Development of Health Care Management Information System at County Level
(Final)

KIPH

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Foreword

In accordance with the rapid progress as an information society, the Korean government has established a long-term plan for modernization of government administration and sectoral computerization. As a part of a long-term comprehensive development plan for statistical information system prepared by the Ministry of Health and Social Affairs (MOHSA), the Korea Institute for Population and Health has commenced researches on health care management information system development since 1985.

During the first year, an effort to improve health statistics at township level was made, and a new model for health care management information system (HMIS) was developed in the second year.

The new model was demonstrated at Kangwha county, Kyunggi province in 1987.

I think the professors of the Institute of Population and Health Services Research at the Yonsei University for their joint research, and the World Health Organization for its technical and financial support.

Chi Dal Hyun, Ph.D.
President

CONTENTS

Chapter 1. Introduction

1.1 Reason for the study

Due to the rapid changes in social patterns, demand for long-term and comprehensive information is sharply increased. Consequently, establishment of a management information system for the timely production and distribution of useful information is badly needed. To construct a welfare society, Korean Government introduced the various kinds of welfare system. The demand for both health care services and health care information has been increased as living status of the people is being improved day by day. Medical care is changing rapidly in terms of accessibility and effectiveness. Besides, maldistributon of the resources, inadequate health care delivery system and medical fee system still remain unsolved.

To deal with these problems, timely production and utilization of necessary health informations are urgently required. Therefore, the Korean Insistitute for Population and Health (KIPH) commenced to develop a model for an information system as well as a demonstration project plan under the plan prepared by the government.

1.2 Background

a. In June, 1982, a joint meeting between Ministry of Health and Social Affairs(MOHSA) and KIPH was held at MOHSA to develop a medical care information system in order to meet the expanding demand of medical security, to support primary health care, and to increase public health sector's role.

b. KIPH commenced a study on the development of the health management information system (HMIS) in order to improve the health statistics and format development under the KIPH research fund and WHO supporting fund in 1984. Its demonstration project was conducted in Kangwha county from January to August of 1985.

c. The KIPH continued the study (HMIS) as a part of regular research project in 1986. In the early 1986, however, the World Health Organization suggested that a joint research be conducted with the Institute of Population and Health Services Research at Yonsei University, and granted a research fund, Therefore, a joint research with the Yonsei research team was conducted from the April of 1986 to the December of 1987.

1.3 Purpose of the study

a. To develop a health management information system which provides adequate information for planning and evaluation of community health programs.

b. To develop a data collection network to improve quality of raw data.

c. To establish a health care program for successful implementaton of the information system.

d. To improve operation and management functions of County Health Center activities through computerization.

1.4 Methodology

a. Steps for implementation

  1) Analyze general health status, Health Center activities and information system of the county.

  2) Develop a model for a health care management information system.

  3) Operate and evaluate the newly developed model through a demonstration project.

b. A joint research was performed by the KIPH staffs and the faculties of the Institute of Population and Health Services Research at Yonsei University.

c. A demonstration project is planned to be conducted in 1987 in the Kanghwa county, Kyunggi-province as the continuation of the first demonstration project performed in 1985.

d. Project organizations and functions :

  1) Project coordinating committee :

    a) Constituents :

    Chairman : the President of KIPH

    Members : 16-20 persons including MOHSA officials, professors and higher ranking researchers

    b) Frequency of meeting : Once or twice a year

    c) Place : MOHSA or KIPH

    d) Functions :

      (1) Coordination of project direction

      (2) Problem identification and solving

  2) Working committee

    a) Constituents

    Chairman : Project leader of KIPH

    Members : 12 persons including working level MOHSA officals, research team members and county representatives

    b) Frequency of meeting : When needed

    c) Place : KIPH or Yonsei University

    d) Functions :

      (1) Setting the direction of project

      (2) Preparation of a work plan

      (3) Others

  3) Field advisory committee

    a) Constituents :

    Chairman : County chief

    Members : 15-16 persons including MOHSA representatives, province representative, local administration and health care institute representatives, and researchers.

    b) Frequency of meeting : Every other month

    c) Place : County office of the health center

    d) Functions :

(1) Consultation for the effective implementation of the project

(2) Providing a support for the problem solving

(3) Making recommendations to the higher channels, if necessary

(4) Others

e) Performances

1.5 Periods of study

a. Development of a new model : 1 Apr. -30 Nov., 1986(8 months)

b. Demonstration project : 1 Jan.-31 Dec., 1987(12 months)

Chapter 2. System analysis and design

2.1 Clinical service

a. Functions and data flow of current health center activities

Clinical functions of County Health Center(CHC) are different from the other primary health care institutes because it provides health care for the dwellers, particularly for the poor people, at lowest cost. Clinical information system of CHC, therefore, is slightly different from the other administrative or other health project information system in the county. Requisition of medical fee for the medical insurance society and management of drugs required in the patient treatment room are the major parts of clinical information system. Functions of patient treatment information system can be summarized as follows :

1) Receiving of patients

2) Patient treatment

3) Settlement of medical fee

4) Management of drugs

5) Statistics and reporting

Detailed current activity flow by function is omitted

b. Need for computerization

Community health insurance system has been introduced in Kangwha County since 1982 and medical utilization rate has been higher than other communities. Administration works related to the patient treatment activities such as preparation of medical fee drug management, management of clinical records, and etc, have increased the workload of administrative personnel. To solve these problems and effectuate the clinical activities, computerization of the work is needed.

1) Hierarchical chart of clinical service subsystem.

```
                          ┌─────────────────┐
                          │ 1.0             │
                          │ Clinical service│
                          └─────────────────┘
                                  │
   ┌──────────┬──────────┬────────┴────────┬──────────┬──────────┐
┌────────┐┌────────┐┌──────────────┐┌────────────┐┌────────────┐
│ 1.1    ││ 1.2    ││ 1.3          ││ 1.4        ││ 1.5        │
│        ││        ││ Settlement of││ Management ││ Statistics │
│Registra││Treatment││ medical fee ││ of drugs   ││ & reporting│
│tion    ││        ││              ││            ││            │
└────────┘└────────┘└──────────────┘└────────────┘└────────────┘
```
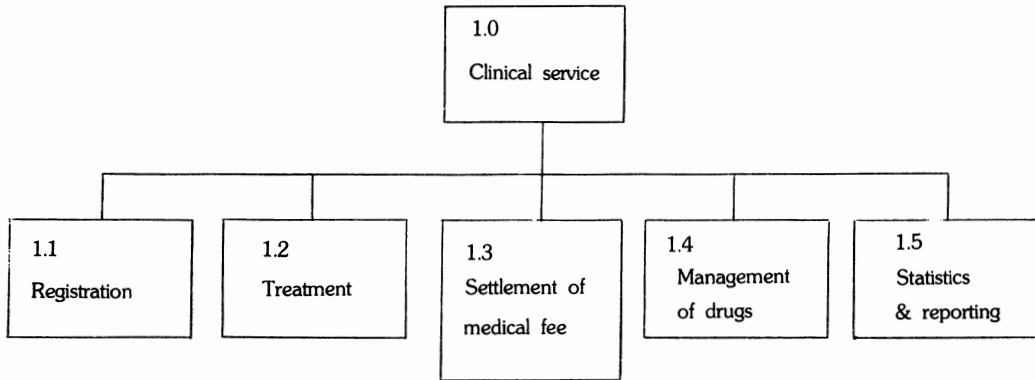
2) HIPO

a) HIPO of registration

```
                    ┌──────────────────────┐
                    │ 1.1  Registration     │
                    └──────────────────────┘
                              │
      ┌───────────────────────┼────────────────────────┐
┌──────────────┐   ┌──────────────────┐   ┌──────────────────────┐
│ 1.1.1        │   │ 1.1.2            │   │ 1.1.3                │
│ Registration │   │ Input the contents│  │ Output information   │
└──────────────┘   └──────────────────┘   └──────────────────────┘
```

Input	Process	Output
Medical insurance card **D1**	1.1.1 Receiving of patients	Registration book (Filled)
Registration card (Unfilled) **D2**	1.1.2 Input of information on reception	Copy of R.B. **D₂** / File of pat record
	1.1.3 Output of patient information	Output pat treatment on CRT **D5** / Results **D6**

— 4 —
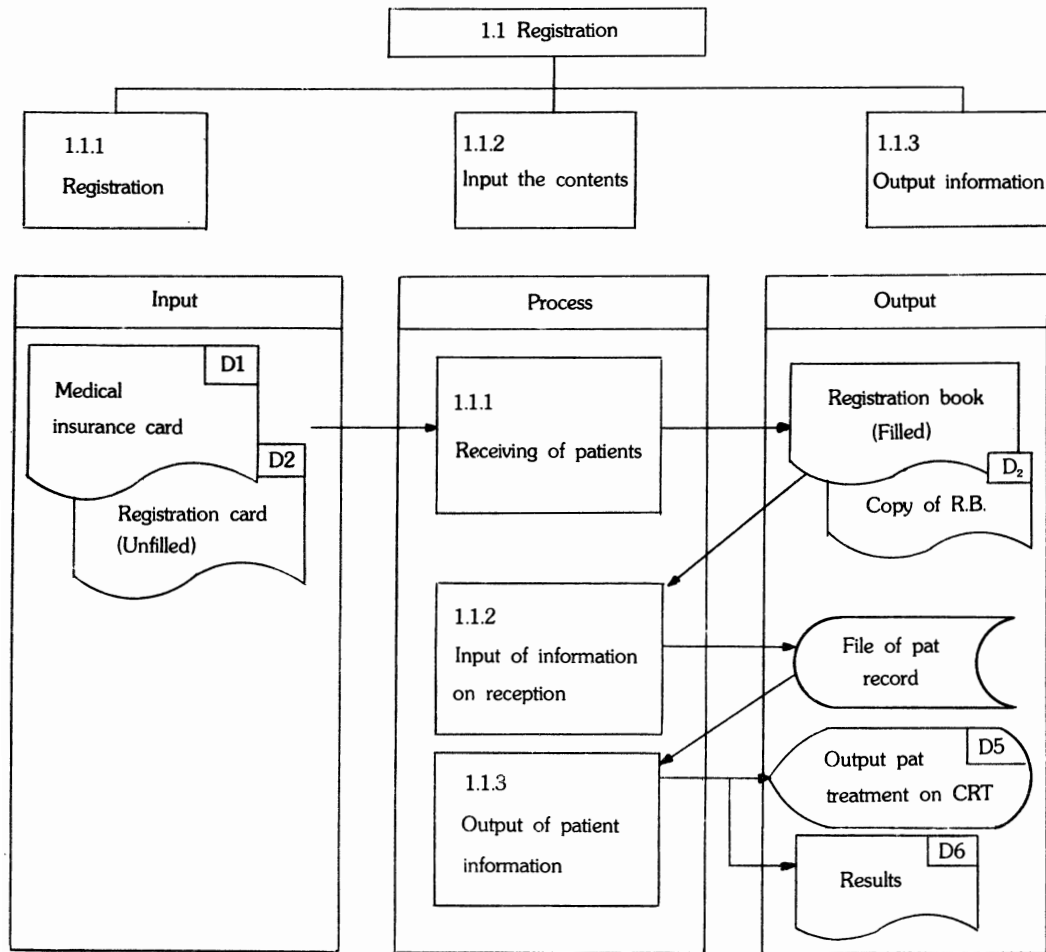
3) Priority information

- The status of treatment by covering field of clinical work by area (I & II)
- The status of treatment by covering the field of clinical work by institution (I & II)
- The status of treatment by disease and injury by area
- The status of treatment by disease and injury by institute
- The status of treatment by age and institute
- The status of examination for health by institute
- The status of treatment by medical insurance

4) Data structure diagram

```
  ┌──────────────┐              ┌──────────────┐
  │ Drug code file│─────────────→│ Unit code file│
  │  (DRUGCOD)   │              │  (UNITCOD)   │
  └──────────────┘              └──────────────┘
         ↑                  ↑              ↑
     drug code          unit code      unit code
         ↓                                 ↓
  ┌──────────────┐              ┌──────────────┐        ┌──────────────┐
  │ Drug purchasing│◄───────────│Prescription file│──────→│disease code file│
  │ file (DRUGI)  │───────────→│   (PRESC)    │        │  (DIAG-COD)   │
  └──────────────┘  drug code   └──────────────┘        └──────────────┘
                                       ↑                      disease code
                                 Registration
                                   number
  ┌──────────────┐       ┌──────────────┐       ┌──────────────┐
  │ Procedure and │◄──────│  Patient     │◄──────│Patient visit file│
  │ labaratory file│       │ management file│◄─────│   (PTUSE)    │
  │  (LABPROC)   │───────→│   (MSTPT)    │──────→└──────────────┘
  └──────────────┘       └──────────────┘        Registration
         ↑                                        number
   Procedure and labaratory code           Registration number
         ↓
  ┌──────────────┐                         ┌──────────────┐
  │ Procedure and │                         │  MCH center  │
  │ labaratory code file│                   │ discharge file │
  │  (PROLAB-C)  │                         │   (MCHCT)    │
  └──────────────┘                         └──────────────┘
```

2.2 Family planning

a. Functions and data flow of current activities

The following family planning activities are conducted at the County Health Center and the Health sub-centers :

1) Registration of eligible couple

2) Supplying oral contraceptives and other devices

3) Contraceptive surgeries

4) Postnatal care

5) Administrative support

6) Consultation and counseling

7) Reporting and statistics

* Details on each function and activities are omitted.

b. Need for computerization

1) Hierarchical chart of family planning subsystem

```
                        ┌─────────────────┐
                        │ 2.0             │
                        │ Family planning │
                        └────────┬────────┘
         ┌────────────┬──────────┼──────────┬────────────┐
┌────────┴───┐ ┌──────┴─────┐ ┌──┴─────────┐ ┌──────────┐ ┌──────────┐
│ 2.1        │ │ 2.2        │ │ 2.3        │ │ 2.4      │ │ 2.5      │
│ Management │ │ Supply of  │ │ Contra-    │ │ Adm.     │ │ Statistics│
│ of enrollees│ │ contracep- │ │ ceptive    │ │ support  │ │ & reporting│
│            │ │ tives      │ │ surgery    │ │          │ │          │
└────────────┘ └────────────┘ └────────────┘ └──────────┘ └──────────┘
```
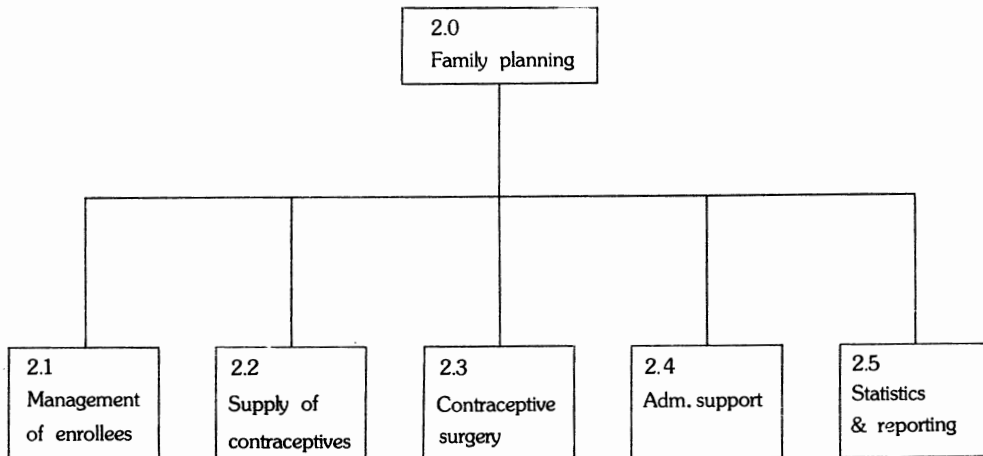
2) Priority informations

    — A list of permanent sterilization candidates by area

    — The status of family planning (F.P.) performance by area

    — A list of permanent sterilization acceptors by area

    — The distribution of the number of children for permanent sterilization acceptors by area

    — The status of sterilization performance and the amount of disbursement

    — The performance of sterilization by hospital and clinics

3) Data structure diagram

```
┌─────────────────┐   ┌─────────────────┐   ┌──────────────────────┐
│ Sterilized file │   │ Eligible couple │   │ Family planning report│
│   (COUPON)      │   │    (FAMCD)      │   │     (FARPO)          │
└─────────────────┘   └─────────────────┘   └──────────────────────┘
       ↕                     ↕     ↕              ↕        ↕
┌─────────────────┐   ┌─────────────────┐   ┌──────────────────────┐
│ Hosp & Clinic   │   │                 │   │                      │
│ Sterilized      │   │  Address code   │   │    F.P. Table        │
│ (H·NAME)        │   │   (ADD, COD)    │   │    (FATABLE)         │
└─────────────────┘   └─────────────────┘   └──────────────────────┘
```
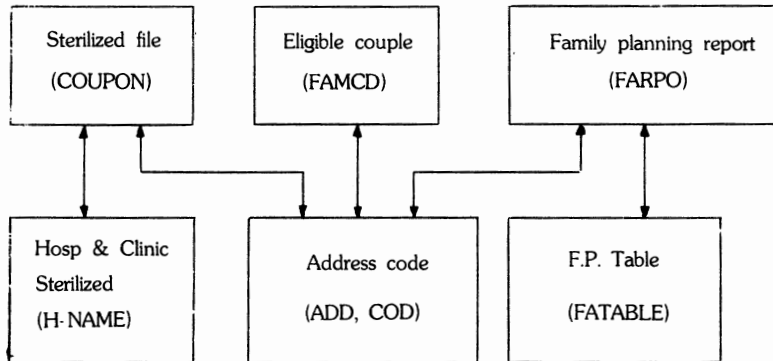
2.3 Maternity and Child Health (MCH) Program

a. Functions and data flow of current activities.

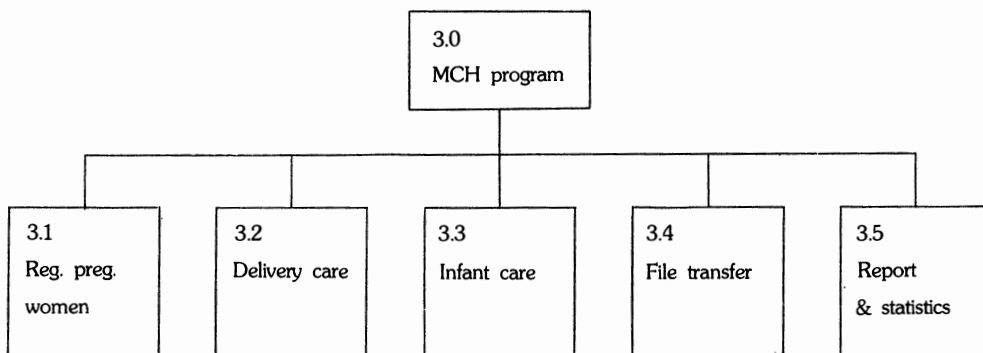The purpose of MCH program of the County Health Center is to promote the health of pregnant women and infants. The acitivites are performed by the family health section of the MCH Center and the health sub-centers of the Township. The senior staff of the family health section supervises the Township health workers and performs reporting and statistical works. Prenatal, delivery, and postnatal cares are performed by the MCH Center. Township health workers perform prenatal care through the home visiting, and implement the health education for MCH.

The functions of MCH program:

1) Management of eligible couples
2) Prenatal care
3) Delivery care
4) Postnatal care
5) Management of infant health
6) Reporting and statistical analysis

b. Need for computerization

1) Hierarchical chart of MCH subsystem

```
                    ┌──────────────┐
                    │ 3.0          │
                    │ MCH program  │
                    └──────┬───────┘
        ┌───────┬──────────┼──────────┬──────────┐
┌───────────┐┌───────────┐┌──────────┐┌──────────┐┌──────────┐
│ 3.1       ││ 3.2       ││ 3.3      ││ 3.4      ││ 3.5      │
│ Reg. preg.││ Delivery  ││ Infant   ││ File     ││ Report   │
│ women     ││ care      ││ care     ││ transfer ││ & statistics│
└───────────┘└───────────┘└──────────┘└──────────┘└──────────┘
```

2) Data structure diagram


```
┌─────────────────┐        ┌─────────────────┐   ID NO    ┌─────────────────┐
│ Prenatal care   │        │ Post natal care │ ←────────→ │ Postnatal care  │
│ file            │        │ file            │           │ discharge file  │
│ (HCPREPREG)     │        │ (AFTER)         │ Health subcenter │ (HC-AFTER) │
└─────────────────┘        └─────────────────┘   code    └─────────────────┘
```

ID NO.

Health
subcenter
code

ID NO. Health subcenter code

ID NO.
Health subcenter code

```
┌─────────────────┐        ┌─────────────────┐   ID NO   ┌─────────────────┐
│ Postnatum care  │        │ Pregnant        │ ←───────→ │ Pregnant women  │
│ discharge file  │        │ women file      │  Health   │ discharge file  │
│ (HC-PRE)        │        │ (HCPREG)        │ subcenter │ (HC-PREG)       │
└─────────────────┘        └─────────────────┘  code     └─────────────────┘
```

Residence code

Health subcenter
code

```
┌─────────────────┐                                      ┌─────────────────┐
│ Health subcenter│                                      │ Residence code  │
│ code file       │                                      │ file            │
│ (HC-COD)        │                                      │ (ADDRI-COD)     │
└─────────────────┘                                      └─────────────────┘
```

Residence
code

```
                           ┌─────────────────┐
                           │ Infant care file│
                           │ (INFANT)        │
                           └─────────────────┘
┌─────────────────┐  ID NO              ID, NO  ┌─────────────────┐
│ Health care file│ ←──────            Health    │ Vaccination file│
│ (INFMGT)        │ Health subcenter  subcenter code │ (VACCIN)    │
└─────────────────┘  code                         └─────────────────┘
```

ID NO, Health subcenter code

ID, NO
Health subcenter code

ID, NO
Health
subcenter
code

```
┌─────────────────┐        ┌─────────────────┐           ┌─────────────────┐
│ Health care     │        │ Infant care     │           │ Vaccination     │
│ discharge file  │        │ discharge file  │           │ discharge file  │
│ (HC-MGT)        │        │ (HC-INF)        │           │ (HC-VACC)       │
└─────────────────┘        └─────────────────┘           └─────────────────┘
```

2.4 MCH Center Activities

a. Functions and data flow of current activities

In order to provide delivery care and health care for the pregnant women and infants, the MCH centers have been in operation in the rural area since 1982. The MCH center belongs to the family health section of the County Health Center and its main function is to provide normal delivery care and postnatal care : but infant health care is relatively inactive. The deliveries for those

receiving prenatal care at the health sub-centers or the CHP posts were administered by midwives before the County MCH Center was established. However, the pregnant women are receiving delivery care from the MCH Center currently, and the number of deliveries at the Center are increasing daily.

Abnormal pregnancies are refered immediately to the nearby hospital or clinic. The MCH Center is operated under the different authorities. However, the reporting activities are done through the family health section of the County Health Center.

The functions of the MCH Center :

1) Prenatal care

2) Delivery care

3) Postnatal care

4) Infant health management

5) Drug and supply management

6) Reporting

b. Need for computerization

1) Hierarchical chart of MCH Center activities subsystem
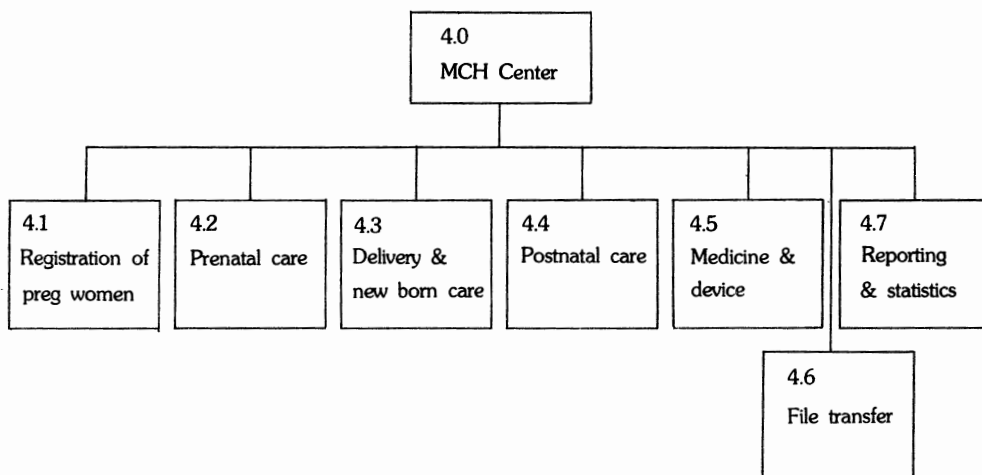
2) Priority informations

    — A list of prenatal care candidates

    — A list of delivery care candidates

    — A list postnatal care candidates

    — The status of health management of pregnant women

    — The distribution of registration time of newly registered pregnant women

    — The number of pregnancies by age and area

    — Vaccination status

    — The distribution of infants by delivery place and area

3) Data structure diagram
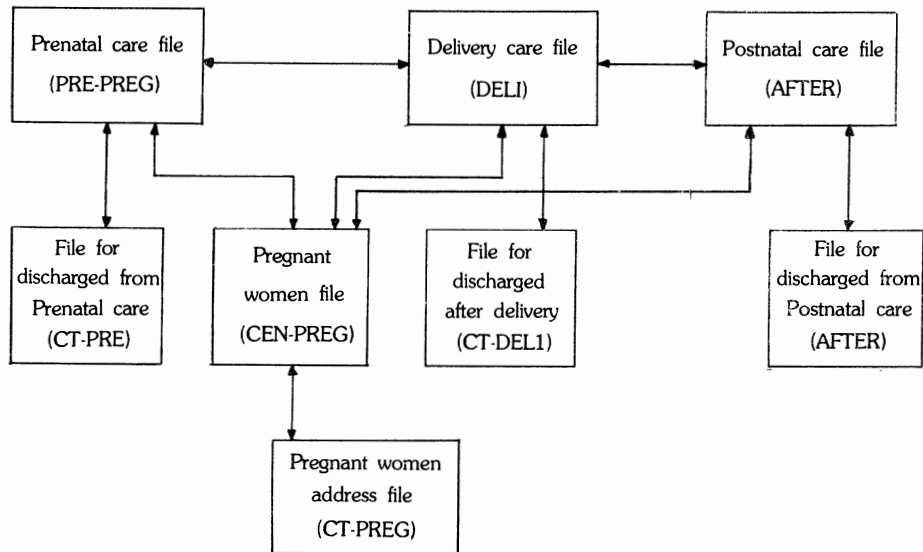
2.5 Tuberculosis control

a. Functions and data flow of current activities

For an effective tuberculosis patient control and maintenance of various informations relating to tuberculosis, tuberculosis control work has been implemented by the preventive medicine section of the County Health Center (CHC).
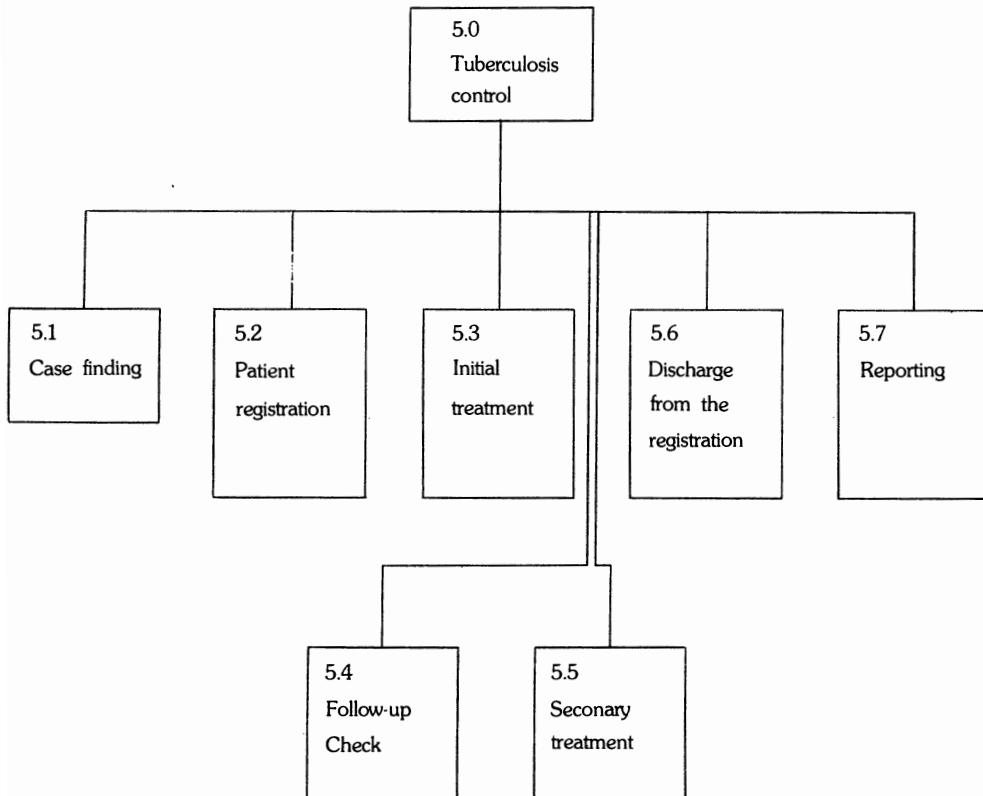
Functions

1) Case finding
   a) Sputum test
   b) X-ray check-ups
2) Patient registration
3) Initial treatment
4) Follow-ups
5) Secondary treatment
6) Discharge from the registration
7) Reporting and record keeping

b. Need for computerization

1) Hierarchical chart of tuberculosis control subsystem

2) Priority informations
    — The distribution of finding background and treatment of newly registered patients by area
    — Prescriptions of newly registered patients by the result of smear
    — A list of newly registered patients by area
    — A list of medication candidates by month
    — Family health examination of tuberculosis patients
    — Moderate cases distribution and treatment of tuberculosis (Tbc) patients
    — The distribution of discharge from the registration of the patients by treatment area
    — Period of past treatment of newly registered Tbc patients by medicine
    — A list of follow-up check candidates.
    — A list of the discharged from the registration
    — The status of receiving and disbursement of medicine
    — Vaccination status against Tbc

3) Data structure diagram
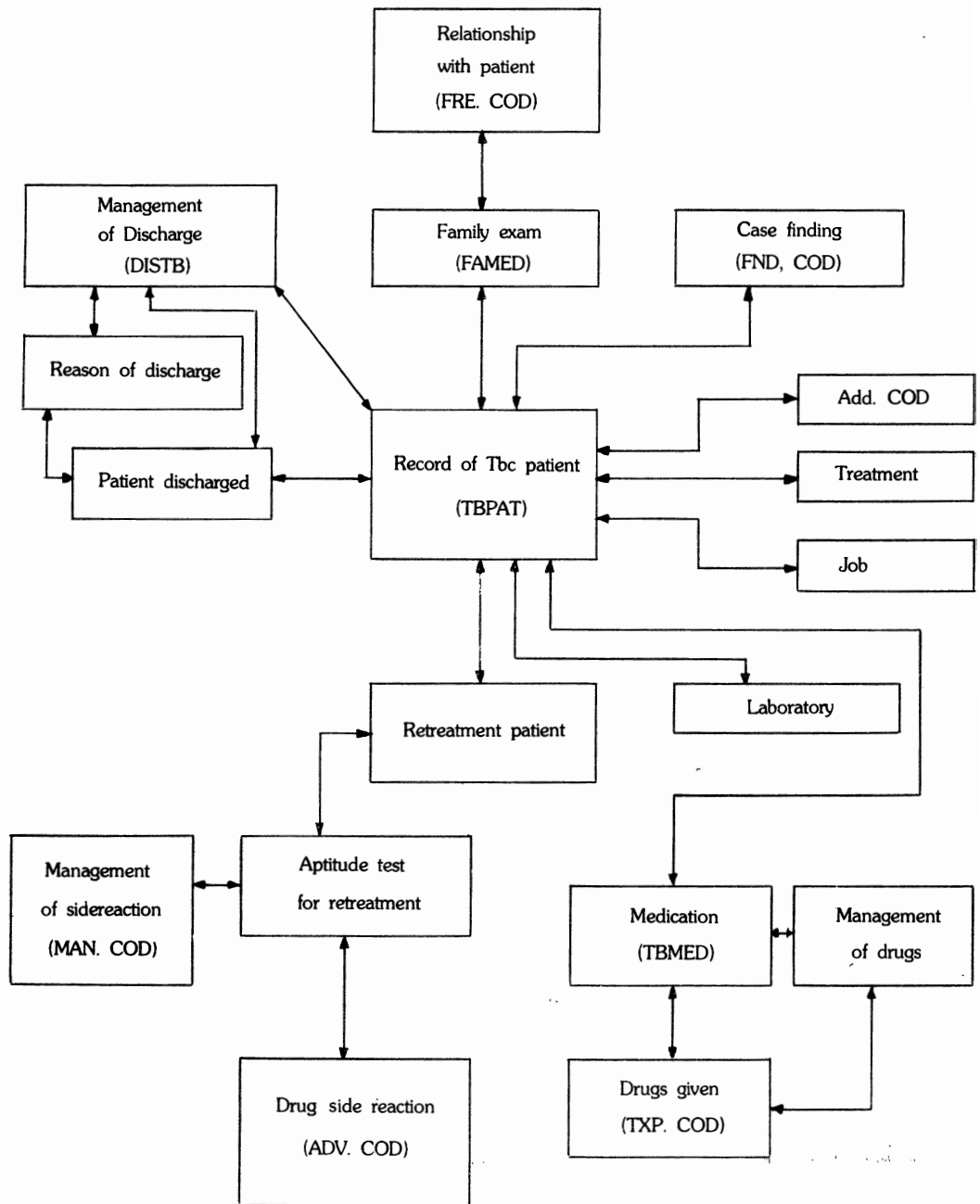
2.6 Management of equipment and supplies

a. Functions and data flow of current activities

The equipment and supply management is aimed at an adequate and efficient control by stipulation of basic articles concerning various equipment which are necessary for administrative or specific work in each agency.

The equipment and supply management in the County Health Centers comprises of purchasement, allocation, repairment, disposement, inventory and reporting.

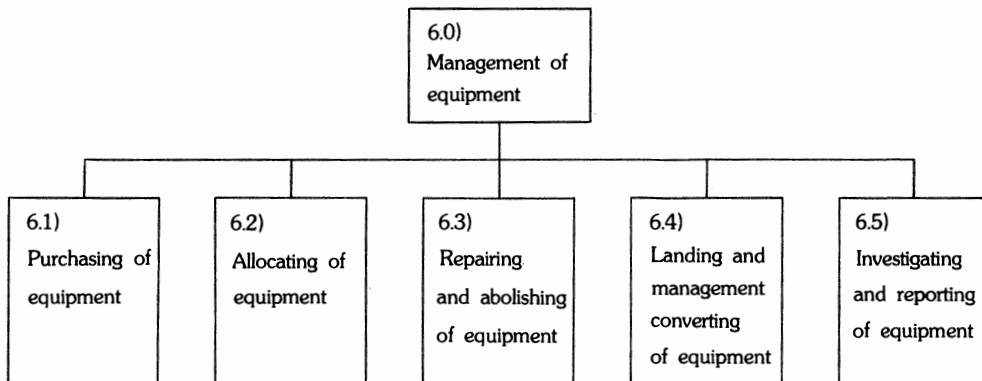Its function can be divided as follows :

- Purchase
- Allocation.
- Repairment and dispose
- Rental and transfer.
- Inventory and reporting.

b. The function and necessary information in introducing computer system.

1) Function of the system

The computer system will be of help in quick identification of problems and in adequate purchasement and allocation of equipment and supplies.

2) Hierarchical chart of the system

```
                        ┌─────────────────┐
                        │ 6.0)            │
                        │ Management of   │
                        │ equipment       │
                        └─────────────────┘
                                 │
   ┌──────────┬──────────┬───────┴───────┬──────────┬──────────┐
┌────────┐ ┌────────┐ ┌────────┐ ┌────────────┐ ┌────────────┐
│ 6.1)   │ │ 6.2)   │ │ 6.3)   │ │ 6.4)       │ │ 6.5)       │
│Purchasing│ │Allocating│ │Repairing│ │Landing and │ │Investigating│
│of      │ │of      │ │and abolishing│ │management │ │and reporting│
│equipment│ │equipment│ │of equipment│ │converting │ │of equipment│
│        │ │        │ │        │ │of equipment│ │            │
└────────┘ └────────┘ └────────┘ └────────────┘ └────────────┘
```

a) Function of purchasing equipment and supplies.

For purchasing equipment and supplies, purchasement and financing processes should be documented. Initial checking and final report also should be documented after purchasement. The copies of such documents will be delivered to the computer room.

b) Function of allocating equipment and supplies

The processes of allocation equipment and supplies are as follows :

  i) Allocation of equipment and supplies.
  ii) Input of information.
  iii) Output of necessary information.

c) Function of repairment and disposement of equipment

The processes to carry out the function of repairment and disposement of the equipment and supplies are as follows :

i) Repairment and disposement of equipment

In order to repair equipment, the documentation of initial plan, the order of repairment, the expenses are to be made, and the documentation of the final inspection for the repaired equipment will be summitted. All the documents are delivered to the computer room.

ii) Input of information about repairment and disposement of equipment.

iii) Output of necessary information.

d) Function of rent and transfer of equipment.

If rental or transfer of equipment is offered by other institutions, it can be disposed after consideration of more effective utility and approval by the county chief. The processes are as follows :

i) Rent and transfer of equipment.

ii) Information input.

iii) Output of necessary information.

e) Inventory and reporting

The inventory of the equipment is carried out every year to eliminate waste, and to reduce expenses by investigating the amount and the status of equipment. The process of conduction inventory and reporting are as follows :

i) Output information pertaining to utilization of equipment.

ii) Conduct inventory of equipment (Manually)
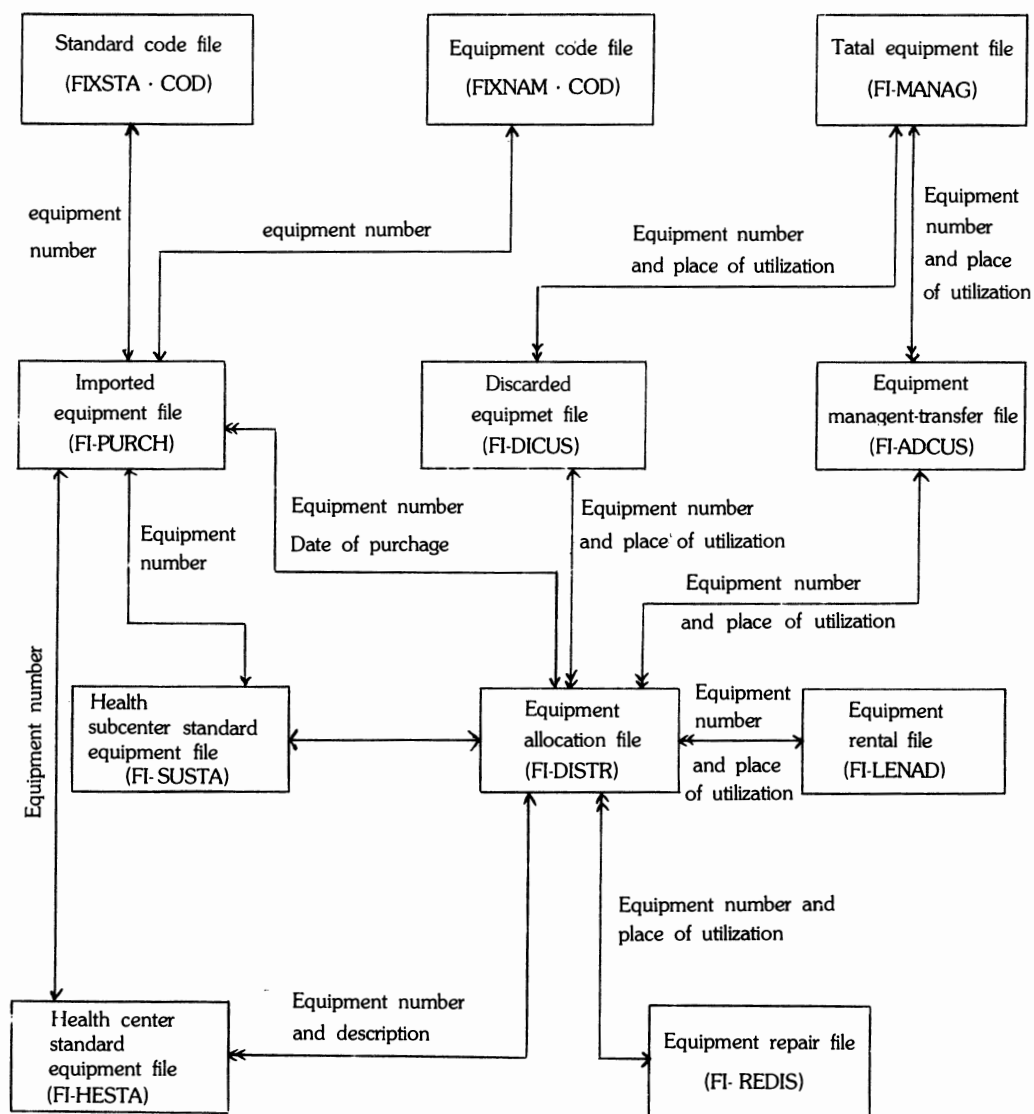
Modified list of equipment will be sent to computer room after conducting inventory

iii) Input modified list of equipment

iv) Output inventory list

v) Reporting

3) Data structure diagram


```
┌─────────────────────┐        ┌─────────────────────┐        ┌─────────────────────┐
│  Standard code file │        │  Equipment code file│        │  Tatal equipment file│
│   (FIXSTA · COD)    │        │   (FIXNAM · COD)    │        │   (FI·MANAG)        │
└─────────────────────┘        └─────────────────────┘        └─────────────────────┘
```

Standard code file (FIXSTA · COD)

Equipment code file (FIXNAM · COD)

Tatal equipment file (FI·MANAG)

equipment number

equipment number

Equipment number and place of utilization

Equipment number and place of utilization

Imported equipment file (FI·PURCH)

Discarded equipmet file (FI·DICUS)

Equipment managent-transfer file (FI·ADCUS)

Equipment number Date of purchage

Equipment number and place of utilization

Equipment number and place of utilization

Equipment number

Equipment number

Health subcenter standard equipment file (FI· SUSTA)

Equipment allocation file (FI·DISTR)

Equipment number and place of utilization

Equipment rental file (FI·LENAD)

Equipment number and place of utilization

Health center standard equipment file (FI·HESTA)

Equipment number and description

Equipment repair file (FI· REDIS)

2.7 Management of pharmaceuticals

a. Functions and data flow of current activities

The management of pharmaceuticals is aimed at an efficient and adequate control of drugs by stipulating basic articles concerning purchasement, using inventory of drugs which are used for primary health care, family planning project, and tuberculosis control. The areas of management include purchasement, allocation, reporting of durgs which are needed in each divisions of health centers. The function which are carried out in management of pharmaceuticals are as follows:
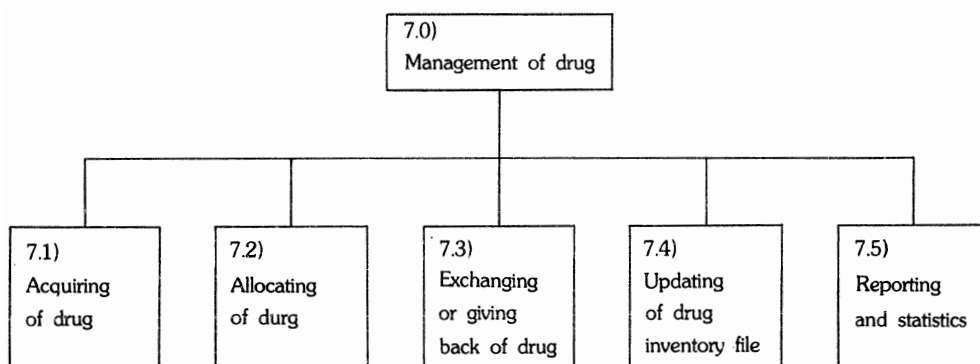
— Function of purchasing pharmaceuticals.

— Function of allocation pharmaceuticals.

— Function of exchange or return of pharmaceuticals.

— Function of statistics.

b. The function and necessary information in introducing computer system.

1) Function of the system.

The functions carried out after introducing the computer system will not be much different from the present system. However, addition of an inventory file update function will be of help in purchasing and budgeting since a quick identification of purchased, used, and remaining drugs is possible.

2) Hierarchical chart of the system

a) Function of purchasing pharmaceuticals.

Purchasement function can be divided into purchasement by a standard price, a private contract, an open bids, and allocation from provincial government.

i) Standard price of pharmaceuticals

— Price listing of pharmaceuticals.

In case that the price or the items of drugs used in health center were changed, the computer room should be notified.

— Input price list of drugs.

— Output necessary information.

A standard price list of drugs can be retrieved according to the needed items.

ii) Purchasement through private contracts

— Output predetermined prices of drugs.

A predetermined price list will be retrieved from a standard list file of drugs to be purchased.

— Purchasement of pharmaceuticals.

In order to purchase drugs, an initial plan with predetermined price list is formed and

contract is made according to the final decision on the expense. A final report will be prepared after purchasement. All of these documents are to be sent to the computer room.

— Input information about the purchasement of drugs.

— Retrieve necessary information.

iii) Purchasement through open bids

The information concerning drug names, amounts, prices, manufactuers, and suppliers which is recorded at purchasing step will be input for utilization and management purpose. These functions can be specified as follows:

— Output predetermined prices of drugs.

A predetermined price list will be retrieved from a standard list file, and the information about prices of drugs which are previously purchased through open bids will also be retrieved from purchasement files of drugs.

— Purchasement of drugs

The successful bidder carries out a contract by filling out the items on the purchasement form and making detailed statements about the contract. The checking list, expense statement and final report will be made after purchasing drugs. All of these documents are to be sent to the computer room.

— Input information about purchasing drugs.

The contents of standard contract form, detailed statements of contract, checking list, expense statement, and final report delivered to the computer room are input in computer.

— Retrieve necessary information.

iv) Pharmaceuticals allocated from province government

A list of drugs allocated from provincial government will be input as basic data.

— Allocation of drugs.

The drugs for tuberculosis and oral pills are delivered with an official document. A receipt must be sent to provincial government. All of these documents are to be sent to the computer room

— Input information of purchasement.

— Retrieve necessary information.

b) Function of allocating pharmaceuticals

The processes of allocating drugs purchased or delivered from provincial government can be described as follows:

i) Allocation of drugs.

Drugs or supplies are to be delivered to clinics, dental clinics, and maternal and child care center after registering. Tuberculosis drugs and oral pills are to be delivered to each village with the official documents and receipts. All of these documents will be sent to the computer room.

ii) Input information of allocating drugs

iii) Retrieve necessary information

c) Function of exchange or return of pharmaceuticals

The process of exchange or return of durgs that are out of date or unnecessary is as follows

i) Retrieve the list of drugs which will be exchanged or returned

ii) Exchange or return of drugs(Manually)

The initial plan for exchange or return of drugs is made according to the list of expired drugs. The copies of document of initial plan and the list of exchanged or returned drugs are to be sent to the computer room.

iii) Input information of exchange or return of drugs

iv) Retrieve necessary information

d) Updating of drug inventory file.

By using this system the amount of stocks and management expense can be quickly reduced. The process of drug inventory file update is as follows :

i) Updating of drug inventory file

The drug inventory file is updated every month for obtaining a new list

ii) Retrieve necessary information.

e) Function of reporting and statistics.

3) Data structure diagram
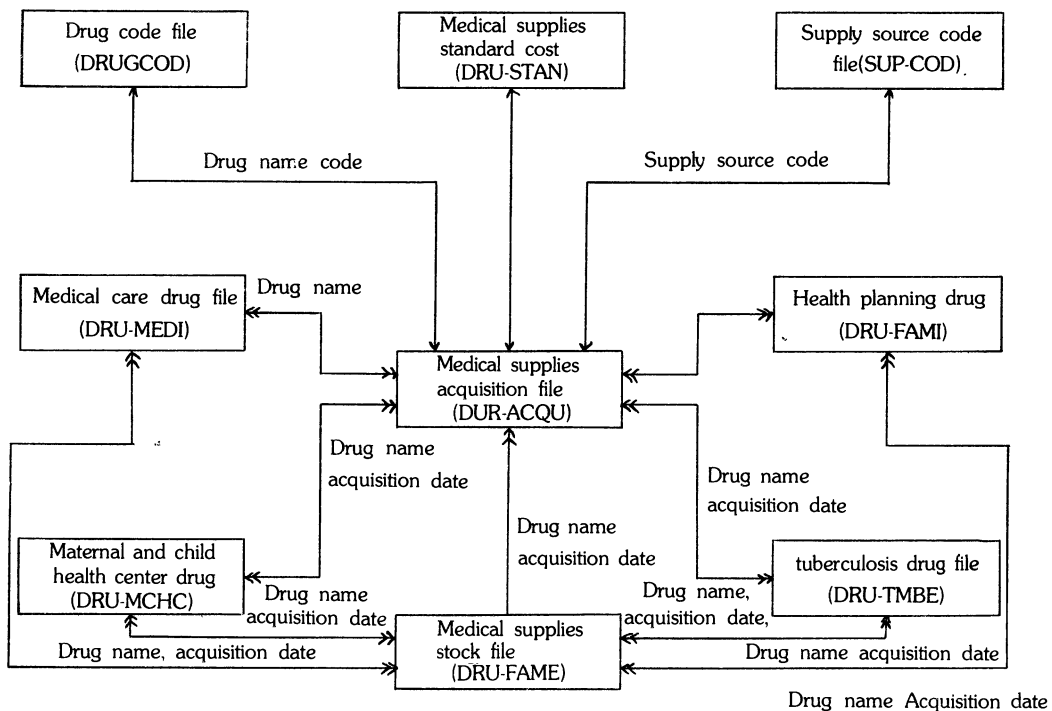
Chapter 3. System implementation and demonstration

3.1 Purpose

A model for the health care management information system, which is newly developed using the life cycle method, has implemented and evaluated through a demonstration project.

3.2 Place : Kangwha county, Kyunggi province.

3.3 Demonstration period : from Jan. to Oct. of 1987

3.4 Strategy of implementation

a. Scope of the project

The scope of the demonstration project lies primarily on the patient treatment, the maternity and the child health, the family planning, and the tuberculosis control. Additional works such as drug control will be added later.

b. Guiding principles

1) Newly developed model with the user manual and documentation should be utilized when the aforementioned activities are processed by the computer at the county health center.

2) Early case finding, registration, and continuous follow-ups should be implemented for MCH and tuberculosis control.

3) The age limit for infant registration and health management should be 3 years or under.

4) Pregnant women who require pre- and post-natal care should be cared for 8 weeks before and after delivery.

5) The health records and risk scoring sheets should be utilized for the registered pregnant women and infants for the early detection of the risk factors.

c. Operation of computer room

1) The County Health Center provides a room for the computer establishment.

2) The KIPH provides a computer, IBM/PC with hard disk and printer during the demonstration project period and takes necessary action for the procurement of a computer by the government budget with the help of Ministry of Health and Social Affairs (MOHSA).

3) Expendables needed for the computer during the demonstration period are provided by the local health project fund.

4) The health administrative officers of the County Health Center is designated as the Computer Responsible Officer(CRO). And one each from the health administration section, the family health section, and the preventive medicine section are nominated as the Computer Operators (CO).

5) Each CO provides his/her input daily and produces the information requested by the county chief and the health center director in accordance with the user manual provided under the supervision of CRO.

6) The CRO decides the scope of the security for the computer outputs.

7) Should computer operator resign due to the various reasons, the CRO will train the successor one month prior to his or her resignation.

8) If any problem occurs to the computer, the CRO informs it to KIPH immediately.

9) The CRO maintains the softwares provided by the KIPH

10) The county computer room is locked when not in use.

d. Training

1) Selected computer operators have been periodically trained since December 1986.

2) Additional training will be conducted whenever neccessary.

3) The outlines of the demonstration project and the implementation methods will be explained to the field health workers at the regular monthly meething.

e. Supervision and evaluation

1) The KIPH staff will supervise and evaluate Town or Township health workers' activities, and identify and solve the problems encountered.

2) Performance will be evaluated quarterly by Town or Township and presented at the regular meeting.

Chapter 4. Summary and conclusion

4.1 Purpose of the study

The main goal of this study is to realize the plan of national health information system through the establishment of the health sub-systems. The specific objectives are to provide necessary information and to improve management capability for the various health programs by the adequate and effective planning, implementation and evaluation of the community health programs through computerization of the County Health Center activities.

4.2 Study team and financing

This study was carried out by the joint research team of the Korean Institute for Population and Health (KIPH) and the Institute of Population and Health Services Research at Yonsei University under the KIPH research fund and financial supporting of World Health Organization (W-HO).

4.3 Approach

The System Development Life Cycle (SDLC) approach was applied, DBASE Ⅲ, a relational database management software package, was used for the Project.

4.4 Period

a. The development of the model for health management information system took nine months from April 1 to December 31, 1986.

b. Implementation of the model took ten months from January 4 to October 30, 1987.

4.5 Results of the study

a. The current health center activities were classified and analyzed under 15 subsystems.

    1) Health administration

        a) Document control

        b) Financial management

        c) Service guidance

        d) Clinical Services

        e) Management of equipment and supplies

        f) Management of pharmaceuticals

    2) Family health

        a) Family planning project

        b) MCH project

        c) Operation of MCH Center

    3) Preventive medicine

        a) Control of acute communicable disease

        b) Tuberculosis control

        c) Sexually Transmitted Disease control

        d) Leprosy control

        e) Parasite disease control

        f) Supervision of hospitals, clinics and drug stores

        g) Laboratory

b. From the above 15 activities, seven priority services, (clinical service, family planning, MCH, MCH center, tuberculosis control, management of equipment and supplies, and management of pharmaceuticals) were selected and analyzed. Priority information for various management levels were determined. Furthermore, new information which was not obtained before, was also identified.

c. Expected benefit from the system

    1) Managerial effectiveness of the health center managers will be greatly improved since the system provides key performance information on each program in timely manner. This also will improve the quality of planning and evaluation of each program.

    2) Workload of employees at the health center will be reduced since the system can perform some of their clerical tasks.

    3) Activities of village health workers will be more effectively coordinated and monitored since the system can identify those who need service in advance and keep track of service details.

    4) Reports and statistics will be prepared more rapidly and accurately. This will also improve the quality of national health statistics.

    5) Computerized inventory management of drug and medical supplies will reduce their expenditures and improve their supplies.

Priority informations for users at various management level

User	Priority information	Remark
County chief	(1) Number of daily patient trea tments, medical and dental	Obtainable from current system
	(2) Number of eligible couples for family planing and monthly performance	Obtainable from current system
	(3) Number of eligible women and children for MCH care and monthly performances	Obtainable from current system
	(4) Number of tuberculosis patients by month	
Health center director	(1) Number of daily patient treatment and income for the patients	Obtainable from current system
	(2) Monthly family planning, MCH, MCH center operation, and tuberculosis patient control status	Obtainable from current system
	(3) Drugs management by program	Newly developed
	(4) Vaccination status	Obtainable from current system
Health administratopn chief	(1) Status of patient treatmenmt by target area	Newly developed
	(2) Status of patient treatment by disease and injuries	Newly developed
	(3) Status of patient treatment by age, sex and address	Newly developed
	(4) Status of physical examination and laboratory tests	Obtainable from current system

User	Priority information	Remark
Family health chief	(1) List of target population for permanent sterilization	Obtainable from current system
	(2) Contraceptive status by hospital and clinic	Newly developed
	(3) List ofthose to be cared by MCH center	Newly developed
Preventive medicine chief	(1) Status of drug received and issued	Obtainable from current system
.	(2) Distribution of moderate TB cases by treatment classification	Newly developed

d. Relationship with the National Information Network in Korea

The National Information Network is currently being developed with the five interconnecting specific networks : National Defense Network, National Security Network, National Monetary Network, National Education Network, and National Administrative Network. The National Health Information Network, which comprises all information systems in health industry, will be added to this next year. The system developed here, i.e. the Health Center Information System will be an important part of the Regional Hospital Information Network which consists of two other systems : Regional Hospital Information System and Regional Health Insurance System. The information produced by the Health Center Information System will be an important source for the national health statistics on primary health care services. The framework of the National Information Network is as follows :

4.6 Conclusion

This study has produced a model for health management information system covering seven of the fifteen activities of a county health center model has been demonstrated, tested, and revised at Kangwha county. The prerequisites for the successful establishment of the health information system are the acceptability of the new system by the County Health Center staffs and the financial support by the government. In the future, the model will further include other service areas such as financial and laboratory examination. Also, an evaluation of the model will be conducted to measure the effectiveness of the programs. The drafts of designs and programs were seperately published.

National Information Network