COMPUTERIZED ASSESSMENT OF THE IMPACT OF NATIONAL PROGRAMMES ON IMMUNIZATION (N P I) IN NIGERIA

BY

BALOGUN ADEKUNLE ADEBAYO

PGD/MCS/635/97/98

A PROJECT SUBMITTED TO THE DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE OF THE FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

FOR THE AWARD OF POST GRADUATE DIPLOMA IN COMPUTER SCIENCE

MARCH, 2000.

CERTIFICATION

I certify that this work was carried out by BALOGUN ADEKUNLE ADEBAYO in the Department of Mathematics and Computer science, Federal University of Technology Minna.

....

SUPERVISOR DATE

(MAL. AUDU ISAH)

....

HEAD OF DEPARTMENT DATE

(DR. S.A. REJU)

....

EXTERNAL EXAMINER DATE

DEDICATION

This project is dedicated to almighty God for his loving kindness in my life.

ACKNOWLEDGEMENT

My gratitude goes to Almighty God who gave me strength and guidance throughout the course of my study. To my supervisor Mallam Isa Audu whose supervision of this project work was marked with patience, maturity, beauty, professionalism and intellectual appeal, I shall ever remain grateful for your co-operation and understanding throughout the period of this project work.

Without any reservation, I wish to express my sincere gratitude to my elder brother Mr. P. O. Balogun for his sponsorship of my educational career.

I wish to express my sincere gratitude to the following people:

Mr. Badmus(the programms co-ordinator), Mr & Mrs Lanko, Mallam Tawfiq, Mr. Garba Joseph, Mr. Lekan Akindele, Doctor Adeyemo, Miss Helen, My Godly praying pastor on whose grave are the words: Ida Duewel-Intercessor; and many people I may not be able to mention their names.

May God reward all of you abundantly. (Amen).

I am very grateful to my parents and entire Balogun family, they have all contributed positively to the success of this project. May God bless the entire family.

I give due regards to Head of Department in person of DR. S.A. REJU, MR. L.N. EZEAKO (the current programme co-ordinator), DR. YOMI AIYESIMI, MR. ABDULRAHEEM K. and to other lecturers in the department of Mathematics and Computer Science. May God bless you all.

ABSTRACT

This project was on computerization of the assessment of the impact of the National Programmes on Immunization in Nigeria. The data used for this project was collected by making use of abstract published statistics which was compiled by the Federal office of statistics. The data was analyzed using test of difference proportion. The analysis was computerized using Q Basic computer language. This project will be useful to students, Health workers, Nurses and government because it contains a clear analysis of basic principles of statistics which any reader, regardless of his own personal specialty, will find very useful. Also the programs written on the analysis can be used to assess other related data.

TABLE OF CONTENTS

CHAPTER ONE

1.0 GENERAL INTRODUCTION

1.1 BACKGROUND OF THE STUDY:

We are today at the beginning of a dramatic and historic new era in our civilization – the computer Age: make no mistake. A computer world is not some future science fiction concept; it is already here today and it will profoundly alter all our existing social, economic and political into the largest business activity on earth, such that anyone who does not know how to operate or use computers will be considered functionally illiterate.

Unlike the gradual transformation normally accompanying an industrial revolution, the computer age and the information society it creates, will bring changes upon us with terrifying swiftness. Eliminating the barriers of time and distance, the instant communication of the new electronic network will dramatically alter even the current political institutions. The new technology will also radically alter other traditional institutions in education, health services, scientific research, marketing and the world of communication.

Nowhere will the changes be more profound than in the restructuring of the social order. Whereas the level of money accumulation was the principal determinant of status in the old industrial society, a totally new class structure based upon knowledge and technical skill will be the key to advancement and status in the new information society. Leadership will be based upon creative intelligence and technological merit.

Willing or not, we have arrived at the computer age, and the old society is already disintegrating while this new era will bring forth its own host of problems; man now stands at one of the most exciting frontiers in his history.

Guided by human intelligence, the computer with its lightening speed will extend man's creativity a thousand folds to accomplishments tasks previously undreamed of.

Freed from the restrictions of time and labour which hitherto have consumed 98 percent of his time, man will for the first time be able to give total sweep to his inherent genius.

Against the background of this exciting and awesome new future, the author is writing on the "computerised assessment of the impact of expanded programmes on immunization in Nigeria".

Health is wealth. A healthy child is a happy child not only must its body be fit but mind must also be at ease. This is the joy of the nation. A sick child is unhappy and is a problem to the parents, its death is a serious loss to the nation at large.

In 70's, it was noticed that in African countries, millions of children were dying and a few millions disabled from preventable diseases like measles, tuberculosis, whooping cough, polio mychitis, tetanus and diptheria annually. These diseases were among the top ten causes of death among children 0 to 5 years of age.

Most of these diseases have been completely eradicated in the developed countries. That lead to the meeting of W.H.O. and the developed countries to consider how to help less developed member nations.

Presently, the government of Nigeria is embarking on a National Expanded programme on immunization to control these six childhood diseases throughout the federation. The programme was launched in Lagos in October 1984; by now all the local government areas in the country have launched the programme.

Although Nigeria has been declared smallpox free for the past ten years, surveillance against the disease is still being maintained.

The ultimate goals of the programmes is to reduce to barest minimum the number of sickness and deaths in Nigeria.

The target was to reach 99% immunization coverage by the year 2000 which is a few months away. It is believed that at 99% immunization coverage the rate of transmission of these diseases will be completely eradicated.

This project is carry out on Nigeria in order to assess the impact of NPI since its commencement using computer.

1.2 PROBLEM IDENTIFICATION

It is discovered that the immunization programme still suffers from poor logistics, lack of cold chain equipment, erratic supply of vaccines, insufficient trained manpower and lack of political commitment.

Pregnant women were not protected against tetanus and there was high neonatal and maternal deaths.

Record keeping and data analysis and reporting for programme improvement is usually inconsistent or in most cases lack data integrity. Data redundancy is also very prevalent.

1.3 OBJECTIVES OF STUDY

The aim objective of this research project is to have an assess automated assessment of National Programmes on Immunization in Nigeria.

Much emphasis is placed on obtaining information about the six killer diseases. The objectives of the study are:

1. To determine the impact of National programme on immunization on Nigerian children.
2. To make necessary recommendation for better administration of health programmes for children.

3. To assess the impact of some health programmes in the health of children in Nigeria

1.4 .JUSTIFICATION FOR THE STUDY

In Nigeria, 20 percent of our estimated population at the mid year are children (FMN'95) under the age of five years and the needs of these children are very great in both rural and urban areas. Every state has its own problems but many are common nationwide. Some of them are well known to us all. Many children die from Dipluteria, measles, poliomyelitis, tuberculosis (Grant 1985).

Many children grow up weak because of poor feeding, frequent illness such as malaria and diarrhoea billarzia (Grant 1985).

Recent advances in medical knowledge have created an opportunity for more immediate attack on the problems of diarrhoea and other childhood diseases (FMH 1985).

Set of management practices summarized under the term NPI is believed to have significantly reduced both mortality and morbidity existing from this childhood disease.

Several researchers have been carried out by different people on paediatrics in Nigeria and the world at large because of the importance of children in the society.

There are also different type of software packages common in the market today, but non of our programmes even written a programmes that can automatically assess the impact of NPI in Nigeria. As a result of this, this research project becomes a necessity for the benefit of children and Nigerians at large.

1.5 SCOPE OF THE STUDY

This project is strictly limited to Nigeria. This study will cover the period 1980 to 1997.

The diseases under study are Tuberculosis, Diphteria, Measles, Poliomyelitis, Tetanus, Whooping cough.

The following will be used to analyse the data collected.

1.6 DATA COLLECTION

1.6 DATA COLLECTION.

	DIPHTERIA		MEASLES		POLIOMYELITIS		WHOOPING COUGH		TETANUS		TUBERCULOSIS	
	CASES	DEATH	CASES	DEATH	CASES	DEATH	CASES	DEATH	CASES	DEATH	CASES	DEATH
1980	970	15	156571	1095	1620	117	88626	101	3943	411	12170	343
1981	914	10	154261	1010	1340	181	83722	221	3553	368	11341	416
1982	890	4	139785	985	1456	199	77830	73	3419	372	10949	334
1983	275	-	136778	983	1719	170	70024	77	2577	226	10212	208
1984	733	-	182591	1431	1207	188	62751	61	2437	209	10677	161
1985	1996	8	161768	1721	1038	116	92266	166	2679	219	14934	354
1986	1871	26	115743	1991	707	-	42193	101	2269	157	14071	575
1987	1979	32	140405	491	769	3	54303	112	2296	106	15113	602
1988	1779	23	138095	662	830	1	49400	99	2062	102	13322	314
1989	3797	7	30436	304	318	5	44497	81	2308	196	12232	300
1990	1768	2	115682	1399	873	29	39594	96	3763	134	20122	213
1991	2819	59	44026	388	842	-	34691	66	3353	195	19100	471
1992	2351	3	85965	94	957	1	29788	76	3440	N.A	14802	16
1993	4042	2	54734	58	383	1	24844	73	4075	4	11601	12
1994	1363	-	106081	695	502	-	19981	56	2643	75	14854	352
1995	1556	-	49880	671	439	4	15078	60	2774	130	10040	407
1996	1372	-	121929	607	541	-	10174	61	2174	103	10776	132
1997	1020	-	119620	621	492	-	5271	61	2112	116	11340	210

SOURCE: FEDERAL MINISTRY OF HEALTH AND SOCIAL SERVICES

1.7 TEST OF DIFFERENCE OF PROPORTION

Our interest her is to compare the period before the introduction of UNICEF programme with the period after the introduction of the programme.

We consider the null hyphothesis that there is no difference in the level of treatment between the two periods i.e. period one=period two.

The null hypothesis are denoted by Ho and hypothesis alternate to the null hypothesis is denoted by H_1

The maximum probability with which we would be willing to risk the rejection of hypothesis when it should be accepted is called level of significance of the test. This probability is denoted by , is generally specified before any samples are drawn so that results, obtained will not influence our choice. In practice a level of significance of 0.05 or 0.01 is customary.

For the purpose of easy identification the periods under study will be classified as follows:

PERIOD ONE: Children that did not receive any of the UNICEF programmes.

PERIOD TWO: Children that received either of the UNICEF programmes.

This test will show if there is significant difference since this programme started in Nigeria.

CHAPTER TWO

LITERATURE REVIEW

2.1. THE COMPUTER

The computer has become many things to many people: to some, it is a terrible complex invention which is best avoided, while to others, it is the ultimate solution to all problems. These are only two examples of several misconceptions about the computer. While the former view depicts a deliberate and ultimate futile attempt to ignore an overwhelming technological development, the later view is rather simplistic, as it invariably leads to disappointments and frustration.

The fact is that computer is basically a machine. It cannot think, it has no intelligence and it will do only what it is told to do.

Infact, it is just a dumb, silent machine full of switch-circuits that will do absolutely nothing until someone gives it complete instructions (a programme) on what activities to perform. It works with lighting speed, nonetheless, its still just a machine. It is this speed factor which really makes the computer such a modern market. Actually the computer does not do anything that a human being cannot do just as well, but it does so with such incredible speed that it completely alters the entire nature of human activity.

WHAT IS A COMPUTER?

A computer is an automatic electronic data processing machine.

AUTOMATIC: means that a computer can carry out a sequence of operations on its own following a set of instructions known as program.

ELECTRONIC: means that a computer is made from solid-state electronic components, commonly known as chips.

DATA: is for information. It is used to describe the information in a form which can be processed by a computer.

PROCESSING: Describes the type of work done by a computer,which includes storing, locating, selecting and sorting data, doing calculations and making simple decisions.

MACHINE: Is a reminder that a computer is a device that requires maintenance and can break down like any other machine such as a car, fan, sewing machine, e.t.c. Most of the works which a computer can do are summarized by the words INPUT, PROCESSING, and OUTPUT.

INPUT: Is the act of supplying data to the computer from the environment. Data can be input to a computer through the keyboard, mouse, e.t.c.

OUTPUT: Is the act of supplying data from the computer to the environment. This can be achieved in a number of ways; display screens, paper or microfilms (through the printer or plotter), disk e.t.c. Most computers can also store, retrieve and communicate with other computers or suitable devices.

One of the major limitations of a computer is based on the fact that, everything a computer does is a response to instructions in a programme. Therefore, a computer cannot respond to an unforseen circumstance. Although a computer can take simple decisions based on questions which have 'YES or NO'. It cannot think for itself. Similarly, a computer cannot make a moral judgement. Finally, computers only undrrstand natural languages like English or French, though they can store texts in natural languages. All the programming languages, such as BASIC, LOBOL, PASCAL used to instruct computers are simple than natural languages, even though they may contain complicated mathematical formulae.

2.2 COMPUTER SYSTEM

This can be defined as a group of component which relates together in order to help computer perform the task of data processing.

The components are Hardware, software and humanware.

HARDWARE:

This is the physical component of a computer system, it is the mechanical, electrical, magnetic and electronic devices.

HUMANWARE: Constitute the group of people that puts computer into one use or the other. This group includes the systrem analyst, the programmers, the system engineer, the computer operators etc.

SOFTWARE: These are the programs being used to control the activities and operations of the computer. It is with the introduction of the s/w that we are being able to explore the capabilities of a computer.

TYPES OF SOFTWARE

There are two types of software namely:

System software and application software.

The system software are program written by the manufacturer of a computer which aid easy access and operations of the computer.

Examples of system software are operating system, translators, utility programmes e.t.c

Application software is the set of programmes written by the computer users in order to carry out some operations on the computer. There are two types of Application software which include application packages and home-made packages.

Application packages are programs written by group of experts for a particular use e.g. The word processing packages, spreadsheet packages, Data base management system, statistical packages, Desktop publishers, Graphics packages etc.

HOME-MADE PACKAGES: Constitute the programs written by the user to solve a local problem. This is where programming comes in.

2.3 THE CONCEPT OF PROGRAMMING

Programming can be defined as an out of writing programs. A program is a set of instructions given to computer to carry out a particular task.

COMPUTER LANGUAGE

This is the language with which we use to communicate with the computer. There are difficult types of programming lanuguages which can be categorised as follows. Machine language, assembly language and high level language.

We shall use high level language to achieve the aims and objectives of this project work.

2.4 NATIONAL EXPANDED PROGRAMMES ON IMMUNIZATION:

Each year, more than 80 million children are born in the developing countries. About five million of these children die from diphtheria, whooping cough, tetanus, poliomycelites, measles, and childhood tuberculosis. In additionto those who die, many are disabled through brain damage, paralysis, stunted growth, chronic lung illness, deafness and blindness (FMH). Also measles and whooping cough can prevent a child from eating and therefore become clinically malnourished.

None of these should happen because children can be protected against all these diseases. There are safe vaccines available. The vaccines for the six diseases lost little to protect each child in the developing world for life.

The government of Nigeria has planned a national expanded programme on immunization (EPI) to control these six childhood diseases throughout the federation.

These arre tuberculosis, measles, whooping cough, Diptheria, tetanus and poliomyelitis.

Set objectives and goals: the ultimate goals of the WHO was to reduce to barest minimum the number of sickness and deaths through EPI.

Target Age Group: the target age group are children from the very day they are born to 2 years (0-2yrs), and pregnant women. The definition of age is important as in the former immunization programme of children 0-5 years brought a lot of wastages of vaccines, high defaulter rate and therefore provided very little protection.

There was therefore little impact on the prevalence of those diseases. Pregnant women were not protected against tetanus and there was high neonatal and maternal deaths (FMH & UNICEF 1986)

2.5 IMMUNIZATION:

Immunity is the state of resistance of the body to agents foreign to it. Among which environmental and especially, infections agents are the best known, immunity is not necessarily and absolute nor a permanent state. It may be natural dependant on the species, or the individual. In the later case, it may be genetic (e.g. resistant strains of animals) actively acquired (e.g subclinical infections) or passively acquired e.g. by means of maternal antibodies passively transferred through placental or colostrum).

Immunity may also be provided artificially by active or passive immunization.

Active immunization by means of vaccines provides usually effective and long lasting immunity. While passive immunity acquired by injection of ready-made antibodies is short-lasting and less effective (GAT 1983).

2.6 EPIDEMIOLOGY:

Is derived from the word epidemics. Epidemics is any sudden increase in the incident rate of a disease. The rate must be in excess of the normal, but the actual value required to justify the name epidemics is not fixed.

Epidemicology is the study of the distribution and causes of disease in population and technique for establishing such knowledge. Epidemiology deals with questions about circumstances which allow a disease to developed and flourish, what permitted some member to escape and what brought the epidemic to an end. Epidemiology was until recently dominated by the study of acute epidemics and contagious diseases and by the search for infections, agents. Today the subject covers all types of disease – physical as well as mental, noninfectious as well as inectious and Epidemiologysts study all types of population characteristics and agents- social and psychological as well as biological and physical- that may help to describe or explain the prevalence disease.

Some of the infectious diseases that influences the growth of our children are discussed below:

1. TUBERCULOSIS:

Tuberculosis is a bacterial diseases that can be transmitted from one person to the other by droplet infections. The droplets from the spitum of the sufferer, when inhaled or ingested by another person may manifest itself later.

The newborn babies have no immunity from the mother and is prone to the disease as early as the first day of life.

Overcrowding and poor feeding predisposes one to infection. With our social pattern of collective living and the typical slums in the urban areas the incidence of this disease has not reduced appreciably.

B.C.G. is the vaccine used as early as the first day of life to protect the newborn babies.

It is important to know the local names for each disease and educate people on early immunization for babies and the evil effect of overcrowding and poor personal and environmental hygiene.

2. WHOOPING COUGH:

Whooping cough is another bacterial disease that affects the respiratory tract. It is passed from one person to the other through droplets from the spitum of the patient and inhaled by another person.

The name describes rightly the characteristics of the cough. The cough starts and prolong is with a whoop. The prolonged cough prevents air entering the lumps and lack of oxygen to the blood vessels. The child vomits in the process. The eyes becomes swollen and red due to the pressure built up in the blood vessels during the period of whooping. Malnutrition results from persistent vomiting.

By immunization combined with tetanus and Diphtheria (DPT) this is the best form of protection and prevention.

3. MEASLES:

Measles is one of the commonest cause of death among children. It is caused by a virus. The infection is passed to another child through droplet infection. The infection is passed to another child even before the appearance of rashes.

Measles usually affect children above six months of age. Before six months the child is under protection of inherited immunity from the mother.

The well fed babies, when affected, are better able to resist the complications that develop following the initial episode.

Measles is well known disease characterized by catarrh with discharge from the nose and mouth.

The use of measles vaccine is the best means of protection. The lifetime protection is the one that results from a previous measles infection and from the successful immunization. Mother should be mobilized to bring children for measles immunization and to complete the doses.

4. POLIOMYELITIS:

This is a viral disease that affects the central nervous system thereby causing paralysis of the areas supplied by the nerve. It does not affect sensory component but the motor (action) muscles. It is a disease of poor sanitation. The infection is passed through the stool or urine, via water to the next victim where there is indiscriminate disposal of faeces the transmission is favoured.

The cause of disease is usually unnoticed with slight fever and short diarrhoea episode. It is the paralysis (weakness of an arm or leg).

The mother complains that her child, usually a toddler or bigger child suddenly stopped walking. The affected limbs weak within a few weeks the affected area, due to lack of use, become wasted.

If one leg is affected it becomes thinner than the unparalysed leg. Because the muscles are notg equally affected contracture occurs resulting in lameness.

Oral polio vaccine is the most effective method of protection even in developed countries where sanitation is no more a problem. It can be disatrous if a common source of water gets contaminated, all the unprotected children in the population can develop the disease resulting in epidemics.

5. TETANUS

Tetanus is a bacterial disease. The organism exists in the soil contaminated by cow dung or horses stool.

A| person gets influted through contamination of the wound by the soil. A baby can be infected from the first day of life through the unbilicus. The traditional way of putting cow dung on the unbilical cord by some elderly women encourages early infection and the rate of development of the disease depends on the amount of contamination. The heavier the infection the more deadly.

PROTECTION:

Immunization of babies with DPT or tetanus toxoid.

Immunization of pregnant women with tetanus toxoid.

6. DIPTHERIA:

This disease is not common in Africa but when it occurs, it is highly fatal. It is a bacterial disease passed from one victim to the other through droplet infection.

The disease affects the upper respiratory tract. It forms very thick highly inflamered covering on the back of the throat. This can cause obstruction and suffocation

2.7 NUTRITIONAL DISEASES

The human body is made up of many subtances, all of which are derived from foods, in addition, foods provide the body with the heat and energy required to maintain normal body temparature, to perform all functions essential to human life (heart beat, breathing, digestion of food e.t.c.) and to carry out all other bodily activities from the slight muscular activity required in sitting, reading and writing to streneous excertious called for in atheletics and heavy labour.

Most infants thrive well on their mother's milk alone in the first 3 to 4 months of life. This is a period of rapid growth the average infants is expected to increase his birth weight by more than half and grows in length by a percent during this time. But after 4 to 6 months other foods are needed. Ideally the child should continue to be breast fed until he is at least 2 years (24 months).

The process of introducing foods other than milk to the infants diet and gradually taking him off the breast is referred to as weaning. The process of weaning is very fundamental to the growth development and upbringing of a child and it must be carried out in such a way that will enhance these processes. Practical experience in the act of weaning could be helpful and for an inexperienced mother, there is the need for her proper education on the procedure of weaning. If weaning is not properly carried out, children tend to develop malnutrition and other nutritional diseases that are often difficult and expensive to cure e.g. Kwarshiokor, Marasinus, Anaemia, Xerophthalnia etc.

The breastmilk of healthy mother is regarded as a balance diet and if this source of food is to be gradually displaced, it must be replaced by a food whose formation and composition is very close to that of breast milk.

CHAPTER THREE

3.0 METHODOLOGY

3.1 USES OF STATISTICAL ANALYSIS IN DECISION MAKING

The statistical analysis to be carried out in this study is to summarize, manipulate and investigate data so that useful decision making can result. Statistical Analysis involves the process of converting data into useful information.

The test of hypothesis is used in order to determine the feasibility of this information collected about the population and also to determine the effectiveness of an experiment whether it has been a success or failure.

3.2 TEST OF DIFFERENCE OF PROPORTION

A difference between two proportion can be treated as special case of a difference between two means. If two interest is focussed on comparing two independent random samples with respect to their proportions.

The null hypothesis to be tested will indicate that the two populations are equal against the alternative hypothesis that the two populations are not equal. This test enables one to carry out analysis on comparison between different groups or samples in order to find out if there is any significant difference between the groups under study.

Our interest here is to compare the period before the introduction of UNICEF programme with the period after the introduction of the programme.

We, consider the null hypothesis that there is no different in the level of treatment between the two periods i.e. period one period two.

The null hypothesis are denoted by HO and hypothesis alternate to the null hypithesis is denoted by HI.

The maximum probability with which we would be willing to risk the rejection of hypothesis when it should be accepted is called level of significance of the Test. This probability is denoted by &, is generally specified before any samples are drawn so that results obtained will not influence our choice. In practice, a level of significance of 0.05 or 0.01 is customary.

For the purpose of easy identification the periods under study will be classified as follows:

1ST PERIOD: Children that did not receive any of the UNICEF programmes.

2ND PERIOD: Children that received either of the UNICEF programmes.

This test will show if there is significant difference since this programme started in Nigeria.

DIPHTERIA DISEASE

1ST PERIOD

YEAR	CASES	DEATH
1980	970	15
1981	914	10
1982	890	4
1983	275	-
1984	733	-
1985	1996	8
TOTAL	5778	37

2ND PERIOD

YEAR	CASES	DEATH
1986	1871	26
1987	1979	32
1988	1779	23
1989	3797	7
1990	1768	2
1991	2819	59
1992	2351	3
1993	4042	2
1994	1363	-
1995	1556	-
1996	1372	-
1997	1020	-
Total	25717	154

HO: Ps1 = Ps2 (There is no different in the level of treatment).

HI: = Ps1 = Ps2 (There is difference in the level of treatment)

& = 0.05 (Level of significant)

Ps: = D/C where D = number of Deaths

M= Total no. of cases

Ps1 = Proportion of group:

I = 1, 2

Ps1 = 37/5778 = 0.0064036

Ps2 = 154/25717 = 0.0059883

P = is used as an estimate of the period proportion.

P = N1 Ps1 + N2 Ps2 = Pooled estimate of the standard error.

N1 + N2

= 37 (0.0064036) + 154(0.0059883)

37 + 154

= 0.236933194 + 0.922191546

191

= 0.0060687

q = 1-p

= 1-0.0060687

= 0.993931

$$^{\delta} Ps1 - Ps2 = \sqrt{P(1-P)(\frac{1}{N1} + \frac{1}{N2})}$$

$$= \sqrt{(0.006087)(0.993931)(\frac{1}{37} + \frac{1}{157})}$$

= 0.0002021915

= 0.014219404

TEST STATISTIC:

Zc = Ps1 – Ps2 – 0

$\delta_{Ps1 - Ps2}$

= 0.0064036 – 0.0059883

0.014219404

= 0.029206568

Z table = $Z_1 - \alpha / 2 = 1.96$

Decision rule

Reject HO if Zc > Z table otherwise do not reject HO.

CONCLUSION:

Since Z computed = 0.029206568 is less than Z from table = 1.96 we have no statistical reason to reject HO and conclude that there is no difference in the level of Treatment.

MEASLES DISEASES

1ST PERIOD

YEAR	CASES	DEATH
1980	156571	1095
1981	154261	1010
1982	139785	985
1983	136778	983
1984	182591	1431
1985	161768	1721
TOTAL	931754	7225

2ND PERIOD

YEAR	CASES	DEATH
1986	115743	1991
1987	140405	491
1988	138095	662
1989	30436	304
1990	115682	1399
1991	44026	388
1992	85965	94
1993	54734	58
1994	106081	695
1995	49880	671
1996	121929	607
1997	119620	621
TOTAL	1122596	7981

Ho: Ps1= Ps2 (There is no different in the level of Treatment)

H1: Ps1 =/ Ps2 (there is difference in the level of treatment)

$\alpha = 0.05$ (Level of significant)

Ps1 = D / M where D = number of Deaths

M = total no. of cases

Ps1 = proportion of group I

I = 1, 2

Ps1 = 7225/931754 = 0.0077542

Ps2 = 7981/1122596 = 0.0071094

P = is used as an estimate of the period proportion

$$P = \frac{N1\ Ps1 + N2\ Ps2}{N1 + N2}$$ (Pooled Estimate of the standard error)

$$= \frac{7225(0.0077542) + 7981\ (0.0071094)}{7225 + 7981}$$

$$= \frac{56.02404175 + 56.74023513}{15206}$$

$$= \frac{112.7642769}{15206}$$

= 0.00741578

q = 1-P

=1- 0.00741578

= 0.992584

$$^{\delta} Ps1 - Ps2 = \sqrt{P(1-P)(\frac{1}{N1} + \frac{1}{N2})}$$

$$= \sqrt{(0.00741578)(0.992584)(1/7225 + 1/7981)}\ )$$

$= \sqrt{0.00000194108}$

$= 0.001393$

TEST STATISTICS: Zc

$$Zc = \frac{Ps1 - Ps2 - 0}{\delta Ps1 - Ps2}$$

$$= \frac{0.0077542 - 0.000710940}{0.001393}$$

$$= \frac{0.0006448}{0.001393}$$

$=0.46281035$

Z Table = Z_1 - &/2 = 1.96

Decision Rule

Reject HO if Zc > Z table otherwise do not reject HO

Conclusion:

Since Z compared = 0.46281035 is less than Z_1-&/2 = 1.96 we have no statistical reason to reject HO and conclude that there is no difference in the level at treatment.

TUBERCULOSIS DISEASES

1ST PERIOD

YEAR	CASES	DEATH
1980	12170	343
1981	11341	416
1982	10949	334
1983	10212	208
1984	10677	161
1985	14934	354
TOTAL	70283	1816

2ND PERIOD

YEAR	CASES	DEATH
1986	14071	515
1987	15113	602
1988	13322	314
1989	12232	300
1990	20122	213
1991	19100	471
1992	14802	16
1993	11601	12
1994	14854	352
1995	10040	407
1996	10776	132
1997	11340	210
TOTAL	167373	3544

HO: Ps1 = Ps2 (there is no different in the level of treatment)

H1: Ps1 = Ps2 (there is difference in the level of treatment)

& = 0.05 (level of significant)

Psi = D/C where D = number of Deaths

C = Total no. of cases

Psi = proportion of group

I= 1, 2

Ps_1 = 1816/70283 = 0.025838396

Ps_2 = 3544/167373 = 0.021174263

P = is used as an Estimate of the period proportion

$$P = \frac{N1\ Ps1 + N2\ Ps2}{N1 + N2}$$ (the pooled estimate of the standard error)

$$= \frac{1816\ (0.025838396) + 3544\ (0.021174263)}{1816 + 3544}$$

$$= \frac{46.9225275 + 75.04158974}{5360}$$

$$= \frac{121.9641172}{5360}$$

$$= 0.022754499$$

$q = 1 - P$

$= 1 - 0.022754499$

$= 0.977245501$

$$^{\delta} Ps1 - Ps2 = \sqrt{P(1-P)(\frac{1}{N1} + \frac{1}{N2})}$$

$$= \sqrt{(0.022754499)(0.977245501)(\frac{1}{1816} + \frac{1}{3544})}$$

$$= \sqrt{0.000018451937}$$

$= 0.0043034$

TEST STATISTICS: Zc

$$Zc = \frac{Ps1 - Ps2 - 0}{\delta Ps1 - Ps2}$$

$$= \frac{0.025838396 - 0.021174263}{0.0043034}$$

$$= \frac{0.0046647}{0.0043034}$$

$= 1.083825$

Z table

$$Z_{1-\frac{\alpha}{2}} = Z.975 = 1,96$$

DECISION RULE:

Reject HO if $Zc > Z_1 - \alpha / 2$ otherwise do not reject HO.

Conclusion: Since $Zc < Z_1 - \alpha / 2$ that is $1.084 < 1.96$ we have no statistical reason to reject HO and conclude that there is no difference in the level of treatment. I.e. NPI has no impact in the diseases.

WHOOPING COUGH

1ST PERIOD

YEAR	CASES	DEATH
1980	88626	101
1981	83722	221
1982	77830	73
1983	70024	77
1984	62751	61
1985	92266	166
TOTAL	475219	699

2ND PERIOD

YEAR	CASES	DEATH
1986	42193	101
1987	54303	112
1988	49400	99
1989	44497	81
1990	39594	96
1991	34691	66
1992	29788	76
1993	24884	73
1994	19981	56
1995	15078	60
1996	10174	61
1997	5271	61
TOTAL	369854	942

Ho: Ps1 = Ps2 (There is no different in the level of treatment)

HI: Ps1 = Ps2 (There is difference in the level of treatment)

α = 0.05 (level of significant)

Ps1 = D/M where D = number of Death

M= Total no. of cases

Ps1 = Proportion of group

I = 1, 2

$$Ps1 = \frac{699}{475219} = 0.0014709$$

$$Ps2 = \frac{942}{369854} = 0.00254695$$

P is used as an estimate of the period proportion

P = N1 Ps1 + N2 Ps2 = poolewd estimate of the standard error.

N1 + N2

$$= \frac{699\ (0.0014709) + 942\ (0.00254695)}{699 + 942}$$

$$= \frac{1.0281591 + 2.3992269}{1641}$$

$$= \frac{3.427386}{1641} = 0.0020886$$

$$= \frac{3.427286}{1641} = 0.00208866$$

q = 1-p

= 1-0.0020886

= 0.99791

$$^{\delta} Ps1 - Ps2 = \sqrt{P(1-P)(\frac{1}{N1} + \frac{1}{N2})}$$

$$= \sqrt{(0.0020886)(0.99791)(\frac{1}{699} + \frac{1}{942})}$$

$$= \sqrt{0.0000051943}$$

$$= 0.0022791$$

TEST STATISTICS Zc

$$Zc = \frac{Ps1 - Ps2 - 0}{\delta Ps1 - Ps2}$$

$$= \frac{0.0014709 - 0.00254695}{0.0022791}$$

$$= -0.472138$$

Z table = Z1 - &/2 = 1.96

Decision Rule

Reject HO if Zc > Z table otherwise do not reject HO

Conclusion

Since $Zc < Z_1 - \alpha /2$ we have no statistical reason to reject HO and conclude that there is no difference in the level of treatment.

POLIO DISEASE

1ST PERIOD

YEAR	CASES	DEATH
1980	1620	117
1981	1340	181
1982	1456	199
1983	1719	170
1984	1207	188
1985	1038	116
total	8380	971

2ND PERIOD

YEAR	CASES	DEATH
1986	707	-
1987	769	3
1988	830	1
1989	318	5
1990	873	29
1991	842	-
1992	957	1
1993	383	1
1994	502	-
1995	439	4
1996	541	-
1997	492	-
TOTAL	7653	44

HO: Ps1 = Ps2 (There is no different in the level of treatment

HI: Ps1 = Ps2 (There is difference in the level of treatment)

$\alpha = 0.05$ (level of significant)

Psi = D/M where D = number of Deaths

M= total number of cases

Psi = Proportion of group I

I = 1, 2

$$Ps1 = \frac{971}{8380} = 0.115871121$$

$Ps2 = \frac{44}{7653} = 0.0057494$

P = is used as an estimate of the period proportion

$P = \frac{N1\ Ps1 + N2\ Ps2}{N1 + N2}$ = The pooled estimate of the standard error

$= \frac{971\ (0.005871121) + 44\ (0.0057494)}{971 + 44}$

$= \frac{112.7638312}{1015}$

=0.11109737

q = 1-p

= 1-0.11109737

= 0.888902629

$$^{\delta} Ps1 - Ps2 = \sqrt{P(1-P)(\frac{1}{N1} + \frac{1}{N2})}$$

$$= \sqrt{(0.11109737)(0.888902629)(\frac{1}{971} + \frac{1}{44})}\ )$$

$= \sqrt{0.00234613}$

= 0.048436866

TEST STATISTICS : Zc

$Zc = \frac{Ps1 - Ps2 - 0}{\delta Ps1 - Ps2}$

$= \frac{0.115871121 - 0.0057494}{0.048436867}$

=0.110121721

=2.2735104

Z (Table)

$Z1 - \alpha / 2 = Z.975 = 1.96$

DECISION RURE

Reject HO if Zc > Z table otherwise do not reject HO

CONCLUSION:

Since Z compared = 2.2735104 is greater than Z table = 1.96 we reject HO and conclude that there is different in the level of treatment.

CHAPTER FOUR

4.0 SYSTEM DEVELOPMENT AND IMPLEMENTATION

4.1 CHOICE OF SOFTWARE AND PROGRAMMING LANGUAGE

The software to be used for this project are the Ms – Dos and D Base.

The Ms-Dos is needed essentially to boot the hardware (i.e. computer machine) and make it ready to carry out necessary instructions that will subsequently be given to it.

The Qbase is the main software to be used in the system development.

One good thing about Basic is that it encourages running the computer in an interactive mode. As soon as the user submits a program and some data to the computer, the computer executes the program, produces the result back to the user immediately.

In this way, it is easy for the user to find out whether the program is working properly or there is a bug.

Qbasic is a computer and supports blocked operations particularly structured programming than those before it.

4.2 HARDWARE OPERATIONS

In order to use the software, the hardware must first of all be activated using Ms-Dos.

The first stage is the booting of the machine. This booting is of two types namely cold booting and warm booting.

COLD BOOTING: This is an act of setting the computer on for operation by connecting it to electrical source. To do this, the system diskette (DOS) is inserted into the drive A of the computer. The computer is then connected to the electrical source and switched on. After some seconds, the screen (VDU) will display the DOS date and will require the user to enter the current date.

WARM BOOTING:

This is a way of initializing the computer without switching it off and on.

On most MS-DOS computer this is accomplished by simultaneously pressing three keys:

CTRL ALT DEL

Hold down CTRL and ALT key and press DEL

Some computers have a separate reset button instead.

4.3 SOFTWARE OPERATION

The new software can only be put to work only when q basic environment is activated i.e. after your PC have been booted the prompt signs C:/> will be visible on the screen. This C:/> shows that you are currently working on drive C and the sign> indicate that computer is ready for your command.

Since the qb package have been installed on the system with name q base under sub directory q base then type CD q base to get into this subdirectory i.e. C:/> cd q b then you will be prompted with C:/> to get into q basic environment then type q base i.e. C:/> Now you are at the dot prompt of q basic environment.

To gain access into the new software, use the command; From C:\> Type CD\QB and press ENTER key, then type QB and press ENTER key, then press and hold ALT key and press F, select OPEN and type BALOGUN and press ENTER key, then press F5 key. Introduction will be displayed and you will be prompted to enter password in order to be able to make use of the new software.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATION

5.1 CONCLUSIONS

This study was to computerize the assessment of the impact of National programmes on immunization in Nigeria.

The statistical analysis used in chapter three helped so much in achieving the aim and objective of this study.

The test of different of proportion was used to access the impact of National programmes on immunizations in Nigeria and the results was satisfactory. I therefore encourage the intending researcher to embrace the statistical test for future assessment because of its accuracy and reliability.

The analysis of data collection for this project was computerized using QBASIC computer language. With the aid of QBASIC language, we have developed a package that can be used to access the impact of National progammes on immunization in Nigeria periodically. The package can be used to access other related programmes.

During the course of running the program for this project, I was able to get used to more computer functions and this has broaden my knowledge of computer system.

5.2 RECOMMENDATION

From the analysis, findings and conclusions in the study, the objectives and aims have so far been achieved and bearing in mind that the impact of child health care programmes on our children cannot be over emphasized, the researcher wishes to recommend the newly developed software packages in this study to the Federal Government of Nigeria and states alike for periodical assessment of the impact of National programmes on Immunization in the lives of Nigerians in other to avoid wastage of funds.

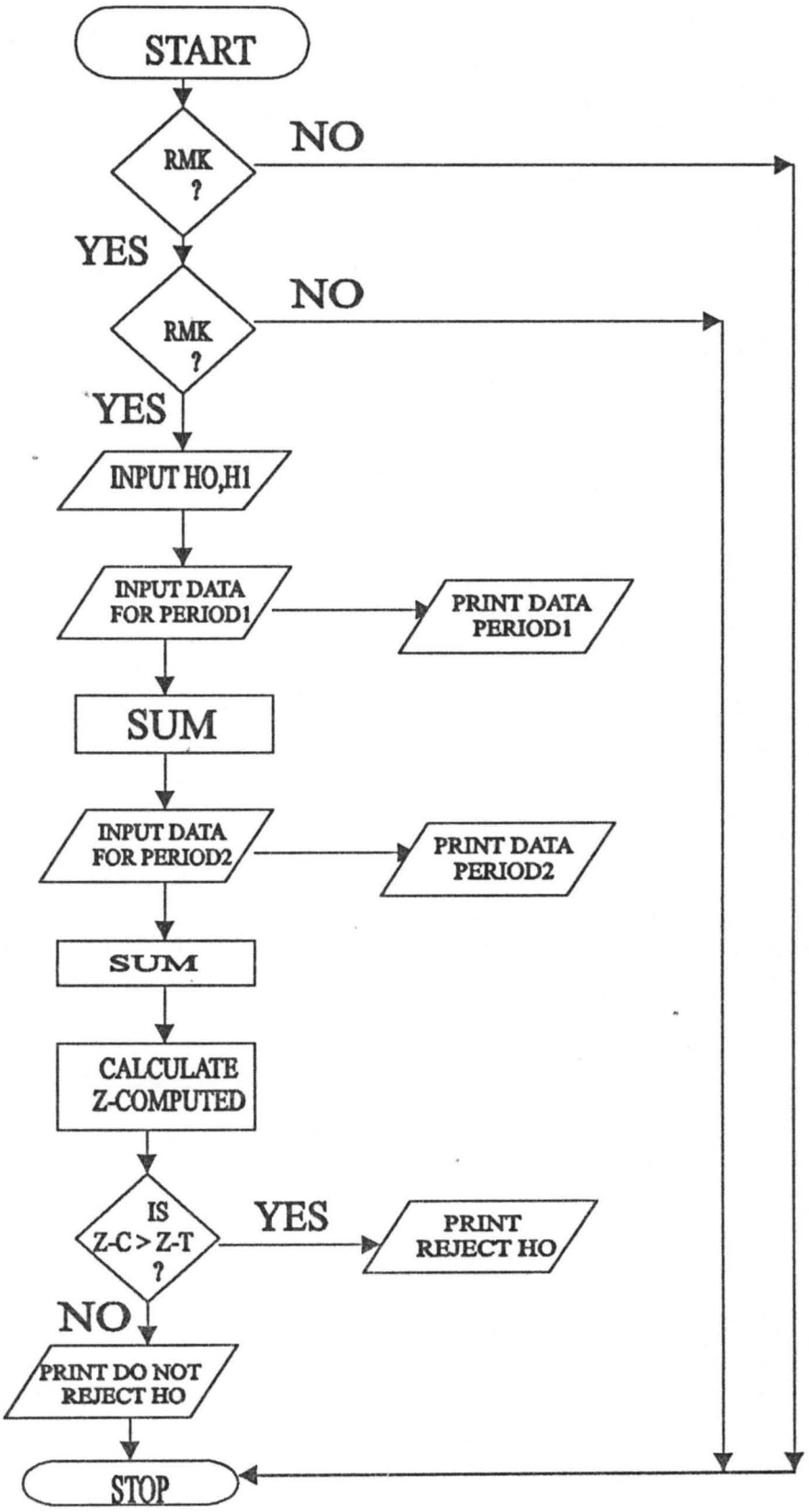
BIBLIOGRAPHY

1. Abdulraheem K. (1996). Computer progrmming made easy F.U.T Minna. [UNPUBLISHED]
2. Expanded Programme on Immunization (1981), published by the Federal Epidemiological Unit, Lagos.
3. H.R. Neave- Ohingham University, Statistical table Page 35 (C.D.F of the standard normal distribution).
4. MURRAY R.S (1987), Schaunis outline series Theory and problems of probability and statistics, Me Graw-hill Book Co, Singapore Pages 211-25.
5. Richard w. Hoth Basic data procossing (second Edition) prntice hall INC.

APPENDIX A

SYSTEM FLOW CHART

FLOW CHART



APPENDIX B

PROGRAM CODES

```
CLS
REM MAIN MENU
FOR M = 5 TO 22
FOR N = 15 TO 70
LOCATE M, N
PRINT "*"
NEXT N
NEXT M
FOR L = 7 TO 20
FOR R = 17 TO 68
LOCATE L, R
PRINT " "
NEXT R
NEXT L
LOCATE 9, 22: PRINT "THIS PROGRAM IS DESIGN"
LOCATE 11, 20: PRINT "FOR THE TEST OF HYPOTHESIS"
LOCATE 13, 21: PRINT "USING DIFFERENT OF PROPORTIONS AS"
LOCATE 15, 21: PRINT "STATISTICAL TOOL"
LOCATE 17, 21: INPUT "DO YOU WISH TO USE THIS TOOL (Y/N) :",
QUES$
IF QUES$ = "N" THEN GOTO 1000
IF QUES$ = "Y" THEN
CLS
```

```
FOR M1 = 5 TO 22
FOR N1 = 15 TO 70
LOCATE M1, N1
PRINT "="
NEXT N1
NEXT M1
FOR L1 = 7 TO 20
FOR R1 = 17 TO 68
LOCATE L1, R1
PRINT " "
NEXT R1
NEXT L1
LOCATE 9, 19: PRINT " YOU CAN ONLY COMPARE TWO PERIOD"
LOCATE 11, 19: PRINT "YOU NEED TO TELL ME THE NUMBER OF"
LOCATE 13, 19: PRINT " YEAR YOU WANT TO COMPARE BOTH"
LOCATE 15, 19: PRINT "FIRST AND SECOND PERIOD"
LOCATE 17, 20: PRINT "GET READY TO ENTER YOUR DATA"
LOCATE 20, 22: INPUT "CAN I CONTINUE (Y/N):", QUEST2$
IF QUEST2$ = "N" THEN GOTO 1000
IF QUEST2$ = "Y" THEN
CLS
LOCATE 10, 5
INPUT "ENTER THE NULL HYPOTHESIS:", HP$
LOCATE 12, 5
INPUT "ENTER THE ALTERNATIVE HYPOTHESIS:", HP2$
LOCATE 15, 5
```

```
INPUT "DISEASE NAME:", HP3$
CLS
LOCATE 8, 29
PRINT " DISEASE NAME :"; HP3$
LOCATE 10, 24
INPUT "HOW MANY YEAR FOR THE 1ST PERIOD:", A
D = 0
F1 = 0
K = 14
LOCATE 12, 20: PRINT " YEAR    CASES    DEATH "
10 LOCATE K, 20
INPUT YI
LOCATE K, 30
INPUT C1
LOCATE K, 39
INPUT D1
SUM2 = SUM2 + C1
SUM3 = SUM3 + D1
K = K + 1
D = D + 1
IF D = A GOTO 30
GOTO 10
30 REM PRINT SUM2, SUM3
CLS
LOCATE 8, 24
INPUT "HOW MANY YEAR FOR THE 2ND PERIOD:"; B
```

```
LOCATE 10, 20: PRINT "YEAR      CASES      DEATH "
L = 12
40 LOCATE L, 20
INPUT Y2
LOCATE L, 30: INPUT C2
LOCATE L, 39: INPUT D2
SUM4 = SUM4 + C2
SUM5 = SUM5 + D2
L = L + 1
F1 = F1 + 1
IF F1 = B THEN GOTO 50
GOTO 40
50 REM PRINT "SUM4,SUM5"
PS1 = SUM3 / SUM2
PS2 = SUM5 / SUM4
REM PRINT"PS1=";PS2
P = (SUM3 * PS1 + SUM5 * PS2) / (SUM3 + SUM5)
Q = 1 - P
TS = P * Q
TS1 = (1 / SUM3) + (1 / SUM5)
TS2 = TS1 * TS
TS3 = SQR(TS2)
CLS
LOCATE 2, 20: PRINT "HO: PS1=PS2 :"; HP$
LOCATE 4, 20: PRINT "H1: PS1<>PS2 :"; HP2$
LOCATE 6, 20: PRINT "ALFA=0.05 LEVEL OF SIGNIFICANCE"
```

```
LOCATE 8, 20: PRINT "TEST STATISTICS=Z - COMPUTED"
ZC = (PS1 - PS2) / TS3
ZT = 1.96
IF ZC > ZT THEN
LOCATE 15, 20: PRINT "REJECT HO SINCE Z-COMPUTED IS GREATER
THAN Z-TABLE"
LOCATE 17, 20: PRINT "CONCLUSION: THERE IS DIFFERENCE"
ELSE
LOCATE 15, 20: PRINT "DO NOT REJECT HO SINCE Z-COMPUTED IS
LESS THAN Z-TABLE"
END IF
REM PRINT"P=";P
REM PRINT"Q=";Q
REM PRINT"TS=";TS2,TS3
REM PRINT"ZC=;ZC
END IF
END IF
LOCATE 10, 20: PRINT "Z-COMPUTED="; ZC
LOCATE 12, 20: PRINT "Z-TABLE="; ZT
1000 END
```

POLIO DISEASES

HOW MANY YEAR FOR THE 1ST PERIOD:6

YEAR	CASES	DEATH
? 1980	? 1620	? 117
? 1981	? 1340	? 181
? 1982	? 1456	? 199
? 1983	? 1719	? 170
? 1984	? 1207	? 188
? 1985	? 1038	? 116

HOW MANY YEAR FOR THE 2ND PERIOD:? 12

YEAR	CASES	DEATH
? 1986	? 707	? 0
? 1987	? 769	? 3
? 1988	? 830	? 1
? 1989	? 318	? 5
? 1990	? 873	? 29
? 1991	? 842	? 0
? 1992	? 957	? 1
? 1993	? 383	? 1
? 1994	? 502	? 0
? 1995	? 439	? 4
? 1996	? 541	? 0
? 1997	? 492	? 0

PS1=PS2 :THERE IS NO DIFFERENCE IN THE LEVEL OF TREATMENT

PS1<>PS2 :THERE IS DIFFERENCE IN THE LEVEL OF TREATMENT

ALFA=0.05 LEVEL OF SIGNIFICANCE

TEST STATISTICS=Z - COMPUTED

Z-COMPUTED= 2.273511

Z-TABLE= 1.96

REJECT HO SINCE Z-COMPUTED IS GREATER THAN Z-TABLE

CONCLUSION: THERE IS DIFFERENCE

y to continue

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, NIGERIA

Your Ref
Our Ref

Tel: 222887 Ext 33
PMB 65, Minna

DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE

Head of Department: Dr. Sunday A. Reju
(B.Sc., M.Sc., Ph.D., MMAN, MCOAN, MSTAN, MNSA)

30th September, 1999

TO WHOM IT MAY CONCERN

This is to introduce BALOGUN A. ADEKUNLE with registration number PGD/MCS/635/97/98 to your organisation. He/She is an POSTGRADUATE student of this Department.

He/She would like to use your organisation for some information regarding his/her project topic: COMPUTERIZED ASSESSMENT OF THE IMPACT OF NATIONAL PROGRAMS ON IMMUNIZATION (NPI) IN NIGERIA.

Please kindly give him/her the necessary assistance.

Thanks for your cooperation.

DR. S.A. REJU
Head of Department.