COMPUTERIZATION OF DRUG INFORMATION SYSTEM

(A CASE STUDY OF MEDICAL SERVICES, C.B.N. CLINIC, IBADAN)

BY

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CERTIFICATION

This project has been supervised, read and approved as meeting the requirement for the award of Post Graduate Diploma (PGD) Certificate in Computer Science in the Department of Mathematics/Computer Science, Federal University of Technology, Minna.

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DEDICATION

To Allah (SWA) and my family.

ACKNOWLEDGEMENT

ALHAMDUL-LILLAHI (S.W.A)

Profound regards and gratitude to my able supervisor Mr Audu Isah for his personal and meticulous effort in getting this work completed, to my able head of department, Dr S.A.Reju and host of other lecturers without whom this work would not have been materialised. My Class colleagues were also of great inspiration to me for the much conducive atmosphere of learning they provided through interaction and support.

To my family for being there for me.

ABSTRACT

Profundity of drug knowledge and literatures available on these drugs make it virtually impossible for any individual health worker to memorize all the information published in all the pharmacotherapeutic fields.

In view of this, the World Health Organization (WHO) highlighted the importance of establishing well-sorted and updated drug information unit to serve as an objective source of information for the teaming requests from within the health sector and without (drug users)

C.B.N. Clinic Ibadan is one of the few clinics in the Central Bank of Nigeria that has well-documented drug information since its inception in 2000 although, not up to the WHO standard and so the need for computerization of the drug information system so as to make it up to the WHO required standard in order to make it much easier for the drug information manger (Pharmacist) for easy and precise response to the request as they come.

This work has precisely tried to tackle the above objective by using database management system.

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CHAPTER ONE

GENERAL INTRODUCTION

EVOLUTION OF CENTRAL BANK OF NIGERIA

The increased educational awareness coupled with intensification of the struggle for nation independence in the early 50's made Nigerians conclude that political independence alone was not sufficient. They therefore started the struggle for economic independence as well. Also the alarming bank failures in the early 1950's, which resulted system in the hands of the colonial financial secretary, brought about the growing awareness of the need for a central Bank. As usual the colonial masters opposed the idea as they thought it was premature. As a result of this statement, three different studies were commissioned.

These include: 1) O.L Fisher's report which did not recommend the establishment of a Central Bank because he felt that the financial system of the time was inadequate. This report was not accepted by Nigerians but was supported by the World Bank Mission in 1995. (ii). The World Bank Mission Report did not recommend the establishment of a Central Bank for Nigerian because of their believe that Nigeria was not financially developed enough for the proper operation of central banking. They however recommended the establishment of a state Bank of Nigeria to take over the banking control functions from the financial secretary. (iii) Finally, J.B layers Report of 1957 culminated in the establishment of the central Bank of Nigeria on 17th March 1958 through the Central Bank ordinance, 1958. however, the CBN did not start full operation until 1st July, 1959.

CBN had an authorized and paid-up capital of N3M, which were subscribed and held by the Federal Government. There is no provision for state Government or private sector participation in the equity share holding of the bank.

1.2 ROLES AND FUNTIONS OF CBN

1. The major role of the CBN, are to issue legal lender currency in Nigeria, maintain the external value of the legal lender currency, promote monetary stability and a sound financial system as well as act as banker and financial adviser to the Federal Government and banker to the banks. To achieve these

roles, particularly the promotion of monetary stability and a sound financial system, the CBN. under takes certain functions and activities, details of which are discussed blow.

2 **Functions and Activities**

a) Currency Issue and Distribution:-

Economic transactions in the Nigerian economy are, to a large extent, cash oriented. Consequently, the bank's currency issue function which involves distribution and safe custody of stock, constitutes a vital part of the day-to-day management of the economy. Without the regular supply of currency, economic activates would be much restricted. The bank, by law, is the only bank of issues in the country; it started by issuing the Nigerian pound (in 1959) that was in circulation until January 1973 when decimalized currency, the Naira was introduced in four major denominations –50k, #1, and #10. In February 1979, a higher denomination, #20 note, was introduced in response to the growth in monetary transactions. In 1991, a currency reform, called the D-metric system of currency management widely used in more than 70 countries, was introduced. The system assumes equal denominational structural range of 5 for both coins and notes. The reforms phased out the ½ kobo and 5kobo coins, redesigned the 1k, 10k and 25k coins, coined the 50k and #1 notes and put into circulation the #50 note. The banks notes and coins are commissioned for printing and minting by the Nigerian Security Printing and Minting Company (NSPMC) under conditions of top security and using highly technical devices and designs to make counterfeiting difficult.

b) Banker to other banks

The bank promotes confidence in the system through its activities as banker to other banks within and outside Nigeria.

The purpose is for the bank to promote and sustain reasonable banking services for the public and to ensure a high standard of conduct and professionalism in banking activities. The C.B.N as banker to other banks, issues directives on cash reserve and liquidity rations, prudential

requirements and on other activities of the banks. This is done through its Monetary Policy Circular, which is issued at the beginning of each fiscal year.

The CBN may bar banks from engaging in certain activities and it is empowered to seek and obtain information from the banks. Stiff sanctions are usually imposed on banks for non-compliance with monetary guidelines.

c) Banking Supervision and Examination

The CBN, in seeking to promote a sound financial system, has to supervise and monitor the banks this is done through banking supervision both off-site (that is, through the statutory returns submitted by the banks to the CBN) and on-site, through visitations by CBN officials to the banks, to examine their books, record keeping and internal control systems. This process enables the CBN to identify distressed banks early and to act in concert with the Nigerian deposit Insurance Corporation (NDIC) to take corrective actions.

d) Cheque Clearing The C.B.N is mandated to facilitate the clearing of cheque and credit instruments for banks in Nigeria. The Bank, therefore sets up clearing houses for this purpose and monitors the cheque clearing system to ensure efficient payments mechanism within the financial system.

e) Lender of Last Resort – The CBN is the lender of last resort to the banks and to discount houses under the new system of open market operations. It accommodates commercial and merchant banks in temporary need of liquidity. The bank's function as a lender of last resort enhances the banking orphan's ability to withstand economic strains and stresses. The bank in conjunction with the Nigerian Deposit Insurance Corporation, also took action to save the financial system from collapse in 1993 when the incidence of distress became generalized. In 1994, the CBN evolved a "Life Boat Scheme" to provide financial support to banks whose liquidity crisis was traceable to the collapse of the inter-bank money market.

f) Banker to the Government

The CBN as banker to the Federal Government's undertakes most of the Federal Government undertakes most of the Federal Government's banking business within and outside Nigeria. The Bank also provides banking services to the state and local governments an it may act as banker to institutions, funds or corporation set up by the Federal, State and Local Government. The Federal Government, at its own discretion, may use the services of other banks or the state treasuries for its banking requirements. The CBN mobilizes funds for the Federal Government through the issuance of short term and long-term government securities. The short-term securities are mainly treasuring bills and certificates, while the long term debt instruments are referred to as Federal Government development stocks. Treasury certificates were first issued in 1968. Treasury bills, being of shorter duration (90 days), tend to be more widely used than treasury certificates.

g) Debt Management

Not only does the CBN mobilize funds for the Federal Government, it also managers its domestic and external debt in conjunction with the Federal Ministry of Finance. The CBN, is empowered to issue debt instruments and manager Federal Government domestic debt on terms and conditions agreed upon by the government and the government and the Bank.

h) Promotion of Monetary Stability

The effectiveness of any Central Bank in executing its functions hinges crucially on its ability to promote monetary stability. Price stability is indispensable for money to perform its role of medium of exchange, store of value, and unit of account.

i) Foreign Exchange Management

Foreign exchange management involves the acquisition and deployment of foreign exchange resources in order to reduce destabilizing shot-term capital flows. The CBN monitors the use of scarce foreign exchange resources to

ensure that foreign exchange disbursement and utilization are in line with economic priorities.

j) Promotion of the Growth of Financial Markets

One of the object of the Bank as enumerated in the central Bank act is the promotion of sound financial structure in the economy. In essence, the bank is charged with the responsibility of developing the money and capital Markets in the country. For the development of the money market, the bank issues and redeems treasury bills and treasury certificates, manages the Bankers Unit Fund (BUF) and processes applications from banks for the issuance of Negotiable Certificates of Deposit (NCD). As far as the capital market is concerned, the bank issues and redeems federal republic of Nigeria development stocks.

For the same purpose, the CBN helps in no small measure in the development of financial institutions such as the Nigerian stock exchange, the Nigerian Bank for Commerce and Industry, the mobilization of long-term capital for investment purpose.

k) Agricultural Productivity

In a bid to enhance agricultural productivity in the economy, the federal government set up the Agricultural Credit Guarantee Scheme, the management of which has been entrusted with the bank. Under this scheme, an initial fund of #00 million was created to enable it to guarantee up to maximum of 75%, whatever credit the commercial and Merchant banks extend to the farmers, co-operative societies as well as state government that engage in agriculture from this fund claims, in respect of loans which cannot be recovered are met by the bank.

It should be noted, however, that the essence of the whole exercise is to encourage the banks to extend credit to the agricultural sector however unpredictable it may appear to be.

L Medical Service

This was a unit under the than personal department (now Human resources) created to cater for medical needs of the staff.

The CBN clinic started operation in the 60's Tinubu and later in staff quarters (estates I & II) in satellite town Lagos.

The division became a department in headed by a director.

As the need increased, new clinics were opened in the 1990" at Abuja and Kano followed by three others at Bauchi, Enugu and Ibadan in 2000.

The clinics are full fledged headed by a medical doctor with the following sections.

i. Medical headed by a Principal medical officer
ii. Pharmacy headed by a pharmacist
iii. Nursing headed by a senior nursing officer
iv. Medical records

1.3 BACKGROUND OF THE STUDY

Studies in several countries of the world have noted that Medical practitioners and indeed health workers in general receive their drug information from pharmaceutical company promotions, many of which contain bias and misinformation on the uses, side effects and contraindication of the drugs.

It is impossible for the individual health worker to have all information published in different pharmacotherapeutic fields and so it became difficult to accurate and reliable patient-related drug information. It was to meet this perceived need that the World Health Organization (W.H.O) highlighted the importance of establishing drug information center in hospitals worldwide with the pharmacist and clinical pharmacologist as the custodian of such centers.

1.3.1 Sources of Drug Information

Source of drug information is mainly the drug literature, and basic to all drug literature is the publication of an observed event, a tested hypothesis, or a description of a chemical synthesis or Isolation. These primary publications

contain the scientific data upon which knowledge is built. Periodical journals and patent literature are the most common formats for the primary literature. The primary literature is defined as a collection of original data. Indexing and abstracting services, which provide a retrospective rational approach to the primary literature, represent secondary literature. Tertiary literature includes publications such a textbooks, monographs, and compendia of handbooks. These are less current and less numerous than the document of primary literature, but they are often the first resources purchased for a drug information services.

1.4 AIMS AND OBJECTIVES

It is well known that the performance of a computer system depends on the characteristics of hardware and software. The aims and objectives of this project include: -

i) Examining the suitable application programs to meet the need of the organization.

ii) Surveying of suitable application programs to meet the organization

iii) Analyzing the hardware requirements of the suitable software.

iv) Final selection of the optimal computer system that meets the hardware requirement of the software.

1.5 METHODOLOGY.

The bedrock of any project work is the viability of data. The source of data collection include primary detail first hand information and secondary data which are data collected from magazines, journals, textbook etc.

There are also measurement techniques available for researchers. These include the use of questionnaires, interviews, observations & Feedbacks.

The method used to gather information and obtain data for this project is basically the feedback from the users (consumers) of the drugs

CHAPTER TWO

2.0 ORIGIN OF DRUGS

2.1 HISTORICAL BACKGROUND OF DRUGS

A drug may be defined as an agent intended for use in the diagnosis, mitigation, treatment, cure, or prevention of disease in man or other animals. One of the most astonishing qualities of drugs is the diversity of their actions and effects on the body.

Drugs in the form of vegetation and minerals, have existed longer than man himself. Human diseases and man's instinct to survive have, through the ages, led to their discovery. Among many early races, disease was believed to be cause by the entrance of demons or evil spirits into the body. The treatment quite naturally involved ridding the body of the supernatural intruders. From the earliest records of history it is evident that the primary methods of doing so were through the use of spiritual incantations, the application of noisome materials, and the administration of specific herbs or plant.

Before the days of priest craft, the wise man or woman whose knowledge of the healing quality of plant had been gathered through experience or handed down by word or mouth was called upon to attend to the sick or wounded and prepare the remedy. It was in the preparation of medicinal materials that the act of apothecary originated. The act of apothecary has always been associated with the mystery and its practitioners were believed to have connection with the world of spirits and thus performed as intermediaries between the seen and the unseen. Throughout history the knowledge of drugs and their application to disease has always meant power, in the Homeric epics, the team PHARMAKON (Gr) connotes a charm or a drug that can be used for good or for evil purposes. Today it is obvious that many of apothecary's failure were due to impotent medicines, inappropriate medicines, under dosage, over dosage, and even poisoning, while the success may be attributed to an appropriate drug based on his experience, coincidence of proper therapy, inconsequential effect of the therapy for an individual with nonfatal illness. As time assed, the act of the apothecary became combined with priestly functions, and

among the early civilizations the priest magician or priest physician became the healer of the body as well as the soul.

Due to the patience and intellect of the archeologist, the types and the specific drugs employed in the early history of drug therapy are not as indefinable as one might suspect. Many ancient tablets, scrolls and other relics dating as far back as 3000 B.C have been uncovered and deciphered by archeolologic scholars to the delight of historians of drug therapy.

Throughout history many individuals have contributed to the advancement of the drug therapy and health science. Notable among those whose genius and creativeness had a revolutionary influence on the development of drug therapy were Hippocrates (46–377B.C). Dioscorides (1st Century A.D), Gales (130–200A.D) and paracelsus (149 – 541A.D).

HIPPOCRATES was a Greek physician who rationalized medicine and systematized the knowledge of drugs. His works included the descriptions of hundreds of drugs, and it was during this period that the term PAHRMAKON came to mean a purify remedy for good only, transcending the previous connotation of a charm of drug for good or for evil purpose. In recognition of his works, Hippocrates was honoured by being called the " Father of Medicine".

Dioscorides, a Greek physician and botanist was the first to deal with botany as an applied science of pharmacy. His work DE MATERIA MEDICA", is considered a milestone in the study of naturally occurring medicinal materials, also his descriptions of the art of identifying and collecting natural drug products, the methods of there proper storage, and the means of detecting adulterants or contaminants were standards of the period.

Galen, a Greek pharmacist physician who attained Roman Citizenship aimed to create a perfect system of physiology, pathology, and treatment and formulated doctrines that were followed for 1500 years. His works included the description of numerous drugs of natural origin (plant and animals) with a profusion of drug formulas and methods of compounding. He originated so many preparations of vegetable drugs by mixing or melts the individual ingredients, that area of pharmaceutical preparations has been commonly referred to as "Galenic pharmacy"

Perhaps no man in history exercised such a revolutionary influence on drugs therapy as did Aureolus Philippus, a Swiss physician and chemist who called himself paracelsus. He influenced tremendously the transformation of pharmacy form a profession based primarily on botanic science (plant as sources of drug only) to one based on chemical science (Chemical synthesis of drugs). He believed that it was possible to prepare a specific medicinal agent for use in combating each specific disease and introduced a host of chemical substances to drug therapy. Some of the formulas he derived, the names he coined, and the theories the advanced have remained a part of our daily therapy practice.

The process of drug discovery and development is complex. After a potentially new drug substance is discovered and has undergone definitive chemical and physical characterization a great deal of biological information must be gathered. The basic nature and mechanism of action of the drug on the biological system must be determined including toxicologic features, pharmacokinetic features, effective route of administration and also the short term and long term effects on various body cells, tissues and organs. All these features are documented in pharmacopoeia. Certainly the vast array of effective medicinal agents available today represents one of man's greatest scientific accomplishments. It would be frightening to conceive of our civilization devoid of these remarkable and beneficial agents. Through there use, many of the diseases, which have plagued mankind throughout history, as smallpox and poliomyelitis, are now virtually extinct. Illnesses such as diabetics, hypertension and mental depression are now effectively controlled with modern drugs. Today's surgical procedures would be virtually impossible without the benefit of general anesthetics, analgesics, antibiotics and intravenous fluids.

2.2 RELEVANCE OF DRUGS IN HEALTH CARE AND THE NEED FOR DRUG INFORMATION SYSTEM.

2.2.1 Relevance of Drugs in Health Care

It is a fact that one of the greatest enemy of man is disease, it is equally true that the greatest hope of man against diseases are drugs, no wonder, one of the most

distinguishing factors between man and other animal is the urge to take drugs when the need arises.

For users of health care services, the quality of curative care is the focus of attention and the overriding factor is the availability of drugs. Historically, drugs assume center stage in the health care delivery services when penicillin was first discovered in 1929 by Fleming.

While more than 90% of patients that visit hospitals world wide require drug therapy, the procedure in the laboratory, operating theatre and X-ray also required the use of drugs and chemicals; it is obvious then that only a negligible fraction or percentage of patient required other forms of therapy such as physiotherapy etc. World Health Organization (WHO) underscored the importance of drugs in health care delivery when it said "Drugs occupy the central position (Backbone) in the health care, as its availability gives credibility to the health care while it's absence is more than catastrophic''

2.2.2 The Need for Drug Information System

There are a very large number of drug products available in the markets and each year many new drugs are introduced. New facts about existing drugs are also being discovered. It is impossible for busy clinicians to have a satisfactory knowledge of all these drugs. In fact, it may not be possible to remember all the clinically important details of even a limited range of drugs. Selection and use of the right drug in a appropriate manner (rational use of the drug), is thus a challenging and difficult task. There has been a rapid increase in the volume of information provided by drug companies about drugs, the quality of which need to be assured or authenticated. The identification of drugs given the proliferation of brand names, is often difficult and time consuming.

Given all these challenges, the health care workers particularly the clinician have stated to request patient - related drug information, that is evaluated by an objective source, hence the need for drug information system.

2.3 CLASSIFICATION OF DRUGS

Drugs are classified in multifarious dimensions, however, pharmacological classification in universally more acceptable. This classification is done in accordance with the actions exerted by the drugs; consequently, drugs are classified under this method into three (3) very brand categories viz:

1 PHARMACODYNAMIC AGENT

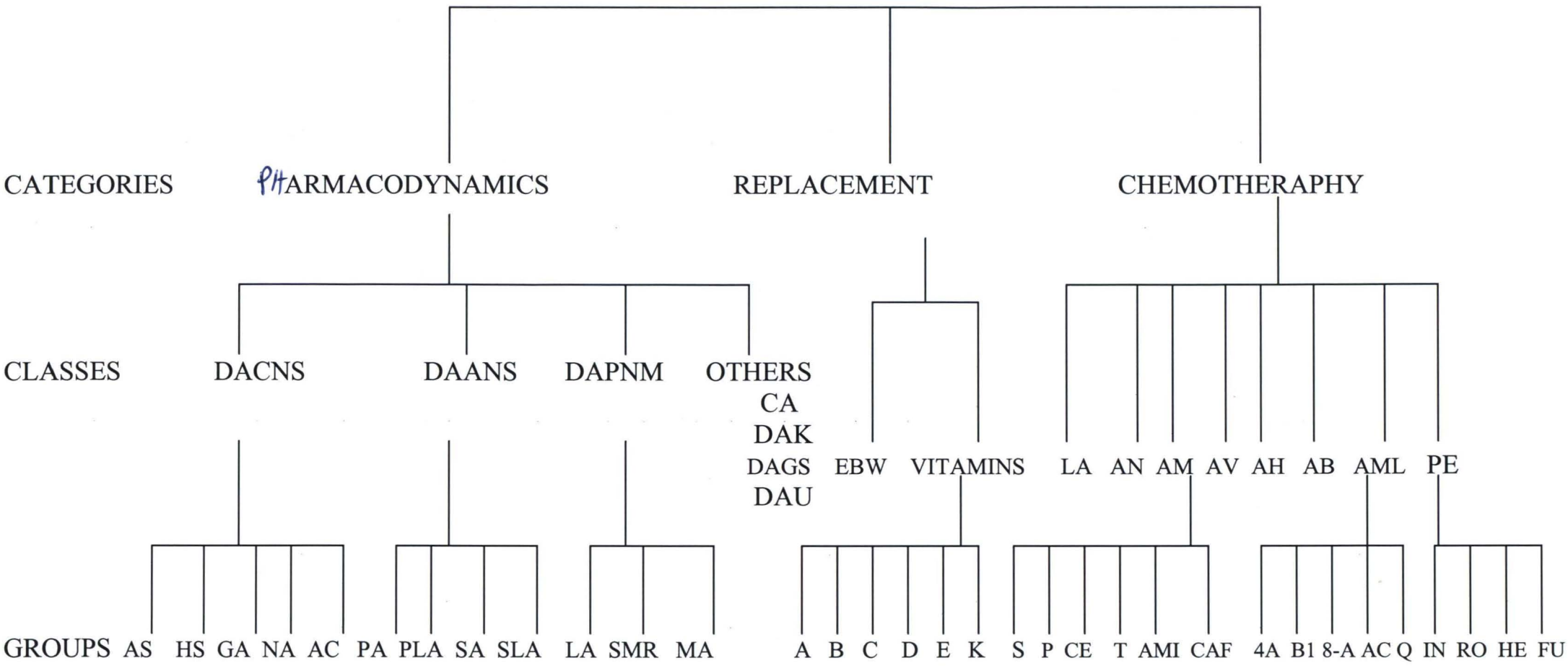
These groups of drugs exert their actions by modifying the tissue functions qualitatively; it does not change the principal activity or integrity of the tissue. Therefore the action of these group of drugs is either stimulating or depressive e.g cimetidine.

2. REPLACEMENT AGENTS

These are drugs that serve their action by replacing the deficit occurring in the body e.g. Insulin.

3. CHEMOTHERAPEUTIC AGENTS

These are drugs that demonstrate their effect by killing or inhibiting the growth, they are toxic to parasites, bacteria or rapidly growing ceroplastic tissues and harmless to host cells e.g. Anti-malarial, Antibiotics, etc.



DRUG CLASSIFICATION CHART

INTERPRETATION OF ABBREVIATION

DACNS - Drugs Acting On central Nervous System

DAANS - Drugs Acting On Autonomous Nervous System

DAPNM - Drugs Acting On Peripheral Nerves and Muscles

CA - Cardiovascular Agents

DAK - Drugs Acting On the Kidney

DAGS - Drugs Acting On Gastrointestinal System

DAU - DRUGS acting on Uterus

EA - Endocrine drugs (Agents)

EBW - Electrolytes and body water

LA - Local Antiseptics

AN - Anti Neoplastics

AM - Amebicides

AV - Anti viral

AH - Anti Helminthes

AB - Antibiotics

AML - Antimalarials

PE - Pesticide

AS - Anti Psychotic Agents

HS - Hypnotics and Sedatives

GA - General Anaslgesics

AN - Narcotic Analgesics

AC - Anti Convulsants

PA - Parasympathomimetic Agents

PLA - Parasympatholythic Agents

SA - Sympatholytic Agents

SLA - Sympathylytic Agents

LA - Local Anesthetics

SMR - Skeletal Muscle Relaxants

MA - Myeoneural Agents

A - Vitamin A

B - Vitamin B6, B12, B2, etc

C - Vitamin c (Ascobic Acid)

D - Vitamin D (Calcifecol)

E - Vitamin E

K - Vitamin K

S - Sulphonamides

P - Penicilline

CE - Cephalosporins

AMI - Aminoglycosides

CAF - Chloramphenicol

4-A - 4-Amino quinolines

8-A - 8-Aminoquinolines

AC - Acridines

Q - Quininess

IN - Insecticides

RO - Rodenticides

HE - Herbicides

FU - Fumigants

2.4 THE CONCEPT OF INFORMATION SYSTEM

Since the application of computer in administrative data processing began in 1954 it has become one of the key instruments for improving organizations formal information processing activities. In three (3) decades, computer based information have evolved from supporting peripheral, already formalized, system like payroll to penetrating the whole organization.

One way to view data processing is as a 3- phase system of INPUT, PROCESSING and OUT PUT. Data are recorded, which is called input, then processed (classified, sorted, stored, retrieved, summarized, analyzed, communicated) to obtained output (either management information, custodial documents or historical records).

Drug information was once a relatively simple matter but with growing amount of drug products in the markets, it grow more complex as it becomes impossible for any individual to keep the knowledge about all the drugs in memory. The advent of sophisticated and efficient computers finally provided tools that could adequately control and manage the burgeoning amount of drug information available, this is because the memory capacity of the computer to hold these information is not doubtful whereas the speed of retrieval of such information is amazingly fast, the quality of the information is neither adulterated nor threaten.

CHAPTER THREE

3.0 SYSTEM ANALYSIS AND DESIGN

3.1 REQUIREMENTS OF DRUG INFORMATION SYSTEM

This is the analysis of each component (sub system) of drug information system based on the old system.

3.1.1 *Professional Content Information on Drugs*

This is defined as detailed information on drugs otherwise called MONOGRAPH; Usually the information is in medical terms and strictly for consumption of the health care workers only.

The elements of Monograph are: -

Name — The Universally accepted drug names are those names that were scientifically coiled and are called GENERIC NAMES. Trade names are not universal accepted, e.g. Paracetamol and not Panadol (R)

Class - The class the drug belong e.g. Antimalarial, Antibiotics etc.

Indication - The disease conditions in which the drug could be used i.e uses of the drug e.g. Chloroquine is indicated in the treatment of malaria fever.

Dose - This is the quantity of the drug to be taken at a time, the frequency i.e. how many times in a day and the duration i.e how long the drug is to be taken. Doses are age and disease condition dependent. E.g. Cap Ampicillin; Dose:- 500mg to be take four times in a day for five days.

Side effect - Other effects (Unpleasant) of the drug that are not desired.

Contra-Indication -Conditions where the drug must not be used either because of its fatal consequence or it may exacerbate the patient condition.

Precaution - This is where the use of a drug or combination of drugs must be made only after careful consideration of the benefit and the risk.

Pharmacokinetics - This has to do with absorption and fate of the drug in the body. How the drug is absorbed into the blood stream, bioavailability i.e. the minimum concentration of the drug required in the blood to elicit the desired therapeutic effect, how long it stay in the site of action before it is metabolized, metabolic pathway and subsequent elimination of the drug in the body.

Poisoning - Where accidental overdose occur, adverse effects might manifest in the form of sign and symptoms.

HOW THIS COMPONENT (SUB SYSTEM) OF DRUG INFORMATION IS OPERATED IN CBN CLINIC, IBADAN

Most of the requests or feedbacks information is made by telephone or personal contact to the pharmacist. A manual literature search is made and information from available sources is evaluated. A preliminary telephone answer is given if urgently needed otherwise a referenced handwritten answer is sent to the requester later. Pharmacist who takes full professional responsibility of the information given out documents all responses. The documented responses are then kept for future references

3.1.2 FEEDBACK ON NEW FACTS (USES AND SIDE EFFECTS) ABOUT EXISTING DRUGS

Mostly emphasis is laid more on the adverse effects (side effects) that are new to the usage of the drug. The process is such that either a patient or health worker could walk up to the pharmacist and give details of his/her experience. The patient's particulars i.e Name of patient, ID. No, Name of drug – preferably Brand Name and a description of unpleasant effects reported are then noted and documented

3.1.3 SCHEDULE LISTING (DRUG BULLETIN)

This is defined as periodic information publication about drugs, which serve as a continuining education through information dissemination. The following are contain in a drug bulletin:-

Drug Review – complete review of medical and phamaceutical literature on specific drugs or drug classes.

- Announcements – Information about a new drug, drug recalls etc
- Drug use problems as noted in the literature such as new side effects bioavailability data, special warnings, new methods of administration.

3.2 SYSTMES DESIGN

The proposed system will be designed to be users friendly where the menu will display various options tasks and operations that be performed with the system enabling the user to provide supply the required information.

The design of the proposed system also required the design of the input and output. The input being the data to be supplied into the system and output, communicates the result of the operation to the users.

3.3 PROJECT FEASIBILITY TESTING

Testing a project feasibility allows for confirming the possibility of implementing the system. The yardstick of ascertaining the project feasibility are:

- Operational/ feasibility
- Economical feasibility

3.3.1 OPERATIONAL/FEASIBILITY

This is the test to confirm the working of a new system. However, the described computerized system is anticipated to work given the software to be designed, the hardware to be procured and the human ware to manage the system. All would be effectively combined for efficiency.

3.3.2 ECONOMICAL FEASIBILITY

This is a test to assess the cost of implementing a proposed project vis-à-vis benefit to be derived. Given the importance of this, a section below (Chapter 4) is set to discuss the cost and benefit of the system.

3.4 INPUT SPECIFICATION

From the analysis specified above, the proposed system requires five (5) forms for data entry. The forms are to be used to accept information from the users on the following:

i New drug

ii Drug classes (Classification)

iii Drug indications (uses of the drug)

iv. Feedback operation (information (+ve-or-ve) from the users)

v. Drugline Entries (easier documented information)

3.5 OUTPUT SPECIFICATIONS

There are various reports that are required to be generated by the new system. These are both the soft copy and the hard copy reports. These reports are listed below:

i. Drugline report

ii. Drug usefulness report

iii. Drug disease report

iv. Feedback report.

DRUG DISEASE REPORT

In a disease condition more than one drug could be useful in the treatment i.e. many drugs could be used independently in the treatment of particular disease, though these drugs have varying side effects. Comprehensive information about drug use in the treatment of a particular disease condition is contained in this report. This report becomes important for the sake of consultation by the health workers.

3.6 FILE DESIGN

In DBMS environment a database file is required for the sake of data storage. In this connection, the proposed system requires six (6) database file for operational efficiency. The files are listed below.

i DRUG. DBF

ii. CLASS.DBF

iii. INDICATE.DBF

iv. DRUGLINE.DBF

v. USES.DBF

vi. FEEDBACK.DBF

DRUG. DBF

This is a file that contains various information about each drug. The structure of the file is as shown below:

S/NO	FIELD NAME	TYPE	WIDTH	DEC.	INDEX
I	DCODE	CHARACTER	8		N
2.	DNAME	CHARACTER	20		N
3.	DCLASS	CHARACTER	30		N
4.	DGRP	CHARACTER	50		N
5	DINDC	CHARACTER	50		N
6.	DOSE	CHARACTER	50		N
7.	SIDE 1	CHARACTER	50		N
8	SIDE 2	CHARACTER	50		N
9	CONTRA	CHARACTER	50		N
10.	CAUTION	CHARACTER	50		N
11	KINET	CHARACTER	50		N
12	POISON	CHARACTER	50		N

CLASS.DBF

This is a reference file, which allows for the application of the coding system. It contains the drug name and their respective classes. The structure of the file is as follows:

S/NO	FIELD	NAMETYPE	WIDTH	DEC.	INDEX
I	CLASS	CHARACTER	3		N
2.	DESCR	CHARACTER	20		N

INDICATE. DBF

This is the file that contains the various indications of drug. The structure of the files is as shown below:

S/NO	FIELD NAME	TYPE	WIDTH	DEC.	INDEX
I	DCODE	CHARACTER	8		N
2.	DNAME	CHARACTER	20		N
3.	UCODE	CHARACTER	7		N
4.	UDESCR	CHARACTER	20		N
5.	DOSE	CHARACTER	20		N

DRUGLINE.DBF

This drugline is a database file that contains information about questions and response of all enquiries made earlier. The structure is as shown below:

S/NO	FIELD NAME	TYPE	WIDTH	DEC.	INDEX
I	DCODE	CHARACTER	8		N
2.	DNAME	CHARACTER	20		N
3	QSN	CHARACTER	6		N
4.	QDATE	CHARACTER	8		N
5.	ENQ1	CHARACTER	50		N
6.	ENQ2	CHARACTER	50		N
7.	RESP1	CHARACTER	50		N

8.	RESP 2	CHARACTER	50	N
9.	RESP 3	CHARACTER	50	N
10.	SOURCE	CHARACTER	40	N
11.	RESEARCH	CHARACTER	40	N

USES.DBF

This file indicates the various drugs and their associated usefulness. It's structure is as shown below:

S/NO	FIELD NAME	TYPE	WIDTH	DEC.	INDEX
1	UCODE	CHARACTER	7		N
2	UDESCR	CHARACTER	20		N

FEEDBACK,DBF

This is one file that contains facts especially the side effect of a drug which is strange or new. In this case, the necessary details about the

S/NO	FIELD	NAMETYPE	WIDTHDEC.	INDEX
1.	HPNO	CHARACTER	9	N
2.	DATE	DATE	8	N
3.	NAME	CHARACTER	30	N
4.	SEX	CHARACTER	1	N
5.	AGE	CHARACTER	2	N
6.	LOCATE	CHARACTER	4	N
7.	DIAG	CHARACTER	30	N
8.	DNAME	CHARACTER	30	N
9.	ROUTE	CHARACTER	10	N
10.	DATEB	DATE	8	N
11.	DOSAGE	CHARACTER	15	N
12.	FREQ	CHARACTER	10	N

13.	USE	CHARACTER	30	N
14.	ADVERSE	CHARACTER	50	N
15.	DATER	DATE	8	N
16.	RESP	CHARACTER	20	N

3.7 CHOICE OF SOFTWARE

For purpose of feasibility, the proposed system will be designed using Database Management System (DBMS). A DBMS is a software that maintains and manipulates the content of a database. It also provide the interface between the user and the data in such a way that it enables the user to record, organize, extract, summarize and report on the data contained in a data base. However, a database can be defined as a mechanized shared and centrally controlled collection of data used in an organization. It is regarded as a collection of useful information organized in a systematic and consistent manner. A database can also be regard as a databank.

3.8 OBJECTIVES OF DBMS

The overall objectives for development of a database technology is to treat data as an organizational resource and as an integrated whole. DBMS allows data to be protected and organized separately from other resources (e.g hardware, software and program)

3.9 PROGRAM DOCUMENTATION

The source program is designed using the concept of modular programming in order to reduce the complexity of the design. The new system has about 20 sub-programs which are integrated with a main program which co-ordinate the sub-programs. The program listing of the source program is contained in Appendix I

CHPTER FOUR

4.0 SYSTEMS IMPLEMENTATION

4.1 INTRODUCTION

This Implementation of the new system is the stage that requires putting into use the newly designed system. For the purpose of workability, implementation is to be done after proper procedures that will ascertain the proper workings of the system.

4.2 COMPUTER HARDWARE SPECIFICATION

The new system is designed to work on a efficient stand alone microcomputer system. Specifically, the computer hardware configuration should include a Microcomputer, printer, and an Uninterrupted Power Supply (UPS). The description and capacity of each are as stated below:

i. *COMPUTER HARDWARE*

A good hardware should as a minimum requirement consist of the following configurations.

Pentium 300 Mhz

64MB RAM

6.4GB Hard Disk

3.5" Disk Drive

40X CD-Rom

SVGA Monior

Windows 98 Keyboard

Mouse + Mouse pad

Software pre-installed.

ii PRINTER

The recommended model of the printer is leser jet 1100.

iii UPS

An APC back up pro 1.4 KVA with the capability of holding power for up to 45 minutes is required.

4.3 SOFTWARE REQUIREMENT

dBase IV and Clipper (Version 5.3) are required to be installed for the sake of execution and future modification of the new software. The developed source program would require dBase IV for modification and expansion while Clipper is needed for the purpose of compilation once a modification is carried out on the system.

However, the newly designed program cab be executed in DOS and windows environment. In this vein, it is recommended that DOS 7.0 and windows 2000 be installed.

In addition, for other areas of computer application, a Word-processing package is required for text processing and report preparation, Spreadsheet package for calculation and graph/data representation and a Desktop Publishing Package for designing letter headed paper, memo paper and other graphical representations.

Summarily, the required software are:

* dBASE IV
* Clipper Version 5.3
* MS-DOS 7.0
* Windows '98
* Word '97
* Excel '97
* Power Point '97

4.4 SYSTEM TESTING

The new system has been tested and confirmed working in accordance with its requirement. A test-run was conducted which involve some data entry. In the test analysis, the data were used to execute the various menus and submenus available in the software. The various results displayed were discovered to be correct and in order. These results are contained in the

appendix. With this belief and assurance, it was confirmed that the software is working perfectly and as required.

4.5 STARTING THE SYSTEM

Given that the necessary files have been established in the computer, taking the following steps can start the system.

* Type CD/DIS + < ENTER> Key
* Type DIS + < ENTER> Key

The execution of the above steps allows the first level menu (Main menu) appear on the screen from which the user would select an appropriate choice.

4.6 DESCRIPTION OF THE SYSTEM MENU

The first level menu consists of five options as displayed in figure 1 in the Appendix. Each of this is itemized and discussed as follows:

* Drug Information Management
* Drug Enquiry System
* Drug Information Update
* Reports Generation
* Exit.

4.7 COST BENEFIT

The Cost Benefit Analysis, the analysis of the total cost (expenses) that is needed in order to put the drug information software into actual implementation irrespective of environment, people and other constraint that may deter the implementation is itemized as can be see below:

S/NO	DESCRIPTION	UNIT	RATE	AMOUNT
(A) OPERATIONAL COST				
1.	Complete Computer System	1	250,000	250,000.00
2.	HP Laser Jet 6L Printer	1	65,000	65,000.00
3.	Epson LQ 2170 Printer	1	100,000	100,000.00
4.	Stabilizer (AVR)	1	55,000	55,000.00

5.	UPS (Un-Interrupted Power Supply)	!	65,000	65,000.00
6.	Equipment Maintenance	Lot	70,000	70,000.00
7.	Miscellaneous Expenses	Lot	20,000	20,000.00
TOTAL ON ITEM (A)				625,000.00
(B) DEVELOPMENTAL COST				
1.	System Analysis & Design, Program	Lot	100,00	100,000.00
2.	Development	Lot	50,000	50,000.00
3.	Software Implementation	Staff	10,000	10,000.00
4.	Personnel Training for One Month	Lot	30,000	30,000.00
	TOTAL ON ITEM (B)			230,000.00
GRAND TOTAL ON ITEM (A) & (B)				**855,000.00**

A total of Eight Hundred and Fifty Five Thousand Naira (N855,000.00) will be needed to actually implement the CURRENCY Software.

4.8 BENEFITS OF THE NEW SYSTEM

The following benefits would be desired from this newly designed system:

i. Enhance the efficient operation of the Clinic in terms of drugs information handing and management.

ii. Creation of speedy ways and timely response to enquiry on drug information, especially in emergency situations (life saving) thereby enhancing immediate and definite decision making of the recipient.

iii. Avoidance of common problems such as loss of vital information, data mix-up as it is currently being experienced.

iv. Creation of speedy ways of generating reports from the system.

v. Authenticity and reliability of drug information generated is enhanced, since it is never adulterated and above all unbiased

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION & RECOMMENDATION

5.1 SUMMARY

This project work was conceived based on the need to computerize the management of drugs information in CBN clinic, Ibadan. This is expected to aid the in handling and managing information about all the available drugs without problem.

The application of computer for this purpose is to ensure easy storage of data as well as quick retrieval of information stored,

However, a computerized procedure cannot just be put in place without gong through some stages of its development. The analysis of these procedures was examined and the result was considered in the design of the proposed system. The considerations of the design are both logical and physical for the necessary requirements. Given the design of the proposed system, the required environment for the system was also considered in terms of the computer configuration. The documentation, which serves as the description of the new system, was also elaborated for the purpose of reference for users.

5.2 CONCLUSION

The realization of computer application in all areas has made computers relevant in modern days. This forms the basis of computerization and its introduction in order to replace manual procedures in most organizations. The computer approach becomes necessary because of its features such as reliability, speed, accuracy, efficiency, data security and host of others.

In this regard, the introduction of computer based system for drug information system would enhance the operation of CBN Clinic. As a result, rational clinical use of drugs, through the provision of objective, rational, timely, duly processed, pertinent and evaluated scientific and technical information, will be promoted and ensured.

5.3 RECOMMENDATION

In order to achieve the benefit of the application of the proposed system, the following recommendations need to be adopted.

Training Requirement

For a successful implementation and application of a computerized system, the potential users would be required to be trained on various computer application and operation.

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APPENDIX I (PROGRAM DOCUMENTATION)

DIS.PGR

```
set talk off
set stat off
set score off
set bell off
set date brit
do whil .t.
clea
@ 1,27 to 3,52 doub
@ 1,10 to 22,69 doub
@ 2,29 say CENTRAL BANK OF NIGERIA CLINIC
@ 5,28 say "DRUG INFORMATION SYSTEM'
@ 6, 28 to 6,50 doub
@ 8,30 say 'MAIN  M ENU'
@ 10,22 say 'A    DRUG INFORMATION MANAGEMENT'
@ 12,22 say 'B    DRUG ENQUIRY SYSTEM'
@ 14,22 say 'C     DRUG INFORMATION UPDATE'
@ 16,22 say 'D'     REPORT GENERATION'
@ 18,22 say 'Q' RETURN TO DOS'
@ 9,20 to 19,59
do whil .t.
choice = ' '
@ 21,23 say ' MAKE A CHOICE (A, B, C, D or Q):' get choice pict '!'
read
if choice $ 'ABCDQ'
endi
endd
do case
```

case choice = 'A'

do manage

case choice = 'B'

do manage

case choice = 'B'

do enquiry

case choice = 'C'

do update

case choice = 'D'

do report

othe

exit

endc

endd

clea

retu

MANAGE. PRG

Do whil .t.

Clea

@ 1,27 to3, 52 doub

@ 1, 10 to22, 69 doub

@ 2, 29 say CBN CLINIC

@ 5, 28 say 'DRUG INFORMATION SYSTEM'

@ 6,28 to 6,50 doub

@ 8,24 say 'DRUG INFORMATION MANAGEMENT MENU

@ 10,25 say 'A DRUG DATA ENTRY'

@ 12,25 say 'B DRUG DATA MODIFICATION'

@ 14, 25 say 'C DRUG DATA DISPLAY'

@ 16,25 say 'D DRUG DATA DELETION'

@ 18,25 say 'Q RETURN TO MAIN MENU'

```
@ 9,28 to 19,56
@ 9,23 to 19,56
do whil .t.
choice = ' '
@ 21,23 say 'MAKE A CHOICE (A, B, C , D or Q): get choice pict '!'
read
if choice $ 'ABCDQ'
exit
endi
endd
do case
case choice = 'A'
do dentry
case choice = 'B'
do dmodify
case choice = 'C'
do dlisting
case choice = 'D'
do derase
othe
exit
endc
endd
retu
```

ENQUIRY.PRG

```
Do whil .t.
Clea
@2,27 to 4, 52 doub
@2,10 to 21,69 doub
```

```
@ 3,29 say 'C.B.N. CLINIC IBADAN'
@ 6,28 say 'DRUG INFORMATION SYSTEM'
@ 7,28 to 7,50 doub
@ 9,28 say 'DRUG ENQUIRY SYSTEM MENU'
@ 11,25 say 'A    DRUG USEFULNESS ENQUIRY'
@ 13,25 say 'B    DRUG-DISEASE ENQUIRY'
@ 15,25 say 'C    DRUG LINE ENQUIRY'
@ 17,25 say 'Q    RETURN TO MAIN MENU'
@ 10,28 to 18,56
@ 10,22 to 18,56
do whil .t.
choice =' '
@ 20,24 say 'MAKE A CHOICE (A, B, C or Q):' get choice pict '!'
read
if choice $ 'ABCQ'
exit
endi
endd
do case
case choice = 'A'
do useful
case choice = 'B'
do disease
case choice = 'C'
do dgline 1
othe
exit
endc
endd
retu
```

UPDATE.PRG

```
do whil .t.
clea
@ 1,27 o 3,52 doub
@ 1,10 to 22,69 doub
@ 2,29 say 'GENERAL HOSPITAL MINNA'
@ 5,28 say 'DRUG INFORMATION SYSTEM'
@ 6,28 to 6,50 doub
@ 8,26 say DRUG INFORMATION UPDATE MENU'
@ 10,25 say 'A    DRUG CLASS UPDATE'
@ 1,10 to 24,69 doub
@ 2,29 say 'GENERAL HOSPITAL MINNA'
@ 5,28 say 'DRUG INFORMATION SYSTEM'
@ 6,28 to 6,50 doub
@ 8,29 say 'REPORT GENERATION MENU'
@ 10,25 say 'A    DRUG DATA REPORT'
@ 12,25 say 'B    DRUG USEFULNESS REPORT'
@ 14,25 say 'C    DRUGLINE REPORT'
@ 16,25 say 'D    FEEDBACK REPORT'
@ 18,25 say 'E    DRUG-DISEASE REPORT'
@ 20,25 say 'Q    RETURN TO MAIN MENU'
@ 9,28 to 21,56
@ 9,23 to 21,56
do whil .t.
choice =' '
@ 23,21 say 'MAKE A CHOICE (A, B, C, D, E or Q):' get choice pict '!'
read
if choice $ 'ABCDEQ'
exit
endi
endd
```

```
do case
case choice ='A'
do report !
case choice = 'B'
do report 1
case choice = 'B'
do report2
case choice = 'C'
do report3
case choice = 'D'
do report3
case choice = 'D'
do report4
case choice = 'E'
do report 5
othe
exit
endc
endd
retu
```

DENTRY.PRG

```
use indicate
copy stru to temp 1 .dbf
sele a
use class
sele c
use use
sele d
use temp 1
do whil .t.
```

```
clea
@ 2,30 say 'DRUG DATA ENTRY FORM'
@ 1,28 to 3,51 doub
@ 1,3 to 23,76 doub
@ 21,4 to 21,75
mdcode = spac(8)
@ 5,5 say 'DRUG CODE (Press <ENTER KEY> to exit):' get mdcode pict
'!!!/9999'
read
if mdcode = spac(8)
exit
endi
subcode = substr(mdcode, 1,3)
sele b
go top
loca for subcode = class
if .not. foun()
@ 22,15 say 'CLASS CODE NOT APPLICABLE – Press any key to exit'
set cons off
wait
set cons on
loop
endi
mdescr = descr
sele a
go top
loca for mdcode = dcode
if foun()
@ 22,17 say 'DRUG CODE ALREADY EXIST – Press any key to exit'
set cons off
wait
```

```
set cons on
loop
endi
misus = 0
stor spac(20) to mdname,mdose
stor spac(50) to mdgrp,mside 1, mside2
stor spac(50) to mcontra,mcaution,mkinet,mpoison
@ 5,5 clea to 5,52
@ 5,5 say 'DRUG CODE'
@ 5,21 say 'DRUG NAME'
@ 5,46 say 'DRUG CLASS'
@ 6,5 get mdcode
@ 6,43 get mdcode
clea gets
@ 6,18 get mdname pic '@!'
@ 8,5 say GROUP:      'get mdgrp pict '@!'
@ 10,5 say 'SIDE EFFECTS:   ' get mside 1 pict '@!'
@ 12,5 say'                  ' get mside2 pict '@!'
@ 14,5 say 'CONTRAINDICATION:' get mcontra pict '@!'
@16,5 say 'PRECAUTION:     'get mcaution pict '@!'
@ 18,5 say 'KINETICS:        ' get mkinet pict '@!'
@ 20,5 say 'POISONING:      ' get mpoison pict '@!'
read
@  22,18 say 'Press any key for the Drug Indications Entry'
set cons off
wait
set cons on
clea
@ 0,28 say 'INDICATIONS ENTRY SCREEN'
@ 1,28 to 1,51
@ 3,8 say 'DRUG CODE:' get mdcode
```

```
@ 3,30 say 'DRUG NAME:' get mdname
clea gets
@ 4,8 to 24,71
@ 4,9 to 4,70
@ 5,10 say 'S/NO'
@ 5,18 say 'CODE'
@ 5,30 say 'DESCRIPTION'
@ 5,52 SAY 'dose'
@ 5,15 to 21,15
@ 5,25 to 21,25
@ 5,48 to 21,48
@ 6,9 to 6,14
@ 6,16 to 6, 24
@ 6,26 to 6,47
@ 6,49 to 6,70
@ 22,9 to 22,70
sno = 0
r = 7
do whil .t.
sno = sno =+1
@ r, 11 say sno pict '99'
do whil .t.
mcode = spac(7)
@ r, 17 get  mucode pict '!!!/999'
read
sele c
go top
loca for ucode = mucode
if .not. foun()
@ 223,20 say 'ILLEGAL INDICATION CODE – Press any key'
set cons off
```

```
wait
set cons on
@ 23,20 clea to 23,59
loop
endi
mudescr = udescr
sele d
if .not. eof()
go top
loca for ucode = mucode
if foun()
@ 23,19 say 'DUPLICATE INDICATION CODE –Press any key
set cons off
wait
set cons on
@ 23,19 clea to 23,60
loop
endi
endi
exit
endd
@ r, 28 get mudescr
clea gets
mdose = spac(20)
@ r, 50 get mdose pict '@!'
read
appe blan
repl dcode with mdcode, dname with mdname
repl ucode  with mucode, undescr with mudescr
repl dose with mdose
@ 23,23 say 'TO ENTER MORE INDICATIONS (Y/N);'
```

```
do whil .t.
choice  = ' '
@ 23,56 get choice pict '!'
read
if choice $ 'YN'
exit
endi
endd
@ 23,22 clea to 23,57
if choice = 'N'
exit
endi
r = r +2
if r>21
@ 7,2 clea to 21,7
@ 7,9 clea to 21,19
@ 7,21 clea to 21,52
@ 7,54 clea to 21,63
@  7,65 clea to 21,77
r = 7
endi
endd
clos all
@ 23,28 say 'TO UPDATE FILE (Y/N):'
do whil .t.
choice = ' '
@ 23,50 get choice pict '!'
read
if choice $ 'YN'
exit
endi
```

```
endd
if choice = 'Y'
use drug
```

DLISTING.PRG

```
Use indicate
Copy stru to temp 1
do whil .t.
clea
@ 2,29 say 'DRUG DATA DISPLAY FORM'
@1,27 to 3,52 doub
@ 1,3 to 23,76 doub
@ 21,4 to 21,75
mdcode = spac(8)
@ 5,5 say 'DRUG CODE (Press< ENTER KEY> to exit):' get mdcode pict'!!!/999'
read
if mdcode = spac(8)
exit
endi
subcode = substr(mdcode,1,3)
use class
loca for subcode = class
if .not. fou()
@ 22,15 say 'CLASS CODE NOT APPLICABLE –Press any key to exit'
ste cons off
wait
set cons on
loop endi
mdescr = descry
use drug
loca for mdcode = dcode
```

```
if .not. foun()
@ 22,16 say 'DRUG CODE DOES NOT EXIST – Press any key to exit'
set cons off
wait
set cons on
loop
endi
muses = 0
mdname = dname
mdose = dose
mdgrp = dgrp
mside 1 = side 1
mside 2 = side 2
mcontra = contra
mcaution = caution
mkinet = kinet
mpoison = poison
@5,5 clea to 5,52
@ 5,5 say 'DRUG CODE'
@ 5,21 say 'DRUG NAME'
@ 5'46 say 'DRUG CLASS'
@ 6,5 get mdcode
@ 6,43 get mdescr
@ 6,8 get mdname pict'@!'
@ 8'5 say 'GROUP:              'get mdgrp pict '@!'
@ 10,5  say 'SIDE EFFECT: 'get mside1 pict '@!'
@ 12,5 say'          'get mside2 pict '@!'
@ 14,5 say 'CONTRAINDICATION:'  get mcontra pict '@!'
@ 16,5 say ' PRECAUTION:          'get mcaution pict '@!'
@ 18,5 say 'KINETICS:          ' get mkinet pict '@!'
@ 20,5 say 'POISONING:               ' get mpoison pict '@!'
```

```
clea gets
@ 22,17 say 'Press any key for the Drug indications Display'
set cons off
wait
set cons on
clea
use temp 1
appe from indicate.dbf for dcode=mdcode
go top
@ 0,27 say 'INDICATIONS DISPLAY SCREEN'
@ 1,27 to 1,52
@ 3,8 say 'DRUG CODE:'      get mdcode
@ 3,30 say 'DRUG NAME:'     get mdname
clea gets
@ 4,8 to 24,71
@ 5,10 say 'S/NO'
@ 5,18 say 'CODE'
@ 5,30 say ' DESCRIPTION'
@ 5,52 say 'DOSE'
@ 5,15 to 21,15
@ 5,25 to 21,25
@ 5,48 to 21,48
@ 6,9 to 6,14
@ 6,16 to 6,24
@ 6,26 to 6,47
@ 6,49 to 6,70
@ 22,9 to 22,70
sno = 0
r = 5
n1 = 0
do whil .not. eof ()
```

```
r = r=2
sno = sno+1
n1=n1+1
mucode=ucode
mudescr=udescr
mdose=dose
@ r, 11 say sno pict '99'
@ r , 17 get mucode pict '!!!/999'
@ r, 28 get mudescr
@ r, 50 get mdose pict '@!'
clea gets
skip
endd
@ 23,19 say 'VIEWING DRUG DATA – Press any key to exit'
set cons off
wait
set cons on
zap
endd
eras temp 1 .dbf
retu
```

USEFUL.PRG

```
Use indicate
Sort on dcode to temp 2
Sele a
use drug
sele b
use temp 2
do whil .t.
clea
```

```
@ 1,25 say 'DRUG USEFULNESS ENQUIRY SCREEN'
@ 0,23 TO 2,56 DOUB
@ 0,8 TO 24,71 DOUB
@ 22,9 TO 22,70 DOUB
mdcode =spac (8)
@ 4,10 say 'DRUG CODE (Press<ENTER KEY> to exit):'  get mcode pict
'!!!9999'
read
if mcode=spac(8)
exit
endi
sele a
go top
loca for dcode=mdcode
if .not. foun()
@ 23,23 say ' ILLEGAL DRUG CODE – Press any key'
set cons off
wait
set cons
on
loop
endi
@ 4,10 clea to 4,50
mdname = dname
@ 3,10 say 'DRUG CODE:' get mdcode
@ 3,36
say 'DRUG NAME:' get mdname
clea gets
@ 4,9 to 4,70
sele b
go top
```

```
loca for dcode = mdcode
if .not. foun()
@ 23,20 say 'NO ENTRIES ON THIS DRUG –Press any key'
set cons off
wait
set cons on
loop
endi
@ 5,10 say 'S/NO'
@ 5,18 say 'CODE'
@ 5,30 say 'DESCRIPTION'
@ 5,52 say 'DOSE'
@ 5,15 to 21,15
@ 5,25 to 21,25
@ 5,48 to 21,48
@ 6,9 to 6,14
@ 6,16 to 6,24
@ 6@ 6,26 to 6,47
@ 6,49 to 6,70
sno =0
r = 5
do whil .not. eof()
sno = sno + 1
r = r +2
@ r, 11 say sno pict '99'
mucode = ucode
mudescr = udescr
mdose = dose
@ r, 17 get mucode
@ r, 27 get mudescr
@ r,50 get mdose pict '@!'
```

```
clea gets
skip
if dcode <> mdcode
exit
endi
endd
@ 23,15 say 'DISPLAYING USEFULNESS –Press any key to exit'
set cons off
wait
set cons on
endd
clos all
eras temp2 .dbf
clea
retu
```

DISEASE.PRG

```
Use indicate
Sort on ucode to temp2
Use temp2
Do whil .t.
clea
@ 1,26 say 'DRUG DISEASE ENQUIRY SCREEN'
@ 0,24 to 2,55 doub
@ 0,7 to 24,71 doub
@ 22,8 to 22,70 doub
mucode = spac(7)
@ 4,10 say 'INDICATIO CODE (Press <ENTER KEY > to exit):' get mucode pict
'!!!/999'
read
```

```
if mucode = spac(7)
exit
endi
go top
loca for ucode = mucode
if .not. foun()
@ 23,20 say 'ILLEGAL INDICATION CODE –Press any key'
set cons off
wait
set cons on
loop
endi
mudescr = udescr
@ 4,10 clea to 4,50
@ 3,10 say 'INDICATIONCODE:' get mucode
@ 3,38 say 'DESCRITION:' get mudescr
clea gets
@ 4,8 to 4,70
@ 5,9 say 'S/NO'
@ 5,17 say 'CODE'
@ 5,30 say 'DESCRIPTION'
@ 5,52 SAY 'dose'
@ 5,14 to 21,14
@ 5,25 to 21,25
@ 5,48 to 21,48
@ 6,8 to 6,13
@ 6,15 to 6,24
@ 6,26 to 6,47
@ 6,49 to 6,70
sno = 0
r =5
```

```
do whil .not. eof90
sno – sno +1
r = r+2
@ r, 11 say sno pict '99'
mcode = dcode
mdname = dname
mdose = dose
clea
retu
```

CLASS.PRG

```
use class
do whil .t.
clea
@ 5,12 to 18,99 doub
@ 14,13 to 14,65
@ 7,29 say 'DRUG CLASS UPDATE FORM'
@ 6,27 to 8,52
mclass = spac(3)
@ 10,15 say 'DRUG CLASS CODE (Press <ENTER KEY> to exit):'
get mclass pict '@!'
read
if mclass = spac(3)
exit
endi
go top
loca for class = mclass
if foun()
@ 16,22 say 'DUPLICATE CLASS CODE – Press any key'
set cons off
```

```
wait
set cons on
loop
endi
mdescr = spac(30)
@ 12,15 say 'CLASS DESCRIPTION:' get mdescr pict '@!'
read
do whil .t.
choice = ''
@ 16,19 say ''S'' to SAVE      or      ''A'' to ABANDON:'      get choice pict'!'
read
if choice $ 'S'
exit
endi
endd
if choice = 'S'
appe blan
repl class mclass, descry with mdescr
endi
endd
clos all
clea
retu
```

INDICATE.PRG

```
use use
do whil .t.
clea
@ 5,14 to 18,65 doub
@14,15 to 14,64
@ 7,26 say 'DRUG INDICATION UPDATE FORM'
@ 6,24 to 8,54
```

```
Mucode = spac(7)
@ 10,16 say 'INDICATION CODE (Press <ENTER> to exit):' get mucode pict
'!!!/999'
read
if mucode = spac(7)
exit
endi
go top
loca foe ucode = mucode
if foun()
@ 16,19 say 'DUPLICATE INDICATION CODE –Press any key'
set cons off
wait
set cons on
loop
endi
mudescr = spac(20)
@ 12,16 say 'INDICATION DESCRIPTION:' get mudescr pict '@!'
read
do whil .t.
choice = ''
@ 16,19 say 'Press ''S'' to SAVE   or   ''A''  to ABANDON:'
get choice pict'!'
read
if choice $ 'S'
exit
endi
endd
if choice = 'S'
appe blan
repl ucode with mucode, udescr with mudescre
```

```
endi
endd
closcall
clea
retu
```

FEEDBACK.PRG

```
use feedback
do whil .t.
clea
@ 0,4 to 24,75 doub
@ 1,30 say 'FEEDBACK UPDATE FORM'
@ 2,30 to 2,49 doub
@ 22,5 to 22,74
mhpno = spac(9)
@4,6 say 'ID NO (Press <ENTER> to exit:'  get mhpno pict'99/999999'
read
if mhpno = spac(9)
exit
endi
stor ctod (‘  /  /  ‘) to mdate, mdateb, mdater
stor spac(40) to mname
stor spac(10) to mfreq, mroute
msex = ‘  ‘
mage = ‘  ‘
mdname =spac(45)
muse = spac(450
mdiag = spac(50)
mlocate = spac(4)
mdosage = Spac(15)
madverse = spac(50)
```

```
mresp = spac(20)
@ 4,60 say 'date:' get madte
@ 6,6 say 'NAME OF PATIENT:'  get mname pict '@!'
@ 8,6 say 'SEX:'  get msex pict '!'
@ 8,17 say 'AGE:'  get mage pict '99'
@ 10,6 say 'DIAGNOSIS:'  get mdiag pict '@!'
@ 12,6 say 'NAME OF DRUG:' get mdname pict ''!'
@ 14,6 say' DATE BEGUN'
@ 14,21 say 'DAILY DOSE'
@ 14,38 say 'FREQUENCY'
@ 14,51 say 'ROUTE OF ADMINISTRATION'
@ 15,7 get mdateb
@ 15,19 get mdosage pict '@!'
@ 15,38 get mfreq pict '@!'
@ 15,55 get mroute pict '@!'
@ 17,6 say 'USE OF DRUG:'  get muse pict '@!'
@ 19,6 say 'ADVERSE REACTION:'  get madverse pict '@!'
@ 21,6 say 'DATE OF REACTION:'  get mdater
@ 21,37 say 'PHARMACIST NAME:'  get mresp pict '@!'
read
do whil .t.
choice = '  '
@ 23,19 say 'Press ''S'' to SAVE  or  ''A''  to  ABANDON:'  get choice pict'!'
read
if choice $ 'SA'
exit
endi
endd
if choice = 'S'
appe blan
repl date with madate, dateb with mdateb
```