

PROVISION OF PUBLIC HEALTH SERVICES IN NAIROBI:
AN ANALYSIS OF DISTRIBUTION, LOCATION AND UTILIZATION

DEPARTMENT OF URBAN AND REGIONAL PLANNING
Faculty of Architecture, Design and Development
P. O. Box 30197 . Tel. 27441
UNIVERSITY OF NAIROBI.

BY

UNIVERSITY OF NAIROBI
LIBRARY

CHEGE, P. GACHERU BA (Hons)

DEPARTMENT OF URBAN AND REGIONAL PLANNING
FACULTY OF ARCHITECTURE, DESIGN AND DEVELOPMENT
UNIVERSITY OF NAIROBI

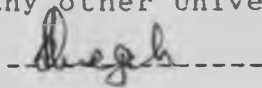
THIS THESIS HAS BEEN SUBMITTED IN PART FULFILMENT FOR
THE DEGREE IN MASTER OF ARTS (PLANNING) IN THE
UNIVERSITY OF NAIROBI.

JUNE 1992

DECLARATION

This Thesis is my original work and has not been presented in any other University.

Signed

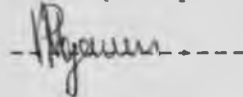
-----

CHEGE P. GACHERU

(candidate)

This Thesis has been submitted for examination with my approval as University supervisor

Signed

-----

DR. P. NGAU

(Supervisor)

DEDICATION

In memory of my mother Annah Mugure for the love and sacrifice she made for my success, and to my daughter Maureen Mugure may you grow up to do better than this.

Acknowledgements:

I wish to express my heartfelt gratitude to all those who either as individuals or in their official capacities rendered their invaluable assistance during the initial stages at the preparation and writing of this piece of work. It is nevertheless not possible to mention everyone of them by name.

I wish to thank the tax payers of this country, who through the Government of Kenya enabled me to pursue this course at the University of Nairobi.

Special acknowledgement goes to my supervisor Dr. Peter M. Ngau for his immense contribution in the preparation and writing of this work. I am well aware of the debt this work owes to him. His patience, positive criticisms and encouragement is what has made this work to be what it is.

I also grateful to the Nairobi City Commission officials at the City Hall, Provincial Medical Office, Kenyatta National Hospital who assisted me greatly in facilitating my visits to their health institutions. Recommendable contribution offered by the various doctors, sisters, nurses, medical statisticians and other workers in these institutions during the data collection, is a true testimony of your contribution towards achievement of better health status to our people. Lot of thanks goes (the to entire staff of Department of Urban and (Regional Planning (DURP) University of Nairobi for their contribution either as individuals or as group) and particularly to the Chairman of the Department Dr. E. N. Ndegwa for his perspective of planning which makes me feel proud to be associated with the discipline and the profession. I would wish to note with alot of appreciation the contribution of my colleagues in DURP for their contribution in this work particularly Cecilia, Njenga and Okayana for input in this work.

Last but not least, there are two acknowledgments I would like to make. They are to Ann Gacheru, my wife whose love and encouragement has given me the fighting spirit throughout this course, and my daughter Maureen Gacheru who was a source of inspiration during this demanding time. Needless to say, however all the errors and omissions in this research wholly rests on me.

ABSTRACT:

Attainment of better community health status is a central aim of governments and many international organisations. The World Health Organisation has a declaration that targets "health for all by the year 2000". However the provision of health services to specific target groups is a problem to many countries. This study provides an in-depth analysis of the level of distribution, accessibility and utilisation of public health services in Nairobi. The aim is to examine the extent to which Nairobi residents are served by these public health facilities. The study has a bias on the public health sub-sector, because public service provision, is based on social welfare rather than a market orientation. Its planning therefore requires more deliberate efforts in order to harmonise the basic objectives of equity, efficiency and geographical accessibility which may not be an overriding factor in market oriented service provision.

The study uses data obtained through a stratified random survey. The study area was categorised into administrative units from which the various hierarchies of health facilities were sampled and questionnaires to health officials and the patients administered. The study analyses information as pertains to patients' socio-economic characteristics,

modes of travel to health visits trips, distances, and the structural effect of distance (distance decay). Analysis on accessibility shows distance is a major factor in influencing patients choice of health facility to seek the medical care. It shows that majority of the patients seek medical care at the nearest health facility but this varies with the kind of treatment being sought. The distance decay gradient seems to obey the hierarchical order of health facilities and the findings of this analysis can be applied in the spatial planning of these facilities and other similar social services. Other forms of accessibility were also found to influence the patient's decision to seek the health services, and the choice of the facility to visit. The study also analysis the locational approach used in the distribution of health facilities in the study area. It was found out that the current planning approach is unable to address effectively to the planning problems of accessibility, equity and efficiency in relation to the distribution and location of health facilities .

Analysis on the utilisation shows that the facilities are over-utilised. This is characterised by

a high population; patient; facility ratios, high bed occupancy rate and high medical personals patient ratios. This analysis shows that Nairobi is still inadequately served with health facilities. The study makes the following proposals. Due to rapid growth of the city there is urgent need to address to the spatial distribution of the health facilities. This is to ensure a fair spatial coverage whereby there is need to decentralise the health planning and delivery system in the city. Urgent attention should be paid to the acute shortage of medical personals in the study area. The role of public sector in the delivery of healt care need to be critically analysed as regard to the availability of this critical human requirement. This is crucial in respect to the current move of privisation of the economy and the increasing medical costs in the private sector which may have adverse effect to the majority of the population.

TABLES OF CONTENT

	Page
Title of Thesis -----	i
Declaration -----	ii
Dedication -----	iii
Acknowledgements -----	iv
Abstract -----	v
Table of Contents -----	vii
Appendixes -----	ix
List of Tables -----	x
List of Figures -----	xi
List of Maps -----	xii

Chapter ONE

INTRODUCTION

1.0 Preamble -----	1
1.1 Statement of the Problem -----	3
1.2 Objectives and their Scope -----	7
1.3 Hypotheses -----	8
1.4 Assumption -----	9
1.5 Justification and Significance of the Research -----	9
1.6 Literature Review -----	11
1.7 Conceptual Framework -----	21
1.8 Research Methodology -----	22
1.8.1 Sources of Data -----	22
1.8.2 Sampling Frame -----	24
1.9 Method of Data Analysis -----	25
1.10 Outline of the Thesis -----	26

CHAPTER TWO

THE STUDY AREA AND BACKGROUND INFORMATION

2.1. The Study area and Background Information -----	29
2.1.0 Physical Environment of Nairobi -----	31
2.1.1 Growth and Planning Approach in Nairobi -----	32
2.1.2 Population Profile of Nairobi -----	36
2.1.3 The Economy of Nairobi -----	41
2.1.4 Education -----	43
2.1.5 Morbidity Patterns in Nairobi --	44
2.2 Overview of Health Services in the study area -----	45
2.2.1 Provincial Medical Office (PMO) -----	47
2.2.2 Kenyatta National Hospital (KNH) -----	49
2.2.3 Nairobi City Commission (NCC) -----	52
2.2.4 Private Sector Health Services-	55
2.2.5 Parastatal/ Company Health	

	Units-----	58
2.2.6	Non-Governmental Organisations (NGOs)-----	59
2.2.7	Herbalists -----	59

**CHAPTER THREE:
SPATIAL DISTRIBUTION AND LOCATION OF
HEALTH FACILITIES IN NAIROBI:**

3.0	Introduction -----	61
3.1.1	Spatial Distribution of Health Facilities in Nairobi -----	62
3.1.2	Health Users Survey Method ----	67
3.1.3	Origin-Destination to Health Facilities -----	68
3.1.4	Health Facility catchment Area and Measurement -----	69
3.1.5	Catchment Population for Health Units in the Study Area -----	73
3.1.6	Catchment Population of Health Centres Dispensaries at Different Population Density Zones -----	76
3.1.7	Distance Decay in Health Service Attendance -----	79

**CHAPTER FOUR:
UTILISATION OF HEALTH FACILITIES:**

4.0	Introduction -----	98
4.1	Patients Characteristics -----	99
4.1.1	Factors Influencing Choice of Health Facility -----	102
4.1.2	Patients Attendance to Health Facilities -----	103
4.2	Utilisation levels at Kenyatta National Hospital (KNH) -----	105
4.2.1	Bed utilisation at KNH -----	110
4.3	Utilisation of Pumwani Maternity Hospital-----	113
4.4	Utilisation of other Categories of Public Health Facilities -----	116

**CHAPTER FIVE:
SUMMARY OF FINDINGS, POLICY IMPLICATIONS AND
CONCLUSIONS**

5.1	Summary of Findings -----	123
5.2	Policy Implications-----	131
5.3	Conclusion -----	136
	SELECTED BIBLIOGRAPHY-----	138

APPENDIXES: RESEARCH QUESTIONNAIRE --142

LIST OF TABLES:

2.1	Population Projection of Nairobi 1990--39	
2.2	Population Projection of Nairobi by Divisions - -----	39
2.3	Private Sector Health Inventory- ----	58
3.1	Public Health Facilities in Nairobi By Division in Relation to Pop., 1991----	65
3.2	Modes of Travel to Health Facilities---	67
3.3	Distance and attraction to health unit by categories -----	69
3.4	Ministry of Health Facility Classification -----	70
3.5	Catchment (Threshold) Population at Given Percentile Travel Distances --	74
3.6	Comparsion of the Observed and Expected Facility Catchment Population -----	76
3.7	Distance Travelled Per Facility Category Per Zone-----	77
3.8	Threshold Population of Health Facilities by Density Zones -----	78
3.7.1	Distance Decay and Interaction Intensity of Patients Trips to Health Facilities in Nairobi-----	82
3.7.2	Distance Decay and Interaction Intensity of Patients Trips to Clinics in Nairobi-----	83
3.7.3	Distance Decay and Interaction Intensity of Patients Trips to Dispensaries in Nairobi-----	84
3.7.4	Distance Decay and Interaction Intensity of Patients Trips to Health Centres in Nairobi-----	85
3.7.5	Distance Decay and Interaction Intensity of Patients Trips to Hospitals in Nairobi -----	86
4.1	Patients Age Distribution-----	101
4.2	Reasons of Choosing the Health Facility visited-----	103
4.3	Out-patient Visits at KNH 1985-90 ----	106
4.4	Doctor, Nurse, Outpatient Ratio at KNH--	107
4.5	In-patient Admission at KNH 1986-91-----	108
4.6	Doctor, Nurse, In-patient Ratio at KNH--	109
4.7	Bed Utilisation at KNH 1986-89 -----	111
4.8	In-patient admission at Pumwani 1987-91-----	114
4.9	Health Centres Attendance Classification-----	118
4.10	Annual Average Facilities Attendance -----	119

LIST OF FIGURES

<i>3.1 Distance Decay to Health Facilities in Nairobi-----</i>	<i>89</i>
<i>3.2 Distance Decay to Clinics -----</i>	<i>90</i>
<i>3.3 Distance Decay to Dispensaries-----</i>	<i>91</i>
<i>3.4 Distance Decay to Health Centres-----</i>	<i>92</i>
<i>3.5 Distance Decay to Hospitals-----</i>	<i>93</i>
<i>3.6 Smoothed Distance Decay Functions for clinics, Disp.,Health Centres and Hospitals -----</i>	<i>94</i>

LIST OF MAPS

2.1	<i>Nairobi City-Boundary Changes Since 1900-----</i>	<i>30</i>
2.2	<i>Nairobi Population Distribution by Densities-----</i>	<i>40</i>
3.1	<i>Location of the Existing Public Health Facilities in Nairobi.-----</i>	<i>64</i>

CHAPTER ONE

INTRODUCTION

1.0 Preamble

At the attainment of independence the Kenya Government singled out three major constraints to national development namely diseases, poverty and illiteracy. Since then a lot of attention has been given to improving health, education for all and the creation of conducive environment to promote economic growth and development to eradicate poverty.

According to the Government health strategy majority of her population will have access to adequate health services and other related amenities like clean safe drinking water, sanitation services, decent housing and eradication of illiteracy among others by the turn of the century (Republic of Kenya, Sessional Paper No. 1 1986). World Bank (1980) in a health sector policy paper, states that health improvement is a priority in Less Developed Countries (LDCs) whereby 6-10 percent of Gross National Product (GNP) is spent on health care, and an additional substantial amount is used for the promotion of other related basic needs like supply of clean safe water, provision of education, decent housing, sanitation and nutrition.

Provision of health services in Kenya has increasingly become expensive due to the rising cost in medicine, and equipment, and a fast growing

population. Hence, health services remain insufficient countrywide even in urban areas which are said to be fairly well served in contrast to rural areas.

The rapid increase of population has placed a heavy burden on provision of medical services. The national population growth rate is about 3.8 percent and the rate is higher (6.8 percent) in urban areas (Republic of Kenya CBS. 1989). These rates call for a shift in policy formulation not only in provision of health services but also in their spatial distribution and level of utilisation.

It is in this line that this research tries to examine the present location, distribution and utilisation of health facilities in the city of Nairobi. Nairobi being the capital city of Kenya provides a suitable case study of the coverage and adequacy of urban health services. The city has a high rate of rural-urban migration, and proportionally high rate of urbanisation problems compared to other urban centres in Kenya.

Since 1970s, there has been a focus on the provision of health services in the country whereby emphasis has been geared towards establishment of more health facilities in the rural areas. This kind of approach has been adopted due to the argument that over 80 percent of the health services are found in urban centres with Nairobi taking the lion's-share.

However, much as this is true, in reality Nairobi continues to experience adverse health services problems. This can be cited to be a result of the rapid urbanisation rate, the dwindling financial capability of the local authority- Nairobi City Commission (NCC), and the uneven spatial distribution of present health facilities in the city. This research will attempt, to identify salient issues as regards present and future health planning in Nairobi in order to achieve the broader national goal of health for all. The study aims at examining the distribution of health facilities, evaluating the planning standards to gauge how these facilities are accessible to the people, and assess their efficiency and level of utilisation.

The research hopes to come up with viable recommendations which can be applied in improving equity, efficiency and accessibility of public health services in Nairobi. A spatial health demand and location model is used to predict health needs in each category of health facility and for the study area in general.

1.1 Statement of the Problem

Nairobi is a fast growing urban centre. Currently the population is estimated to be around 1.34 million people with an annual population growth

rate of 4.6 percent (Republic of Kenya CBS 1989 Population census).

Rapid urbanisation in Nairobi has caused a serious strain on the provision of basic services like water, housing, sewerage, education and health among others. Inadequacy of these basic services makes urban life become unbearable.

Availability of health services is of paramount importance, because the productivity of a person has direct link with good health condition. The current National Development Plan (1989- 93) states that the success of planning for economic and social progress depends to a large extent on the people who are the critical resource in the development process. One way of achieving this is through the provision of health care. This is because achievement of the physical and mental well-being of the people is critical to development of the human resource and the economy. In planning for health services in a city like Nairobi certain issues like location, spatial distribution, and accessibility become crucial as they determine access and the level of utilisation.

Shannon (1975) has argued that the analysis of the location of health services is intricately related to planning for the delivery of medical care. The manner in which medical facilities are distributed vis-a-vis the population distribution has a

demonstrated effect upon illness and therapeutic behaviour. Geographical accessibility is therefore included as a major variable in recent models proposed to examine and explain the utilisation of health services. Consequently interest continues in measuring the extent to which certain populations are served or not served and the degree of efficiency in the spatial distribution of medical facilities.

Nairobi is faced by an imbalance in the distribution and location of health facilities. This kind of imbalance has led to a deficit of health care services more so in the outer zone and the newly residential areas of the city. The result of this has been manifested by congestion in those areas with few health units. To avoid this problem residents of such places are forced to wait for long hours before they get services or commute to less congested health units to get services there incurring transport cost. This therefore rises the issues of accessibility and utilisation which are critically affected by the distribution and location of health facilities.

Nairobi is also experiencing pressure from the countryside. It is a major focus of rural-urban migration. Nairobi is furthermore linked to a ring of several satellite towns such as Thika, Kiambu, Athi River and Ruiru which generate considerable influx of patients. Some come from the immediate hinterland

while others come from other parts of the country to seek medical care in town. It is known that, people tend to have a low opinion of the rural health care services, and this tends to make them seek medical care in towns even for those ailments which could be handled at the local health units. Kenyatta National Hospital (KNH) in Nairobi serves as a national referral as well as an international hospital. This increases the interaction of Nairobi with the rest of the country and beyond in terms of provision of health services.

Nairobi faces a big task in planning for its health services. There is need for a planning strategy which takes into account the resource constraints on one hand and high demand of health services on the other, its importance as a referral point to the country also means that, its health services should be planned considering the central government health strategies.

In this study the following research questions will be investigated:-

- To what extent does the distribution of public health units reflect population distribution in the city of Nairobi ?
- To what extent does the location pattern of public health units address population needs and health characteristics in the city.
- To what extent does the location and

distribution of public health facilities influence the level of utilisation of the health public facilities ?

- To what extent do patients' economic and behavioural factors affects access and utilisation of health services in the study area ?

1.2 Objectives and their Scope

The broad objective of this study is to establish the spatial distribution and location of public health facilities in Nairobi.

The research has the following specific objectives:-

1. To examine the spatial distribution of public health facilities in relation to the population.
2. To examine the location criteria of public sector health facilities in Nairobi.
3. To assess the level of utilisation of the public sector health facilities.
4. To come up with policy measures that would ensure equitable distribution and location of public sector health facilities and their efficient utilisation in Nairobi

The first objective is examined by establishing the number of health facilities and relating this to population density in the city. The second objective

is examined by looking at the planning standards used in the location of health facilities in the study area, to find out whether they have enabled planners to meet the health needs of the users in Nairobi. In this case the research will be able to come up with trends of location and be able to predict future spatial pattern of public sector health care facilities in Nairobi.

The third objective is examined by analyzing the attendance, medical personal, population/patient ratios, and inpatients statistics like bed utilisation rates.

1.3 Hypotheses

- 1.H₀ There is no significant difference in the distribution of health facilities in relation to population in the study area.
 - H₁ There is a significant difference in the distribution of health facilities in the study area.
- 2.H₀ The distribution of public health facilities does not conform to the location criteria of public health facilities in Nairobi.
 - H₁ The location criteria of public health facilities in Nairobi has had significant effect on the distribution of public health facilities.

3.H₀ Public health facilities in Nairobi are not overutilized.

H₁ Public health facilities in Nairobi are significantly overutilised.

1.4 Assumption :

The public sector will continue to be the major provider of health facilities and services in Nairobi. The escalating medical costs in the private health sector will continue making them financially inaccessible to majority of Nairobi residents.

1.5 Justification and Significance of the Research:

Research on health care services in Third world cities like Nairobi are rare. On the outset, urban life in Third World cities is perceived as most "ideal life" by people in the rural areas. This brings about mass rural-urban influx where people migrate to urban centres seeking employment and other social amenities. On the other hand it is common to find that residents of Third world cities are faced with serious problems like inadequate health care services.

This research tries to highlight these problems and hence to enable policy makers get the true perspective of health situation in Nairobi. It will also examine to what extent Nairobi's residents enjoys these services. The study aims at identifying factors

hindering the general improvement of health conditions of Nairobi residents despite the availability of the present health facilities.

The health and the well being of a population is crucial to its productivity. It is the objective of this research to come up with effective measures on how to improve the accessibility and the utilisation of health care services in order to realise better health conditions for all as set out in the global strategy for health for all by the year 2000.

This calls for a proper planning approach, as a process of deciding in what respect the future should be better than present, what changes are necessary to bring about improvement and how these changes can be implemented. Thus there is justification of planning for health services in an urban centre like Nairobi.

Urbanisation is associated with concentration of activities. This means that most people are fully-occupied, and as a result of this, provision of basic needs like water, education, and health facilities should be located at convenient points. Nairobi is an area where such kind of development has taken place and hence it would be necessary to plan for such facilities to be in line with people's places of work and residence. This will ensure that the objective of taking the services to the targeted group is achieved.

1.6 Literature Review:

Nairobi is the largest urban centre in Kenya with a population of 1.346 million persons and annual population growth rate of 4.86 percent (CBS 1989) with such a high population, Nairobi then offers a typical case of the challenges of providing health services in the rapidly expanding, cities of Less Developed Countries.

According to world Health Organisation (WHO), health is not just the absence of diseases and infirmity but is a state of complete well-being physically, mentally and socially. However, this definition has been criticised as being utopian. Jones (1981 p. 13) defines health as a state of physical, mental and social well-being, and ability to function and not merely the absence of illness or infirmity. The policy of the Kenyan Government is similarly stated in the National Development Plan (1989-93, p. 193) The plan states that " the dynamics of human development is dependent on the level and efforts employed towards bringing up a healthy population that has the strength and the will to turn the wheels of progress for the general welfare of the people. A healthy nation stems from a healthy populace. Health is not just the mere absence of disease but the complete physical, spiritual, social, cultural, and emotional wellbeing as encapsulated in the set of

values and attributes that contribute towards the development of the total person."

In trying to obtain this desired state, Nairobi has a number of health facilities to cater for the health needs of its residents. A study on health care services carried out in the city by the Resource for Child Health Project (REACH 1988) established that Nairobi was served by a total of 154 health facilities registered with the Ministry of Health. They comprise the hospitals, health centres, maternity units, nursing homes, dispensaries and clinics. They are managed by the Government, Nairobi City Commission, parastatal organisations and private agencies which include non-governmental Organisation (NGOs).

Provincial Medical Office (PMO) report of 1990 says that Nairobi City Commission is the largest provider of health facilities accounting for 71% of the outpatient services in the City, in all its eight(8) administrative divisions. It is also the largest provider of the vital preventive health services in Nairobi with over 90% of its facilities providing these types of services.

The government medical services are offered through PMO which was established in 1987. Previously government health services in the city were handled through KNH, the national referral, teaching and research hospital. Since 1987, the government has made

major changes in the provision of health in the city of Nairobi which include:

- the establishment of PMO in Nairobi in August 1987.
- the re-organisation of KNH into a parastatal body.
- government restrictions on medical practitioners wishing to engage in part-time private practice - among other changes.

Other health providers include missionaries, parastatals, private sector and NGOs. By 1991, these providers operated 8 hospitals, 9 nursing homes, 9 clinics and 37 dispensaries. Private hospitals accounted for 6 percent while NGOs and parastatals combined accounted for 4 percent of total outpatient services. Private hospitals provide 17 percent of the hospital beds and approximately 26 percent of admissions. Nairobi also enjoys health services from a large number of traditional practitioners.

After identifying the prevailing health services in Nairobi, the major question which we need to ask ourselves is where these services, and particularly those managed by NCC and PMO of Ministry of Health, are located, whether they are accessible to the people, and how are they are utilised. These are pertinent issues which planners need to consider. In analyzing these questions we explore not only the

local experience but also international experience, on how these issues have been applied in attaining a better strategy for delivery of services like health.

Planning is perceived as a process of deciding in what respect the future should be better than the present, what changes are necessary to bring about improvement and how these changes can be implemented. In the case of Nairobi, the study aim is how to achieve effective health care service. Kirigia (1985) states that Kenya with her scarce economic resources can achieve effective health care services by making an effort to interpret the existing situation and clearly defining feasible goals in relation to the technical and economical resources of the country and in accordance with her cultural and social values.

In planning for health services in Nairobi the concern should be how to make the existing facilities more accessible to the people and maximising their utilisation. Although Nairobi has more health facilities than any other part of the country, the most crucial question is really whether they meet the health needs of the people. In this respect the question of accessibility and utilisation becomes important in the provision of health services.

Morrill., et al (1970) on a study carried out in Chicago United States of America (USA), on factors influencing distances travelled to hospital. He

observes that, the accessibility to the hospital should not only be viewed on geographical space interpreted in terms of so many miles or minutes, but other factors can determine the movement. In this case he found out that the patients' by race, religion and income influences to limit the actual or perceived choice of hospital open to them. In this respect we can argue that geographical accessibility should be seen as an integrated indices. It can used in measuring the level utilisation of a facility and by so doing it has to be incorporated with other socio-economic, attitudinal and other functional measures to come up with a useful tool of determining accessibility.

Anderson (1973) identifies four types of accessibility namely:

- Geographical accessibility
- Financial accessibility
- Cultural accessibility and
- Functional accessibility

Geographical accessibility refers to the distance which the user has to cover in order to reach the facility. Gish (1975) observes that there is non-linear inverse relationship between distance and use. The further a facility is from potential users the less likely they are to use it. He reports a survey carried out in Tanzania which established that over 50

percent of the users of a particular health facility come from within 8km and 30 percent between 8-16 km. Totowa et al. (1985) points out that in Philippines the choice of self-treatment, traditional healers or public modern services are influenced by the relative distance to the alternatives. Thus geographical accessibility is an important aspect in determining the location, and the utilisation of a health facility.

In case of financial accessibility, Omburo (1988) found out that poor people will consume more of a service where costs are minimal. He states that because most government services are almost free, then the accessibility will be assessed from the transport cost incurred. In our case therefore we expect transport cost to be a major factor which will determine the people's use of health facilities.

Obudho and Mugenzi (1989) argues that availability of health facilities and resources like doctors does not imply accessibility and utilisation by the people. They state that, 75 percent of Nairobi population fall in the low income bracket where the bulk of income is spent on housing, school fees, food and clothing, making both the private doctors and hospital inaccessible. Morrial (1970) giving an example of a developed country, says that income does not only hinder the poor people from seeking physician

services but also influence the distribution of their services. He argues that economic distance is unbridgeable and the patient care are therefore forced to seek physician care at community health clinics and charitable hospitals. In Nairobi we have " free" medical services offered by the NCC and PMO and partially by NGOs. We have also costly medical services offered by private practitioners and hospitals. We observe that most of the people seek medical care in NCC and PMO health units. This is attributed largely to the low cost associated with these facilities.

Over 60 percent of those who seek medical care in public facilities have income between Kshs. 700-2,500 per month (Ikiara 1988). This shows that the cost element is an important factor in determining the distribution of patient to various categories of health units that is public and private. In this respect, in planning for health services in Nairobi, there is need to see how low income groups, and the unemployed will have access to the services.

Cultural accessibility can be studied on behavioral point of view. Perceived mobility has been cited as an important factor which influence the level of utilisation. This can be supported from a study carried out by Ministry of Finance and Planning (1984) in rural Kenya at Kajiado and Elgeyo-Markwet on the

human perception of illness. It concluded that illness perceived was dichotomised into traditional and modern medicine because:

- the causality of illness and health care are still largely traditional
- to some people modern medicine is just an alternative available for health care.
- Some people have poor access to modern health facilities due to poor communication system.

Although Nairobi is an urban area, there is still a lot of influence of traditional way of life due to ruralisation affect. People still hold to their cultural backgrounds. This means that when delivering health case services, it is very important to understand their cultural beliefs and practises. The success of medical care does not depend on the quality alone but also how people are readily willing to accept it. This calls for increased community involvement in planning and delivery of health services. In Kenya though family planning started three decades ago, it has not achieved its intended aim. The main reason has been due to poor approach where people's cultural backgrounds are either ignored or given very little attention.

The accessibility of health services has also been viewed from the functional point of view. This relates to operation of the health unit. In this case

the users may evaluate the services from the quality point of view. The study carried out by REACH (1988) in Nairobi found out that there was under-utilisation of some maternity facilities. This was found to be a result of users perception on the quality of services. In this respect a patient seeking maternity services perceived quality as the most important factor, and this was in both public and private maternity clinics. The perception of services offered has also been looked at from the availability of drugs, manpower, and the courtesy of the health staff to the public.

Lewis et al (1976) argues that although a variety of social and ethnic differences have been noted, education has been the most consistently observed factor influencing medical utilisation. A person with more education uses more preventive services, have higher average use of medical facilities and are more likely to take the advantage of new medical programmes.

Other socio-economic factors which have got influence on the utilisation of health facilities have been categorised as demographic factors which are broken down into sex, age, number of the users of health facility and pattern of morbidity among others.

It has been observed that women tend to seek medical services more than men. Lewis et al (1976) argue that women suffer less embarrassment in

expressing pain and asking for help and are probably less likely to be inconvenienced by seeking medical care during usual working hours. They also take care of, children for instance seeking child health care thus increasing their number in health units.

Other factors which have been identified to have effect on utilisation of health services include nutrition, housing, sanitation, and water among others. According to world Bank (1980), when a large number of people live in poor households located in crowded insecurity surrounding, communicable diseases spread easily. This result in high morality and morbidity rates which in turn induces people to have many children so that they can assure themselves of progeny. The effect of safe clean water on health is important too. Lack of safe clean water leads to deteriorating health of a community.

Therefore, in planning for health services in a place like Nairobi, then we need to adopt a multi-sectoral approach. Improvement of sanitation, access to safe clean water, descent housing, better education, good nutrition among others will go along way in improving the health conditions of a community and hence cutting down on health budget. Therefore health planning should adopt a preventive rather than a curative approach. Eradication of poverty which leads to man's ability to acquire the basic needs,

should be a central objective to the attainment of better health.

1.7 Conceptual Framework:

The location criteria of a public purpose good like a health facility is based on the distance and the perceived level of utilisation. In health planning, ultimate objective is to provides health services at convenient points to the user. Access to the health services is determined in the first instance by place of residence, and the utilisation of available resources in a health unit will depend on the level of demand. The study highlights a spatial health planning strategy which will ensure equity, efficiency, and accessibility. In this case equity will be assessed by analyzing whether the present distribution of health facilities provides fair access to health units in the study area. Efficiency is defined in relation to the location of health facility, whether it maximises the benefits of the users by satisfying their preference for treatment in different locations.

Accessibility criterion is viewed in relation to the location of the health facility from the users place of residence. This will lead into defining a location criterion which will minimise the variance in the accessibility costs from the places of origin to

place of the treatment. In this way, those patients with very high or very low accessibility costs may be taken into account.

1.8 Research Methodology

This section outlines how the research was organised, the type of data collected and how was analyzed. Given that Nairobi is a very big area covering 680 sq.km., the area was divided into eight administrative divisions. Both primary and secondary data were collected.

1.8.1 Sources of data:

(a) Secondary Data:

This form of data includes information such as the number of health facilities in the study area, the number of medical personnel in the city and their distribution, and number of patients seeking medical care per health facility.

(b) Primary data

This data was collected at three levels. First through interviewing key personnel who are concerned with provision and planning of health delivery services in the study area. The heads of Public Health Department at Nairobi City Commission, Provincial Medical Office and Kenyatta National Hospital were interviewed by administering of questionnaire forms.

Among the information sought included staffing of the various cadre of health officers, supply of equipments like drugs in the health units, and problems and constraints facing the delivery of health of care as regard the study area .

The second level of health institutions interviewed involved interviewing the officer in-charge of health services in the sampled health units on issues such as, the number of patients seeking health care per day, the range of services offered, number of health personnel and other supportive staff, the catchment area the health facility is supposed to serve, common ailments whose services are sought for, and problems and constraints facing these health facilities as to their operational efficiency among other issues.

The third source of primary data, was the health user survey interviews. This was carried out in the sampled health facilities whereby a questionnaire form was administered to those patients who were found seeking medical services during the visit to the health unit. Important information sought includes, place of origin, distance from the residence to health facility, choice of health facility, cost incurred, treatment sought curative/preventive, and problems faced in seeking the health care among other relevant information.

1.8.2 Sampling frame

To achieve a random and a representative sample the sampling frame for health facilities was stratified by division and category of health units. On the category of hospitals there are only two (2) public hospitals, Kenyatta National Hospital and Pumwani Maternity Hospital which are accessible to the general public and both were selected. Others public maintained hospitals are meant for certain group of people like the Forces Memorial Hospital meant only for the member of the forces and the police. Others are specialised health facilities hence only certain ailment are treated there on referral basis for instance Mathare Mental Hospital, Infectious Disease Hospital (IDH) and Spinal Injury Hospital. The latter two operates as affiliates of Kenyatta National Hospital. In the category of health Centres, there were twenty (20) and six (6) were randomly selected. In the category of dispensaries there were 20 and 20 percent or four (4) were sampled. For the clinics it was established that they were only offering Maternal Child Health Care and Family Planning (MCH/FP) and some were not operating as individual health units but part of other category of health units hence only two (2) were sampled. In total fourteen (14) health units were sampled.

In administering the patient questionnaire a

systematic random sampling interviewing method was used, whereby because patients are normally seated on benches while waiting for treatment, after selecting the first patient every 5th patient was interviewed.

In Kenyatta National Hospital interviews were done at casualty department since 90% of the patients passes through here, thirty (30) patients were interviewed. At Pumwani Maternity Hospital questionnaires were evenly distributed in the six (6) wards and twenty (20) questionnaires were answered, while in the health centres questionnaires were distributed at three sections namely dispensary, maternity and MCHFP. Three (3) patients were interviewed in each place. At the dispensaries seven (7) patients were administered in each. At the clinics five (5) patients were interviewed in each case. In total 160 questionnaires were answered.

1.9 Methods of Data Analysis

The data collected in the field has been analyzed using both qualitative and quantitative techniques. These include descriptive statistical methods where data is tabulated in tables and frequencies. Further analysis is carried out using health user survey data to determine the facility catchment area. The Gravity model specifically the term of distance- decay function is used to asses the level of geographical

model specifically the term of distance- decay function is used to assess the level of geographical accessibility as it relates each category of health unit. Medical personnel- patient ratio technique is applied to establish the number of various categories of medical staff per number of population/ patients per each provider in the study area. This is used to assess the quality of health as it is assumed to be reflected by the number of medical staff available. Further analysis are done using in-patients data to assess facility utilizations such as bed occupancy and average length of stay (ALOS).

1.10 Outline Of The Thesis:

This thesis consist of 5 (5) chapters. In chapter one an introduction to the study is presented whereby salient issues as relates to the statement of the problem are highlighted. Then a concise statement of the problem is presented.

The Literature review presents the development of the subject matter, and also provides a point of departure for this study from the others. The objectives and literature review forms the basis of research design. This consist of the methodology and data analysis parts of the research which present the linkage between the statement of the problem and the rest of the study.

of Nairobi is presented. Also presented is information on issues such as the demographic profile, the economy, social infrastructures like housing, water, education, and sanitation as they relate to the Nairobi population.

An overview of health services in the study area is also outlined in this chapter. This is further documented by critically looking at each provider namely the Ministry of Health through Provincial Medical Office (MoH/PMO), Nairobi City Commission (NCC), Kenyatta National Hospital (KNH), the Private Sector, the Parastatal and Companies, the Non-Governmental Organisations (NGOs) and finally the role of herbalists in medical care in the study area.

Chapter Three presents analysis of spatial distribution and location of health facilities. It covers the first and second objectives of the study. The first objective concerns the spatial distribution of health facilities in relation to population and various spatial models are used. The second objective looks at the locational pattern used in organising the delivery of health services in the study such as the Neighbourhood Concept and other planning techniques in the location of the health facilities. This is evaluated in relation to the human settlement patterns in the study area as pertains to the ability of the city to cope with the rapid population increase in

meeting its medical care needs.

Chapter Four looks at the third objective. It presents an evaluation of utilisation of health facilities in Nairobi particularly the public sector health units. This involves the use of medical data such as population/patient facility, staff ratio, bed occupancy rate, among other techniques.

Chapter Five, presents summary of findings, policy implications and recommendations as pertains to the health planning strategy. These are based on the research findings. Finally a conclusion on the whole study is drawn.

CHAPTER TWOTHE STUDY AREA AND BACKGROUND INFORMATION

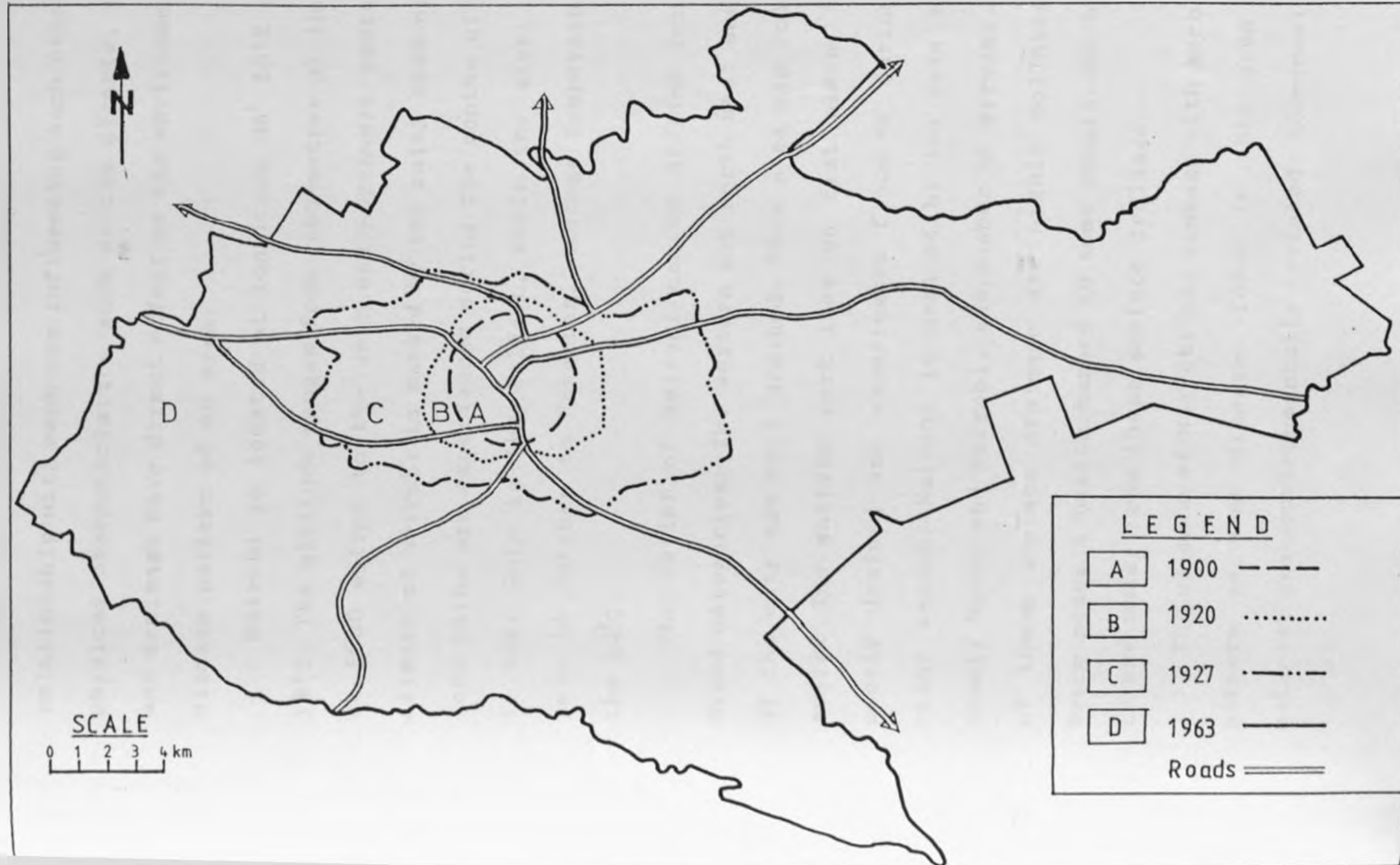
2.1 Introduction :

Nairobi city has grown rapidly both in terms of population and physical expansion. The growth of Nairobi started with the establishment of a caravan trade depot in 1885. In 1899 the Uganda railway line reached Nairobi and this led to the transfer of the railway headquarters and Government administration headquarters from Mombasa and Machakos to Nairobi respectively.

Ondiege (1990) says that the physical area of Nairobi expanded from 3.84 sq.km in 1910 to 25 sq.km in 1919 and by 1948, the city had expanded to 83 sq.km. At independent in 1963, Nairobi underwent the fourth boundary review and the areas was expanded to 680 sq.km. which is still the current official size of the city. Map 2.1 shows the growth of Nairobi over time as show by the boundary expansion.

NAIROBI CITY-BOUNDARY CHANGES SINCE 1900

Map 2.1 Growth of Nairobi Since 1900



2.1.0 The Physical Environment of Nairobi

Man and physical environment have a mutual relationship with each one influencing each other. The physical characteristics such as the climate, relief and drainage have direct effect on the environment and disease pattern of an area.

Nairobi is located at longitude $36^{\circ} 50'E$ and $1^{\circ} 18'S$. The altitude ranges from 1600 metres at the east to 1800 metres to the west and northwest parts. The climate of Nairobi is marked by two rainy seasons. The long rains are experienced during the months of March to May. July is the coldest, while the short rains sets in October to November. Average temperature is the $24^{\circ}C$.

The relief of Nairobi can be divided into two broad categories. The western and north west sections of the city are well drained. This area has volcanic soils. The eastern part lies on flat plain, it is poorly drained and experiences flooding during the rainy season. Nairobi is drained by two main rivers namely Ngong and Nairobi, and number of streams. Most of these surface drainage are highly polluted and hence poses a health hazard to some people who happen to use water from these surface drainage.

The climate of Nairobi has linkage with morbidity pattern as some diseases found in this area like malaria are environmentally related diseases. The

climate of Nairobi is said to be undergoing some form of modification due to its fast growth in terms of industries and residential development. One major problem Nairobi is facing is the increasing air pollution due to industrial activities and other related man-made sources. Ng'ang'a (1988) points out that the suspended particulate pollutants in the industrial area have recently been found to have reached significant concentration levels and a concentration of over 300 micrograms per cubic meter is said to be common in some places.

Residential areas close to industrial areas are the most prone to air pollution problems. Such areas are expected to have more pollution related problems. Therefore if the long term impact of environmental pollution is to be reduced the planners therefore have to take into consideration the prevailing meteorological conditions in their long term planning of the city.

2.1.1 Growth and Planning Approach in Nairobi

Nairobi emerged as a result of external contact between Kenya and the rest of the world towards the end of 19th century. By 1901 Nairobi population had reached 8,000 people and due to its growth, a private company was given the responsibility of garbage collection, cleansing and drainage system, sweeping

and lighting the city streets. The company failed on its duties resulting to a plague epidemic outbreak in 1902. Poor environmental conditions prevailed and there was another plague outbreak in 1904. Despite these incidents, Nairobi was made a capital in 1905. Thus the town set itself for more growth and development. Kingo'riah (1980) citing some available literature on Nairobi says that by that time the town had sorted itself out into district function zones. The main ones were namely.

- a) The railway zone
- b) The Indian Bazaar
- c) The European business and administrative centre
- d) The European suburbs
- e) the wash-mens quarters, and
- f) The military barracks (outside the town limits)

Inspite of this development poor health conditions prevailed and in 1912, another plague hit the town. To solve this problem once and for all, Simpson Commission was set-up. The Commission report recommended that there should be well-defined and separate residential areas of the Europeans, Asians and Africans. New commercial centres were to be set up beginning as small pretty grocery and provision stores which later were developed into large enterprises.

In 1919 Nairobi became a full fledged municipality, the boundaries were expanded to include Muthaiga, Eastleigh, Pangani, Kilimani, Parklands and Upperhill. This was done so as to facilitate the municipality collect more revenues. By this time a clear racial residential areas were clearly emerging. It was also during this period that industrial zone was developed as a separate entity from the Central Business District (CBD). During the second world war (1939-45) Nairobi become the headquarters of British East African Forces. Eastleigh airport was built, and the Royal National Park (Nairobi National Park) was established to cater for the recreational purposes for the British soldiers.

The rapid expansion of Nairobi, necessitated the need for a comprehensive land-use plan. In 1947, a planning team from South African was given the task of preparing a masterplan in preparation of Nairobi becoming a city. This led to the production of the "1948 Nairobi Master Plan for a colonial capital." The plan was supposed to guide the land uses in the city for the next 25 years. The report of the study group recommended a great deal of land use reorganization and particularly emphasised land use development based on racial segregation. The Master Plan also proposed the following:

- That industries be located South East of the

city

- That the industries dealing with bulky goods be located along the railway line
- Other industries could be located to the north of the town
- That the area of low density be left exclusively for whites.

During struggle for independence and particularly during the emergence period (1952-60), the African residential areas were extremely neglected in the provision of essential services. However with the advent of independence there emerged a non-racial residential composition, where the Africans who were economically able, started moving into the former white and Asian residential neighbourhood.

The present organisation of land uses bears a strong legacy of the colonial planning policies, and then the post-independence government policies. Urban land use in Nairobi has a marked separation of land uses such as residential, commercial, and industrial areas; which are based along socio-economic class. The metropolitan growth strategy policies adopted by city council of Nairobi envisaged the long term development strategy to be based on the development of the city on a comprehensive and efficient provision of services. The services were to be made accessible to the residents.

One may argue that, the location of public facilities in Nairobi has been based on the neighbourhood concept. According to Gibberd (1955), a neighbourhood is taken as a spontaneous social grouping, and it cannot be created by the planner. All what planners do is to make provision for the necessary physical needs by designing an area which gives the inhabitants a sense of living in one place in which facilities like schools and play fields, are conveniently located. For example a large neighbourhood of say 15,000 people may require a health centre. Using such a large number it is possible to provide most of the communal facilities, whereby the size and the number of the facilities is determined on the density of the population and the distances any household has to travel to the social facilities in its neighbourhood. The provision of public health facilities in Nairobi has been based on this approach. However the rapid population increase, and the emergence of informal residential housing scheme have outstripped the capacity of city authority and the government in provision of these facilities.

2.1.2 Population Profile of Nairobi:

The expansion in the physical size of Nairobi has gone parallel with population increase. This has been due to:-

- (1) a high natural population growth rate
- (2) rural-urban migration, and
- (3) boundary expansion bringing in people who were outside the city jurisdiction into town boundaries.

In 1906, Nairobi population was 11,512 people. This rose to 29,864 in 1926 and by 1944 it had increased to 108,900. At the time of independence in 1963, the city population had risen to 342,764. In 1979 Nairobi population according to Obudho (1989) accounted for 36 percent of the total urban population in Kenya or 1.3 percent of the national population. The 1989 population census figures puts the Nairobi population at 1,346 million people with a growth of 4.86 percent per annum.

The rapid population growth rate of Nairobi has made the provision of basic needs such as shelter, food, water, sanitation, education and health care a heavy burden to the Nairobi city Authority.

Ondiege (1988) argues that as the urban population continues to increase, capital requirement has increased at least proportionally if not faster, due to the rising expectation of urban residents for improved services. He further observes that approved expenditure in the recent past represents not only an absolute decline in available resources but more a market decline in investment per urban residents. This

is expected to worsen as the Government budget rationalization measure aims at financing projects with potentially high productivity. Project with low potential benefits are to be identified and postponed or cancelled to free funds for the former. This implies a shift from social projects to economic projects. This approach though it aims at achieving both objectives of improving the welfare of a community but through an economic approach may have negative impact particularly on the vulnerable groups like the urban poor, slum dwellers in the urban areas and peasants farmers and pastoralist in the rural areas. Provision of basic needs like health is crucial not only for maintaining the dignity of all the people but also to make them increase their productivity.

Nairobi as a fast growing urban centre experiences two main concerns:-

- (1) How to cope with an increasing demand of both physical and social infrastructure.
- (2) Increasing unemployment due to a low level of employment creation.

Table 2.1 shows the population projection for the study area in 1990

The table shows that Nairobi's population mainly compost of the young and the middle age population. This puts lot to pressure on the exiting infrastructure. This also calls for need to address to

provision of facilities like schools, health units and creation of more job opportunities.

Table 2.1

Population Projection for Nairobi 1990

Age Group	Male	Female	Total
0-4	130,219	127,004	257,223
5-9	81,768	84,981	166,749
10-14	57,222	68,601	125,823
15-19	73,546	81,942	155,488
20-24	153,448	94,579	248,027
25-29	109,496	66,120	175,616
30-34	88,549	40,526	129,075
35-39	59,347	25,304	85,253
40-44	42,705	15,888	58,603
45-49	30,720	10,127	40,847
50-54	18,874	6,991	25,870
55-54	11,314	5,141	16,455
60-64	5,779	3,563	9,342
65-69	2,968	2,429	5,397
70-74	1,421	1,572	2,992
75+	933	1,196	2,129

Total	868,919	635,971	1,504,890

Source: MoH Nairobi Province annual Report 1990

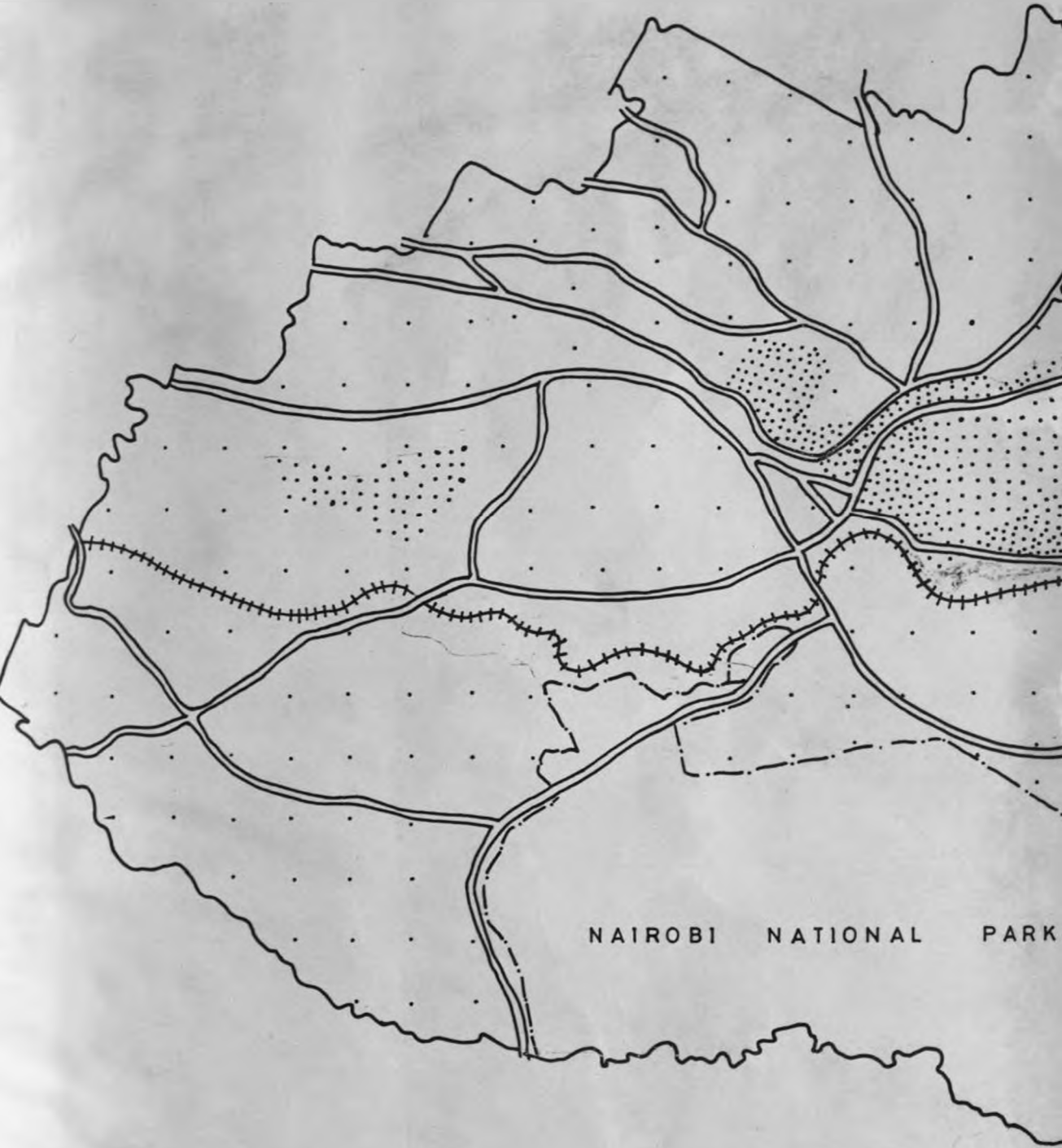
The distribution of this population in terms of the divisions is shown by table 2.2 below.

Table 2.2

Administrative Areas:	Total	%Pop.
Dagoretti	165538	11
Kibera	255830	17
Central	75245	5
Pumwani	165538	11
Makandara	180587	12
Embakasi	195635	13
Kasarani	331076	22
Parklands	135441	9.0
Total	1,504,890	100%

Source: PMO 1990

K I A M B U D I S T R I C T



NAIROBI NATIONAL PARK

SCALE 1:1250

K A J I A D O D I S T R I C T

Fig. 2.2

2.1.3 The Economy of Nairobi:

In relation to the above, the discussion of the economy of Nairobi becomes important. At macro-level, Nairobi has grown very rapidly. It has undergone a massive change in terms of construction of high rise commercial buildings at Central Business Districts (CBD), and a fast growing residential sector, including the growth of slums. Residential expansion has resulted into the growth of the city in all direction whereby currently the satellite towns of Nairobi like Ongata Rongai, Athi River, Ngong, Kikuyu, Limuru, Kiambu, Ruiru and even Thika are serving as dormitory towns of Nairobi. This has extended the interaction of Nairobi with the countrywide perpetuating its primacy status but also increasing a high population influx.

The expansion of Nairobi has outstripped the economic capacity of the city to provide both the physical and social infrastructure. This problem is more pronounced in the slums and squatter settlements, where 40 percent of Nairobi population reside. These areas are devoid of basic infrastructure like roads, sewerage, drainage, health facilities and services like garbage collection. This has contributed to a poor living environment hence posing a health hazard to the resident of such places.

Apart from the economy of Nairobi, a look at both

physical and social infrastructure provides a good linkage in understanding their role in the attainment of a better overall health of a individual and hence the health status of the entire study area.

Housing has a high impact on the health conditions of a community, and hence its productivity. Nairobi like other urban centres in LDCs is unable to cope with the ever rising housing demand. The worst hit population is the low income group who have ended up living in poor housing conditions mostly overcrowded. About 40 percent of Nairobi residents resides in slums. Such living conditions make the people vulnerable to health related problems.

Household income is an important component in any economy. In this study it was found out that average household monthly income in Nairobi was Kshs.1,800. Nairobi Social Economic Profile (1989) also found it to be Kshs.1,711. This kind of low income condition forces households to spent most of the income on needs like school fees, food and clothing. 75 percent of Nairobi population falls within low income category. The low level of income of most households in Nairobi makes the private sector health services financially inaccessible to them. Therefore most of these people end up in public sector health units.

Sanitation is highly related to housing. As stated above 40 percent of Nairobi population resides

in slum and squatter settlements. These areas according to Republic of Kenya - Food and Nutrition Policy (March 15, 1991) 15 percent of these people have no sanitation facilities at all though 76 percent have pit latrines. Such living conditions makes these people to experience environmentally related diseases like amoebiasis, enteritis, the dysenteries and other intestinal parasitic diseases, and malaria among others.

2.1.4 Education

Education has a significant role to play in influencing the health status of an individual. This is because it makes him appreciate the need not only to seek curative but also preventive and promotive medical care. During this research it was found out that 62 percent of the respondents had attained primary education, 25 percent had secondary education, while 3 percent had post secondary education, 9 percent had no education at all.

The Nairobi Socio-Economic Profile (1988) indicates that about 43 percent of the sampled households had primary education. 32.5 percent had attained secondary education and only 3.8 percent had post-secondary school education while 15.5 percent had no formal education at all.

The slums/squatter settlements were found to have

fewer residents who had completed primary school. The lower levels of education in these areas explains the lower average income levels. These groups have less access to permanent employment, and hence low and irregular incomes. This affects their living standards making them vulnerable to ill health conditions.

2.1.5 Morbidity Patterns in Nairobi

Generally morbidity pattern in Nairobi is similar to that of the country as a whole. Kenya's diseases pattern can be grouped into six main categories. These are namely:

- Respiratory diseases like pneumonia, tuberculosis, bronchitis and whooping coughs.
- Parasitic and infectious diseases like malaria, schistosomiasis, sleeping sickness and filariasis
- Sanitation related diseases such as amoebiasis, arteritis, dysentery and intestinal parasitic diseases.
- Measles especially among the infants and children
- Maternity related diseases like haemorrhage, abortions, uterine rupture, and hypertension
- Sexually related diseases which includes gonorrhoea, syphilis and AIDS.

According to the Ministry of Health report

(1990), the first three diseases accounted for 60 percent of all morbidity and for 70 percent of all mortality in the country reported in the country in 1980's.

It was found difficult to get the actual morbidity pattern in Nairobi. This is attributed to shortage of trained medical statisticians mainly in the private health units and lower order public sector health units. Most of the private institutions were said to be unwilling to release their medical information to Provincial Medical Office (PMO) which is responsible for documentation of morbidity and mortality data in Nairobi.

2.2. Overview of Health Services in the Study Area

Nairobi city has a population of 1.346 million and is currently growing at a rate of 4.8 percent a year. The city has many more health facilities and medical personnel than any other province/district in the country. It has 154 health facilities registered by the Ministry of Health by 1990, with a total reported beds within these facilities being 8,781 (MoH/PMO, 1990).

These facilities are run by a number of providers whereby the public sector accounts for 80 health units, while a variety of Non-Governmental Organization (NGO), government parastatal and

companies and private sector operate the remaining 74 facilities. In the public sector category, NCC is the largest provider, followed by MoH/PMO and the giant Kenyatta National Hospital. The other sector operates the remaining 20 percent as follows:- religious bodies account for 12 percent, parastatal 6 percent and NGO 2 percent.

The planning, budgeting and operational administration for the three public providers of health services- NCC, MoH/PMO and KNH are independent of each other and under the authority and jurisdiction of two different ministries, that is Ministry of Health and Ministry of Local Government. NCC is under the Ministry of Local Government, while PMO and KNH are under the Ministry of Health. This has posed a problem as regards the co-ordination, planning and hence hindering an efficient use of these facilities as pertains to deployment of human resources and flow of patients.

Apart from the above organisations we also have private practitioners who operate about 500 registered clinics. Nairobi also has a large number of herbalists who also form an important component of health delivery in Nairobi who provide "miti shamba" drugs.

However, some of the facilities are not open to the general public. These includes parastatal and company dispensaries and clinics which exist primarily

to deliver their services to the employees of these organisations. Also some of the PMO facilities are meant for special groups such as the Forces and Police. This therefore at one level reduces the sheer number of health facilities available to most people. Nairobi also has some of the most expensive private sector health units in the country. This makes such health facilities financially inaccessible to majority of Nairobians where 75 percent of the population falls in the low income category. This kind of scenario emphasizes the importance of public sector health provision and particularly NCC and PMO facilities which have a heavy burden of meeting the health needs of the majority of population in this city.

2.2.1. Provincial Medical Office (PMO)

The PMO is responsible for the administration and management of health services in Nairobi on behalf of the Ministry of Health.

The PMO was established in 1987 and was supposed to take over from Kenyatta National Hospital the management of health services in Nairobi. Nairobi PMO differs from other MoH/PMO in that Nairobi does not have district and provincial hospitals and also have a diversity of facilities under its supervision. In some of the facilities it doesn't have total control over them and such includes parastatal and

institutional clinics and dispensaries whereby its role is only one of providing technical staff and drugs. The PMO is responsible for the following functions in the health delivery system in Nairobi:-

- The organisation and administration of health services in the province.
- Co-ordination of private and public health services.
- Policy planning and regulating the supply of health services.
- ensuring the public health namely promotive/preventive and supportive services are adequately provided.

These roles have brought poor working relationship between the PMO and NCC. The latter given that it operates the largest number of health facilities in Nairobi does not recognise the powers given to the former. This has adversely affected the co-ordination of health planning and delivery in the study area.

The PMO runs two hospitals namely, Mathari Mental Hospital and Kamiti Prison's Hospital. Mathari Mental Hospital is a specialised hospital. It only caters for mental patients. It also acts as the national mental referral hospital as well as psychiatric teaching hospital. Kamiti prison hospital caters specifically for prisons but it is also open to the general public

for out-patient services only. In terms of beds Mathari has got 1,000 beds and Kamiti has 63 beds.

PMO also operates 40 out-patients facilities of which 17 are health centres and 23 dispensaries. However some of these facilities are only meant for special groups like the military, General Service Unit (GSU), police, while other especially those located in learning institutions and parastatals like Kenya Railway are only meant for people within these institutions. However this is contrary to what the PMO health provision policy states. Where PMO has provided technical staff and supply of drugs, such institutions are expected to be accessible to the general public. During the research it was found out that these facilities were restricting the public due to shortage of medical provision like drugs. During the research, it was established that PMO health units were well equipped in terms of drugs and medical personnel than the NCC facilities. Therefore if most them were accessible to the general public this could go along way in alleviating health demands in Nairobi.

2.2.2. Kenyatta National Hospital (KNH)

Kenyatta National Hospital was established in 1901, with a total of 45 beds. It was supposed to act as the national referral hospital for complicated ailments from the provincial and at time district

hospital in the country.

At independence it was given a new role as the national teaching and referral hospital. It serves as a teaching hospital for the University of Nairobi where the college of Health Sciences is based and the Government Medical Training Centre (MTC) for medical supportive staff.

However due to inadequacy of health services in Nairobi especially lack of provincial and district hospitals, KNH serves both as a referral hospital and an out-patient hospital for Nairobi area. Data collected from the field shows that the out-patient visits at casualty department rose by 34 percent between 1987 and 1989. This is contrary to the intention that, KNH is earmarked to offer tertiary medical services, while the primary and secondary medical care are supposed to be handled at a lower level. This rapid increase in patient volume has problems such as rapid decline in quality due to shortages of drugs, long delays in diagnosis, shortage of medical staff, and deteriorating physical condition problems.

Information gathered from the hospital indicates that these problems are further compounded due to other roles played by the hospital such as being the largest medical and health teaching site for training doctors and other medical staffs. Kenya Medical

Research Institute (KMRI) also uses KNH facilities for research. These teaching and research functions have affected the hospital's operational efficiency, and hence provision of services. Multiplicity of these functions brings about complications. They bring about the tendency to keep patients over a longer period to evaluate the outcome of care and creates pressure to maintain both primary and secondary services. These roles mean that an appropriate referral system and efficiency objectives are difficult to achieve.

In 1987 KNH was established as a state corporation with the aim of achieving the following objectives.

- Receive patients on referral from other hospitals or institutions within or outside Kenya for specialised care;
- Provide facilities for medical education for the University of Nairobi and research either directly or through cooperating health institutions;
- Provide facilities for education and training on nursing and other allied health professions; and
- participate as the national referral hospital in national planning.

KNH offers a wide range of clinical services organised around six (6) department namely:- medical,

surgical, obstetrics and gynaecology; paediatrics, diagnostics and dentistry. There are in addition several special units namely heart, renal and medical genetics. Currently KNH has got 1,928 beds. It was found out that inpatient days increased by over 200,000 to 681,000 by 1989 and the bed occupancy rates accelerated to over 100 percent by 1989.

2.2.3 Nairobi City Commission (NCC)

NCC is the largest provider of health services in terms of the number of health facilities and the number of patients treated per year. Until 1987 when established of PMO, planning of health services in Nairobi was the primary task of NCC. In terms of provision of outpatient services NCC accounts for 71 percent of facility based out-patient visits in its health centres, dispensaries and clinics.

NCC has got a Public Health Department. This department is charged with the responsible of providing promotive, preventive and curative services to the estimated 1.6 million population of Nairobi. To ensure efficient management of health services the city is divided into two health management division namely Division 1 and Division 2. Division one covers the eastern and southern part of the city. Division two covers the western and northern section of the city. The NCC health facilities offer a wide range of

comprehensive integrated health care services - these include:-

- specialised outpatient services
- a maternity hospital and a school of mid-wifery
- maternal child health and family planning clinics (MCH/FP)
- school health services
- cleaning services
- nutritional advice
- ambulance services
- mortuary and funeral services
- communicable diseases
- environmental sanitation

The NCC operate Pumwani Maternity Hospital. Pumwani is the largest maternity hospital in the country. It has got 329 beds and with a bed occupancy rate of about 100 percent. It has an average daily admission of 70 patients per day and average delivery rate of 60 babies per day. NCC has also eight (8) Health Centres which are operational and three (3) which are not yet operational. In terms of dispensaries there are sixteen (16), while there are 28 designated MCH/FP clinics. In terms of referral system within NCC it is only well co-ordinated for maternity services. The eight (8) maternity units have got a total of 216 beds. In these health units only

mothers delivering their second and third babies and without any complications are served. All the other cases are admitted at Pumwani which is the only NCC health facility well equipped to handle any gynaecological and paediatric problems. During the research it was found out that to ease congestion at Pumwani, those patients who have delivered and are detected not to have any problem are transferred to these other maternity units awaiting discharge.

In the provision of the out-patient services the NCC has a weak vertical referral system. This is due to lack of higher order health units like hospitals. This forces the patients to seek further treatment at KNH. It was found out that only in a few cases like X-ray services were patient referred to Ngaira Dispensary (formarily Rhodes Avenue Dispensary).

In terms of health personnel as will be shown in chapter four, NCC health units suffer from shortage of medical staff. It was found out that it is only Ngaira Dispensary which had doctors. Other health centres and dispensaries relied on a few clinical officers and nurses. Therefore NCC experiences acute problems in its task of provision of health care. This is due to a number of factors, namely:-

- Poor co-ordination with other providers.
- Shortage of health personnel particularly medical specialists and technical supportive

staff. Therefore only general medical services are offered.

- Scarcity and dwindling sources of funds. The main sources of funds is from the City Authority which generate revenue from taxes and government allocations.
- Weak management system in which case the lower medical cadre with little management skills are left to run the administration of health services.

The above reasons have contributed to a declining health care delivery services in the NCC health units. The results of this is overcongestion in an equally poorly managed, staffed, funded and equipped KNH. Other times the patients are forced to seek medical care in private sector where the costs are generally high. This kind of situation has adversely affected the improvement of the people's health care and particularly the 75 percent of Nairobi residents who falls within the low income earners.

2.2.4. Private Sector Health Services:

This sector comprises the private health care institutions like hospitals, nursing homes, dispensaries, private clinics and surgeries. There are eight (8) private hospitals in Nairobi and twelve (12) nursing and maternity homes. These include:-

- Nairobi Hospital
- Aga Khan Hospital
- Gertudes Children Hospital
- Guru Nanak Hospital
- M.P. Shah Hospital
- Mater Misericordie Hospital
- Masaba Hospital
- Westlands Cottage Hospital

Gertudes hospital is a special hospital offering only paediatric medical care both outpatient and inpatient services, while the others offer all services both outpatients and inpatients.

The private nursing homes and maternity includes the following:-

- City Nursing Home,
- Kariobangi Nursing Home
- Avenue Nursing Home
- Jamaa Home Maternity
- Nairobi West Nursing Home
- Alfa Maternity
- Eastleigh Maternity
- Radiant Health Nursing Home
- Ideal Nursing Home
- Parklands Nursing Home
- Marie stoope Maternity (Eastleigh)
- Marie Stoope Clinic (Pangani)

The location of these health facilities is

largely market oriented. They are located near high income and middle income residential areas, or where transport network is good due to accessibility.

In 1988, the Ministry of Health had licensed 476 doctors as full time fee - for service private practitioners of whom 216 were practising in Nairobi. The total number of private clinics including the clinical officers and nurses registered by Ministry of Health was over 500 by 1991 (PMO, 1991 Estimates). These doctors operates on small clinics employing one or two persons and serving on average of 360 patients per month.

There is a strong referral system between the private doctors and the private hospitals, whereby they refer their patients to these hospitals if they require specialised treatment. However there is a weak referral system between the private and public hospitals apart for cases which may require special attention at KNH or Pumwani Maternity Hospital.

The cost in the private sector health units has forced the people to rely on the public sector health units and this explains the reason why there is congestion in both the Nairobi City Commission and Provincial Medical Office Health Units. Currently in private hospitals bed charges ranges from 500- 1500 per day. This is excluding doctor, drugs and other charges, making this institutions inaccessible to

major of Nairobi residents.

Table 2.3 Private Sector Health Inventory

Type of Health Unit	Number of units	<u>Number of Beds</u>
Hospitals	8	879
Nursing/Maternity Homes	12	350
Total	20	1229

Source: Field Survey, 1991

2.2.5 Parastatal/Company Health Units

Apart from KNH discussed above which is a special parastatal hospital we have other parastatal and company health units in Nairobi whose services are mainly meant for the people working or residing there.

The other parastatal health units are such as University of Nairobi Health Centre, Mbagathi Postal Training School, Railway Training School, Kenya Airways, Railway Headquarters, Loco Dispensary, Central Bank, East Africa Power and Lighting Training Dispensary. These health units are exclusively meant for the people who reside or work in these places. However during the research it was found out that a few of these facilities like Mbagathi Postal Training School were open to members of public.

A number of companies in Nairobi have got their staff clinics. There were found to be company registered clinics. The service here are meant for the

workers or their close relatives in some cases.

2.2.6 Non-Governmental Organisations (NGOs)

In the provision of social infrastructures like schools, water and health facilities NGOs have played a significant role. Among the earliest providers of health services in the country were the missionaries who established a number of health units in many parts of the country where different denominations had a strong hold. In Nairobi NGO account for 23 percent of the health facilities. These NGOs include religious groups, institutions like Africa Medical Research Foundation (AMREF), and UNICEF.

Most of the NGOs health facilities are located in low income areas particularly targeted to serve the poor. The aim of these groups is to avert health problem among these people who are vulnerable to health related problems because of poor living environment. These organisations offer their services free of charge or charge a token fee only, hence making them to be of easier reach to majority of Nairobi residents.

2.2.7 Herbalists (Miti Shamba):

The role of herbalist in the provision of health services is becoming important in the delivery of health services in the country. These groups which

rely on herbs for their medication. are becoming increasingly recognized as opposed to the earlier belief where they were marginalised in medical field from the official circles.

Their recognition has increase their and they are now registered with the Ministry of Culture and Social Services which has enabled many of them to practise. Research institutions like the University of Nairobi and Kenya Medical Research Institute (KEMRI) are showing keen interest in the contribution of these people. This is explained by these institutions being involved in testing and developing their herb drugs to be clinically safe. Nairobi is served by a large number of herbalists who provide their services, hence complimenting the other providers.

CHAPTER THREESPATIAL DISTRIBUTION AND LOCATION OF HEALTH
FACILITIES IN NAIROBI3.0 Introduction

This chapter takes a critical analysis of the distribution and location of public sector health facilities in Nairobi in relation to the existing and the emerging population distribution patterns. Analysis of distribution and location should provide the reasons why there is a high concentration of health facilities in some parts of the city than others. This will therefore form the basis of recommendations and conclusion on how best the situation can be improved using the available planning techniques. This has to be given due attention because as planning aims at ensuring fair distribution of a public good or service like medical care, it gives an effective solution to inequality which then can provide real access to health care. Shannon and Bever (1974), recognise that health care is a fundamental human right, and therefore the planning problem is one of ensuring this right. The achievement of this goal is embodied in numerous and diverse international health care systems. The emphasis is to ensure that accessibility is provided to all regardless of economic or socio-cultural differences.

In analyzing the above, the study examines the

first and second objectives. In combining the two this will highlight the underlying factors influencing the current health care delivery in Nairobi. This can be used to arrive at how the future health needs can be met. The analysis in this chapter aim at examining the first and second hypotheses of this study.

3.1.1 Spatial Distribution of Health Facilities in Nairobi

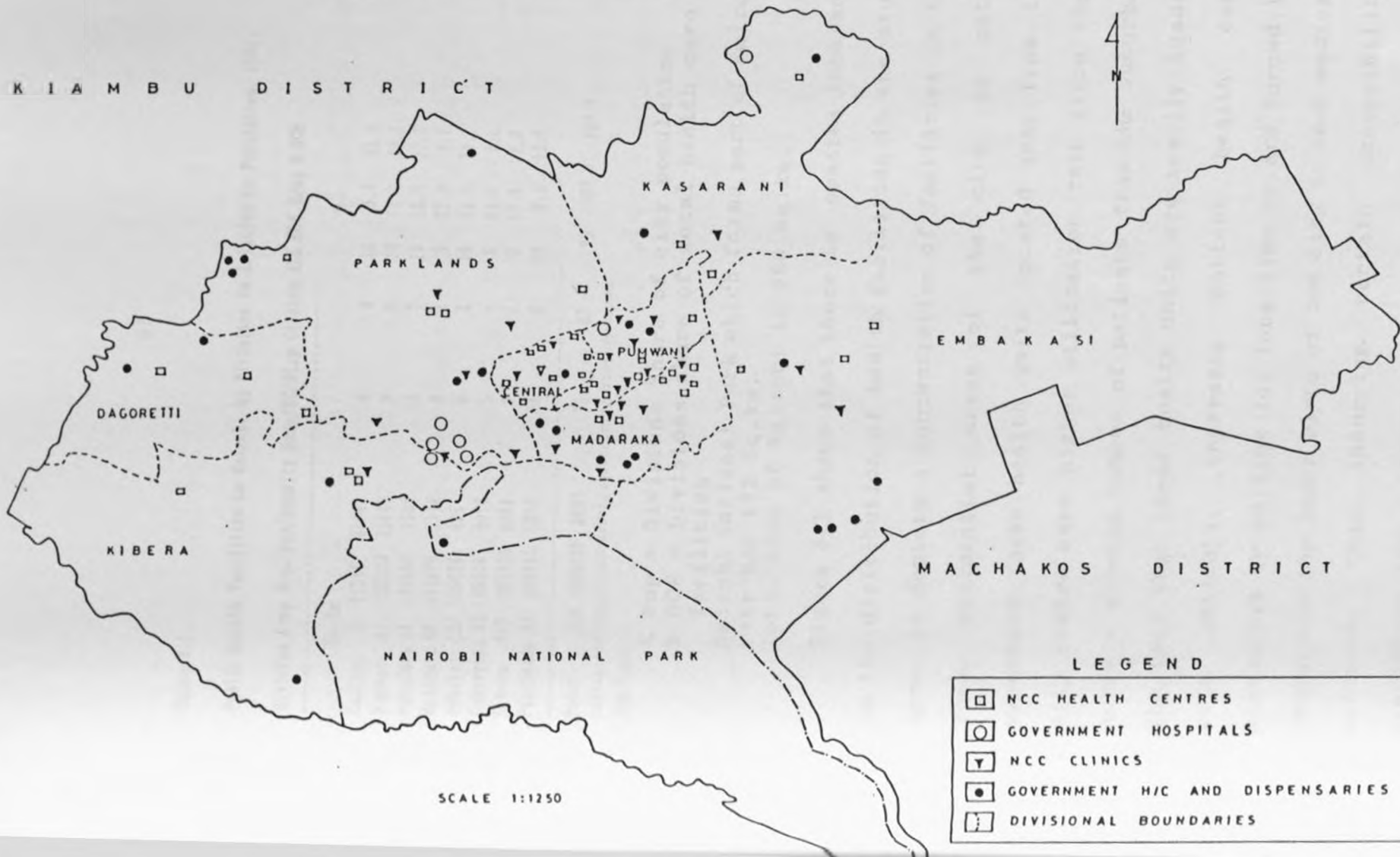
The spatial growth and planning approach in Nairobi as discussed in chapter two has given rise to the present spatial distribution of health facilities. The outcome of this is the concentration of health facilities in the old eastern part of the city. This area is presently covered by the administration divisions of Central, Pumwani and Makadara. This has led to a spatial imbalance on the distribution of health facilities whereby these divisions comprises with only 28 percent of the city population accounts for 48.5 percent of the public sector health facilities. This situation is perceived to become more critical as the city continue to expand to the outer zones and the suburbs.

The outer divisions of Kasarani, Embakasi and Dagoretti and Kibera with 63 percent of the city population account for only 32 percent of the health facilities. Parklands division which covers the income

Western and North Western suburbs of the city with 9 percent of city population has 19 percent of the facilities.

The imbalance shows out vividly when we consider population per health unit. The outer divisions have 29,627 persons per health care facility, while Parklands has 7,128 and the inner city residential areas have 8,779 respectively. It is true that administrative divisions do not in themselves constitute impermeable barriers and health users are able to move to health facilities which are near to them. However, distance and transport cost act as strong limiting factors, so the, the population residing in the outer divisions are truly underserved and have limited access to public care services. This explains that there is spatial imbalance in the distribution of public sector health facilities in the city. This can be illustrated using table 3.1 and figure below 3.1

LOCATION OF EXISTING HEALTH FACILITIES



SCALE 1:1250

LEGEND

- NCC HEALTH CENTRES
- GOVERNMENT HOSPITALS
- ▼ NCC CLINICS
- GOVERNMENT H/C AND DISPENSARIES
- - - DIVISIONAL BOUNDARIES

Table 3.1

Public Health Facilities in Nairobi by Divisions in Relation to Population, 1991

Division Area Pop. Pop/Density Hosp/HC/Disp Clinics ALL HCF %Pop % HCF

	Sq.Km						
Central	8	75245	9406	9	3	12	5.0 12.1
Pumwani	11	165538	15049	9	8	17	11.0 17.1
Makadara	19	180587	9505	12	7	19	12.0 19.2
Kasarani	66	331076	5016	8	1	9	22.0 9.1
Embakasi	221	195636	885	8	2	10	13.0 10.1
Dagoretti	33	165538	5016	5	-	5	11.0 5.1
Kibera	103	255830	2484	7	1	8	17.0 8.1
Parklands	97	135441	1396	14	5	19	9.0 19.2
Total	558	1504890	2697	72	27	99	100.0 100.0

Notes:

- % Pop = Divisions Share of city population
- % HCF = Divisions share of total health care facilities

Nairobi National Park which forms part of Nairobi city has 122 Sq.km.

Total area of Nairobi is 680 sq.km.

Figure 3.1 shows that there is spatial imbalance in the distribution of health facilities in the study area. It depicts a concentration of facilities in the inner residential areas of the city. As noted elsewhere those health units located away from the city centre have higher utilization rate since they serve a growing number of patients from the suburbs. The fact that these health units are heavily loaded with patients, increases patient health care discomfort by waiting for long time or are forced to commute to the inner parts of the city to seek medical services, thus incurring certain accessibility discomfort like, transport costs and distance. That means that those residing outside the central part of

the city may experience certain health delivery problems as opposed to those who are nearer to the health units. This can be noted from what other writers like Mayhew (1986) who argues that, the geography of health care system is rarely given much importance and yet, a better geographical organisation of health care resources, may led in resolving, many other problems associated with health services.

The situation depicted by table 3.1 and figure 3.1 can be used to argue for a more rational planning approach should address the question of equity and accessibility.

In this study, to analyze the distribution of these facilities, a number of approaches are used. First, geographical accessibility is analyzed. This is important given that the location of health facilities should be based on the level of demand and this should aim at achieving one major objective among others, that is minimisation of the maximum distance a person should travel to get medical services. This is very important particularly given that in this study it was found out that 53 percent of the respondents walked to the health units, 40 percent relied on public means while only 7 percent used others modes of transport Table 3.2 below shows the mode of transport used.

TABLE 3.2 Modes of Travel to Health Facilities

MODE OF TRANSPORT USED	PERCENTAGE
WALKING	53
PUBLIC TRANSPORT	40
OTHER MODES	7
TOTAL	100

Source: Field survey 1991

3.1.2 The Health Users Survey Method

One major interest in this study was to arrive at a method of determining the health facility catchment area. This is an important planning, aspect because it can be used to determine the range of services to be offered at any given health unit given the catchment (threshold) population. The survey used a simple patient questionnaire to gather information like patients' place of residence, distance travelled, time taken, mode of travel, services sought and the use of other health centres.

The data has been analyzed to determine the population catchment area. A simple method of delimiting the population catchment area of each category of facilities is used. This is compared with set population catchment standards for each category of health units. Further analyses are carried out using distance decay analysis to explore the effect of

distance on travel to the health facility from the point of origin.

3.1.3 Origin Destination to Health Facility

Category Attendants:

Distance travelled to the health facility is an important component in analyzing accessibility. It can be used as a attractive index to measure the level of interaction between two points. Ngau (1989 P.6) argues that "distance acts as a structural factor influencing decision making and perception processes which trigger interaction." The explicit mechanisms behind distance are cost, time, and human effort which serve to limit human interaction. In this study the effect of distance is analyzed by running the frequencies of distance.

In the category of clinics 25 percent, 50 percent, 75 percent and 90 percent of the patients come from within a radius of not more than 0.75Kms, 2Kms, 2.4Kms and 3.2 Kms, from the health units respectively. A detailed analysis of origin-destination of patients using distance limits from where 25 percent, 50 percent 75 percent and 90 percent of the health users are attracted to each category of health units in the study area is represented by table 3.3. The distances represents the radius within the given percent of attendants come from.

Table 3.3 Distance and Attraction to Health Unit Categories

Health Unit Category	Percentage of Attendants and Distance Travelled (Km)			
	25%	50%	75%	90%
CLINICS	0.75	2.00	2.40	3.20
DISPENSARIES	1.00	3.00	4.63	5.50
HEALTH CENTRES	1.50	3.40	5.00	6.50
HOSPITALS	4.00	8.25	12.25	15.90

Source: Field Survey 1991

Table 3.3 indicates three key distance and service use relationship.

- Patients tend to use the nearest health unit to their place of origin.
- The facility's catchment area increases with the availability of a wider range of services or centralised specialised service(s) and,
- The probability of use of a health unit diminishes with distance from the health unit.

3.1.4 Health Facility Catchment Area and Measurement

The organisation and management of public health services in Kenya is based on an hierarchical sub-division of the country into regions and health areas. The organisation follows administrative units, but takes into consideration the average population to be served. Table 3.4 gives the latest Ministry of Health, health facility classification.

served. Table 3.4 gives the latest Ministry of Health, health facility classification.

Table 3.4 Ministry of Health: Health Facility Classification

<u>Health Facility Category</u>	<u>Catchment Population</u>
National Hospital (KNH)	National Population
Provincial Hospital	1-2 million
District Hospital	250000 - 1000000
Sub-District Hospital	100000-250000
Health Centre Type 2	70000-100000
Health Centre Type 1	50000-70000
Dispensary Type 2	10000-15000
Dispensary Type 1	10000

Source: Ministry of Health

KNH is supposed to be the national referral hospital. It also caters for some of the neighbouring countries. As illustrated in section 2.1.1, the planning of health facilities in Nairobi has been mainly based on residential neighbourhood concept. Planners are interested in delimiting the catchment population of a centrally located public purpose facility. Studies carried on this respect aims at establishing the extent to which distance influences the range of goods and services a facility offers. Ngau (1992 p.30) in defining the market area of a centre says it is "the area in the vicinity of the market centre in which the majority of the people use that centre for the provision of basic goods and services". Vicinity here is taken as the adjacent hinterland, however some time

a market centre may also draw customers from non-adjacent areas either because it specialises in the provision of a specific good or services or because it has unusual transportation access. However the location of a health facility aims at achieving three major objectives according to Malczewski (1990, P.125)

- Minimisation of the aggregate (or average distance patient travel to the health care facilities. This is commonly used in studies of the delimitation of service area pattern. It refers to the physical accessibility of the facilities, which is recognised as one of the main objectives of the particularly primary health care policies. It can be argued that if the aggregate accessibility is maximised then the inconvenience is minimised and consequently we maximises socio welfare.
- Minimisation of the maximum extra distance travelled by patients. This is determined as the difference between the distance to the health care facility to which the patients are allocated and the distance to the nearest facility. This can be regarded as a measure of spatial equity. This allows the remotely located patients to be more equitably served.
- Maximisation of the number of patients who should utilise a given health care facility. This aims

at ensuring economic efficiency in the resource utilization.

The word majority acknowledges that the service of a market area in reality is seldom a hard and fast one, and the area tend to overlap. The problem in this case is to delimit the health service catchment areas which can be used to allocate the population catchment, so as to optimise the three objectives above. In delimiting the service area the information collected in the survey as explained in section 3.1.2 above, is used to determine the threshold population, whereby the distance to the health facility is taken as the most representative variable. Travel distance in this study is considered as a better measure of determining the catchment population given that people tend to travel to the nearest facility to seek services there.

Using the cumulative travel distances, 90 percent is taken to represent the majority of the patients attending each health units category. The distance in each case associated with 90 percent is taken as the maximum distance served, and the maximum population served. These two concepts can be related to range and threshold concepts respectively. Range in this case represents the service area of a health facility given that different health facility categories have got different range. This is because the range of services

they offer differs. The higher the health facility is in terms of hierarchical order, the wider the range of services it offers, and thus it has a wider (threshold) population coverage.

The result of table 3.4 can be used to calculate the catchment population of each type of health facility category using 90 percent as the maximum population served (threshold population). Further analysis are carried out by categorising Nairobi into three major population density zones and catchment population for health centres, dispensaries and clinics is carried out.

3.1.5 Catchment Population of Health Units in the Study Area:

To determine the catchment population, the following formula is used

$$\pi r^2 \times \text{population density}$$

whereby $\pi = 3.142$

r = radius, which represents the travel distance per given patients percentiles.

$$\text{Population density} = \frac{\text{Population of the study}}{\text{Area (Km}^2\text{)}}$$

Using the 1991, Nairobi population figures, the population density is $\frac{1504,890}{558} = 2697.0$

558

Thus the population density of the settled part of the

city is about 2697.0 persons per sq.km

In calculating the threshold population for each category of health facilities, in this case it is assumed that the area has a uniform population density. To arrive at the threshold population of each category of a health facility, the distance (radius) travelled by a given population percentile is multiplied by the population density.

Table 3.5 gives the summary of the threshold population of each category of health units at 25 percent, 50 percent, 75 percent, and 90 percent, based on the distance given in table 3.4 above.

Table 3.5: Catchment (Threshold) Population at Given Percentile Travel Distances in Nairobi:

Health Facility Category	25%	50%	75%	90%
Clinic	4967.0	33896.0	48910.0	86773.0
Dispensary	8474.0	76266.0	181656.0	256339.0
Health centre	19066.0	97959.0	211949.0	358025.0
Hospital	135584.0	576760.0	1324058.0	2142305.0

Source: Field Survey, 1991.

If 90 percent is used to effectively identify where the majority of patients comes from, this conforms to a key threshold and distance relationship, that,

- There is strong relationship between the range of

services offered and the distance where the patients come from. The higher the hierarchical order a health facility, the further it will attract the patients. This distance may be termed as the "threshold services level distance". The service level range is limited because of competition between the health units of its rank (order) and those of higher hierarchical order.

- Each health unit has a limit to its service range because of competition between health units of its rank order and those of higher hierarchical order.

Comparing the 90 percent threshold population with the set population standards for each category of health facility, we find that the existing facilities are overutilised. The table 3.6 below gives the comparison between the observed and expected catchment population of public health care facilities in the study area.

Table 3.6 Comparison of the Observed and Expected Catchment Population of Health Care Facilities in Nairobi:

Facility Category	Observed Population		Expected Population
	50%	90%	
Prov. hospital	576760	2142305	1-2 million
Health Centre	97959	358025	70-100,000
Dispensary	76266	256338	15,000
Clinic	33896	86773	10,000

Source: Field Survey, 1991

3.1.6 Catchment Population for Health Centres, and Dispensaries at Different Population

Density Zones:

This section analysis the catchment population using the major population densities zones in the study area. These zones are the Westlands, the Eastlands and the Southlands each representing the broad population density zones in Nairobi.

TABLE 3.7 Distance Travelled Per Facility Category

by Zones

WESTLANDS	25%	50%	75%	90%
	(DISTANCE IN KM)			
H/CENTRE	3.0	5.0	5.7	7.0
DISPEN	2.0	4.0	5.0	13.0
SOUTHLANDS				
H/CENTRE	0.5	2.0	4.3	6.9
DISPEN	0.5	2.5	4.8	8.0
EASTLANDS				
H/CENTRE	1.0	2.0	4.0	6.5
DISPEN	0.9	1.5	3.1	4.4

Source: Field Survey 1991

H/Centre = Health Centres

Dispen= Dispensaries

Using the 1979 population census each of these zones has the following population densities, Westlands 5,000, Southlands 10,000, and Eastlands 25,000 persons per sq.km. In this analysis the two hospitals that is KNH and Pumwani are not considered because they both operate as referral hospitals for the entire study area. Therefore analysis of this kind can only be done at a general level. Clinics were not considered at because the all the sampled facilities happened to have been in eastlands.

Taking the distance represented by 90 percent of the population catchment sizes for each category of health facilities one observes that:

In the low and medium densities zones on average patients travelled further covered longer distances in

each category of health units. In terms of dispensaries while in the low density and medium density zones majority of the patients came within a radius of 13.2 and 8 Kms respectively, in the high density zone majority came from within a radius of 4.4 Kms. However in case of health centres the difference is generally very small. This findings can be interpreted that these zones are not uniformly served in terms of accessibility by the various health categories of facilities. Further analysis are carried to calculate the 90 percent threshold population catchment for category of health facility per zone. Compared with the set standards the catchment population these facilities have a much bigger catchment population than the set standards.

Table 3.7 gives the summary of the threshold population of the above category of facilities at 25 percent, 50 percent, 75 percent and 90 percent per the different population density

Table 3.8
Threshold Population of Health Facilities by Density
Zones

Zone	Health Centre	Dispensary
Westlands	737152.0	2654990.0
Southlands	1495906.0	2010880.0
Eastlands	3318738.0	1520728.0

Source: Field Survey 1991

3.1.7 Distance Decay in Health Services Attendance

A major interest in this research is to establish a measure of interaction between point of origin of the patients and the health facility. This is a useful information in spatial planning whose major concern at a local level aims at finding the best location of facility in relation to population needs. This is because basic question of location in planning is the question of accessibility.

Ngau 1989 (p.6) notes that "regional scientists have recognised that the trip generation potential of various land uses tends to decline with distance. Distance acts as a structural factor influencing decision making and perception processes which trigger interaction. The explicit mechanisms behind distance are cost, time and human effort which serve to limit human interaction. The limiting affect exerted by distance is termed as distance decay effect and it operates behind all forms of human interaction, including travel, marriage, and communication. It is because of its effect that shorter distance are preferred over longer distance (Ziff's principle of least Effort)".

In this study, distance decay model is going to be used as a measure of the patients' ability to overcome the frictional effect of distance to consume the services which are therefore at a fixed point in

space. In this study we investigate the probability at which demand of each health unit category, diminishes with distance from the point of origin to the point of destination. In the distance decay model, the assumption is that the flow of patients between the place of origin and the place of treatment is proportional to the hierarchical order of a health unit, but it is inversely proportional to the accessibility costs (inter alia, distance, travel time and transport cost). Researches carried using gravity models have shown that the probability of interactions between any two points diminishes at some exponential rate from the centre in a highly predictable fashion. In this research the rate at which the demand of health services diminishes will vary with the range of services offered in each category of health units.

In examining the functional relationship between distance and patients visits in different categories of health units, distance decay interaction analysis for each is carried out. This is shown in tables 3.8.1, 3.8.2, 3.8.3 3.8.4 and 3.8.5. The tables show the frequency distribution of health users trips within specific distance bands and the absolute frequencies of interaction which shows the influence of the spatial structure in which the interactions take place. In this study we can obtain a relative measure of interaction if we assume an isotropic

plane. Under such conditions, opportunities for health users seeking services at any given health unit category are evenly spread over the vicinity and the probability of a patient moving a specific distance class interval is equal to the area of a circular band defining that class interval around the health unit. The probability of a move to distance band j , is given

$$\text{by: } P_j = \frac{\pi r_j^2 - \pi r_{j-1}^2}{\pi r_n^2}$$

Where: r_j is the outer radius

r_{j-1} is the inner radius

r_n is the final outer radius

$\pi = 3.14$

Dividing absolute frequency of interaction (X_{ij}) by the probability of interaction (P_j) we obtain a ratio indicating the relative interaction intensity. The X_{ij}/P_j ratios are therefore measures of relative interaction for each category of health units. These measures exhibit a strong distance decay affect which are explored further below by way of graphs and regression functions. In calibrating the distance decay functions, the basic of the proposition interaction - distance relationship is that interaction intensity to or from a centre is a function of the distance to the centre, that is [$I_j = f(d_j)$].

TABLE 3.8.1 DISTANCE DECAY AND INTERACTION INTENSITY OF PATIENTS TRIPS TO HEALTH FACILITIES IN NAIROBI:

Distance Point Bands (KMS)	MDP	Absolute Frequency (Xij)	Probability of Interaction (Pj)	Relative Interaction Intensity (Xij/Pj)
0-1	0.5	37	3.145sq.km = .0044	8409.0
1.01-2.0	1.5	24	9.42 ^{sq} = .0133	1805.0
2.01-3.0	2.5	19	18.24 ^{sq} = .0266	714.0
3.01-4.0	3.5	13	21.98 ^{sq} = .0311	418.0
4.01-5.0	4.5	20	28.26 ^{sq} = .0400	500.0
5.01-6.0	5.5	10	34.54 ^{sq} = .0489	204.0
6.01-7.0	6.5	10	40.92 ^{sq} = .0577	172.0
7.01-8.0	7.5	6	47.10 ^{sq} = .0666	90.0
8.01-9.0	8.5	3	53.38 ^{sq} = .0756	40.0
9.01-10.0	9.5	4	59.94 ^{sq} = .0844	47.0
10.01-11.0	10.5	2	69.94 ^{sq} = .0990	20.0
11.01-12.0	11.5	3	72.22 ^{sq} = .1022	29.0
12.01-13.0	12.5	1	73.50 ^{sq} = .1111	9.0
13.1-14.0	13.5	1	84.40 ^{sq} = .1201	8.0
14.01-15+	14.5	7	91.06 ^{sq} = .1298	54.0

n=15

f=160

prob.=1.0

MDP= Mid-Distance Point

Table 3.8.2

DISTANCE DECAY AND INTERACTION INTENSITY OF PATIENTS TRIPS TO CLINICS IN NAIROBI.

Distance bands(kms)	MDP	Absolute Frequency of Interaction	Probability of Interaction (p _j)	Relative interaction Intensity (X _{ij} /P _j)
0- 0.5	0.25	4	0.785sq.km=.016	250.0
.51 -1.00	0.75	3	2.355" =.048	63.0
1.01 -1.50	1.25	1	3.925" =.065	15.0
1.51- 2.00	1.75	6	5.495" =.107	56.0
2.01- 2.5	2.25	1	7.065" =.154	7.0
2.51 -3.00	2.75	1	8.635" =.172	6.0
3.01 -4	3.25	1	11.9" =.428	2.0

n =7

f =17

prob =1.0

MDP = Mid-Distance Point

Table 3.8.3

DISTANCE DECAY AND INTERACTION INTENSITY OF PATIENTS TRIPS TO DISPENSARIES IN NAIROBI:

DISTANCE BANDS(KMS)	MDP	Absolute Freq.of Interaction (Xij)	Probability of Interaction (Pj)	Relative Interaction Intensity (Xij/Pj)
0- 0.5	0.25	5	$0.785 \text{sq. kms} = 0.0060$	833.0
0.51-1.00	0.75	3	$2.355 \text{sq. kms} = 0.0190$	167.0
1.01-1.50	1.25	2	$3.925 \text{sq. kms} = 0.0236$	68.0
1.51-2.00	1.75	3	$5.495 \text{sq. kms} = 0.0414$	72.0
2.01-2.5	2.25	2	$7.065 \text{sq. kms} = 0.0533$	38.0
2.51-3.00	2.75	2	$8.635 \text{sq. kms} = 0.0651$	31.0
3.01-3.5	3.25	1	$10.205 \text{sq. kms} = 0.0770$	13.0
3.51-4.00	3.75	2	$11.775 \text{sq. kms} = 0.0850$	24.0
4.01-4.5	4.24	3	$13.345 \text{sq. kms} = 0.1010$	30.0
4.51-5.0	4.75	2	$14.915 \text{sq. kms} = 0.1124$	18.0
5.01-5.50	5.25	2	$16.485 \text{sq. kms} = 0.1243$	16.0
5.51-6.00	5.75	1	$18.055 \text{sq. kms} = 0.1361$	7.0
6-6.50	6.25	1	$19.625 \text{sq. kms} = 0.1480$	7.0

n=13

f=23

prob.=1.0

TABLE 3.8.4 DISTANCE DECAY AND INTERACTION INTENSITY OF PATIENTS TRIPS TO HEALTH CENTRES IN NAIROBI:

Distance	MDP	Xij	Pj	Xij/Pj
0-.5	0.25	8	0.785sq.km=0.0039	2051.0
0.51-1.00	0.75	10	2.355 " " =0.0117	855.0
1.01-1.50	1.25	5	3.925 " " =0.0195	256.0
1.51-2.00	1.75	2	5.595 " " =0.0273	73.0
2.01-2.5	2.25	5	7.065 " " =0.0352	142.0
2.51-3.00	2.75	5	8.635 " " =0.0430	116.0
3.01-3.50	3.25	1	10.205 " " =0.0510	18.0
3.51-4.00	3.75	3	11.295 " " = 0.0560	54.0
4.01-4.50	4.25	5	13.345 " " = 0.0664	75.0
4.51-5.0	4.75	6	14.915 " " = 0.0742	81.0
5.01-5.50	5.25	2	16.485 " " =0.0820	24.0
5.51-6.00	5.75	2	18.055 " " =0.0900	22.0
6.01-6.50	6.25	5	19.625 " " = 0.0977	51.0
6.51-7.00	6.75	2	21.195 " " = 0.1060	19.0
7.01-7.50	7.25	1	22.765 " " =0.1133	9.0
7.51-8.00	7.75	2	24.335 " " =0.1211	17.0

n=16

f=64

prob.= 1.0

Table 3.8.5: DISTANCE DECAY AND INTERACTION INTENSITY OF PATIENTS TRIPS TO HOSPITALS

Distance bands(kms)	MDP	Absolute Freq.of interaction (X _{ij})	Probability of Interaction (P _j)	Relative Interaction Intensity (X _{ij} /P _j)
0-1	0.5	4	3.14sqkm=0.0044	9090.0
1.01-2	1.5	5	9.42"" =0.0133	376.0
2.01-3.0	2.5	3	19.84""=0.0266	113.0
3.01-4.0	3.5	5	21.98""=0.0311	161.0
4.01-5.0	4.5	4	28.26"" =0.0400	100.0
5.01-6.00	5.5	3	34.54"" =0.0489	61.0
6.01-7.0	6.5	2	40.82"" =0.0577	35.0
7.01-8.0	7.5	3	47.1"" =0.0666	45.0
8.01-9.0	8.5	3	53.38""=0.0756	40.0
9.01-10.0	9.5	4	59.66""=0.0844	47.0
10.01-11.0	10.5	2	69.94""=0.09900	20.0
11.01-12.0	11.5	3	72.22""=0.1022	29.0
12.0- 13.0	12.5	1	75.5""= 0.1111	9.0
13.1- 14.0	13.5	1	84.4""= 0.1201	5.0
14.01-15+	14.5	7	91.06""= 0.1289	54.0

n=15

f=50

prob.=1

Plotting the distance-interaction data in the above tables (3.7.1 -3.7.5) graphically, a non-linear patterns are obtained changes (see figures 3.2, 3.3, 3.4, 3.5 and 3.6). There are various functions that can be fitted to the data for purposes of estimating parameters, in this case the distance decay exponent (b), the most commonly used functions are from a family called gravity models. The gravity model has the general form:

$$I = KDi_j^{-b} \quad \text{or} \quad (X_{ij}/P_i P_j) = KDi_j^{-b}$$

where:

I or X_{ij}/P_iP_j is the relative measure of interaction.

K is a constant.

D_{ij} is distance between i and j places.

b is a co-efficient or exponent.

This non-linear function becomes a simple linear function when the distance - interaction intensity data is transformed into logarithmic values,
 $\text{Log } I = a - bD_{ij}$.

Using these linear gravity functions for clinics, dispensaries, health centres, and hospitals, we derive the following regression equations

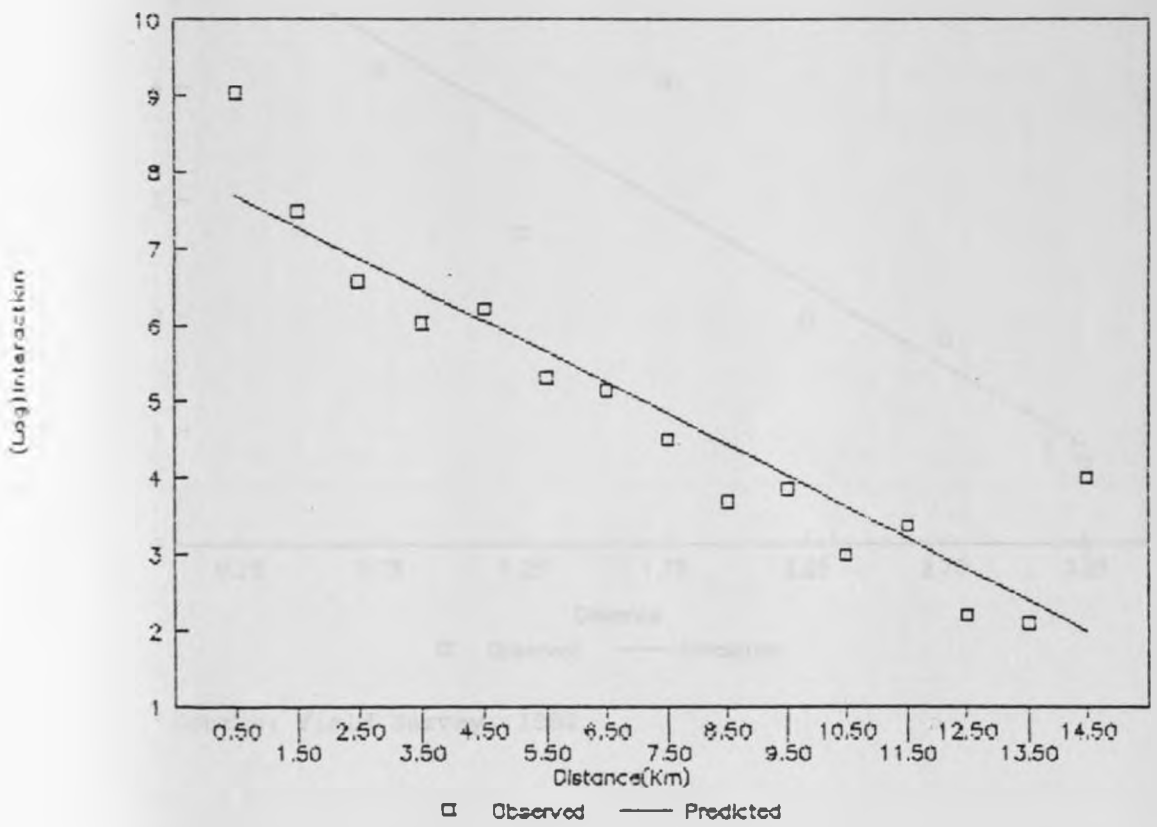
For all categories of health facilities

	$\text{Log}(I) = 7.896 - 0.409 * D_{ij} (R^2 = 0.73)$
Clinics	$\text{Log}(I) = 5.469 - 1.422 * D_{ij} (R^2 = 0.77)$
Dispensaries	$\text{Log}(I) = 6.101 - 0.73 * D_{ij} (R^2 = 0.64)$
Health Centres	$\text{Log}(I) = 6.377 - 0.540 * D_{ij} (R^2 = 0.73)$
Hospitals	$\text{Log}(I) = 6.376 - 0.290 * D_{ij} (R^2 = 0.76)$

Graphically, these functions are shown in figure 2 below by way of smoothed exponential curves. In all case R^2 is significant at 0.05 level. This attests that use of health care services is very sensitive to the distance potential users have to travel. Hence distance has a significant effect on the accessibility to health facilities in the study area. The negative b - coefficients (exponents) shows the rate at which health care use declines with distance to various

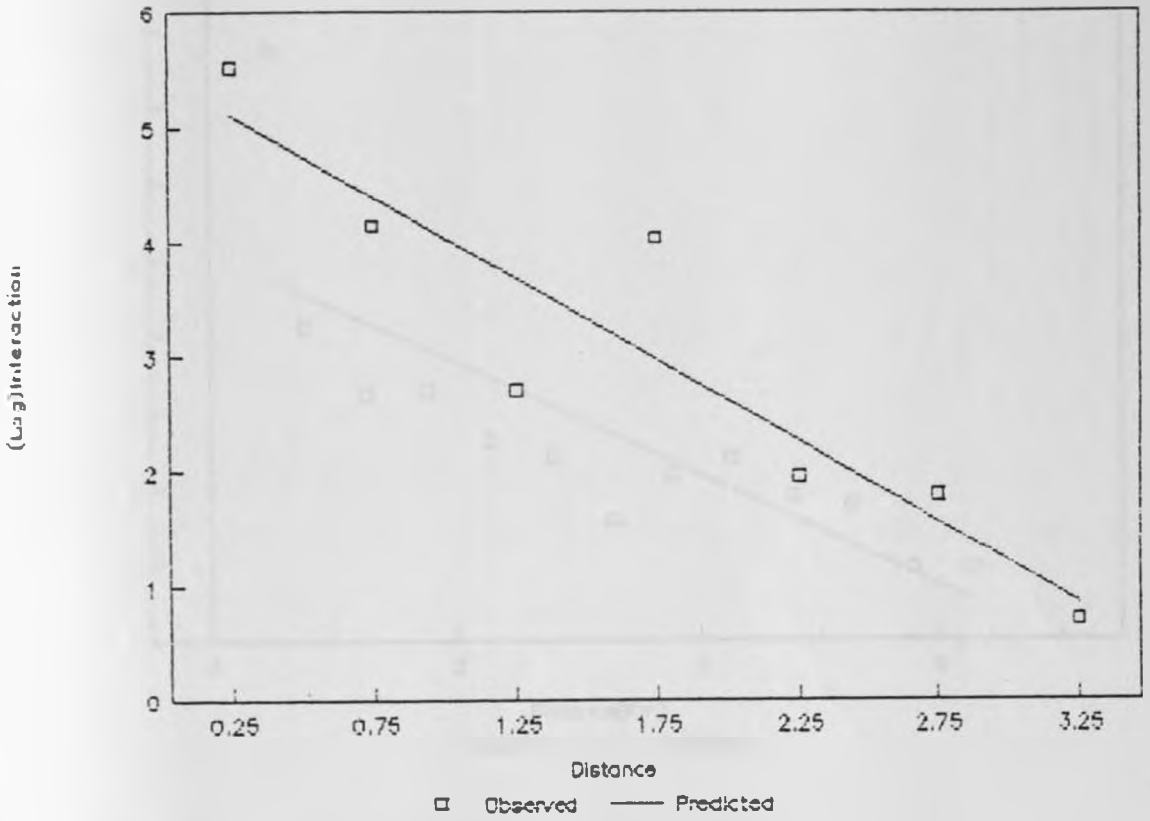
health care facilities in Nairobi. The rates are very steep for clinics and much gentler for hospitals as expected. Simply, health users are willing to travel longer distance to hospitals, but only short distances to clinics. This is a compelling reason why facilities offering basic health care should be more accessible and equitably distributed to population.

Figure 3.1 Distance Decay to Health Facilities in Naiorbi:



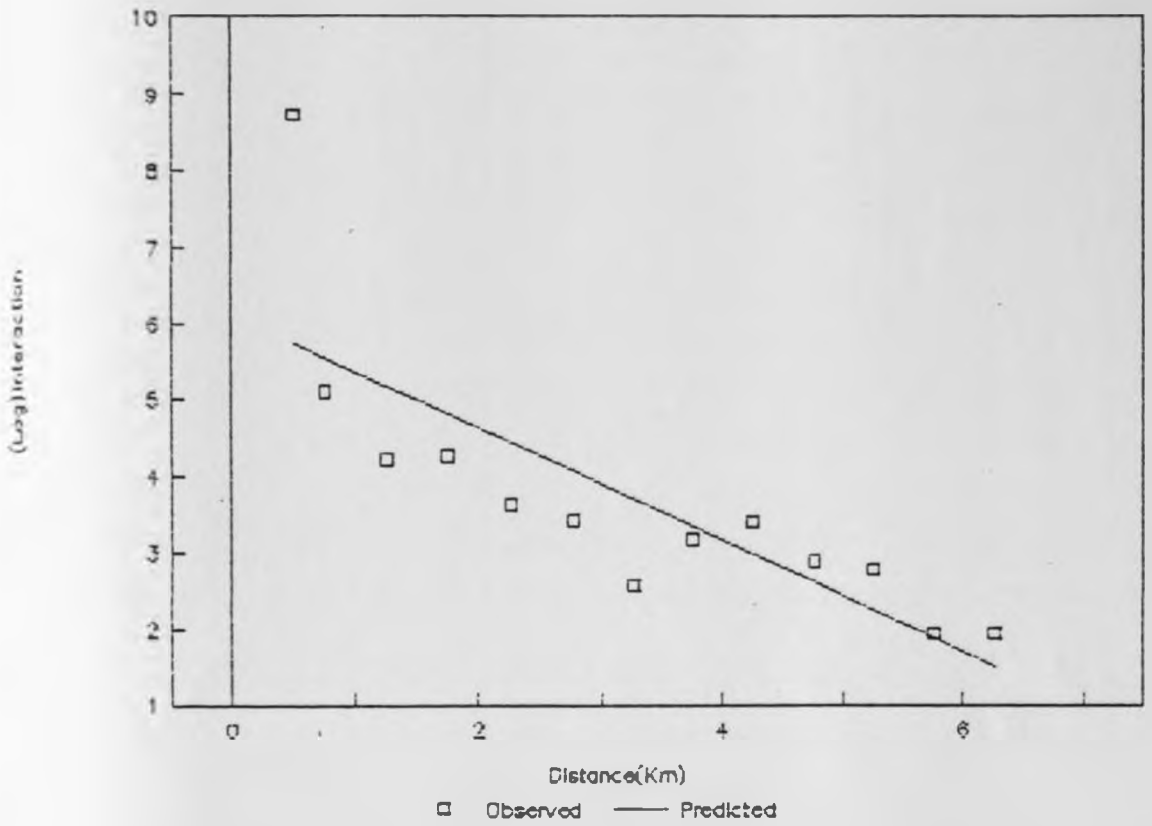
Source: Field Survey, 1992

Figure 3.2 Distance Decay to Clinics



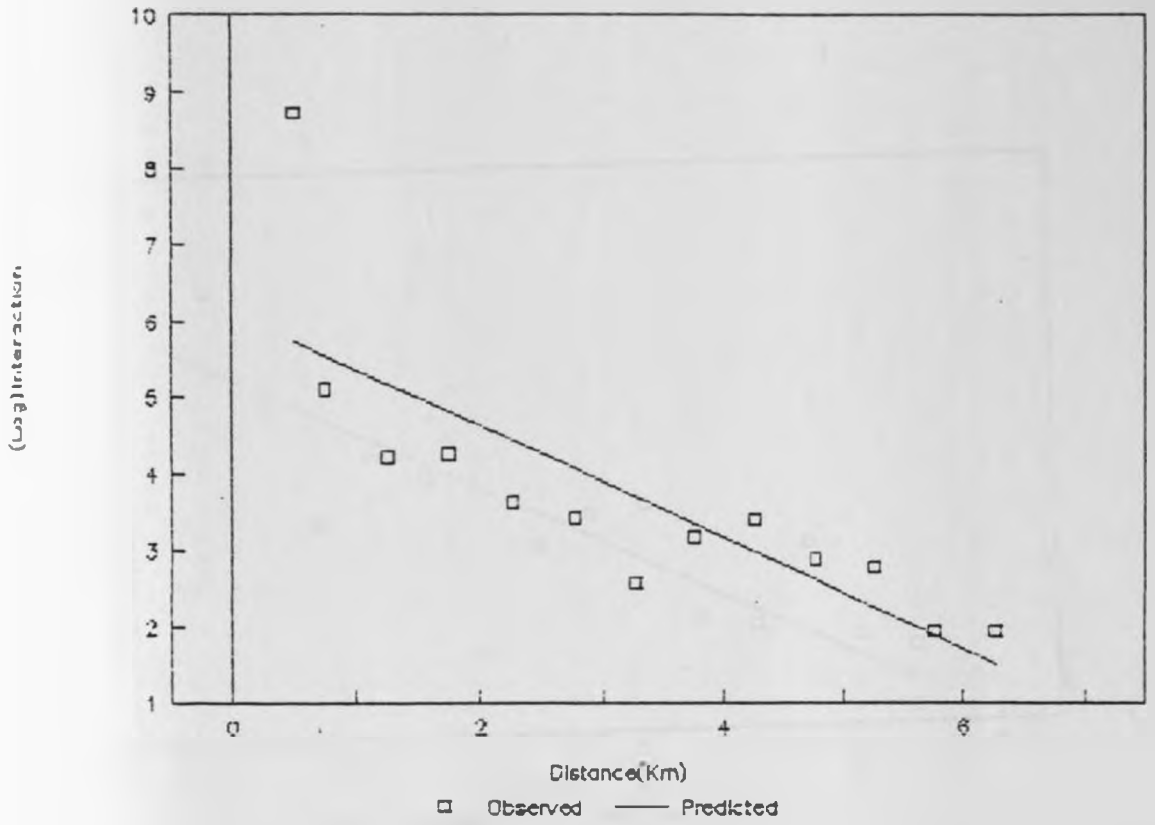
Source: Field Survey, 1992

Figure 3.3 Distance Decay to Dispensaries



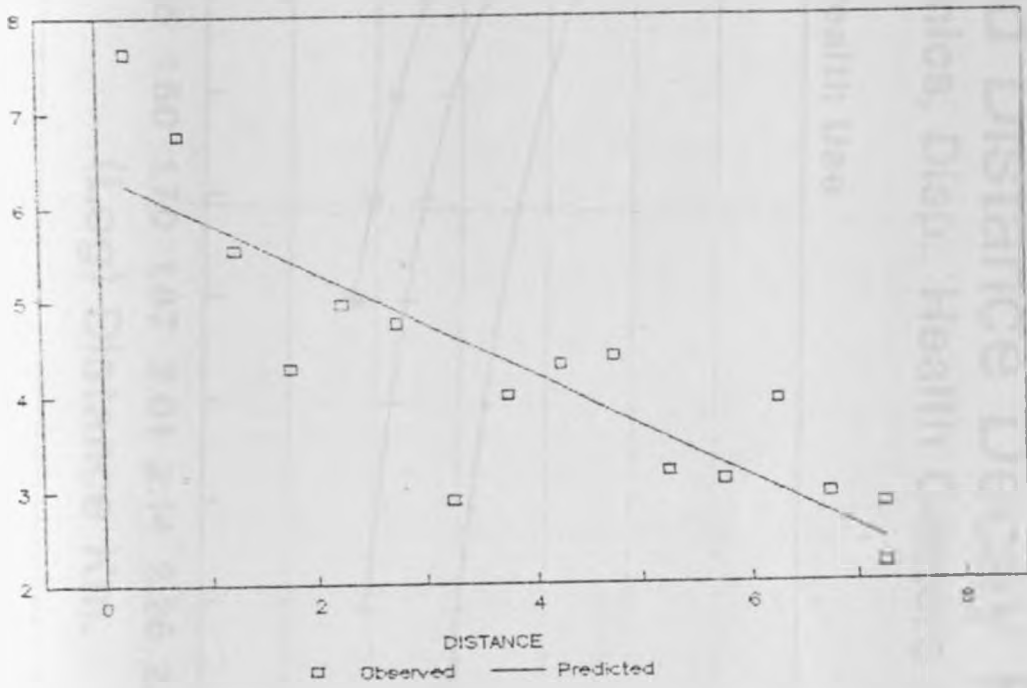
Source: Field Survey, 1992

Figure 3.3 Distance Decay to Dispensaries



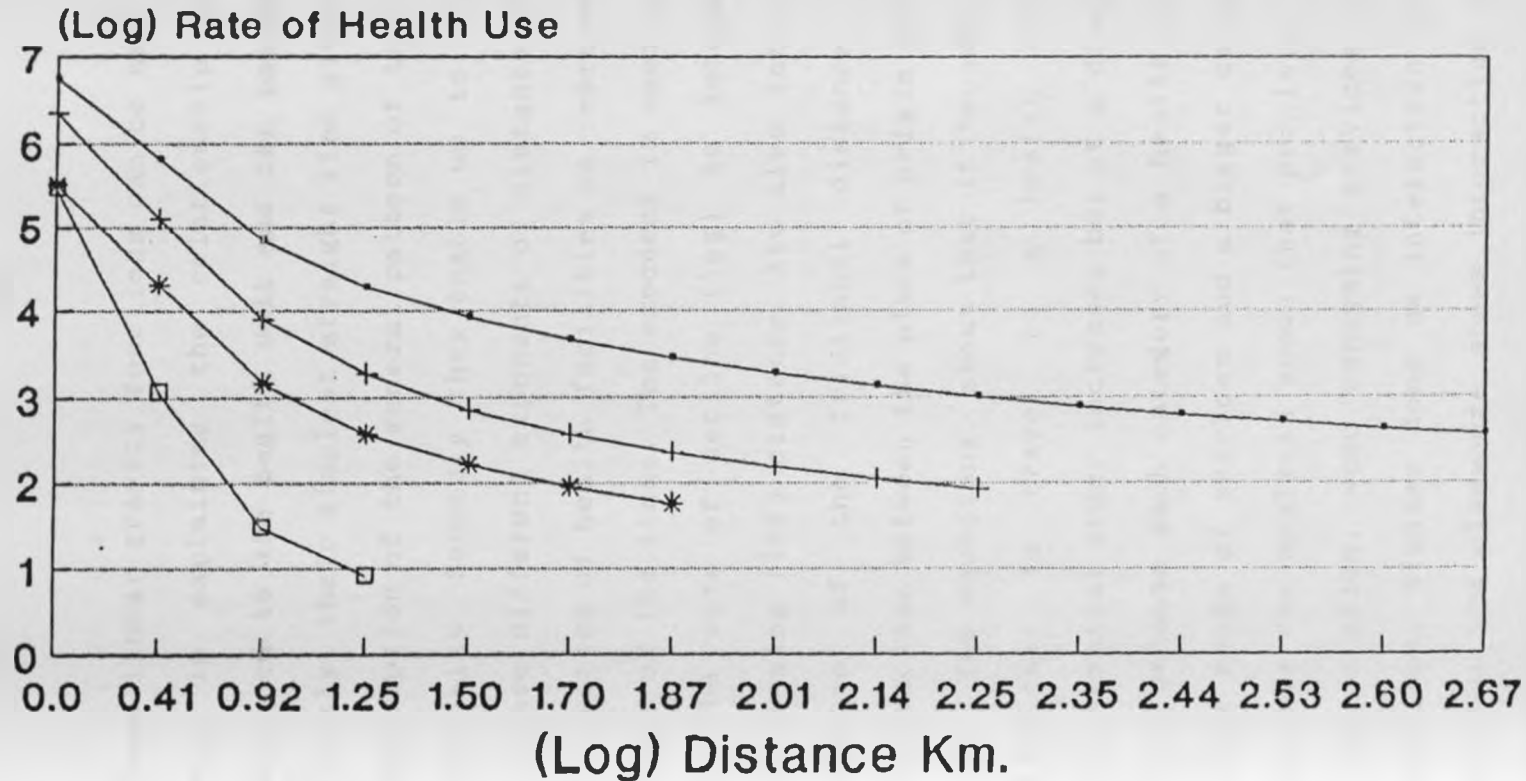
Source: Field Survey, 1992

Figure 3.5 Distance Decay to Hospitals



Source Field survey, 1991.

Smoothed Distance Decay Functions for Clinics, Disp., Health Centers and HPs



—●— Hospitals —+— Health Centres —*— Dispensaries —□— Clinics

These linear gravity functions can be used in several ways in explaining the relationship between the distance to the health unit and the patients visits. Firstly, their simplest straight line gives a succinct description of the general pattern of the interaction intensity. Secondly they enable us to ascertain and compare different exponents of distance of different categories of health facilities as represented by the slope of the lines. The exponent is used as a measure of the rate of decline (log) in interaction with increasing (log) distance. Its also interpreted as a measure of the frictional distance effect of interaction between the place of origin and the health unit. The equations, shows that it becomes increasing difficult to travel to a health unit as the hierarchical order increases but at a disproportional rate because each category of a health unit has got wider range of services and a bigger catchment area. However the analysis shows that proximity is a major consideration, when consuming services like health services. Studies done on interaction intensity in Nairobi and elsewhere shows interaction varies with respect to trip purpose. In Nairobi gravity functions fitted to interaction data for the following trip purposes give the distance decay (-b) or slope gradient of, work as -1.33, social -1.62, medical -

1.79, and grocery -3.25. While doing a transportation study in Nairobi applying gravity model Ngau came out with a distance decay exponent (-b) of -1.83 for the travel (Ngau 1989)

The result as shown above indicates that distance is a major factor influencing the consumption of health services. The analysis shows the exert of distance decay effects to different categories of health facilities. The result shows that the distance decay effect decreases with the increasing hierarchical order of the health units categories. The distance decay to the distance decay exponent for hospitals is the least. This can be supported by field observations that:

There are few public hospitals in Nairobi compared with the categories of health units apart from KNH an Pumwani. The later offers specialised services medical care in form maternity services for the study area. KNH is a referral hospital and therefore patients are expected come here on referral basis. Thus we expect patients to come from very far. Hospitals have more gentle slope than all other health facilities. This is attributed to the fact that hospitals have wider catchment area than other facilities. Thus the patients come from very far even outside the the study area given that they are said to offer good services and also because they operate as

referral centres. Health centres have a bigger catchment area than the dispensaries and clinics. However the gradient of dispensaries is very close to that of health centres because they happen to be well equipped with medical staff and other equipments thus they are perceived by patients as having better quality services.

The findings of this research can be used to argue the case for the improvement of health services at the lower order health units. This would go along way in improving the health conditions of people and also reducing the congestion in the higher order health units. This points out that primary health care which calls for an increased emphasis on community involvement in promotive and preventive health care provision will go along way in cutting down not only the curative health care which is mainly facility based but also improving the health conditions of the people. The findings of these models can be used predicate how far the patients are willing to travel to consume a given health care, among other health planning applications.

The analysis in this chapter rejects both the first and second null hypotheses (H_{01}) of this study and accepts the alternative hypotheses (H_1).

CHAPTER FOURUTILISATION OF HEALTH FACILITIES

4.0 Introduction

Provision of health services, can also be analyzed from point of view of utilisation. Access to a facility to a large extent determines its utilization in relation to the patients' choice of the health units, attendance and facility resource utilisation. Accessibility therefore is not only perceived on spatial terms but also in terms of acceptability and affordability. Distance alone does not determine the use of a health facility but also other related factors such as the perception of the people toward services and the financial implications involved. It is due to this, other forms of accessibility like cultural accessibility, functional accessibility and financial accessibility have been defined. These have been found to have a lot of impact in the utilisation of services.

The concept of utility was originally defined by economists as a subjective measure of feeling of individual satisfaction, which could be empirically identified. Nowadays it is commonly interpreted as that something which individuals tries to maximise. In this study, the concept of utilisation is used to analyze how the health resources are utilised as consumers (patients) exercise their preference in

demand of health services in the study area. Analysis based in the distribution and location aspects of the health units in the study area indicates that there is inadequate number of health facilities. It is a fact that absence of district and provincial hospitals in the study area points to the problem of inconsistency of health referral system causing congestion particularly at KNH and Pumwani Maternity Hospital.

This chapter provides a further analysis and evaluation of the maximum number of patient who should utilise a given health facility and the factors behind patient's choice of a health facility. The analysis answers and test both the third objective and hypothesis of this study respectively.

4.1 Patients' Characteristics

Patients' demographic characteristics have influence on the type of health care sought. Related behavioural factors also have a lot of impact on the utilisation of a health facility. Patients demographic factors give a forecast on what kind of medical care is required most. According to Kurt Scwaorz (1975) certain demographic factors like age and sex determine the health demand characteristics of a community and hence help in sound medical planning. Age is an important indicator as it indicates certain aspects of the need and demand for medical care and provision of

medical care and its utilisation. Sex ratios on the other hand have lot of impact in health care demand.

Women live longer than men and are said to develop certain diseases more frequently than men, for example rheumatoid arthritis, and iron deficiency anaemia. At various age milestones, the sex factor may reveal an interesting diseases patterns as can be seen in accidents when young boys have more accidents than girls. With the onset of puberty and child bearing the women are more prone to hormonal disorders, and other related ailments. And as they advance in age, this is accompanied by menopausal and psychiatric disorders.

In this study it was found out that, majority of the patients were female, comprising 69 percent of total patients, while male were only 31 percent. This shows that women are the greatest consumers of medical care which could be explained by the following reasons:

- Women are said to be less embarrassed while explaining, their health problem than men.
- Certain medical care are exclusively consumed by women such as the maternity, ante and post-natal medical cares.
- Women consume certain services like family planning more than men. They also take the greatest burden in child rearing, hence

increasing their sheer number in health units.

In terms of age, the study found out that certain age groups consumer medical services more than others. Table 4.1 below shows the age distribution of patients

TABLE 4.1 Patients Age Distribution

AGE GROUP (Years)	PERCENTAGE ATTENDANCE
0-5	15
6-10	01
11-15	03
16-20	12
21-25	26
26-30	24
31-35	09
36+	12
Total	100.0

Source: Field Survey, 1991

It can be explained that between 0-5 years there is a high demand for health services. This shows a high demand for child related medical care. How between 6-15 years there is a decline associated with the period when children are growing very fast, and in most cases, they either do not have a lot of medical problems or they are unwilling to disclose. The age between 20's and 30's are associated with a lot of

body development. This is also the child bearing age. This explains a high consumption of certain medical services particularly those related to women in child bearing bracket.

4.1.1 Factors Influencing Choice of Health Facility.

Consumption of health services is also influenced by patients health needs. In the study, proximity was found to be an important factor particularly as related to promotive and preventive medical care. However in terms of curative medical care other factors were more important. It was found out that the patient perception of what is a good medical care influenced the choice of the health facility to visit. In this study just like what Reach (1988, p.5) established, for preventive services, proximity to the place of residence/work was even more importance than for curative services. It was the main reason for facility choice. Quality of the care was a more important reason in facility choice for curative clients than for clients of preventive services. Clients of curative services by-passed the nearest facility more often than clients of preventive services. Decision to consume health services is also a function of inherent patients behavioral factors. In this research it was found out while approximately

60 percent of the patient responded that they visited the health facility because of proximity, 20 percent responded that it was because of the perceived treatment 18 percent associated the choice with familiar staff while 2 percent gave other reasons. Table 4.2 gives the reasons of given choosing the health facility visited during the time of interview. Table 4.2

Reasons for Choosing the Health Facility Visited

Reason	Percentage
Proximity	60
Good Treatment (Availability of drugs)	20
Familiar Staff	18
Others	2
Total	100

Source: Field Survey, 1991.

4.1.2 Patients' Attendance to Health Facilities

Patients visits to health facilities provides a measure of demand of medical care at each health unit. This can be used at a general level to forecast the demand of health services. However it may be fair to point out that, forecasting on the level of demand of health care, based on the volume of attendance may at time give misleading information. This is made difficulty because it is hard to predict the morbidity rate and pattern particularly in an urban

population which can be termed as a "shifting population". However patients attendance provides a useful medical planning framework. This is vital in regard to resource allocation, disease treatment and monitoring, and also future expansion of health facilities.

Patients visits to health facilities is basically expected to reflect the range of services offered in each facility. This has been shown to be based on the hierarchial order of health delivery system which operates on a referral system. However as explained above this may not always to be the case when a patient seeks medical care. Unless where a strict referral system is adhered to. This is difficult to observe due to other factor like behavioral reasons as explained in section 4.10 above.

In the study area it was found out that, within the NCC health delivery system there is inconsistency in the referral system. Whereby two designated dispensaries namely Ngaira Avenue Dispensary, and Jericho Dispensary operated as referral centres even for health centres which are an a higher hierarchical order. Also due to absence of district and provincial hospitals in Nairobi, all the public referral cases were either first attended at these two dispensaries or at KNH. Given the national/international role KNH is supposed to play, and the persistent shortage of

drugs and personals in other public sector health units, the situation at KNH is marked by over congestion, reducing it to almost an out-patient hospital for Nairobi metropolitan area. Hence KNH is experiencing serious shortage of staff and equipments or more like other public sector health units in the study area.

4.2 Utilization of Kenyatta National Hospital (KNH).

In terms of out-patient attendance KNH has got the highest volume of patients visits in the study area. This high rate of attendances can be attributed to:

- It serves not only the residents of Nairobi but also the entire country and beyond.
- Nairobi lacks district and provincial hospitals hence KNH is currently serving these functions in Nairobi.
- Patients perception that KNH offers the best treatment hence leading to high influx of patients even for those whose ailments could be managed at a lower health facility.

This has been discouraged through a strict referral requirement at the hospital but it is still not possible due to the increasing population and inadequate facilities to cope with this escalating

health demand. Currently KNH is serving an average of 600,000 out-patient visits annually. This is rather a high level of demand given the scarcity of medical staff and equipments at the hospital. Table 4.3 below shows the out-patient visits to KNH between 1985-1990.

Table 4.3 Out-Patient visits at KNH 1985 - 1990

Year	Attendance
1985	912,419
1986	815,519
1987	802,973
1988	744,234
1989	762,480
1990	3,28,320
1991	800,000*

Source: Medical records ENH

* Estimated 1991 figures

The table shows a declining out patient visits in the hospital over the years. This can be explained by a number of factor(s), like continuance enforcement of a strict referral requirement. However a significant decline was experienced in 1990. This was attributed to introduction of cost-sharing in late December 1989 (which was later suspended but by the time the writing of this report was on progress cost-sharing was reinstated again). It was expressed that introduction of cost-sharing discouraged patients with minor ailments to seek medical services at KNH. Before the

suspending cost-sharing in health services there were a lot of complains from the people who were used to "free medical services" expressing the views that the charges were either high or undesirable, and termed unnecessary taxation.

Going by the current estimates of out-patient visits of 600,000 the out-patient medical personnel ratio at KNH is shown in table 4.4 below:

Table 4.4:
Doctor, Nurse Out-Patient Ratio
at KNH

Total	Doctors	Nurses	Out-Patient Volume
Numbers	127	980	600,000
Ratio	1:4724.0	1:612.0	

Source: Field Survey Data 1991

These ratios are said to be high given that the hospital also had a high number of in-patients, and therefore the resources available are inadequate to handle the volume of patients.

KNH is also experiencing an increasing in-patient admissions. This kind of medical care is a crucial service in this hospital given that it is the national referral hospital where certain cases can only be handled here.

Table 4.5 below shows the number of in-patients in KNH between 1980-1991.

Table 4.5 In-Patients Admissions at KNH 1980-91

Year	Admissions
1986	64,937
1987	68,538
1988	70,111
1989	81,212
1990	82,457
1991	85,000*

Source: Medical Records - KNH

*Estimated 1991 Figures

The table above shows that KNH has been experiencing an increasing number of in-patient admissions as opposed to the out-patients visits. A peculiar example is 1990 whereby even with the introduction of cost-sharing the volume of in-patients did not decline. This shows that cost-sharing, would serve as a good method of cutting down the out-patient visits, thus patients would seek medical care first at the lower order health facilities before going to KNH. This kind of a system it can be recommended as a filter method ensure a fair utilisation of the available resources. For instance KNH can make use of the available resources towards other functions like

in-patient medical care, research, teaching among other competing demands.

However the increasing in-patient admissions can at KNH can be used to explain that cost-sharing has adverse effect of preventing some patients from seeking medical care hence they only come when they are too sick.

Using the 1991 in-patient admissions the doctor, nurse, in-patient ratio at KNH are quite high. This is shown in table 4.6 below.

Table 4.6: Doctor, Nurse, In-Patient Ratio at KNH.

Total	Doctor	Nurse	In-Patient Volume
Number	127	980	85,000
Ratio	1: 669	1:87.0	

Source: Field survey analysis 1991.

Medical personal forms a major ingredient in the provision of health services. Shortage of these personnel may led to serious health delivery problems. Commenting on the doctor, nurse patient ratio in Kenyatta Daily Nation issue of February 17th 1992 p.4 stated that : "there are about 600,000 out-patients who uses Kenyatta annually while there are around 80,000 in-patients. There are 980 nurses, a number thought to

be inadequate to handle the volume of patients. According to sources a surgeon is supposed to have three nurses in the theatre during a major operation; only one is in attendance these days. The situation at Kenyatta is critical. Few doctors, nurses, technicians, or patients escape being touched by the disease afflicting the massive medical complex". According to the hospital staff establishment records there is a shortage of about 50 percent of all categories of medical personnel in this hospital.

4.2.1 Bed Utilization at KNH.

In analyzing the utilisation of health facilities, apart from the medical staff patient ratios, the other case-load capacity of vital importance is the hospital bed analysis. Health planners have used the spatial bed requirements to determine the bed allocations in each level of health facility category and each health provision zone.

This section analysis the bed utilisation at KNH and same will be done for the other sampled in-patient hospital that is Pumwani Maternity Hospital. To carry out this analysis some of important medical statistical techniques used are discussed below:

- Available Bed Days per year = Available Beds x Days
in the period (year)

$$= AB \times DIP$$

- Occupied Bed Days - Number of days when the beds are occupied

- Percentage Bed Occupancy (% occu)=

ABD

----- * 100

OBD

This gives the percentage at which the beds in the health units are occupied during the period under consideration.

- Average length of stay (ALOS) - this indicates the average how long an in-patient stays in the hospital:

ALOS = Occupied Bed Days or OBD

Death and Discharges D + D

Table 4.7: Bed Utilisation at KNH 1986-1990

Year	Admission	ABD	OBD	% OCCU	ALOS
1986	64937	661320	629484	95.0	10
1987	NA	NA	NA	NA	NA
1988	70111	654569	630516	96.0	9.0
1989	81212	685673	671924	98.0	8.5
1990	82457	678930	651422	96.0	9.9

Source: Medical Records KNH:

From the table above, the situation depicts an increasing in-patient admission at KNH. This can be

attributed to the continued role of the hospital as the national referral hospital and especially offering medical care services, especially referral cases from other health facilities.

Percentage bed occupancy rate is a good indicator and a measure of bed utilisation in hospital. This points out that KNH is over congested given the current level of resources viz via the number of patients. During the research it was found out that, the efficiency of the hospital is curtailed by the fact that most of service care were directed towards primary and secondary medical care with only a small patient number being true emergency or these who require tertiary medical services.

As indicated above bed occupancy rate at KNH is quite high. This presents a high rate of bed utilisation at the hospital. This explains why the hospital is congested through out the year and therefore putting a heavy strain on the meagre resources available. Average length of stay gives the average duration which an in-patient occupies a hospital bed. In case of KNH it shows a rather long stay in the hospital. This is explained by a number of factor:

- The hospital handles specified medical cases, which require a lot of attention thus prolonging the length of stay.

- Functions of KNH suffer from conflicting roles, it is supposed to serve not only as a treating hospital but also a teaching and a research hospital. This is said to create the need for patients to be retained for a longer time in order to observe the clinical and the research outcome.

This among other factors hinders the achievement of hospital objectives of having a shorter in-patient stays. However this is in conflict with the objective as set out in 1987, when it was established as a parastatal with the objectives such as providing facilities for medical education for the University of Nairobi and for research, either directly or through cooperating health institution.

4.3 Utilisation of Pumwani Maternity Hospital

Pumwani Maternity Hospital with an official bed capacity of 329, accounts for 37 percent of all the maternity beds and 55 percent of all deliveries in Nairobi. This indicates that this institution plays a significant role in the provision of this kind of medical care. Interviews with officials at NCC Public Health Department expressed the views that, utilisation of maternity services is unevenly distributed both across public and private facilities, and within the public system. High

occupancy rates are seen at the public referral hospitals KNH and Pumwani, Private hospitals have moderate to high occupancy rates. In general, the maternity and nursing homes have relatively low occupancy rates. There is some evidence that these occupancy rates are related to the clients' perception of quality of care at the facility.

It was found out that Pumwani Maternity has an average daily admission of seventy (70) patients per day. The utilisation of hospital facilities indicates a high utilization level on both the medical personnel and beds.

Table 4.8: In-Patient Admission at Pumwani 1987-1991

Year	Admissions
1987	29607
1988	28549
1989	30151
1990	28440
1991	30000*

Source: Medical Records - Pumwani Maternity Hospital;
*Estimated 1991 Figures

The table above shows that the in-patient services at Pumwani is quite high. In terms of medical staff patient ratio at Pumwani it was found

out that the hospital experience an acute shortage of doctors and other staff more than KNH. The doctor patient ratio is 1:2,000 while nurse patient ratio is 1:164. During the survey it was established that Pumwani was experiencing an acute shortage of medical officers specifically experts in the categories of gynaecologist and paediatricians. These are the critical medical personnels given the kind of services which the hospital provides. The hospital was found to be experiencing this shortage mainly because of low remuneration as compared to private sector, or in self-employment.

In terms of bed utilisation, hospital medical records shows that, the bed occupancy rate was very high. For example in 1988 it was 85 percent, 89 in 1989, and 100 percent in 1990. This explains why there is congestion in the hospital. It was found out that to try and minimise this problem those patients who were found not to be having any complication were encouraged to go home soon after delivery. The hospital was also found to be resolving this problem of congestion by transferring the mothers who had delivered to the NCC health centres with maternity wings for observation before discharge. It was established that the ALOS at Pumwani was approximately 2.0 days. This is a fairly short time. According to the normal situation, it was established

that a mother who had just delivered may stay in the hospital for at least three to four days to ensure a fair observation of both the herself and the baby. Congestion at Pumwani, was also found to be quite high because of other factors like high fees charged by the private facilities making those facilities to be financially inaccessible to majority of Nairobi residents.

4.4 Utilisation of Other Categories of Public

Health Facilities:

The efficiency operation of a hospital, depends on how the lower order health facilities are able to cope with the task of delivering health services to the people. This is because, in essence a hospital is supposed to provide care and treatment for the sick and injured through therapeutic medical care by trained medical personnel. The lower order health units serves an important role, given that they are the most geographically accessible to the local community. Apart from providing curative services, these facilities mainly provide promotive and preventive medical services. In fact it is the provision of promotive and preventive medical services through community trained medical workers which is gaining lot of attention in today's health care approach. Therefore these facilities occupies a

significant role in the attainment of better health. This is explained by the common medical phrase "prevention is better than cure". Promotive and preventive medical care has a number of advantages, both medical and economical. On medical grounds it enables the individual to take care of his health, and economically it is cheaper to provide thus it is cost-effective among other advantages. This current emphasis in medical care provision places the health centres, dispensaries and clinics at a very central role in health care provision. In the study area these facilities were found to serve a very important purpose especially due to shortage of public hospitals.

In the study area all the health centres were operated by NCC. However out of the designated health centres only eight (8) had maternity units. According to the Ministry of Health classification these are called health centre type 2 and they consists of three sections namely a dispensary (for curative services), maternal child and family planning section (MCH/FP) and a maternity wing. This kind of a health facility is supposed to serve a catchment population of 70,000 - 100,000. Health centre type 1 has no maternity wing and serves a target catchment population of 50,000 - 70,000 people. However in this study both type of health centres were found to be serving the same

purpose mainly because maternity services were very much underutilised as will be shown below.

In terms of medical personnel, all the health centres had no doctors. Doctors' role was played by the clinical officers. 75 percent of the health centres had two clinical officers, while according to the staff establishment each health centre should have four (4) clinicians who are supposed to supplement least one doctor. Shortage of nurses was also a problem in these health facilities. On average there were twenty five (25) nurses and this in most cases was said to be slightly below the required number. In terms of patients attendance the available records shows that on average health centres had a daily patients' visits ranging from 200-400. This gives an average of 300 patients per day. Among the health centres visited it was found out that those located in high density areas had a high average attendance rate. Table 4.9 shows the criteria used and the percentage of the health centres in each category.

Table 4.9 Health Centres Attendance Classification

Category	Attendance	percentage
High	401+	17.0
Medium	301-400	66.0
Low	200-300	17.0

Source: Field Survey, 1991

Further analysis on the catchment population of the health centres as compared to their established sizes is carried out. It was found out that apart from the hospitals and, two referral dispensaries (Ngaira and Jericho) all other public health units were not operating at the weekends and public holidays. However as the writing of paper was on progress, NCC was on the process of opening up more health units to operate both 24 hours and throughout the year. There are about 250 working days in Kenya. Therefore using the above classification (Table 4.9), table 4.10 below gives the average annual population attendance per each category .

Table 4.10 Annual Average Facilities Attendance:

Category	Mean Attendance	Catchment Population	Percentage of units in the Category
High	450	112,500	17.0
Medium	350	87,500	66.0
Low	250	62,500	17.0

Source: Field Survey 1991.

The table above compared with the Ministry of Health classifications (see Table 3.4 above) shows that those health centres with high and medium attendance had a high average annual attendance. These facilities accounting for 83 percent of the health centres had average annual attendance above the set

standards compared at both the lower and the upper limits.

Maternity services was found to be the most underutilised medical care in the health centres. According to the data available there was an average attendance of 200 in-patient maternity cases per year in each NCC maternity unit. The bed utilisation was quite low with a bed occupancy rate of 30 percent per year. This low rate of maternity utilisation was explained by lack of some essential equipments, which could only be found at Pumwani, and hence these health centres could only admit certain maternity cases, only those patient detected not to be having any problem and not delivering either their first and or fourth baby. This explains why there is congestion at Pumwani because these other NCC maternity units can not handle most of the cases. Also it was observed the patient perceived the maternity services in these facilities as poor, and therefore sought the care either at Pumwani or elsewhere. 65 percent of those interviewed said given a choose they could not seek maternity services in these health units they cited poor conditions and services as the major problems.

Dispensaries serve useful function by providing curative, preventive and promotive medical care, thus reducing the workload at the health centre. According to the government criteria cited above, dispensaries

are categorised into two classes that is dispensary type one (1) and two (2). Dispensary type one (1) has a catchment population of 10,000 people and it aims at providing curative services. Dispensary type two (2) has a target catchment population of 15,000 persons, offering curative services, MCH/FP and environmental health services. However as stated in chapter two, this classification is not well adhered in the study area.

In NCC category of dispensaries it was found out that two dispensaries namely Jericho, and Ngaira Avenue were operating as referral centres. Ngaira Avenue Dispensary was found to be well equipped with equipments like X-rays which were not found even on the health centres. In terms of doctors all the NCC dispensaries except the above two had no doctors, while PMO dispensaries had at least a doctor or a clinical officer. The attendances in the dispensaries was found to range from an average attendance of 250 patients visits per day. But a dispensary like Ngaira was recording up to 600 patients visits per day.

In the study area the lowest order health unit was found to be a clinic. These are operated only by NCC and they provide promotive and preventive services only. The clinics were meant to be accessible to the people as possible. Nairobi has about 28 designated clinics distributed all over the city, some operated

as branches of higher order health units like Pumwani clinic which is within Pumwani Hospital.

As indicated in chapter three the maximum geographical catchment area was found to be 3.2 km with a catchment population of 70,783 people. The field result shows that a clinic had a daily average attendance of (60) sixty patients per day. However this was found to vary depending on the locality. In terms of medical staff, clinics were only staffed with nurses, with a community nurse heading the institution. On average clinics had five (5) nurses. In terms of medical staff patient ratio, clinics had a nurse, patient ratio of 1:1750. Analysis on the utilisation of health facilities in the study indicates a serious shortage of not only equipments like beds but also medical staffs. This points out that the available resource are scarce and therefore if the goal of improving health care in the area has to be achieved, then there is need to enhance particularly the availability of the resources.

The analysis in this chapter rejects the H_0 that Public health facilities in Nairobi are not overutilized and hence accepts the alternative (H_1) that public health facilities in Nairobi are significantly overutilised.

CHAPTER FIVESUMMARY OF FINDINGS, POLICY RECOMMENDATION: AND CONCLUSION.

5.1 Summary of Findings:

The objective of this study was to examine the provision of public sector health care services in Nairobi in view of their accessibility and utilisation particularly. However the study did appreciate the role played by other providers and therefore in making the recommendations these other providers are not be overlooked.

It may be important to emphasis again at this stage that, the study recognises the fact that the public sector has a significant role to play in ensuring the attainment of health for all given that it is the leading provider of health services, and taking into account the escalating medical costs in the private sector making the services financially inaccessible to majority of the people.

The findings of the study indicates that, the "attainment of health for all by the year 2000" as a global strategy set by WHO during the 1978, Alma-Ata, USSR conference is still an ambitious strategy. This is in regard to the acceptability, affordability, and availability of health services both in the country and in the study area. First in the socio- economic background section, the study has indicated that

provision of health services should be viewed as a package. This will lead to the attainment of improved health condition which enables the individual to have a physically, mentally, socially and economically productive life. This can only be realised through availability and accessibility of clean and safe drinking water, decent and affordable housing, waste disposal, employment and good working environment among others. This therefore is seen as an approach through the primary health care strategy.

The situation as relates to some of these packages shows that in terms of water supply, 89 percent of Nairobi population is served with house water connections. But we note that much of health problems relating to water supply and sanitation are mainly prevalent in the poor urban areas like Mathare Valley, Kibera, Kawangare, Kangemi. In terms of housing about 40 percent of Nairobi residents live in slums areas, while only 30-40 percent of the city is served with sewerage systems. However even the existing system is unable to cope with the demand due to inadequate capacity of the existing treatment plant, ineffective operation resulting into untreated sewage discharge into Nairobi and Ngong rivers. These rivers happen to be used by the slum population for domestic water uses, thus threatening health conditions much more.

Problems of poverty, a fast growing population, and the economy inability to create opportunities like adequate employment means a low standard of living which leads to poor nutrition status of a community among other poverty related problems. The living environment of such a group is characterised by defective sanitary facilities whereby a combination of all these leads to a high incidence of communicable diseases causing high infant mortality rate, and loss of production. During the field survey these were observed as critical problems mainly in the slums and squatter settlement areas. This kind of poor health and living environment calls for increased need for curative health care. In terms of the financial capacity of both the Central Government and the local Authorities, the study acknowledge that there is a downward trend in the availability and generation of revenue in the face of the increasing demands. The result of this is the deteriorating maintenance of the existing facilities and the inability to expand the infrastructure which is necessitated by the increasing population. The inability of the public sector to cope with the demand means a deteriorating health conditions for those who can not afford to meet the costs at the private sector. Majority of urban population are poor hence leading to over-utilisation of the available public sector services. For example

the study shows that 75 percent of those interviewed had a household income not exceeding Ksh 2,000 per month. This means that such a household is faced with a financial crisis. This meagre income is used to meet the most pressing basic needs like food, clothing and housing of which they can hardly meet the bare minimum standards of housing, clothing, and nutrition. This leads to a worsening health condition of these people.

The role of Non-Governmental Organisations (NGOs) in health services provision has gone along way in augmenting the public sector mainly in the slums and squatter settlement, and other low income areas. Though their services are at a fee, they are affordable to majority of the people. During the field survey it was revealed that NGOs play a key role in bridging the gap in health care provision particularly in the slum areas, which due to the convectional planning approach these areas are hardly served with public infrastructure as they are often termed as illegal settlements.

Analysis on the distribution and the location of existing public sector health facilities that there is an imbalance in the spatial distribution of these facilities in terms of population distribution. The expansion of the city in terms of human settlement outstrips the capacity of the Government and NCC to provide these facilities. This has caused the

concentration of most of facilities in the old part of the city with new residential areas being inadequately served. In terms of geographical accessibility 90 percent of the people were within a range of 3.2 Kms to a clinic, 5.5 Kms to a dispensary, 6.5 Kms to a health centre and 15.9 Kms to a hospital. This shows that in terms of the set standards Nairobi has not attained the recommended standard of at least a dispensary or a health centre being within 4 Kms. This is true even at 75 percent of the people are within 4.6 Kms and 5.0 Kms to a dispensary and a health centres respectively. Similiar analysis on the different categories of facilities per the different population density zones clearly shows that Nairobi is still inadequately served with health facilities. The same trend is also clearly shown by looking at the set catchment population per each category of the facilities verse the observed catchment population.

The location approach of these facilities has been based on the neighbourhood concept approach. The field study revealed that this approach seems to have worked well in the planned neighbourhoods particularly where NCC has been involved. The study has identified that with the current housing provision whereby the supply is mainly carried out by informal and formal private developers, there is a serious need to address to this health facility location approach. Where NCC is

involved the construction of the estate also includes the construction of public facilities like schools and health units. However, in other cases where NCC plays a passive role these public facilities are not put up during housing construction. Most of such residential areas, happens not to have these facilities. This location approach was also found to neglect slums and squatter settlements. Though most of these areas happen to be illegal settlements, they also happen to be the areas prone to serious health problems like outbreaks of epidemics. This calls for a need to address to this problem if Nairobi is to realise an improved health condition. Most of the health problems found in these areas include infant and child mortality, though Nairobi has most of the health facilities in the country.

Organisation of the current health facility structure in the study area is rather poor. This is despite the Government clear guidelines on how the hierarchical order of the facilities should be organised. Nairobi has a weak referral system. This is due to shortage of certain categories of health facilities like the designated dispensaries and hospitals. This has caused a serious strain in the existing facilities at both the lower and upper levels. For example a patient may not be able to get curative services at the clinics which mainly deals

with MCH/FP, while at the health centres, there is overcrowding with ailments which could have been dealt with at dispensary level. The situation is even serious at the hospital level, mainly at KNH which is supposed to serve as a national referral hospital among other roles like as a research institution, a teaching hospital and also assisting in formulating health planning guidelines. Due to absence of district and provincial hospitals, KNH has turned out to be more or else a out-patient facility of Nairobi, and handling a large number of primary and secondary in-patient cases instead of dealing with tertiary (specialised) in-patients. Though there is a proposal to construct two district hospitals and a provincial hospital in Nairobi, before this becomes operational, KNH is still going to continue in the present state.

Analysis of the utilisation based on the facility/population ratio, equipment/patient ratio, and staff patient ratio, shows a high utilisation rate though it varies both horizontally and vertically. In terms of catchment population, it shows that compared to set standards, there is a high population/ facility ratio. This analysis shows that even using 75 percent population threshold the health centres dispensaries and clinics can not cope with the catchment population. This is supported further when we look at the average attendance of these facilities where for

instance 83 percent of the health centre recorded a daily average attendance of 300 patients and above. Analysis on bed utilisation shows a high in-patient volume with hospitals like Pumwani and KNH with a percentage bed occupancy of over 80 percent. This explains the reasons behind congestion in these hospitals resulting into sharing of beds among the patients. Other problems associated with this are, shortage of drugs and other equipments, and high medical personals patient ratios. KNH has a high average length of stay (ALOS) of nine days with some departments going up to twenty days or more. This contributes to further congestion. One of the problems related to this is the teaching and research functions which requires a patient to be "held on" much longer than required, for clinical observations. The result of this inter alia aggravates overcrowding and increasing the in-patient cost and general operation costs in this hospital.

The high population, patient, staff ratios were found not only due to shortage of facilities; increasing patient visits, but also due to shortage of staff as a result of low remuneration, compared with the private sector or self employment. This means that there is over utilisation of the available staff resulting to diminishing output of their productivity. Most of the NCC health units have a few or no doctors,

Puwmani Maternity Hospital has a 60 percent shortage. It has only ten doctors though it is supposed to be having at least twenty five, while KNH has 50 percent shortage of medical staff all categories.

5.2 POLICY IMPLICATIONS:

On the basis of the findings of this study it is recommended that the following proposals be viewed as appropriate means of facilitating the attainment of health care provision in the study area and other areas facing similar problems.

There is need to address to the provision of health care as a package. The rising level of community health is mainly attributed to rising standards of living and amenity rather than in medical care and treatment reflected in an increasing sheer number of health facilities and personals. Therefore there is need to tackle the problems of poverty, expanding population, poor nutrition, sanitary facilities, housing, education, safe and clean water. Absence of these services leads to deteriorating health conditions marked by high incidence of communicable diseases. This may lead to high morbidity and mortality rates, unhealthy population and unproductive labour force. This leads to an increasing demand of curative services. The result of this is escalating medical budget which is also aggravated by

increasing costs of drugs and equipments. Therefore the study stresses the need to step up primary health care strategy amongst other community based health and poverty alleviation strategies. This would go along way in reducing the medical expenditure.

The inability of the public sector to continue providing some of the services, should be tackled through; defining the critical area of public sector direct involvement in the provision of both economic and social infrastructure vis-a-vis where the private sector should play a leading role. This should be evaluated on the basis of social welfare approach. This is because withdrawal through privatisation of certain services like health services will not only deny those who cannot afford the economic price of the service and the accessibility to these services. Health is a fundamental human right and therefore there is need to ensure its accessibility to the entire population.

The study does appreciate the fact that both the Central Government and Local Government are unable to cope with the cost of provision of various economic and social infrastructure. This is why these bodies are advocated to shift their role to that of "creating enabling environment" to facilitate the development of infrastructure like housing, health and education. However, it is crucial to note that experience in the

developed countries has shown that privatisation of certain services like health has led to "denial" of these services to the poor because they are unable to afford private sector charges. Our own experience is that private service is only affordable to the rich or those with employers medical cover. The study recommends that the public sector should continue to provide these services though the consumer may share the cost. Thus, there is need to review the cost sharing strategy in view of raising the financial capability of the Government and Local Authority in meeting the health budgets. The revenue generated should be ploughed back to augment the health delivery budget.

On the same line, there is need to explore other avenues of enabling the individuals to take care of their health expenses. Such options include, incorporating beyond the salaried workers into the National Health Insurance Fund (NHIF). This could be promoted through encouraging those who are self employed and in co-operative societies to join the scheme. The study revealed that the existence of PMO health facilities does not mean their accessibility to the general public. Most of these PMO facilities are located in public institutions, where some of the heads of these institutions were found to deny the use of health facilities to "outsiders", arguing that they

were meant to serve only those who reside or work in these institutions. This is contrary to the presidential directive of 1987 which led to the formation of PMO. It also directed the use of these facilities to the general public use (apart from those in restricted areas). This study recommends the translation of this directive in total into a policy.

There is need to streamline the management of public sector health facilities in the study area. There exists conflicting roles between the NCC and PMO. The former under the Local Authority Act is supposed to provide health services in the study area, while the later with accordance to the Ministry of Health regulations is supposed to oversee the provision of health services in the study area. This has created duty conflict among the two providers. There is also an inter-ministerial coordination problem with NCC being under Ministry of Local Government and Physical Planning while PMO is under the Ministry of Health. The study recommends that the management of health services should be left to the NCC with the Ministry of Health through PMO playing a supportive role such as secondment of staff.

The distribution and location of health facilities call for dire need to reorganise the management of the health and social care system. This can be done within a well defined framework of

hierarchical subdivision of the study area into regions and health care areas. The regional scale, which can be based at administrative division level. This can work as the unit of organisation for the functions of regional departments of health and social care within the division. The local level can be based at the sub-location level. This unit can be responsible for the provision of integrated health and social care services. The local level can also serve as the basic operational unit within which day-to-day management of health services takes place. This sub-locational level may have at least a health centre with in-patient services. This kind of organisation is seen as a solution to the problems experienced out of the current planning approach based on neighbourhood concept. This arrangement will address to the problem of equity, efficiency and accessibility much better than the existing planning approach.

The morbidity pattern in the study area show a high incidence of environmentally related diseases leading to high demand of health care services, particularly curative. This has resulted into high utilisation of the available health resources as discussed above. To curb this problem, the study calls for intensification of primary health care with the aim of making the public more aware of their own health problems and possible care. There is also need

to integrate other health related sectors inter alia education, housing, environmental awareness and water supply, in order to improve the living environment.

5.3 CONCLUSION:

The study has been able to answer the research questions as set out in the statement of the problem and translated into the objectives of the study. Therefore the existing distribution and location pattern of the health facilities in the study area is unable to meet the health needs of the residents. However, the study acknowledges that there is need to address the health needs of the area as a package approach whereby other related health sectors should be involved. This means that, a more cost-effective approach and community involvement in health care provision should be encouraged.

The present organisation and management of health services need to be reviewed with the aim of further decentralisation leading to a better spatial coverage and hence facilitating easier management monitoring and planning of health services in the study area.

The role played by other providers of health services in the study area need to be enhanced and in relation to not only the provision of therapeutic medical services, but also in the monitoring and planning of health progress.

Finally the study calls for a special attention to be paid to the urban poor particularly women and the children who were not only found to be the major consumers of health services but also the most vulnerable group when it comes to health problems. Thus the strategy of attainment of health for all by the year 2000 A.D ought to be seen as a task to be addressed to from all fronts.

SELECTED BIBLIOGRAPHY:

- Anderson, et al (1973) "Choice of Medical Care Behavioral Model of Health and Illness Behaviour". Journal of Health and Social Behaviour Vol. 14 Pgs. 343-2.
- Bennet, F.J.(1979): Community Diagnosis and Health Action. A Manual For Tropical and Rural Areas. Daily Nation" 1992 Feb.17-19. Special Assignment on Kenyatta National Hospital
- 1992,"Bold Action at KNH but..." July 28
----- 1991," Health for All, Now a Pipe Dream", April 21
- Eldridge, J.D.,and Jones III,J.P 1991, Warped Space: A Geographer of Distance Decay". Professional Geographer 43 (4): 500-511
- Gibberd, F (1955) Town Design London, The Architectural Press. 2nd Edition
- Gish, O. (1975) Health Economics in Developing World. Oxford University Press, London.
- Government of Kenya,Ministry of Planning and National Development, and UNICEF June 1990): SOCIO-ECONOMIC PROFILES. Ministry of Planning and National Development/ UNICEF, Nairobi.
- Hagget, P.(1972) Locational Analysis in Human Geography. Edward Arnold.
- Hartwig, C. (1975), Health Policies and National Development in Kenya, Ph.D. Thesis (unpublished) University of Kentucky Laxington
- Jones, S. (1981) Health Care Delivery in the United States. Springer Publishing Company, New York.
- Ikiara, G.K. (1988) Health Care Provision - Paper presented at First International Conference on Urban Growth and Spatial Planning of Nairobi Kenya. Dec. 13-17 1988. Nairobi- Kenya.
- King, M. et al (1975) Medical Care in Developing Countries. Oxford University Press, Nairobi.
- Kingorihah G.K (1987) Introduction to Land Economics Department of Land Ecomonics. University of Nairobi (Unpublished)
- (1980) Policy Impact on urban

Landuse Pattern in Nairobi, Kenya. School of Graduate Studies Indiana State University Indiana USA (Phd Thesis unpublished).

Kirigia, B.N (1985) Planning for Health Facilities in South Imenti. M.A.(Planning) Thesis (Unpublished), University of Nairobi.

Kirigia, J.M (1988), The Economics of Prepaid Health Services: A Case Study of Meru Central Farmers Co-operative Union. Unpublished M.A Thesis, Department of Economics, University of Nairobi.

Lewis, C.E. (1976) A Right to Health. John Wiley and Sons. New York.

Malczewski, et al (1988): "A multi-objective Approach to Reorganisation of Health Services Areas". Journal of Environment Planning . A. 20 pg. 1461-1470.

----- (1990) "The Spatial Planning of Health Services. Case Study in Warsaw Poland". Progress in Planning Vol.33 Part 2 pg. 121-171.

Mayhew ,L.(1985) Urban Hospital Location George Allen & Unwin, London

----- (1982)" Equity,efficiency,and Accessibility in Urban and Regional health-care systems" Environment Planning Journal Vol. 14 pg. 479-1567.

Milford, B.G. (1976) "The Bounded Transportation Problems" Economic Geography Journal pgs. 30-43.

Ministry of Health: Naiorbi Provincial Medical Office (MOH/PMO) 990 Report.

Morrill, R.C. et al (1970) "Factors influencing Distances Travelled to Hospital". Economic Geographer Journal Vol 46 pg. 161-71.

Mwabu, G.M. (1980), Economic of Primary Health Care in Kenya.A case of Tharaka Rural Health Unit. A Paper presented in Dept. of Economics University

of Nairobi April, 1982.

Ng'ang'a, J.K (1988) " Climate and Meteorology of Nairobi": Paper Presented at First International Conference on Urban Growth and Spatial Planning in Nairobi Dec. 13-17 1988.

Ngau P.M. and Gary Gaile (1992) Measures For Strengthening The Implementation of Rural Trade Production Centres Programme(RTPC) In Kenya: Report Prepared For Government of Kenya Ministry of Planning and National Development

----- (1989)" Transportation and Characteristics of Urban Travel in Nairobi: A View Through the Gravity Model" (Unpublished Paper)

Obudho, R.A. and Mugenzi (1989) Collogues at Seminars. Urbanization Et Sante Bans Le Tiers Monde Paris 1989.

Omburo (1988) Improving Accessibility of Health Services on Rural Kenya, Kisii District. Project Paper Presented at Graduate School of Cornwell University

Ondiege P.O (1990) " Nairobi Socio Economic Profile" Ministry of Planning and National Development and UNCIEF, Socio-Economic Profiles Nairobi Government Printers,

Republic of Kenya, National Development Plan 1989-93 Nairobi, Government Printers.

-----, Sessional Paper No. 1 (1986) Nairobi, Government Printers.

----- (1980) Population Projection (1980-2000) CBS. Government Printer 1980, Nairobi.

-----, (1974) Ministry of Finance and Planning.

-----, Economic Survey (various issues)

Resource for Child Health Care (REACH), Nairobi Area Study Vol.II (1988).

-----, (1988) Executive Report.

- Simth D.M (1979) Human Geography : A welfare Approach, London, Edward Arnold
- Shannon et al (1975) "A Method For Evaluating The Geographical Accessibility of Health Services". The Professional Geographical Journal Vol. 27 No.1 FEB 1975 pg 30-6
- (1974) "Health Care Delivery: Spatial Perspective. New York McGraw- Hill.
- Thomas, R.W (1977) . An Introduction to Quadrat Analysis (CATMOG 12) Concepts and Techniques in Modern Geography Geo Abstract Ltd University of East Angalia Norwich.
- Totowal, N.J. et al (1985) The Demand For Primary Health Care in Third World.
- Vogal R. et al (1982) Health and Diseases in Kenya E.A.L.B.Nairobi.
- World Bank, Feb. (1980) Health Sector Policy Paper World Bank, Washington D.C.
- World Health Organisation (1981) Global Strategy of Health For All By Year 2000, WHO Geneva.
- Zipf, G.K. (1949) Human Behaviour and the Principle of Least Effort. Cambridge, Mass.

SURVEY INSTRUMENTS:
SAMPLE QUESTIONNAIRES USED IN THE DATA COLLECTION

UNIVERSITY OF NAIROBI

DEPARTMENT OF URBAN AND REGIONAL PLANNING.

PATIENT QUESTIONNAIRE.

PLEASE NOTE THAT INFORMATION COLLECTED IN THIS SURVEY
WILL REMAIN CONFIDENTIAL.

(1). Questionnaire number.

(2). Date of survey.

(3). Name of Health facility.

(4). Patient background information.

Table 1

Name	Sex	Age	Highest Education level reached	Occupation

(5). Place of residence. 1. Nairobi (plot on the map)
2. Outside (specify district-----)

(6). Where are you from now ? 1 home 2. work

1.home

2.work

(7).What is the distance in kms to this health facility from place of your residence\ work?

KMs

(8). How much time did you take to travel to this health facility?

hrs

(9). Which mode of travel did you take to this health facility (a) on foot

- (b) bus (c) matatu
- (d) private car
- (e) other (specify)

(10).How much did you pay for transport to come here?

Shs.

11).Why did you choose to come to this health facility.(Tick to indicate)

(a) It is near home\ place of work

b) It offers good treatment.

(c)It is easy to get transport to here

d) Others (specify) _____

(12) Are there other public health facilities the you could have visited?

1. Yes

2. No

(13). If yes, please explain why you did not go there.

(a) _____

(b) _____

(c) _____

(14). Are there private health facility you could have attended ?

1. Yes

2. No

(15). If yes please explain why you did not go there .

(16). Which medical care did you come to seek today ?

(a) _____

(b) _____

(c) _____

(d) -----

(17). How long do you usually wait to get treatment here?

hrs

(18). Which health facility did you visit the last time ?

1. The one visiting today

2. Others (specify)

(19). What is your head of household income per month ?

(20) What changes do you recommend for improving the accessibility of these facilities

(a) _____

(b) _____

(c) _____

(d) -----

(21). How can the health services be improved?

(a) _____

(b) _____

(c) _____

(d) -----

(5).How many of these are accessible .to the general public?

(6).Which Criteria is used in distribution the following health facilities in the study area?

(a).hospital

(b).health centre.

(c).dispensary.

(d).child welfare clinics.

(7)How do these planning standards relates to population health needs in each zone and the study area in general?.

(8) How has the health status of Nairobi residents being changing over time in last 10 years in terms of major health indicators like (in each case give the figures)

(a) morbidity patterns

(b) life expectancy rate

(c) infant mortality rate etc.

9) How have you being working to improve the above ?

(10).Please give the breakdown of your health personals in the study area in terms

1.Doctors

2.Clinical officers

3.Registered nurses

4.Community nurses

5.Enroled nurses

6.others (specify)

11).What is the ratio of each category of health personnel per patient in the study area?

(12). What is the utilisation level of N.C.C Health facilities in the study area .

Please illustrate this using medical indicators like attendant rate ,bed turn over rate etc (per each health unit if possible)

(13).How much do spend on health care delivery .

(i).What is your average budget per year

(ii).What are your sources of funds

(14) What problems and constraints do you experience in the provision and utilisation of health services?

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

(15).What would you propose for improvement of accessibility and

utilisation of health services in the study area?

(16) What type of health programmes are engaged in ?

UNIVERSITY OF NAIROBI
DEPARTMENT OF URBAN AND REGIONAL PLANNING
HEALTH FACILITY HEAD QUESTIONNAIRE

PLEASE NOTE THAT INFORMATION COLLECTED IN THIS SURVEY
WILL REMAIN CONFIDENTIAL.

1. Name of health facility _____.
2. Date of survey _____.
3. When was this institution established? _____
4. Which categories of health services does this health facility offers?
 1. _____
 2. _____
 3. _____
 4. _____
5. What is the catchment of this health facility in terms of (a). kms sq. _____ (plot on the map)
 - (b). population _____
 - (c). Which do patients come from list them down _____
6. What is the patients attendance per day per services sought?
 1. child welfare services _____
 2. maternity services _____
 3. others (specify) _____
7. What is the number of medical personals in this health unit? _____

Cadre	Actual	Potential
Doctors		
Clinical officers		
Registered nurses		
Community nurses		
Enroled nurses		
Others (specify)		

10. What are the major diseases in this area?

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____

11. Please explain why these diseases are common

12. Which are the major medical equipments available?

13. Is the location of this health facility in accordance to the health needs in this area

- 1. YES
- 2. NO

14.(a) If YES how _____

(b) If NO why _____

15. What changes do you recommend for the improvement and utilisation of health services in the study area?

UNIVERSITY OF ILLINOIS
ADD LIBRARY