

AUTOMATION OF MEDICAL DEPARTMENT IN AN INDUSTRY

CASE STUDY: MEDICAL DEPARTMENT

NIGERIAN BREWERIES PLC - KADUNA

KADUNA STATE

BY

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CERTIFICATION

This is to certify that this project entitled “Automation of Medical Department in an industry” by Samuel E. Okpara meets the regulations governing the award of Post Graduate Diploma of the Federal University of Technology, Minna, Niger State.

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DEDICATION

This project is dedicated to Our Lord God Almighty, the creator of Heaven and earth.

ACKNOWLEDGEMENT

I give God the glory, honor and adoration for the successful completion of the project. I will continue to praise His holy name. The lord is abundant in mercy, this I know.

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ABSTRACT

There are many Industrial processes that can be automated but the focus of this study is the Automation of Medical Department, Nigerian Breweries Plc – Kaduna.

The programming language used in this project is Visual Basic. The Microsoft visual basic is an object oriented programming language of the fifth generation, which is window-based package.

The project work also sought for a more accurate, efficient and reliable method of keeping records, diagnosing diseases, treatment and conducting medical research in Nigerian Breweries plc in general and Kaduna location in particular.

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CHAPTER ONE

GENERAL INTRODUCTION

1.1 INTRODUCTION PATIENT RECORD

The evolution of information technology has brought about changes in the method of presenting data. Information technology offers the opportunity to collect and store enormous volumes of data, process business transaction with great speed and accuracy, and provide timely and relevant information for management.

A computer application system, which is computer-based solution to one or more business problems or needs therefore, becomes very paramount. Today, it is hard to imagine any system that has not been affected by computer information systems and computer applications. The fields of engineering, agriculture, medicine, quantity surveying, estate management and other businesses use computer applications. Indeed, many businesses consider management of their information resource to be equal in importance to managing their property, facilities, employees and capital. Consequently, the use of a computer- based system in the Medical department in an Industrial set up becomes inevitable.

An automated medical department will appreciate the use of the computer in diagnosis of diseases, updating files of patients, analyzing laboratory results and booking for consultations. An automated medical department enables the doctor to have access to patients' medical record such as family history, past medical history, drugs tests, surgeries and general treatment. This automation ensures that these records are precise, complete, unambiguous, well organized, accurate and easily accessible.

1.2 Problem Definition

Despite the organization and re-organization, which the Medical department has passed through, it is sad to note, that there are problems associated with its operations.

Manual method of operation dominates the activities in the Medical Department with lot of paper work being involved.

Some other problems are:

Absence of Departmental Manager or a Senior Supervisor to sign “Medical Form C” for a patient as authority to attend clinic, hinders smooth operation.

Inadequate storage facilities like File Cabinets, Shelves, etc.

Inability to cope with growing mass of paper due to lack of storage.

File Jackets are susceptible to wear and tear leading to loss of information.

Retrieval of information on a patient is slow.

When a patient cannot remember his/her Card Number, it is usually difficult to trace his File Jacket.

Lack of confidentiality in method of storing information.

Preparation of Statistical Report takes great deal of time and energy.

Occasionally, File Jackets are misplaced as a result of human error.

1.3 Aims and Objectives

The aims and objectives of this project work relate to automating patients medical records. This automation will enhance the following:

To improve performance of medical personnel in the clinic.

To eradicate delay associated with manual search for patient's file jacket.

To ensure neat and accurate keeping of patients' records.

To eliminate duplication of records.

To ensure faster means of preparing statistical record to check epidemics.

To enhance disease eradication through research work aided by the computer.

To provide a more adequate and reliable method of storing vast volume of data, and retrieval of records.

To provide a more reliable, timely, and accurate information about patients.

To reduce cost and to increase profit margin.

To contribute to the current information technology advancement.

1.4 Historical Background of the Case Study

The Kaduna branch of Nigerian Breweries Plc was declared open on 11 January 1964 by the then Honorable Minister of Trade and Industry, Northern Nigeria, Hon. Michael Audu Buba (O.B.E, M.H.A) and the Wazirin Shendam.

The Medical Department of Nigerian Breweries plc Kaduna Branch started operation in the early 70s.

The first medical Doctor was Dr Seravirani (Dutch) in the 1978.

The First Administration Manager was Mr. Sa'akwem.

The first staff Manager was O. Ala who reported to Administration Manager. Later the positions of Administration Manager and Personnel Manager were merged and designated Human Resource Manager.

Dr J. Abebe succeeded Dr Seravirani when the latter returned back to Holland. After the Departure of Dr Seravirani, subsequent Doctors came from the U.A. C congloromate. They were not resident but visiting Doctors. Dr Adewunmi took over from Dr Abebe in the 80s. After Dr Adewunmi, came Dr A.A. Adeyera and presently Dr R. Ajayi.

Mrs. Fasanu was the first Nursing Sister in the 70s. In the early 80s, Sister Mohammed succeeded her. Later, Mrs. S.K Adanu was employed in 1985 as staff nurse but later upgraded to Nursing sister. Other medical staff in the Dept was categorized into Dressers, Attendants, Auxiliary Nurse and record Clerk. They were – M. Biniki (Attendant), Mrs. V. Onyekwe (Auxiliary), Ishaya Jatau (Auxillary Nurse), Francis Mayaki (Record Clerk), Simon Kuka (Auxillary Nurse), Yakubu Bugai (Auxillary Nurse), Michael Unubi (Record Clerk), Bawa Malachy (Auxillary/Record Clerk) Etc

The Medical Dept went through transformation in the year 2002. It recruited two Industrial Nurses. In year 2004, the Company decided to employ Resident Doctor. Dr R Ajayi who was then a visiting Doctor succeeded in the Interview. Currently, the Dept has four industrial Nurses (R. Aremu, A. Usman, C. Olofu, S. oghoghoirhiere), Head of Industrial nurse (Mrs. P Jalijah) and a Resident Doctor (Dr R. Ajayi).

1.4 Scope and Limitations

It is worthy of note that there are different types of Automation, different types of Health care systems. The scope of this project is limited to Automation of Medical Department of Nigerian Breweries Plc – Kaduna.

Consequently, a more accurate, time saving, reliable and efficient method of processing patients' information would be designed.

The limitations that this project would encounter include the provision of computer facilities and educating the staff. These problems are overcome because the company has the capability to budget for this automation. Furthermore, literacy is one the core competencies of the Organization. As a result about 99% of staff are literate. So it becomes easier to carry staff along in the automation process.

Due to the dynamic nature of information technology, a faster and more accurate method will develop in the future. Nevertheless, this project forms the basis for further research and development.

CHAPTER TWO

LITERATURE REVIEW

Mcgraw-hill encyclopedia of science and technology defines computer as a device that receives, processes and presents information.

When computers were introduced in the early seventies in hospital administration, they were primarily used for accounting processes and record keeping. Currently, the trend has changed. In today's world, hospitals or medical departments are equipped with computers.

Computers aid doctors and health personnel in medical research and surgeries the computerized medical department will have paper work reduced to the barest minimum. Computers are used in administering administrative duties such as the time a patient arrives at the clinic, departure time, medication, appointment etc. These pieces of information are entered into the patient database file. In this way it is easier to store, retrieve and analyze information than the manual way of record keeping.

The importance of the computer to the pharmaceutical industry cannot be ignored. With the advent of computer, new drugs, side

effect, government approval on drug, allergies and its prescription can be recorded and monitored with ease, unlike in the manual form. With the help of the computer, database can be created for the patient with their information. It will assist pharmacist in filling the medication for the patient. Computer is a useful tool in health care delivery.

Cox and Groves (1975) in their book 'Design for health care' classified health care into three categories- Primary, Secondary and Tertiary care.

The primary levels are those health services, which are based in the community and relatively accessible to patients and their families such as immunization program antenatal and childcare and simple diagnosis and treatment.

At the secondary level is the general hospital to which patients from a wide surrounding area are referred when necessary by primary care units for more sophisticated diagnosis.

Tertiary care is at regional leveling the more highly specialized hospital (Teaching Hospital) This is larger than general hospital and has a greater emphasis on teaching, particularly of doctors. There is close relationship with medical school and with medical research

Cox (1981) went further to enumerate the problems facing primary health care such as finances and manpower. He advocated that running a small size medical unit will require much smaller number of staff with less specialization of task. This is applicable to the Medical department, Nigerian Breweries Plc.

Henry Miller (1968), in his book “Modern medical treatment” opined that the first essential treatment is diagnosis, which is based on history, a careful analysis of the morphology and distribution of the rash, and the finding of any relevant physical signs on the other systems supported by investigation.

P. R. Uldall (1975), in his book “renal disease” admitted the role of the computer in modern medicine when he said and I quote ‘The explosion of knowledge relating to renal and urinary tract disorders over the past fifteen years has received its main impetus from the development of reliable methods for supporting life during renal failure’

On the impact of computer to the society, R.W. Hamming and G. A. Silver asserted the process of pictorial communication, (computer graphics) between men and computers by imputing problems to computers and receiving answers. According to

Hamming and Silver, computer produced graphs and charts are sufficiently readable to permit direct use in reports, eliminating laborious and costly manual plotting and drafting.

R. Brechtlein, in his book – “Comparing disc technologies, Datamation” published Jan, 1978, applauded the computer for its high processing speed and the high memory and ability to store large volume of data in storage devices. Manually, it would be difficult to store such volume of data.

Chao C. Chien in his book –“Computer essentials” opined that we could use the computer to diagnose a disease without having to cut open the body. According to him, a lot of research would never have taken place at all had not computers been there first.

He further advocated that the bigger computers had no place in the managerial office, where automation only spread with the advent of microcomputers. The electronic spreadsheet replaced reams of papers with disks and hand drawn charts with charts on screen. Electronic file handling replaced data in file. Chao went further to describe an automated department as such “the entrance of the computer through the office door created the phrases ‘paperless office’ and ‘automated office’”. This is not to say that the modern office can do without paper

altogether, or that robots run the modern office. Instead, these terms convey a sense of order, efficiency, and improved productivity. No matter how much automation is involved, paper will always be required.

Chao however, noted negative impact of computer when he noted that “our contemporary lifestyle have been conditioned not only by the computer but by the new computer applications that are daily modifying the ways in which we live, see, hear, feel and think”.

On computer and health, Alexis and Mathew Leon posited that if stress factors in the work place are reduced and operator comfort is enhanced, then it is very likely that workplace and work related injuries will be reduced. Physical and cognitive work involves interaction between humans and machine. The elements of the human-machine systems are: human, interface, machine and environment. Whenever these four elements are in harmony, the injury potential is minimized, if not eliminated.

On the application of computer to scientific endeavors, Alexis wrote “scientists use computers to develop theories, to collect data and test data, and to exchange information electronically with colleagues around the world”. Researchers can access databases in

distant locations – all without going any farther than the closest computer. In his topic “computer in medicine” Alexis wrote “computers are used for everything in medicine, from diagnosing illnesses and monitoring the patients to controlling movements of robotic surgical assistants”. This can be used for tasks that vary in complexity from recording of patient’s history and treatment details to monitoring the patients. Computers are used in automating the medical systems so that the information about the patient – the patient history, the treatment details etc are available to the doctors.

The advantages of the electronic patient record over the paper work counterpart is that the electronic documents can be searched for specific keywords, can be sent via e- mail to other doctors for second opinion, can be stored and retrieved more effectively, and so on. The computerized system automate the billing, and other administrative process, thus freeing the doctors and medical staff, so that they can spend more time on practicing medicine.

The advancement in digital and imaging technology have helped in better diagnosis as the images and outputs produced by the latest equipment are capable of delivering more information.

Advancement in the field of biomedical engineering results in development of laboratory and medical equipment that are better and more accurate. The pacemaker computer operates within the human body to help it function better. The Cochlear Implant- a hearing aid allows profoundly deaf people to hear. Tiny computers when swallowed provide valuable diagnostic tool when they navigate the twists and tight spaces in the body and transmit photographs of internal problems such as blood clots and tumors that previously could be seen only during exploratory surgery.

Computers play a vital role in patient monitoring and automated drug administration. In hospitals, bedside clinical information systems collect vital-sign measurements directly from patient's monitors and automate the charting process.

The modern drug administration systems automate the process of administering medicine to patients.

Magnetic Resonance Imaging (MRI) uses radio waves and strong magnetic field to scan a patient's body. A computer assembles this information into a picture that shows internal organs and certain types of diseased tissue. Another use of the computer in the medical field is in the automated imaging technique, which produces a fully

dimensional picture with much more detail and less risk than the standard x-ray films. Using this technique, doctors can look inside a person's body and study each organ in detail.

Video conferencing and other related technologies help in the collaboration of doctors from different parts of the world.

Advancement in telemedicine have made the life of patients easier and enable them to get high quality medical care irrespective of their physical location. Telemedicine is the use of technology to deliver medical services to the point of need. It uses electronic information and communication technologies to provide and support health care when distance separates the participants.

CHAPTER THREE

SYSTEM ANALYSIS AND DESIGN

3.1 System Analysis

The primary focus is the analysis of the current record keeping of Medical Department, Nigerian Breweries plc – Kaduna. This analysis will thereafter, justify its automation.

3.2 The Existing System

The Medical Department operates twenty-four hour service. A Resident Doctor is the head of the Department. Next to the doctor is the Head Industrial nurse. The other Industrial nurses are on Senior Supervisor level.

The staff strength of the Medical Department is six.

Currently, the method of record keeping in the clinic is manual.

The following procedure is followed:

One of the processes of securing employment with the organization is to pass through Medical Examination, which is conducted by a Doctor or a Nurse. Candidate that passes Medical Test has file jacket opened for him/her.

The information contained in the jacket include:

Medical Registration Number is allocated serially to the successful candidates. The serial numbering of File Jacket is based on date of Employment.

The patient fills Medical History Form.

Personal Data Information included in the File Jacket are:

Patient's Name, Registration Number, Sex, Marital Status, Date of Birth, Age, Occupation, Religion, Place of Origin, Tribe, Telephone Number, Name and Address of Next of kin, etc.

The File Jacket also contains forms on which Doctors and Nurses record observations and request. File Jackets are kept in a cabinet in serial form using patient's Registration Number.

The Jackets are retrieved during Consultation. They are returned to same position in the cabinet after Medical attention is concluded.

For cases requiring Laboratory test, X-ray for confirmation of diagnosis, the Doctor or staff on duty fills forms for such services, which are rendered by outside contacts.

The patient goes for such examination and thereafter brings result back to the clinic.

Based on the result of the test, the patient may require further treatment.

At the end of the day, the statistical report is compiled. The essence is to check if there is outbreak of Epidemics. The Report also forms part of Period End Reports.

Nigerian Brewery plc runs Medical Capitation in addition to the company's clinic.

Every permanent employee, his/her spouse and minimum of five children qualify for this Capitation (Medical Insurance Scheme). Each Brewery location has designated Hospitals for the Scheme. The Hospitals are selected based on merit and proximity to staff residents. The Capitation Hospitals in Kaduna Location are: Tim Unity and Specialist Hospital; Beto Hospital in Badikko by Nnamdi Azikiwe Express Way; Ishiaku Hospital by Station Round About; Maneks Hospital in Kakuri; and Alba clinic along Constitution Road, Kaduna; Mends Hospital, Angwa Rimi.

However, a window of Change is opened to any staff after every six months if dissatisfied with his/her present Capitation Hospital.

Employees living outside Production Plant also have designated Hospitals they attend.

The outlets belonging to Kaduna Plant are Jos, Abuja, and Kano Regions.

Hygia Consult is administering the Medical Capitation.

With Hygeia Registration Card an Employee can receive treatment in any part of the country in any standard hospital especially under emergency.

For more information on Hygia Consult and Medical Capitation, see appendix IV

3.3 Problems with the existing system

Manual method of operation dominates the activities in the Medical Department because lot of paper work is involved.

Other constraints with the present system are:

Absence of Departmental Manager or a Senior Supervisor to sign “Medical Form C” for a patient as authority to attend clinic. This hinders smooth operation.

Inadequate storage facilities like File Cabinets, Shelves, etc.

Inability to cope with growing mass of paper due to lack of storage space.

File Jackets are susceptible to wear and tear leading to loss of information.

Retrieval of information on a patient is slow.

When a patient cannot remember his/her Card Number, it is usually difficult to trace his File Jacket.

Preparation of Statistical Report takes great deal of time and energy.

Occasionally, File Jackets are misplaced as a result of human error.

Mistakes can occur in manual preparation of reports.

3.4 Methodology

The method used in collection of data and its analysis is:

Interview: the Doctor, Head Industrial Nurses and other Industrial Nurses of the Medical Department were interviewed on method of admission of patients, records keeping, and administration of drugs. Medical record is inspected.

Careful study of the existing system- the Capitation and the Hygeia Program.

3.5 System Design

Definition: System Design is the drawing, planning, sketching, or arranging of many separate elements into a viable unified whole.

System Analysis on the hand focuses on what the system does or what it should be doing to meet the needs of the users.

A Database is a collection of useful information organized in a specific manner. It is an organized and integrated collection of data.

See Appendix III for system design flow chart.

A Database Management System (DBMS) can be defined as software package, which manage large and complex file structure.

The DBMS will store the data and the data relationships on the backing storage device.

A tabular form of database was used so as to follow the standard requirement of database design called RDBMS (Relational Database Management System).

Ted Codd first described a RDBMS. A Relational Database Management System therefore makes Database easily accessible to the Programmer, Operating System and Information User. With this System, the Physical layout of data field can be altered without

necessitating changes in the application program. A DBMS performs the Following task:

Add records

Modify records

Display records

Delete record

Organize record

Summarize record

Extract record

Print record

Easy retrieval of information

The Database of the system is named medical.mbd. It is designed with Microsoft Access 2000. It has relational tables as Biodata, History and laboratory results.

Biodata:

The Biodata table keeps information about a patient and every data related to the patient. It has First name, Other name, Last name, Staff Registration number, Sex, Marital status, date of birth, Age, Occupation, Department, Date of Employment, Religion, Home

address, Telephone number, Next of kin first name, Next of kin Other name, Next of kin last name, Relationship, Next of kin Telephone number, Next of kin Address, next of kin Local Government and State of origin.

History:

The history table keeps record about the Employee's attendance to the clinic, the past illnesses associated with the employee and his /her family. It has the following Fields;

Employee number, Drug History, Surgical, Chronic illness, Family illness, past illness, Examination, Therapy, Complaints, Diagnosis and Prescription.

Laboratory Results:

The table keeps records of test carried on the employee in medical laboratories. It has the following field: Employee's Number, Request, Nature of Specimen, Date collected, Diagnosis and Laboratory Technician's name.

3.6 The Design of the Proposed System

The Input format comprise of:

Method of data collection and its validation.

The various input media.

The design of input layout.

The input format in this automation design is the Keyboard and the mouse.

Data are keyed into the computer with the keyboard. The mouse is used in accessing the various form required by the user.

The input design varies from as the information required varies in the Medical Department.

The way the input design is made will influence the output structure.

The following are the input specification in tabular form: -

PATIENT DATA BASE FILE (DBF)

<u>Field name</u>	<u>Data Type</u>	<u>Field Length</u>
Registration number	Memo	10
Surname	Text	15
Other names	Text	30
Date of birth	Date/time	N.A.
Sex	Text	1

Height	Memo	N.A.
Genotype	Text	2
Blood group	Text	3
Passport photograph	Text	50
Occupation	Text	15
Address	Memo	60
Special information	Text	100

DOCTOR'S DATA BASE FILE (DBF)

Field name	Data Type	Field Length
Surname	text	15
Other names	text	30
ID Number	memo	10
Specialization	text	30
Passport Photograph	text	50

The above database is for the Medical Doctor in the Brewery Location

It is designed to give the doctor special access to some information,

and restrict others from such information.

DISEASES DBF

Field name	Data Type	Field Length
TYPE	Text	20
Date of Occurrence	Date/Time	N. A
Patient ID	memo	10

The type of disease, date of occurrence and the patient associated with it, is shown by the above data.

DRUG DATA BASE

Field name	Data Type	Field Length
Drug Name	Text	20
Drug Number	Memo	10
Drugs Received	Text	20
Drugs Purchased	Text	20
Date Purchased	Date/Time	N. A

The above is data base file for Drugs. It gives information about Drug Name, Drug Number, Drug received, Drug Purchased and dates respectively.

DISPENSING DATABASE

Field name	Data Type	Field Length
Drug Name	Text	20
Unit	Text	5
Number	Memo	10
Date	Date/Time	N.A

MEDICAL CAPITATION DBF

Field name	Data Type	Field Length
Name of Hospital	Text	30
Address of Hospital	Memo	30
Medical Director's Name	Text	30
Specialization	Text	15
N.B Plc Employee Name	Text	30

The above Database shows the name of the Capitation Hospital, its address, Name of the Medical Director, area of specialization of the Medical Director and list of Nigerian Breweries plc employee registered with the Capitation Hospital.

ACCIDENT DBF

Field name	Data Type	Field Length
Surname	Text	15
Other Names	Text	30
Department	Text	20
Injury Type	Text	30
Location of Accident	Text	30
Referral	Text	30

The above database is useful in detecting rate of accident at various locations in the work place, and the Department that is mostly affected.

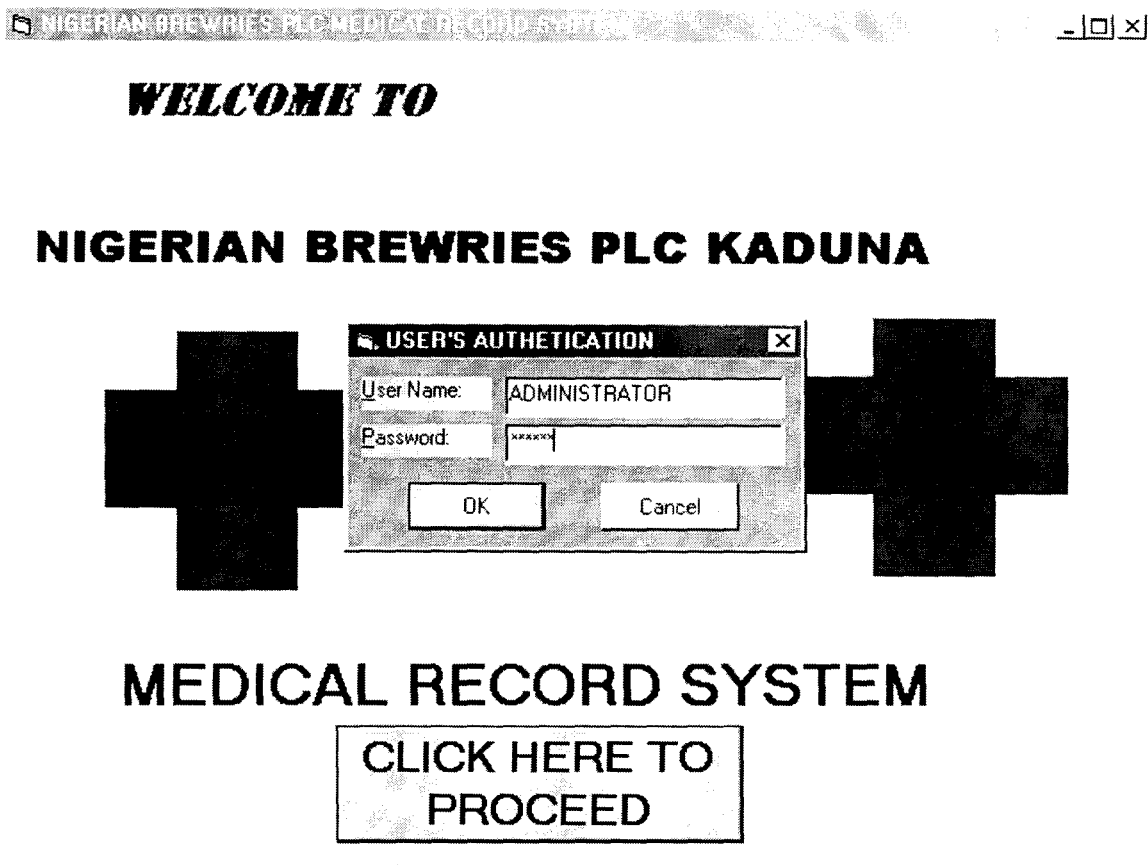
3.7 FILE STRUCTURE

This is the definition of typical file record in consideration of the field. The design of the database has to conform to acceptable standard. Each file structure is made up of tables.

In a network environment, the file can be updated from any workstation. The composition of each file structure include- Name of field, Field length, Type of data entered. The Input design takes care of this phase.

The following are input specification:

INTRODUCTION SCREEN



PATIENT INFORMATION FORM

PATIENT FORM			
PATIENT ID	NB233	DEPARTMENT	ENG
SURNAME	OKONKWO	ADDRESS	NO GALADIMA SRT KADUNA
OTHER NAMES	JULIUS	SPECIAL INFORMATION	CALL ME
SEX	MALE		
DATE OF BIRTH	12/3/99		
GENOTYPE	AS		
BLOOD GROUP	O		
HEIGHT	5.8FT		
ADD		FIND RECORD	
UPDATE		DELETE	
EXIT			

DOCTORS RECORD FORM

NIGERIAN NURSING MEDICAL RECORD SYSTEM - [] [] [X]
NB/RIE MEDICAL RECORD SYSTEM - [] [] [X]

File Report

NIG
MED

LC
TEM

RA.E

DOCTOR'S RECORD [] [] [X]

PATIENT ID: NB778

SURNAME: SULEIMAN

OTHER NAMES: GARBA

SEX: MALE

SPECIALIZATION: SURGEON

ADD EXIT

DISEASE RECORDS

NPIC MEDICAL RECORD SYSTEM

File Edit View Help

DISEASE RECORDS

PATIENT ID
NB466

SURNAME
HUSSAIN

OTHER NAMES
SADAM

TYPE OF DISEASE
TYPHOID

DATE OF OCCURENCE
12/09/2001

ADD EXIT

DRUG PURCHASED FORM

NI
MI

PLC
TEM

DRUG RECORDS

DRUG PURCHASED: FANSIDAR

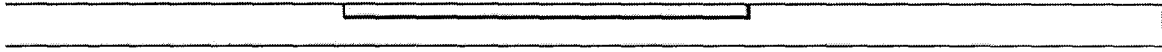
DRUG NUMBER: G/233B4M

DRUG RECIEVED: 125

DATE PURCHASED: 12/6/03

ADD NEW DRUGS FIND DRUG EXIT

Y:
PARA.E



DISPENSED DRUG FORM

NB PLC MEDICAL RECORD SYSTEM

File Report

NA
MA

DISPENSED DRUGS

DRUG NAME | CHLOROQUINE

UNIT | 16

NUMBER | NBCHQBM

DATE | 12/9/2004

RECIEVER | DAYO OBASANJO

DISPENSING OFFICER | JERRY GANA

GIVE DRUGS | FIND DISPENSED DRUGS | EXIT

PLC
STEM

BY:

KPARA.E

ACCIDENT FORM

File Report

NB PG MEDICAL RECORD SYSTEM

ACCIDENT

PATEINT ID: NB444

SURNAME: UDO

OTHER NAMES: UDOMA

SEX: MALE

DEPARTMENT: BREWRIES SERVICES

INJURY TYPE: DISLOCATION

LOCATION OF ACCIDENT: STAIR CASE

REFERRAL: CLINIC

RECORD ACCIDENT FIND ACCIDENT RECORD EXIT

**NI
ME**

**LC
TEM**

ARA.E

MEDICAL CAPITATION FORM

NB PC MEDICAL REE

File Report

MEDICAL CAPITATION

NAME OF HOSPITAL
ST THOMAS SPECIALIST HOSPITAL

ADDRESS
NO 3 DERE STR BARNAWA

MEDICAL DIRECTOR'S NAME
DR. ARAFAT

SPECIALIZATION
SURGEON

EMPLOYEE ID
NB 666

NB EMPLOYEE'S NAME
DAGOGO ISAAC

ALLOCATE FIND EXIT

NIGE
MEDI

C
EM

P.A.E

3.8 OUTPUT SPECIFICATION

THE Output specification is designed to meet or match the existing Input specification. The output design/description is mainly through the Visual Display Unit (VDU) or the Monitor. This enables the user to view the forms and reports. A printer is used to generate a patient's information on request by external body. The information includes Patient's bio data, Laboratory test result and Consultation result.

3.9 COST/BENEFIT ANALYSIS

Cost benefit analysis is the benefit that accrues from the development of a new system.

The Cost:

(a) Development cost.

Labour Cost.

Computerized Cost.

System analysis cost.

(b) Operating Cost.

Maintenance cost.

Labour cost.

Benefits: - The benefits of that will accrue from the proposed system

are: -

Direct Saving.

Measurable benefits.

High speed processing.

High storage capacity.

Full documentation of information.

Time saving.

CHAPTER FOUR

PROGRAMME IMPLEMENTATIONN

4.1 Program Logic

A program is a group of instructions, which a computer uses to perform Specific tasks. Every Program is composed of Modules. The various modules are linked up to make up the main program.

By “Modularization” is meant breaking down complex information into simpler one. All modules are linked up through the menu program. The following are menu, which also contain submenu items: File Menu, Edit Menu, View Menu, Query Menu and Help Menu.

For program logic, see Appendix

4.2 MENU AND SUBMENU

A menu can be defined as a list of commands that appear at the top of windows. A window on the other hand can be defined as rectangular portion of the screen, which displays an open program, or contents of a file or disk. A submenu is a command that is housed under a menu.

The program design has both Menu and Submenu to allow multi document interface. It has a well-designed GUI (Graphical User Interface) that permits the use of mouse. The following are menu:

FILE MENU

The file menu gives direction to the user of the system. It has new, assign patient, doctor's schedule, print and exit as its options. Under the new, there is provision for patient, department and doctor's schedule. The information required on the new patient is – name of patient, department, age, address and passports e.t.c.

EDIT MENU

The edit menu functions to correct data or information or texts. The terms under edit menu are – undo, redo, cut, copy, paste and delete.

VIEW MENU

The view menu is a compilation for information regarding to Doctor, staff or patient, department and drug. When 'doctor' is clicked on, information about the Clinic Doctor is displayed. Clicking on 'patient', displays all staff, that of department will show all departments and drug, will show drug list.

REPORT MENU

This menu generates reports about patient, diseases, drugs etc

The report menu is achieved by the use of Microsoft visual basic 6

Data Report Designer.

Besides printing report, it is possible to export the report to HTML or text files.

HELP MENU

The help menu will give options for certain diseases and their symptom, about program version and the author.

4.3 PROGRAM TESTING AND DEBUUGING

Debugging is the process of locating and fixing bugs in an application. The process of debugging gets rid of all the bugs that the program encountered during its generation. Each module of the program is first tested before they are integrated together.

4.4 PROGRAM IMPLEMENTATION

Program implementation involves putting all the electronic devices in place and other necessary requirements for the new program to work. It involves all the Hardware and Software components. The Hardware components are processors, memory

expansions, Visual Display Unit (VDU), Mass storage option, hard disk, diskettes/CD drives.

4.5 Choice of Programming Language

The programming language used for the front-end is Visual Basic and Microsoft Access 2000 for the back-end. THE visual basic allows for designing of Object Oriented Programming Language (OOP). While the Access 2000 permit the query of the database through Structured Query Language (SQL). Access has high degree of consistency of record manipulation.

A pilot stage is also required to integrate the old system to the new one. Care must be taken to avoid poor handling of the new program so that it does not loose its credibility to the users.

The staff requirement will include trained staff to man the computer. Password should be used to prevent unwanted persons from having access to the computer information.

For program flow chart see Appendix

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 CONCLUSION

Automation of the medical field has a lot of advantages over the manual processes. The invention of the computer and its subsequent application in solving problems in the medical sector has made life more meaningful.

The computer is very efficient. It does not commit errors. It accomplishes its task with great speed. Consequently, inquiry about patients' complain, diagnosis and drug prescription is quick or very fast. Generation of statistical report on diseases and patients is done with ease and at a very short time interval.

The automation of the medical department has made reports on patients' biodata, complaints, diagnosis and prescription on referral to external body to be more accurate, less time consuming and less costly.

The use of the computer in medical field would reduce the rate of spread of disease, date rate and complications in treatment of chronic diseases.

5.2 RECOMMENDATION

The cost of installation and implementation of a new computer system is very expensive. To derive maximum benefit of the new system, the following recommendation should be adopted:

Training: The medical department should start training their personnel before the installation of the computer system. To support the trained personnel, the department should recruit computer professionals with good knowledge of networking and programming.

Security: All authorized persons should be given user ID, to enable them gain access to the computer and prevents unauthorized persons from having access to computer information.

Environment: The computer should be operated in a good environment preferably in an air-conditioned room to provide an optimum temperature for the parts to function effectively.

There is need for provision for upgrading of the system due to changing Technology such as connection to Internet.

Finally there would be more benefits when all human endeavors are computerized.

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- 5: Hamming R.W (1972) Computer and the society
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Volume 8
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- 12: Mustafa A. (1988) Microcomputer Interfacing and
Applications
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- 14: Uldall (1975) Renal Disease.

APPENDIX I

PROGRAM SOURCE CODES

```
Private Sub Command1_Click()
Dim db As Database
Dim rs As Recordset
Dim rs1 As Recordset
Set db = OpenDatabase("C:\medication\medicalreports.mdb")
Set rs = db.OpenRecordset("PatientRecords")
With rs
AddNew
!PatientID = UCase(Trim(Text1.Text))
!Surname = UCase(Trim(Text2.Text))
!OtherNames = UCase(Trim(Text3.Text))
!Sex = UCase(Trim(Combo1.Text))
!DateofBirth = UCase(Trim(Text4.Text))
!Genotype = UCase(Trim(Combo2.Text))
!BloodGroup = UCase(Trim(Combo3.Text))
!Height = UCase(Trim(Text5.Text))
!Department = UCase(Trim(Text6.Text))
!Address = UCase(Trim(Text7.Text))
!Specialinformation = UCase(Trim(Text8.Text))
.Update

rs.Close
db.Close
Text1.Text = ""
Text2.Text = ""
Text3.Text = ""
Combo1.Text = ""
Combo2.Text = ""
Combo3.Text = ""
Text4.Text = ""
Text5.Text = ""
Text6.Text = ""
Text7.Text = ""
Text8.Text = ""

End With

End Sub
```



```

Private Sub Command2_Click()
lookitem = InputBox("Enter Patient ID")

Dim db As Database
Dim rs As Recordset
Set db = OpenDatabase("C:\medication\medicalreports.mdb")
Set rs = db.OpenRecordset("PatientRecords")
With rs
MoveFirst
5 If .EOF Then GoTo 500

If UCase(Trim(!PatientID)) = UCase(Trim(lookitem)) Then
Text1.Text = UCase(!PatientID)
Text2.Text = UCase(!Surname)
Text3.Text = UCase(!OtherNames)
Combo1.Text = UCase(!Sex)
Text4.Text = UCase(!DateofBirth)
Combo2.Text = UCase(!Genotype)
Combo3.Text = UCase(!BloodGroup)
Text5.Text = UCase(!Height)
Text6.Text = UCase(!Department)
Text7.Text = UCase(!Address)
Text8.Text = UCase(!Specialinformation)

Else
.MoveNext
GoTo 5
500
rs.Close
db.Close
MsgBox ("Record Doesn't Exist"), vbCritical

End If
End With
End Sub

Private Sub Command3_Click()
Dim db As Database
Dim rs As Recordset
Set db = OpenDatabase("C:\medication\medicalreports.mdb")
Set rs = db.OpenRecordset("PatientRecords")

With rs
MoveFirst

```

5 If .EOF Then GoTo 500

If UCase(Trim(Text3.Text)) = !OtherNames Then
.Delete
.MoveNext

.AddNew
!PatientID = UCase(Trim(Text1.Text))
!Surname = UCase(Trim(Text2.Text))
!OtherNames = UCase(Trim(Text3.Text))
!DateofBirth = UCase(Trim(Text4.Text))
!Height = UCase(Trim(Text5.Text))
!Sex = UCase(Trim(Combo1.Text))
!Department = UCase(Trim(Text6.Text))
!Address = UCase(Trim(Text7.Text))
!Specialinformation = UCase(Trim(Text8.Text))
!Genotype = UCase(Trim(Combo2.Text))
!BloodGroup = UCase(Trim(Combo3.Text))
.Update
MsgBox ("Record Updated"), vbCritical
Text1.Text = ""
Text2.Text = ""
Text3.Text = ""
Text4.Text = ""
Text5.Text = ""
Text6.Text = ""
Text7.Text = ""
Text8.Text = ""
Combo1.Text = ""
Combo2.Text = ""
Combo3.Text = ""

Else
.MoveNext
GoTo 5

500 'MsgBox ("Record Doesnt Exist"), vbOKOnly
'Text1.Text = ""

End If
rs.Close
db.Close

```
End With  
End Sub
```

```
Private Sub Command4_Click()  
Me.Hide
```

```
End Sub
```

```
Private Sub Command5_Click()  
With Data1.Recordset  
.Delete  
.MoveNext  
If .EOF Then .MovePrevious  
End With  
End Sub
```

```
Private Sub Command1_Click()  
Dim db As Database  
Dim rs As Recordset  
Set db = OpenDatabase("C:\medication\medicalreports.mdb")  
Set rs = db.OpenRecordset("DoctorsRecord")  
With rs  
.AddNew  
!PatientID = UCase(Trim(Text1.Text))  
!Surname = UCase(Trim(Text2.Text))  
!OtherNames = UCase(Trim(Text3.Text))  
!Sex = UCase(Trim(Combo1.Text))  
!Specialization = UCase(Trim(Text4.Text))
```

```
.Update
```

```
rs.Close  
db.Close  
Text1.Text = ""  
Text2.Text = ""  
Text3.Text = ""  
Combo1.Text = ""  
Text4.Text = ""
```

```
End With
```

```
End Sub
```

```

Private Sub Command2_Click()

End Sub

Private Sub Command3_Click()
Me.Hide
End Sub
Private Sub Command1_Click()
Dim db As Database
Dim rs As Recordset
Set db = OpenDatabase("C:\medication\medicalreports.mdb")
Set rs = db.OpenRecordset("DrugRecords")
With rs
.AddNew
!DrugPurchased = UCase(Trim(Text1.Text))
!DrugNumber = UCase(Trim(Text2.Text))
!DrugRecieved = UCase(Trim(Text3.Text))
!DatePurchased = UCase(Trim(Text4.Text))

.Update

rs.Close
db.Close
Text1.Text = ""
Text2.Text = ""
Text3.Text = ""
Text4.Text = ""

End With

End Sub

Private Sub Command2_Click()
lookitem = InputBox("Enter Drug Number")

Dim db As Database
Dim rs As Recordset
Set db = OpenDatabase("C:\medication\medicalreports.mdb")
Set rs = db.OpenRecordset("DrugRecords")
With rs
.MoveFirst
5 If .EOF Then GoTo 500

If UCase(Trim(!DrugNumber)) = UCase(Trim(lookitem)) Then

```

```
Text1.Text = UCase(!DrugPurchased)
Text2.Text = UCase(!DrugNumber)
Text3.Text = UCase(!DrugRecieved)
```

```
Text4.Text = UCase(!DatePurchased)
```

```
Else
.MoveNext
GoTo 5
500
rs.Close
db.Close
MsgBox ("This Drug Doesn't Exist"), vbCritical
```

```
End If
End With
End Sub
```

```
Private Sub Command3_Click()
Me.Hide
```

```
End Sub
Private Sub Command1_Click()
Dim db As Database
Dim rs As Recordset
Dim rs1 As Recordset
Set db = OpenDatabase("C:\medication\medicalreports.mdb")
Set rs = db.OpenRecordset("DispensedDrugs")
With rs
.AddNew
!DrugName = UCase(Trim(Text1.Text))
!Unit = UCase(Trim(Text2.Text))
!Number = UCase(Trim(Text3.Text))
!Date = UCase(Trim(Text4.Text))
!Reciever = UCase(Trim(Text5.Text))
!DispensingOfficer = UCase(Trim(Text6.Text))
.Update
```

```
rs.Close
db.Close
Text1.Text = ""
Text2.Text = ""
Text3.Text = ""
Text4.Text = ""
```

```
Text5.Text = ""  
Text6.Text = ""
```

```
End With  
End Sub
```

```
Private Sub Command2_Click()  
lookitem = InputBox("Enter Drug Number")
```

```
Dim db As Database  
Dim rs As Recordset  
Set db = OpenDatabase("C:\medication\medicalreports.mdb")  
Set rs = db.OpenRecordset("DispensedDrugs")  
With rs  
.MoveFirst  
5 If .EOF Then GoTo 500
```

```
If UCase(Trim(!Number)) = UCase(Trim(lookitem)) Then  
Text1.Text = UCase(!DrugName)  
Text2.Text = UCase(!Unit)  
Text3.Text = UCase(!Number)
```

```
Text4.Text = UCase(!Date)  
Text5.Text = UCase(!Reciever)  
Text6.Text = UCase(!DispensingOfficer)
```

```
Else  
.MoveNext  
GoTo 5  
500  
rs.Close  
db.Close  
MsgBox ("This Drug Doesn't Exist"), vbCritical
```

```
End If  
End With  
End Sub
```

```
Private Sub Command3_Click()  
Me.Hide
```

```
End Sub
```

```

Private Sub Command1_Click()
Dim db As Database
Dim rs As Recordset
Dim rs1 As Recordset
Set db = OpenDatabase("C:\medication\medicalreports.mdb")
Set rs = db.OpenRecordset("MedicalCapitation")
With rs
.AddNew
!NameofHospital = UCase(Trim(Text1.Text))
!Address = UCase(Trim(Text2.Text))
!MedicalDoctorsName = UCase(Trim(Text3.Text))
!Specialization = UCase(Trim(Text4.Text))
!NBEmployeesName = UCase(Trim(Text5.Text))
!EmployeeID = UCase(Trim(Text6.Text))
.Update

rs.Close
db.Close
Text1.Text = ""
Text2.Text = ""
Text3.Text = ""
Text4.Text = ""
Text5.Text = ""
Text6.Text = ""

End With
End Sub

```

```

Private Sub Command2_Click()
lookitem = InputBox("Enter Employee ID")

Dim db As Database
Dim rs As Recordset
Set db = OpenDatabase("C:\medication\medicalreports.mdb")
Set rs = db.OpenRecordset("MedicalCapitation")
With rs
.MoveFirst
5 If .EOF Then GoTo 500

If UCase(Trim(!EmployeeID)) = UCase(Trim(lookitem)) Then
Text1.Text = UCase(!NameofHospital)
Text2.Text = UCase(!Address)
Text3.Text = UCase(!MedicalDoctorsName)

```

```
Text4.Text = UCase(!Specialization)
Text5.Text = UCase(!NBEmployeesName)
Text6.Text = UCase(!EmployeeID)
```

```
Else
.MoveNext
GoTo 5
500
rs.Close
db.Close
MsgBox ("This Record Does not Exist"), vbCritical
```

```
End If
End With
End Sub
```

```
Private Sub Command3_Click()
Me.Hide
```

```
End Sub
Option Explicit
```

```
Public LoginSucceeded As Boolean
```

```
Private Sub cmdCancel_Click()
'set the global var to false
'to denote a failed login
LoginSucceeded = False
Me.Hide
End Sub
```

```
Private Sub cmdOK_Click()
'check for correct password
If (txtUserName.Text = "ADMINISTRATOR" And txtPassword.Text =
"OKPARA") Then
'place code to here to pass the
'success to the calling sub
'setting a global var is the easiest
LoginSucceeded = True
Form8.Show
Else
MsgBox "Invalid Password,Or you may not have the Permission to use this
system!", , "Login"
txtPassword.SetFocus
```



```

SendKeys "{Home}+{End}"
End If
End Sub
Private Sub Command1_Click()
Dim db As Database
Dim rs As Recordset
Dim rs1 As Recordset
Set db = OpenDatabase("C:\medication\medicalreports.mdb")
Set rs = db.OpenRecordset("MedicalCapitation")
With rs
.AddNew
!NameofHospital = UCase(Trim(Text1.Text))
!Address = UCase(Trim(Text2.Text))
!MedicalDoctorsName = UCase(Trim(Text3.Text))
!Specialization = UCase(Trim(Text4.Text))
!NBEmployeesName = UCase(Trim(Text5.Text))
!EmployeeID = UCase(Trim(Text6.Text))
.Update

rs.Close
db.Close
Text1.Text = ""
Text2.Text = ""
Text3.Text = ""
Text4.Text = ""
Text5.Text = ""
Text6.Text = ""

End With
End Sub

Private Sub Command2_Click()
lookitem = InputBox("Enter Employee ID")

Dim db As Database
Dim rs As Recordset
Set db = OpenDatabase("C:\medication\medicalreports.mdb")
Set rs = db.OpenRecordset("MedicalCapitation")
With rs
.MoveFirst
5 If .EOF Then GoTo 500

If UCase(Trim(!EmployeeID)) = UCase(Trim(lookitem)) Then

```

```
Text1.Text = UCase(!NameofHospital)
Text2.Text = UCase(!Address)
Text3.Text = UCase(!MedicalDoctorsName)
Text4.Text = UCase(!Specialization)
Text5.Text = UCase(!NBEmployeesName)
Text6.Text = UCase(!EmployeeID)
```

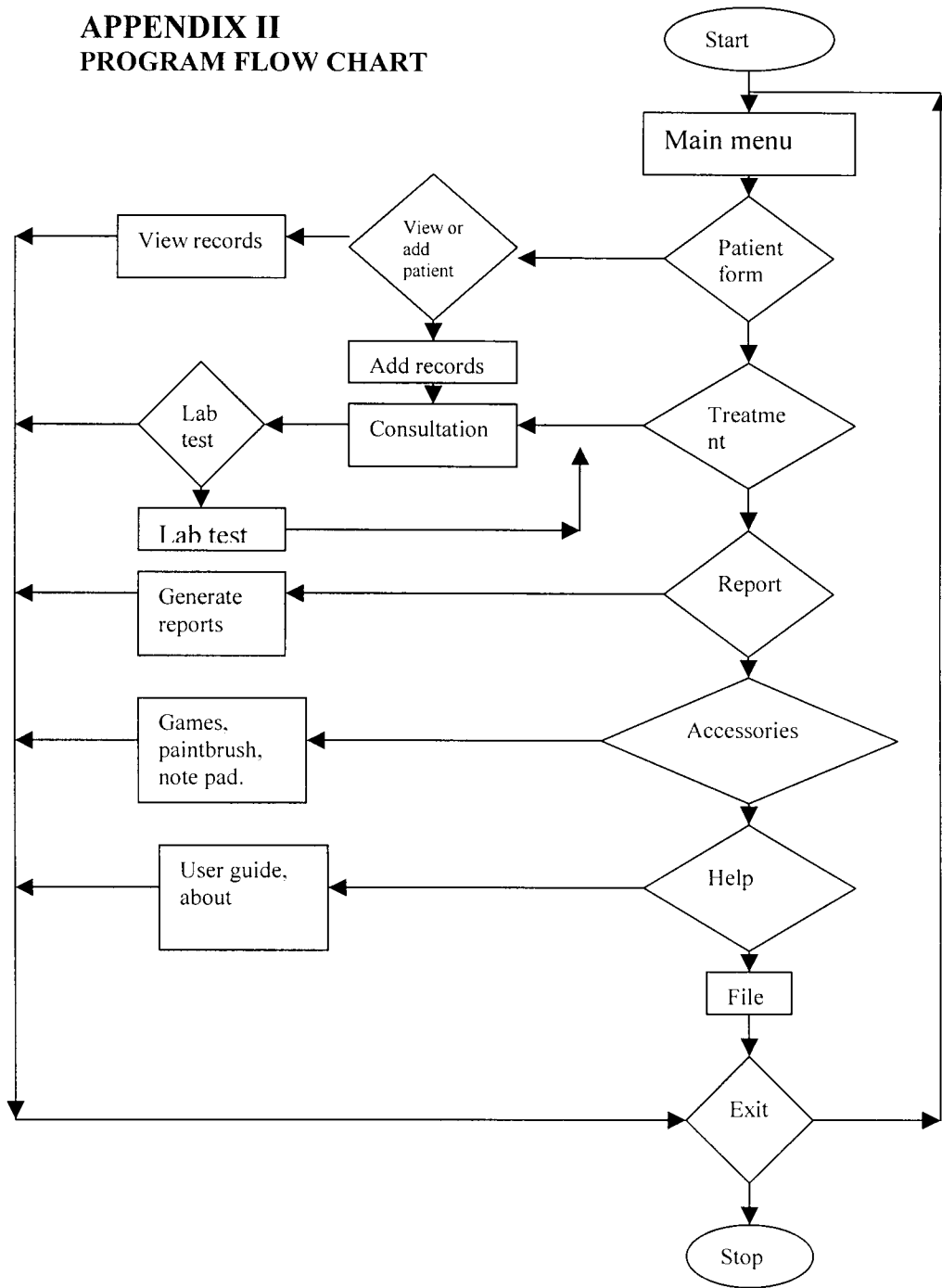
```
Else
.MoveNext
GoTo 5
500
rs.Close
db.Close
MsgBox ("This Record Does not Exist"), vbCritical
```

```
End If
End With
End Sub
```

```
Private Sub Command3_Click()
Me.Hide
```

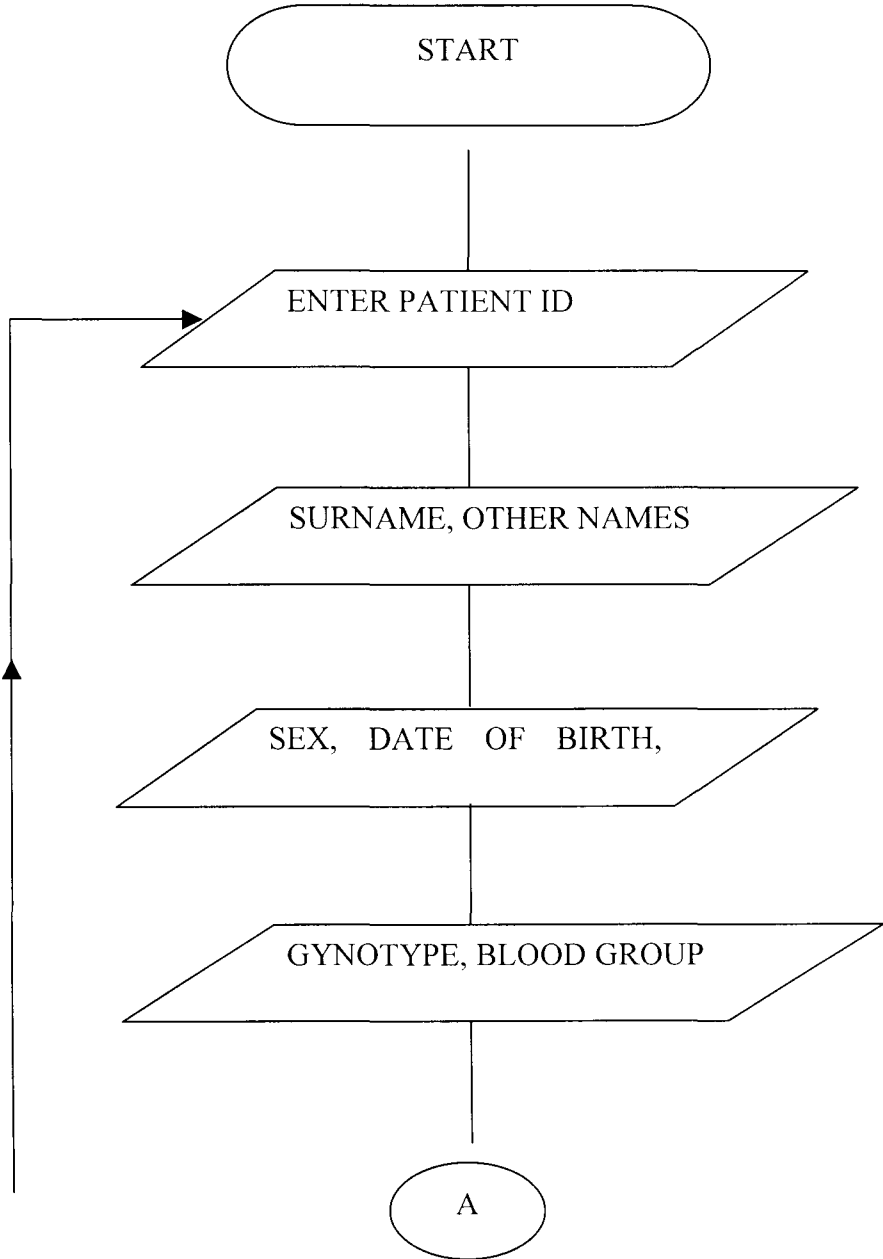
```
End Sub
```

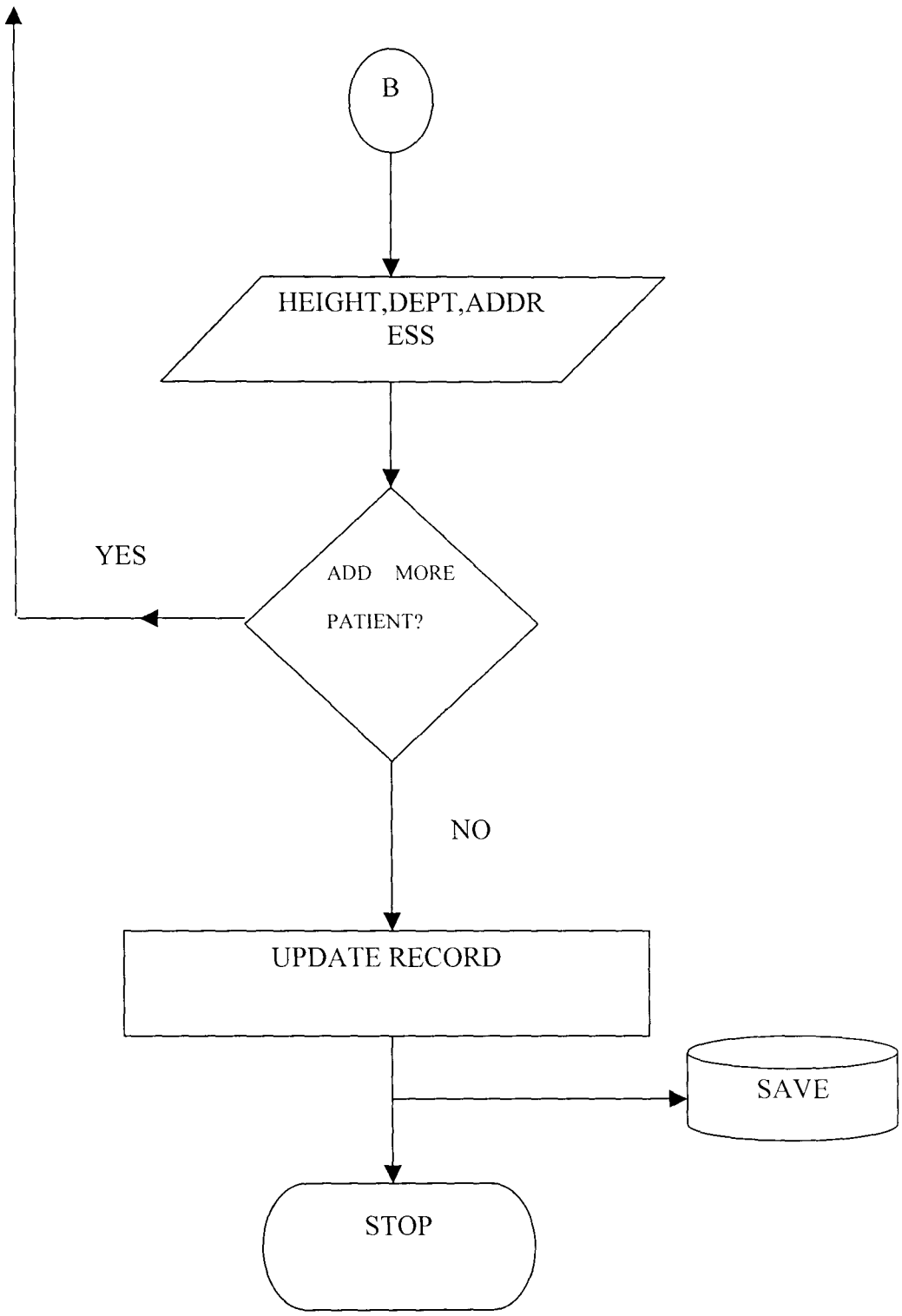
**APPENDIX II
PROGRAM FLOW CHART**



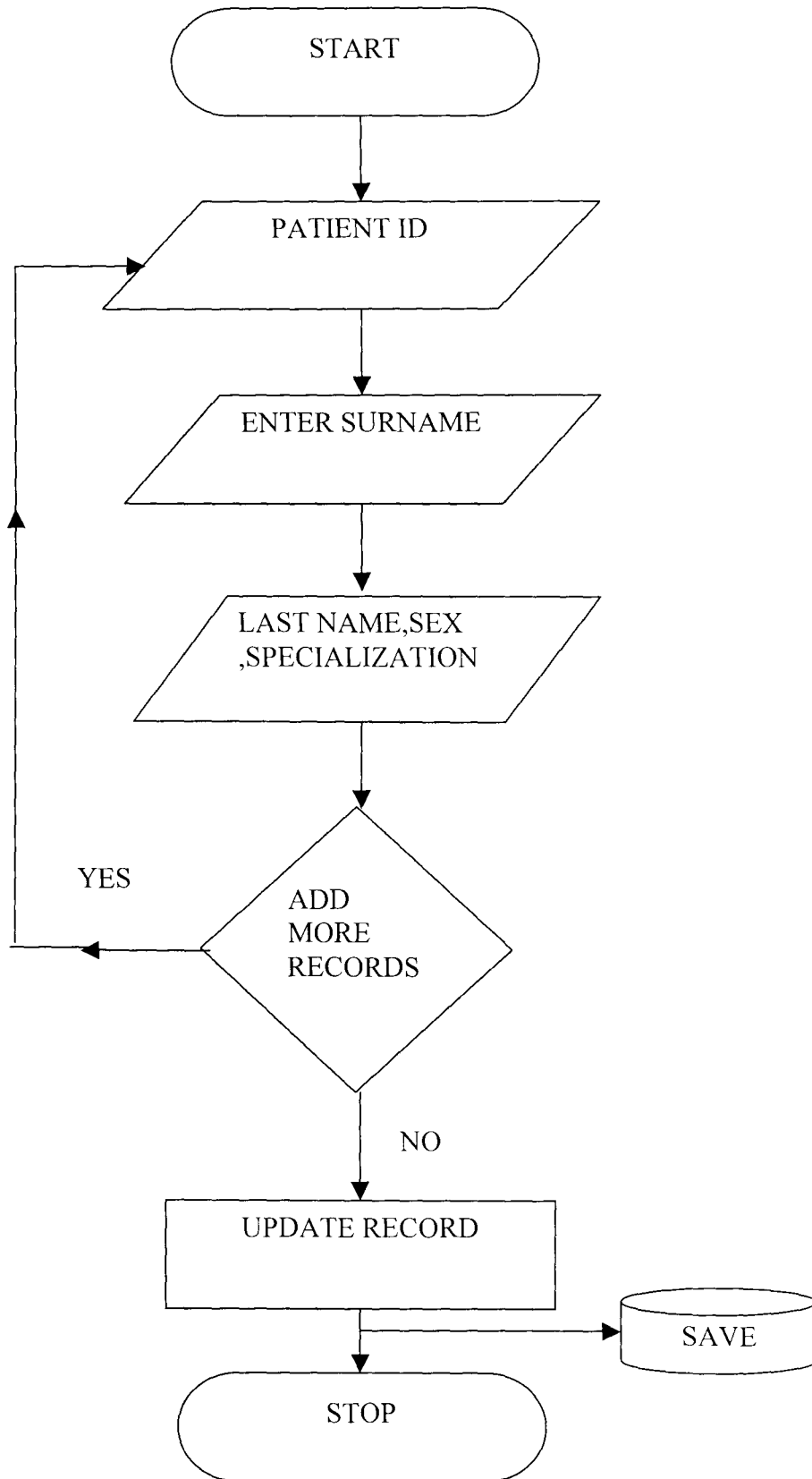
APPENDIX III SYSTEM DESIGN FLOW CHART

1. PATIENT FLOW CHART

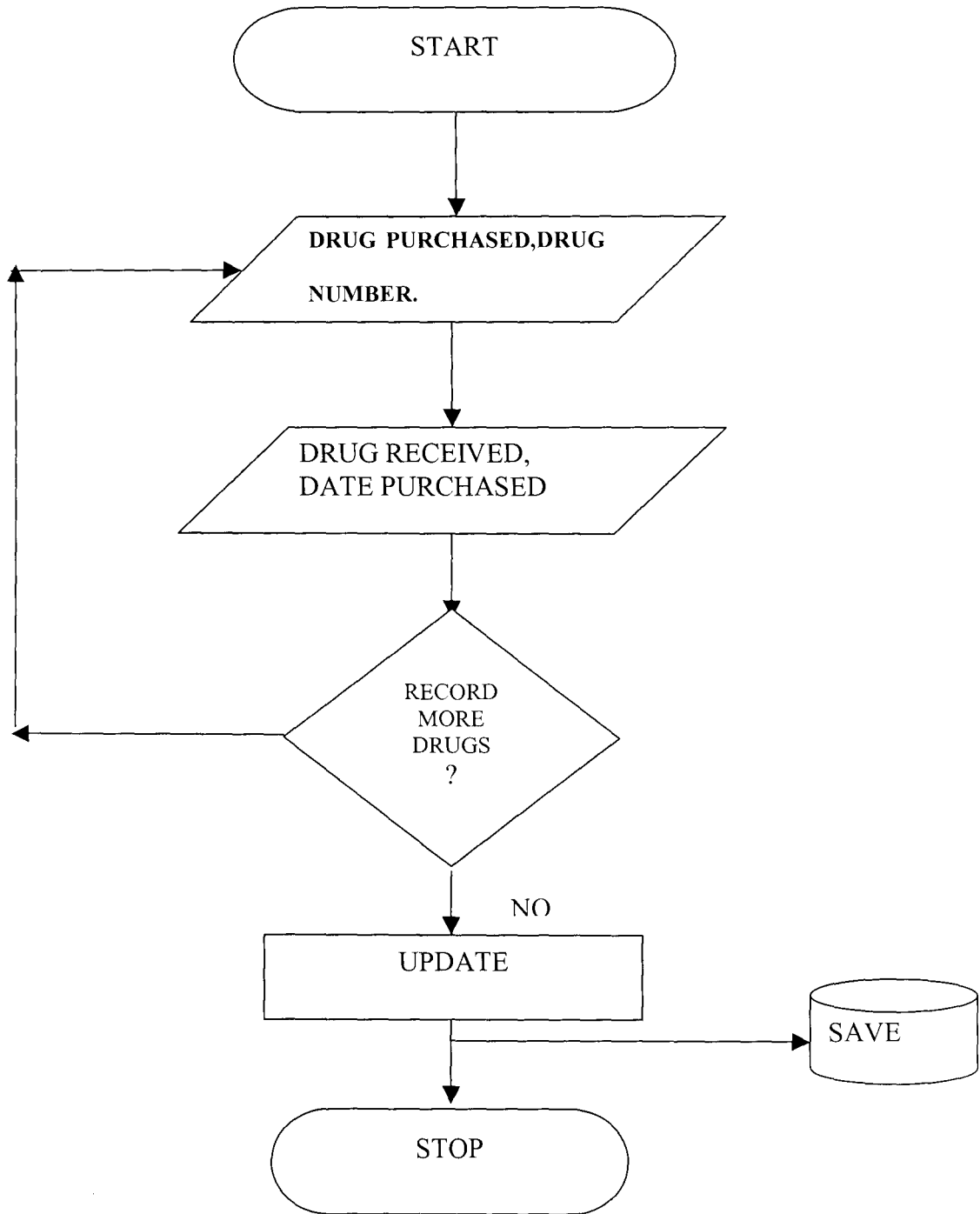




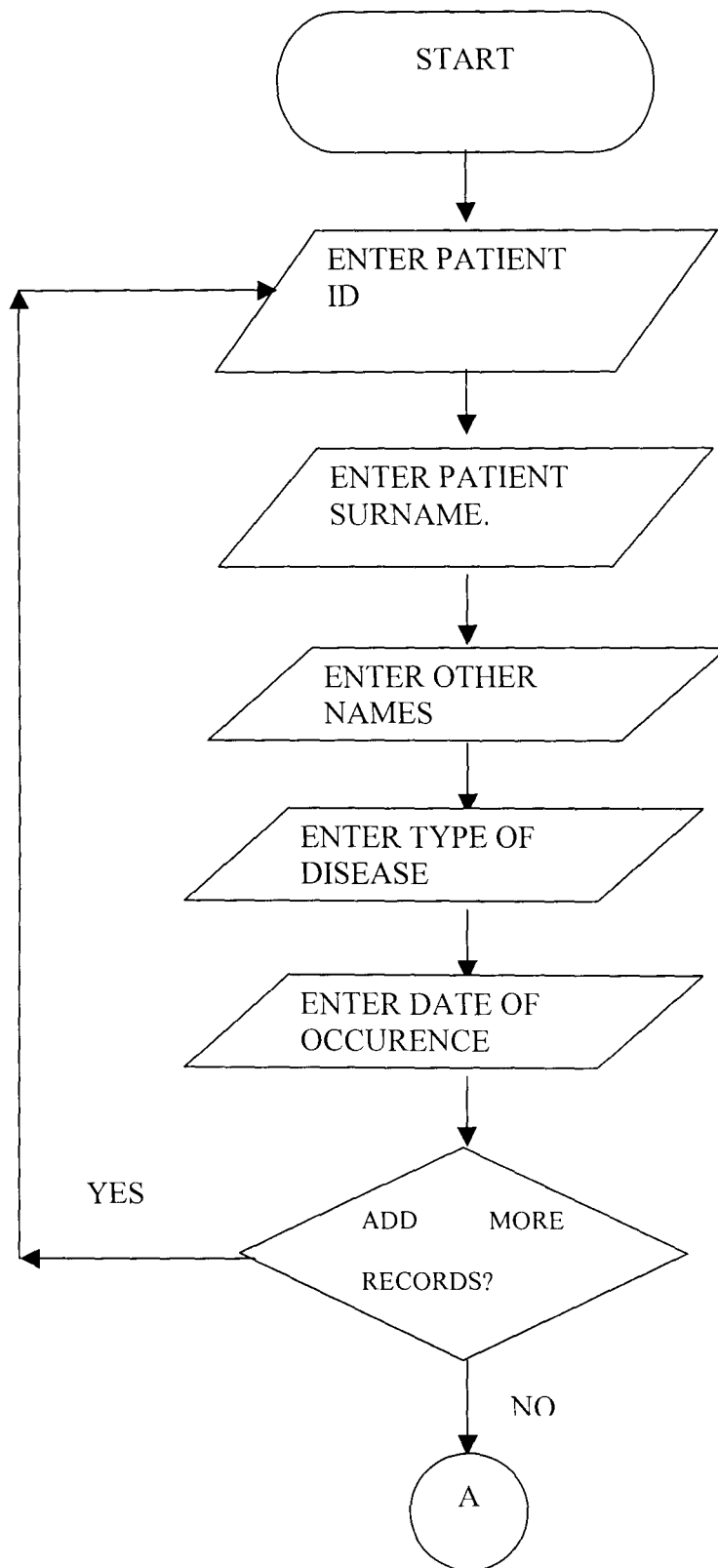
2. DOCTOR'S FLOWCHART

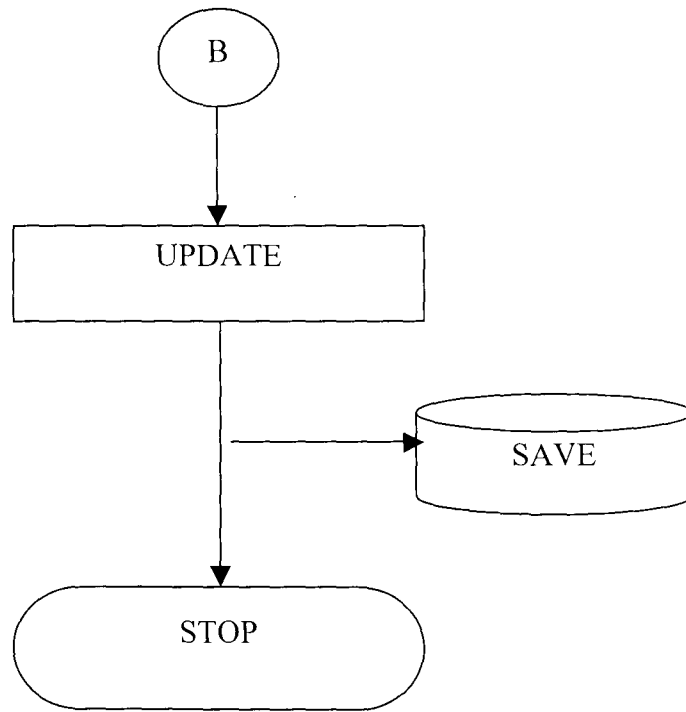


3. DRUG FLOWCHART

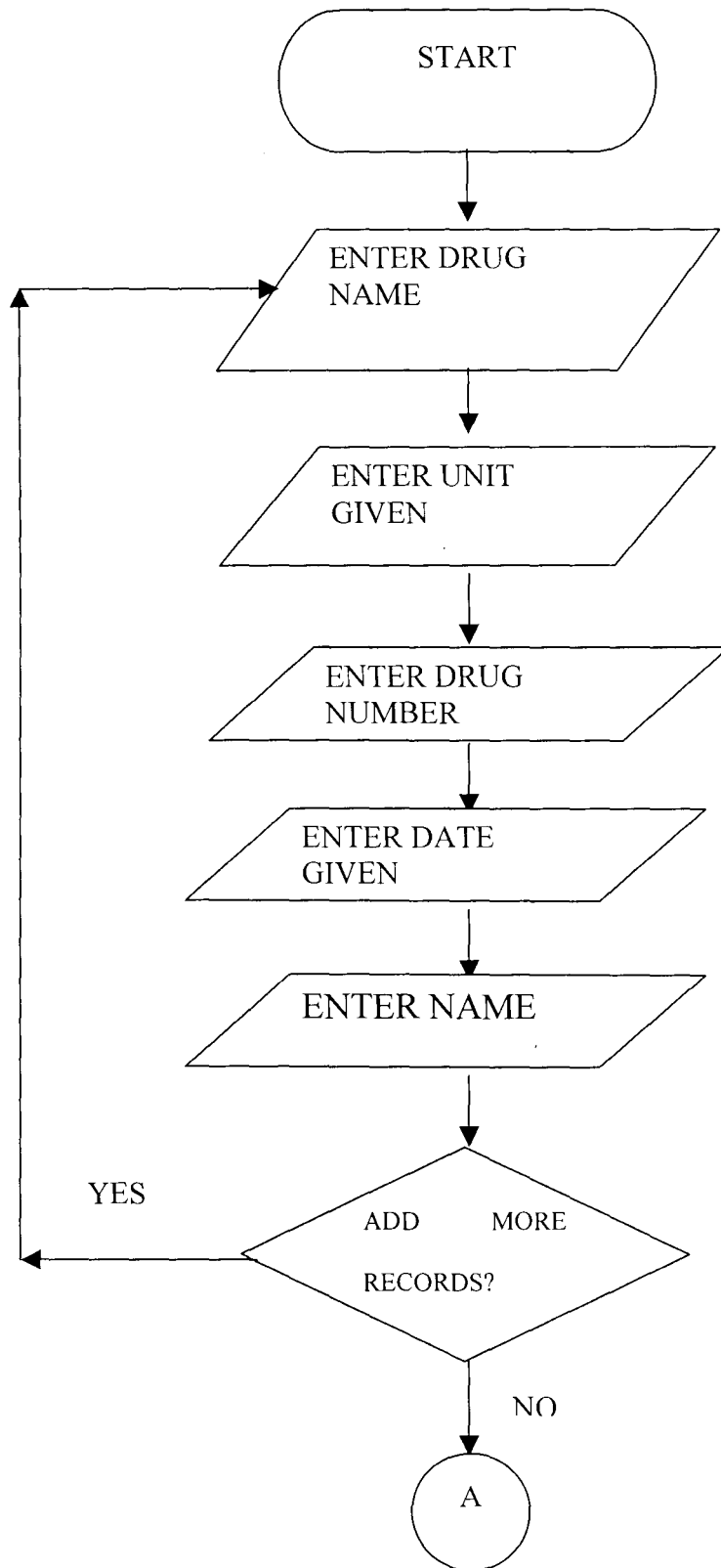


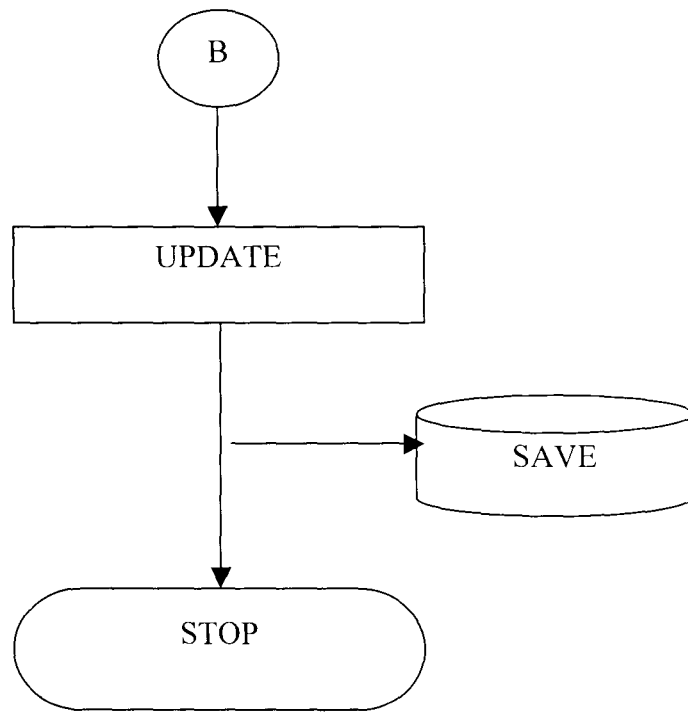
4. DISEASE FLOWCHART



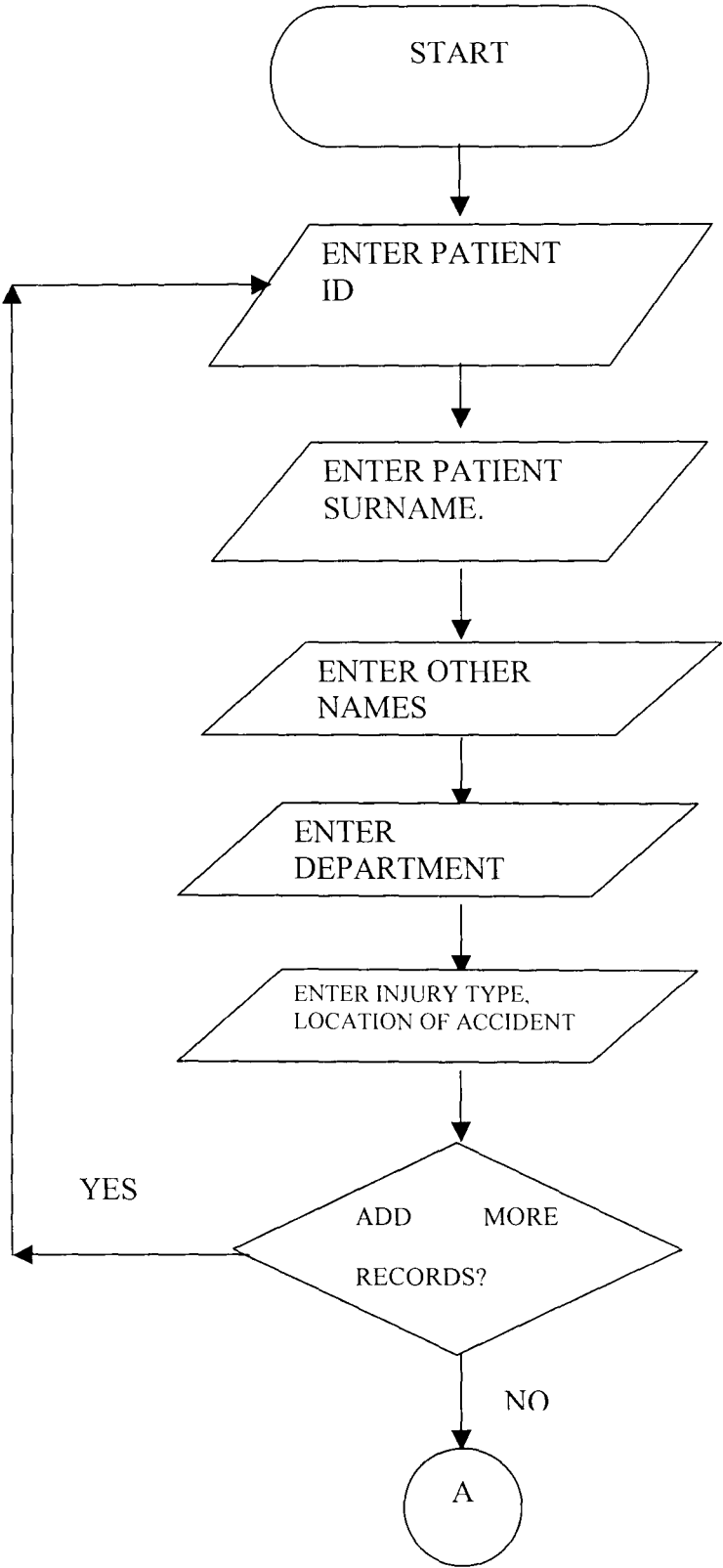


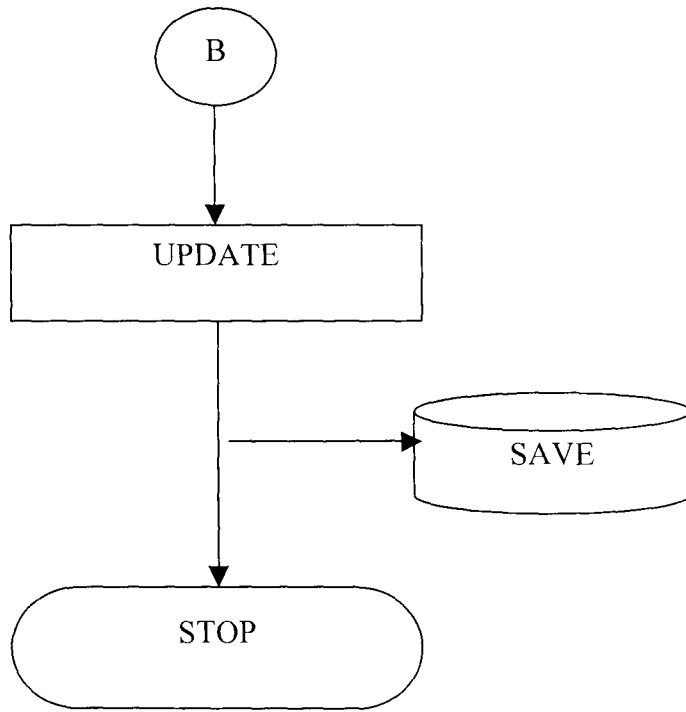
5. DISPENSED DRUGS FLOWCHART



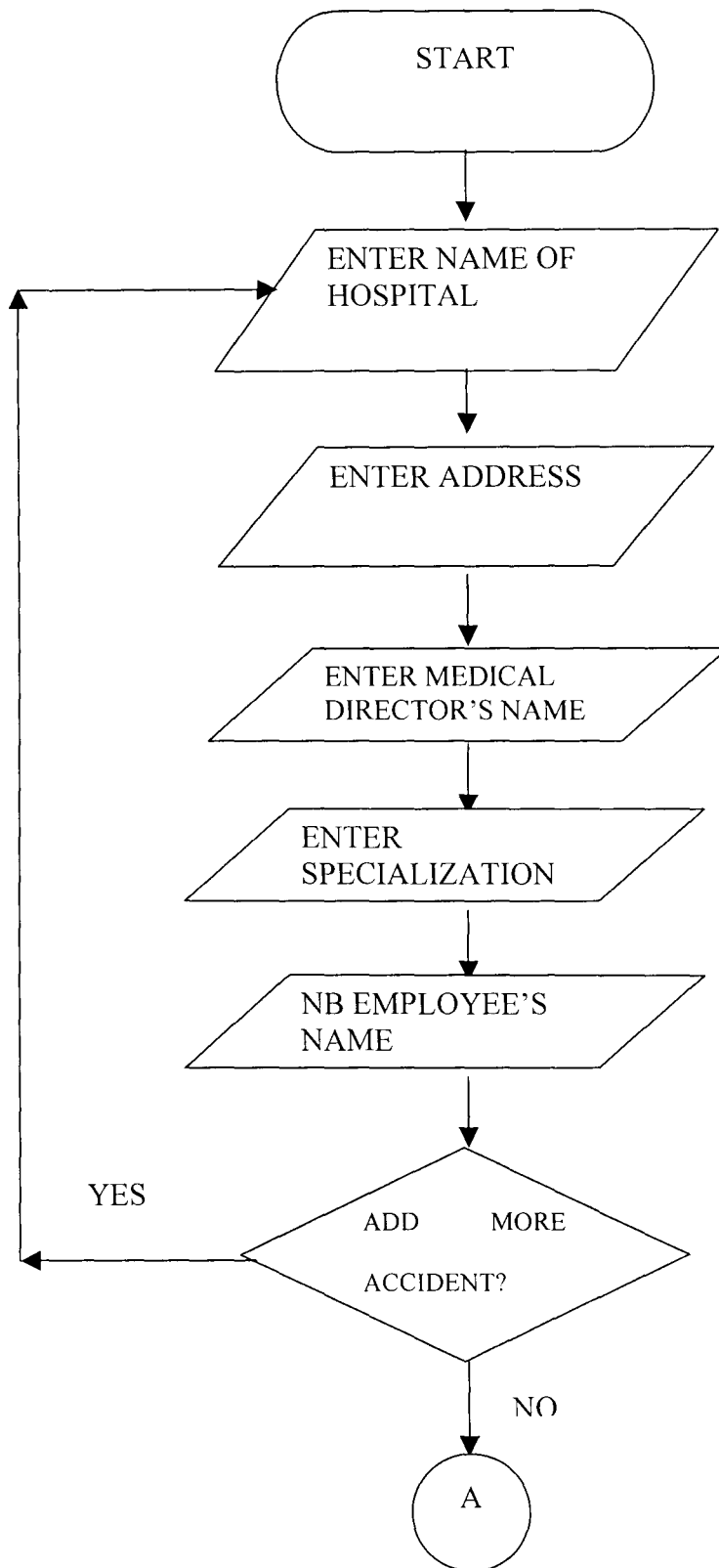


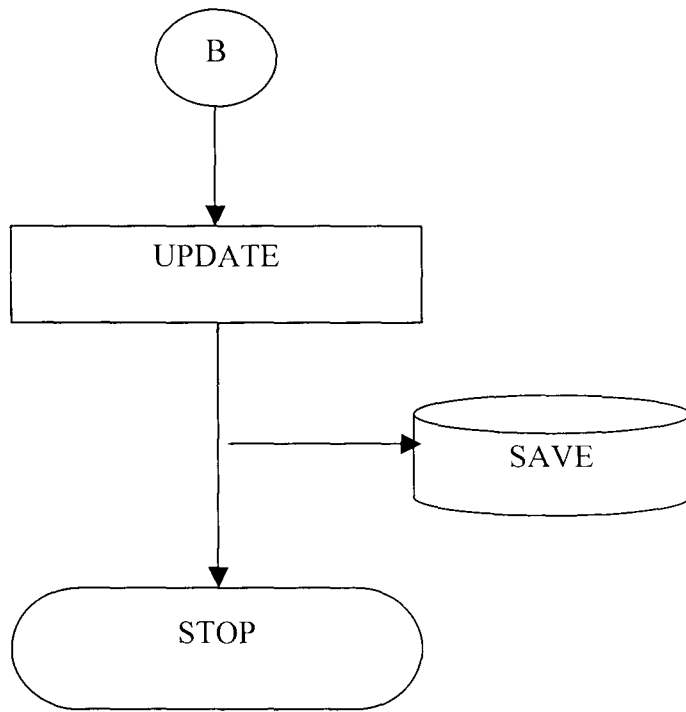
6. ACCIDENT FLOWCHART





7. MEDICAL CAPITATION FLOWCHART





**APPENDIX IV: MORE ABOUT NB PLC AND
CAPITATION SCHEME**

NIGERIAN BREWERIES Plc AT A GLANCE



Mission :

***“To be the leading Beverage
Company in Nigeria marketing high
quality brands to deliver superior***

SCOPE OF OPERATIONS

Nigerian Breweries Plc, the pioneer and largest brewing company in Nigeria was incorporated in 1946 and recorded a landmark when the first bottle of STAR Lager beer rolled off the bottling lines in its Lagos Brewery in June 1949. This was followed by Aba Brewery, which was commissioned in 1957, Kaduna Brewery in 1963 and Ibadan Brewery in 1982. In September 1993, the company acquired its fifth brewery in Enugu. On April 9, 2001, it laid the foundation for yet another brewery in Enugu, which was completed in year 2003. The sixth brewery, sited at Ama in Enugu State, is the biggest and most modern brewery in Africa. Thus, its high quality products are distributed to all parts of this great country.

COMPANY EQUITY

With about 70,000 shareholders, the authorized share capital of Nigerian Breweries Plc is ₦2 billion, divided into 4 billion ordinary shares of 50 kobo each. The issued share capital as at 10th June 2004 stood at ₦1,890,640,585 divided into 3,781,281,170 ordinary shares of 50 kobo each. Heineken N.V of Holland has a majority shareholding of 54.10% while 45.90% is held by Nigerian citizens and associations.

The company's turnover in year 2003 was ₦56.5 billion, out of which the sum of ₦3.63 billion was paid to the Federal and State Governments as taxes and levies. Also in year 2003, the company's profit before tax was ₦10.99 billion and it paid a dividend of ₦4.15 billion i.e. ₦1.10 per 50 kobo share.

BRAND PORTFOLIO

Nigerian Breweries Plc has a rich portfolio of high quality brands: Star Lager Beer (1949); Gulder Lager Beer (1970); Maltina (1976); which now has four varieties (Maltina Classic, Maltina Strawberry, Maltina Exotic and Maltina with Pineapple), Legend Extra Stout (1990); Amstel Malta (1994); Heineken Lager (1998).

EXPORT

Nigerian Breweries Plc has an increasing export business that dates back to 1986. Currently, we export to the U.K, U.S.A., Italy, Netherlands, Germany and Kenya.

RESEARCH AND DEVELOPMENT

Nigerian Breweries Plc keeps pace with key international developments, thus ensuring that its systems, processes and operational procedures are always in conformity with world-class standards. It is in line with this policy that the company established a Research and Development Centre in 1987 to enhance its research activities on all aspects of brewing operations.

ANCILLARY INDUSTRIES

The company encourages the establishment of ancillary businesses. These include manufacturers of Bottles, Crown Corks, Labels, Cartons, Plastic Crates and such services as Hotels/Clubs and our Key Distributors.

SOCIAL RESPONSIBILITY

Nigerian Breweries Plc is a socially responsible corporate citizen with a very good record of corporate philanthropy in the areas of education, the environment (water) and sports, among others. The company in 1994 established an Education Trust Fund of N100 million to take more active part in the funding of educational and research facilities in higher institutions, all in an effort to provide and encourage academic excellence in Nigeria. This is in addition to its secondary and university scholarship programme for children of its employees.

Nigerian Breweries Plc is the foremost sponsor of sports by variety in the country with sponsorship covering Football, Table Tennis, Lawn Tennis, Cycling, Chess, Golf, Badminton, Dart, Boat Racing and Ayo. The aim is to develop Nigerian sportsmen and women to participate in national and international sports, and boost the sports profile of the country. The company is also involved in the development of musical talents, through various programmes.

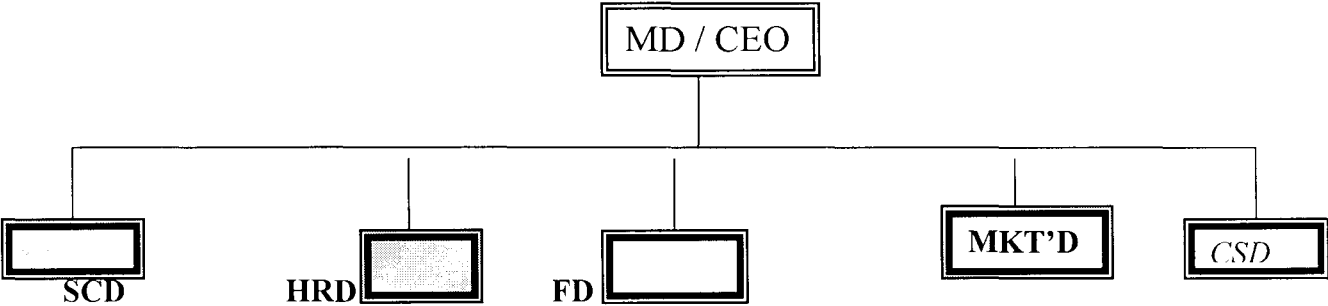
TRACK RECORD

Nigerian Breweries Plc has won several awards. It has consistently won the prestigious Nigerian Stock Exchange President's Merit Award for several years now. For three consecutive years (2001, 2002 and 2003) the company won the Nigerian Stock Exchange Quoted company of the year award. It has also won the Nigeria Industrial Standards (NIS) Awards for its various products. Also for two consecutive years (1999 and 2000), the company won the keenly contested Africa Beer Award organized by Heineken for its operating companies in Africa and the Middle East.

CONCLUSION

Nigerian Breweries Plc is a model corporate citizen with a vision to be a world-class company. The company's successful operations can be traced to good product quality, efficient management of operations and strategic penetration into the market environment. Others are proper understanding of consumer attitudes and habits and high social responsibility profile at national and zonal levels.

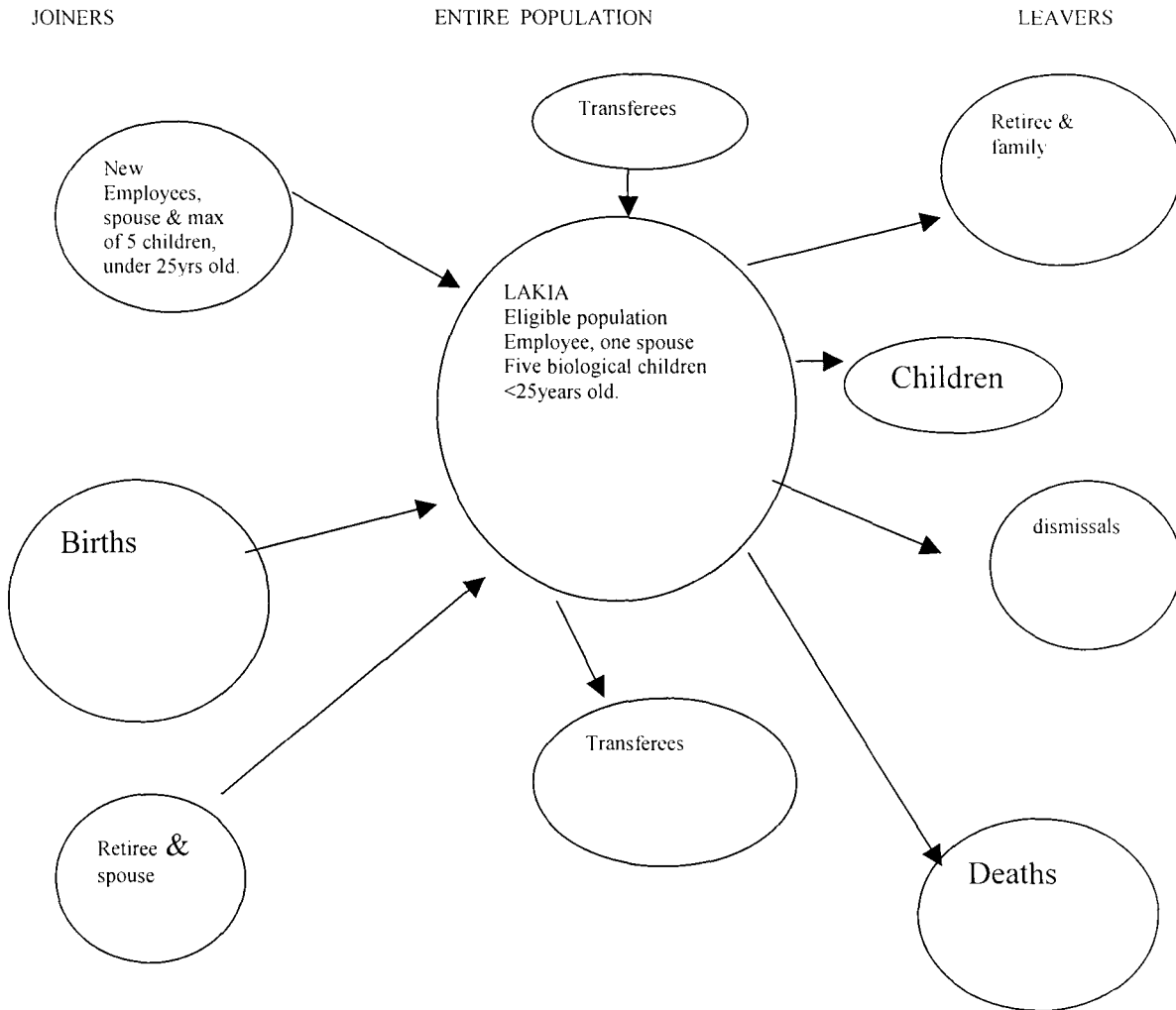
ORGANISATIONAL CHART: NB PIC- HEADQUARTERS



GLOSSARY :

- SCD - Supply Chain Director
- HRD - Human Resource Director
- FD - Financial Director
- MKT'D - Marketing Director
- CSD - Customer Service Director

NB Plc MEDICAL CAPITATION SCHEME POPULATION



PROCEDURE FOR CAPTURING BIRTHS AND DEATHS UNDER THE NB Plc MEDICAL CAPITATION SCHEME.

A: As stated in the Head Industrial Nurses' weekly hospital visit "checklist", information on births and deaths is to be obtained from the hospitals.

B: Births are registered after due consultation with employee- parent, who will be required to fill Enrollee Registration Form accordingly.

C: Deaths are deleted.

CHILDREN ABOVE 25YEARS OLD.

A: A prompter from SAPHR data notifies on this target population, who are deleted accordingly.

B: Employee- parent, is notified thereafter.

DISMISSALS.

A: HRMs and ERAM, to notify BMDs (Brewery Medical Doctor) in their respective locations of dismissals.

B: Such persons and their dependants are deleted IMMEDIATELY.

C: Relevant provider Hospitals are communicated with in writing on dismissal cases, by the location's BMD.

NEW EMPLOYEES.

A: At their visit to the CMA, during Induction Week, Enrollee Registration Forms and the list of company – wide (LAKIA) Provider Hospitals are handed over to the new employees- managers.

B: At locations, HRMs to refer new employees- staffs, to BMD for enrollment under the company medical scheme.

C: In both instances above, properly completed forms are to be returned to the BMD/HIN (Head Industrial Nurse), within the first week of employment.

C: A one month grace period is allowed, during which reminders will to sent to the new employees, at the expiration of the grace period, concerned employees would be notified in writing, by the BMD, copying the HRM, CMA, ERAM and HRD, that their health needs, requiring hospital care shall be borne by themselves.