can be redistributed and how such redistribution could lead to geographical equity.

CHAPTER SIX: TOWARDS GEOGRAPHICAL EQUITY IN THE KENYAN HEALTH SECTOR.

6.0:Introduction

This chapter looks at how the Kenyan health sector can improve the resource allocation process and by doing so achieve equity in health care. It presents results from interviews carried out at the MOH headquarters and at the district level as to what should be incorporated in a Kenyan resource allocation formula and how the redistribution process could be undertaken. It is however important to point out that changes in the resource allocation process must be accompanied by policy changes (McIntyre et al 1997). This means that although the study attempts to make recommendations for the redistribution of resources, the Kenyan health sector must put appropriate policies in place if equity is to be achieved.

6.1: Using a needs-based resource allocation formula in the Kenyan health sector.

Various issues arise from the analysis presented in chapter five. There are large disparities in per capita expenditure. It is clear that Riftvalley and Central provinces are relatively close to the equity target levels when un-weighted population figure are used. Nairobi province is high above the equity level while Western province is far below. However after weighting the population for mortality (see fig5.1 and fig 5.4) Nairobi, Central and Riftvalley provinces are significantly above the equity target while Nyanza, Western and Northeastern are far below the equity target.

It is important to point to out that the study was limited to the use of IMR as the only indicator of different need for health services available to weight the population. However it is questionable whether the IMR data is completely accurate. The study further acknowledges that the use of population size alone as the basis of resource allocation is not sufficient and

therefore highlights the need of incorporating other indicators. These indicators will be available once a comprehensive analysis of the 1999 Kenyan population census is complete and can therefore be brought into consideration in a future needs-based formula.

Having quantified the inequities existing in the Kenyan health sector, it is evident that something needs to be done if the Kenyan health sector is to move towards equity. However as stated in chapter two of this study, the Kenyan health sector is experiencing a lot of problems. These problems include: a decrease in government budgetary allocations and increasing health care needs (especially due to the widespread of HIV/AIDS). Due to these problems it is evident that under such circumstances, it would be difficult to achieve equity through increased total health budgetary allocation but rather equity in resource allocation in Kenya can only be achieved through the redistribution of current resources.

An important issue that arises from the redistribution of resources is that a redistribution of financial resources must be accompanied by strategies to redistribute human resources. This is because human resources consume a large share of health care expenditure. Another major issue to consider when re-allocating resources is the capacity of provinces to absorb changes in budgetary allocations without affecting the delivery of quality health services. The issue of capacity is discussed in a later section of this chapter.

6.2: Towards a better health care resource allocation formula.

Results from interviews presented in chapter five showed that equity in the Kenyan health sector existed in policy papers but is not put into practice. However it was encouraging to note that health officials had a good understanding of what should be incorporated in a Kenyan health care resource allocation formula. This tells us that if the MOH committed itself

to equity, its likely that health officials would contribute good ideas on how to move towards equity.

All interviewees identified the size of the population per province as the main determinant of budgetary allocations. Some interviewees identified disease pattern as an additional factor that should be taken into consideration in a Kenyan health resource allocation formula. They noted that disease patterns vary between provinces and that it was important for the Ministry of Health to incorporate this in the resource allocation process. Of particular importance was the wide spread of the HIV/AIDS epidemic and its variations between different provinces. The majority identified mortality rates as an important factor that should be incorporated in a Kenyan health formula. Others maintained that the number of facilities per province should be considered but were quick to point out that it should not be the ultimate factor determining the size of budgetary allocations.

Out of this discussion and the results from the study a proposed resource allocation formula for the Kenyan health sector is discussed in the next sub-section. While such a formula may not address all the limitations of the existing resource allocation process it is hoped that it will help to structure an appropriate resource allocation formula and highlight the importance of adopting a needs-based formula. The formula has been adapted from RAWP with a few amendments to fit the Kenyan context.

6.2.1: Important indicators for use in a Kenyan resource allocation formula.

One of the critical issues in developing a formula is the identification of appropriate indicators of need for health services. This may include demographic indicators, health status indicators, and socio-economic indicators (Mays 1989). This tells us that the first step in developing a

needs-based health care resource allocation formula is to identify the indicators of need suitable for the Kenyan situation.

6.2.1.1: Population size and relevant adjustments.

The simplest way to calculate a province's equitable resource allocation is on the basis of its relative share of the entire population. After reviewing the distribution of the Kenyan population, the study noted that some provinces had a relatively small share of the population, and yet had a relatively large amount of resources (e.g. Nairobi), while others have a high share of the population and a relatively small amount of resources (e.g. Riftvalley). The study therefore recommends that the population size should be taken into consideration when allocating resources if each province was to have an equal spending that is based on the national average per capita expenditure level.

In addition, as stated in chapter two the private health sector plays a significant role in the delivery of health care services in Kenya. This means that relying on the population size alone is not sufficient. It would be important to have an estimate of the proportion of population on each province that relies on public sector services. For example, provinces which have big towns like Coast and Nairobi are likely to have a large number of people relying on the private sector for service. This means if resources were to be allocated on the basis of population size alone, these two provinces will receive a large amount of public sector resources relative to the population dependent on government funded health services.

Further it would be important to note the population growth of each province. For example, results from the analysis in chapter five showed that Nairobi province had a per capita expenditure that was about 279% above the national average. This means that if equity is to

be achieved then Nairobi province has to receive a large budgetary cut. However being the capital city it is likely that the population of this town is growing at a high rate as people leave the rural areas in search of jobs in the city. This tells us that it would be unrealistic to re-allocate all the excess resources allocated to Nairobi province only to find out after a few years that the province is under-resourced due to rapid rate of population growth.

6.2.1.2: Demographic composition of the population.

The age and gender composition of the population within a specific geographical area is also an important indicator of need for health services. For example children, women of child-bearing age and the elderly are likely to require more health care services than any other section of the population. Consequently it would be important to incorporate the demographic composition of each province in the resource allocation formula.

6.2.1.3: Health status indicators.

As most interviewees noted, the type and amount of disease present in each province would have a large influence on its health needs. The most accurate measure for this is morbidity. However as stated earlier, morbidity data collected is usually related to the utilisation of health services. Such data would thus reflect morbidity seen at health services and would underestimate the total morbidity of the population (Carr-Hill 1989). A more accurate measure is that of mortality. However it is noted that mortality can vary considerably from year to year within a particular province, thus it would be more appropriate to use average mortality over several years (Reagon et al 1997).

6.2.1.4: Socio-economic indicators

The socio-economic status of a population is likely to influence the need for health care services. For example poor people tend to suffer more ill-health and are therefore likely to need more health services. Some of the socio-economic indicators that may be incorporated in a resource allocation formula include: housing, income, employment and education level.

6.2.1.5: Other indicators

In addition to the above indicators, it would be important to take into consideration the different cost of service provision in rural areas as compared to the urban areas. For example it would be cheaper to provide accessible services in the urban areas due to the fact that the population is concentrated in a relatively small area as compared to rural areas where the population density is relatively low.

Having identified the various needs based indicators to be incorporated in the formula, the next issue would be to decide how to weight the population size to reflect the different indicators. Different people have approached this issue differently. An example of how to weight the population is discussed briefly in the methodology.

The study recognises however that developing a needs-based formula is a controversial process (Gilson et al 1999) partly because of the difficulties associated with measuring need. The study therefore highlights the need for accurate data on indicators of need to be used in the formula. Further the study recognises that it would be difficult to incorporate all the above indicators in the formula at this time. It therefore recommends that the Kenyan health sector should start by adopting a simple resource allocation formula based on the population size

adjusted to reflect the demographic composition. Over time, the resource allocation formula can be refined to include other indicators of need for health services.

In addition, this study notes that needs are bound to change with time and at times a particular formula may seem inappropriate. Gilson et al (1999) note that when a formula becomes inappropriate it must be reviewed with changes that don't cause major disruptions to the delivery of health services. Doherty and Van den Heever (1997) identified what a successful formula should entail. This information may act as a starting guide to the Kenyan health sector and is provided in the appendix.

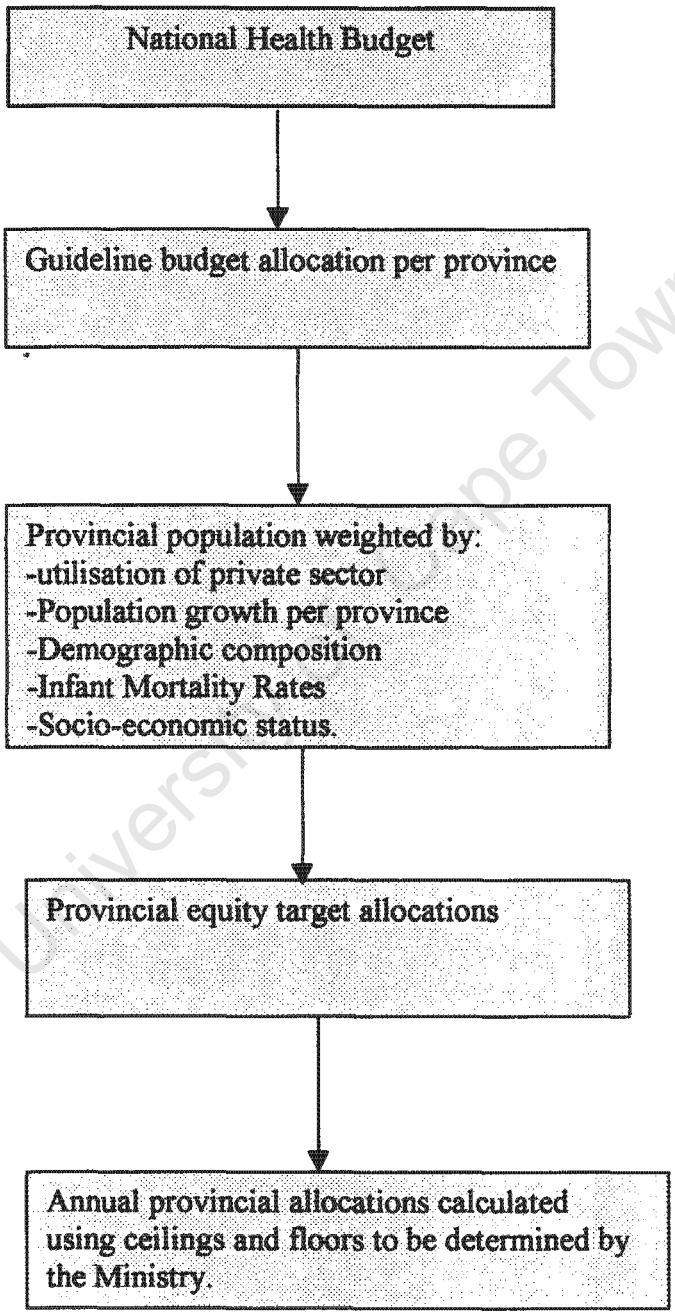
6.3: The process of resource allocation/redistribution.

The needs-based formula provides information on each provinces' "equity target" allocation. However it doesn't provide information on how to achieve these targets. It is therefore important that one identifies a process for moving towards these targets.

The most important issue is determining the time period in which resources should be redistributed between provinces. The pace of redistribution is very important for various reasons. On the one hand, it is important to assess whether the provinces receiving budgetary increases/decreases have the capacity to absorb budgetary changes without adversely affecting the delivery of health services i.e. the change of pace shouldn't be too rapid. The detailed district and provincial level budgets and plans will provide insights into whether provinces and the districts within them can absorb budgetary changes. However, on the other hand, redistribution should not take a long time, say 50 years, as there will be limited visible difference in health service delivery on the ground and commitment to redistribution may decline over time. Consequently any attempt to redistribute health care resources must ensure

that it is done within the right time frame using appropriate ceiling and floors for budgetary change. A summary of the redistribution process is presented in figure 6.1.

Fig 6.1: Summary of the resource allocation/redistribution process.



Although a process like that in fig 6.1 could lead the Kenyan health sector towards equity in health care, it is expected that such a process and/or any other redistribution process may face some challenges. The next sub-section presents information on the challenges that a health care resource redistribution process in Kenya is likely to face.

6.3.1: Challenges that may face a Kenyan resource redistribution process.

Results from interviews carried out at the Ministry of Health headquarters and at the district levels raised the issue that a resource redistribution process may face the following challenges. First it is expected that the process is likely to face political challenges. Interviewees noted that any changes in the resource allocation process would lead to a decrease in budgetary allocations for those provinces with strong political powers, and thus to be heavily opposed by many politicians.

Most of the interviewees noted that the issue of a formula-based resource allocation process had been raised a few years ago but it was dismissed with claims that it was difficult to implement and that it was going to work in favor of the disadvantaged provinces. Although it would be difficult to have a health care resource allocation process that is free from any political influence, the study notes that before an attempt to redistribute health care resources is made, MOH officials must be fully committed towards equity. Health officials both at the district/provincial and national level must ask themselves whether equity is important to the Kenyan health sector or not. If they feel that equity is important then they should try to mobilise those in opposition to cooperate with rather than oppose their ideas.

However the primary issue that came up is the fact that resources are constrained. One interviewee noted that "*sometimes we understand that a certain province needs this amount of*

money, but in some cases the ministry doesn't have the money and we can only give what we have." However, it is precisely at times of resource scarcity that it is most important to use the unlimited available resource efficiently and effectively. Other challenges that may face a Kenyan formula and that were not raised in the interview are lack of adequate data on the various indicators of need and in some cases information of actual expenditure isn't available in a sufficiently disaggregated form.

In addition to the challenges facing a resource allocation process during a period of overall health budget growth, interviewees were asked to discuss the factors that may constrain the redistribution of resources if the study was able to identify this as the only way towards equity in health care.

All interviewees identified human resources as the major constraint to implementing resource redistribution. Most of the interviewees agreed that redistribution is the only way that can lead the Kenyan health sector to equity. However all the interviewees were quick to point out that the process would be difficult since it must involve the redistribution of human resources. One interviewee noted that " *generally who would want to work in the dry Northeastern province? Everybody wants to be in the urban areas. Nobody wants to work in a place where there are no roads and where there are frequent bandit attacks. You may go to work there but the next thing your people know is that you are dead."* Another interviewee had this to say: " *yes we do accept that something must be done. Recently an issue was raised on the high number of nurses in Thika district, but we cannot reallocate these nurses, we can't separate them from their families. Any attempt will make them shift to the private sector."* This shows that in addition to the fact that most staff want to work in the urban areas where chances of getting more money from private practice is high, there are also other issues outside the

control of the health sector (e.g. family issues) that make the reallocation of staff quite difficult.

Although the issue of human resources seems to be a major factor that may constrain redistribution, the study notes that where a MOH is committed to equity, it is possible to come up with strategies to be able to attract staff to work in the rural areas. Some of the strategies that the MOH may adopt include: higher salaries, improved opportunities for further training, good housing and location of training colleges in the rural areas.

In addition to the problem of reallocating staff, another issue that came up is that of capacity. Most interviewees noted that although there is a need to redistribute resources, some provinces lack the capacity to accommodate budgetary changes, especially those that have to do with budgetary increases. One interviewee noted that historically disadvantaged regions are so used to having low expenditures that they may not know what to do with an additional budget.

Other constraints raised in the interviews include the difficulties of redistributing non-financial resources. The interviewees noted that although it could be possible to redistribute financial and human resources it is not possible to redistribute facilities. A major issue that arose from this point is that it would be of no use to reallocate staff to areas where there are no facilities. This implies that before any redistribution of recurrent resources is done, new facilities should be built in the disadvantaged provinces and that these facilities must be provided with drugs and equipment. This requires carefully planned redistribution of the development budget. This again raises the issue of limited resources available to the health

sector and the possibility of building facilities and reallocating staff to work in facilities that lack basic services like drugs.

From this discussion it is clear that the main problem is that of redistributing staff to the rural areas. This therefore calls for urgent attention on how incentive mechanisms should be introduced to attract staff to the rural areas. However before any redistribution is put in place it would be important for MOH to assess the capacity of the various provinces to accommodate changes in budgetary allocations. The next sub-section presents a brief analysis of capacity issues.

6.3.2: Absorptive capacity of provinces

As stated earlier, one of the things to consider when redistributing resources is the capacity of under-resourced provinces to absorb increases in budgets and that of over-resourced provinces to absorb budgetary cuts (McIntyre et al 1997). Capacity is frequently understood as a human resource issue. In other words capacity is understood to mean availability of personnel with the specific mix of skills required to fulfil their tasks (Gilson and Brijlal 1997). However capacity relates not only to the availability of people and skills, but also to other factors such as availability of financial resources, information systems and the context within which health services are delivered (McIntyre et al 1999). The key capacity factors that can impact on the public sector are:

- Action environment- Macro economic and political factors set the conditions in which tasks are to be performed.
- Public sector institutional context- Rules and regulations within the public sector and public sector ideology will affect the performance of the task.

- Task networks- Interrelationship between organisations, co-operating to achieve a common task, affects the performance.
- Organisations- The structure, hierarchy and management of institutions affect capacity.
- Human resources – The skills, training and motivation of individuals affect their ability to conduct the work (Gilson and Brijlal 1997).

In this context, there are several areas that are linked to the absorptive capacity of provinces. These refer to the ability of provinces to down-scale/up-grade within either a decrease or increase in budgetary allocation. Of major importance is the staff and skill availability in provinces receiving large budgetary increases like Nyanza and Western. Before receiving any budgetary increase, it would be important for MOH to assess whether staff in these provinces have the right skills to plan, budget and allocate funds to the intended services. For example the under-resourced provinces have poor physical infrastructure. The staff in these provinces will require assistance in careful planning for the development of physical infrastructure so that they can absorb budget increases. Development of physical infrastructure is important especially because it acts as an incentive to allocate staff in the under-resources provinces.

In addition to budgetary and planning skills, it would be important to consider the institutional context in which redistribution is done. For example, the tendering process of development budgets is usually complicated within a centralised public institutional context. As a result, urban areas are in a better position to receive their development allocation earlier than the rural areas. In the context of the task network, rural areas have limited access to other people. This means that they have limited access to information regarding issues on good health service delivery. On the other hand, urban areas have good access to information. This has been made possible by the introduction of modern technology in these areas. Such a situation

makes it difficult for the health officials in the rural areas to communicate any information within the right time frame. A good redistribution process should therefore provide modern communication facilities in the rural areas and ensure that the tendering process is made simpler such that all districts/provinces are in an equal position to acquire development budgetary allocation within the right period of time.

Further it is equally important to consider the issues of time and period of redistribution. This implies that a good redistribution process should be able to take into account the right time frame in which each province will be equipped to absorb the increase/decrease of budgetary allocation. If redistribution is done within a short time period it is likely to affect the delivery of health care services. While it is easier to expand than contract services, Doherty and Van den Heever (1997) argue that large budgetary increases are likely to affect poor provinces in various ways. For example additional budgetary allocations to the under resourced provinces may not be absorbed into services for which they are intended because it takes time to create new facilities and to re-allocate personnel. As a result spending could occur on services which are not of the highest priority and the poor provinces could experience a surplus at the end of the year, while the richer provinces experience deficits. This further highlights the importance of capacity in the redistribution of resources.

To be able to deal with the problem of capacity, it would perhaps be important for the MOH to implement smaller changes in the first years of redistribution. These small changes in budgetary allocation could be put into training staff with management, planning and budgeting skills and in other capacity related areas as well.

6.3.3: The pace of redistribution.

As stated earlier, it is important to determine the pace in which resources are to be re-allocated from the over-resourced provinces to the under-resourced provinces. Consequently the study attempts to model the pace of redistribution based on geographical needs of each province. However it is important to note that any redistribution process needs to be carefully planned, managed and integrated into a budgetary plan (McIntyre et al 1997). The following section presents a model of the time period required and the relative adjustments needed to be considered by the MOH.

6.3.3.1: Modeling the pace of redistribution for provinces within an equity model.

The table below illustrates the actual and equity target expenditures for each province. It goes further to show the annual percentage budgetary change necessary for each province in order to achieve equity within various time periods. The periods considered in the model range from 1 to 25 years.

6.3.3.1.1: One-year redistribution.

The results show that if equity is to be achieved in a period of one year some provinces will have to suffer from high budget cuts while others receive a significant high increase in their budget allocation. The provinces that are likely to be affected by a large reduction in their budget allocation are Nairobi and Central provinces which will require a reduction of 78% and 51% receptively. On the other hand Nyanza and Western provinces will have to accommodate more than a 100% increase in their budget allocations with Nyanza having to absorb the highest increase of 185%. This brings us to the issue of capacity discussed earlier in this chapter. It is unlikely that these regions have the capacity to accept the large

increase/decrease of budgetary allocations. Such redistribution is not likely to be practical and may pose a lot of problems to health service delivery.

Table 6.1: Pace of redistribution model.

	expenditure		Average annual %change						
provinces	Actual	Target	1year	4yrs	8yrs	10yrs	15yrs	20yrs	25yrs
Nairobi	64,502,113	17,028,106	-74	-18.4	-9.2	-7.4	-4.9	-3.7	-2.9
Central	36,944,573	18,074,872	-51	-12.8	-6.4	-5.1	-3.4	-2.6	-2.0
Coast	33,238,836	31,191,065	-6	-1.5	-0.8	-0.6	-0.4	-0.3	-0.2
Eastern	41,208,786	35,486,429	-14	-3.5	-1.7	-1.4	-0.9	-0.7	-0.6
N.eastern	9,163,808	12,033,165	31	7.8	3.9	3.1	2.1	1.6	1.3
Nyanza	27,843,664	79,367,956	185	46.3	23.1	18.5	12.3	9.3	7.4
Riftvalley	74,224,027	60,253,312	-19	-4.7	-2.4	-1.9	-1.3	-0.9	-0.8
Western	21,396,232	50,087,135	157	39.4	19.7	15.7	10.5	7.9	6.3

6.3.3.1.2: Four-year redistribution

The four-year period is much longer than the one-year option. It gives more time for the provinces to adjust and the percentage change in the annual budgets is much smaller. For example Nairobi province gets a reduction of 18% unlike in the one-year period where it was expected to experience a cut of 74%. Central, Coast and Eastern provinces experience a reduction of 12.8%, 1.5% and 3.5% respectively compared to Nyanza and Western provinces receive a lower increase of 46.3% and 39.4% respectively. While this option seems to be better than the first one it would still have a significant effect on the provinces especially Nyanza and western which are likely to receive high increases.

6.3.3.1.3: Eight-year redistribution.

In this option, Nairobi, Central and Coast provinces would experience annual decreases of 9.2%, 6.4% and 0.8% respectively compared to Northeastern, Nyanza and Western provinces which would receive an increase of 3.9%, 18.5% and 15.7% respectively. A budgetary decrease of 0.8% seem acceptable for Coast province but that of Nairobi and Central is still high and may impact on service delivery.

6.3.3.1.4: Ten, fifteen, twenty to twenty five-year redistribution.

The annual change in budgetary allocations decreases as it is spread along a longer period of time. In the twenty year period for example, Nairobi, Central and Coast provinces would absorb an annual decrease of 3.7%, 2.6% and 0.3% respectively compared to Northeastern, Nyanza and Western provinces that would have to absorb an increase of 1.6%, 9.3% and 7.9% respectively. As we approach the 25-year period, the percentage change is much smaller with some provinces like Coast experiencing very limited changes in budgetary allocation on an annual basis.

It is important to note that the above changes do not reflect the effect of inflation. If the total health budget is not increasing in real terms, the percentage increase/decrease in provincial budgets will be even greater. Further it would be important to slow down the changes in the first years (e.g. the first two years) while building capacity, developing policy on staff redistribution and building facilities and speed up the redistribution when this has been achieved. In addition, the redistribution process can have different time frames for different provinces depending on the percentage from their respective equity target. The formula should also be revised, if it is found to be inappropriate at a particular time. This likely to arise if there is a change in health needs of some provinces.

6.4: Summary

In summary a needs-based formula provides information on the extent of inequities and determines the direction in which financial resources should be redistributed in order to achieve an equitable geographical distribution of resources. However it doesn't provide information on how to move towards geographical equity. It is up to the country concerned to come up with the most appropriate process of redistributing resources.

The above model is just a guide to the Kenyan health sector as to how resources could be redistributed. However the health officials should determine the right time frame in which to redistribute these resources without posing difficulties to the health service delivery in the provinces involved. The RAWP formula recommended that a maximum rate of annual real growth for the regions below their equity target should be approximately 5% and that of the rich regions should be -2.5%. McIntyre et al (1997) argue that such ceilings may not be appropriate in all countries and that the pace of redistribution should be country specific. Where disparities are great as in many middle and low-income countries, it may be necessary to have larger changes than those recommended by RAWP. If RAWP ceilings and floors were to be applied to Kenya, it would take more than 25 years to achieve equity.

Moreover, the pace of change within a particular country should be assessed on the basis of what key stakeholders regard as an acceptable time period for redistribution. This study therefore doesn't recommend a specific time period for the Kenyan health sector but emphasizes the fact that health officials and policy makers should work towards identifying the appropriate ceilings and time frames for the redistribution of the existing resources.

Further, the development of a needs-based resource allocation formula is a good step towards equity. However the MOH should make sure that equity is not achieved at the expense of efficiency. Consequently the MOH should ensure that the resources allocated to provinces are used efficiently in support of improved service delivery.

CHAPTER SEVEN: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

7.0: Introduction.

This chapter summarises the main findings of the study with regard to the distribution of health care resources between provinces, their equity positions and how equity can be achieved. It goes further to discuss the main challenges facing resource allocation in the Kenyan health sector. Section 7.1 discusses the geographical distribution of health care resources, its implication for equity and a possible of way of achieving equity in the health sector, which is the redistribution process. Section 7.2 provides a brief discussion on the resources allocation process while section 7.3 discusses the way forward. The study concludes with suggestions for further research.

7.1: Summary of key issues regarding equity.

As stated earlier the study adopts the definition of equity as being *"equal resources for equal need."* Based on this definition of equity the study has revealed that great disparities exist in the distribution of health care resources. Another issue that came up from the analysis is the importance of having a correct estimate of the percentage of health care resources allocated to KNH that is used to serve population living outside Nairobi province. This is evident from the variation of the results including 100% of KNH resources and those that include only 50% and 25% of resources allocated to KNH. For example by including 100% of KNH, Nairobi province had a per capita expenditure that was 479.5% above the equity target, however after reducing KNH expenditure by 50% the figure reduced to 278.8% affecting the equity positions of all provinces. The study therefore recommends that the MOH should come up with the correct estimate of this figure.

The resource distribution patterns seem to favor five provinces namely Nairobi, Central, Eastern, Riftvalley and Coast. Of these five, Nairobi, Central and Rift valley are considerably above the "equity target." These provinces have the highest number of health personnel per 100,000 population. Nairobi province for example has the highest per capita expenditure and the highest number of personnel per 100,000 population. Western, Nyanza and Northeastern provinces have the lowest per capita expenditure, lowest number of personnel per 100,000 population and the highest number of population per facility.

Looking at the equity position before weighting the population, we find that only Nairobi and Coast provinces have per capita expenditure that is above the national average. However after weighting the population for mortality, Central Eastern and Riftvalley Provinces which were initially below the "equity target" also have their per capita expenditure above the target. However the remaining three provinces have expenditure below the target allocation with Nyanza being as low as 65% below the equity target. This shows that by merely looking at the amount of resources allocated to a particular province, one cannot be able to make a conclusion regarding equity in resource distribution. Other factors need to be taken into consideration. Such factors include IMR, the size of the population, demographic composition of the population, socio-economic indicators, the percentage of people dependent on the private sector e.t.c.

The resource allocation disparities call for immediate action from both planners and policy makers to re-allocate financial resources from the five provinces (Nairobi, Central, Coast, Eastern, and Riftvalley) to the disadvantaged provinces (Nyanza, Western and Northeastern). It should however be noted that the redistribution of financial resources must be accompanied by redistribution in human resources since a large percentage of health care expenditure is

used to pay staff salaries. Concerning the other indicators of need, the study recommends that such data should be made available and should be corrected on a regular basis because it contains important information not only for equity issues but for other issues as well.

Focusing on personnel we find that there is a maldistribution of KHP per 100,000 population. For example 56% of KHP are located in the three leading provinces namely Nairobi, Central and Riftvalley. Of particular interest is that 21% of total health personnel are found in Nairobi despite its low population size of about 7.7% compared to Riftvalley province which has roughly the same number of KHP, yet about 24.4% of Kenyan population live in this province. The study noted that staff prefer working in these provinces because of their good physical infrastructure, ability to get involved in private practice and because of their advantaged historical and political background. The study therefore highlights the need for redistribution of personnel from the over-resourced provinces to the under-resourced provinces.

A similar pattern was observed in the number of facilities and beds with the relatively over-resourced provinces having populations per facility that is better than the national average and beds per 1,000 above the average. However the study notes that it is not possible to redistribute facilities and it's equally difficult to redistribute large equipment. Consequently the study recommends that the disadvantaged provinces should receive additional development budgetary allocations. In particular the study highlights the urgent need of the Northeastern province which has a population of 15,500 per facility and yet received almost no development budgetary allocation in 1997/98 financial year.

The study also recommend that MOH should set a minimum capital budgetary allocation per province to make sure that at least every province has received a certain amount per year instead of having some provinces receiving large allocations while others get no allocation. However the issue of building more facilities is more complex than it seems. This is because there is a possibility of more facilities being built, for example in Northeastern provinces, but with no or little equipment, drugs and personnel available. This brings us back to the issue of the redistribution and how it should be done.

Although the study's main recommendation is that resources must be redistributed if equity in health care is to be achieved, it notes that the process of redistribution is not easy and it involves detailed planning and integration of these plans into budgetary plans. For example the study emphasizes the need for redistributing financial resources as the major first step towards equity. However as stated earlier, any attempt to redistribute financial resources must be accompanied by a redistribution of health personnel.

Various issues arise regarding how to address the redistribution of personnel. For example in case of re-allocation of personnel from over-staffed to the under-staffed provinces, the MOH should decide on the incentive package that will be used to attract the staff being re-allocated. Developing an incentive package involves financial resources which are limited to the Kenyan health sector. The study suggests that since additional resources may not be currently available, part of the redistribution process of financial resources could go into designing the right package. Such a package could include higher salaries, promotion, better housing and improved opportunities for further training. However a lot of caution should be taken when designing and implementing the package. For example, if the package is very attractive, a lot of health workers will be willing to re-allocate to the under-resourced provinces a situation

that may lead to under-staffing in the currently over-staffed provinces. Such an approach is not rational and doesn't achieve much towards equity in health care.

As stated in chapter six, redistribution of resources should be done gradually to enable the provinces to absorb changes in budgetary allocations. The study noted that a short time period might interfere with the delivery of health care services in the affected provinces. Consequently the study highlights the need to develop absorptive capacity as a major factor influencing the success of a redistribution policy. Capacity factors that may impact positively or negatively on the performance of provinces receiving budgetary changes include human resources, management and structure of health care institutions, macroeconomic and political factors. Based on these factors the study recommends that further training and motivation of staff is necessary in both under and over-resourced provinces. In particular the under resourced provinces will require assistance in planning for the development of physical infrastructure so that they can be able to absorb recurrent budgetary increase. The same should be done to the over resourced provinces to enable them absorb budgetary cuts.

To be able to redistribute resources in a way that will not adversely affect service delivery, the study recommends that MOH should carefully plan, manage and fully integrate the redistribution process into the budgetary plan. Further MOH should be able to set up the correct time frames and ceilings for the redistribution.

7.2: Summary of key issues in the resource allocation process.

This study has confirmed that the Kenyan health sector heavily relies on the historical incremental approach to budgeting as a means of resource allocation. It also shows that the forces of demand and supply are major determinants of budgetary allocations with provinces

that have high number of facilities receiving more money while those with few facilities receive less money. Such an approach to resource allocation is likely to have serious implications for the health sector. For example by following the forces of supply and demand, people from the disadvantaged provinces are forced to travel long distances to seek care from the advantaged provinces. This leads to a further increase in demand at facilities in the rich provinces and a further decrease in the demand of facilities in the poor provinces. As a result the advantaged provinces will be in a position to receive higher budgetary allocation the following year at the expense of the disadvantaged regions. This leads to wider disparities not only in resource allocation but also in the health status of the population.

Further the structure of the Kenyan health sector clearly shows that the management of health care services mainly lies at the district level. This is because at the district level, district health officials are responsible for the performance of district and sub-district hospitals, health centers and dispensaries. This tells us that health needs are likely to be recognised more easily at the district level rather than the national level. As a result districts health officials are likely to be in a position to develop budgets that reflect the needs of their population. However despite the fact that a lot of management is done at the district level, results from the interviews indicated that districts budgets and plans are rarely taken into account in the resources allocation process. Consequently, budgetary allocations rarely reflect the districts/provincial needs.

In addition results from the study have shown that the resource allocation process/formula in the Kenyan health sector is likely to be constrained by a number of factors. The main factor being that of limited resources. It has been stated in chapter two of this study that the Kenyan health sector has been experiencing a decrease in total budgetary allocation which is expected

to meet the increasing health care needs. This shows that the total amount of resources available to the sector has been going down each year. Consequently the ministry is not in a position to allocate the required amount of resources to all provinces. Focusing on the total health budgetary allocation, the study identified that the amount available to the health sector is determined by the treasury through a 'fair' competition with other sectors of the economy. This tells us that despite the fact that the health of a nation is very important, the health sector has equal chances with any other sector of the economy in budgetary allocations.

A factor raised from the study is the role of the Kenyan political system in the resource allocation process. Results from the interviews revealed that there is a high possibility of budgetary allocations being altered to suit the requirements of strong political leaders. Lack of appropriate skills among health officials further constrains the resource allocation process. Due to the strong role of politics in the Kenyan health sector, it would be difficult to develop a technical planning approach. Instead there is need for MOH to develop strategic policy skills to counter the influence of politics. Such skills will enable health officials to argue persuasively within the political process.

These resource allocation issues call for urgent attention from planner and policy makers to come up with a new approach to resource allocation. In particular the study recommends that a needs-based resource allocation formula would be appropriate. A simple version of such a formula is discussed in chapter six of this study. However it should be noted that a resource allocation formula alone may not help to achieve equity. This is because a needs based resource allocation formula gives information on "equity target" of each province but it doesn't tell us how to move towards these targets. Such a formula must be accompanied by the training of personnel (both at the national and district level) with the right skills to address

a resource allocation process. As Gilson et al (1999) note: a formula determines how funds should be distributed fairly between regions but it doesn't provide guidance on how to translate funds into resources such as personnel, pharmaceuticals and equipment. It's upon the country concerned to adopt the right process of resource redistribution.

In addition, the study recommends that MOH should develop a link between district plans and budgets and the resource allocation process. In other words district plans should be considered in the resource allocation process. A possible way of doing this is first to estimate "guideline allocation" based on equity targets and the recommended pace of change. Districts could then be required to develop their own budgets and plans that reflect what they believe they require to implement improved service delivery in their districts. These budgets should lie within the "guideline allocation" and must reflect the district plan. Such a procedure avoids wasting time developing budgets that will have to be reduced significantly at the provincial level.

However it is important to note that if districts are to be given the responsibility for planning and budgeting, this process must be accompanied by efforts to develop capacity required to allow effective district planning and budgeting. In particular, the study recommends that staff should be equipped with the relevant skills and necessary information required to address resource allocation issues.

The study further recommends that if equity in the allocation of health care resources between provinces is to be regarded as a priority, MOH should play a central role of monitoring progress towards equity and revising policies appropriately. As concerns the total health budgetary allocations, the study recommends that the MOH should design strategies to protect health sector allocations during the competition between other sectors. However, the study

recognises that other sectors (e.g. housing and education) may have an even greater effect on improving the health status of the population. This implies that, the government should not reduce the budgetary allocation of sectors that are known to contribute positively towards health but rather should consider reducing the allocations to other sectors (e.g. military and defense).

Finally, it is important to highlight the role of politics in the Kenyan health care planning and resource allocation process. As most interviewees noted, implementing a formula may not be a solution to the problems facing the Kenyan resource allocation process. Political factors are likely to come into play and alter budgetary allocations. Thus implementation of any of the above recommendations heavily relies on political decisions. Health officials should seek ways of convincing political leaders that redistribution is necessary if Kenyan citizens are to enjoy good health services regardless of their geographical residence and socio-economic status.

7.3: The way forward

The study has established that there exist disparities in resource allocation between provinces. It has recommended that redistribution is necessary if Kenya is to achieve equity in health care. This sub-section looks at how the MOH can lead the Kenyan health sector towards equity in health care.

The first step towards equity is for the health officials at the central, provincial and district levels to consider whether the issue of equity is important to Kenya. If it is then they should commit themselves fully to achieving the equity goal. As a result they should discuss what could be done to make sure that equity doesn't only appear in policy papers. Instead equity

should be put into practice. This may be done through holding open discussions with stakeholders as a way of exchanging ideas on the most important appropriate formula/process of resource allocation. Such a discussion would involve suggestions on the right indicators to be incorporated in a resource allocation formula.

Finally it would be important to recognise the fact that an attempt to distribute resources on the basis of need is likely to face some opposition. Health officials and other stakeholders should decide how they could mobilise support for, and overcome opposition to equity goals.

7.4: Further research

For further research in the area, the study recommends the following:

- One of the major issues arising form the analysis is the importance of having a correct estimate on the percentage of resources allocated to KNH that is used to serve residents from other provinces. The study therefore suggests that it would be important to find out the percentage of KNH spending that goes on tertiary referral services for all Kenyans and what percentage goes to the provision of basic services to the Nairobi residents.
- The study concentrated on distribution of resources between provinces. However the study notes that districts in the same province may have different characteristics. Hence a similar study should be carried out to investigate the resource distribution within provinces (i.e. between districts) and the extent of inequities.
- Secondly in the discussion of the delivery of health care services in Kenya, the study noted that curative care received a higher proportion of health care resources. The study therefore recommends that it would be important to carry out a study focusing on equity between level of care.

- In addition the study suggests that it would be important to carry out a research on the capacity of provinces. This is important because it helps in informing the MOH on the actions to take towards developing capacity both at the district and provincial level.
- Although the study mainly focused on the public sector, it recognises that the role of private providers in the provision of health service in Kenya is on the rise. This is evident from the public/private mix structure on the health sector discussed in chapter two. In view of this it would be important to carry out an investigation on the public/private mix in Kenya and its implication for equity in health care.

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APPENDIX 1: Interview schedule

1) Which position do you hold and what are your responsibilities?
2) When doing resource allocation, what criteria do you follow?
3) What determines the amount of resources available to the health sector?
4) How do you formulate budgets? How is the budgeting process?
5) Who is involved and who makes the final decision?
6) Is the level of expenditure always equal to the budget levels? If not what causes these imbalances?
7) Is there a tendency for districts to spend more than the allocated amount? What happens under such circumstances? Are districts given more funds?
8) Are the less resourced districts well represented in the process of budgeting and resource allocation?
9) How do you make decisions on the distribution of resources between different geographical areas?
10) Are district level budgets and plans taken into account?
11) What are these plans based on? What are the priorities? Do they consider issues of equity ?
12) Is there any link between budgeting and planning?
13) What are the strengths and weaknesses of this procedure?
14) Are there factors that constrain the allocation of resources?
15) In your opinion, what do you think should be put into consideration when allocating resources?
16) Do you think there is need for redistribution? What factors are likely to constrain redistribution.
17) Are you interested in equity or meeting the needs of the districts?
18) Do you consider adopting a needs-based formula? What are the challenges that may face such a resource allocation formula?

APPENDIX 2: Principles of a successful formula.

Some principles of a successful formula.

- Policy objectives of a formula must be made clear and explicit before it is developed.
- The policy objectives of a formula must be consistent with other policies in general, and with service priorities in particular
- A formula should have the following characteristics:

  -It is simple and clear-it must not be too sensitive to changes in data and assumptions

  -Makes use of indicators which are well and frequently recorded-it avoids indicators which reflect the existing supply of services

  -It takes account of:

  demography,

  utilisation of the private sector,

  health status

  cross boundary flows,

  the cost of teaching and research and

  the special cost of service delivery in different areas.

APPENDIX 4: Distribution of health care resources: including 60% of KNH for the year 1997/98

PROVINCE	ADMINISTRATI	RECURRENT EXPENDITURE			DEVT EXPENDITURE			
		PROV HOSP	DIST HOSP	TOTAL	PROV. HOSP	DIST HOSP	TOTAL	TOTAL EXP
Nairobi	3,350,489	37,338,578	10,878,648	51,568,015	12,864,099	40,000	12,934,099	64,502,113
Central	245,409	7,419,273	28,708,891	36,373,573	5,000	566,000	571,000	36,944,573
Coast	423,386	10,521,612	22,208,838	33,153,836	5,000	80,000	85,000	33,236,836
Eastern	1,410,626	7,604,401	32,083,759	41,098,786	86,000	50,000	110,000	41,286,786
N.eastern	122,228	4,469,778	4,566,604	9,158,806	5,000	0	5,000	9,163,806
Nyanza	345,874	6,988,675	20,466,615	27,801,164	2,500	40,000	42,500	27,843,664
Rift valley	460,641	9,881,056	63,022,530	73,364,427	5,000	654,600	859,600	74,224,027
Western	264,055	6,900,424	12,709,489	19,863,966	5,000	1,427,264	1,432,264	21,396,232
Total	6,622,988	91,123,799	194,736,874	292,482,677	12,981,599	3,087,864	16,039,463	308,622,039

PROVINCE	HUMAN RESOURCES					FACILITIES			
	NURSES	DOCTORS	PHARM'	CLINICAL O	TOTAL	HEALTH .C	DISPEN'	TOTAL	BEDS
Nairobi	3,970	954	130.5	179.5	4,334	36	303	339	3,346
Central	4,645	337	86	456	5,538	78	345	423	7,218
Coast	2,735	449	88	312	3,584	48	361	409	4,227
Eastern	4,653	308	95	528	5,564	73	665	738	6,516
N.eastern	660	32	1	56	749	9	53	62	1,501
Nyanza	3,944	319	164	403	4,860	104	298	402	9,879
Rift valley	7,165	628	246	867	6,727	148	963	1111	10,401
Western	2,830	182	45	296	3,356	83	158	241	5,753
Total	29,702	3,210	897.6	2,920	36,729	579	3,146	3,726	48,941

	Population	IMR(per 1000 bi	normalised IMR	weighted pop	Dist of pop to v	dist weight pop	Dist of pop to weight		Actual exp	targets	difference	%differerence
Nairobi	2,137,000	49	1.63333333	1502868.053	3490433	0.055	1582886.05		64,502,113	17028106	47,474,007	73.6007
Central	3,705,000	30	1.00000000	1880169.241	3705000	0.059	1680169.24		36,944,573	18074672	18,869,701	51.075706
Coast	2,491,000	77	2.56666667	2899389.205	6393567	0.101	2899386.21		33,238,836	31191085	2,047,771	6
Eastern	4,643,000	47	1.56666667	3298878.37	7274033	0.115	3298679.37		41,208,786	35486429	5,722,357	13.886256
N.eastern	961,000	77	2.56666667	1118555.856	2466567	0.039	1118555.86		9,163,808	12033165	-2,869,357	-31.311839
Nyanza	4,397,000	111	3.70000000	7377734.243	16268900	0.257	7377734.24		27,643,664	79367956	-51,524,292	-185.04853
Rift valley	6,991,000	53	1.76666667	5600911.611	12350767	0.195	5600911.61		74,224,027	80253312	13,970,715	18.822362
Western	3,354,000	101	3.36666667	5120684.221	11291800	0.179	5120684.22		21,396,232	55087135	-33,690,903	-157.48165
Total	28,676,000			28679000	63241067	1.000	28679000		308,622,039	308622039	0	

EXPENDITURE AND RESOURCES RELATIVE TO POPULATION

	Adminstration	Reccurent expenditure		Total	Development expenditure			Total expenditur
		prov hosp	dist hosp		prov hosp	Dist hosp	total	
Nairobi	1.567846982	17.47242747	5.090757136	24.13103159	6.033738164	0.018717829	6.05245601	30.1834876
Central	0.066237247	2.002502834	7.748688529	9.81742981	0.001349528	0.152766532	0.15411606	9.971544669
Coast	0.169966278	4.223850662	8.915631473	13.30944941	0.002007226	0.032115616	0.03412284	13.34357126
Eastern	0.30361779	1.93782059	6.910135473	8.861773653	0.012922679	0.010768899	0.92369158	8.875465432
N.eastern	0.127188345	4.651171696	4.752137357	9.530497399	0.005202914	0	0.00520291	9.535700312
Nyanza	0.07866136	1.566418922	4.654677053	6.322757335	0.000568569	0.009097112	0.00966568	6.332423016
Rift valley	0.065919162	1.413390653	9.01480904	10.46412487	0.000715205	0.122242894	0.12295809	10.61708296
Western	0.078728384	2.057371497	3.816186345	5.952298225	9.001490757	0.425540847	0.4270316	6.378317920
National average	0.23093232	3.177870069	6.790190623	10.19849288	0.4626651714	0.1066228861	0.55927682	10.76776897

	Human resources					Population per facility			
	nurses	doctors	pharm	clinical off	total	health.c	disp'	total	beds/1000pop
Nairobi	143.6359382	44.64202153	6.106891624	8.3996256	202.784277	59361.11111	7052.8053	6,303.83	1.57
Central	125.3711201	9.095816464	2.645074224	12.307692	149.4187031	47500	10739.13	8,758.87	1.95
Coast	109.7952629	18.0248896	3.532717794	12.52509	143.8779607	51895.83333	6900.277	6,090.46	1.70
Eastern	100.215378	6.633642042	2.04609090	11.371958	120.2670687	63602.73973	6981.9548	6,291.33	1.40
N.eastern	68.67845994	3.329864724	0.104058273	5.8272633	77.9396462	106777.7778	18132.079	15,500.00	1.56
Nyanza	89.69762104	7.264946554	4.412098159	9.16534	110.5299068	42278.84615	14755.034	10,937.81	2.25
Rift valley	102.4889143	6.99728222	3.518809890	8.8269203	124.8319298	47236.48649	7259.6054	6,292.53	1.49
Western	94.37689345	5.426356589	1.341681574	8.8848135	100.0298151	40409.93856	21227.848	13,917.01	1.72
National average	114.2682799	11.19286889	3.13	10.179923	128.0676756	49681.96164	9116.8283	7,699.96	1.70306668

EXPENDITURE AND RESOURCES RELATIVE TO NATIONAL AVERAGE

	Adminstration	Reccurent expenditure		Total	Development expenditure			Total expenditure
		prov hosp	dist hosp		prov hosp	Dist hosp	total	
Nairobi	578.9205526	449.9021964	-25.02777177	136.613703	1232.975884	-82.44498087	982.195778	180.5736753
Central	-71.31746346	-36.9760894	14.11592213	-3.736476041	-99.7018618	43.27620074	-72.4436248	-7.308427483
Coast	-26.3999605	32.93543559	31.30163938	30.50407161	-99.55656282	-69.87950551	-93.896742	24.03661058
Eastern	31.5613988	-46.45357685	1.766444545	-13.20507962	-97.14511645	-89.90009803	-95.7638806	-17.49715063
N.eastern	-44.92397358	46.36432673	-30.01466835	-6.54994265	-98.85057021	-100	-99.0697047	-11.35986585
Nyanza	-65.93746329	-49.97690174	-31.44897866	-38.00302235	-99.6743914	-91.46802914	-98.2717496	-41.1362796
Rift valley	-71.45519436	-55.51677492	32.76224903	2.606781469	-99.64199656	14.64677846	-76.0147556	-1.30775636
Western	-65.90846007	-35.24923158	-43.79853802	-41.6356288	-99.67000129	299.1049289	-23.645575	-40.70936078

	Human resources					Population per facility			
	nurses	doctors	pharm	clinica off	total	health.c	disp'	total	beds/1000pop
Nairobi	25.70062166	298.6437805	95.14	- 17.49	58.34	19.84407671	-22.632848	-18.12	-8.07
Central	9.718467413	-18.73553882	- 15.48	20.90	16.67	-4.10230482	17.805029	13.77	14.40
Coast	-3.914487015	61.03919281	0.64	23.04	12.35	4.772438021	-24.306036	-20.89	-0.36
Eastern	-12.29816529	-40.73328476	- 34.62	11.71	-6.09	29.40749793	-23.410056	-18.28	-17.59
N.eastern	-39.68717663	-70.25009644	- 96.67	- 42.76	-39.14	115.6735323	96.903412	101.32	-8.28
Nyanza	-21.50269429	-35.10236379	40.99	- 9.97	-13.69	-14.6432983	61.858278	42.07	31.93
Rift valley	-10.30851746	-19.81587016	12.44	- 3.47	-2.53	-4.63431195	-20.364313	-18.27	-12.64
Western	-26.15897986	-51.51947644	- 57.13	-12.721207	-21.89	-18.4170274	132.66311	80.76	0.72

APPENDIX 3: Distribution of health care resources- including 100% of KNH for the year 1997/98 .

PROVINCE	ADMINISTRATI	RECURRENTEXPENDITURE			DEVT EXPENDITURE					HUMAN RESOURCES				FACILITIES			
		PROV HOSP	DIST HOSP	TOTAL	PROV. HOSP	DIST HOSP	TOTAL	TOTAL EXP	NURSES	DOCTORS	PHARM'	CLINICAL O	TOTAL	HEALTH .C	DISPEN'	TOTAL	BEDS
Nairobi	3,350,489	74,677,155	10,878,948	88,906,592	25,788,197	40,000	25,828,197	114,734,788	6,139	1,908	261	359	8,667	36	303	339	6,691
Central	245,409	7,419,273	28,708,891	38,373,573	5,000	566,080	571,000	38,944,573	4,645	337	98	456	5,536	78	345	423	7,218
Coast	423,386	10,521,612	22,208,838	33,153,836	5,000	80,000	85,000	33,238,836	2,735	449	88	312	3,584	48	361	409	4,227
Eastern	1,410,626	7,604,401	32,083,759	41,098,788	60,000	. 50,000	110,000	41,208,786	4,653	308	95	528	5,584	73	665	738	6,516
N.eastern	122,228	4,469,776	4,566,604	9,156,808	5,000	0	5,000	9,163,808	660	32	1	56	749	9	53	62	1,501
Nyanza	345,674	6,988,875	20,466,615	27,801,164	2,500	40,000	42,500	27,843,664	3,944	319	194	403	4,860	104	298	402	9,879
Rift valley	460,841	9,881,056	63,022,530	73,364,427	5,000	854,600	859,600	74,224,027	7,165	829	246	687	8,727	148	963	1111	10,401
Western	264,055	6,900,424	12,799,489	19,963,968	5,000	1,427,264	1,432,264	21,396,232	2,830	182	45	298	3,355	83	158	241	5,753
Total	6,622,968	128,462,372	194,736,874	329,821,164	29,876,697	3,067,964	28,938,661	368,764,716	32,771	4,164	1028	3,099	41,062	579	3,146	3,726	62,186

	Population	IMR(per 1000 bi	normalised IMR	Dist of pop to we	Weighted pop	dist weight pop	Dist of pop to weight
Nairobi	2,137,000	49	1.63333333	1582866.053	3490433	0.055	1582866.05
Central	3,705,000	30	1.00000000	1680199.241	3705000	0.059	1680189.24
Coast	2,491,000	77	2.56666667	2899399.205	6393567	0.101	2899389.21
Eastern	4,643,000	47	1.56666667	3298679.37	7274033	0.115	3298679.37
N.eastern	961,000	77	2.56666667	1118555.856	2466567	0.039	1118555.66
Nyanza	4,397,000	111	3.70000000	7377734.243	16268900	0.257	7377734.24
Rift valley	6,991,000	53	1.76666667	5600911.811	12350787	0.195	5600911.81
Western	3,354,000	101	3.36666667	5120684.221	11291000	0.179	5120684.22
Total	28,679,000			28679000	63241067	1.000	28679000

EXPENDITURE AND RESOURCES RELATIVE TO POPULATION

	Administration	Reccurent expenditure		Total	Development expenditure			Total expenditure	Human resources					Population per facility			
		prov hosp	dist hosp		prov hosp	Dist hosp	total		nurses	doctors	pharm	clinical off	total	health.c	disp'	total	beds/1000pop
Nairobi	1.567846982	34.94485494	5.090757136	41.68345905	12.96747637	0.016717829	12.0861942	53.68965325	287.2716765	89.28404305	12.21338326	16.799251	405.568564	59361.11111	7052.8053	6,383.83	3.1310246
Central	0.066237247	2.002502834	7.748688529	9.81742881	0.001349529	0.152768532	0.15411606	9.871544668	126.3711201	9.095816464	2.645674224	12.387692	149.4197031	47500	10739.13	6,766.87	1.94817814
Coast	9.169966279	4.223850682	8.915631473	13.30944841	0.002007226	0.032115618	0.03412284	13.34357129	109.7952629	18.0248896	3.532717784	12.52509	143.8779807	51895.83333	6900.277	6,090.46	1.69690667
Eastern	0.30381779	1.63762059	6.910135473	8.851773853	0.012922079	0.010768899	0.82369158	8.878465432	100.215378	6.633642042	2.04609089	11.371958	120.2870687	63602.73973	6981.9549	6,291.33	1.40340297
N.eastern	0.127188345	4.651171696	4.752137357	9.530497399	0.005202914	0	0.00520291	9.535700312	68.67845994	3.329864724	0.104058273	6.8272633	77.9396462	106777.7778	18132.075	15,500.00	1.56181467
Nyanza	0.07866136	1.588418922	4.654677053	6.322757335	0.000568569	0.009097112	0.00966568	6.332423016	89.69752104	7.254946554	4.412099156	9.16534	110.5299068	42278.84615	14755.034	10,937.81	2.24675915
Rift valley	0.065919162	1.413396653	9.01480904	10.49412487	0.000715205	0.122242884	0.12295609	10.61708296	102.4889143	6.89728222	3.518809898	9.8269203	124.8318208	47236.48649	7259.6054	6,292.53	1.48776999
Western	0.078728384	2.057371497	3.818186345	5.952286225	0.001400757	0.425540847	0.4270316	6.379317829	84.37686345	5.426356589	1.341681574	8.8848135	100.0298151	40409.63855	21227.848	13,917.01	1.71526535
National average	0.23093232	4.479319386	9.790190623	11.50044123	0.962262416	0.106623891	1.00587622	12.60931744	114.2682709	14.6193947	3.58	10.896918	143.1779361	49631.05164	9116.9293	7,899.96	1.81906898

EXPENDITURE AND RESOURCES RELATIVE TO NATIONAL AVERAGE

	Adminstration	Reccurrent expenditure		Total	Development expenditure			Total expenditure	Human resources					Population per facility			
		prov hosp	dist hosp		prov hosp	Dist hosp	total		nurses	doctors	pharm	clinica off	total	health.c	disp'	total	beds/1000pop
Nairobi	576.9205528	680.1377782	-25.02777177	261.7553204	1237.483411	-82.44498087	1097.98584	329.1973042	151.4012433	514.9320535	240.73	55.48	193.2619103	19.84407871	-22.632848	-18.122024	72.0885701
Central	-71.31748348	-55.29447428	14.11592213	-14.63433085	-99.85042682	43.27620074	-84.7239873	-20.28706032	9.718487413	-37.35376552	- 26.21	13.89	4.359448261	-4.10230462	17.805029	13.77	7.06281533
Coast	-26.3999605	-5.703272261	31.30163938	15.72989375	-99.77753166	-69.87950551	-96.8177375	6.669059406	-3.914487015	24.14404633	- 0.11	15.91	0.488920017	4.772438021	-24.306038	- 20.89	-6.74577561
Eastern	31.5013988	-63.43594181	1.768444545	-23.03100650	-98.50773126	-89.90009803	-97.6516863	-29.94916299	-12.29816529	-54.31166664	- 42.92	5.24	-16.00167397	28.40748763	-23.410056	- 19.28	-22.6754956
N.eastern	-44.92397356	3.836595103	-30.01486835	-17.12928914	-99.42334108	-100	-99.4842862	-23.7712161	-39.89717883	-77.08599654	- 97.10	- 48.07	-45.56448509	115.5735323	98.903412	101.32	-14.1844294
Nyanza	-65.93746329	-64.51650039	-31.44997866	-45.02181083	-99.93898332	-91.46802914	-99.0419359	-49.37834903	-21.50269426	-50.03251387	23.09	- 15.18	-22.60241596	-14.8432863	61.850276	42.07	23.4714402
Rift valley	-71.45519438	-68.44616678	32.78224003	-8.750241284	-99.92073113	14.64877846	-87.8123711	-15.12660055	-10.30651748	-38.03240711	- 1.83	- 9.06	-12.81343287	-4.63431195	-20.364313	- 18.27	-18.2390765
Western	-65.90846007	-54.06954096	-43.79853802	-48.24297514	-99.83477381	299.1049289	-57.6725472	-49.00346995	-26.15897999	-62.62868573	- 82.57	-17.776562	-30.13601216	-18.4170274	132.66311	80.78	-5.73698884

EXPENDITURE AND RESOURCES RELATIVE TD WEIGHTED POPULATION

	Administration	recurrent expenditure		total	Development expenditure			Total exp	Human resources						Population per facility			
		prov hosp	dist hosp		prov hosp	Dist hosp	total		nurses	doctors	pharm	clinical off	total		health.centre	disp'	total	beds/1000pop
Nairobi	2.116723013	47.17844247	6.872942901	56.17	6.872942901	0.025279816	16.32	72.49	387.84	120.54	16.49	22.68	547.55		43968.50147	5223.9804	4669	4.23
Central	0.146062072	4.415789087	17.08690428	21.65	17.08690428	0.336879826	0.34	21.99	276.48	20.06	5.83	27.14	326.48		21540.6313	4870.0658	3972	4.30
Coast	0.146025425	3.626893869	7.659806887	11.43	7.659806887	0.027591923	0.03	11.46	94.33	15.49	3.04	10.76	213.31		60464.15011	8031.5787	7089	1.48
Eastern	0.427633559	2.305286494	9.726243566	12.46	9.726243566	0.015157581	0.03	12.49	141.98	9.34	2.88	16.01	169.26		45187.38863	4960.4201	4470	1.98
N.eastern	0.109273041	3.99602396	4.092787852	8.19	4.092787852	0	0.00	8.19	59.00	2.86	0.09	5.01	66.96		124283.984	21104.827	18041	1.34
Nyanza	0.046880789	0.947265755	2.774105752	3.77	2.774105752	0.005421719	0.01	3.77	53.46	4.32	2.83	5.46	65.87		70939.75233	24757.497	18353	1.34
Rift valley	0.082279639	1.764187035	11.25218109	13.10	11.25218109	0.152582299	0.15	13.25	127.93	11.23	4.39	12.27	155.81		37643.99872	5916.1076	5041	1.86
Western	0.051566351	1.347558979	2.499566161	3.90	2.499566161	0.278725252	0.28	4.18	55.27	3.55	0.68	5.82	65.52		61694.99061	32406.394	21248	1.12
Total	3.126443868	65.68344764	61.96462869	136.66	61.96462869	0.841620216	17.1832763	147.8276984	1196.24161	187.3966669	36.22673994	106.14169	1613.691124		466663.3971	107173.66	82882.7769	17.6178618
National average	0.23993232	4.479319386	6.790196623	11.69644128	6.902262416	0.106628801	1.90967622	12.89931744	114.2682799	14.6193347	3.684604341	16.866916	143.1779361		49631.95164	9116.9293	7699.9664	1.81966898

Relative to national average

	Administration	recurrent expenditure		total	Development expenditure			Total exp	Human resources						Population per facility			
		prov hosp	dist hosp		prov hosp	Dist hosp	total		nurses	doctors	pharm	clinical off	total		health.centre	disp'	total	beds/1000pop
Nairobi	816.5988609	953.2504614	1.218704602	388.3995949	661.7538936	-76.2992732	1517.3799	479.4518352	239.4124576	730.2090982	360.0099564	109.69047	282.4269914		-56.5116443	-42.694507	-39.353361	132.304091
Central	-36.75113483	-954.6687619	151.6410139	66.24262484	1793.805320	215.9433649	-66.3143296	75.77779325	141.9396224	36.14340426	62.72112367	151.16218	130.126872		-56.5116443	-46.576954	-48.408882	136.867981
Coast	-36.70700396	-18.98557669	12.80695087	-0.571413278	748.9649639	-74.12217275	-87.0941511	-8.355970265	-17.44875545	9.057551276	-15.3268833	-0.4161285	40.9837414		21.94986894	-11.89602	-7.9236863	-19.8812387
Eastern	65.17700754	-49.53488198	43.23982683	9.336390586	977.9958477	-85.78405489	-98.694671	-0.134357032	23.44322485	-35.69216405	-19.655826	48.127689	18.23041405		-8.77123324	-45.585684	-41.944148	6.55528334
N.eastern	-52.68178954	-10.78946358	-39.87255678	-26.86216688	352.5083985	-198	-99.5569279	-34.50853702	-48.36305147	-80.29639984	-97.5059037	-53.668862	-53.23208084		150.9167918	131.51361	134.330198	-26.2549269
Nyanza	-79.89933844	-78.85245759	-59.14539154	-67.23384589	207.4644863	-94.91509525	-99.4290106	-69.83038532	-53.2169848	-70.22025607	-20.8416403	-49.449615	-53.99159609		43.22616411	171.5623	136.374188	-26.4131987
Rift valley	-64.37068984	-80.61483262	65.71245026	13.89700193	1147.122383	43.10341303	-84.7875281	5.938096439	11.95197773	-22.65269361	22.53136228	13.511648	8.825368576		-23.5967947	-36.189048	-34.52026	2.05313627
Western	-77.67036201	-69.81598135	-63.18857103	-66.09963554	177.0362396	161.4099745	-72.2759168	-66.58775249	-51.63482644	-75.52083069	-75.4836726	-46.144421	-54.2397461		124.3984712	255.5213	175.977214	-38.2586142

	expnditure	personnel	facilities	beds
Nairobi	326.1973042	183.2019103	-18.12202427	72.0665701
Central	-20.26706032	4.359448201	13.76537962	7.062815333
Coast	6.669059406	0.488920017	-20.89340479	-6.745775614
Eastern	-29.04916299	-16.00167397	-18.2644713	-22.67549565
N.eastern	-23.7712181	-45.56448509	101.3232678	-14.16442636
Nyanza	-49.37834903	-22.80241599	42.06682859	23.47144019
Rift valley	-15.12660055	-12.81343267	-19.26886758	-16.23907649
Western	-49.00346995	-30.13601216	80.76247906	-5.736988636

EXPENDITURE AND RESOURCES RELATIVE TO WEIGHTED POPULATION

	Adminstration	recurrent expenditure		total	Development expenditure		total	Total exp	Human resources						Population per facility			
		prov hosp	dist hosp		prov hosp	Dist hosp	total		nurses	doctors	pharm	clinical off	total		health.centre	disp'	total	beds/1000pop
Nairobi	2.116723613	23.58922123	6.872942901	32.57888715	6.872942901	0.025270016	6.17131587	40.75026302	193.9203898	60.27641886	8.244538426	11.340168	273.7756347		43968.50147	5223.9904	4669.22139	2.11357114
Central	0.146062672	4.415789067	17.08690428	21.64875544	17.08690428	0.336870826	0.33984672	21.98860216	276.4602449	26.05750324	5.832745749	27.140123	329.490617		21540.8313	4870.0558	3972.0313	4.2958958
Coast	0.146025425	3.628893869	7.659806887	11.43472616	7.659806887	8.027591923	8.82931642	11.4640426	64.32988721	15.48598886	3.035111544	10.76085	213.3118445		60404.15011	8031.5767	7068.99561	1.45788824
Eastern	0.427633559	2.305288464	9.726243566	12.45916362	9.726243566	0.015157581	0.03334668	12.4925103	141.0564495	9.337069943	2.879940405	16.006406	169.2799855		45197.38863	4960.4261	4469.75524	1.97533597
N.eastern	0.109273841	3.99602398	4.082787952	8.188084954	4.082787952	0	0.00447005	8.192535003	58.00465289	2.860831655	0.089400989	5.0064554	66.96134093		124283.984	21164.827	18041.2235	1.34190885
Nyanza	0.846660789	0.847265755	2.774105752	3.768252206	2.774105752	0.005421719	0.00576058	3.774012872	53.45814677	4.323620695	2.629533589	5.4823618	65.87388268		70939.75233	24757.497	18352.5727	1.33902899
Rift valley	0.082279639	1.764187035	11.25219109	13.09865777	11.25218109	0.152582299	0.15347501	13.25213278	127.9255993	11.2363143	4.362141999	12.26586	155.8139155		37643.99872	5818.1078	5041.32478	1.05701906
Western	8.051566351	1.347558979	2.499566181	3.898691491	2.499566161	0.278725252	0.27970168	4.178393175	55.26605192	3.554212526	8.878788811	5.8195348	65.51858805		61694.99061	32409.384	21247.6524	1.12349267
Total	3.128443888	41.99422641	61.98462086	107.6761888	61.98462860	0.841628216	9.81723391	116.9924318	1061.421421	127.1201381	27.98220162	93.901799	1348.926689		466863.8971	107173.96	82892.7769	16.6042867
National average	0.23993232	3.177370069	6.798196623	10.16849286	9.482881714	0.108623801	0.66927662	18.76776037	103.8663286	11.19286889	3.120467666	10.179923	128.0678756		49831.96184	9116.0293	7099.8694	1.70300568

Relative to national average

	Adminstration	recurrent expenditure		total	Development expenditure		total	Total exp	Human resources						Population per facility			
		prov hosp	dist hosp		prov hosp	Dist hosp	total		nurses	doctors	pharm	clinical off	totol		health.centre	disp'	total	beds/1000pop
Nairobi	818.5988609	642.4134162	1.216704802	219.4480559	1419.37333	-76.2992732	1361.05375	278.7979219	97.24451034	436.4720693	163.448599	11.397594	113.7742778		-56.5116443	-42.664507	-39.353361	24.1082843
Central	-36.75113483	-603.4371951	151.6410139	112.2740659	3674.645516	215.6433849	-39.2344726	164.3974306	166.9428603	79.1991076	86.38140985	166.60442	157.2787193		-56.5116443	-46.576954	-48.408882	152.259626
Coast	-36.76700398	14.21061627	12.90695087	12.1217257	1592.267641	-74.12217275	-94.7581436	6.56524855	-8.917501298	38.3557766	-3.01508191	5.7065907	66.5618448		21.64968804	-11.89602	-7.9238863	-14.3932253
Eastern	85.17700754	-27.44670948	43.23962683	22.16671424	2048.725869	-85.78405489	-94.9375222	16.12548133	36.2004584	-16.58011581	-7.97346979	57.235043	32.18011249		-8.77123324	-45.585684	-41.944140	15.9911552
N.eastern	-52.66178954	25.76514377	-39.87255678	-19.71299022	801.9667561	-106	-99.2007426	-23.64540433	-43.02663366	-74.44056354	-97.1432524	-50.8203	-47.71405593		150.9167918	131.51361	134.330196	-21.2036015
Nyanza	-79.69933844	-70.18711222	-59.14536154	-63.05089045	512.8565666	-94.91509525	-98.9699931	-64.91625464	-48.38219648	-81.36982751	-15.8750487	-46.341619	-48.56318441		43.22016411	171.5823	136.374168	-21.3726062
Rift valley	-64.37066984	-44.47650007	65.71245026	28.43719124	2365.838615	43.10341363	-72.5582481	23.18663431	23.52164814	0.334636694	40.34790017	20.4907	21.86539021		-23.5967647	-36.199048	-34.52026	9.04362095
Western	-77.67036201	-57.58865572	-63.16857103	-61.77186583	452.205169	161.4099745	-49.9865698	-61.15929408	-46.63653004	-68.24571307	-71.9189033	-42.833212	-48.84061189		124.3984712	255.5213	175.977214	-34.0294231

APPENDIX 5: Distribution of health care resources: including 25% of KNH for the year 1997/98.

PROVINCE	ADMINISTRATI	RECURRENT EXPENDITURE			DEVT EXPENDITURE				HUMAN RESOURCES					FACILITIES			
		PROV HOSP	DIST HOSP	TOTAL	PROV. HOSP	DIST HOSP	TOTAL	TOTAL EXP	NURSES	DOCTORS	PHARM'	CLINICAL O	TOTAL	HEALTH .C	DISPEN'	TOTAL	BEDS
Nairobi	3,350,489	18,669,289	10,878,948	32,898,726	6,447,050	40,000	6,487,050	39,385,778	6,139	1,908	261	359	8,667	36	303	339	6,691
Central	245,409	7,419,273	29,708,891	36,373,573	5,000	566,000	571,000	36,944,573	4,845	337	98	458	5,536	78	345	423	7,218
Coast	423,388	10,521,812	22,208,838	33,153,836	5,000	80,000	85,000	33,236,836	2,735	449	88	312	3,584	48	361	409	4,227
Eastern	1,410,626	7,604,401	32,083,759	41,098,786	60,000	50,800	110,000	41,208,786	4,653	308	95	528	5,584	73	665	738	8,518
N.eastern	122,228	4,469,778	4,566,804	9,156,808	5,000	0	5,000	9,163,808	660	32	1	56	749	9	53	62	1,501
Nyanza	345,874	6,988,675	20,468,815	27,801,184	2,500	40,000	42,500	27,843,664	3,944	319	194	403	4,860	104	298	402	9,879
Rift valley	460,841	9,881,056	63,022,530	73,364,427	5,000	854,600	859,600	74,224,027	7,186	829	246	667	8,727	148	963	1111	10,401
Western	264,055	6,900,424	12,799,469	19,963,988	5,000	1,427,264	1,432,264	21,396,232	2,830	182	45	298	3,355	83	158	241	5,753
Total	6,622,906	72,464,666	194,735,874	273,813,288	6,534,586	3,057,864	8,592,414	282,405,702	32,771	4,164	1028	3,099	41,062	579	3,146	3,725	52,186

	Population	IMR (per 1000 bi	normalised IMR	weighted pop	Dist of pop to v	dist weight pop	Dist of pop to weight	Actual exp	targets	difference	%differerence
Nairobi	2,137,000	49	1.63333333	1582868.053	3490433	0.055	1582066.95	84,502,113	15841873	48,860,240	78
Central	3,795,000	30	1.00000000	1680169.241	3705000	0.059	1680169.24	36,944,573	16603422	28,341,151	55
Coast	2,491,000	77	2.56666667	2899399.205	6383567	0.101	2899399.21	33,236,836	28651845	4,566,991	14
Eastern	4,843,000	47	1.56666667	3298679.37	7274033	0.115	3298679.37	41,208,786	32597526	8,611,257	21
N.eastern	961,000	77	2.56666667	1118555.856	2466567	0.039	1118555.88	8,163,808	11053562	-1,889,754	-21
Nyanza	4,397,000	111	3.70000000	7377734.243	16268900	0.257	7377734.24	27,843,664	72906724	-45,063,060	-162
Rift valley	6,991,000	53	1.76666667	5600911.611	12350767	0.195	5600911.61	74,224,027	55348176	18,875,851	25
Western	3,354,000	101	3.36666667	5120684.221	11291800	0.179	5120684.22	21,366,232	50602570	-29,206,338	-137
Total	28,679,000			28679000	63241067	1.000	28679000	306,522,039	283405702	28,116,338	

EXPENDITURE AND RESOURCES RELATIVE TO POPULATION

	Administration	Reccurent expenditure		Total	Development expenditure			Total expenditure	Human resources					Population per facility			
		prov hosp	dist hosp		prov hosp	Dist hosp	total		nurses	doctors	pharm	clinical off	total	health.c	disp'	total	beds/1000pop
Nairobi	1.567846982	8.736213851	5.090757136	15.39481797	3.016869209	0.018717829	3.03558704	18.43040501	287.2718765	89.28404305	12.21338325	16.799251	405.568554	59361.11111	7052.8053	6,303.83	3.13
Central	0.066237247	2.002502834	7.748688529	9.81742861	0.001349529	0.152766532	0.15411606	9.971544669	125.3711291	9.095818484	2.645074224	12.307692	148.4187031	47500	10738.13	8,758.87	1.95
Coast	0.169966278	4.223850662	8.915631473	13.30944841	0.002007226	0.032115618	0.03412284	13.34357126	109.7952626	18.0248896	3.532717764	12.52509	143.8779607	51895.83333	6900.277	6,000.46	1.70
Eastern	0.30361778	1.63782058	6.910135473	8.851773653	0.012922679	0.010768899	0.02369158	8.878465432	100.218378	6.633642042	2.04609089	11.371958	120.2870687	63602.73973	6981.9549	6,291.33	1.48
N.eastern	0.127188345	4.651171899	4.752137357	9.530487399	0.005202814	0	0.00520281	9.535700312	68.67845994	3.329864724	0.104058273	5.8272633	77.9396462	106777.7778	18132.075	15,500.00	1.56
Nyanza	0.07866136	1.589418922	4.654677053	6.322757335	0.000568569	0.009097112	0.00966568	6.332423016	89.69752164	7.254946554	4.412099159	9.16534	110.5298068	42278.84615	14758.034	10,937.81	2.25
Rift valley	0.065919182	1.413396653	9.01480904	10.49412487	0.000715205	0.122242884	0.12295809	10.61708296	102.4889143	8.99728222	3.518809898	9.8269203	124.8319268	47236.48649	7259.6054	6,292.53	1.49
Western	0.078726384	2.057371497	3.818186345	5.952286225	0.001490757	0.425540647	0.4270316	6.379317829	84.37686345	5.426356599	1.341681574	8.8849135	100.0298151	40409.63855	21227.948	13,917.01	1.72
National average	0.23003232	2.52639883	6.7601996823	9.547818672	0.227861372	0.106623881	0.33447617	9.881893846	114.2882799	14.5193347	3.58	10.806818	143.1779361	49631.96164	9116.8203	7,699.86	1.81966806

EXPENDITURE AND RESOURCES RELATIVE TO NATIONAL AVERAGE

	Adminstration	Reccurent expenditure		Total	Development expenditure			Total expenditure	Human resources					Population per facility			
		prov hosp	dist hosp		prov hosp	Dist hosp	total		nurses	doctors	pharm	clinica off	total	health.c	disp'	total	beds/1000pop
Nairobi	578.9205526	245.7975092	-25.02777177	61.24417785	1224.051368	-82.44498087	807.567221	86.50492294	151.4012433	514.9320535	240.73	55.46	183.28	19.84407871	-22.632848	-18.12	72.07
Central	-71.31746348	-20.73677408	14.11592213	2.8270186	-99.4077156	43.27820074	-53.9230198	0.908281878	9.716467413	-37.35378552	- 28.21	13.90	4.36	-4.10230482	17.805029	13.77	7.06
Coast	-26.3999605	67.16879175	31.30163936	39.46217214	-99.11906345	-69.87950551	-89.7980942	35.02813951	-3.914487015	24.14404633	- 0.11	15.91	0.49	4.772438021	-24.306038	-28.89	-6.75
Eastern	31.5613988	-35.17165557	1.766444545	-7.297170454	-94.32848106	-89.90009803	-92.9167901	-10.16547906	-12.29816529	-54.31166664	- 42.92	5.24	-16.00	28.46748783	-23.410056	-18.20	-22.88
N.eastern	-44.92397356	84.10304678	-30.01406835	-0.178279553	-97.7165318	-100	-98.4444545	-3.504286091	-38.99717883	-77.06599654	- 97.10	- 46.07	-45.56	115.5735323	98.903412	101.32	-14.18
Nyanza	-65.93740329	-37.08749424	-31.44997866	-33.77591025	-99.75046478	-91.46802914	-97.1101947	-35.91958147	-21.50269428	-50.03251367	23.09	- 15.18	-22.80	-14.6432863	61.858278	42.07	23.47
Rift valley	-71.45519430	-44.05482165	32.76224003	9.914682915	-99.68610686	14.84877848	-63.2385006	7.43867209	-10.30651748	-38.03240711	- 1.83	- 9.06	-12.81	-4.63431195	-20.364313	-18.27	-18.24
Western	-65.90846007	-18.56495633	-43.79853802	-37.65619707	-99.34573258	299.1049289	27.8721377	-35.44503337	-26.15697999	-62.62668573	- 82.57	-17.778562	-30.14	-16.4170274	132.88311	80.78	-5.74

EXPENDITURE AND RESOURCES RELATIVE TO WEIGHTED POPULATION

	Administration	recurrent expenditure		total	Development expenditure			Total exp	Human resources					Population per facility				
		prov hosp	dist hosp		prov hosp	Dist hosp	total		nurses	doctors	pharm	clinical off	total		health.centre	disp'	total	beds/1000pop
Nairobi	2.116723013	11.79481077	8.872942901	20.70427669	8.872942901	0.026270616	4.0982934	24.88257009	387.8407771	120.5408377	16.48907696	22.690378	547.5510695		43908.50147	5223.9804	4669.22139	4.22714227
Central	0.146062072	4.415789087	17.08890429	21.64875544	17.08890429	0.338870828	0.33984872	21.98980216	276.4602449	20.05750324	5.832745746	27.140123	329.490817		21540.8313	4870.0558	3972.0313	4.2959058
Coast	0.146025425	3.628893088	7.859806887	11.43472918	7.859806887	0.027581823	6.02931842	11.4640426	94.32988721	15.48596886	3.035111644	10.76085	123.6118156		60404.16011	9631.5767	7088.90561	1.45788824
Eastern	0.427833559	2.305288494	9.726243566	12.45916362	8.726243568	0.015157581	0.03334968	12.4925153	141.0584495	9.337069943	2.879940405	16.006406	169.2798655		45187.38963	4960.4291	4469.75624	1.97533597
N.eastern	0.109273041	3.99602398	4.082767852	8.189064954	4.082767852	0	0.00447005	8.192536093	59.00465289	2.860831655	0.089400989	5.0064554	66.96134083		124263.984	21104.827	18041.2235	1.34190885
Nyanza	0.046880789	0.947265755	2.774105752	3.768252296	2.774185752	0.005421716	0.00576058	3.774612872	53.45814677	4.323820695	2.629533589	5.4623818	65.87388269		70930.75233	24757.497	18352.5727	1.33902899
Rift valley	0.862279639	1.754187035	11.25219108	13.00665777	11.25219108	0.152582299	0.15347501	13.25213278	127.9255983	11.2303143	4.392141996	12.26586	155.8139158		37843.90872	5616.1078	5041.32478	1.85701906
Western	0.051566351	1.347558975	2.499566181	3.890691481	2.499566181	0.276725252	0.27970186	4.178383175	55.26605192	3.554212526	0.878786811	5.8196348	85.51858806		81894.99061	32409.394	21247.6524	1.12346267
Total	3.126443688	30.19961686	61.98462869	95.28868843	61.98462869	0.841626216	4.94421064	100.224799	1196.34161	187.3906669	36.22673994	106.14199	1624.161096		468963.3971	107173.86	82882.7769	17.6178616
National average	0.23893232	2.62639682	6.798196823	9.647610672	9.227081372	0.1008623861	0.33447617	9.881983846	114.2882798	14.6198347	3.684604341	16.808816	148.1779361		48631.86164	9116.8263	7698.9084	1.81966889

Relative to national average

	Administration	recurrent expenditure		total	Development expenditure			Total exp	Human resources					Population per facility				
		prov hosp	dist hosp		prov hosp	Dist hosp	total		nurses	doctors	pharm	clinical off	total		health.centre	disp'	total	beds/1000pop
Nairobi	816.5988609	366.8552186	1.218704802	117.8929672	2916.414972	-76.2992732	1125.29076	151.7570612	239.4124578	730.2090982	360.0099564	109.89047	282.4269914		-56.5116443	-42.694507	-39.353391	132.304091
Central	-36.75113483	-292.8681049	151.9410139	126.7474533	7399.144762	215.9433649	1.60596169	122.5117977	141.9396224	39.14340429	82.72112387	151.16218	130.126672		-56.5116443	-46.576954	-48.408882	138.067861
Coast	-36.76700398	43.63916479	12.80695087	19.76647099	3261.755875	-74.12217275	-81.2350988	16.0094084	-17.44875545	6.657551276	-15.3268833	-0.4161285	-13.66559689		21.94986894	-11.89602	-7.8238863	-19.0612387
Eastern	65.17708764	-8.751967257	43.23962653	30.49635247	4168.676954	-85.76405489	-90.0301484	26.41690019	23.44322465	-35.89216405	-19.655826	48.127689	18.23041405		-8.77123324	-45.585684	-41.944146	8.55528334
N.eastern	-52.68178854	58.17093717	-39.67255678	-14.23881707	1691.855786	-100	-98.6635632	-17.09633571	-48.36305147	-80.29639884	-97.5059037	-53.668882	-53.23208084		150.9187916	131.51381	134.330198	-26.2549269
Nyanza	-79.60933844	-82.50525176	-56.14539154	-60.5316059	1117.506714	-94.91509525	-98.2777268	-61.80918629	-53.2189848	-70.22025607	-26.6416403	-49.448815	-53.99159609		43.22016411	171.5823	139.374186	-26.4131907
Rift valley	-64.37068984	-30.18980894	65.71245029	37.19436659	4838.380755	43.10341303	-54.1148779	34.10383558	11.95187773	-22.85269361	22.53138228	13.511646	6.825368576		-23.5867947	-36.199049	-34.52626	2.05313627
Western	-77.87036201	-48.66081368	-63.16857103	-59.16539648	997.0160672	161.4099745	-16.3759507	-57.71710406	-51.63482644	-75.52063068	-75.4836726	-46.144421	-54.2387451		124.3964712	255.5213	175.977214	-38.2596142