

The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.

**AN ECONOMIC EVALUATION OF REPRODUCTIVE HEALTH  
SERVICE DELIVERY IN CENTRAL LUSAKA**

**A COST-EFFECTIVENESS ANALYSIS OF DIFFERENT MODES OF  
FAMILY PLANNING SERVICE DELIVERY: HOSPITAL, CLINIC AND  
COMMUNITY BASED DISTRIBUTION**

**BY:  
BESINATI PHIRI**

Dissertation submitted to the School of Economics, University of Cape Town, in partial fulfilment of the requirements for the award of the degree of Masters in Health Economics.

**August, 2000**

## DECLARATION

This research is my original work and has not been submitted for any academic and/ or examination purposes at any other university.

Signed by candidate

**Signature removed**

**BESINATI PHIRI**

This research paper has been submitted for examination with my approval as the University supervisor.

Signed by candidate

**Signature removed**

**EDINA SINANOVIC**

## **ACKNOWLEDGEMENTS**

I would like to express my utmost gratitude to my dissertation supervisor Ms Edina Sinanovic, for her dedication, valuable input and guidance through all the phases of the study.

This study would not have proceeded without the financial support from the Health Economics Unit at the University of Cape Town and the institutional support from the Economics department at the University of Zambia. My sincere thanks go out to them.

I wish to sincerely thank the family planning teams of UTH and Kaunda Square clinic, Mr H.C. Kaimba and Mr G.C. Mumba (PPAZ), Mr G. Mutale and Mr R. Mushamba (UTH), Mr Mbewe and Mr Kayongo (DHMT), Mr Ndola (Building dept) and Mrs M. Siachumpi (family planning trainer). I am grateful for their assistance during the data collection phase of the study. I am also thankful to my field workers Mr D. Tembo, Sr E. Ngoma and Ms N. Tembo for their commitment to making this study a success.

I am most grateful to my parents Mr and Mrs E.N Phiri. Thank you for believing in me that I could reach my goals and for pushing me to ensure it. I am also grateful to Mr Brian Mpepo and Ms Mwila Chanda for their support and encouragement, right from the beginning to the end of the Masters in Health Economics programme.

I would like to thank my course mates James Akazili, Francis Mangani, Urbanus Kioko and Reverend Hycinth Ichoku, who by the end of the programme have turned out to be very valuable friends.

Above all, I would like to thank the almighty God for making all things possible.

## TABLE OF CONTENTS

CONTENT	PAGE
ACKNOWLEDGEMENTS	I
TABLE OF CONTENTS	III
LIST OF TABLES	V
LIST OF FIGURES	V
LIST OF APPENDICES	V
LIST OF ABBREVIATIONS AND ACRONYMS	VI
ABSTRACT	VII
<b>1. INTRODUCTION</b>	<b>1</b>
1.1 Research Problem	2
1.2 Rationale	3
1.3 Objectives of the Study	4
<i>1.3.1 Aim of the Study</i>	4
<i>1.3.2 Specific Objective</i>	4
1.4 Research Hypothesis	5
1.5 Outline of the Dissertation	6
<b>2. DESCRIPTION OF COMPETING FAMILY SERVICES DELIVERY OPTIONS</b>	<b>8</b>
2.1 The Hospital: The University Teaching Hospital	8
2.2 The Clinic: Kaunda Square Clinic	9
2.3 The CBD: N'gombe CBD	9
<b>3. THE STUDY AREA</b>	<b>11</b>
3.1 Background	11
3.2 The HIV Problem	14
3.3 Family Planning Issues In Zambia	15
<i>3.3.1 Contraceptive Awareness</i>	15
<i>3.3.2 Population Policies</i>	17
<i>3.3.3 The Reforms</i>	17
<b>4. LITERATURE REVIEW</b>	<b>19</b>
<b>5. METHODOLOGY</b>	<b>23</b>

5.1 Conceptual Framework for Cost Analysis	23
5.1.1 <i>Costs</i>	24
5.1.2 <i>Effectiveness</i>	24
5.2 Cost Computation	24
5.2.1 <i>Distribution Channel Costs</i>	25
5.2.2 <i>Client Costs</i>	28
5.3 Effectiveness Computation	30
5.4 Cost-Effectiveness Computation	31
5.5 Limitations	32
<b>6 RESULTS</b>	<b>34</b>
6.1 Cost Analysis	34
6.1.1 <i>Distribution Channel Costs</i>	34
6.1.2 <i>Client Cost</i>	38
6.1.3 <i>Total Costs</i>	41
6.2 Effectiveness	42
6.3 Cost-Effectiveness	45
6.4 Sensitivity Analysis	46
6.4.1 <i>Assumption of Kaunda Square clinic providers' salary</i>	46
6.4.2 <i>Assumption of UTH administrator's and CDEs' salary</i>	48
<b>7 DISCUSSION</b>	<b>50</b>
<b>8 CONCLUSION AND RECOMMENDATIONS</b>	<b>55</b>
<b>REFERENCES</b>	<b>58</b>
<b>APPENDICES</b>	

## **LIST OF TABLES**

	<b>PAGE</b>
Table 1: Family Planning Knowledge vs. Utilisation	16
Table 2: Distribution Channel Costs' Allocation	27
Table 3: Conversion Factors	31
Table 4: University Teaching Hospital Costs	34
Table 5: Kaunda Square Clinic Costs	35
Table 6: CBD Costs	36
Table 7: Summary of Distribution Channel Costs	37
Table 8: Average Cost per Family Planning Client Visit	38
Table 9: Total Costs of Family Planning Client Visits	41
Table 10: Total Costs Table	42
Table 11: CYP's Achieved	43
Table 12: Cost-Effectiveness by Mode of Service Delivery	45
Table 13: Sensitivity Analysis 1	47
Table 14: Sensitivity Analysis 2	48

## **LIST OF FIGURES**

Figure 1: Zambia's Population Growth	11
Figure 2: Population's Age Structure	12
Figure 3: Distribution Channel Costs	37
Figure 4: Client's Average Monthly Income	39
Figure 5: Client's mode of Travel	40
Figure 6: Total Couple Years of Protection	44
Figure 7: Cost Per Couple Year of Protection	46

## **LIST OF APPENDICES**

Appendix 1: Questionnaire for family planning clients
Appendix 2: Client costs

## LIST OF ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immune-Deficiency Syndrome
BTL	BI Tubaligations
CBD	Community Based Distribution
CBOH	Central Board of Health
CCYP	Cost per Couple Year of Protection
CDE	Classified Daily Employee
CEA	Cost-Effectiveness Analysis
CF	Conversion Factor
CLBD	Clinic Based Distribution
CYP	Couple Year of Protection
DALY	Disability Adjusted Life Years
DHMB	District Health Management Board
DHMT	District Health Management Team
GRZ	Government Republic of Zambia
HBD	Hospital Based Distribution
HIV	Human Immuno-Deficiency Virus
IUD	Intra Uterine Device
LDHMT	Lusaka District Health Management Team
MCH	Maternal and Child Health
MOH	Ministry of Health
NGO	Non-Governmental Organisation
PPAZ	Planned Parenthood Association of Zambia
TFR	Total Fertility Rate
TWF	Total Wanted Fertility
USAID	United States Agency for International Development
UNFPA	United Nations Programme For Family Planning Activities
UTH	University Teaching Hospital
UNCPD	United Nations Conference on Population and Development
WHO	World Health Organisation
ZDHS	Zambia Development and Health Survey
ZMK	Zambian Kwacha

## **ABSTRACT**

A rapid growth in the Zambian population over the past three decades and its subsequent effects on the provision of basic services such as food and shelter has ushered in a need for effective population control mechanisms. Despite one of the country's newly introduced reform targets being to make family planning available, accessible and affordable by at least 30 percent of adults in need by the year 2000, Zambia is still characterised by high levels of unmet need for these services. As in the case with other third world countries especially in recent years, Zambia faces financial constraints. In the face of these constraints and in addressing the population woes of the country, it is important to assess not only at the family planning services being delivered, but the efficiency with which this is being done.

The main aim of this study was to assess the relative cost-effectiveness of the hospital, clinic and community based distribution of family planning services in central Lusaka. The data collection process involved the administration of a multiple-choice questionnaire to 208 randomly selected family planning clients at the three delivery modes under study. Taking a societal perspective, it estimates the costs borne by the family planning provider and family planning service recipients for each delivery mode and measures the relative effectiveness of each mode through the total couple years of protection achieved. The measure of cost-effectiveness used is the cost per couple year of protection.

The results of the research indicate that the hospital is the most cost-effective delivery mode followed by the clinic and the community based distribution programme. A pattern in the results reveals that the family planning delivery modes offering long-term family planning methods such as sterilisation, implants and intra uterine devices are relatively more cost-effective than those that provide shorter-term methods like the condoms, oral contraception and foaming tablets.

An analysis of the results suggests that introducing longer-term contraception methods to the clinic can increase its cost-effectiveness without a proportionate increase in costs. On the other hand, combining community based distribution with the clinic provision of family planning services can enhance cost-effectiveness but caution should be paid to the possible effects this can have on increasing clients costs, and hence ultimately their ability or willingness to acquire these services.

## 1. INTRODUCTION

**Section overview:** The introductory section provides the backbone of the study. The research problem is defined, the study justification is given and its objectives are outlined.

Over the years, Zambia has followed a trend common to most third world countries of planning and budgeting for health services based on historical trends rather than information on how much it costs to provide these services or what the health outcomes of these investments will be. This tends to lead to misallocation of already dwindling public resources. The realm of reproductive health is no exception with a particular emphasis on how these services are delivered. An economic evaluation, using cost-effectiveness analysis as the tool, allows for a comparison between alternative modes of family planning service delivery. A more cost-effective health service is considered to be a better economic investment.

Over the past three decades, Zambia's population has more than doubled in size. It currently stands at approximately 10.5 million people. Zambia has one of the highest population growth rates in the world with a natural rate of 2.7% per annum and a fertility rate of 6.1 (*GRZ-MOH, 1998*). The negative impacts of an uncontrolled population are many. Among them are its effects on the provision of basic services such as health and education and other services such as housing, food and transportation (*GRZ-MOH, 1991*). An uncontrolled population goes further to negate the creation of new wealth. In recognising this problem, the Zambian government has responded by introducing a number of family planning intervention strategies.

## 1.1 Research Problem

Zambia has recently introduced health reforms with one reform program targets' being to make family planning available, accessible, and affordable by at least 30 per cent of adults in need by the year 2000 (*GRZ-MOH, 1991*). Unfortunately, the country is still characterised by high levels of unmet need for these services. Due to the limited nature of government resources and the unlimited nature of public needs on them, family planning services and their delivery must be best selected to fit, among other things, within the context of available resources.

Limited public funds directed towards family planning can be utilised more effectively, preventing more pregnancies per dollar invested, if resources are reallocated towards cost-effective delivery of these services. It is important in planning any family planning delivery system, to examine the cost-effectiveness of the delivery channels. Unfortunately, very few studies in the past have been directed towards this. Research in Zambia has given attention to the methods of family planning services offered and has paid little attention to costs, effectiveness and cost-effectiveness of the various delivery modes. This problem is common to a number of countries and has presented information gaps in the area of reproductive health cost-effectiveness. In view of this, the study attempts to bridge the information gap and provide a basis for future research in this area. The study sought to address the following question: From a societal perspective, is it more cost-effective to deliver family planning services through the hospitals, clinics or community based distribution programs in Central Lusaka? The cost-effectiveness ratio is expressed in Cost per Couple Year of Protection (CCYP).

## **1.2 Rationale**

Zambia, as is the case with most third world countries, is faced with the problem of a lack of adequate resources to satisfy the needs of its population. The tightening of government budgets and growing competition for donor funds has increased the concerns associated with paying for reproductive health programmes of which family planning is one (Harvey and Barberis, 1997). An understanding of programme costs is therefore essential in making decisions concerning issues such as choice among program alternatives, decisions concerning program scale and the allocation of resources within a given program (Simmons et al, 1991).

For family planning managers and various donors, the absence of an economic evaluation of family planning service delivery stands in the way of finding efficient and effective ways to provide and fund these services and further prevents an adequate assessment of which groups should be targeted and in which way. Such can lead to failures in delivering efficient and sustainable population control mechanisms.

The essential elements of investing in women's health, including family planning and comprehensive reproductive and maternal health, has been proven to be one of the most effective and cost-effective ways to reduce poverty, improve the health and well-being of families and strengthen national development world-wide (Family Care International, 1994). The methods of family planning offered and their delivery must be selected to fit the needs of the individuals served, the geographic, social and cultural setting and, perhaps most important, the resources available (Huber and Harvey, 1989). If these factors are not

appropriately considered, the resultant situation would be one of high levels of unmet need for these services, despite proof of their delivery.

An analysis of the various costs associated with the different modes of delivering family planning services acts as an aid to effective decision making about which mode is most suitable given available resources, population needs and access constraints. Recipients of these services can benefit from consequent policy decisions on how best to provide quality family planning services and through the targeting of those services which are most demanded by them. Furthermore, considerations can be made as how to make savings on time lost from work in receiving family planning services.

### **1.3 Objectives of the study**

#### **1.3.1 Aim of the Study**

- The aim of this study was to assess the cost-effectiveness of delivering family planning services through the hospital, clinic and CBD in central Lusaka.

#### **1.3.2 Specific Objectives:**

- To calculate the costs borne by the hospital, clinic and CBD programme in providing family planning services in central Lusaka.
- To calculate the costs borne by family planning services clients and their families in obtaining services through the clinic, hospital and CBD.

- To measure effectiveness in terms of couple-years of protection (CYP's) for the clinic, hospital and CBD in providing family planning services.
- To compute the cost per couple-years of protection as the cost-effectiveness measure for each delivery mode.
- To compare the cost-effectiveness of the hospital, clinic and CBD family planning delivery modes.
- To formulate policy recommendations based on the findings of the research.

#### 1.4 Research Hypothesis

The hypothesis behind this study can be summarised through the following relationship of the cost-effectiveness ratios;

$$\text{Cost/Effectiveness Of CBD} > \text{Cost/Effectiveness Of CLBD} > \text{Cost/Effectiveness Of HBD}$$

Where;        *Cost* = Total Cost,

*CBD* = Community-based distribution mode

*CLBD* = Clinic based distribution mode and;

*HBD* = Hospital based distribution mode

The above hypothesis has been adopted from past research on cost-effectiveness of family planning service delivery (Huber and Harvey, 1989; Barberis and Harvey, 1997). From the hypothesis, it is expected that the cost-effectiveness is least for the CBD mode (highest cost-

effectiveness ratio) and greatest for the delivery mode that offers long term family planning services such as the hospital providing sterilisation procedures (lowest cost-effectiveness ratio).

## **1.5 Outline of the Dissertation**

Section 2 of the paper provides a description of the competing family planning delivery options selected for the study with particular focus on the characteristics of each delivery mode.

In section 3, the study area is discussed and an insight into the past and the present of family planning issues in Zambia is presented. It discusses the problems, policies, awareness and reforms of family planning issues in Zambia.

In section 4, the literature on family planning delivery and its cost-effectiveness is reviewed. It looks at the findings of past researches carried out on the cost-effectiveness of family planning service delivery.

Section 5 gives the methodology used in this cost-effectiveness study. It explains the data collection methods and tools and discusses the limitations to the study.

Section 6 gives and explains the findings of the study. This includes a cost analysis, effectiveness assessment and a cost-effectiveness analysis. Further, it provides a sensitivity analysis based on the research assumptions.

Section 7 presents a discussion of the results given in section 6 and allows an evaluation of the achievement of the study objectives.

Lastly, section 8 concludes the study and gives recommendations based on the study findings.

## **2. DESCRIPTION OF COMPETING FAMILY PLANNING SERVICE DELIVERY OPTIONS**

**Section overview:** Section 2 gives a description of the competing family planning service delivery options. It describes each of the delivery modes under study in terms of location, coverage, authority and family planning methods offered.

The research was carried out in Zambia's capital city, Lusaka. The selected distribution channels are all situated in central Lusaka, which has a population of diverse characteristics. This allowed the study to avoid focusing largely on any particular indigenous group. The selection of the study area also took into consideration that at the time the study was taking place, central Lusaka had available all the facilities required for the data collection including a fully operational CBD programme. A description of each delivery mode and the family planning services it provides is given in 2.1 to 2.3.

### **2.1 The Hospital : University Teaching Hospital (UTH)**

Lusaka's UTH was chosen to represent the hospital distribution channel. Lusaka has a total of five hospitals (MOH, 1995) of which UTH is both the largest and the most central. The hospital is under the authority of the Central Board of Health (CBOH) and the Ministry of Health (MOH). Being a referral hospital, the population coverage of the hospital goes beyond the boundaries of central Lusaka. The family planning services offered are; Oral contraception, Barrier methods, Intra Uterine Devices (IUD), Implants (Norplant), Foaming tablets, Injectables, as well as Voluntary Surgical Contraception (VSC) in form of male and

female sterilisation. In 1998, UTH had approximately 7 048 family planning client visits. For this study, a sample of 66 family planning clients were randomly chosen from this delivery mode to answer a multiple-choice questionnaire for the purpose of generating information on hospital family planning client's costs.

## **2.2 The Clinic: Kaunda Square Clinic**

Kaunda Square clinic was selected to represent the clinic distribution channel. It is under the authority of the LDHMT. The clinic lies towards the eastern part of central Lusaka in an area known as Kaunda Square stage 1. Its catchment area includes a mix of shanty compound, farm lands, suburban and urban localities. For the year under study, the catchment population was 38 553 of which 22% were women of child bearing age (Kaunda Square Health Clinic Annual Report, 1998). The family planning services offered are; Oral contraception, Barrier methods, Intra Uterine Devices (IUD), Foaming tablets and Injectables. During 1998, approximately 5 292 visits to the facility were for family planning. A sample of 63 family planning clients were randomly selected from this delivery mode to answer a questionnaire for the purpose of generating information on clinic family planning client's costs.

## **2.3 The CBD: N'gombe Community Based Distribution programme**

Community based distribution of reproductive health services is not widespread in Zambia. At the time this study was taking place, the most active CBD programmes were those run by

the PPAZ. The PPAZ run CBD programmes that currently cover only two out of the nine provinces in the country, thus Lusaka (three sites) and the Copperbelt Province (two sites) and at the time of this study, Lusaka's most active CBD site was N'gombe CBD. It is based in central Lusaka's N'gombe compound and from time to time it carries out its operations from N'gombe clinic. Its catchment population is mainly the compound's community with very few exceptions. The family planning services offered through the CBD are; Oral contraception, Barrier methods, and Foaming tablets. For 1998, N'gombe CBD had a total of 2 970 clients. A sample of 79 family planning clients were randomly selected from this delivery mode to answer a questionnaire for the purpose of generating information on CBD family planning client's costs.

### 3. THE STUDY AREA

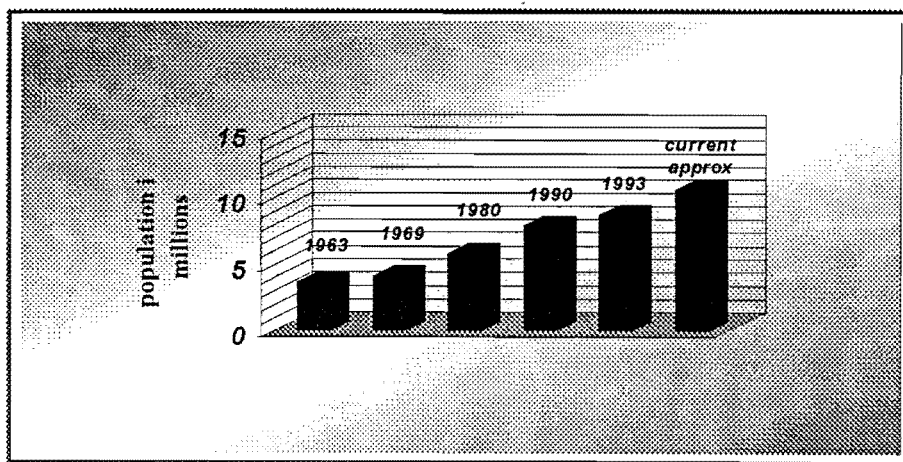
**Section overview:** This section gives an overview of the study area and the population issues surrounding it. It highlights some of Zambia's family planning policy objectives and reform targets.

#### 3.1 Background

Zambia is landlocked and lies in the heart of Central Africa. It has a total land area of 752,614 square kilometres and represents about 2.5% of the area of the African continent. Its climate is a moderately cool sub-tropical type reflected in its predominant vegetation type being that of Miombo woodland (a sub-category of the Savannah). Zambia's most important crop is maize and its major proven mineral resource is copper. The country attained its independence on the 24<sup>th</sup> of October 1964.

Over the past forty-seven years, Zambia's population has increased rapidly. See figure 1.

**Figure 1** Zambia's population growth

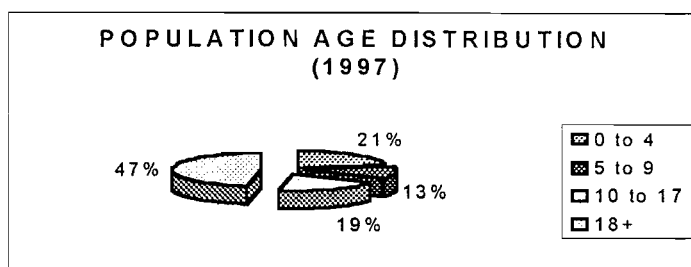


Source: Graph obtained using data from WHO, 1995

Results from the last four national censuses indicate that the population increased from about 3.5 million in 1963 to 5.7 million in 1980 and from 7.8 million in 1990 to approximately 10.5 million to date (WHO, 1995). The population growth rate remains among the highest in the world. It fluctuated from 2.6% per annum between 1963 and 1969 to 3.1% per annum between 1969 and 1980 and levelled off to 2.7% per annum between 1980 and 1995, remaining at approximately this level to date (Gaisie et al., 1993). The country's fertility levels are relatively high and stand at approximately 6.5 per annum (ibid. 1993).

In 1983, the African population was estimated at 513 million. It increased rapidly to almost 648 million in 1990 and was expected to reach 813 million by the end of the twentieth century (Adepoju and Oppong, 1994). Africa's estimated population growth (approximately 3% per annum) stems from high fertility, with an average birth rate of 43 per thousand and relatively high but declining mortality of about 13 per thousand in 1990 (ibid. 1994). These rates are amongst the highest in the world and their continuation can almost be guaranteed by the population's characteristics of an in built momentum of youthful age structure, which would not only double but also remain young.

**Figure 2                      Age structure of the Zambian population (1997)**



Slightly over half of the Zambian population (53%) is below the age of 18, half of these being infants below the age of 5 (see Figure 2). Although the National Population Policy sought to reduce the nations total fertility rate from 7.2 to 6 by the year 2000, the highly youthful age composition of the country's population implies that there is high momentum for future population growth even if fertility levels in the immediate future decline (WHO, 1995).

Zambia has an average population density of 12 per square kilometre. This though relatively sparse compared to some of its neighbours (Tanzania (27.5), Malawi (76.3) and Zimbabwe (26.6)), is high compared to others (Botswana's (2.3)) (UNZA/IHE, 1996). The country has large variations in the population densities between the provinces such as a high of 55.2 persons per square kilometre in Lusaka province compared to a low of 3.0 persons per square kilometre in the North-Western province. These give an indication of its high urbanisation levels which in 1991, were the highest in the region (42% of the total population, compared to Tanzania (21%), Malawi (12%), Zimbabwe (29%) and Botswana (29%)) (Ibid. 1996).

In recognising the impact of a population with these characteristics on the provision of basic services such as health and education, the Zambian government recently introduced intense family planning campaigns with the view of fulfilling one of its health reforms targets of:

*'Making family planning available, accessible and affordable by at least 30% of adults in need by the year 2000'.*

Through family planning campaigns, there has developed positive attitudes and an increase in knowledge towards contraceptive services among both the general public and the policy makers. However, contraception utilisation rates have remained fairly static over time. Amongst the reasons are the inefficient supplies of these services, restricted method mix, poor logistics and information systems and inadequate capacity on the part of the service providers.

### **3.2 The HIV Problem**

The emergence of the Human Immunodeficiency Virus (HIV) infection is a major health problem in many urban areas. The human and economic costs of HIV/AIDS are enormous and concentrated in low-income countries, particularly Sub-Saharan Africa, although the levels of infection are rising rapidly in some Asian countries (Hanson et al, 1998). The HIV/AIDS levels in Zambia are very high. According to the 1994 Zambia HIV Sentinel Surveillance, the overall adult prevalence was estimated to be between 22 and 25 percent for urban areas and between 10 and 13 percent for rural areas (GRZ/UN, 1996). This has seen the growth in the number of AIDS orphans in the country. HIV/AIDS has been identified to be amongst the top ten diseases in the country that account for over 90% of all Disability Adjusted Life Years (DALYs) lost (UNZA/IHE, 1996). In the face of this problem, there has been stronger emphasis on the importance of condoms not only as a contraceptive but also in preventing infection.

### **3.3 Family Planning Issues in Zambia**

The history of family planning in Zambia has shown a drift away from high levels of pro-natalism to anti-natalism. During the 1960's and 1970's, the official policy was pro-natalist and opposed to contraception with the unavailability of organised population control programmes and modern family planning devices (Borne et al, 1996). At that time, the government of the Republic of Zambia acknowledged a high population growth rate but perceived it not to be a problem for the country's socio-economic development.

The plummeting of international copper prices in the early 1980's resulting in large falter in the national economy was the turning point in the pro-natalist attitudes. The cost and means of living became difficult to satisfy and as a result people's perspective on population began to change. The Zambian delegation to the 1984 United Nations Conference on Population and Development (UNCPD) in Mexico returned home with a anti-natalist stance. They used a health and human rights argument as the rational for population policy (Borne et al, 1996). This argument helped to increase the acceptability of voluntary contraception among both the government leaders and the general public.

#### **3.3.1 Contraceptive Awareness**

According to the results of a research carried out in Zambia (see Table 1), the majority of married women (90%) indicated an awareness to at least one modern family planning method and almost all of them (87.2%) reported an awareness to a source of them (Gaisie et al., 1993). Over 50% of the women in the same sample reported a further awareness to

traditional methods. Despite an awareness of type and source of family planning methods, analysis still points to an unmet need for these services. The gap between level of family planning awareness and modern family planning practices is very large with less than 10% of the 90% married women aware of modern family planning actually using any modern method (Borne et al., 1996).

**Table 1** Family planning knowledge vs. utilisation

METHOD	KNOWLEDGE	UTILISATION
Any method	89.4%	11.6%
Modern method	87.1%	7.0%
Oral contraceptives	78.1%	3.5%
IUD	43.0%	0.4%
Injectable contraceptives	38.1%	0.1%
Female sterilisation	63.6%	1.5%
Male sterilisation	17.9%	0.0%
Foam/Jelly/diaphragm	23.8%	0.1%
Condom	72.0%	1.4%

Source: Gaisie et al., 1993

Although there are a number of norms in the Zambian society concerning large family size, there is evidence of unwanted fertility. This is reflected in the discrepancy between the total fertility rate (TFR) of 6.5 and total wanted fertility rates (TWF) of 5.4 (Borne et al., 1996), thus almost 10% difference. Family planning efforts that aim to reduce fertility levels need to be delivered highly effectively in order to counter the high fertility from an increased number of sexually active women entering reproductive years. The majority of women who use contraception receive their services and supplies from government health facilities (56%) and private hospitals and clinics (36%) (Gaisie et al., 1993). Only 7% reported obtaining them from other sources (ibid. 1993).

### **3.3.2 Population Policies**

To improve the living standards and quality of life for all Zambians, the government established the 1989 Population Policy with its specific goals being;

- *To reduce the population growth rate to 3.4 percent by the year 2000 and further to 2.5 percent by 2015;*
- *To reduce the total fertility rate to 6 by 2000 and to 4 by 2015;*
- *To reduce infant mortality from 97 per 1000 live births to 65 per 1000 live births by 2000 and to 50 by 2015; and*
- *To provide family planning services to at least 30 percent of adults in need of them by the year 2000 (Gaisie et al., 1993; Mutambo, 1989).*

These policy goals are to be achieved within the context of the country's newly introduced health reforms.

### **3.3.3 The Reforms**

In the context of the newly introduced health reforms, the government of Zambia has committed itself to financing a basic package of cost-effective health care services consisting of six major thrusts of which reproductive health including sexual health and family planning is one. Under the reform system family health, including maternal and child health (MCH) and family planning, is the major Ministry of Health (MOH) priority. In this system, the District Health Management Boards (DHMB) decide how to allocate their funds and encouragingly a rapid IEC<sup>1</sup> assessment in 11 of 62 districts revealed that family

---

<sup>1</sup> National Population Information, Education, and Communication (IEC) program- developed in 1994.

planning is actually the fourth or fifth priority of most of the 11 DHMBs (Borne et al., 1996).

Initially, there was a lot of resistance and opposition to family planning programmes with nurses in some cases being harassed when providing these services without the consent of client's spouses. Other cases included the confiscation and resultant burning of family planning literature and contraceptives by unwilling members of the community. However with more information on the issue people have changed position and the promotion of 'informed choice' has began to assimilate through. 'Informed choice' is in line with national population policy, which emphasises voluntary acceptance of family planning in accordance with fundamental human rights.

On overall, Zambia's population activities continue to be donor-driven by organisations such as USAID and UNFPA, all of which work in collaboration with the national government.

#### 4. LITERATURE REVIEW

**Section overview:** This section reviews the literature on family planning delivery and its cost-effectiveness. It gives an insight into past studies in this realm, providing the current one a basis for reference and comparisons of results.

Over the years, both the world-wide prevalence of contraception and the absolute number of users have increased, making the challenge of finding the resources to provide reproductive health services increasingly difficult (Harvey and Barberis, 1997). This has led to a growing interest in the sustainability and cost-effectiveness of family planning programmes and increasing attention to the relative cost-effectiveness of different delivery modes.

An article reviewed by Huber and Harvey (1989) studied the relative cost-effectiveness of several modes of family planning service delivery using cost per CYP. Based on 63 projects in ten developing countries (three each in Africa and Asia, and four in Latin America), the study findings indicate that on average, family planning service delivery through social marketing projects and sterilisation tend to cost less than Clinic distribution and CBD. The results of the study indicated that programs with the highest volume of services delivered corresponded to the lowest average costs. Social marketing projects and sterilisation projects had 2.8 million CYP's and 960 thousand CYP's respectively and a resultant average cost of \$2 per CYP.

Harvey carried out another study with Barberis (1997) based on fourteen developing countries (five in Africa, four in Asia, three in Latin America and two in the Middle East). Their findings were similar to those of Huber and Harvey (1989), indicating that sterilisation

and social marketing programmes had lower cost per CYP than the clinic and the CBD programmes.

Sinanovic (1998) carried out a study on the cost-effectiveness of clinic and community based distribution of contraceptive services in South Africa. Based on the study of three clinics, one hospital and three CBD programmes, her study results indicated that CBD of contraceptive services is more cost-effective than clinic distribution, though by a very small amount. She concluded that CBD is actually comparable in cost to clinic distribution and can provide significant monetary savings.

From a locality perspective, a research was carried out in Kenya to calculate the cost-effectiveness of four rural based and three urban based CBD programmes. The results found that rural and urban programmes can achieve similar cost-effectiveness levels. Further, it was found that high costs were in no way related to the way the programmes operated and whether they are operated by the government or by a non-governmental organisation (NGO) (Chenge and Askew, 1997).

The results from a questionnaire administered to women during the 1992 Zambia Demographic Health Survey (ZDHS) revealed the role of proximity to the provider on willingness or ability to access reproductive health services. An average of 44% of women practising family planning lived within 30 minutes of the provider and another 27% lived within 30 minutes to an hour of travel time. Only one fourth were more than an hour away from the provider (Gaisie et al., 1993). If a potential user assesses the time and transportation costs of obtaining contraceptives, he or she may find these costs too high

regardless of the price of the contraceptive itself. As a result, people may be willing to pay more for contraceptives that they can get conveniently (Population Reports, 1991).

It is important to have a wide variety of distribution channels ranging from household distribution, commercial outlets and social marketing, to clinics and hospitals so as to make available a range of contraceptive methods (Mamdani et al, 1993). Berman and Rose (1996) however noted that in Latin American countries, non-governmental providers are the dominant source of reproductive health services (over 60% of all cases). This was attributed to the fact that their governments have been reluctant to provide such services due to the political influence of the Catholic Church, which strongly opposes these programs.

Over the years CBD has become a generally accepted alternative to clinic based programmes for the distribution of contraceptives in many developing countries. Experimentation with this strategy was widespread in selected countries of Asia and Latin America in the 1970's, but did not begin in Africa until the 1980's (Gallen and Rinehart, 1984). Despite CBD programmes now operating in a number of African countries (ranging from small demonstration projects in selected areas to a widespread, systematically organised network of distributors covering a large geographical area), they are still an untapped resource that reaches only a small part of the African population (Birdsall and Sai, 1988).

In recent years however, CBD projects that are either independent or combined with full or partial clinical services have emerged as a force for the provision of family planning services. According to a review by Huber and Harvey, 1989, CBD projects are not very

cost-effective when operated on their own unless linked to clinical methods particularly sterilisation and Intra Uterine Device (IUD) which provide long periods of protection.

The literature reviewed seems to suggest that differences in the scope of family planning service delivery, in terms of contraceptive methods offered, have a direct influence on variations in family planning programme costs across different delivery modes. Those delivery modes offering long term contraceptive methods such as IUD's, implants and sterilisation, tend to have higher costs than those that offer shorter term methods such as condoms, oral contraception and foaming tablets. The differences in costs stem from differences in the technical requirements of providing each contraceptive method.

In summary, most of the reviewed literature propose that family planning services tend to be least cost effective when delivered through the CBD and most cost-effective when delivered through social marketing projects and sterilisation. In the current study, sterilisation procedures are offered through the hospital distribution channel, which if in line with the above analysis, would be expected to be a highly cost-effective delivery channel. Despite the increasing popularity of CBD in many parts of the world, it proves not to be a very cost-effective means of distributing family planning services with the exception of the study carried out by Sinanovic (1998) in South Africa.

Evidently, the area of cost-effectiveness of family planning service delivery has not received so much attention in past research and thus sets an environment for future study. This study is one attempt to add on to the limited information base of this subject.

## 5. METHODOLOGY

**Section overview:** This section discusses the methodology used in this study. It presents the conceptual framework, data collection methods, cost computation, cost allocation procedure, the effectiveness and cost effectiveness estimation. Section 5 concludes by discussing the limitations of the study.

Cost-effectiveness analysis (CEA) is one form of full economic evaluation, where both the costs and the consequences of health programmes or treatments are examined (Drummond et al, 1987). It considers costs and outcomes resulting from any service provision in monetary and physical units respectively.

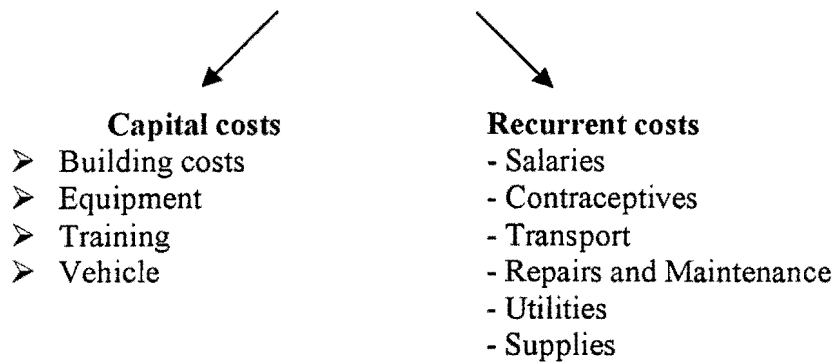
The CEA does not state whether an investment in a program is worthwhile or not, but can only indicate which particular means of achieving a given measure of outcome is preferable in terms of being an efficient use of resources (Hughes and McGuire, 1996). Cost per couple-year of protection is the cost-effectiveness measure used in this research to assess the relative cost-effectiveness of hospital, clinic and CBD modes of family planning service delivery. The evaluation takes a societal perspective and makes use of 1998 data.

## 5.1 Conceptual Framework for Cost-Effectiveness Analysis

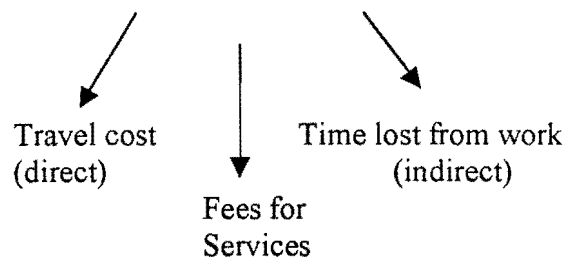
The conceptual framework for the cost-effectiveness analysis is adopted from Drummond et al (1987).

### 5.1.1 Costs

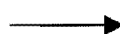
#### 1. Costs incurred in the provision of family planning services



#### 2. Costs incurred by the family planning client



### 5.1.2 Effectiveness

- 
- Couple Years of Protection (CYP's).
  - Improvement in contraceptive access and population controls.
  - Reduction in time lost from work - To family planning clients.
  - Efficient use of resources - To program manager, government.

The costs and effectiveness procedures are explained in greater detail in the next few sections of this chapter.

## **5.2 Cost Computation**

Costs encompass both direct and indirect costs. Direct costs in this case are the costs of organising and operating the family planning programme where as indirect costs are those costs not directly related to organising and operating the programme (Drummond et al, 1987). The cost computation is done two folds. On the one hand are all costs assumed to be paramount in the provision of family planning services by each delivery mode (equation (i)) and on the other hand are all the costs associated with accessing and obtaining these services through each mode (equation (ii));

- i) Costs borne by the distribution channel in the provision of family planning services = capital costs + recurrent costs
  
- ii) Costs borne by the clients in obtaining family planning services = time costs + travel costs + fees for service

### **5.2.1 Distribution channel costs**

The direct and indirect costs incurred by the University Teaching Hospital, Kaunda Square clinic and N'gombe CBD in delivering family planning services to clients were collected for the year 1998. These costs can be broken down into capital costs and recurrent costs.

In each case, cost information was compiled from the distribution channel's inventory and financial records and through interviews with facility personnel. Additional interviews were carried out with government officers from the Lusaka District Health Management Team (LDHMT) and senior officers from the Planned Parenthood Association of Zambia (PPAZ).

All capital items were annuitised with a 3 percent discount rate and an assumed life span of 30 years for buildings, 20 years for initial training, 10 years for equipment and vehicles, and 2 years for linen. Selection of the discount rate was based on the proposal that a discount rate between 2 and 10 percent is consistent with economic theory (Drummond et al, 1987) where as 3 and 5 percent are the commonly used rates (Schmid, 1995). Annuitisation is the process of computing an Equivalent Annual Cost (EAC) of capital items and automatically incorporates both the depreciation and the opportunity cost of the capital items (Drummond et al, 1987). It is computed as follows:

$$\begin{aligned} \text{Equivalent Annual Cost (EAC)} &= \text{Replacement Value (RV) of the item} / \text{Annuity factor (AF)} \\ &= RV \times I/AF \end{aligned}$$

Where;  $AF = r(1+r)^t / ((1+r)^t - 1)$ ;

$r$  = discount rate and

$t$  = useful life of the capital (years)

Salary and contraceptive costs for the hospital and clinic, as well as drugs, medical and surgical supplies, and cleaning materials for the former were available for the year 1999 only. For consistency, these costs were deflated by 27% (inflation rate) to bring them to

1998 prices (year under study). Depending on the availability of information from each distribution channel, the costs were carefully allocated using the criteria set out in Table 2.

**Table 2** **Distribution Channel Costs Allocation**

Item	Allocation
Salaries	Hospital Providers = 100% Clinic Providers = one full day + four afternoons (approximately 2½ days out of 5 working days with 8 hours a day) CBD Agents = 100% Clinic and Hospital Classified Daily employees (cleaning)= percentage building space Hospital Surgeons = share of time spent on family planning
Building costs	Clinic and Hospital = share of building space N'gombe CBD = share of CBD among all PPAZ programmes and then share of N'gombe CBD clients.
Equipment costs	Clinic and Hospital = Specifically for family planning (100%)
Repairs and maintenance	Clinic and Hospital = share of family planning cases.
Training	Clinic, Hospital and CBD = 100% per trainee.
PPAZ Overheads	CBD = Specific to CBD thus 100%, share of clients for N'gombe CBD
Warehousing costs	CBD = 10% of the value of the stored items for N'gombe CBD
Transport costs	Clinic = share of family planning cases CBD = share of clients for N'gombe CBD
Utilities	Clinic and Hospital: Telephone = share of family planning cases, Electricity/ water = share building space
Contraceptives	Clinic, Hospital and CBD = 100% to family planning
Miscellaneous	Clinic = share of family planning cases
Supplies	Clinic = share of family planning cases Hospital = technical supplies based on building space and the medical, surgical and cleaning supplies = 100% for family planning
Linen	Hospital - 100% for family planning
Cleaning costs	Clinic and Hospital = accounted for in facility supplies and classified daily employee salary PPAZ = share of CBD among total programmes and then share of clients for N'gombe CBD
Administration	Clinic and Hospital Administrators = share of family planning cases. Other administrative costs are accounted for under supplies CBD Administrators = share of CBD among total PPAZ programmes and then share of clients for N'gombe CBD.
Vehicle	CBD = specifically for CBD programmes therefore share of clients for N'gombe CBD Clinic = share of family planning cases

### 5.2.2 Client costs

In order to estimate the direct and indirect costs incurred by a client in accessing and obtaining family planning services, a client cost questionnaire was administered at the hospital, clinic and the CBD programme under study. From each facility a minimum of 63 service recipients were randomly selected, based on econometric theory of the size of a representative sample. From this, it was reasonable to conclude that a minimum of approximately 60 family planning service clients from each distribution mode would give a good representation of that modes family planning client population.

The interviews took into account ethical considerations by explaining the study to each respondent, allowing them to willingly participate in the study and ensuring the anonymity of each respondent for confidentiality purposes. Interviews were conducted within a specified period of ten working days with each interview approximating between 10 and 15 minutes. The interviewers were based in an allocated room in the family planning section of each facility. The interviewed composed of any family planning clients receiving services from that distribution channel.

Once obtained, the data from the questionnaires was appropriately coded and entered into excel spreadsheets for generation of results and analysis. To compute the family planning client's time lost from work, the average income of the clients using the different modes of delivery was computed and broken down into income per minute.

Client costs estimated in this study were time lost from work (Waiting time and travel time cost) and travel cost. Fee for service is not generally charged for most reproductive health and Mother Child Health (MCH) services and as such is not included. The questionnaire did however endeavour to confirm this (Appendix 1, question 12 and 13).

#### *Time lost from work*

The average family planning clients waiting time at each mode is estimated using questionnaire data and multiplied by its respective average income per minute to get the average waiting time cost for the clients using each mode. Similarly, to estimate the average travel time cost for family planning clients travelling to each delivery mode, the clients average travel time is estimated and multiplied by its respective income per minute.

#### *Travel cost*

The average travel costs incurred by clients seeking family planning services through each delivery mode is estimated from the questionnaire. Clients receiving services through the CBD agent generally incur no travel costs as they mainly walk to the CBD agent or the CBD agent travels to them.

#### *Total client cost*

To approximate the total client costs for each delivery mode, the following computation was made:

- *Av. cost per family planning client visit*  $_x = \text{Cost of time lost from work}_x + \text{average travel cost}_x$

- *Total client costs*  $_x = \text{Av. cost per family planning client visit}_x \times \text{total number of family planning client visits}$

Where x = Hospital, Clinic or CBD and

Av. = average

### 5.3 Effectiveness computation

**The couple-year of protection (CYP)** is a measure of effectiveness of reproductive health services. The concept of CYP is a useful administrative tool that assesses total program output. It is measured as the amount of a particular contraception method required to protect a couple from conceiving over a period of one year. It was developed in Pakistan in 1965 to compare the effects of different contraceptive methods or combination of methods (Population Reports, 1980). The CYP does not measure the number of acceptors, buyers, or users but rather provides a composite measure of the total amount of protection against pregnancy conferred by a certain supply of contraceptives or family planning services.

In this study, the volume of contraceptives issued is converted into a measure of protection or CYPs by multiplying the quantity of each type of contraceptive issued through each mode in 1998 by a conversion factor ( $f$ )<sup>2</sup>. The conversion factor is derived by dividing one (1) year by the average number of units of each contraceptive, required to protect a couple from conceiving during this period. For example, it is commonly assumed that 13 cycles of oral

---

<sup>2</sup> The conversion factor ( $f$ ) is equivalent to the average length of time for which one unit or procedure of a contraceptive method protects a couple.

contraception or 100 units of condoms are required by a couple to avoid conception over a one-year period. Resultantly, the conversion factor for oral contraceptives is 0.0769 (1/13) and for condoms is 0.01 (1/100). The conversion factors are listed in table 3.

**Table 3 Conversion factors**

<u>Method</u>	<u>Conversion Factor</u>
Oral (cycle)	0.0769
Condom (male or female)	0.01
Foaming tablets (can or tube)	0.2
Implant	5.0
Sterilisation	12.5
Injectable	0.25(3mth),0.17(2mth),0.0769(1mth)*
IUD	2.5
Diaphragm	1.0

Source: computed using the methodology described in Sinanovic, 1998.

\*mth = month

Conversion factors are widely used in the computation of family planning programme effectiveness and may differ slightly across countries in terms of the estimated amount of a contraception required to protect a couple from conceiving during a year. Such observations are evident in the study carried out by Barberis and Harvey, 1997.

#### 5.4 Cost-effectiveness computation

*The cost per couple-year of protection* for each mode of service delivery is obtained by dividing the total program costs by the total number of CYPs achieved through each mode.

The cost-effectiveness ratios are computed as:

$$\text{Cost per CYP}_X = \frac{(\text{Total cost of running the FP programme or clinic} + \text{total client costs})}{\sum(\text{Quantity of contraception}_i (Q_i) \times \text{conversion factor}_i (f_i))}$$

Where X = Clinic, Hospital or CBD and;

$$\text{Total CYP}_x = \sum(\text{Quantity of contraception}_i (Q_i) \times \text{conversion factor}_i (f_i))$$

$i$  = the  $i$ th contraception method

$Q_i$  = quantity of the  $i$ th contraception method

$f_i$  = conversion factor of the  $i$ th contraceptive method

## 5.5 Limitations

Government tender prices were used in the costing procedure with exceptions of a few equipment items, vehicles and Norplant, whose prices were unavailable at the time of the research. An approximate international price was used for Norplant costing whereas local wholesale prices were used for the other missing item's prices. The extreme cases in which no market price was available and it was impossible to impute costs for that item, meant the item being left out of the costing computations. More specifically, the items and their quantities are as follows;

<b>Clinic;</b>	<b>and</b>	<b>Hospital;</b>	
Uterine sounds	= 11	Uterine sounds	= 8
Irrigators	= 2	Uterine elevators	= 10
Surge protector	= 1	Bubble cock	= 20
Uterine hand model	= 1		

Another limitation is that the CYP does not in its gross form take into account the failure rates of the various types of contraception. It assumes that the contraceptives distributed are always effective, which is not the case. In addition, the CYP calculations do not value client preferences, informed choices or the clients need to use certain contraception for disease

prevention. For instance, condoms distributed are not always used for pregnancy prevention and can solely be utilised to prevent sexually transmitted diseases (STDs).

The final limitation is that the hospital, clinic and CBD under study do not offer all identical family planning methods as described in section 6, which may result in comparisons between the three being slightly biased.

## 6. RESULTS

**Section overview:** This section explains the study findings. It examines the costs, effectiveness and cost-effectiveness of each delivery mode.

### 6.1 Cost Analysis

#### 6.1.1 Distribution Channel Costs

The distribution channel costs are divided into two categories: capital costs and recurrent costs. Capital costs describe the costs of all those programme items that are purchased at one point in time and have an expected useful life of more than one year (e.g. equipment, buildings, vehicles and initial training). On the other hand recurrent costs are the costs of those programme items purchased on a regular basis as they have a useful life of less than a year (e.g. drugs and contraceptive supplies). The costs for each of the distribution channels are presented in Tables 4 to 6.

**Table 4 University Teaching Hospital Costs (1998)**

ITEM	COST (ZMK)	% RECURRENT	% TOTAL
<b>RECURRENT COSTS</b>			
Salaries	8,963,367.74	5.24%	4.57%
Contraceptives	149,725,530.97	87.47%	76.26%
Technical supplies	901,441.33	0.53%	0.46%
Medical and surgical supplies	4,502,599.35	2.63%	2.29%
Cleaning materials	3,194,738.52	1.87%	1.63%
Drugs other than contraception	608,443.55	0.36%	0.31%
Utilities	3,207,008.66	1.87%	1.63%
Repairs and maintenance	79,982.72	0.05%	0.04%
<b>TOTAL RECURRENT COSTS</b>	<b>171,183,112.84</b>	<b>100.00%</b>	<b>87.19%</b>
<b>CAPITAL COSTS</b>			
Building costs	1,964,347.67		1.00%
Equipment and linen	22,510,185.50		11.47%
Training	681,348.08		0.35%
<b>TOTAL CAPITAL COSTS</b>	<b>25,155,881.25</b>		<b>12.81%</b>
<b>GRAND TOTAL</b>	<b>196,338,994.09</b>		<b>100.00%</b>

The results from the Table 4 indicate that contraceptives were the highest cost item incurred by the University Teaching Hospital in distributing family planning services in 1998. Of these, implants accounted for over 90% of the contraceptive costs. Contraceptives formed up to 88% of total recurrent costs and 76% of total hospital costs, followed by equipment and salaries (12% and 5% of total costs respectively). Total hospital recurrent costs made up approximately 87% of its total family planning services costs.

**Table 5 Kaunda Square Clinic Costs (1998)**

ITEM	COST (ZMK)	% RECURRENT	% TOTAL
<b>RECURRENT COSTS</b>			
Salaries	3,733,723.46	28.29%	20.96%
Contraceptives	8,340,666.06	63.19%	46.82%
Supplies	191,317.74	1.45%	1.07%
Miscellaneous	39,000.00	0.30%	0.22%
Transport	115,613.29	0.88%	0.65%
Utilities	102,942.33	0.78%	0.58%
Repairs and maintenance	676,483.64	5.12%	3.80%
<b>TOTAL RECURRENT COSTS</b>	<b>13,199,746.51</b>	<b>100.00%</b>	<b>74.09%</b>
<b>CAPITAL COSTS</b>			
Building costs	1,081,263.65		6.07%
Equipment	2,275,759.44		12.77%
Vehicle	350,399.03		1.97%
Training	908,464.12		5.10%
<b>TOTAL CAPITAL COSTS</b>	<b>4,615,886.24</b>		<b>25.91%</b>
<b>GRAND TOTAL</b>	<b>17,815,632.75</b>		<b>100.00%</b>

Similar to the case of the hospital, the clinic's largest cost item was the contraceptives (see Table 5). They accounted for 63% of total recurrent costs and 47% of total clinic costs. The injectables (Noristerat) accounted for 40% of the contraceptive costs and microgynon (oral contraception) accounted for 36%. Salaries were the second largest clinic cost item accounting for approximately 28% of total recurrent costs and 21% of total costs. The clinic's recurrent cost formed up to 74% of its total family planning services costs.

The CBD cost proportions took a different dimension from that of the hospital and clinic.

See Table 6 below.

**Table 6 N'gombe CBD Costs (1998)**

ITEM	COST IN ZMK	% RECURRENT	% TOTAL
<b>RECURRENT COSTS</b>			
Salaries	16,905,187.27	45.86%	40.38%
Contraceptives	7,057,566.38	19.15%	16.86%
Overheads	1,086,930.00	2.95%	2.60%
Administrative costs	7,722,000.00	20.95%	18.45%
Cleaning costs	85,800.00	0.23%	0.20%
Transport costs	189,280.00	0.51%	0.45%
Family planning cards	2,821,500.00	7.65%	6.74%
Warehousing costs	991,406.64	2.69%	2.37%
<b>TOTAL RECURRENT COSTS</b>	<b>36,859,670.29</b>	<b>100.00%</b>	<b>88.05%</b>
<b>CAPITAL COSTS</b>			
Building costs	1,352,402.20		3.23%
Equipment	5,275.37		0.01%
Vehicle	2,702,146.06		6.46%
Training	941,018.32		2.25%
<b>TOTAL CAPITAL COSTS</b>	<b>5,000,841.95</b>		<b>11.95%</b>
<b>GRAND TOTAL</b>	<b>41,860,512.24</b>		<b>100.00%</b>

The results from Table 6 indicate that salaries made up the highest proportion of costs incurred by the CBD programme in 1998. They accounted for approximately 46% of the total recurrent costs and 40% of total programme costs. The second highest cost item was the administrative costs (18% of total costs) followed by the contraceptives (17% of total costs). The CBD recurrent costs formed up to 88% of total CBD programme costs.

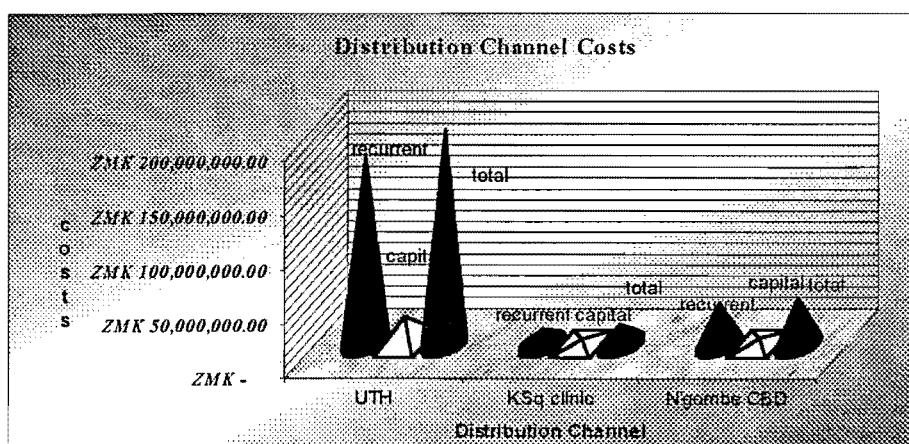
The distribution channel's costs were summarised and are presented in Table 7.

**Table 7 Summary of Distribution Channel Costs 1998 (ZMK)**

	UTH	KSq clinic	N'gombe CBD
<b>Recurrent costs</b>	171,183,112.84	13,199,746.51	36,859,670.29
<b>% of total recurrent costs</b>	87%	74%	88%
<b>Capital costs</b>	25,155,881.25	4,615,886.24	5,000,841.95
<b>% of total capital costs</b>	13%	26%	12%
<b>Total cost</b>	196,338,994.09	17,815,632.75	42,006,423.92

The cost results clearly show that in each case, the distribution channel had over 74% of total costs spent on recurrent items. Conversely, programmes with a low proportion of their total costs going into capital items do not require high levels of fixed capital expenditures to operate, and so can probably absorb fluctuations in their annual operating budget more easily.

**Figure 3 Distribution Channel Costs (1998)**



The distribution channel cost as presented in Table 7 and Figure 3, show that from the provider's point of view, the most costly family planning delivery mode is the hospital

followed by the CBD. The amount of capital costs incurred by the clinic and the CBD are almost comparable with the latter's being only 8% more than those incurred by the former.

### 6.1.2 Client Costs

Tables 8 and 9 present the costs incurred by family planning service clients visiting the hospital, clinic or CBD programme under study. User fees are generally not charged for reproductive health services provided by the government or NGOs and as such were excluded from the client cost analysis in this study.

**Tables 8                      Average cost per family planning client visit (1998)**

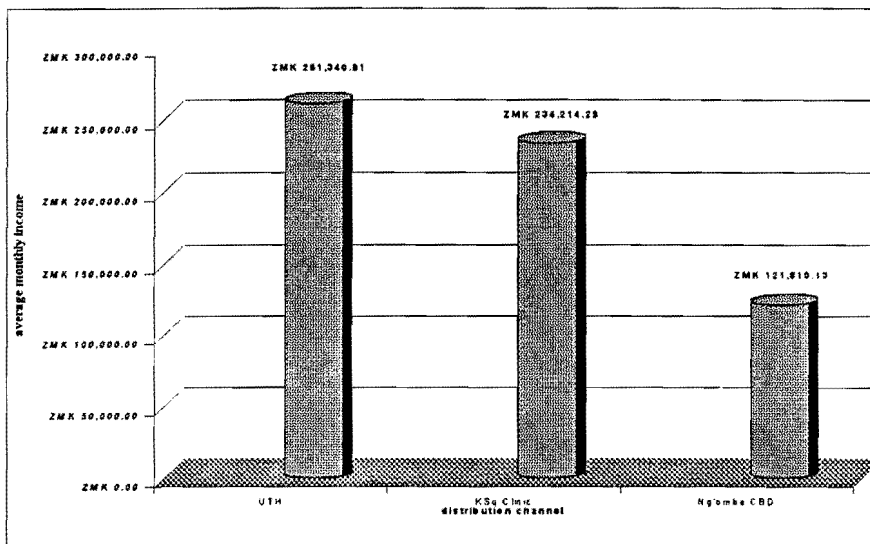
Type of cost	<i>hospital visit</i> (ZMK)	<i>clinic visit</i> (ZMK)	<i>CBD visit</i> (ZMK)
Average waiting time cost	718.49	379.52	2.9
Average travel time cost	2,136.67	779.47	611.4
Average travel/transport cost	2,389.39	1,349.21	-
<b>Average cost per family planning client visit</b>	<b>5,244.55</b>	<b>2,508.20</b>	<b>614.4</b>

The results shown in Table 8, indicate that the hospital family planning clients had the highest average cost per family planning visit (ZMK 5, 244.55), an amount more than double that faced by the clinic clients (ZMK 2, 508.20) and approximately 8.5 times more than that faced by CBD clients (ZMK 614.47).

To estimate the cost of client's time lost from work in acquiring family planning services, information from the family planning client's questionnaire was used to approximate the

average monthly incomes of family planning clients visiting each delivery mode. These are presented in Figure 4.

Figure 4 CLIENTS AVERAGE MONTHLY INCOME

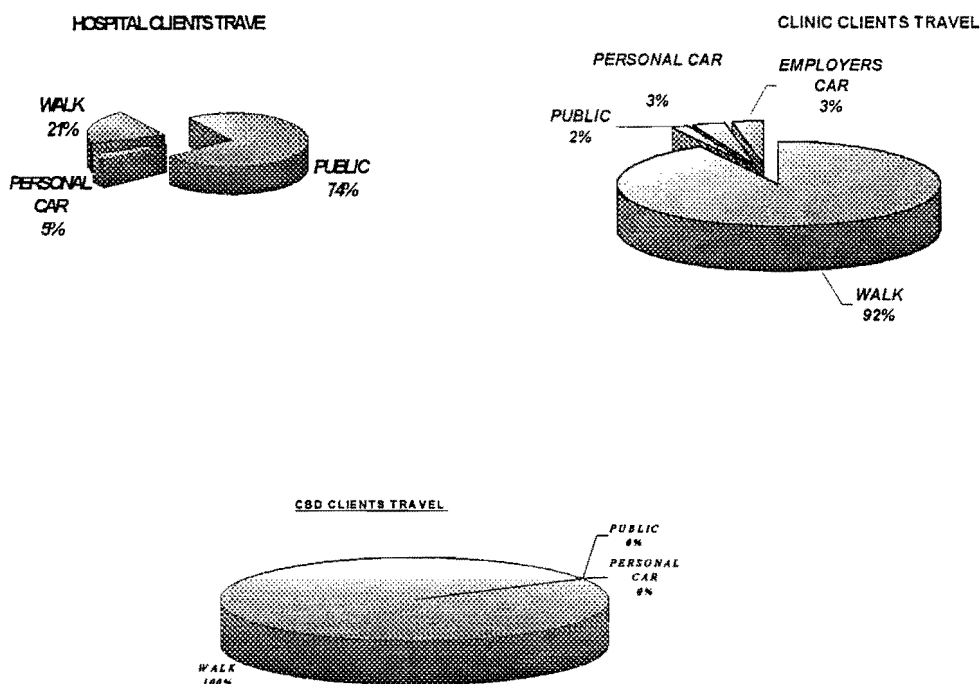


The average monthly income of family planning clients visiting the hospital, clinic and CBD was estimated to be ZMK 261, 340.91, ZMK 234, 214.29, and ZMK 121, 810.13 respectively. The assumption made in calculating the client's time lost from work (see Table 8) was that most people work 22 days a month, eight hours a day, 480 minutes an hour and 60 seconds a minute. From this assumption, the average monthly income per minute was calculated for the University Teaching Hospital (ZMK 24.75), Kaunda Square clinic (ZMK 22.18), and N'gombe CBD (ZMK 11.54). The average incomes per minute were later multiplied by the total number of minutes lost from work for each mode to obtain the cost of

time lost from work through travel and waiting for the clinic, hospital and CBD (see Table 8).

In terms of transport costs, all of the CBD family planning clients and most of the clinic clients (92%) were within walking distance from the CBD agent and as such did not incur any (see Figure 5).

Figure 5 Clients mode of travel



In contrast, the majority of the hospital's family planning clients (74%) used public transport and only 21% reported walking to the facility. On the other hand, while the clinic reported an average client waiting time of 17 minutes and the hospital reported an average of 29

minutes, the CBD programmes client's waiting time was almost negligible averaging 0.3 minutes (18 seconds) per visit.

To obtain the total family planning client costs for each delivery mode, the total number of family planning visits in 1998 at each mode was multiplied by the respective average cost per family planning client visit (see Table 8). The results are presented in Table 9.

**Table 9 Total costs of family planning client visit in 1998 (ZMK)**

	UTH	KSq clinic	N'gombe CBD
Number of family planning visits	7 048	5 292	2 970
Average cost per family planning client visit	5,244.55	2,508.20	614.47
<b>Total client costs 1998</b>	<b>36,963,588.40</b>	<b>13,273,394.40</b>	<b>1,824,975.90</b>

In 1998, the hospital had approximately 25% more family planning visits than the clinic and 57% more than the CBD. Since the hospital had not only the highest average client cost per visit but also the largest number of family planning visits, it clearly follows that it had the highest total family planning client costs (see Table 9). The clinic had the second largest family planning client costs followed by the CBD programme.

### 6.1.3 Total Costs

Given the distribution channels costs (see Table 7) and the total client costs (see Table 9), the total costs of providing and obtaining family planning services through the hospital, clinic and CBD were computed and the results are given in Table 10.

Table 10

Total Costs Table (1998, ZMK)

	UTH	KSq clinic	N'gombe CBD
Distribution channel costs	196,338,994.09	17,815,632.75	42,006,423.92
% total	84%	57%	96%
Client costs	36,963,588.40	13,273,394.40	1,824,975.90
% total	16%	43%	4%
Total cost	233,302,582.49	31,089,027.15	43,685,488.14

In all three cases, the distribution channel costs constituted over half the total costs, with a high of 96% in the case of CBD. The hospital had the largest total costs of ZMK233, 302, 582.49 followed by the CBD programme with ZMK 43, 658, 488.14. The clinic had the lowest total costs of ZMK 31, 089, 027.15.

## 6.2 Effectiveness

Table 11 gives the 1998 effectiveness data by means of CYP's generated through the hospital, clinic and community based distribution programme. The effectiveness results indicate that on average, the hospital derived most of its CYP's (73%) from implants (lasting for up to 5 years per procedure) and approximately 19% from sterilisation. Only 2% of the CYP's came from oral contraception and even less came individually from foaming tablets, condoms and injectables.

The clinic on the other hand derived the majority of its CYP's (40%) through foaming tablets and oral contraception (33%). Approximately 16% of its CYP's were as a result of injectables and the remaining 10% from condoms and IUD.

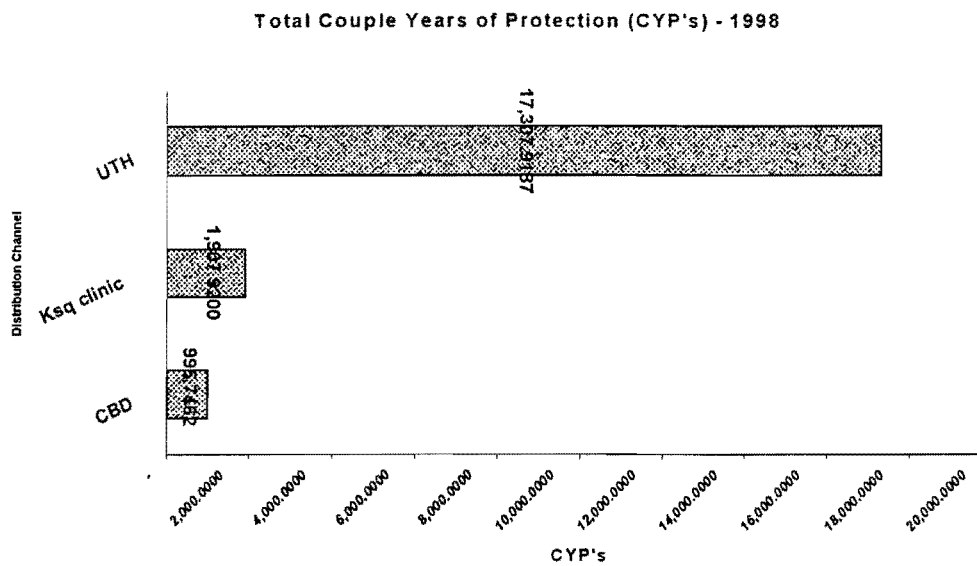
Table 11 CYP's Achieved

MODE	CONTRACEPTION METHOD	UNIT	QTY	CF	CYP's ACHIEVED	% MODE CYP's
UNIVERSITY TEACHING HOSPITAL	Pill- microgynon	cycles	4,133	0.0769	317.8277	1.84
	Pill- microlut	cycles	530	0.0769	40.7570	0.24
	Loop- Copper T	Each	179	2.5000	447.5000	2.59
	Condom- male	Each	12,915	0.0100	129.1500	0.75
	Condom- female	Each	2,486	0.0100	24.8640	0.14
	Foam- neo-sampooon	tube	1,178	0.2000	235.6000	1.36
	Inj-2 MTH- noristerat	Vial	787	0.1700	133.7900	0.77
	Inj-3 MTH- Depo-Provera	Vial	335	0.2500	83.7500	0.48
	Implant- Norplant	Set	2,536	5.0000	12,680.0000	73.26
	Emergency pill- PC4	x4tab	218	0.0100	2.1800	0.01
	Sterilisation- BTL	Each	255	12.5000	3,187.5000	18.42
Sterilisation- vasectomy	Each	2	12.5000	25.0000	0.14	
<b>TOTAL HOSPITAL CYP's</b>					<b>17,307.9187</b>	<b>100.00%</b>
KAUNDA SQUARE CLINIC	Pill- microgynon	cycle	7734	0.0769	594.7446	31.17
	Pill- microlut	cycle	456	0.0769	35.0664	1.84
	Pill- safe plan	cycle	110	0.0769	8.4590	0.44
	Loop- Copper T	each	27	2.5000	67.5000	3.54
	Condom- male	each	12236	0.0100	122.3600	6.41
	Condom- female	each	500	0.0100	5.0000	0.26
	Foam- neo-sampooon	tube	3860	0.2000	772.0000	40.46
	inject-2 MTH -noristerat	vial	1780	0.1700	302.6000	15.86
	Emergency pill- PC4	x4tab	19	0.0100	0.1900	0.01
<b>TOTAL CLINIC CYP's</b>					<b>1,907.9200</b>	<b>100.00%</b>
PPAZ CBD	Pill- microgynon	cycles	6132	0.0769	471.5508	47.36
	Pill- microlut	cycles	766	0.0769	58.9054	5.92
	Condom- male	Each	36384	0.0100	363.8400	36.54
	Condom- female	Each	785	0.0100	7.8500	0.79
	Foam- neo-sampooon	tube	468	0.2000	93.6000	9.40
<b>TOTAL CBD CYP's</b>					<b>995.7462</b>	<b>100.00</b>
<b>TOTAL CYP's</b>					<b>20,211.5849</b>	

Where; MTH = month, inject = injectables

The large part of the CBD's contraception effectiveness came from oral contraception (53%) and condoms (37%). Unlike the clinic, only 10% of its effectiveness came from the foaming tablets. A graphical representation of the effectiveness levels (total CYP's) for each family planning delivery mode is presented in Figure 6.

Figure 6



Evidently, the hospital had the highest number of CYP's and hence highest effectiveness level for the year 1998, approximately nine times more than the clinic and seventeen times more than the CBD programme.

Given the total costs (see Table 10) and the total number of CYP's for each delivery mode (see Table 11), the cost-effectiveness by means of costs per couple year of protection were computed using the formulae presented in 4.3 to obtain the cost-effectiveness for each mode.

### 6.3 Cost-Effectiveness

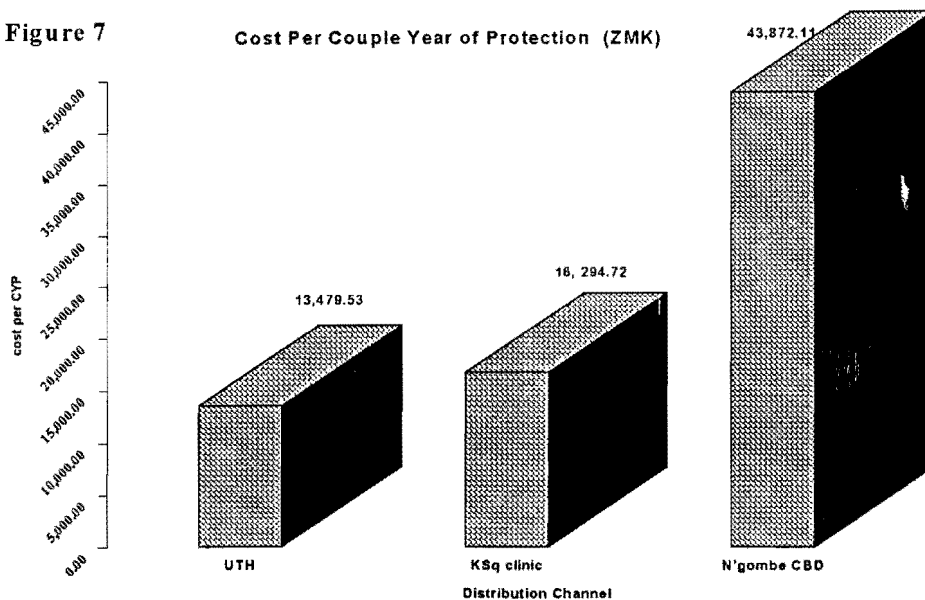
The cost-effectiveness ratios presented in Table 12 give the relative cost-effectiveness of each of the distribution channels for the year 1998.

Table 12 Cost-effectiveness by mode of service delivery in 1998 (ZMK)

	UTH	KSq clinic	N'gombe CBD
<b>Total cost</b>	233,302,582.49	31,089,027.15	43,685,488.14
<b>Total CYP</b>	17,307.92	1,907.92	995.75
<b>Total cost per CYP</b>	13,479.53	16,294.72	43,872.11

According to the results as given in Table 12, the hospital was the most cost-effective delivery mode (ZMK13, 479.53.12/CYP) followed by the clinic (ZMK16, 294.72/CYP), and then the CBD programme (ZMK43, 872.11/CYP). See Figure 7 for a graphical representation of the cost-effectiveness results.

Figure 7



The cost-effectiveness of the hospital is almost comparable to that of the clinic and almost three times more than the CBD.

#### 6.4 Sensitivity Analysis

A sensitivity analysis was undertaken to see if the cost-effectiveness results were sensitive to the assumptions made for particular cost items.

##### 6.4.1 Assumption of Kaunda Square Clinic Providers' salary

In allocating salaries for the clinic's family planning providers, it was assumed that they spent one full working day a week plus the afternoons of the remaining four days on





The results given in the Table 14 show that the cost-effectiveness results are insensitive to the assumption of the hospital reproductive health administrator's and CDEs' salaries. The hospital's new total costs reduced and its cost-effectiveness slightly increased from ZMK 13, 514.64 per CYP to ZMK 13, 476.81 per CYP but the delivery mode's costs and cost-effectiveness rankings remained the same with the hospital being the most cost-effective delivery mode.

## 7. DISCUSSION

**Section overview:** Section 7 discusses the results presented in section 6 with relation to the objectives of the study. It sets a foundation for the recommendations put forth in the next section (Section 8).

The study sought to compare the relative cost-effectiveness of the hospital, clinic, and CBD modes of delivering family planning services. In analysing the cost-effectiveness ratios, it is imperative to begin with the individual costs and effectiveness categories for each distribution channel.

### Costs

The cost analysis showed contraceptives to be the largest family planning cost item for the clinic and the hospital. A large amount of contraceptive supplies to the public health sector in Zambia have been and continues to be through international donations. Some of the types of contraceptives are not produced locally resulting in unavailability of local prices for costing purposes. For such contraceptives, the study made use of international prices. The largest contraceptive costs for the hospital in 1998 came from the popular use of Norplant implants by hospital clients and clients referred from health centres and clinics that do not provide these procedures. The implants have a relatively higher cost than the other contraceptives.

The family planning equipment costs were much higher for the hospital than the clinic and CBD. This is attributed to the scale of the family planning services being provided at each mode. The hospital not only provides the services common to the clinic and CBD, but goes further to provide implants and sterilisation procedures. As such, it requires a relatively larger equipment scale than that used for injectables and IUD's (in clinics) and the basic services provided by the CBD agent.

A number of economic evaluations report salaries as the biggest cost item. In this study however, this was only the case for the CBD programme. Salaries at the clinic and hospital were rather low in the year under study, accounting for as little as 5% of total programme costs in the hospital and 21% in the case of the clinic. This, to some extent, reflects the low payment concerns of most public service employees in the country. On the other hand, N'gombe CBD's salaries made up 40% of total programme costs relating to the wide scope of personnel required in organising and running the CBD programmes.

In as far as clients costs were concerned, the hospital had the highest average cost per family planning visit. Hospital clients spend an average of ZMK5, 244.55 per visit compared to the clinic clients (ZMK2, 508.20) and the CBD clients (ZMK614.47). The high hospital client travel costs reflects the main travel mode used by hospital clients. Unlike the clinic and CBD where most of the family planning clients walk to the service provider (92% and 100% respectively - Figure 5), the majority of the hospital's family planning clients use public transport hence incurring higher travel costs. The only travel costs that the CBD clients incur are those costs associated with time lost from work. However, when viewed together with

waiting time costs, the costs of time lost from work are lowest for the CBD (ZMK614.47 per visit) followed by the clinic (ZMK1, 158.99 per visit) and the hospital (ZMK2, 855.16 per visit). Not surprising in the case of the CBD as services are almost always provided immediately, especially when the CBD agent goes to the client's location and not vice-versa.

In putting all the costs together, the hospital had the highest family planning total costs considering that not only did it have the highest distribution channel costs among the three modes but also the highest family planning client costs (see Table 10). The clinic, on the other hand, had higher client costs than the CBD but less than half the size of its distribution channels costs and as such, the CBD had the second largest family planning total costs.

The magnitude of the distribution channel costs corresponds to the scope of family planning services being offered through each channel. It follows clearly that the distribution channel offering the most family planning services and the most intensive family planning services (e.g. sterilisation and IUD), have the largest distribution channel cost. The study proved this hypothesis by identifying the hospital as the most costly distribution channel followed by the clinic and CBD the least. The family planning services offered through the CBD were not as intensive as those from the other channels and comprised contraception that is easily self administered by the client. Such procedures are less costly by the provider.

### **Effectiveness**

The effectiveness results shown in Table 11 and interpreted in terms of CYP's achieved indicate that among the three delivery modes under study, the hospital was the most

effective (17 308 CYP's) followed by the clinic (1 908 CYP's) and the CBD (996 CYP's) in 1998. The levels of effectiveness at each mode were a direct result of the family planning methods being provided. From the CYP results, it is implied that the longer the period the contraceptive method is assumed to protect a couple from conceiving, the more CYP's (effectiveness) that particular method is assumed to provide. For example, in 1998 the hospital had a large number of clients for long term contraceptive methods (both through referrals and directly) and resultantly the largest number of CYP's (73% resulting from implants) amongst the three delivery modes. The hospital's longest protecting family planning procedure is the male and female sterilisation (12.5 CYP's per each procedure) compared to the clinics IUD (2.5 CYP's per procedure) and the CBD's oral contraceptive (less than a CYP per cycle).

### **Cost-effectiveness**

Despite the hospital's family planning costs being the highest of the three distribution modes, it was also highly effective (from CYP's achieved) resulting in a low cost-effectiveness ratio and hence a high level cost-effectiveness. The other extreme was the CBD programme, which had very high programme costs (compared to clinic) but low CYP's, hence a high cost-effectiveness ratio and thus relatively low cost-effectiveness. The clinic had the least costs of the three delivery modes under study and CYP's more than those of the CBD resulting in a cost-effectiveness ratio that fell in between that of the hospital and the CBD though closer and more comparable to that of the former.

Table 12 confirms this analysis by presenting the cost-effectiveness results through the cost-effectiveness ratios of the three delivery modes under study. According to these results, the hospital was the most cost-effective delivery mode at ZMK13, 479.53 (US\$4.45) per CYP followed by the clinic with ZMK16, 294.72 (US\$5.38) per CYP. The least cost-effective was the CBD at ZMK43, 872.11 (US\$14.48) per CYP, an amount approximately three times less cost effective than the hospital and clinic. The hospital and clinic have similar cost-effectiveness with a difference of ZMK2, 817.90 (US\$0.93) per CYP between them.<sup>3</sup>

The results of this study are similar to a number of past research findings (Hanson et al, 1998; Huber and Harvey, 1989; Barberis and Harvey, 1997, etc). These seem to suggest that the community-based distribution of family planning services is relatively expensive compared to other delivery modes and sterilisation clinics tend to be least costly and hence more cost-effective (see Section 4). However, this study did not assess a pure sterilisation clinic due to unavailability at the time of data collection. It never the less assessed the cost-effectiveness of a hospital, which offers the services offered by a sterilisation clinic. In line with expectation, the hospital was the most cost-effective delivery mode. Most of these studies went on to show that the cost-effectiveness of CBD can in fact increase when combined with clinical methods (particularly sterilisation and IUD's which provide long periods of protection).

In all, despite the hospital being the most cost-effective distribution channel, it exhibited the highest average cost to the family planning clients. Clearly clients visiting the hospital for

---

<sup>3</sup> The exchange rate used is ZMK3, 030 to \$1.

family planning services experienced the highest cost per visit attributable to transport costs and time costs. Given that a large number of these clients visited the facility for long term contraception such as implants and IUDs, the waiting time tends to be longer than for the short-term procedures. In addition, clients being referred from clinics and health centres for the longer term contraceptives, tend to incur high transport costs corresponding to distance and thus pushes up the average client travel costs of the hospital clients.

The results of the study can not easily be generalisable to the whole Zambia due to its bias towards urban facilities. In future, a comparison between rural and urban should be conducted to assess whether the cost-effectiveness rankings of family planning delivery channels differ across locality as carried out in Kenya (Chenge and Askew, 1997).

## 8. CONCLUSION AND RECOMMENDATIONS

This study sought to look at the relative cost-effectiveness of family planning services delivery modes. It was based on the University Teaching Hospital, Kaunda Square clinic, and N'gombe Community Based Distribution programme. Study results show that for the year 1998, the hospital was the most cost-effective delivery mode followed by the clinic and the CBD programme.

Careful analysis seems to suggest that the clinic has potential to be more cost-effective than at present if it ventures into provision of more long-term contraceptive methods e.g. implants in addition to the IUD's it already provides. The clinic's inventory records revealed that despite these service not being provided, almost all equipment required for hormonal implants are presently available and in working order. Moreover, almost no additional staff would be required for this and minimal additional training as these procedures are already within the scope of the clinic's family planning providers. The end result would not only be an increase in the clinics cost-effectiveness in delivering family planning services but also wider client choice from this facility. Furthermore, the provision of these services at clinic level will lead to increased strengthening of the decentralisation process by referring only complicated and sterilisation cases to central structures.

It is interesting to note that despite the increasing popularity of CBD of family planning services over recent years, it has not proven to be very cost-effective. Research evidence supports the idea of combining CBD delivery of these services with those of the clinic to enhance cost-effectiveness. In so doing, rather than competing with clinics for clients, the

CBD programme can refer clients who have preferences for long-term contraceptive services (beyond the scope of CBD) to the clinics. The value of the CBD in reaching a large number of individuals who can not access family planning services from health facilities should not be overlooked. This study actually proved that the CBD is infact the least costly delivery mode from the client's side in accessing family planning services and as such maybe preferred by some clients to the other delivery modes.

It is highly likely that despite enhancing cost-effectiveness, combining CBD with clinic services could increase client costs (waiting time and travel time) hence discouraging some of the previous CBD only clients from receiving services. Such impacts should be taken into account by the decision-makers. A fundamental requirement before such a merge is undergone, would be to carry out a survey to assess its possible effect on client accessibility.

The hospital and clinic should move towards achieving higher efficiency and client satisfaction through improving the of quality services. Reducing client waiting-time and ultimately client time costs has a quality improving effect. A reduction in time costs can ultimately encourage more individuals to find time to obtain family planning services. This in the long run benefits the country as a whole.

Future research should go a step further and consider the relative cost-effectiveness of combining CBD and EBD (Employer Based Distribution) of family planning services. Such an option could help increase family planning coverage to those individuals in the formal work environment, who otherwise find it difficult to leave work for the sole purpose of

obtaining these services. Further, a locality perspective should be considered in future research to enable a generalisation of study results throughout the Country.

In conclusion, the importance of a wide variety of distribution channels can not be over emphasised as they make available a range of contraceptive methods. The type of services provided by each distribution channel should carefully consider the characteristics and concerns of the targeted population such as income, age, marital status, previous child bearing and AIDS prevalence. As such, a national family programme should be able to reap contributions from each delivery mode. It cannot be overlooked that commitment from the people is a fundamental requirement in the success of family planning interventions but for this there must be a widespread awareness of family planning services offered, availability and access.

This research addressed the concern that Zambia, as in the case with all third world countries, faces financial constraints. These constraints dictate that resources not only be used efficiently but also optimally. The realm of family planning is no exception. Given that the negative impacts of an uncontrolled population growth cannot be ignored, the government has to view all the possible means by which to effectively control it. Family planning delivery modes as considered in this study, are one such avenue.

## REFERENCES

Adepoju, A. and Opong, C., (editors), "Gender Work and Population in Sub-Saharan Africa," *International Labour Organisation*, Great Britain, 1994.

Askew, I. et al, "Quality Of Care In Family Planning Programmes: A Rapid Assessment In Burkina Faso," *Health Policy and Planning*; 8 (1); p19-32, 1993.

Barberis M. and Harvey P.D., "Costs Of Family Planning Programmes In Fourteen Developing Countries By Method Of Service Delivery," *Journal of Biosocial Science*; 29 (2); p219-233. 1997

Berman, P. and Rose, L., "The Role of Private Providers in Maternal and Child Health and Family Planning Services in Developing Countries," *Journal of Health Policy and Planning*; 11(2): 142-155, 1996.

Betrand J.T., Boughman C.N., Mangani N., McBride M.E. and Kinuau, M., "Community Based Distribution of Contraceptives in Zaire," *International Family Planning Perspectives*; 19(3): September 1993.

Birdsall, N. and Sai, F., "Contraceptive services in Sub-Saharan Africa," *Finance and Development*, Vol. 25, pp.6-9, 1988.

Borne, F. et al, "Family Planning And Reproductive Health In Zambia Today," The John Hopkins school of Public Health center for communication programmes supported by the US Agency For International Development, *IEC Field Report*: Number 2, January 1996.

Central Statistical Office, Zambia Situation Analysis Study- "An Assessment of the Functioning and Quality of Reproductive and Child Health Services in Zambia," *Government Republic of Zambia*, August 1998.

Chege, J.N. and Askew I., "An Assessment of Community Based Family Planning Programmes In Kenya," *Population Council*, 1997.

Drummond M.F., Stoddart L.G. and Torrance W.G., "Methods for the Economic Evaluation of Health Care Programmes," Oxford University Press, United States, 1987.

Forrest, J.D. and Singh, S., "Public Sector Savings Resulting from Expenditures for contraceptive services," *Family Planning Perspectives*, 22 (1), January/February, 1990.

Gaisie, K. et al, "Zambia Demographic and Health Survey, 1992," University of Zambia, Central Statistical Office (Lusaka, Zambia) and Macro International Inc. (Columbia, Maryland, USA), 1993.

Gallen, M.E. and Rinehart, W., "Operations Research: Lessons for Policy and Programs," *Population Reports*, Series J, No. 31 (Sept-Oct), 1984.

Government of Zambia, United Nations, "Prospects For Sustainable Human Development in Zambia- More Choices for Our People," December 1996.

Hansan, K., Kumaranayake, L. and Thomas, I., "Supplying Subsidised Contraceptives- Economic Rationale and Programme Issues for Promoting Sustainability," Options Consultancy Services Limited for Health and population Division, Department of International Development, August 1998.

Huber, S.C. and Harvey, D.P., "Family Planning Programmes in Ten Developing Countries- Cost-Effectiveness by Mode of Service Delivery," *Journal of Biosocial science*; 21: p267-277, 1989

Hughes, D. and McGuire, A., "The cost-effectiveness of family planning service provision," *Journal of Public Health Medicine*; 18(2): 189-196, 1996.

Kaunda Square Clinic Annual Report - Unpublished, 1998.

Mamdani, M., Garner, P., Harpham, T. and Campbell, O., "Fertility And Contraceptive Use In Poor Urban Areas Of Developing Countries,"- Review article, *Journal of Health Policy and Planning*; 8(1): 1-18, United Kingdom, 1993.

Ministry of Health, Planning Unit, National Health Policies and Strategies-Health Reforms, Government Republic of Zambia, December 1991.

Ministry of Health, National Health Strategic Plan (1998-2000): From Vision to Reality, V5, Government Republic of Zambia, April 1998.

Planned Parenthood Association of Zambia, Family Health Project Progress Report-Financial and Progress Report on Project Activities; September 1<sup>st</sup> 1997- February 28<sup>th</sup> 1998, Zambia, February 28, 1998.

Planned Parenthood Association of Zambia, Family Health Project Progress Report-Financial and Progress Report on Project Activities; March 1<sup>st</sup>- August 31<sup>st</sup>, 1998, Zambia, 1998.

Planned Parenthood Association of Zambia, Family Health Project Progress Report-Financial and Progress Report on Project Activities; September 1<sup>st</sup>- December 31<sup>st</sup>, 1998, Zambia, 1998.

Population Reports, "Family Planning Programs," Series J, Number 21, January 1980 - Reprinted March 1984.

Population Reports, "Paying for Family Planning -Family Planning Programs," Series J, Number 39, November 1991.

Schmid, G. P. "Understanding the Essentials of Economic Evaluation," *Journal of Acquired Immune Deficiency Syndrome and Human Retrovirology*, 10 (Suppl. 4): S6-S13, ©1995.

Simmons, G. B., Balk, D. and Faiz, K., "Cost-Effectiveness Analysis of Family Planning Programmes in Rural Bangladesh: Evidence from Matlab," *Studies In Family Planning*; 22, 2; p83-101, 1991.

Sinanovic, E. "Cost-Effectiveness Analysis of Couple Years of Protection Provision by Community-Based Distribution of Contraceptive Services in Selected Areas in Khayelitsha," Research Report, Health Economics Unit, University of Cape Town, South Africa, 1998.

Family Care International, "Safe Motherhood in Zambia- A Situation Analysis", prepared on behalf of United Nations Children's Fund (UNICEF) Zambia, Monograph No. Three, Zambia, December 1994.

UNZA/IHE, "Zambia Health Expenditure Review (1995)," Lusaka, 1996

World Health Organisation, "Expanding Family Planning Options- An Assessment Of The Need For Contraceptive Introduction In Zambia," Geneva, 1995.