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MANAGEMENT INFORMATION SYSTEMS ANALYSIS AND DEVELOPMENT

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A. TERMS OF REFERENCE

Assignment: Assisting the Perum Husada Bhakti (health insurance for Government employees) in developing the management information system.

Time: August 29 - September 17, 1988

Scope of Work:

1. Review the existing information system of Perum Husada Bhakti in view of data needs for managing the ASKES health insurance program.

2. Determine the minimum data needed for managing operational activities at each administrative level of the Perum Husada Bhakti organization.

3. Review the computerized management information system developed for Perum Husada Bhakti by the Computer Science Center, University of Indonesia.

4. Develop the systems design for a computerized management information system at Perum Husada Bhakti.

5. Advise the PMU, USAID, and ISTI regarding further technical assistance needed, both domestic and expatriate, to operationalize Perum Husada Bhakti's computerized management information system.

B. INTRODUCTION

The social financing component of the Health Sector Financing project includes three areas of development: hospital services, pharmaceutical utilization, and underwriting. Within the underwriting portion of this project is a subproject aimed at developing a capitated payment plan with Perum Husada Bhakti, the organization responsible for underwriting government employees and retirees. The details of this system have been discussed in depth in previous documents and will not be recounted here.

Within the strategic plan for the development of a capitated system with Perum Husada Bhakti is the provision for developing an improved Management Information System (MIS). It is with this aspect of the overall project that this consultancy deals.

The expatriate consultant was assigned to assist the PHB MIS team in examining the current system and identifying the necessary system modifications needed to improve the management information system. Additionally, the methodologies for achieving these modifications were to be developed within the three week period of the consultancy. The three weeks of work onsite included:

1. Review of the project materials, documents and reports.

2. Review of the PHB organizational & functional structure.

3. Review of materials & software developed by University of Indonesia computer center.

4. Review and analysis of the current PHB reporting system.

5. Discussions with all branch chiefs in the head office in both group meetings and individually.

6. Field visits for systems analysis to PusKesMas, hospital, sub-branch, and branch offices.

7. Development of data tools & protocols with PHB MIS staff.

8. Discussions with University of Indonesia computer center staff concerning strategic information systems development planning and review of PHB software developed by UI.

9. Technical discussions with vendor of computer systems used at Perum Husada Bhakti with regard to system characteristics.

The following report is a result of these activities.

C. MIS DEVELOPMENT PLAN

The following is an overview of a suggested planning framework to serve as a guide to bring the MIS from its current state to the one envisioned by the Perum Husada Bhakti MIS team. It is only a suggested framework and like all plans will be subject to changing requirements and conditions.

Mission Statement

The mission of the PHB Management Information System is to support the administrative, planning, and evaluative functions of the PHB system. Its components should cost-effectively provide timely, high quality information to the appropriate decision makers in a format which favors effective decision making.

Planning Framework

It is of critical importance that the development of the PHB MIS be conceptually placed within a strategic planning context. Only by identifying the short (1-3 month), medium (1-2 year), and long term (3-20 year) goals and objectives of the MIS can development and implementation proceed in an effective and cohesive manner.

Goals & Objectives

GOAL A: Provide all information needs of PHB
GOAL B: Maximize cost-effectiveness of MIS operation
GOAL C: Support achievement of the prime directive: "BETTER HEALTH -- LESS COST"

1. Short term objectives (1-3 months) [1]

A1. Identify all existing data resources
A2. Identify decision based data needs
A3. Calculate data volume
A4. Assess quality of key indicators
A5. Accurately map data flow and utilization
B1. Reduce redundant tasks
B2. Eliminate unnecessary reports
B3. Calculate data costs per volume
C1. Link health services to disease entities
C2. Develop health services cost indicators

After the short term objectives are achieved, calculation of hardware and software costs, manpower needs, training requirements, and operational budget should be possible with a fair degree of accuracy. This tactical plan should include the development costs involved in achievement of the medium term objectives. Tasks pertaining to the short term objectives which were initiated during the period of this consultancy are described in the following section "Tasks Performed."

2. Medium term objectives (1-2 years)

A1. Implement new indicator collection for system upgrade
A2. Develop standard operating procedures for MIS
A3. Complete training of MIS personnel
A4. Initiate training of MIS users
A5. Begin development of integrated reporting
B1. Develop ability to calculate data costs/item
B2. Distribute data processing to cost-effective levels of MIS system
C1. Identify target diseases
C2. Develop utilization review subsystem
C3. Identify quality of care indicators

Upon completion of the medium term objectives, Perum Husada Bhakti will have a functional management information system. The next phase of its development will focus on developing procedures to facilitate modification of the system in response to changing requirements, optimizing the function of each subsystem, producing and using integrated reports, and developing a quality of care monitoring system which measures the outcome of treatment.

3. Long term objectives (3-20 years)

A1. Develop protocols for system modification
A2. Maximize "user friendliness"
A3. Optimize computer and office automation technology use
A4. Complete development of integrated reporting
B1. Develop system to evaluate data cost/benefit
B2. Develop systems modeling tools
C1. Measure impact of interventions on target diseases
C2. Measure impact of interventions on the costs of care
C3. Develop a quality assurance program

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1 See appendix F.

D. ANALYSIS OF THE CURRENT SYSTEM

The current management information system of Perum Husada Bhakti parallels the organization of service delivery. This evaluation concentrated on the Medical Services Branch reporting due to the constraints of time and the fact that it is this system which will undergo the most critical modifications under the proposed shift to a capitated system. The methodology applied to this system will in turn be applied to the information sub-systems of the Finance, General Affairs, and Planning & Development Branches by the MIS team.

The theoretical structure of the MIS for Medical Services is diagrammed in Appendix B. Although this structure was detailed prior to the metamorphosis of BPDPK into PHB, the only major changes are in the reporting forms rather than the pattern of flow. In terms of report formats, the system is not uniform. A mixture of old BPDPK and new PHB forms as well as forms locally produced are used. The system has no formal feedback channels described. Neither the points of decision nor the locations of information use are identified.

The following descriptions proceed from the facility level to the Pusat (Headquarters of PHB).

PusKesMas (Health Centers):

Interviews with personnel from two PusKesMas (Kabayoran Lama and Puter) revealed that between 31 and 42 reports are required by PHB, DepKes, BKKBN, and the regional DepKes. The majority of the PHB forms are completed by non-medical personnel with high school education and no training other than on-the-job. The exception is the drug utilization report (LPO) which is completed by the dispenser. All totals for forms DBK, RKRJ, and LPO are calculated by hand or, in some instances, using a calculator. Completion of the PHB reports is estimated to require four man-days/month. Data quality ranged from excellent in one PusKesMas to fair in the other. According to PHB personnel the variation in data quality is even greater in remote regions of the country.

Specific problems exist with the referral system by which the PusKesMas doctor sends a patient to a hospital for additional treatment or diagnostic studies. The number of referrals are reported on the RKRJ from the PusKesMas to the sub-branch office (Tk. II) of PHB. The sources of referrals and total number is reported to the Tk. II from the hospital. The number of referrals sent from the health centers to hospital often doesn't match the number of referrals received. A referral form, a portion of which is to be sent back to the PusKesMas for confirmation of receipt of referral, is sent with the patient. In practice this is seldom done. This makes adequate follow-up by the PusKesMas doctor difficult. The nature of this problem can be assessed at the Tk. II only through laborious comparison of patient lists DBK and DBP.

The drug utilization report consists of a daily listing of each drug dispensed. The totals are calculated on the LPO form and sent monthly to the Tk. II. The decision period on resupply is made on a quarterly basis by the Tk. II, the flexibility of which is limited by the supplies on hand at the district DepKes. In practice, daily recording is often not done. Instead a monthly or weekly inventory is taken and a retrocalculation of use is performed.

A very significant finding was that a coding system similar to the ICD-9 system is used on the patients' charts and on reports sent to the district DepKes (Department of Health). This will be discussed further in the recommendations section.

Hospital Reporting:

One C level hospital was visited in Bandung (Cibabat). At this facility PHB members accounted for 15% (64 admissions/month) of their inpatient utilization and 5% of their outpatient utilization (255 visits/month). PHB has three staff working full time in this hospital, one of which is a PHB employee, another is a hospital employee, and the third is an employee of the pharmacy. Among their responsibilities is logging the utilization of services which can account for 30% of their time. However, the totals and summary reports are completed by one of the two full time hospital statistical reporting staff. No estimate of the percentage of time spent on PHB reports by this individual could be given. In addition to the summary reports LPO, DBP, and RKRN, claims for individual cases under the Paket tariff system and requests for approval for high cost services are submitted to the Tk. II (sub-branch office.) Calculations are performed with hand calculators. The quality of reporting from hospitals seemed to be good.

Coding of illness with ICD-9 codes is done on reports to the district DepKes.

Sub-Branch Office (Tk. II) Reporting:

Essentially Tk. II offices function as data compilation centers. Few decisions are made at this level. The Tk. II office visited had 14 employees (official manpower profile is 7). Adding machines and hand calculators are used for calculations. Summary reports to the branch office (Tk. I) were the responsibility of one individual. In general, the Tk. II receives summary reports from the PusKesMas and the D and C level hospitals. There is reportedly some variation in this depending on geography, manpower, and the profile of facilities.

The following is a profile of tasks for the Tk. II.

1. Screening of drug claims from hospitals. Prescriptions submitted for payment (in the Paket tariff system) are evaluated with a formulary list. If they are not contained in the approved list, the claim is denied and returned to the member who is then responsible for payment. If the drug is on the list, the claim is either approved for payment or, in some instances, sent to the Tk. I for payment. The reason for this variation was not clear.

2. Screening of drug utilization from PusKesMas. The LPO drug utilization summary is profiled by type of PusKesMas (A, B, C). Utilization patterns are used by the Tk. II in their proposal for resupply during the next quarter. In Bandung, this period has been extended to six months.

3. Screening of Paket tariffs from D and C level hospitals. Charges from hospitals under the Paket tariff system are evaluated as to the profile of services to calculate the reimbursement. If inconsistencies are found, the hospital based PHB staff member is contacted by telephone to initiate adjustment of the claim. This is a basic form of utilization review.

4. Referral approval or precertification. Ostensibly, all referrals from the PusKesMas to the hospital or within the hospital (D and C level) for special procedures or extensive, prolonged, or high cost treatments must be precertified by the Tk. II. In practice, the requests do not always predate the service and in any case requests are rarely denied probably due mostly to the lack of qualified, medically trained reviewers.

5. Compilation and quality check of PusKesMas reports. All summary reports from the PusKesMas are tabulated and the totals are recalculated to check for accuracy. This redundancy serves as data quality check and is warranted.

6. Membership status is reported to the branch office and the Pusat quarterly. Changes in membership status are reported to the Tk. II by the local government personnel office.

7. Provider profile status is reported to the branch office quarterly. It is not clear how these changes are determined as apparently no formal reporting system is functioning and changes are probably self-reported by the providers or by the PHB staff in the hospitals. This profile does not change much over time.

Branch Office (Tk. I) Reporting:

The Tk. I office in its current state is understaffed to handle the magnitude of claims and reports received currently. The manpower profile for a Tk. I is 15. This may be more than adequate in some parts of the country in that the offices are distributed geographically rather than demographically. However, in Jakarta and West Java it is clearly insufficient. Currently, with the increased work load due to a complete member registry update, the Tk. I office in Bandung is employing 20 full time and 20 temporary employees and is still backlogged in some subsystems. The work load ranges from the manual processing of the registration of 886,945 members in Bandung to verification and payment of 1.4 million outpatient visits, 372,000 specialist care cases, 360,000 drug claims, and 27,096 hospital admissions per year, at the Jakarta Tk. I office, in addition to which they are responsible for maintaining over 400 ledgers and producing 11 summary reports for the Pusat per quarter.

The evaluation of claims plays a critical role in the PHB and the estimated savings to the PHB by the Tk. I in Jakarta was Rp. 400 million/year in 1987. In addition to this activity, an elementary form of utilization review is performed by Tk.I PHB staff in B and A level hospitals where they monitor each ASKES member in house. Precertification is required for special procedures and high tech services such as CT scans, dialysis, etc. No quality assurance issues are addressed currently.

This immense task of data manipulation has resulted in inconsistent reporting throughout the country and the Tk. I director in Bandung estimated that complete reporting is less than 10% nationwide.

Summary of Tk. I tasks:

1. Compilation of summary reports from Tk. II's.
2. Claims adjustment for B and A (sometimes C) level hospitals.
3. Basic utilization review & approval on high cost cases.
4. Annual proposal production for the Pusat reporting activity and requesting budget and personnel.

In addition to these activities, both the Tk. II and Tk. I have financial, personnel, and logistics reports. As stated previously those sub-systems were not the priority. However, they will be analyzed and modified within the development plan of the PHB MIS.

Pusat Information Activities:

The PHB headquarters is divided into four operational divisions, plus a board of directors, a supervisory board, an advisory board, an internal auditor's office, and a secretariat. Only the operational branches were evaluated in this study.

In general, the four operational branches function individually with respect to information systems, although information from the branch office quarterly reports is used by Medical Services, Finance, and Planning and Development. The General Affairs Section has its own separate reporting systems.

Medical Services Branch:

The MSB is concerned primarily with the utilization of health services by the ASKES (PHB) members. The current data used is summary or "macro" data. This data supports decisions on the benefit package and the MSB role in budget planning. Current data utilized by the MSB include:

1. Number of PusKesMas visits.

2. Number of referrals

3. Number of Paket tariff II visits

4. Number of Paket tariff III visits

5. Number of patients hospitalized

6. Length of stay

7. High tech services

8. Special procedures

9. Drug costs & transfusion costs

Medical Services Division was chosen as the focal point of the current analysis in that the calculations for the capitated system would depend on their data.

Finance Branch:

This division is primarily for accounting and preparing the total and the cash budget with each of the other divisions. It is also responsible for reporting every six months and annually to the Ministry of Finance on income status, tax performance, and target status (number of services, level of care, length of stay). They receive monthly financial statements from each of the branch offices (Tk. I). In addition to preparing the periodic and annual financial statements for the PHB Pusat, they also prepare a "Report on Reporting" which summarizes the status of financial data received. Like the other branches, the Finance branch prepares internal reports to General Affairs and other organizational standards.

General Affairs Branch:

This is the operational branch of PHB. Its basic function is to provide the support services for the other branches and to maintain the physical plant of PHB. Specifically these services include:

1. Personnel. Functions include payroll, promotions & raises, pensions, and recording of sick leave and disability.

2. Secretarial Management. Functions include production, distribution, storage and retrieval of documents.

3. Logistics. Functions include supply, vehicle and equipment purchase & maintenance, facilities construction, leasing, purchasing, and maintenance.

4. Legislation & Law. Functions include contracting and contract management and conformation of PHB to legal statutes.

5. Organization & Methods. Functions include production of job descriptions, departmental organizational plans, and standard operating procedures and protocols.

They receive periodic and annual reports from the branch offices (Tk. I) and handle other equipment and supply request forms on an "as received" basis. They submit quarterly and other periodic financial reports to the Finance Branch and participate in the annual planning and budgeting process.

Planning and Development Branch:

This branch services what is primarily a Research & Development function as specified in the PHB annual reports. They utilize all other reporting systems and, in addition, information from sources outside of PHB such as the Departemen Kesehatan (DepKes).

The MIS team is organized under the administrative umbrella of this branch.

Like the other branches they submit periodic and annual operational reports to Finance and General Affairs Branches.

Recommendations:

The recommendations based on this evaluation consist of those pertaining to the Medical Services subsystem which was prioritized for reasons stated above and others pertaining to the entire management information system of the PHB organization. These recommendations are made under the assumption that the activities described in the Task section of this report will be completed prior to implementation of the following recommendations.

General:

1. Disease coding must be linked with cost and utilization data. This is necessary for both the current system and the proposed capitation system.

2. Implementation of a computerized membership database to eliminate redundant entry of name, age, address, etc.

3. Use of procedure codes (CPT coding or similar system.) This will facilitate cost benefit calculations, utilization review, and quality assurance activities under the proposed capitated system.

4. Automate unit-cost evaluations. This could be performed at several levels in the system. Standards set by the Pusat could be used as parameters for evaluating service levels at the Tk. I (branch) and Tk. II (sub-branch.)

5. Design, produce, and distribute uniform reporting forms that will facilitate data entry into computers.

Facilities:

1. Implementation of ICD-9 coding (or other code).

2. Increase utilization review activities.

3. Identification of common indicators with other systems. This would serve several purposes. Redundantly derived indicators are a method of checking data quality. Eliminating excessive redundancy reduces work loads and generally increases quality of reporting. The process also identifies potential areas to reduce the costs of producing data.

4. Training for personnel on accurate data entry. This could entail a short competency exam combined with a half day training session.

5. Reduce drug utilization report to quarterly. Use inventory method rather than daily log. Eventually, eliminate LPO form.

6. Initiate feedback report from upper levels. Feedback will not only improve the quality and quantity of reporting but will positively effect service delivery.

Sub-Branch (Tk. II)

1. Initiate microcomputer implementation program.

2. Use modified version of PUSILKOM program. See evaluation of PUSILKOM program below.

Branch (Tk. I)

1. Consider increasing computer capacity from original configuration. (see data capacity)

2. Reduce provider profile report LPPM to biannual.

Pusat:

1. Establish the MIS department as an entity and central authority and coordinator for all MIS activities.

2. Utilize current computer capacities to implement integrated reporting.

E. THE CAPITATION SYSTEM

A form of capitation has already been implemented at the PusKesMas level of the health care system. Within the social financing component, new system characteristics such as full capitation, risk sharing, or quality assurance will be introduced in two regencies (Kulonprogo & Balikpapan) on an experimental basis. Two other regencies with similar characteristics will be chosen as the controls.

These areas must be the focus of the MIS development because capitated health care systems have special data requirements. In addition, indicators common to both the current system and the capitated system must be identified and evaluated to permit comparison.

Apparently, the initial capitation distribution will be based on calculated income minus administration and profit margin, and estimated costs/member/year. This is acceptable for the initiation of the project but it does not achieve the intent of capitation which is to improve health service and contain costs. Additional data will be needed. The following recommendations are divided into data available now and other data which will require an upgrading of the system to obtain.

Recommendations:

It is of utmost importance that epidemiological data be paired with utilization statistics. Only in this manner can the actual problem "disease" be identified and strategies for intervention be planned. However, complete reporting of diagnoses is expensive and unnecessary. In most systems, the majority of health care funds are spent on the leading 5 or 10 diseases. It would simplify reporting tremendously and reduce data volume if disease specific data collection were limited to the leading causes. Initially the leading 10 diagnoses can be estimated from DepKes regional epidemiological data. However, this data is from the population at large and not from the PHB/ASKES membership but it should be similar. After one year, the list can be modified to a membership specific profile. The same principle applies to the leading surgical procedures (in terms of cost).

The following indicators should be evaluated for internal and external validity for potential use in the system to measure the capitated system.

1. Initial Data Set (available now)

    a. cost per member/month
    b. cost per outpatient visit (with and without prescription and diagnosis)
    c. cost per hospitalization (with and without prescription and diagnosis)
    d. cost per hospital day (surgical)
    e. cost per hospital day (non-surgical)
    f. cost of drugs per member/outpatient
    g. cost of drugs per member/hospital

2. Secondary Data Set

    a. 10 leading ICD-9 diagnoses for outpatient utilization
    b. 10 leading ICD-9 diagnoses for inpatient utilization
    c. cost per 10 leading ICD-9 outpatient
    d. cost per 10 leading ICD-9 inpatient
    e. cost per leading 10 surgical procedures
    f. length of stay for leading 10 diagnoses
    g. level of care for leading 10 diagnoses
    h. 10 leading drugs by total cost

3. Tertiary Data Set

    a. profile of members by age, sex, and ICD-9
    b. profile of members by utilization/inpatient

c. profile of members by utilization/outpatient
d. outcome and impact data for leading 10 diagnoses
e. mortality and morbidity for leading 10 diagnoses

F. ANALYSIS OF THE PUSILKOM COMPUTERIZED MIS

The software system designed by PUSILKOM was evaluated based on discussions with the director of PUSILKOM, Mr. Bagyo Moeliodihardjo, and his staff, review of the manual which demonstrates the reports generated, and from demonstrations of the software.

The MIS program for PHB is written in Turbo Pascal and is extremely "user friendly" utilizing pop-up menus and derivational sorting lists. It appropriately links epidemiological data with health care costs. It offers a variety of reports on drug costs and utilization statistics.

It is recommended that the program be modified somewhat to a configuration which monitors the leading 10 diagnoses, drugs, and procedures (in terms of cost); the remaining values would be lumped into an "other" category. This will reduce the data volume and the real costs of processing it. Parameters can be set such that if an "other" category exceeds a predetermined value, such as 25%, a manual protocol can be invoked at the facility level to determine the cause.

It is also recommended that such systems be developed for the other segments of the MIS.

G. ANALYSIS OF THE PUSILKOM STRATEGIC INFORMATION PRESENTATION

The staff of PUSILKOM have produced a strategic overview for the management information systems for PHB (see Appendix E for schematics of subsystems.) They have taken into consideration such factors as the rate of PHB/ASKES membership growth and the changing methods of the payment of services (fee for service, Paket tariff, capitation). Their proposed policy and criteria for the system appropriately includes integration of the subsystems and the reporting process and also system development aimed at decision-making support.

Their strategic guidelines include initiation of the plan on the subsystem that will yield the highest and most immediate impact. They also stress user friendliness, staged development, minimizing change (avoiding unnecessary change), and implementing computerization and office automation from the Pusat to the periphery. In addition to these sound strategic principles, their concern with the problems of MIS system control, data integrity, data volume, and processing schedules is appropriate.

The specific objectives of the plan were not clear. It is possible that they are detailed in Bahasa. The goals which are stated as objectives include:

1. integrated reporting
2. integrated controlling
3. minimized redundancy

4. development of a centralized data bank

5. improve and strengthen the Pusat's role in the system

6. future oriented.

The plan is a good example of systems design. The only additions would be that the MIS development should not parallel the implementation of computerization from the center to the periphery in that if the data quality from the periphery is poor all efforts at the center will be irrelevant. Clean data channels must be established from the point of origin to the point of use and/or storage. In terms of the centralized data bank, it may prove to be prohibitively expensive to implement this due to the data volumes. Also, much if not most of the data generated at the periphery has no use at the center of the system. The current trend in information systems is towards distributed systems rather than centralized ones. It minimizes both capital costs and operating costs as well as affording some protection again system failures. It also prevents system obsolescence by allowing continual, "piecemeal" upgrading.

Overall the plan is of good quality and is a good indicator of the role PUSILKOM can play in the development and implementation of the PHB MIS.

H. TASKS PERFORMED

The following activities were initiated during this consultancy, in addition to the assessments described in sections 4 through 7 above. They pertain to the short term objectives described above. Their completion is necessary for the management information system to progress to the medium range objectives. Although the timeframe of the consultancy did not permit completion of these tasks, the methodology and prototype tools were developed. The Perum Husada Bhakti MIS team will translate and modify the tools and proceed with these tasks.

Data Dictionary

The most fruitful initial step in the development of the MIS is the cataloging of all existing data. This will ensure maximal utilization of the information resource that has already been developed and paid for. It should be produced in two media 1) electronic--a computerized database format which will be operated by the MIS team to assist users in locating data resources as needs change, and 2) printed--an actual catalog of data resources available. These dictionaries should be updated annually and distributed to all branches of the Pusat and the Tk. I regional offices. The preliminary tool and instructions are located in Appendix A.

Data Needs Assessment

The data needs assessment should be performed simultaneously with the compilation of the data dictionary. Data needs should be based upon decision requirements. This task will require the development of an updated schematic of the MIS with the points of decision clearly marked and characterized. It will include not only the decisions made at each point but what information resources are used currently. Upon completion, the MIS team will use the computer-based data dictionary's coding system to identify possible alternative or additional data resources for each decision. Problems with temporal data availability and the unmet data needs will be identified at this point. The prototype tool and instructions are located in Appendix A.

Data Quality Analysis

Each indicator will be evaluated on the basis of internal and external validity. The indicators which will be used to calculate and monitor the capitation system will be evaluated first. Eventually, all indicators in the MIS will be evaluated in this manner. Proposed indicators will be evaluated in this manner prior to acceptance. The methodology for this type of evaluation and typical problems encountered were discussed with the MIS team. A preliminary tool and instructions are located in Appendix A.

Data Capacity and Volume Calculations

Calculation of the capacity of the PHB computer system and the volume of the data the MIS must handle is necessary for strategic and tactical planning of how this data can be handled in the most expeditious and economical manner. Given that PHB is committed to the utilization of computers to support the MIS, the data capacities and volumes should be calculated in bytes. This facilitates the process of data distribution in the MIS system. The methodology for these calculations was discussed with the director of the MIS and a spreadsheet method demonstrated. Examples of such calculations are located in Appendices C and D.

PERT and Gantt charts of these tasks and the short term objectives described above is located in Appendix F. A suggested time frame is indicated in terms of "working days" below each objective on the PERT chart and more graphically typified on the Gantt chart. The objectives which were not initiated during the period of the consultancy were discussed in detail with the MIS team.

I. CURRENT MIS RESOURCES

Personnel:

Currently the MIS staff consists of 14 persons including a director and a statistician. All staff have either received some computer training or are currently in training. With the installation of a mini-computer in the Pusat, it is anticipated that additional training will be required as the systems are developed (see below, Training.) After the current systems analysis is completed, alteration in level of manpower will probably be necessary. As the computer based activities of PHB expand outward from the Pusat, additional MIS staff will be needed in field positions. Some preliminary projections have already been made in the Planning & Development Branch, however, final manpower profiles should be based on the findings of the systems analysis.

Equipment:

The current configuration of the computerized portion of the MIS is confined to the Pusat where a 2.5 gigabyte minicomputer and at least 20 microcomputers are currently available with a variety of software being employed such as Word Star, Lotus 123, and Dbase. Many of these micros are currently linked via Ethernet LAN to the minicomputer.

The projected configurations include microcomputers at the Tk. I and Tk. II levels (see Appendix D). From the calculations in the Appendix, it is apparent that there is a capacity bottleneck at the Tk. I level. All levels of the Medical Services subsystem described in this report are subject to significant backlogging of data tasks. However, it is the Tk. I level which has most significant expansion of personnel beyond the planned level (up to 40, planned level 15). It is quite probable that after the tasks described above are completed and the optimal distribution of the data processing within the system is determined,

that the computer capacity at the Tk. I will have to be increased. It is recommended that faster CPU chips, expanded memory, and potential for local area networks and remote data transmission be considered if such an increase is planned.

J. RECOMMENDATIONS FOR FURTHER ASSISTANCE

Consultants:

Three types of additional consulting assistance are needed during the implementation phase of the MIS.

1. PUSILKOM is needed to assist the MIS staff in reprogramming the computerized MIS software subsystem for medical services. They are also needed to assist in the development of similar software for the other branches of PHB.

2. Statistician: a statistician with considerable experience with insurance industry computer systems and international experience is needed to assist the MIS staff in the completion of the tasks initiated during this consultancy. His assistance would be delivered in two parts of four weeks each. The first would entail assisting the MIS staff in the evaluation of data needs using the data dictionary, decision-based data need assessment, and indicator assessment tools. The second task would entail assistance with analysis of the initial reports generated by the MIS.

3. Systems Development Consultant: a computer systems development consultant with considerable experience in systems development including mainframe, mini-, and micro- computers is needed to assist with the systems configuration after the data volume calculations are completed. Experience with systems development in the health insurance industry would be essential. This could be accomplished in a three week period scheduled to begin after the short range objectives are completed and before the long range objectives.

K. TRAINING

It is anticipated that after the analysis of the MIS is completed, in addition to system configuration, appropriate training of MIS personnel and MIS users will be required. The exact numbers to be trained cannot be estimated at this time. However, three types of training will clearly be needed as the system develops.

1. General: an introductory level training to micro-computer use. This should be a standard package for use with new MIS staff, users in the Pusat, users in the field. It should be broken into periodic sessions to allow for mastery in the interim periods.

2. Mini-computer: training for the MIS staff on use of the mini-computer and current software. This should be fairly intensive and include competency evaluations. A more limited version of this should be offered to users in the Pusat, who will need to access data on the local area network.

3. MIS specific: initiation of this training depends on the development of the MIS software systems which in turn depends on the systems analysis now underway. It will consist of task specific training of MIS staff and users in the utilization of the software that is configured for the PHB system. If the two preceding types of training have been completed it will facilitate this critical step and shorten the training period needed.

L. SUMMARY

The current management information system of Perum Husada Bhakti demonstrates many of the typical problems of any information system. Variable data quality & timeliness, incomplete reporting, loose linkage to decision making, suboptimal presentation formats, retrievability, and volume/capacity problems all play a role in obstructing optimal system function.

This consultancy attempted to identify the nature and magnitude of these problems. A brief strategic and tactical plan was produced. Methodologies and tools to implement the initial phase of the plan were developed, and preliminary training in their use was conducted. Current resources were characterized. Finally, additional needs and technical assistance were identified and described.

The strengths of the system lie in the organizational commitment to the use of computerized data manipulation, the rapid acceptance of computer use by the PHB MIS staff, and high quality technical support obtained from the University of Indonesia Computer Center.

In terms of the overall project of Perum Husada Bhakti, the management information system development should be recognized as the most critical element in the development plan. It must be given the highest priority. Without effective reporting and high quality information, it will be impossible to evaluate the effects of the proposed system and the innovative elements it will introduce.

Appendix A:

Prototype Assessment Tools and Instructions

PHB Management Information System

DATA DICTIONARY INPUT FORM INSTRUCTIONS

Input into the data dictionary must be exhaustive, accurate, and complete. Correct entry of spellings, numerals, and spacing is critical. The following guidelines explain some of the elements of the dictionary. They are only guidelines and are no substitute for clear thinking.

1. DATUM

This entry is the standard name of the datum as used by the PHB organization. Example, "total member visits per year."

2. DESCRIPTION

This is a description of the "physical form" of the datum. Example, "total member visits per year = a whole number, units = visits/year for all members of ASKES."

3. DEFINITION

This entry is perhaps the most critical of the data dictionary elements. One definition, approved by the highest levels of PHB management, must be used consistantly throughout the organization. Example, "total member visits/year = visits by members (card holder, dependants, pensioners) to a designated health facility during the specified year during which they receive a service, visits to such facilities which do not entail receipt of service(s) are not included."

4. LOCATION(S)

The entry of locations should include the reports, files, and geographical location of the data. Example, total member visits/year, locations: "PHB Buku Pedoman Penyusunan Rencana Kerja dan Anggaran, Buku 1, Kantor Bina PLM Kesehatan and Kantor Bidang Anggaran."

5. FREQUENCY OF CHANGE

This entry records not only how often the datum is changed or updated but the actual date, when possible. Example: "total member visits/year is changed annually and is calculated by October 1 each year."

6. CODES

Any number of codes may be developed for the data dictionary. Additional codes may be added at any time. However, codes added later may involve as much time and money as the original total entry. (See attachment: codes.)

PERUM HUSADA BHAKTI

DATA DICTIONARY INPUT FORMAT

DATUM	DESCRIPTION	DEFINITION	LOCATION(S)	FREQUENCY OF CHANGE	CODE #1	CODE #2	CODE #3

DECISION DATA NEEDS ASSESSMENT FORM INSTRUCTIONS

The costs of collecting, processing, storing, and retrieving data necessitate the efficient evaluation of the actual needs of the organization in terms of quantity, location of use, schedule of use, and optimal format. The following guidelines should help the evaluator insure that all data generated and/or gathered by the MIS is functionally linked to decision making.

1. **DECISION MAKER**

   This entry is essentially the job title of the person being interviewed. It should also include the person's actual name.

2. **LOCATION**

   This should identify what level of PHB (Pusat, Tk. I, etc.), kantor, and geographical location (example: Tk. I Surabaya, kantor pimpinan).

3. **DATE**

   Enter the date of the evaluation.

4. **OUTPUT**

   This is the most critical element of the data needs assessment. What are the decisions made? What is the data used for? This entry may be either a decision such as "increase the capitation, hire more personnel, deny payment of a claim, deny a referral," or a report required by law or by upper levels of management such as "a report giving totals for utilization in a particular district which will be used at the Tk. I to calculate provincial totals which in turn will be used to calculate the national totals at the pusat." It is often difficult for a decision maker to tell you what decisions they make if asked directly. Often, a job description, discussions about perceived data needs, and/or listing of required report production will help pinpoint the output.

5. **DESCRIPTION**

   This is a brief textual explaination of the output. Example, output = deny referral, description = referral of patient from level D to level C hospital denied on basis of failure to meet criteria for appropriateness.

6. **FREQUENCY**

   Enter how often this decision is made or a report is produced. Example, monthly, daily, variable. Also enter specific date if appropriate, example, decision made on the 25th of each month. This entry is used to ensure timely arrival of data to optimally support output.

7. **CURRENT INPUT**

   Identify what data are currently being used to support the decision making. Every attempt should be made to use the standardized terms used in the data dictionary. If no data is used enter "none."

8. **POTENTIAL INPUT**

This entry will, in most cases, be filled in at a later date than the initial evaluation. Its entries will be derived from the data dictionary and from the determination of "new" data needs. As the potential input data is identified, it is the function of the MIS staff to acquaint the decision maker with the new sources of higher quality data and to supply such data in a format that optimizes the probability of quality decision making. In effect, the objective is to move data from the potential input column into the current input column. No data should occupy both columns simultaneously.

9. **CODES**

These codes match the codes used in the data dictionary. It is based on these codes that one source of potential inputs may be identified through sorting the data dictionary.

PERUM HUSADA BHAKTI

DECISION DATA NEEDS ASSESSMENT FORM

DECISION MAKER:
LOCATION:
DATE:

OUTPUT	DESCRIPTION	FREQUENCY	CURRENT INPUT	POTENTIAL INPUT	CODE #1	CODE #2	CODE #3

ATTACHMENT: CODES

Codes used in the MIS are for the purpose of cross referencing data on the basis of select factors. Such factors could include:

1. Location of data in PHB organization

   PUS = Pusat
   TKI = Tingkat I
   PKM = PusKesMas

2. Geographic location

   JKT = Jakarta
   AMB = Ambon
   BAN = Bandung

3. Type of use

   FIN = Financial calculations
   CAP = Capitation calculations
   UR = Utilization review

4. Form of data

   RP = Rupiah
   PST = Peserta
   RR = Rata-Rata

With this system a data search could be accomplished by sorting the data dictionary with a search string such as:

Search: TKI,JKT,UR,FIN,RR,RP

This would locate data available on the average utilization and costs at the Tk. I in Jakarta.

Alternatively, numbers and/or unique identifiers could be used in conjunction with a "Key" to accurately pinpoint the data with a minimum of characters and ambiguity. For example, "J1.2" could equal Jakarta, PHB pusat, finance office. The derivation of these codes and their use is determined entirely by MIS criteria and needs.

INSTRUCTIONS FOR USE OF INDICATOR ASSESSMENT FORM

The most critical indicators should be evaluated on the basis of internal and external validity to ensure the quality and utility of the data used for such tasks as calculation of capitation, utilization review, budgeting, and so forth. The assessment tool is a prototype and not intended as the definitive instrument. However, the questions posed cover the major critical areas of indicator validity.

GENERAL

Indicator: Enter which indicator is being evaluated

Date: Enter the date of the evaluation

Point of Origin: Enter location of indicator origin, i.e., PusKesMas

Evaluator: Enter actual name of evaluator

INTERNAL VALIDITY

Question 1. This refers to a "data field" which is actually all of the potential data in a specified area of the system. For example, a PusKesMas has lots of data in it, number of visits, vaccinations, prescriptions, etc. This is the "data field." A good indicator is one which, by itself, tells you how the other data vary. This is functional linking. For example, consider prescriptions, vaccinations, the "number of doors" and the "number of windows" in the PusKesMas. The first three are functionally linked to the number of visits and other data such as number of lab tests, etc. (the number of doors is linked, in that without the doors there could be no visits!). The "number of windows" is not. Obviously, prescriptions and vaccinations are better indicators of clinic activity than doors but in some cases discrimination between indicators is not so easy, therefore additional questions must be asked.

Question 2. An indicator that varies proportionately with the data field that you want to monitor is one that increases when the other data increase and decreases when the other data decrease. If the changes are small, the indicator should vary little. If the changes are large, the indicator should reflect this. In the case of the indicators chosen above, vaccinations, and prescriptions would increase with the number of visits but the number of doors and windows would not. On this basis, the last two indicators could be rejected.

Question 3. Which variables, important to your objectives, may change without being reflected in the indicator? With a good indicator, this number should be minimal. Both prescriptions and vaccinations pose some degree of weakness on this scale. Clinic visits could increase or decrease without necessarily changing the two indicators. Some measure of variance must be performed to determine which is the superior indicator. In reality, clinic "visits" is probably a better indicator of clinic utilization than either considered above.

Question 4. A very simple question but one that is often overlooked. The units of the indicator must be appropriate to its use in calculations. For example, total clinic visits/day cannot be used to calculate district total visits/month. It must be adjusted by multiplication to total clinic visits/month.

Question 5. If a standard definition for the indicator has been established for its use throughout PHB, the internal validity of the indicator is increased.

EXTERNAL VALIDITY

Question 1. Unless an indicator is reliably collected, whether it is internally valid or not is irrelevant. The direct answer to this question may not be apparent in some cases, thus, additional questions must be asked.

Question 2. A preliminary survey at the primary site of indicator collection should give a rough estimate of the error rate. If it is greater than 20% the indicator is probably not worth collecting. Less than 10% is acceptable. Less than 5% is good.

Question 3. If data collection takes place as part of the employee's primary task, the likelihood of completeness, accuracy, and timeliness is increased. It is not absolutely required but a desirable indicator trait.

Question 4. How will data quality be checked? Ideally, quality checks can be performed by comparing certain quantities which should be equal but are derived by different means in the MIS. The quality checks are built into this system. If this is not possible, periodic sampling is an alternative. No quality checks in a system make acceptance and use of the data an act of faith and such circumstances must be avoided.

Question 5. Comparison of the timing of data collection with data use is critical. Regardless of the internal validity of an indicator and the reliability and quality of its collection, if it is not received in time to support decision making it is externally invalid.

Question 6. How is the data transmitted from point of origin to point of use? How certain are we that it will arrive on time? Both physical and electronic transportation of data are prone to failure. Alternative forms of transmission must be evaluated if the primary mode is unreliable.

Question 7. Indicators may not be used immediately upon arrival at the use site or they may be used periodically. Are they stored so that they are easy to find and retrieve?

PERUM HUSADA BHAKTI/MANAGEMENT INFORMATION SYSTEM

INDICATOR ASSESSMENT TOOL

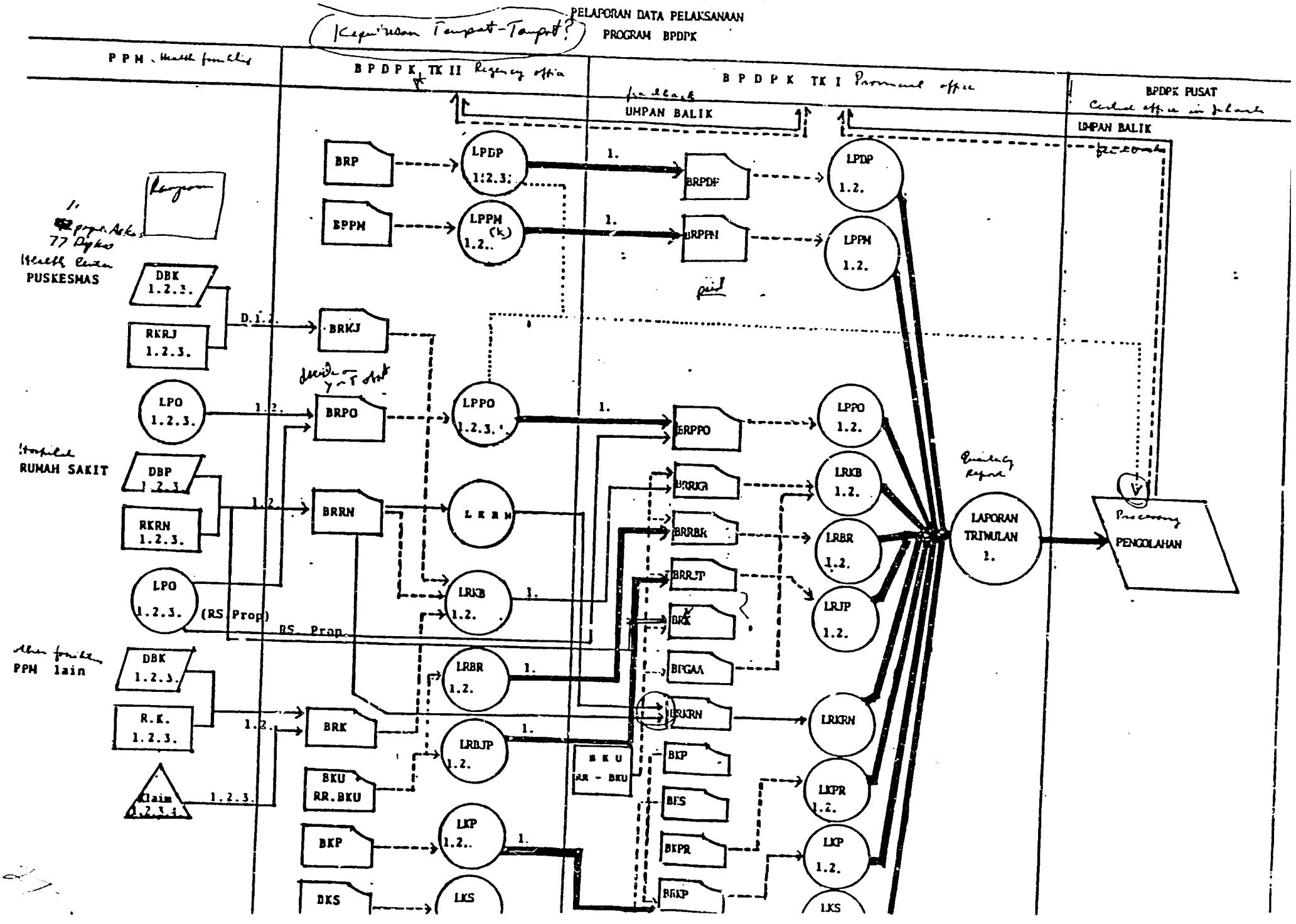
INDICATOR: DATE:

POINT OF ORIGIN: EVALUATOR:

INTERNAL VALIDITY	RESPONSE
1. IS THE INDICATOR FUNCTIONALLY LINKED TO THE DESIRED DATA FIELD?	
2. DOES THE INDICATOR VARY PROPORTIONATE TO THE DESIRED DATA FIELD?	
3. WHAT VARIABLES IN THE DATA FIELD VARY INDEPENDANTLY TO THE INDICATOR?	
4. ARE THE UNITS OF THE INDICATOR APPROPRIATE FOR ITS INTENDED USE?	
5. DOES A STANDARD DEFINITION FOR THE INDICATOR EXIST?	
EXTERNAL VALIDITY	
1. IS THE INDICATOR RELIABLY COLLECTED?	
2. WHAT IS THE ESTIMATED % ERROR RATE?	
3. IS THE INDICATOR COLLECTION INTEGRAL TO PRIMARY TASKS AT POINT OF ORIGIN?	
4. WHAT IS THE METHOD TO CHECK DATA QUALITY?	
5. IS THE INDICATOR COLLECTED AT THE APPROPRIATE TIME FOR OPTIMAL USE IN DECISION MAKING?	
6. WHAT IS THE DEPENDABILITY OF THE DATA TRANSMISSION MODE?	
7. IS THE INDICATOR STORED IN A MANNER THAT ALLOWS RETRIEVAL?	

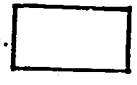
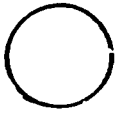
APPENDIX B:

Map & Key to Data System of BPDPK


PELAPORAN DATA PELAKSANAAN PROGRAM BPDPK
PPM
BPDPK TK II
BPDPK TK I
BPDPK PUSAT
UMPAN BALIK
UMPAN BALIK
BRP
LPDP 1.2.3.
BPPM
LPPM (k) 1.2..
BRPDP
BRPPM
LPDP 1.2.
LPPM 1.2.
PUSKESMAS
DBK 1.2.3.
RKRJ 1.2.3.
BRKJ
LPO 1.2.3.
BRPO
LPPO 1.2.3.
BRPPO
LPPO 1.2.
RUMAH SAKIT
DBP 1.2.3.
RKRN 1.2.3.
BRRN
LRKB 1.2.
BRRGA
BRRBK
BRRJP
BRK
BPGAA
LRKB 1.2.
LRBR 1.2.
LRJP 1.2.
LPO 1.2.3. (RS Prop)
RS Prop
PPM lain
DBK 1.2.3.
R.K. 1.2.3.
BRK
LRBR 1.2.
LRBJP 1.2.
BRKRN
LRKRN
Klaim 1.2.3.
BKU RR.BKU
BKU RR - BKU
BKP
BPS
BKPR
LKPR 1.2.
BKP
LKP 1.2..
LKP 1.2.
BKS
LKS
BRKP
LKS
LAPORAN TRIWULAN 1.
PENGOLAHAN

KETERANGAN :

1. Keterangan gambar

1.  : Pencatatan sekaligus Klaim
2.  : Klaim Perorangan
3.  : Pencatatan sebagai lampiran Klaim
4.  : Kegiatan Pencatatan
5.  : Kegiatan Pelaporan
6. 1.2.3. : Menunjukan rangkap
7. ⟶ : Arus Pelaporan Bulanan
8. ➡ : Arus Pelaporan Triwulanan
9. ⟶ : Proses Pemindahan Pencatatan untuk pelaporan.
10. .....⟶ : Tembusan. c/c

cc

II. Puskesmas.

1. DBK : Daftar Bukti Kunjungan
2. RKRJ : Rekapitulasi Kunjungan Rawat Jalan
3. LPO : Laporan Penggunaan Obat
4. DBP : Daftar Bukti Perawatan
5. RKRN : Rekapitulasi Kunjungan Rawat Nginap
6. RK : Rekapitulasi Kunjungan

III. BPDPK Tk. II :

1. BRP : Buku Register Peserta
2. BPPM : Buku Pelaksana Pelayanan Medis
3. BRRJ : Buku Rekapitulasi Rawat Jalan
4. BRPO : Buku Rekapitulasi Penggunaan Obat
5. BRRN : Buku Rekapitulasi Rawat Nginap
6. RKRN : Rekapitulasi Kunjungan Rawat Nginap
7. BRK : Buku Register Klaim
8. BKU : Buku Kas Umum
9. RR BKU : Rekapitulasi Realisasi Buku Kas Umum
10. BKP : Buku Kegiatan Penyuluhan
11. BKS : Buku Kegiatan Supervisi
12. LPDP : Laporan Perkembangan Data Peserta
13. LPPM : Laporan Pelaksana Pelayanan Medis
14. LPPO : Laporan Penerimaan dan Penggunaan Obat
15. LRKB : Laporan Realisasi Kunjungan dan Biaya
16. LRBR : Laporan Realisasi Belanja Rutin
17. LRBJP : Laporan Realisasi Biaya Jasa Pelayanan
18. LKP : Laporan Kegiatan Penyuluhan
19. LKS : Laporan Kegiatan Supervisi

IV. BPDPK Tk. I

1. BRPDP : Buku Rekapitulasi Perkembangan Data Pesert
2. BRPPM : Buku Rekapitulasi Pelaksana Pelayanan Medis
3. BPPO : Buku Penerimaan dan Penggunaan Obat
4. BRRKB : Buku Rekapitulasi Realisasi Kunjungan dan Biaya
5. BRRBR : Buku Rekapitulasi Realisasi Biaya Rutin
6. BRRJP : Buku Rekapitulasi Realisasi Jasa Pelayanan
7. BRK I : Buku Register Klaim Tingkat I.
8. BPG/HA I : Buku Prothese Gigi/Hearing Aids
9. BRKRN I : Buku Rekapitulasi Kunjungan Rawat Nginap
10. BKP I : Buku Kegiatan Penyuluhan.
11. BKS I : Buku Kegiatan Supervisi Tk I.
12. BKPR I : Buku Kegiatan Penataran & Rakerda
13. BRKP I : Buku Rekapitulasi Kegiatan Penyuluhan
14. BRKS I : Buku Rekapitulasi Kegiatan Supervisi
15. LPDP I : Laporan Perkembangan Data Peserta Tk. I
16. LPPM I : Laporan Pelaksana Pelayanan Medis Tk. I
17. LPPO I : Laporan Penerimaan dan Penggunaan Obat Tk.I
18. LRKB I : Laporan Rekapitulasi Kunjungan & Biaya Tk. I
19. LRJP I : Laporan Realisasi Jasa Pelayanan BPDPK Tk.I
20. LRKRN I : Laporan Realisasi Kunjungan Rawat Nginap Tk.
21. LKPR I : Laporan Kegiatan Penataran Tk.I
22. LKP I : Laporan Kegiatan Penyuluhan Tk. I
23. LKS I : Laporan Kegiatan Supervisi Tk. I.

APPENDIX C:

Hardware Configurations and Data Capacity Calculations

DATA CAPACITY CALCULATION FOR

PERUM HUSADA BHAKTI

MANAGEMENT INFORMATION SYSTEM

PRESENT CONFIGURATION

LOCATION	TYPE	CAPACITY	NUMBER	TOTAL CAPACITY	
PUSAT	VAX 8300 MINI	2500	1	2500	
PUSAT	ASTRA CR-300 (LAN)	20	20	400	
TINGKAT I	ASTRA	60	0	0	
TINGKAT II	ASTRA	40	0	0	
			21	2900	MBYTES
				2.9	GBYTES

MINIMUM PLANNED CONFIGURATION

LOCATION	TYPE	CAPACITY	NUMBER	TOTAL CAPACITY	
PUSAT	VAX 8300 MINI	2500	1	2500	
PUSAT	ASTRA CR-300 (LAN)	20	20	400	
TINGKAT I	ASTRA	60	27	1620	
TINGKAT II	ASTRA	40	147	5880	
			195	10400	MBYTES
				10.4	GBYTES

MAXIMUM CONFIGURATION

LOCATION	TYPE	CAPACITY	NUMBER	TOTAL CAPACITY	
PUSAT	VAX 8300 MINI	10000	1	10000	
PUSAT	ASTRA CR-300 (LAN)	20	20	400	
TINGKAT I	ASTRA	60	54	3240	
TINGKAT II	ASTRA	40	294	11760	
			369	25400	MBYTES
				25.4	GBYTES

APPENDIX D:

Prototype Data Volume Calculation

DATA VOLUME CALCULATIONS

MEDICAL SERVICES

DATUM	SIZE (BYTES)	QUANTITY	TOTAL (BYTES)	TOTAL (MBYTES)
MEMBER FILE	500	3,000,000	1,500,000,000	1,500
OUT PT. VISITS (1 YEAR)	85	15,000,000	1,275,000,000	1,275
IN PT. VISITS (1 YEAR)	240	5,000,000	1,200,000,000	1,200
OBAT FILES (1 YEAR)	20	28,000,000	560,000,000	560
SPECIAL PROCEDURES			0	0
HI-TECH SERVICES			0	0
PAKET I			0	0
PAKET II (Dx)			0	0
PAKET III (Rx)			0	0
REFERRALS			0	0
DISEASE CODES			0	0
GRAND TOTAL				4,535
CAPACITY				10,400
EXCESS CAPACITY				5,865

FINANCE & ACCOUNTING

DATUM	SIZE (BYTES)	QUANTITY	TOTAL (BYTES)	TOTAL (MBYTES)
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
GRAND TOTAL				0
CAPACITY				5,865
EXCESS CAPACITY				5,865

GENERAL AFFAIRS

DATUM	SIZE (BYTES)	QUANTITY	TOTAL (BYTES)	TOTAL (MBYTES)
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
GRAND TOTAL				0
CAPACITY				5,865
EXCESS CAPACITY				5,865

PLANNING & DEVELOPMENT

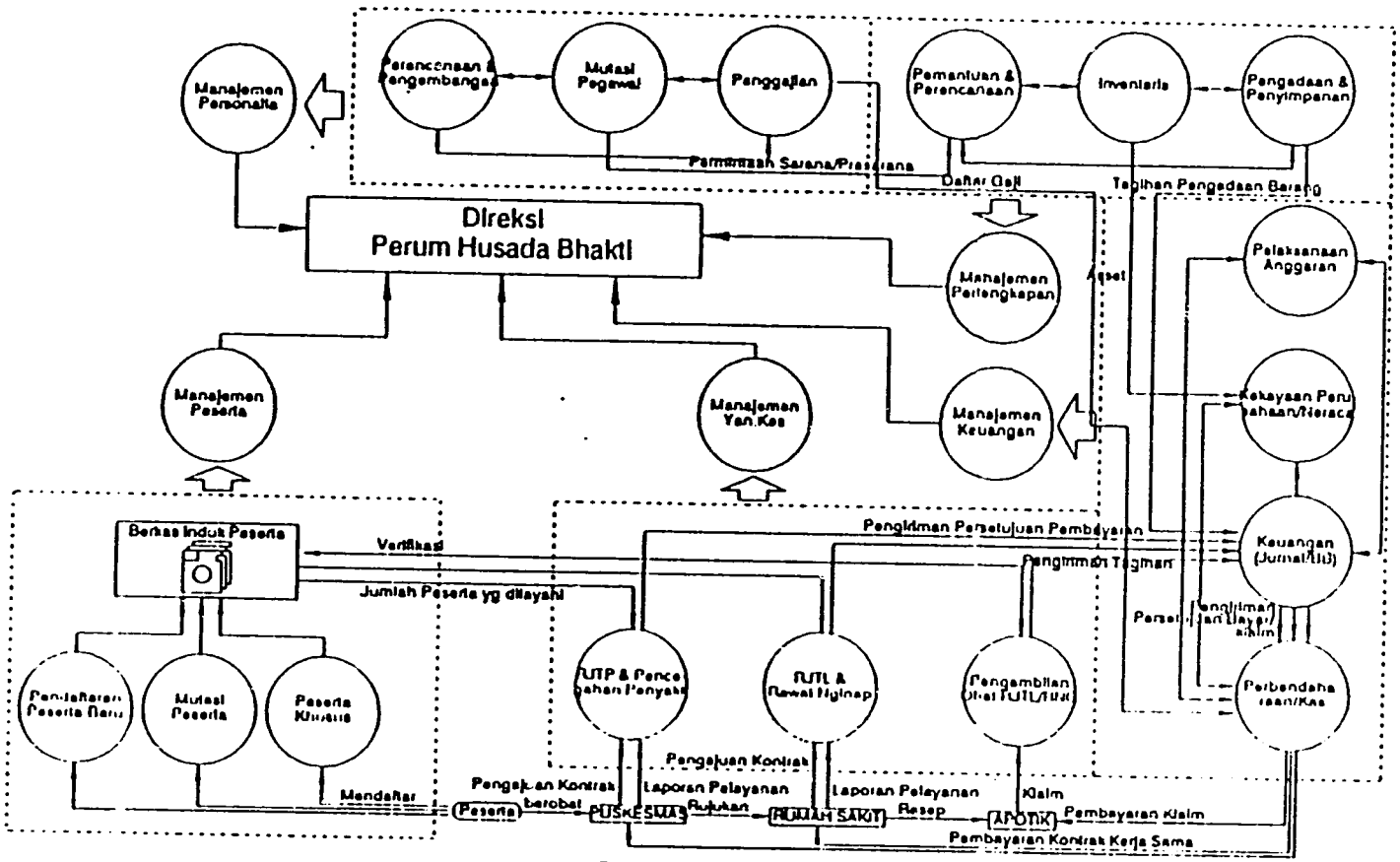
DATUM	SIZE (BYTES)	QUANTITY	TOTAL (BYTES)	TOTAL (MBYTES)
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
GRAND TOTAL				0
CAPACITY				0
EXCESS CAPACITY				5,865

APPENDIX E:

PUSILKOM Strategic Information System Schematics

RANCANGAN SISTEM MENYELURUH
SISTEM INFORMASI MANAJEMEN
PERUM HUSADA BHAKTI

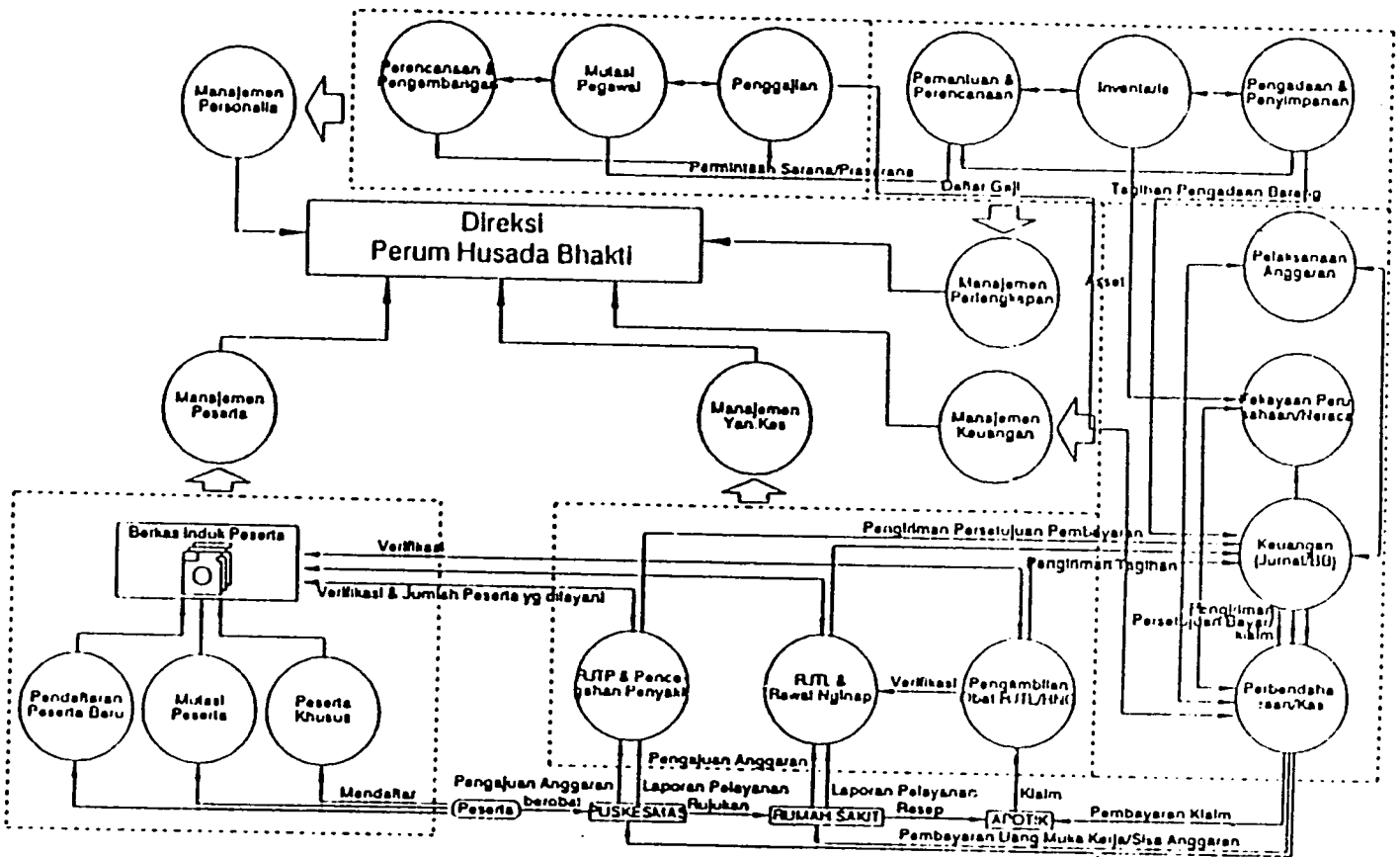
Rancangan Sistem Menyeluruh (dengan sistem kapitasi)



Gambar VII.5.

RANCANGAN SISTEM MENYELURUH
SISTEM INFORMASI MANAJEMEN
PERUM HUSADA BHAKTI

Rancangan Sistem Menyeluruh (dengan sistem anggaran)



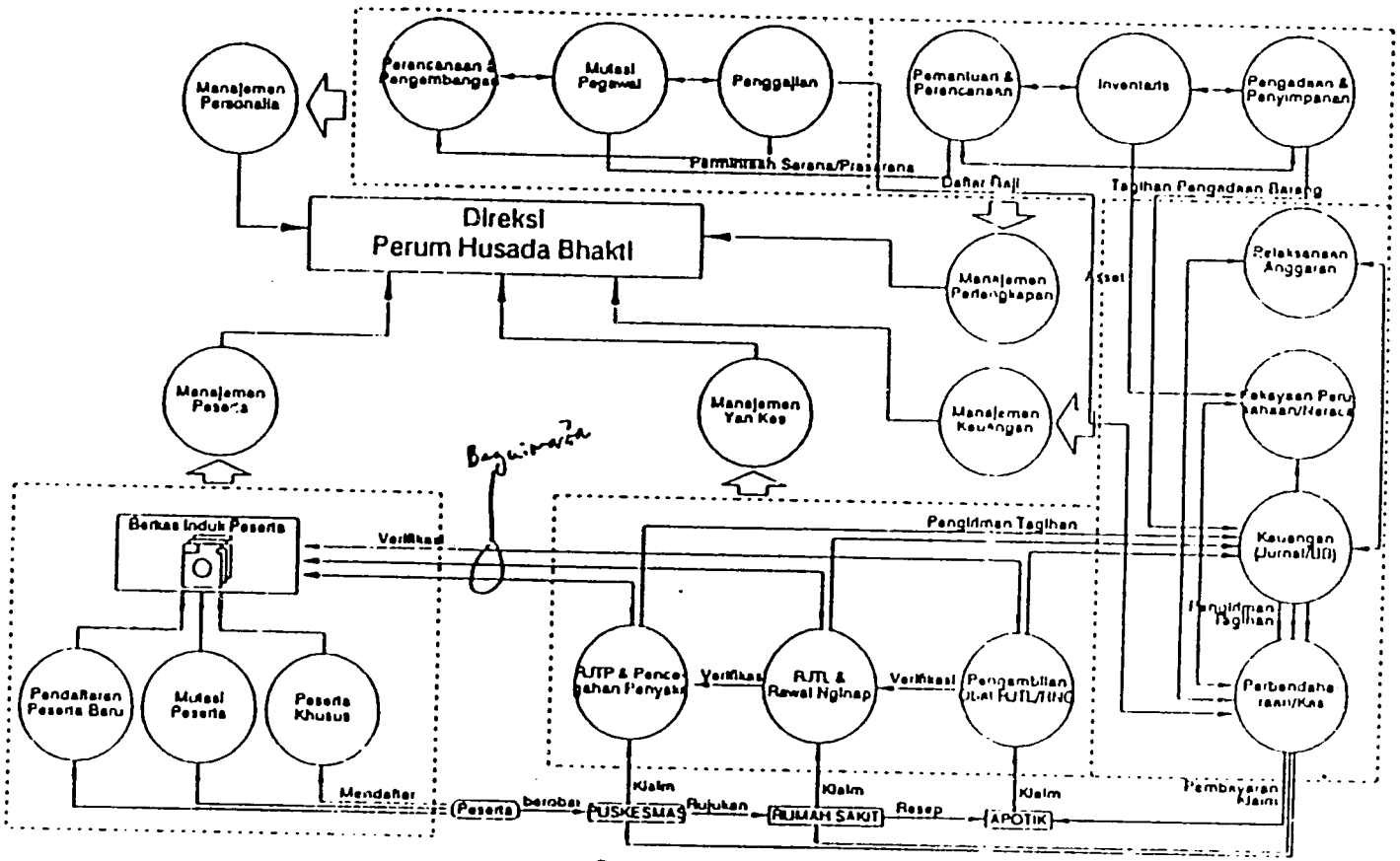
Gambar VII.4.

prepaid portion.

Contract Capitated

RANCANGAN SISTEM MENYELURUH
SISTEM INFORMASI MANAJEMEN
PERUM HUSADA BHAKTI

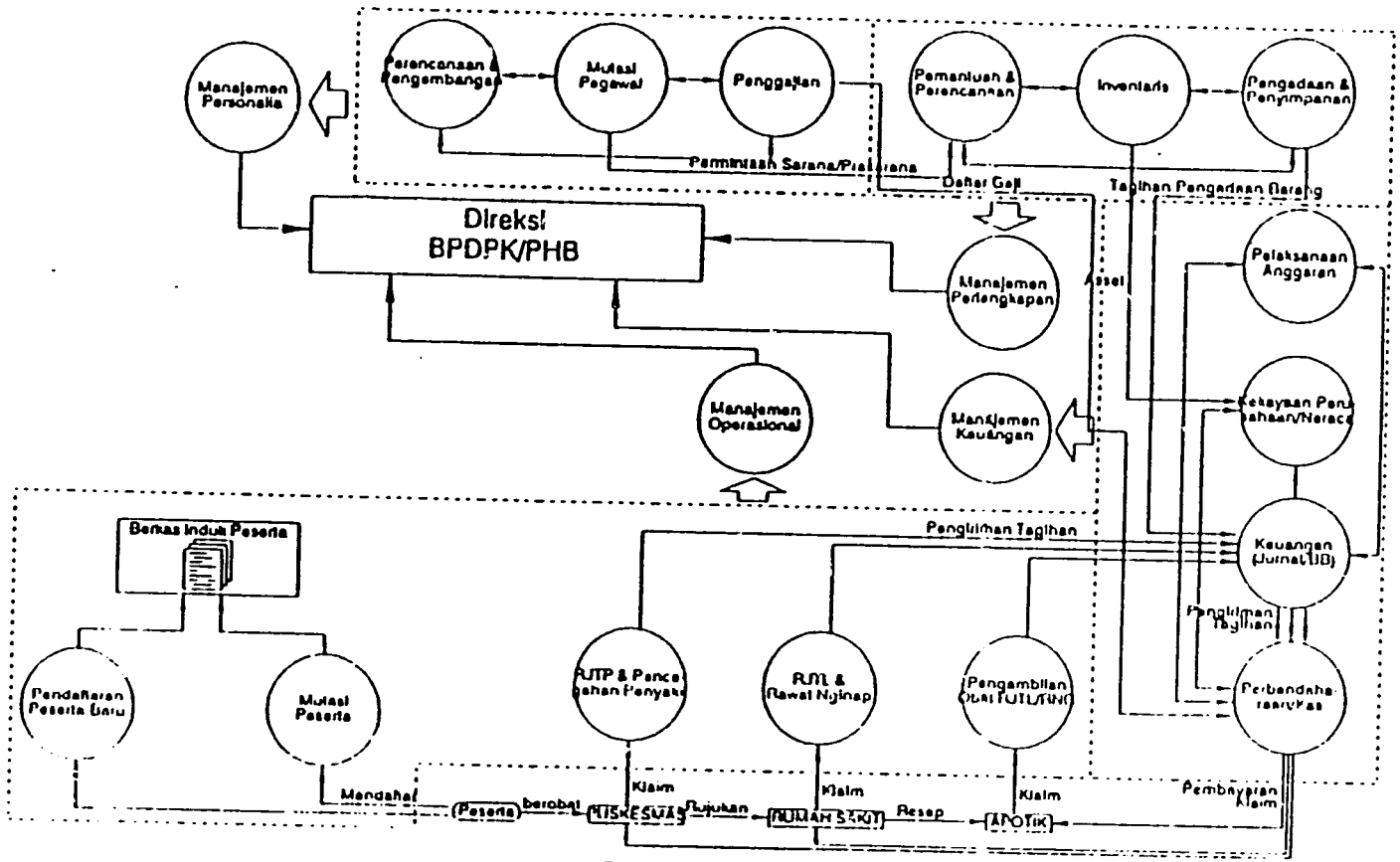
Rancangan Sistem Menyeluruh (dengan sistem klaim)



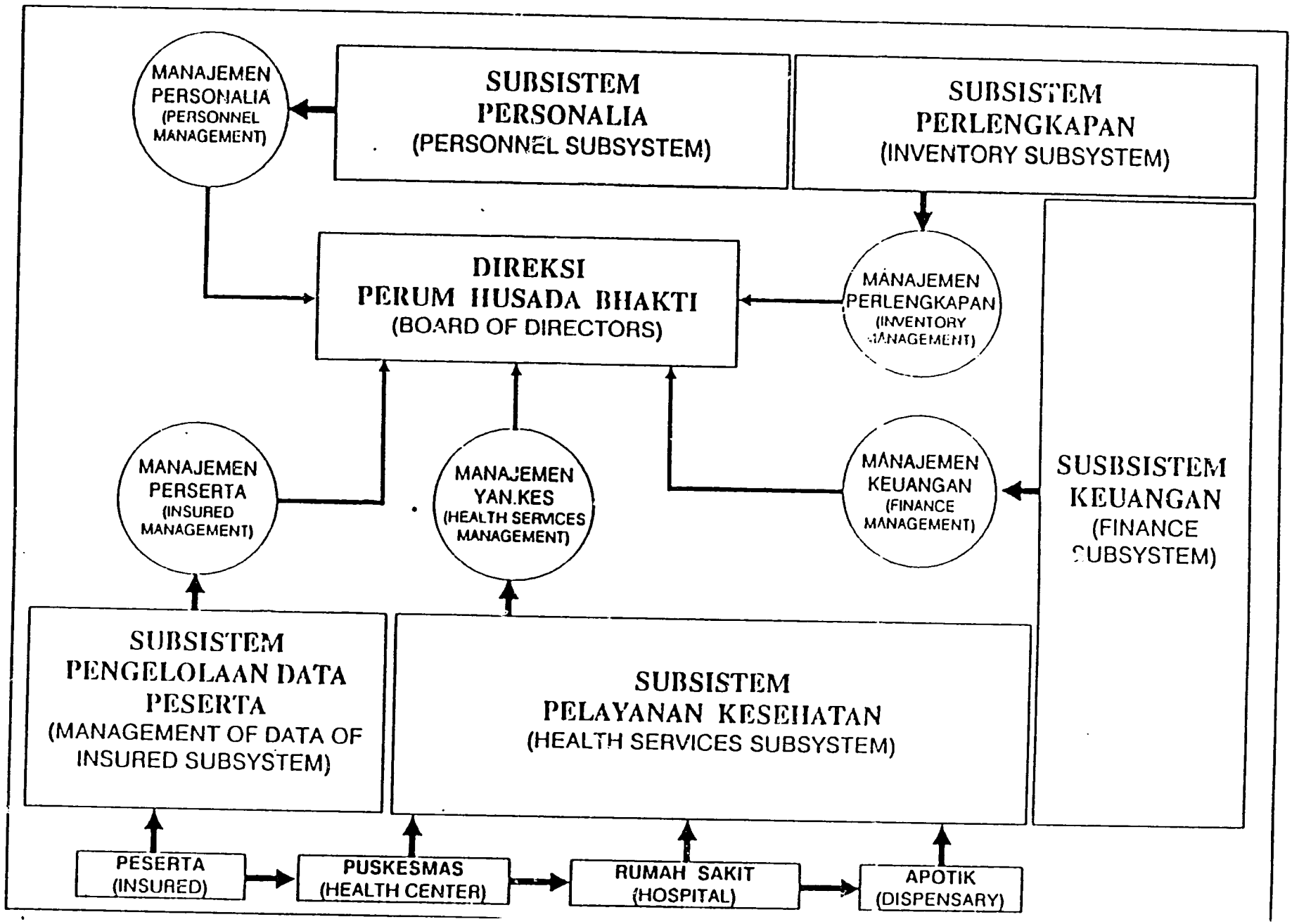
Gambar VII.3.

RANCANGAN SISTEM MENYELURUH
SISTEM INFORMASI MANAJEMEN
PERUM HUSADA BHAKTI

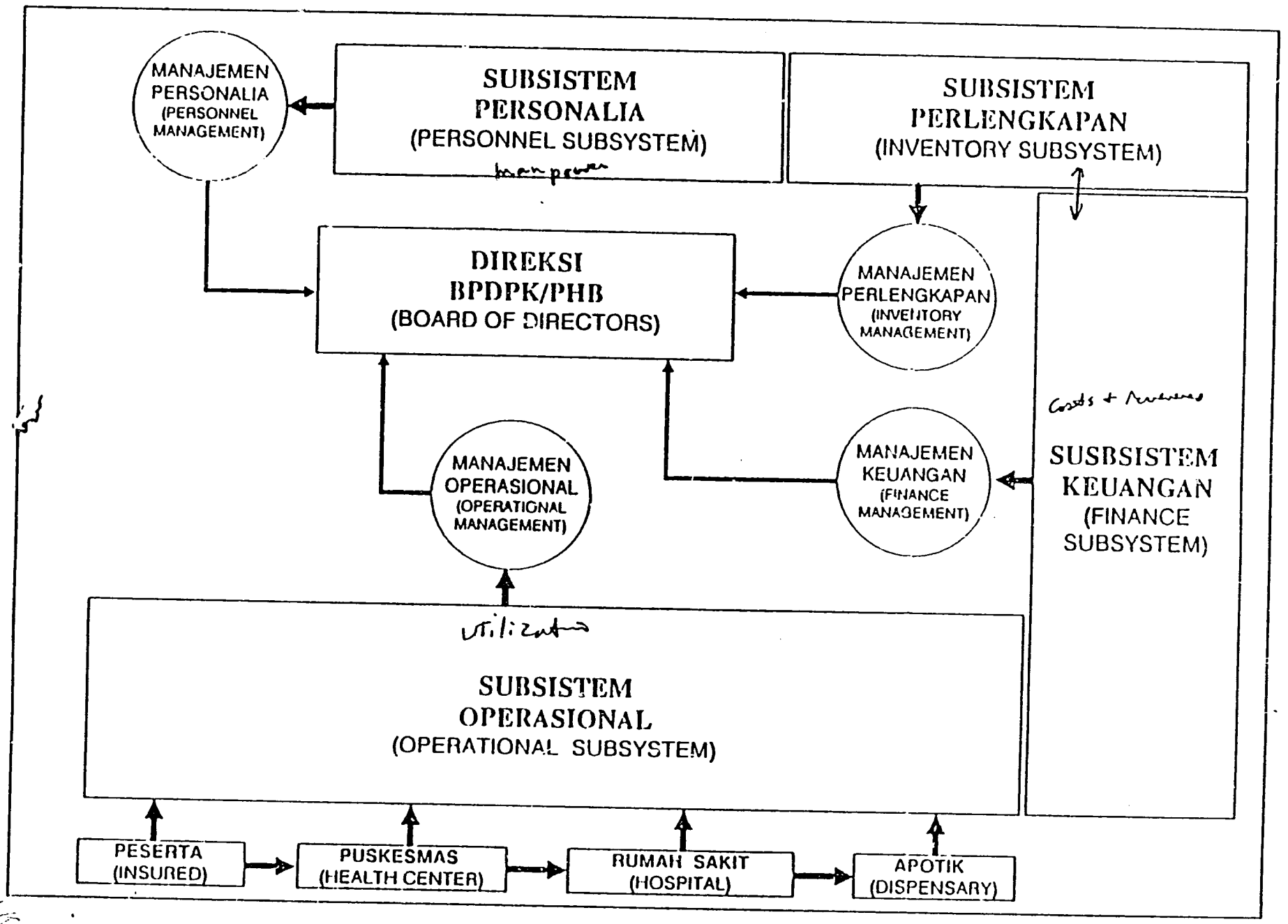
Sistem Yang Sedang Berjalan



Gambar V.1.

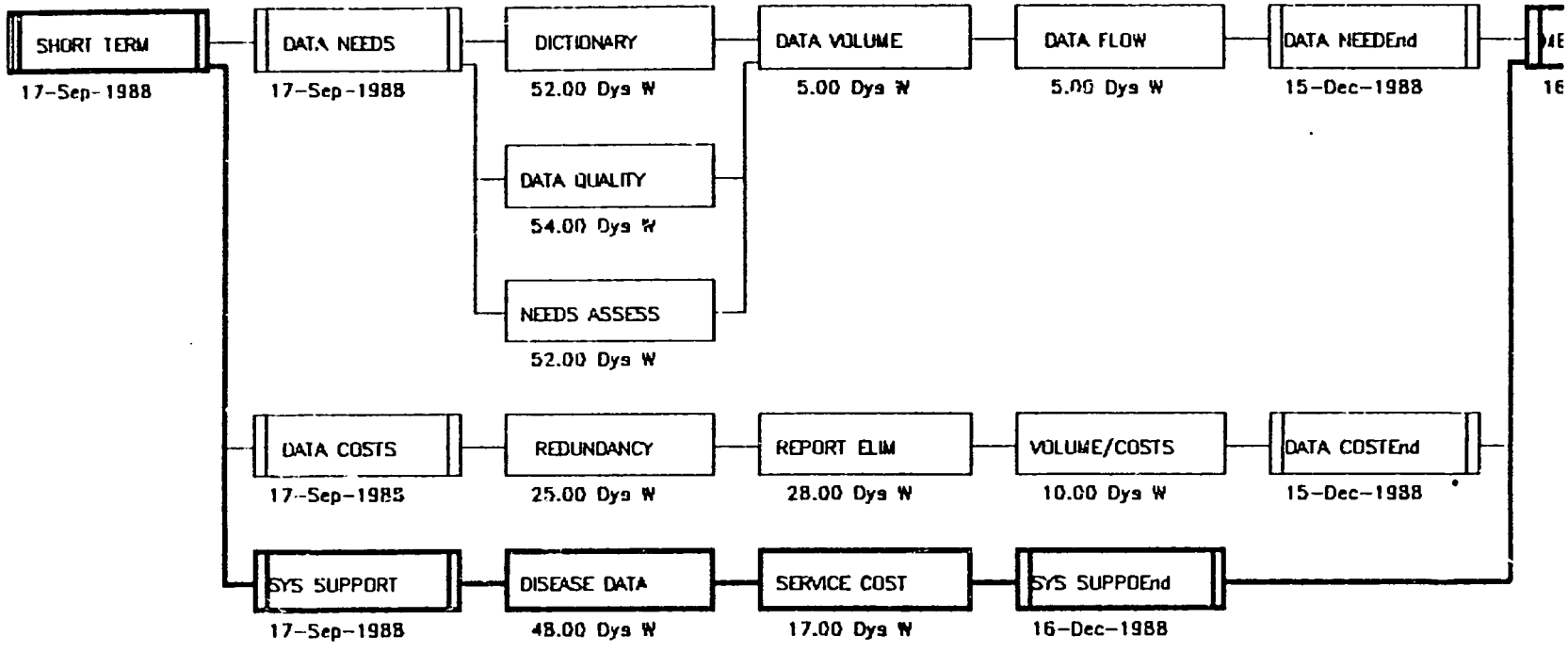

MANAJEMEN PERSONALIA (PERSONNEL MANAGEMENT)
SUBSISTEM PERSONALIA (PERSONNEL SUBSYSTEM)
SUBSISTEM PERLENGKAPAN (INVENTORY SUBSYSTEM)
DIREKSI PERUM HUSADA BHAKTI (BOARD OF DIRECTORS)
MANAJEMEN PERLENGKAPAN (INVENTORY MANAGEMENT)
MANAJEMEN PERSERTA (INSURED MANAGEMENT)
MANAJEMEN YAN.KES (HEALTH SERVICES MANAGEMENT)
MANAJEMEN KEUANGAN (FINANCE MANAGEMENT)
SUSBSISTEM KEUANGAN (FINANCE SUBSYSTEM)
SUBSISTEM PENGELOLAAN DATA PESERTA (MANAGEMENT OF DATA OF INSURED SUBSYSTEM)
SUBSISTEM PELAYANAN KESEHATAN (HEALTH SERVICES SUBSYSTEM)
PESERTA (INSURED)
PUSKESMAS (HEALTH CENTER)
RUMAH SAKIT (HOSPITAL)
APOTIK (DISPENSARY)

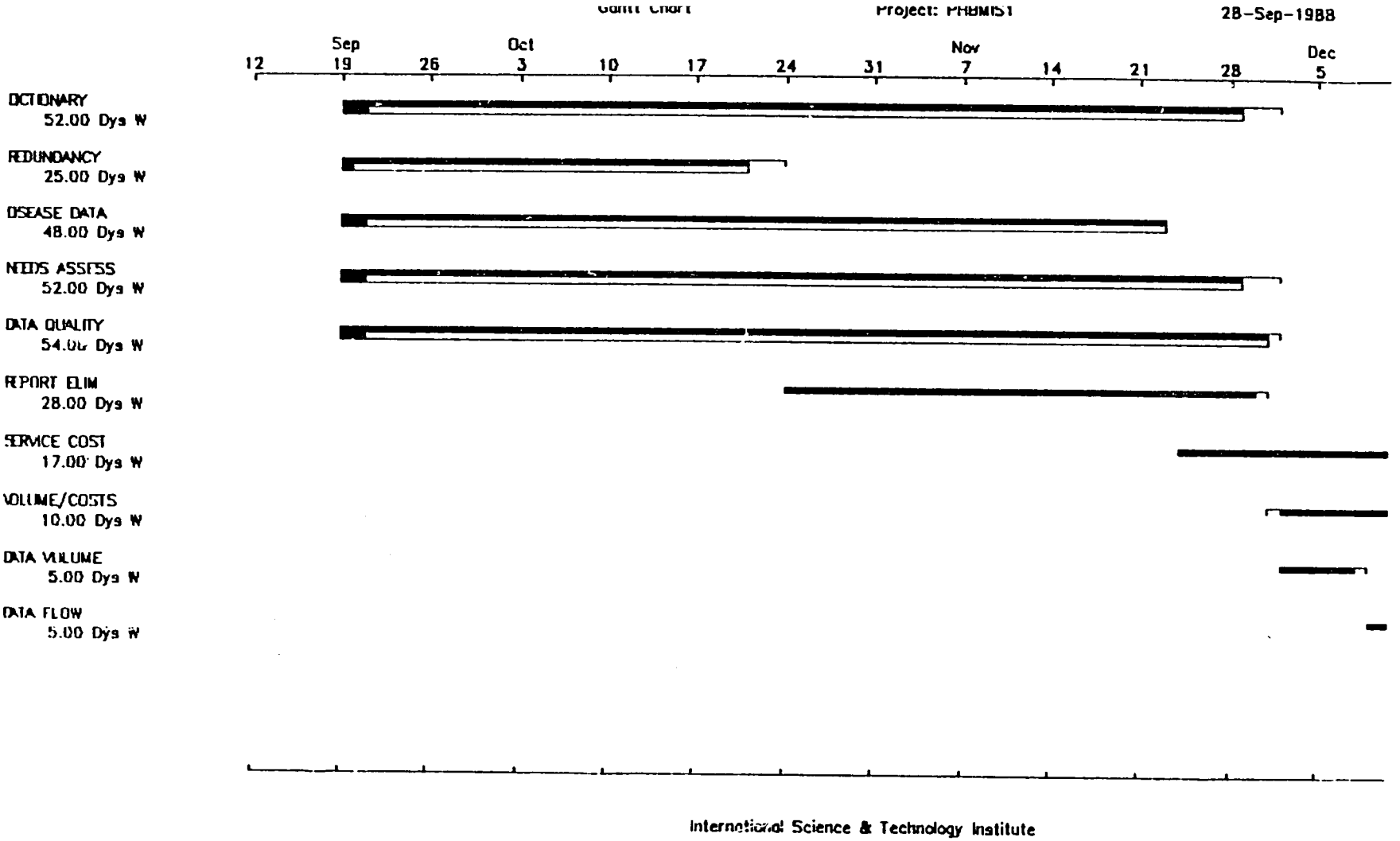
9/1/88


MANAJEMEN PERSONALIA (PERSONNEL MANAGEMENT)
SUBSISTEM PERSONALIA (PERSONNEL SUBSYSTEM)
manpower
SUBSISTEM PERLENGKAPAN (INVENTORY SUBSYSTEM)
DIREKSI BPDPK/PHB (BOARD OF DIRECTORS)
MANAJEMEN PERLENGKAPAN (INVENTORY MANAGEMENT)
Costs + Revenues
SUSBSISTEM KEUANGAN (FINANCE SUBSYSTEM)
MANAJEMEN OPERASIONAL (OPERATIONAL MANAGEMENT)
MANAJEMEN KEUANGAN (FINANCE MANAGEMENT)
utilization
SUBSISTEM OPERASIONAL (OPERATIONAL SUBSYSTEM)
PESERTA (INSURED)
PUSKESMAS (HEALTH CENTER)
RUMAH SAKIT (HOSPITAL)
APOTIK (DISPENSARY)

APPENDIX F:

PERT and Gantt Charts for Short Term Objectives


SHORT TERM
17-Sep-1988
DATA NEEDS
17-Sep-1988
DICTIONARY
52.00 Dys W
DATA VOLUME
5.00 Dys W
DATA FLOW
5.00 Dys W
DATA NEEDEnd
15-Dec-1988
DATA QUALITY
54.00 Dys W
NEEDS ASSESS
52.00 Dys W
DATA COSTS
17-Sep-1988
REDUNDANCY
25.00 Dys W
REPORT ELIM
28.00 Dys W
VOLUME/COSTS
10.00 Dys W
DATA COSTEnd
15-Dec-1988
SYS SUPPORT
17-Sep-1988
DISEASE DATA
48.00 Dys W
SERVICE COST
17.00 Dys W
SYS SUPPOEnd
16-Dec-1988



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APPENDIX G:

List of Resource Documents

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