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Health Sector Financing Project  
Ministry of Health  
Republic of Indonesia

# **DEVELOPMENT OF A MANAGEMENT INFORMATION SYSTEM FOR THE PHARMACEUTICAL COMPONENT**

## **Report No. 48**

Prepared for:  
The United States Agency for International Development

April 1992



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## **INTRODUCTION**

**This consultancy occurred between February 26 and March 17, 1992 to assist the Pharmaceutical Component of the Health Sector Financing Project (HSFP) supported by USAID (United States Agency for International Development) and the Government of Indonesia. This consultancy followed from one conducted in September 1991 on the Development of an Integrated Management Information System (MIS) for the Management of Drug Supply at the Kabupaten.**

**The proposed scope of work included the following tasks:**

- To review the design of the manual and computerized components of the Kabupaten Drug Information System and assure that they adequately meet existing needs;**
- To review the MIS requirements of the generic program and assess the feasibility of adapting the INVEC software for this program's needs.**

## **SCHEDULED ACTIVITIES**

<b>Wednesday, February 26</b>	<b>Arrival in Jakarta</b>
<b>Thursday, February 27</b>	<b>Meeting with PIO/P Staff</b>
<b>Friday, February 28</b>	<b>Review of P.T. Manggala Jiwa Mukti (MJM) System Translation of INVEC</b>
<b>Saturday, February 29</b>	<b>Review of MJM System Translation of INVEC</b>
<b>Monday, March 2</b>	<b>Discussion with POM project staff Presentation of INVEC to POM</b>
<b>Tuesday, March 3</b>	<b>Surabaya: Visit to Gresik District</b>
<b>Wednesday, March 4</b>	<b>Surabaya: Visit to Pasuruan District</b>
<b>Friday, March 6</b>	<b>Presentation of RxDD to project consultants</b>
<b>Monday, March 9</b>	<b>Presentation of INVEC to the Director of PIO/P, Dr. Andayaningsih</b>
<b>Tuesday, March 10</b>	<b>Installation of INVEC and training at POM</b>
<b>Wednesday, March 11</b>	<b>Yogyakarta: visit to Hospital (Cancelled because of traffic accident)</b>
<b>Thursday, March 12</b>	<b>Bali: Meeting with MOH staff</b>
<b>Friday, March 13</b>	<b>Bali: Visit to Hospitals and Health Center</b>
<b>Monday, March 16</b>	<b>Debriefing at POM Visit of St. Carolus Hospital Meeting with P.T. Inti Inforama Sejahtera</b>
<b>Tuesday, March 17</b>	<b>Debriefing at USAID Departure from Jakarta</b>

## **EXECUTIVE SUMMARY**

The two-week consultancy was divided among field visits to Surabaya (Gresik and Pasuruan), Bali and Jakarta, where an assessment was made of on-going computer system development, including presentation/discussion of INVEC and RxDD to the PIO/P staff.

It was difficult to make a complete assessment of the systems developed by the local consultant being incomplete at the time of our visit. However after a demonstration of three software packages developed and used by Management Sciences for Health (MSH):

- INVEC, Inventory and Tender Management software
- RxDD, Prescribing Analysis software
- DEM, Drug Estimation Model software,

It was recommended by the PIO/P staff that these software packages should be modified as appropriate, to fulfill existing needs. The three packages will be integrated in a comprehensive computerized system that should allow Kabupaten level personnel to manage and monitor the procurement, distribution and use of their drug supply system.

A management team was created to allow the PIO/P staff to monitor and support all POM related activities. A list of performance indicators has been developed. The installation of the new system is scheduled for mid-July.

In addition to the Pharmaceutical component, pharmaceutical services provided under the Hospital component were examined.

The HSFP is planning to develop a computer system that is intended to support hospital management by monitoring key performance indicators related to the following tasks:

- Accounting
- Billing
- Filing patient profiles
- Inventory management (pharmacy, medical supplies and maintenance)

It is recommended that a detailed system analysis be performed to assist in the design of the new system, and to establish a link between management concepts and their practical applications.

## **FIELD VISIT TO SURABAYA**

The consultant visited the GFK (District Warehouse) of Gresik, the GFK and a Puskesmas (Health Center) in the District of Pusaruan, accompanied by Dr. Yos Hudyono. This was a complement to the field trip to the District of Sukabumi we had during the previous visit. During this field visit the current manual recording system used for procurement and distribution at the GFK was reviewed. At the Puskesmas procedures to register morbidity data were also examined. The procedures appear to be the same among the various facilities of the same type, from one regency to another. See additional remarks in the Report on Management Information Systems by Jean-Pierre Sallet, October, 1991.

## **EVALUATION OF THE SYSTEMS DEVELOPED BY MJM**

Two days were spent at MJM (local consultant to PIO/P) to assess the computer-based systems currently being developed. This includes ARKO (Analisa Rencana Kebutuhan Obat Di Kabupaten/Kotamadya) - Planning Drug Requirements Software and SIPENDIS (Sistem Informasi Pengadaan Dan Distribusi Obat) - Inventory Control and Distribution Software.

MJM staff was very cooperative, and there were useful discussions of system requirements and design. It was clear that MJM understands the manual inventory system now in use. However, the current versions of the system do not seem to reflect that understanding, and do not support GFK's new role. The remarks made in this report should be placed in the appropriate context - the MJM system was not completed, and it is possible that some concerns addressed here will be resolved in the final version of the systems.

The evaluation is based on the demonstration presented at MJM and review of the proposed systems design and other related documents that were submitted by MJM to POM and PIO/P. These documents were translated into English for the consultant by the PIO/P.

In addition, the assessment took into consideration the recommendations made during the last consultancy on system development (see Report on Management Information Systems, J-P Sallet, October 1991).

It is always difficult to develop the ideal system. One important point is to plan with a view to long-term goals. There is a temptation to start with a "simple" version, one which could be improved at a later date. However, such a strategy necessitates replication of all the problems of testing and debugging every time major changes are implemented.

A more detailed assessment of the MJM system was submitted to Dr. Andayaningsih.

## **DEMONSTRATION OF INVEC and RxDD**

Two presentations were made of INVEC and RxDD (which has been partially translated into Bahasa Indonesia) — one to the PIO/P project staff and one to the PIO/P Director, Dr. Andayaningsih.

After the presentations and discussions with project staff, Dr. Andayaningsih requested three software packages developed by MSH: INVEC (Inventory and Tender Management software), DEM (Drug Estimation Model software, developed for WHO) and RxDD (Prescribing Analysis software). These should be used as major tools to support the various phases of the drug supply system in Indonesia, pending modifications to optimize their utilization within the Indonesia context.

## **RECOMMENDED CHANGES TO INVEC, DEM and RxDD**

These three packages (INVEC, DEM and RxDD) should have the capability to transfer information from one to another either through a local area network (LAN) or with diskettes.

The three packages and their operating manuals should be translated into Bahasa Indonesia.

### **INVEC**

INVEC, the inventory and tender management software, should be used at the GFK level for the management of procurement and distribution of pharmaceuticals.

INVEC should be altered so that it:

- Allows for the control and reporting of the Puskesmas inventory/usage from the GFK level, including financial information. This means that an inventory file has to be maintained by the system for each of the Puskesmas which receive supplies from the GFK (an average of 30 Puskesmas for each GFK);
- Allows the management of the GFK inventory, taking into consideration the four sources of funds (INPRES, APBD I, APBD II, ASKES) and other vertical programs. This includes inventory/financial reports for each source;
- Runs as a true multi-users system (with a record locking function) on a LAN;
- Can exchange information with the planning software and the RxDD;
- Has a password system, to be developed according to the user level and the type of operation;

### **DEM**

The Drug Estimation Model (DEM) software, developed by MSH for the World Health Organization (WHO), is now being used in Indonesia.

This should serve as the basis for the development of a new software package to support the drug planning process at the Kabupaten level.

Completed in 1989, the DEM is now somewhat outdated and requires a new more user-friendly interface.

Major changes to DEM should also include addition of:

- The ability to use consumption data which can be imported directly from INVEC;
- The ability to enter and use morbidity data provided by the current national health information system (SP2TP); and
- The ability to perform budget projections for each source of funds, and to make necessary adjustments, once budgets are allocated, according to ABC analysis or VEN classifications.

## RxDD

Developed by MSH initially for the assessment of diarrhea control programs, RxDD's role has been expanded and now allows for the analysis of the current prescribing patterns (at multiple health facilities) for any disease category. Its main objective is to assess rational drug use according to predefined treatment protocols, using prescription data. The software could also be used to assess the validity of the morbidity data collected through the SP2TP. The information provided by RxDD can then be used to update the data of the DEM's morbidity module.

The combination of the three packages will give the Ministry of Health (MOH) a very unique integrated and comprehensive computerized tool which could be used as model by other countries at a later date. This will permit procurement management and monitoring distribution and use of the essential programs.

Whenever possible, the work of redeveloping the three software packages described above should be done in consultation with the POM/Project.

## **CREATION OF A MANAGEMENT TEAM**

It was recommended that a POM management team should be created. Its main responsibilities on Pharmaceutical component of the project would be to:

- Provide training and support to the "users";
- Monitor and coordinate all activities (including consultant activities);
- Make recommendations for further development;
- Monitor performance indicators (e.g., Figure 1.); and
- Implement changes as needed;

This team should report directly to Dr. Andayaningsih. The proposed members of the team are:

- Dr. Widyastuti Soerojo
- Dr. Linda Sitanggang
- Mrs. Christine Leivermann
- Pharmacist to be identified from POM

While the software packages are being developed, the POM management team should address and resolve the following:

- The current system requires that the PKM maintain separate tabulations for each source of drugs. POM must discuss the issue of monitoring multiple sources of drugs with Dinas Kesehatan and PemDa. A recommendation was made by project staff to combine all stocks into one at the Puskesmas level (INPRES, ASKES, APBDI and APBDII, and other vertical programs). The proposed software package should take this change into consideration. The GFK will monitor the various sources of drugs at the Kabupaten level.
- POM should review the computer hardware to ensure that at least 40 megabytes will be available to the integrated system (INVEC, DEM and RxDD) via DOS hard disk partition.
- The POM team should review existing management/training materials and relay this information to the consultant for modification.

The analysis of the morbidity data implies that standard treatments can be given for each health problem by different age groups. The MOH has already developed such a list, but it does not include specific standard treatments for children and newborns or elderly patients. This concern should be addressed by the team.

TYPE OF INFORMATION	VARIABLE	UNIT HEALTH	DISTRICT	PROVINCE	DEPT. OF HEALTH
1. Availability of drugs (morbidity) per unit health	<u>Cases X st. treatment</u> Stock on hand		v		
2. Availability of drug (consumption) a. per unit health b. per district	<u>Average stock</u> Average drug utilization		v v		
3. Drug utilization ratio	Cases X st. treatment		v		
4. Services ratio per unit health	<u>Drug utilization</u> delivery			v	v
5. Ratio total population/total cases per district	<u>Total population</u> Total cases			v	v
6. Ven ABC analysis - per drug - per therapeutic class	ABC VEN Therapeutic class Drug		v	v	
7. Cost of drugs prescribed per cases	Drug per cases X price		v	v	v
8. Drug consumption patterns - per unit health - per district - per province	ATC-DDD		v		
9. Disease patterns - per unit health - per district - per province		v	v v	v v	v v
10. Total prescriptions per visit	<u>Total prescriptions</u> Total cases	v	v	v	v
11. Percentage of cases receiving antibiotics (AB)	<u>Cases receiving AB</u> Total cases	v	v	v	v
12. Percentage of cases receiving injection	<u>Cases receiving injections</u> Total cases	v	v	v	v

The Region of Surabaya was preferred over Sumatra as a first test site, mainly because of the ease of communication and travel in this region. The first installation is scheduled for early July 1992.

The installation should be preceded by a training workshop that will involve both managers and computer operators from the Kabupaten of Gresik and Pusaruan.

This will also be an opportunity for the management team to learn about the new software packages.

This workshop should combine the training of staff in use of the software packages and drug supply management techniques (taking in consideration the level of operation). If necessary, relevant training material should be developed.

An outline of the steps to develop and implement the system appears below:

- Develop detailed specification of each change to be made (Consultant).
- Incorporate changes in current version of the packages and, if necessary, reprogram the complete package (Programmer).
- Conduct first series of tests after modification (debugging), and adjust, if necessary (Programmer and Consultant)
- Develop/translate user, installation and training manuals (Consultant, Management Team).
- Present final version to POM - Jakarta (Consultant).
- Organize training workshop for POM and project staff (Consultant, Management Team).
- Organize training workshop at the Kabupaten level (Consultant and Management Team), for the proposed site (Surabaya).
- Install software at the Kabupaten level (Consultant and Management Team).
- Develop maintenance and follow-up strategies (Consultant and Management Team).

## **HOSPITAL COMPONENT**

The Chief of Party, Dr. Reginald Gipson, requested a two day extension of this assignment to look at the existing Hospital Pharmacy system.

This activity was coordinated by Dr. Philip Stokoe, Long-term Advisor for the Hospital Component.

Two hospitals in Bali and one in Jakarta (Saint Carolus) were visited. Another visit to Yogyakarta was planned but had to be cancelled. (Unfortunately, the consultant was involved in a traffic accident, permitting some direct, personal experience with the Indonesian health care system.) Despite all odds the consultant survived.

During these visits the primary focus was on logistical and MIS aspects of the drug distribution to the wards, patients and to outpatient clinics by the hospitals' central pharmacy.

It appeared that the efficiency of the system and the problems encountered are related to whether the hospital is private or public, and its proximity to Jakarta. It is difficult to compare Saint Carolus' comprehensive satellite system with the District Hospital visited in Bali.

While in Bali we also had the opportunity to observe the strengths of the private (parastatal) sector. The pharmacy in the government-owned hospital that was visited carries a couple of hundred items, and encounters problems typically associated with public sector health systems (frequent depletion of regular stockouts, poor coordination among different departments, etc.). By contrast, the KIMIA FARMA pharmacy (a parastatal), which is within the hospital compound, has about 3000 items in stock (including 140 generic products), and fills about 400 prescriptions a day (far more than at the hospital pharmacy). Furthermore, the KIMIA FARMA pharmacy gets supplies from its regional warehouse every three days, compared to perhaps once a month for the hospital pharmacy.

During the visit to Bali, a presentation was made on the "Importance of the Role of a Hospital Pharmacist".

The project is considering the development of a computerized MIS for the hospital. This system should support hospital management by monitoring key performance indicators while performing tasks related to the following:

- Accounting
- Quality assurance
- Management information
- Billing
- Filing patient profiles
- Inventory management (pharmacy, medical supplies and maintenance)

This is to be done with the assistance of a local firm, P.T. Inti Inforama Sejahtera (PT IIS).

Meetings were held with the PT IIS development team after the visit to Saint Carolus Hospital. After consultation with the director, Mr. K. Leonardi, it seemed necessary to establish a link between the management concepts and their practical applications. For this purpose, a detailed system analysis needs to be performed and a system design needs to be developed to provide guidelines for the development team.

To develop a complete integrated hospital management system is quite complex, and one might want to consider what is already available on the market before going any further.

The ideal approach would be to purchase a package that has been already developed and fullproofed for the microcomputer platform, provided that it can be translated (if it is not a local product), maintained, and eventually modified by a local firm such as PT IIS.

Unfortunately, research has shown that before the microcomputer "boom", many integrated hospital management systems were already developed, mainly for mini and mainframe computers. Only smaller modules (such as patient recordkeeping, accounting, pharmacy management, etc.) or integrated systems for small hospitals (i.e., with less than 100 beds) have been developed for microcomputers.

Today microcomputers have at least as much power as minicomputers and are becoming more popular and more affordable. They are also easier to use and to maintain. This makes it a very attractive development tool for new software.

The possibility of purchasing a complete accounting system with the source code, like the one developed by SBT Software (using FOXPRO 2.0) was discussed with PT IIS. PT IIS would then modify and translate this package according to the prevailing needs. Other modules could be developed from there.

This could be done only if PT IIS provides clear guidelines on what the system is supposed to do.

## **PERSONS CONTACTED**

### **POM:**

Dr. Andayaningsih  
Dr. Widyastuti Soerojo  
Dr. Linda Sitanggang

### **Ministry of Health:**

Tb. Darmawan Tunggono

### **HSPF:**

Dr. Reginald Gipson  
Dr. Philip Stokoe  
Mrs. Christine Leivermann  
Dr. S.U. Sembiring  
Ms. Eva G. Kavuma

### **Saint Carolus Hospital:**

Dr. Mariono

### **MJM:**

Dr. Yos Hudyono

### **Pt. Inti Inforama Sejahtera:**

Ir. Kurniawan Leonardi

## ACRONYMS AND FOREIGN PHRASES/WORDS

ABC	A form of analysis
APBD-I	Provincial level government budgetary source
APBD-II	District level government budgetary source
ARKO	Analisa Rencana Kebutuhan Obat Di Kabupaten/Kotamadya (Planning Drug Requirements Software)
ASKES	Original name for GOI-sponsored employee health insurance plan for federal, province and district government employees, dependents and civil service and military pensioners. Name recently changed to Perum Husada Bakti (PHB)
DEM	Drug Estimation Model
Dinas Kesehatan	Public Health offices at the district level
GFK	District Warehouse
HSFP	Health Sector Financing Project
INPRES	Presidential Discretionary Budget (main source of pharmaceutical funding)
INVEC	Inventory and Tender Management Software
KIMIA FARMA	a parastatal pharmacy
LAN	Local Area Network
MIS	Management Information System
MJM	Mangala Jiwa Muktilocal (consultant to PIO/P)
MOH	Ministry of Health
MSH	Management Sciences for Health
PIO/P	Project Implementation Office/Pharmaceuticals
PKM	Puskesmas
POM	Pengawasan Obat dan Minuman/Food and Drug Administration, MOH
PT IIS	a local firm, P.T. Inti Inforama Sejahtera
Puskesmas	Health Center
RxDD	Prescribing Analysis Software
SIPENDIS	Sistem Informasi Pengadaan Dan Distribusi Obat (Inventory Control and Distribution Software)
SF2TP	current national health information system
USAID	United States Agency for International Development
VEN	Vital Essential & Non-Essential Drugs
WHO	World Health Organization