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**DESIGN OF DRUG
INVENTORY CONTROL SYSTEM
PHARMACEUTICAL COMPONENT,
HEALTH SECTOR FINANCING PROJECT**

Report No. 45

Prepared for:
The United States Agency for International Development
Contract No. ANE-0354-C-00-8030-00

October 1991



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Prepared by:
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ABOUT THE CONSULTANCY

This consultancy was completed between the 12th of September and the 5th of October, 1991 for the Pharmaceutical Component of the USAID funded Health Sector Financing Project. It was a follow-up to one of the recommendations made in the report on the "Design of Interventions and Evaluation Strategy — Pharmaceutical Component".

The scope of work, to be conducted in collaboration with Ministry of Health counterparts and HSF project consultants, was as follows:

- Review inventory control information requirements for MOH's Gudang Farmasi Kabupaten system with respect to needs estimation, procurement, storage, distribution, and clinical facility level use of drugs.
- Review the proposed GFK inventory control software which is now under development.
- Review design and operations of other relevant drug management software currently in use at the Ministry of Health and especially at Pemberantasan obat dan Makanan (a department at the MOH).
- Advise on system components, file structures, and programming requirements to be incorporated into the new software.
- Advise on training requirements at the central, province, and kabupaten levels for implementing the software once developed.

CALENDAR OF ACTIVITIES

Thursday, September 12	Arrival in Jakarta
Friday, September 13	Briefing, review of Scope of Work and schedule with Pak Yos. Introduction to POM by Pak Sembering
Saturday, September 14	Review of System Proposal with Pak Yos at MJM
Monday, September 16	Review of background materials
Tuesday, September 17	Visit to Kimia Farma
Thursday, September 19	Visit to Sukabumi Kabupaten
Friday, September 20 - Wednesday, September 25	Discussion and software design with MJM
Thursday, September 26	Visit to Fatmawati Pharmacy Hospital
Friday, September 27 - Wednesday, October 2	Preparation of Draft Report with MJM
Thursday, October 3	Meeting with PIO/P
Friday, October 4	Debriefing at USAID and POM
Saturday, October 5	Departure

EXECUTIVE SUMMARY

The approach used during this consultancy was to study the current situation by combining field trips, interviews, and the review of various relevant documents and proposals.

Although the main objective of our scope of work was to focus on the computerization of the district supply system, we felt that it was important to take a broader view and look at this particular project as one component of a larger management information system.

The ultimate reason for any organization to develop an integrated management information system is to improve the efficiency of the management of scarce resources. However, to expect personnel to make spontaneous use of data, even where appropriate reporting systems have been designed, is unrealistic. In addition to the need for a complete analysis and understanding of the environment in which the system has to operate, it is necessary, during the development phase, to get regular feedback from the potential users. Such feedback can contribute greatly to the success of the implementation and acceptance of the final product.

The development of custom software is an ambitious, complex and time consuming exercise. The difficulties which arise often exceed expectations. However, the new system can be very rewarding once successfully completed.

The computerization of a supply system should by no means be considered "the solution" to its problems, but rather a powerful tool to support management decision-making. If a manual system is not functional or effective chances are that a computerized system will not provide any improvement and may even worsen the situation.

Here follows a summary of our recommendations :

Strengthen the current manual reporting format by:

- limiting the frequency of reports to every quarter;
- providing training at every level to increase the analytical capabilities of the users;
- concentrating on the analysis of critical indicators only;
- avoiding the introduction of complex new forms and reports as long as the system is not computerized;
- using sampling methods for the analysis of morbidity data.

Increase the management capabilities of the GFK and the Puskesmas by providing training in the areas of inventory control and stores and personnel management.

Introduce the costing of the goods being distributed by GFK to the Puskesmas.

Develop a computerized system supported by two software programs:

- one for inventory management, and
- one for estimating drug requirements, using both morbidity and consumption methods.

MANAGEMENT INFORMATION SYSTEMS AND THE HEALTH SECTOR FINANCING PROJECT

The current procurement system seems well structured and decentralized. However, it fails to completely serve its main overall objective, which is:

To provide patients with equitable access to essential drugs and medical supplies in the quantities needed and when needed at all levels of the health system.

In order to improve the situation, projects are being conducted by the Ministry of Health in collaboration with various funding agencies (USAID, The World Bank, etc.).

The Health Sector Financing Project, funded by the United States Agency for International Development (USAID), began in 1988 as a 7-year project.

The Pharmaceutical Component of the project aims to strengthen the management of drugs and related supplies to the rural health facilities.

The recommendation was made to:

- Develop and implement an integrated Management Information System to support the decision making process by providing unbiased information to both managers and service providers at the Provincial, Kabupaten and Puskesmas levels.

Management Information Systems — Definition

A Management Information System (MIS) aims to strengthen management through the analysis of the data which is recorded during the daily procedures and operations of a system. A good MIS transforms data into information.

One can identify three steps for this purpose:

- Data Collection
- Data Analysis and Evaluation
- Monitoring of Performance Indicators

The MIS should be an integral component of the procurement system. Its efficient implementation and maintenance support the daily management of operations and guide managers in the decision making process.

The MIS is an on-going process which depends on:

- Commitment and support from the top to the bottom levels of management
- Inter-departmental relationships
- Clearly defined objectives, indicators, and targets

- Clear lines of responsibility for results
- Sufficient available authority to take appropriate actions based on the operating results
- Regular regional and in-house training in the use and maintenance of the systems.

Preliminary work on an MIS for Indonesia's drug supply system has been done in the form of an analysis of the public sector pharmaceutical procurement system by P.T. Manggala Jiwa Mukti (MJM).

Headed by Mr. Yos E. Hudyono, MJM is an Indonesian consulting firm which is serving as an advisor to the HSF project on Drug Management issues. Their main activities within the project include system analysis and development, operations research, and training.

Their detailed analysis covered the entire current flow of documents and information through the system.

Their findings and recommendations are described in 3 separate documents:

- Description of the Procurement System, in which they made the following recommendations:
 1. Delegate more responsibility to the GFK for the management of Puskesmas stocks;
 2. Support the planning and procurement activities with a custom-developed computerized system;
 3. Simplify the actual manual reporting procedures at every level;
 4. Develop a computerized system compatible with the manual system;
 5. Train personnel in both the computerized and the manual system;
 6. Improve the coordination of the different units' and sub-units' tasks.
- Proposal for a Revised Manual System
- Proposal for the development of a Computerized System

PART I OVERVIEW OF THE CURRENT SITUATION

INTRODUCTION

The Indonesia public sector pharmaceutical procurement system has been described in detail in many previous reports (see List of Studied Documents in Annex — Bibliography). This report will give only a brief description of the Ministry of Health procurement system and focus instead on an assessment of the current and proposed systems and on further recommendations.

The scope of work for this consultancy did not include hospital pharmacies. The emphasis was on the procurement of pharmaceutical and medical supplies for the rural health centers through the district warehouses.

THE NATIONAL DRUG POLICY

The National Drug Policy was initiated by a ministerial decree in 1983. Its main objectives were:

1. To ensure the availability of drugs in accordance with the population's needs.
2. To improve equitable distribution of the needed drugs and make them available to the whole population.
3. To ensure the efficacy, safety, quality, and validity of marketed drugs and to promote rational use of drugs.
4. To protect the public from drug misuse and drug abuse.
5. To develop the national pharmaceutical potential towards self-reliance in drugs and to support national economic growth.

A recent government policy requires the use of generic ("generik") drugs throughout the Public Sector.

ESSENTIAL DRUGS LIST AND SUPPLIERS:

A list of essential drugs was established by a ministerial decree in 1980, and revised in 1983 and 1987 with the assistance of WHO. This list is currently divided into three categories A, B, and C. The B category is subdivided into two categories B1 and B2. This ABC classification, which is different from an ABC/Pareto analysis-type classification, corresponds more to a VEN-type classification (Vital, Essential and Non-Essential).

Categories A, B1, and B2 are manufactured (using imported raw materials), labeled "generik", and supplied by 3 state-owned companies:

- Perum Indonesia Farma
- Kimia Farma, P.T.
- Phapros, P.T.

The breakdown of the ABC list is as follows:

<u>Description</u>	<u>Number</u>	<u>Supplier</u>
A Category (Life Saving Drugs)	42	Perum Indonesia Farma
B1 Category (Essential Drugs)	46	Kimia Farma, P.T.
B2 Category (Essential Drugs)	47	Phapros, P.T.
C Category (Least Essential Drugs)	54	local purchase

Prices for these “generik” drugs are set for a one-year period by the Government each February.

STANDARD TREATMENTS AND PREVALENT DISEASES

In order to promote the rational use of drugs, standard treatments have been established for common health problems. These protocols are defined for children and adults.

The distribution pattern of prevalent diseases seen at the rural health centers, by major morbidity group and as estimated by the MOH, is as follows:

Health Problem	Episodes per Thousand visits
▪ Acute Respiratory Infections (ARI)	220
▪ Diarrhea	70
▪ Skin Diseases	50
▪ Gastritis	40
▪ Conjunctivitis	30
▪ Fever	50
▪ Pains	40

A study using 1987 data in the East Kalimantan Province shows a more detailed distribution:

Health Problem	Episodes per Thousand visits
▪ ARI — Mild	264
▪ Skin & Subcutaneous Infections	130
▪ Other Skin Diseases	75
▪ Diarrhea	41
▪ ARI — Moderate	42
▪ Asthma & Chronic Bronchitis	42
▪ Gastritis/Gastric Ulcer	42
▪ Dental Caries	33
▪ Ophthalmic Diseases/Conjunctivitis	21
▪ ARI — Severe	12
▪ Malaria	16
▪ Pulmonary Tuberculosis	13

INFRASTRUCTURE AND MANPOWER OF THE PROCUREMENT SYSTEM

The country is divided into 27 Propinsi (provinces) which are subdivided into Kabupaten (regencies or districts). There is a total of 330 Kabupaten nationwide. Each Kabupaten is divided into Kecamatan (subdistricts). Indonesia has 6000 Kecamatan which are themselves subdivided into Kelurahan. At the Kabupaten level the Ministry of Health is represented by the Kandep and the local government by the Dinkes. Both of these entities provide technical support to Kabupaten procurement operations.

The Kandep has overall responsibility for the Gudang Farmasi Kabupaten — GFK (regency/district pharmacy central warehouse) which is managed by a pharmacist. The GFK provides pharmaceuticals and medical supplies to each Puskesmas (health center located at the Kecamatan level).

Each Puskesmas is responsible for distribution to its satellite facilities: Puskesmas Keliling (mobile health centers) or Puskesmas Pembantu (auxiliary health centers). At these lower levels the personnel in charge of procurement varies. It could be a physician, a pharmacist, an assistant pharmacist, or a community health worker.

FINANCING

At the beginning of each financial year, which runs from April to March, a National Budget (known as INPRES) is proposed by the Ministry of Interior and approved by the Ministry of Finance. Additional funds are available through the Province Budget (APBD I), the Regency Budget (APBD II) and the Government Employees Health Insurance (ASKES).

Although the main sources of drug financing are supposed to be the province and the regency, 80% of the procurement budget is actually being provided by the INPRES budget. (The INPRES budget is used to purchase A, B1, and B2 drugs.) ASKES drugs are for the use of government employees only, but these employees must also have access to INPRES drugs. The APBD I and APBD II budgets are used only to supplement the INPRES budget or for emergency drug procurements.

Payments to suppliers vary according to the budget sources. They are all processed by the Dinkes after receipt of the goods by an appointed committee at the GFK. Payment for INPRES and ASKES drugs are done at the Pusat (Central Level — in Jakarta); APBD payments are done at the Kabupaten level.

The Dinkes is responsible for monitoring the budget expenditures of each Puskesmas, to see that they do not exceed their previously allocated budget for the financial year.

REPORTING

Reports are all done manually within each organizational structure. Morbidity and consumption data are supposed to be recorded at the Puskesmas and Puskesmas Pembantu levels, and then transmitted from the lower to the higher level on a monthly, quarterly, and annual basis.

A national health information system has been implemented. Health structures are supposed to submit regular monthly reports on their various activities (general clinics, nutrition programs, laboratory investigations, etc.).

During a workshop held during the last week of August it was decided that the number of indicators to be monitored should decrease from 252 to 127. If we exclude immunization coverage, only SEVEN of them are directly related to drug procurements:

1. Drug Consumption
2. Percent of Drug Rationally Prescribed
3. Level of Drug Availability
4. Drug Expenditure per Capita
5. Total Expenditure for Antibiotics
6. Total Expenditure for Injectable Drugs
7. Percent of Villages with Community Health Centers

This information is collected using the LB4 forms of the Health Information System. The methodology for calculating these indicators is not described in the reference manual.

PLANNING OF REQUIREMENTS

The planning of requirements is done annually and is described as a "bottom-up" approach.

Needs estimation starts at the Puskesmas Level using two methods:

- Consumption Method
- Morbidity Method

The consumption-based requirements are costed using the current approved prices and are transmitted to the GFK where they are summarized for the whole Kabupaten and then presented to the Dinkes. Morbidity-based requirements are sent directly to the Dinkes from the Puskesmas.

An annual planning session is conducted at the provincial level using both sets of data.

A first proposal is then transmitted to the Pusat who will eventually approve the budget for each province. The province will then modify the list of authorized quantities according to the approved budget, taking into consideration the ratio of cost to therapeutic value for each item.

Budgets are set once for each financial year.

PROCUREMENT AND DISTRIBUTION

C-class drugs are purchased at the provincial level through direct purchases or local tender.

Kimia Farma, one of the state-owned pharmaceutical manufacturers, has the monopoly for the distribution of the A, B1 and B2 Drugs. Kimia Farma has two main depots (in Jakarta and Surabaya) and a regional wholesale warehouse in each province.

Shipments of goods do not coincide with the governments' financial year; they are processed by Kimia Farma from October to September. Distribution from Kimia Farma to the warehouses is done once to twice a year according to their geographical situation. (Indonesia has a total of 13,677 islands of which 6,000 are inhabited.)

The regional warehouses supply the GFKs three times a year on an average (Once a year in far-off areas). Each GFK then distributes to the Puskesmas level every quarter, according to a preset schedule, with quantities corresponding to Puskesmas requests. The quantities requested are checked against the approved budget for each Puskesmas.

A distribution budget is allocated each year to finance the distribution of goods to the Puskesmas level through various means of local transportation.

Each Puskesmas provides drugs to their Puskesmas Pembantu on a monthly basis.

Dispensing to the patient is done at the Puskesmas and below in exchange for a fee which is set by the local government and varies between 300 and 1000 Rupiahs (US\$ 0.15 to 0.50). These revenues are managed by the Dinkes; 25 % of the revenues is used by the Puskesmas.

From the GFK to the Puskesmas level stocks are broken down into four sections (INPRES, APBD I, APBD II, ASKES), and sometimes more in the case of certain donations or vertical programs.

Note on Vertical Programs: Vertical programs like Family Planning, Control of Diarrheal Disease, etc., which include distribution of drugs or related items, are run within the same institutions described above in parallel systems, and are not integrated into the national procurement system.

MINISTRY OF HEALTH COMPUTERIZATION

The Pengawasan Obat dan Makanan or POM (the Indonesian office responsible for the control of food and drugs) has acquired the Registration and Adverse Drug Reactions Module of the SWEDIS system for the Registrasi Obat (Drug Registration Office). This program runs on a mini-computer there.

The SWEDIS system is a computer software package which has been developed, in a proprietary computer language, by the SWEDIS Company to facilitate in-country registration of pharmaceutical products to be made available on a given domestic market.

The current national database in Indonesia contains about 17,000 records and an average of 1,500 applications are processed each year.

Adverse drug reactions are reported to the Drug Registration Office and recorded after review by a committee. Indonesia is a member of the WHO Adverse Drug Reaction Network, which is based in Uppsala, Sweden.

The information generated by SWEDIS is not directly compatible with other popular software packages, such as Lotus 1-2-3 and dBase III Plus, being used at the Ministry of Health. Compatibility can be achieved by converting the SWEDIS data file format into an ASCII file format, which can be then converted into many commercial software formats. This extra step can be time-consuming and somewhat complicated. However, this constraint affects only the registration office since all the data processing is centralized there and there are no direct links with other departments.

Small dBase applications have been developed by the Registration Office to facilitate various research projects which have come up, such as the monitoring of the use of "generik" products at the province level or DURs (drug utilization reviews).

A proposal has been submitted to WHO by the same office for the development of software to monitor rational drug use.

Other computer utilizations include word processing (Wordstar) and spreadsheet development (Lotus 123).

Puskesmas morbidity report data are processed using micro-computers at the Pusat level by the Central Data office at the MOH.

Some hospital pharmacies (like the Fatmawati Hospital pharmacy visited during this consultancy) have just started to implement specialized inventory control software programs which have been developed in Indonesia.

None of the procurement activities, from the central level down to the Puskesmas level have been computerized. SWEDIS offers a Procurement Module and an Inventory Control Module which the Ministry of Health has chosen not to acquire because these modules were not suitable to the Indonesian context.

PART II ASSESSMENTS AND RECOMMENDATIONS

ASSESSMENT OF THE MINISTRY OF HEALTH MANUAL SYSTEM

Inventory control and reporting efforts at the GFK, Puskesmas and Puskesmas Bantu level are complicated by the four parallel systems being maintained, one for each of the budget sources:

- INPRES
- APBD I
- APBD II
- ASKES

Another type of redundancy exists at each level in terms of the schedule for reporting: reports are supposed to be transmitted on a monthly, quarterly, bi-annual, and annual basis. The monthly data are combined for a quarterly report, which is then transferred into a bi-annual report, and finally then summarized in an annual report. The reports transmitted contains the following data:

- Beginning Stock
- Quantity Received
- Quantity Used
- Ending Stock

These reports are often incomplete and transmitted irregularly. A lot of data is transmitted, but little information is actually extracted, and little feedback on the report is provided.

The same problems exist for morbidity data reports. The data for these reports are divided into six age categories for each health problem:

- < 1 year
- 1 - 4 years
- 5 - 14 years
- 15 - 44 years
- 45 - 54 years
- > 55 years

Standard treatments are defined for two broad categories: children and adults. Therefore, to establish a correlation between the morbidity data and standard treatments for quantification purposes it is necessary to combine the age categories from the morbidity data into under-5 and over-5 figures.

In most cases reporting forms are preprinted, but some have been designed individually by the users. The forms are identical at each level and do not take into consideration the level of education of the health staff responsible for their preparation. There is no feed-back about the information transmitted.

The recording of morbidity data is time consuming. The Cisaat Puskesmas which was visited had five employees dedicated only to this task. However, we were informed that this number was not representative of the national situation. Most of the Puskesmas have only one person dedicated to this task.

Requests by the Puskesmas for drugs are transmitted to the GFK every quarter using the standard LPPO form, or on an emergency basis using the FPO form. Requests from the Puskesmas Bantu are made to the Puskesmas on a monthly basis using the LPPO form. Unfortunately, the Puskesmas personnel responsible for submitting requests to the GFK are generally more interested in managing other vertical programs which provide them with more incentives.

Shipments of goods to Puskesmas are not costed by the GFK.

Distribution to the Puskesmas by the GFK happens quarterly according to a delivery schedule, but the amount allocated for the transportation of the drugs is generally inadequate.

Drug budgets and quantities to be distributed at all levels are decided upon once a year and there is no reassessment of these decisions during the course of the year. Consequently, management decisions are limited.

There is no monitoring of performance indicators; there is only control of the quantity requested against quantity allocated.

Minimum (buffer) stocks are inadequate and often calculated using arbitrary methods. For example, the buffer stocks for INPRES drugs kept at the Sukabumi GFK are based on the total value of the quantity requested, as shown below.

- 5% for A Drugs
- 3% for B Drugs
- 0% for C Drugs

It is only once a year that the Puskesmas assess their needs taking into consideration for each item:

- Average Monthly Consumption
- Stock Out Period
- Lead Time

Quantities allocated for the year are not always supplied. Shortages occur at each level. During our visit to the Sukabumi GFK, half of the items were out of stock. The GFK was just "waiting" for shipments to be sent by Kimia Farma.

There is apparently no monitoring of Kimia Farma, GFK and Puskesmas performances.

COMMENTS ON MJM'S RECOMMENDATIONS

MJM's recommendations are enumerated below, with comments following each one.

1. Streamline the inventory control procedures from the Puskesmas to the Puskesmas Pembantu by combining the various stock regardless of the budget sources.

Combination of the stock from the Puskesmas level downward would facilitate inventory management at these levels. Because of administrative procedures, it appears difficult to do the same at the GFK level, although this possibility should be explored.

2. Give the GFK more responsibility for the overall management of the distribution system.

GFK is the main "body" of the Kabupaten procurement system. It is agreed that GFK should have more responsibilities for its overall management.

The role of Dinkes II and Kandep should be clarified and "limited" to the control and monitoring of the GFK performance. They should assist the GFK in planning their annual requirements.

3. Provide drugs to the Puskesmas according to quantities determined by a committee on a quarterly basis.

The implementation of a "push" system should be considered as a temporary measure only. Efforts at the Puskesmas level should focus on improving drug supply management so that they can switch to a "pull" system where they would submit requests to the GFK. This can be achieved through specific training.

It is also recommended that the supply of drugs and related items for other vertical programs (family planning, Oralite, etc.) be integrated into the main system, since the people in charge of making requests are getting incentives for being involved in these vertical programs. Integration should increase the commitment of the staff for the benefit of the system.

4. Evaluate the quarterly use of drugs by the Puskesmas, by looking at morbidity and consumption data for the most prevalent disease (ARI, diarrhea) and other indicators (use of antibiotics and injectables).

The consumption method should be the main method for estimating drug needs and replenishing stocks (assuming that stockouts are not a major problem) since morbidity data collection analysis is more demanding and complex. However, if a sampling method is tried, the use of morbidity data will allow one to assess whether the consumption patterns are in accordance with the prevalent diseases. ABC analyses (which tells which particular drugs or groups of drugs consume most of the budget), should also be conducted at the GFK and Puskesmas level on a quarterly basis.

5. Replenish the Puskesmas Bantu stock only on the basis of quantities previously used

The replenishment of Puskesmas Bantu stock based on their past usage without any evaluation might just perpetuate irrational drug use. Due to the small scale of activities at these facilities, assessment can be done on a periodic basis.

6. Plan the distribution to the Puskesmas according to their location by grouping them by Rayon (201.3)

This should help decrease the cost of distribution.

ADDITIONAL RECOMMENDATIONS

The following recommendations are made:

After submission of their annual schedule of requirements (based on approved budget) to Kimia Farma, GFK should closely monitor the shipping of goods by Kimia Farma to see that it is done according to the proposed delivery schedule.

Although, for security purposes, there is a belief that people involved in the procurement system should not be informed about the real value of the items they handle, we recommend that each shipment made to the Puskesmas be costed. Experience shows that if cost information is provided on a regular basis, it can influence prescribing habits in a positive way. Budget planning will be easier if issues from GFK are costed. This costing would be facilitated by the implementation of a computerized system.

Another good reason for costing is that in the long term GFKs are expected to become relatively autonomous (this was mentioned during the meeting we held with the planning division). Therefore, it seems necessary to start implementing a more business-like approach to the procurement system.

Although computerization facilitates the gathering of information, we should rely on the implementation of the manual system, particularly during the first phase of this intervention.

Since drug deliveries are made to the Puskesmas every quarter, it does not seem necessary to generate monthly reports. Instead, only quarterly reports should be transmitted, one month before the proposed delivery date.

To replace the current reporting forms by new ones will not solve the main problems, which are: irregularity and inaccuracy of the transmitted data, and lack of use or analysis of the data collected.

Minimum and maximum stock should not be entered on every stock card and forgotten. Once these figures are entered people have a tendency to take them for granted and not to reassess them on a regular basis. It is more effective, although more demanding, to try to develop a more critical approach, and reassess minimums and maximums periodically, based on actual consumption.

Training, to focus on improving the management capabilities of the staff responsible for procurement and distribution at the GFK and Puskesmas levels, should be provided during the initial phase of the development of a new MIS.

For each level, an operational manual should be developed and introduced during a regional or provincial training workshop. These manuals will describe in detail the use of all forms and provide guidelines for the analysis of the data collected.

New forms with more detailed information should be generated only if the system is computerized. The manual system should concentrate on the most critical indicators.

Any modification of the current manual system should focus on simplifying it. The manual system to be implemented should be the "backbone" of the procurement and distribution system. It should provide instant information on its efficiency.

The following cards are proposed (see Anne.: 2):

- GFK monitoring card
- Puskesmas monitoring card

These monitoring forms give information on procurement activities for the last three years and could be used as a back-up to the computerized system.

GFK monitoring card:

For each drug, this card will give the following information on side 1:

- Monthly Issues by Budget
- Monthly Receipts by Budget
- Stock Balance at the end of Each month
- Stockout Period Length
- Summary of Quarterly and Annual Activities
- Average Monthly Consumption

Side 2 will be used to monitor Supplier Performance, and will provide the following:

- Lead Time
- Number of Partial Shipments
- Issue Unit Cost, divided according to the various budget sources
- Expiry Date of Batch Received

Puskesmas monitoring card:

For each drug, this card will give the following information on side 1:

- Quarterly Issues
- Quarterly Receipts vs. Quantities Allocated
- Stock Balance at the end of Each Quarter
- Stockout Period Length
- Summary of Annual Activities
- Average Monthly Consumption

Side 2 will be used to monitor GFK Performance, and will provide the following:

- Lead Time
- Number of Shipments
- Issue Unit Cost
- Expiry Date of Batch Received

The daily record of drug consumption at the Puskesmas Bantu, as proposed by MJM, is one option. Another possibility would be to record quantities used only when a container is finished. At that time, number of prescriptions dispensed since the last issue was made should also be recorded.

Communication between GFK and the Puskesmas needs to be improved. At least twice a year general meetings should be held with the GFK "clients" and other officials to discuss the following issues:

- Utilization pattern
- Budget adjustment, expenditures
- GFK and Clients performance
- ABC analysis using individual GFK clients' consumption
- Any other relevant matters.

THE COMPUTERIZED SYSTEM

It was recommended by MJM that the Kabupaten procurement and distribution activities be computerized.

Management Sciences for Health (MSH-Boston) has developed two software packages:

- The DEM (Drug Estimation Model), developed for the World Health Organization.

This software package allows health planners to calculate and adjust drug needs by comparing historical consumption patterns and epidemiological estimates. The latter which uses patient service/morbidity profiles along with standard treatment guidelines.
- INVEC (Inventory Control and Tender Management Software), developed initially for the Eastern Caribbean Drug Service (ECDS, a USAID-funded project).

This software package is a comprehensive inventory management program which keeps track of all daily transactions, accounts payable and receivable and generates more than 20 standard reports and make recommendations on quantities to reorder. It also includes a tender management module which allow the user to process a complete bidding cycle from quantification of requirements to contract awards.

These two software packages and the MJM proposal were used as a basis for discussion and recommendations.

Pak Rifai, a system analyst who was recruited by MJM in August, was our main contact at MJM because Pak Yos had to conduct two training workshops outside Jakarta during our visit.

Although the two MSH systems used as a reference have a lot of features that are suitable for the Indonesia context, the Indonesia supply system is both unique and complex. It was therefore decided that two custom software packages should be developed:

- A Planning Requirement Software package to analyze morbidity and consumption data, and
- An Inventory Management Software package to support the GFK daily procurement and distribution operations.

Nantucket Clipper (preferably version 5.01) would be the development language for the programming of both applications. We would also recommended the use of a third party library for Clipper (e.g., Funky 1.5) to facilitate the development of a user-friendly interface.

Clipper, a popular and well-supported development language both in Indonesia and overseas, allows the programmer to:

- Create applications which are self-contained and do not need any other software to run;

- Program in a modular fashion, which facilitates modifications of the software;
- Use dBase format for the data files, which makes the information easily available to other software.

Concentric Data's Relational Report Writer should be used to develop all the report formats. This will provide a lot of flexibility to the reporting capabilities of the system. It will allow trained users to generate custom reports easily and upon request for the Province or Kabupaten level.

Although there was an outline for the Inventory Control system in MJM documents, during our visit both of the proposed systems were still at an early stage of development.

Procedures, algorithms, files structures, and report formats were discussed. The system design was reviewed, with an eye toward taking full advantage of the relational capabilities offered by Clipper.

Recommendations

Both software packages should:

1. Be able to run on a Novell or Novell-Compatible Local Area Network (LAN) as a multi-user system with files and records-locking capabilities.
2. Have the same morbidity data entry module. This will allow morbidity data to be entered at the GFK or at the Dinkes and thereby facilitate the exchange of information between the two software packages.
3. Have a "user friendly" interface. The interface should be the same for each operation, the function keys should have always the same role. For example:
 - <F1> help
 - <F2> to add a record
 - <F3> sort by code
 - <F4> sort by name
 - <F5> to delete a record
 - <F6> to search for a string
 - <F9> to edit a record
 - <F10> to save a record or changes in a record
 - <Esc> to go back to the previous screen
 - <Pgup> to go to the previous record
 - <Pgdown> to go to the next record
4. Not have more than 2 levels of sub-menu (and only 1 whenever feasible)
5. Allow all reports to be printed to the screen, the printer or an ASCII file. There should be the option to input user-defined criteria.
6. Use pop-up windows and browse pick-lists extensively, to facilitate option choice and operations (and to limit the need to memorize or look up codes).

7. **Have context-sensitive help.** This means that help messages should be relevant to the operation being processed at that time by the computer operator and not just general messages.

The planning software package should be used at Dinkes and the inventory software package at the GFK. Transfer of information between both departments will be done through floppy disks since modem transmission is not reliable in rural areas.

The Inventory Control Software should be developed first, since its processed data will be used by the Planning Software. The main objectives of the Inventory Control Software are to:

1. **Keep track of all transactions that occur at the GFK and Dinkes (including accounts payable and accounts receivable);**
2. **Keep track of each Puskesmas' consumption and inventory position;**
3. **Assess reorder level automatically taking in consideration:**
 - a. **Past consumption**
 - b. **Actual delivery time**
 - c. **Procurement period**
 - d. **Forecasting period**
 - e. **Stockout days during the forecasting period;**
 - f. **Generate reports on the following indicators (the indicators which directly reflect the management capabilities of the GFK are in bold and underlined characters):**

MONTHLY REPORTS:

- **Outstanding orders**
- **Delivery charges**
- **Outstanding claims**
- **List of items available**
- **Quantities available**
- **List of items out of stock**
- **List of expired items and items to expire within the next three months**
- **Monthly consumption**
- **Average monthly consumption**
- **Average unit cost of each item**
- **Balance of all accounts**
- **For GFK clients:**
 - **Financial year-to-date and monthly expenditures (accounts receivable)**
- **For GFK suppliers:**
 - **Financial year-to-date payments and Outstanding payments (accounts payable)**
- **For GFK operations:**
 - **Distribution cost**
- **Total value of unexpected charges**
- **Receipt, distribution and use of nonessential drug list items**

QUARTERLY REPORTS:

- **Number of receiving reports**
- Items and quantities provided through donations
- **Number of orders**
- For each Supplier:
 - Delivery lead time (contract, actual and average)
 - Number of partial shipment
 - Compliance with contract specifications
- Stock out occurrence and duration
- Delivery charges
- Inventory value
- Number and value of items to be disposed of
- Lead time between receipt of requisition and delivery to the client
- Payment to GFK suppliers lead time
- Utilization pattern variation
- **Quality feedback from GFK clients**

BIANNUAL REPORTS:

- Morbidity data from pilot institutions
- List and volume of donated items
- ABC analysis using GFK issues
- ABC analysis using GFK issues grouped by therapeutic categories
- ABC analysis based on Puskesmas utilization
- Stock rotation
- **Percentage of service provided to GFK clients** (ratio between the quantity allocated and the quantity provided)
- **Adherence to the delivery schedule**
- **Number of deliveries**
- List and volume of donated items

ANNUAL REPORT:

- Annual consumption
- Quantities to be ordered/tendered for each procurement cycle

All this information will be provided broken down by budget and drug category. These reports will be submitted to the management staff for analysis. Access to audit reports (like stock variance reports) will be restricted to authorized users only.

Once computerization takes place, it is recommended that the following documents be forwarded regularly to the Puskesmas by the GFK:

- a) With each shipment, an invoice with the current allocation balance
- b) A quarterly report with:
 - The budget expenditures (month-to-date and financial year-to-date)
 - The budget balance
 - The list of items available at GFK, with unit cost.

The Planning Requirements Software package's main objectives should be:

- a) To provide the users with the capability to estimate their needs using either the morbidity method or the consumption-based method, and
- b) To generate the following reports:
 - Drug Master File Listing
 - Health Facilities Listing
 - Health Problems Listing
 - without treatment
 - with associate treatment
 - Therapeutic Class Listing
 - Forecasting Report
 - Morbidity Method, for one facility or a zone or all
 - Consumption Method, for one facility or a zone or all
 - Comparison of Morbidity and Consumption Results,
 - for one facility or a zone or all
 - ABC Analysis Report
 - total for the district
 - total for each facility

Although the system will be designed for use at the Kabupaten level, we may want to extend its utilization to the province level, where the data from all kabupaten could be compiled in a comprehensive report format.

It was agreed that the development process would be done according to the following steps:

- After his departure, the consultant will complete a detailed system design for both packages and will submit it to MJM for approval.
- MJM will then subcontract to a local programmer the development of the Inventory Control Software.
- Upon completion of the first version of this software, the consultant will return to recommend any further modifications, in collaboration with MJM, and will conduct various testing exercises. At that stage, it will be necessary to identify a site to start field testing of the software and hardware and get feed-back from potential users.
- Modifications based on user inputs will be integrated and the product finalized.
- System documentation and a user's manual will be developed when the system development is completed.

The system installation will then proceed at the project locations (East-Java and/or West-Sumatra). If necessary, job descriptions will have to be redefined.

The implementation and training schedule will be developed at a later date.

A similar approach will apply to the Planning software.

System support and maintenance, though often overlooked, is one of the most critical aspects of computerized system implementation, particularly in a case such as this where there is no previous experience. Our experience shows that despite previous testing, problems (with both the hardware and the software) should be expected to occur, at least during the first year of implementation.

The issue of support and maintenance will have to be discussed with the different parties involved, and if necessary a contractual agreement will have to be developed between MJM and the Ministry of Health if no support can be directly provided from either the province level or the Ministry of Health.

TRAINING

Training on estimation of drug needs, using consumption and morbidity methods, is currently being provided at the two project locations to the Kabupaten staff by MJM.

In order to strengthen the overall efficiency of the supply system it is also necessary to provide the manager of each level with appropriate training.

Training materials have to be developed and should include inventory control, record keeping, procurement practice, store and personnel management, budget planning, data analysis and rational drug use.

To support the development of an integrated Management Information System, regardless of whether the system is manual or computerized, the personnel responsible for the data collection must not only understand the need for and share the data, but also be given training in providing accurate data.

Training sessions should emphasize the relevance of the data collected to the staff members' own work. They will be then more likely to ensure the accuracy and timeliness of their data.

Hands-on sessions using real or mock data will provide the users with practice in understanding the reports that they receive or compile and in interpreting the results in terms of potential action that they themselves might take in the future.

It will be necessary to identify existing hands-on computer training capabilities (trainers and facilities) at the Province or Kabupaten levels. This will reduce cost and facilitate continuing in-service training.

Training in the use of computerized systems should be provided at an early stage of the software program implementation. General and specific training has to be provided. These courses will be attended by managers and clerks/computer operators.

General computer training will focus on the use of popular software programs like spreadsheets (Lotus 1-2-3), word processing (Wordstar or Wordperfect), database (dBase), and operating systems (DOS).

The training is expected to:

- Remove some of the "fear" commonly associated with the introduction of this form of technology;
- Institutionalize the concepts and knowledge of computer use at the Kabupaten level so that no subsystem or functions will be completely dependant upon any single individual.

Specific training in the use of the custom-developed software packages will be given on site.

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ANNEX II
PROPOSED MONITORING CARDS

MONITORING CARD for GFK - SIDE 1.

(not shown actual size)

GENERIC NAME:

STRENGTH:

CODE NO.:

UNIT OF ISSUE:

ROUTE:

DOSAGE FORM:

YEAR /		APR	MAY	JUN	QT	% of	JUL	AUG	SEP	QT	% of	OCT	NOV	DEC	QT	% of	JAN	FEB	MAR	QT	% of	GRAND	% of	TOTAL		QTY		
ISSUES	I				TOTAL	Alloc.				TOTAL	Alloc.				TOTAL	Alloc.				TOTAL	Alloc.	TOTAL	Alloc.	ALLOC.	AVG	EXP.		
	PD1																											
	PD2																											
	A																											
	SW																											
TOTAL																												
RECEIPT	I																											
	PD1																											
	PD2																											
	A																											
	SW																											
TOTAL																												
STOCK																												
YEAR /		APR	MAY	JUN	TOTAL	% of	JUL	AUG	SEP	QT	% of	OCT	NOV	DEC	QT	% of	JAN	FEB	MAR	QT	% of	GRAND	% of	TOTAL		QTY		
ISSUES	I					Alloc.				TOTAL	Alloc.				TOTAL	Alloc.				TOTAL	Alloc.	TOTAL	Alloc.	ALLOC.	AVG	EXP.		
	PD1																											
	PD2																											
	A																											
	SW																											
TOTAL																												
RECEIPT	I																											
	PD1																											
	PD2																											
	A																											
	SW																											
TOTAL																												
STOCK																												
YEAR /		APR	MAY	JUN	TOTAL	% of	JUL	AUG	SEP	QT	% OF	OCT	NOV	DEC	QT	% of	JAN	FEB	MAR	QT	% of	GRAND	% of	TOTAL		QTY		
ISSUES	I					Alloc.				TOTAL	ALL.				TOTAL	Alloc.				TOTAL	Alloc.	TOTAL	Alloc.	ALLOC.	AVG	EXP.		
	PD1																											
	PD2																											
	A																											
	SW																											
TOTAL																												
RECEIPT	I																											
	PD1																											
	PD2																											
	A																											
	SW																											
TOTAL																												
STOCK																												

12

MONITORING CARD for **USKESMAS** - SIDE 1.

(not shown actual size)

GENERIC NAME:

STRENGTH:

CODE NO.:

UNIT OF ISSUE:

ROUTE:

DOSAGE FORM:

YEAR /	1st Quarter TOTAL	% of Alloc.	2nd Quarter TOTAL	% of Alloc.	3rd Quarter TOTAL	% of Alloc.	4th Quarter TOTAL	% of Alloc.	GRAND TOTAL	% of Alloc.	TOTAL Allocated	Average	Quantity Expired
ISSUES													
TOTAL													
RECEIPTS													
TOTAL													
STOCK													
STOCKOUT													

YEAR /	1st Quarter TOTAL	% of Alloc.	2nd Quarter TOTAL	% of Alloc.	3rd Quarter TOTAL	% of Alloc.	4th Quarter TOTAL	% of Alloc.	GRAND TOTAL	% of Alloc.	TOTAL Allocated	Average	Quantity Expired
ISSUES													
TOTAL													
RECEIPTS													
TOTAL													
STOCK													
STOCKOUT													

YEAR /	1st Quarter TOTAL	% of Alloc.	2nd Quarter TOTAL	% of Alloc.	3rd Quarter TOTAL	% of Alloc.	4th Quarter TOTAL	% of Alloc.	GRAND TOTAL	% of Alloc.	TOTAL Allocated	Average	Quantity Expired
ISSUES													
TOTAL													
RECEIPTS													
TOTAL													
STOCK													
STOCKOUT													

100

