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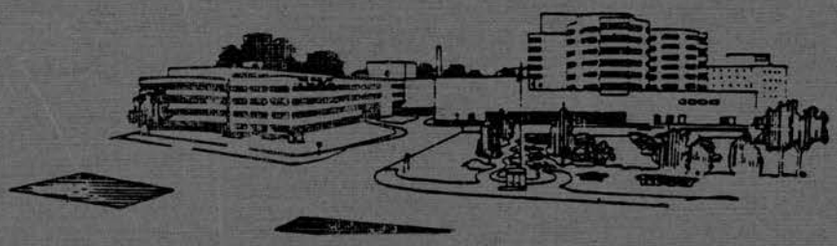
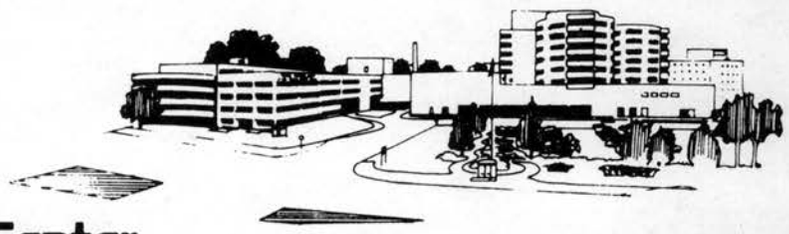


St. Paul-Ramsey Medical Center

Information Systems Plan

APRIL 1982

ARTHUR ANDERSEN & CO



St. Paul-Ramsey Medical Center

640 Jackson Street Saint Paul, Minnesota 55101 (612) 221-3456

October 3, 1983

Mr. Monte Martin
Assistant to the Executive Director
Ramsey County Executive Director's Office
316 Court House
Saint Paul, Minnesota 55101

Dear Mr. Martin:

Per your request via Mr. Richard Culbertson, please find enclosed a copy of the St. Paul Ramsey Information Systems Plan.

As you may know Arthur Andersen and Company was instrumental in the preparation of this document and would be highly recommended on my part.

If you have any questions regarding this plan or St. Paul Ramsey Medical Center's experience with Arthur Andersen and Company, please do not hesitate to contact me.

Sincerely,

Dave

Dave Bergh
Director of Information Systems

DB:pb

Enc.

talked to him 10/5 - wasn't involved in direct plan development -
- have had to move up schedule due to HSS going out of business
- haven't updated plan yet tho recognize need to do so
- call again with questions

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN

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ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
I. MANAGEMENT OVERVIEW

A. INTRODUCTION

During the past year, St. Paul-Ramsey Medical Center (SPRMC) has assessed its information needs, evaluated alternative strategies to meet those needs, and weighed potential benefits against the costs of processing information on a timely and accurate basis. The results of this assessment are contained in this Information Systems Plan. The process of developing the plan involved physicians, department heads, administrators and the staff of SPRMC in a cooperative effort to organize this increasingly important function in a manner that will benefit the entire institution. The following Management Summary will highlight the objectives of this planning project and the project's approach and results. In addition, the potential benefits from automation and plans for subsequent activities are outlined. Each of the points discussed in the summary is treated in more detail in the body of the report.

B. OBJECTIVES OF ST. PAUL-RAMSEY MEDICAL CENTER AND THE NEED FOR INFORMATION SYSTEMS PLANNING

Information Systems Planning is one of the key segments in the overall planning that guides the direction of SPRMC. This overall planning includes health care programs, facilities, equipment, personnel and financial activities. Information Systems Planning complements these other forms of strategic and operational planning by outlining the information systems required to support the Hospital's objectives.

The following are the specific objectives of SPRMC which this Information Systems Planning effort supports:

- Deliver high quality health care effectively to the metropolitan area patient population.
- Increase the utilization of the Hospital by all patients by increasing the perceived level of service and by projecting a positive public image.
- Improve the effectiveness of the day-to-day activities of medical and technical personnel involved in direct treatment of patients (for example, by improving patient scheduling, accessibility of charts, etc.).
- Provide an environment to attract and retain high quality medical, management and clerical staff.
- Develop sound fiscal practices that will allow accurate cost determination as well as maximized third party and direct patient revenues (for example, by more complete charge capture and prompt, accurate billings).
- Integration of the data processing requirements of organizations affiliated with SPRMC.

- Operate in compliance with legal, regulatory and accreditation directives.

- Promote sound management practices.

The Information Systems Planning effort fulfills specific goals to make the plan an overall blueprint for systems development that will support the Hospital objectives outlined above. These specific goals are to:

- Identify and describe in widely accepted terms the scope of required information systems and their place in the development priority scheme.

- Provide a mechanism to distribute this systems planning information to all affected parties (e.g., hospital management, medical staff and others entrusted with execution of the plan).

- Allow management to assess commitments for future information systems development in terms of personnel requirements for each skill level, both systems development and Hospital personnel, that will be required in future periods. This will ensure that the right people are available when needed to participate on systems development project teams.

- Provide a plan which will result in well-designed information systems which will fulfill their functions effectively with a minimum of maintenance and will not require major enhancement or replacement for many years.

- Provide practical, workable action plans that allow systems development progress to be made and successes achieved without exhaustive study or frequent changes in direction that result in fragmented, patch-work systems.

- Provide a framework in which future hardware requirements may be initially projected and continually monitored.

- Provide accurate and consistent data to allow continuous evaluation of the effectiveness of Hospital programs.

C. PROJECT OBJECTIVES

In undertaking the information systems planning project, SPRMC had four major objectives. These were:

- To identify and analyze the various information and communications requirements resulting from SPRMC's continuing effort to improve patient care.

- Based upon these requirements, to identify the financial and patient care applications where computerization would be applicable and beneficial.

- To develop a five-year plan which would prioritize SPRMC's activities with regard to meeting information needs and installing selected applications.

- To determine if Hospital Shared Systems would have a role in maintaining current financial systems or in implementing the required patient care systems.

D. PROJECT APPROACH AND RESULTS

In order to realize these objectives, it was recognized that a comprehensive, in-depth process was required that involved all of SPRMC's management as well as key members of the medical staff. The following narrative will discuss the major steps involved in that process and the information and key decisions that resulted.

Formation of a Project Team

- Approach

  The project team that performed the field work for this plan was composed of professional staff from St. Paul-Ramsey Medical Center and Arthur Andersen & Co. The individuals on the project team are acknowledged in the Appendix.

- Result

  The project team performed the necessary research work, interviewing, and compilation of information for the Management Advisory Committee's review and decision-making.

Formation of a Steering Committee

- Approach

  The Management Advisory Committee (MAC) consisted of all the members of administration and was chaired by Mr. Richard Culbertson, Senior Associate Director.

The role of the MAC was essential in arriving at a plan that met the entire institution's information and communication needs. The individuals on the MAC are also acknowledged in the Appendix.

- Result

Policy decisions, decisions regarding overall strategy, and the ultimate prioritization of system projects were agreed upon by the MAC.

Identification of Information Needs

- Approach

During the course of thirty-one interviews conducted with supervisors, members of the administrative staff, physicians and department chairmen, the information needs of SPRMC were identified, documented and verified with each interviewee. This process included relating each perceived information need to a specific problem resolution or benefit and an assessment of the urgency of the information need by the interviewee. Following the completion of the interviews, the MAC reviewed each individual need and its corresponding urgency for reasonableness and accuracy.

- Result

It became apparent, during the MAC review of the documented information needs, that communications activities were the most frequently cited and most urgent problem areas. These communication problems focused around communication of order requests and results and accessibility of critical financial and patient care information. These needs were specially noted by Nursing and other professional areas. Detailed information regarding these information needs is provided in Section III of this report, "System Descriptions."

Analysis of Current Systems

- Approach

Each of the SPRMC current uses of computer systems, both in-house and shared, was reviewed and analyzed in depth with regard to requested improvements, strengths, and costs. The results of the analysis were reviewed with the MAC and conclusions were reached regarding the need and urgency of replacing, modifying or migrating from the current systems.

- Result

Financial Systems

All major financial applications are currently provided by Hospital Shared Systems (HSS) on a shared processing basis. Concurrent with this planning project, SPRMC was represented on an HSS Steering Committee to determine the role of HSS in meeting SPRMC's information requirements. The HSS Steering Committee recommended that HSS discontinue its services as soon as possible and that current users find other alternatives for financial systems processing. Therefore, new financial applications must be installed including patient accounting, general ledger, accounts payable, payroll, materials management and property ledger. Given this significant change in direction, a financial systems vendor selection must be conducted after the planning process is completed. The integration of the current MCSI supported functions should be included as well during the selection process.

Patient Care Systems

Presently, SPRMC uses an ADT system that is supported on Datapoint equipment. Although this system currently provides adequate functionality, it is not possible to use the current approach as a foundation for the new patient care systems identified during the interview process. This plan suggests that the ADT system be replaced when a new order communications system is acquired in order to provide a foundation system to which future applications can be added. This flexibility does not exist in the current environment.

The implementation projects related to the financial and patient care applications are included in Section II of this report, "Information Systems Strategy."

Definition of Computer Applications

- Approach

Research was performed regarding the computer applications available in the marketplace to meet the information needs that had been defined at the department level. Wherever possible, multiple information needs from multiple departments were addressed by a single application. For each potential application identified, the conceptual functions and features of the application were

defined and reviewed with the department head whose information needs were being addressed. These functions and features, representing the conceptual design of automation for SPRMC, were presented to the MAC.

- Result

Twenty-three distinct computer applications were conceptually designed and reviewed by the MAC. The functions and features that were included in these applications generally represented the leading edge of automation in health care. A description of each of these applications, their functions and features is provided in Section III of this report, "System Descriptions."

Analysis of Benefits and Prioritization of System Projects

- Approach

To effectively prioritize the use of SPRMC resources in meeting information needs, it was recognized that the only reason to consider automation is to provide benefits to SPRMC. The MAC considered the potential benefits from each application and ranked them in order of importance. These benefits will be discussed in the following section of this management summary.

Each system project was evaluated against the seven potential benefits and given a weighted score. The results of this process were reviewed by the MAC and, with some modification, represent the prioritized system projects on which the plan is based.

- Results

At the conclusion of this process the twenty-three computer applications were grouped into system development projects that are logical and practical from an implementation viewpoint. Based upon the assessment of SPRMC's ability to absorb change with minimal disruption, the system development projects were tentatively scheduled to be performed in the following sequence:

Year 1

Financial Systems Vendor Selection
Financial Systems Installation
Patient Care Systems Vendor Selection

Year 2

ADT
Order Communications
Patient Classification
Records Management
Materials Management
Inventory
Word Processing

Year 3

Order Communications (complete)
Patient Classification (complete)
Records Management (complete)
Pharmacy
Radiology
Patient Scheduling
Nurse Scheduling
Dietary
Surgery Scheduling
Inventory (complete)
Case Mix Reporting

Year 4

Patient Scheduling (complete)
Nurse Scheduling (complete)
Dietary Scheduling (complete)
Surgery Scheduling (complete)
Quality Assurance
Productivity Reporting
Employee Scheduling
Personnel Information
Modeling and Forecasting
Physician Billing

Year 5

Personnel Information (complete)
Physician Billing (complete)
Marketing/Referral Analysis
Student/Resident Education
Capital Funds Development

A conceptual overview of these applications and projects and a conceptual description of the data bases that support them are provided in Section III of this report, "System Descriptions."

Development of an Overall Hardware and Software Strategy

- Approach

  In addition to defining the system projects, an overall strategy for acquiring and managing hardware/software services was developed for part of the plan. Having been provided with detailed information regarding information needs and the ways in which computers could be applied to those needs, the MAC evaluated strategies that represent the state-of-the-art in hospital data processing.

- Result

  The MAC decided that the in-house integrated data base system strategy for both financial and patient care systems would provide the best automation tool for the professionals at SPRMC and would best serve to realize the benefits of automation. Software selection should take precedence over hardware selection. The use of proven software packages is recommended and alternatives available in the marketplace should be evaluated as part of the decision process in acquiring new systems. The key questions considered during this critical decision-making process are discussed in detail in Section II of this report, "Information Systems Strategy."

Analysis of Costs

- Approach

  In order to provide a reasonable order of magnitude estimate of data processing costs for the five-year period addressed by the plan, information was secured on integrated hospital information systems from the following sources:

  - Vendor data supplied to and verified on an ongoing basis by Arthur Andersen & Co. software research staff.

  - Information specifically supplied by vendors during this project.

  - Actual Arthur Andersen & Co. experience in implementing health care financial and patient care systems.

The cost estimates were conservatively stated and fully loaded with all data processing costs including existing staff and continued processing of current systems. It should be noted that the estimates were stated in 1982 dollars and were not adjusted for inflation or expected decreases in the cost of computing power.

- Result

Ongoing operational costs of a data processing department and one time and annual recurring costs for each systems development project were estimated. If all applications were implemented, total costs would rise from a present level of $1,078,000 to approximately $2,164,000 by the fifth year of the plan. It is important to note that the cost estimates represent a variety of projects with differing tangible and intangible benefits. Each of these projects should have a detailed cost/benefit analysis performed prior to the final go-ahead. However, based on the overall benefits analysis performed during the project, the tangible benefits justify incurring the incremental costs of implementing the plan. A detailed schedule of the cost and benefit estimates are provided in Section II of this report, "Information Systems Strategy."

It is important to note that the cost estimates are for implementing all systems in the plan. The annual data processing budget would be less if SPRMC were to implement only highest priority systems or phase the implementation over more than five years. The schedules are presented in a manner allowing management to balance the urgency of the system with its implementation cost to arrive at the optimum plan for each year.

Development of the Human Resource Plan

- Approach

A critical element in successfully implementing the projects discussed in this plan and in realizing the benefits from SPRMC's investment in automation is the recruitment and development of a competent and dedicated data processing staff.

- Result

  SPRMC's approach to systems development calls for the purchase of software packages wherever possible to minimize the need for applications programming. Some maintenance programming, operating systems maintenance, and most importantly, systems analysis and installation help will be required. In Section II of this report, "Information Systems Strategy," staffing requirements for the five-year period are estimated. Organizational structure for the data processing department is described in Section IV, "Organization Strategy." Suggested position descriptions for these key individuals are presented in the Appendix to this report.

E. BENEFITS FROM AUTOMATION

As mentioned above, it was recognized that all potential usages of automation must be justified by the benefits that would be realized by installing a computer application. Further, it was recognized that in the patient care applications the most significant potential benefits are intangible in nature, that is, they cannot be accurately represented in terms of dollars. Nonetheless, intangible benefits for patients and physicians are real and worthwhile. There are, however, significant tangible benefits that have been documented in other similar projects and can be reasonably expected to be achieved at SPRMC. The following are the expected benefits from implementation of this Systems Plan.

Meet Critical Needs for Strategic and Operational Objectives

- As mentioned above, each interviewee, during the definition of information needs, was asked to identify his or her critical information needs. These critical needs are defined in detail in Section III, "System Descriptions." A major benefit of the automation outlined in this plan is the rapid meeting of these critical information needs.

Enhanced Patient Care

- Patient care can be served by automation in numerous ways, such as more timely and accurate reporting of diagnostic results, improved cumulative reporting for use by the physician in treating the patient, less patient discomfort and inconvenience through waiting for available beds or performance of procedures, and an overall reduced length of stay.

Improved Physician Convenience

- In addition to providing a setting for the physician's treatment of a patient, a hospital must compile and provide a multitude of information on a timely basis for the physician's use. Improvement in the timeliness and accuracy of this information through better communication of orders and recording of results is a significant benefit for physicians.

Improved Patient Convenience

- One way in which the overall comfort and convenience of the patient's stay will be improved is through a reduction of waiting time in the admitting area for available beds and an overall reduction in the length of stay due to more rapid turnaround of results and communication of orders.

Improved Employee Relations

- Employee relations will be strengthened by the removal of the bottlenecks and frustrations that are currently involved in the paperwork processing at SPRMC. The extra time and effort and in some instances delays involved in these overloaded manual systems were cited frequently as sources of frustration.

Cost Reductions

- Based upon the experience encountered during the implemenation of similar projects in other major health care institutions, overall reduction in cost of delivery of health care can be expected from three major sources. These were an improvement in productivity in numerous ancillary areas and in Nursing, a reduction in the length of stay and a reduction in duplicate tests inadvertently ordered.

Other Benefits

- Several other indirect benefits can be expected through the completion of the projects outlined in this plan. These benefits include improved community relations, better and more timely information for management, improved productivity through the reduction of manual manipulation of statistics and the satisfaction of external reporting requirements which have increased significantly in recent years.

F. SYSTEM PROJECT MANAGEMENT STRATEGY AND METHODOLOGY

The successful use of data processing at SPRMC is dependent upon several specific factors:

- Executive leadership
- Sound management controls
- Operating management involvement
- Competent systems development and technical personnel
- Strong central direction and control

In support of these factors, the following recommendations were developed:

Executive Management Guidance and Control

- To ensure management involvement, a charter for the Management Advisory Committee (MAC) should be developed and its members should be given appropriate training for executing its assigned responsibilities. The primary purpose of the MAC is to ensure effective utilization of data processing equipment and personnel in the solution of SPRMC's business problems.

User Management Participation

- To ensure effective user participation on systems projects, it is recommended that task forces be established to direct systems efforts. The task forces should consist of user, data processing, internal audit and other affected personnel.

Data Processing Department Organization

- It is recommended that a Director of Information Systems be appointed and a data processing staff be built consistent with the hardware/software strategy chosen. In addition, the Systems Development area should be realigned to ensure that each major user has a specific Systems Development Group Manager as its primary contact. This organization should establish appropriate career paths and structures to support systems development and operations in an on-line and data base environment.

Systems Development Standards and Procedures

- To allow a consistent approach to designing and maintaining computer systems, uniform systems development standards are recommended. With a consistent approach to systems projects, uniform status reporting can become a reality. This uniformity facilitates senior management's planning and control over data processing areas; improves communication between the user, data processing and management; and ensures proper understanding of responsibilities in the development of data processing projects.

Project and Personnel Planning and Reporting

- To establish uniform reporting to all parties within the organizational control structure and to establish a basis for effective status reporting, a uniform, progress reporting system and the basic standards for progress reporting are recommended. This progress reporting system should include time recording, progress reporting and data processing cost reporting. Time would be reported against specific, standard project tasks, and estimates to complete each task would be prepared monthly. This system would be the basis for providing quantitative reporting to the MAC.

Section IV of this report, "Organization Strategy," explains systems project management in detail.

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
II. INFORMATION SYSTEMS STRATEGY

A. INTRODUCTION

This section presents the overall Systems Plan resulting from the project. It describes the systems projects to be undertaken during the next five years, outlines the sequence in which the projects should be initiated and defines the number of data processing personnel needed to implement the Systems Plan.

Part B provides a summary of the systems planning work performed during the past year.

Part C discusses the impact of the Hospital Shared Systems Business Plan. This systems planning project was undertaken in conjunction with the HSS business planning project. The systems needs identified by SPRMC were used to help determine the direction of the shared organization. The impact of the HSS Business Plan on SPRMC's data processing direction is presented.

Part D describes the approach taken to prioritize systems implementation. It lists the systems and the type of projects to implement them.

Part E explains the hardware and software strategies SPRMC should consider in carrying out the Systems Plan and provides a guide for the Hospital in performing the financial systems vendor selection and subsequent projects.

Part F describes the implementation timeframe of each systems project and the data processing skill levels required to implement all systems within five years.

Part G identifies the impact of this plan on the current data processing budget.

Part H describes in more detail the next steps involved in implementing the plan.

Detail descriptions of all the systems which form the basis for recommendations contained in this section are documented in Section III, "System Descriptions."

B. PROJECT APPROACH

The following steps were completed to develop this implementation plan:

1. Information needs (see Section III) were found through interviews at SPRMC.

2. The information needs and problems were screened for reasonableness and magnitude.

3. Functions and features were developed and grouped into systems based on the information needs, industry trends, and knowledge of software packages available from vendors.

4. The Management Advisory Committee (MAC) approved a priority ranking of the systems. They previously had set selection criteria against which the project team evaluated systems importance.

5. The project team defined systems interfaces and defined high-level data needs and system relationships. These were used to set actual implementation phasing. Systems may be implemented in an order different from the approved ranking because of intersystem and precedent relationships.

6. The project team approximated systems development effort using Arthur Andersen & Co.'s METHOD/1 guidelines and experience with similar systems engagements. The approximations presented assume that software packages are used. Higher estimates would be needed for custom development. Estimates could be lower if done in a shared environment with other hospitals.

7. A Project Timetable and Personnel Requirements Chart was then prepared. The chart indicates approximate start and complete dates of each project. The Personnel Requirements portion defines the personnel required to complete these projects. The personnel needs are broken into general skill categories.

8. Hardware and software strategies were then developed. Specific strategies are discussed later in this section.

9. Based on the total number of personnel required and those currently available, the number of additional full-time equivalent personnel to implement the plan was determined. This can guide hiring plans, career development plans, and help determine effective use of outside assistance.

B. PROJECT APPROACH (Continued)

10. Plan costs and benefits were then summarized. Major cost factors include computer hardware, software and personnel. Major benefits are from improved business office procedures and systems, increased productivity in nursing areas and ancillary departments and faster, more accurate charging through on-line order entry. Benefits for each system are shown in Section III, "System Descriptions."

C. HOSPITAL SHARED SYSTEMS BUSINESS PLAN IMPACT

The overall objective of the Hospital Shared Systems Business Planning portion of this project was to develop a plan of action that would position HSS to best meet member hospitals' data processing requirements based on the thorough understanding of the current health care system business environment and the internal capabilities of HSS. To accomplish this objective a Long Range Planning Task Force (LRPTF) was organized, made up of representatives of all major HSS user hospitals to assist the planning project team in performing the following steps:

1. Organize the planning effort.

2. Analyze the external environment in which HSS must operate but cannot control.

3. Analyze HSS internal strengths and weaknesses.

4. Develop specific goals, objectives and operating strategies to guide HSS's future business direction.

5. Document the strategies recommended for implementation.

This planning project was undertaken because of recognized changes in both the information processing and health care industries. These changes are reflected in advanced technology, increasing user sophistication and acceptance of computer applications, increased hospital regulatory requirements, increased systems vendor competition, and changing system economies which are redistributing costs from hardware to software development and maintenance. It was the responsibility of the LRPTF to review information presented by the project team, critically analyze the HSS current environment against these changing conditions and determine a plan of action to better position HSS to meet future hospital system requirements.

Their findings indicated there are several circumstances that prevent HSS from successfully continuing as it is currently structured. They include:

1. HSS is losing market share. This is causing prices to become higher than those of competitive systems. There are no present plans that would provide additional revenues.

2. Existing HSS users are already actively reviewing other data processing alternatives for meeting their information needs.

C. HOSPITAL SHARED SYSTEMS BUSINESS PLAN IMPACT (Continued)

3. Current hospital users do not provide HSS with formal long-term commitments.

4. HSS's recent performance during NIBS conversion has reduced user confidence in HSS.

5. There is a limited remaining market for shared financial services in Minnesota.

6. HSS products (hospital accounting systems) are not price competitive in 1981 with other shared and turnkey vendor alternatives particularly for the medium to large user hospitals (major revenue providers).

7. The patient accounting system requires further improvements for it to be a stable product.

8. No significant research and development money is available to acquire new products or services that hospitals desire.

9. HSS and the hospitals have not adequately implemented the patient accounting system to provide efficient business office operations.

Given the above facts, it was clear that both HSS and member hospitals risked the gradual contraction of the shared program at the expense of remaining participants unless significant improvements were made. Furthermore, the increasing competition among local HSS user hospitals was reducing their desire to share data processing services.

After reviewing several possible alternatives, the LRPTF recommended that the current HSS member hospitals cooperate in the phase down of the sharing program. As a result, all current HSS member hospitals must find other alternatives for their financial systems processing.

The phase down of HSS will require SPRMC to perform the following projects within the initial year of this plan, although these projects were not considered highest priority when system requirements were initially ranked. These projects include:

Vendor Selection and Designs for:
- ° Patient Accounting
- ° General Ledger
- ° Accounts Payable
- ° Payroll
- ° Materials Management
- ° Property Ledger

System Installations for:
- ° Patient Accounting
- ° General Ledger
- ° Accounts Payable
- ° Payroll
- ° Materials Management
- ° Property Ledger

D. INFORMATION SYSTEM PRIORITIES

One of the objectives of an Information Systems Plan is to determine the sequence of development for the proposed systems projects. In order to set this sequence based on an objective understanding of the priorities of individual systems, a number of steps must be performed. These steps can be repeated periodically as initial projects are completed and/or conditions within the Hospital change. Reviewing the project sequence, and modifying it if appropriate, should be performed at least annually as part of the annual systems planning procedure.

The major steps for establishing the systems development project sequence are:

1. Identify the mandatory systems projects and establish an initial development sequence based on their logical data relationships, business factors and other constraints.

2. Establish the criteria on which to evaluate the remaining systems projects and document their relative importance.

3. Evaluate each remaining systems project against each criteria.

4. Prepare the final project bar chart and balance the overall personnel requirements.

The following paragraphs describe each of the major steps and summarize the results of the initial sequence determination.

1. Established Project Sequence

Data processing relationships and constraints imposed by Hospital business conditions dictate that certain projects occur at specific times or with a required precedence to other projects. These conditions were documented and became constraints around which the remaining projects would be scheduled. The following are some of the considerations of this initial sequence determination:

- Financial applications now processed at HSS must be re-implemented as soon as practical.

- Patient care systems should occur in the overall sequence of Registration - Census - Order Communications - Scheduling.

D. INFORMATION SYSTEM PRIORITIES (Continued)

- Ancillary support sytems can occur in any sequence but should all follow Registration and Order Communications.

- Fiscal and administrative support systems can occur in any sequence.

2. Establish Criteria and Relative Importance

With the assistance of the Management Advisory Committee, seven separate criteria were identified that systems projects should meet to assist the Hospital in attaining its overall objectives. Weightings were assigned to each criterion based on its degree of importance in fulfilling the overall objectives of SPRMC. The seven criteria and their ranking and weights are as follows:

Rank	Weight	Criteria
1	4	Improved information for decision-making
2	4	Enhanced patient care
3	3	Improved timeliness and accuracy of information
4	3	Flexibility for operational changes
5	2	Improved staff and physician convenience
6	2	Ability to provide favorable cost/benefit
7	1	Increased revenue

In future updates to the plan, it is important to note that criteria can be added or deleted and the weights can and should be changed to reflect management's current assessment of the objectives of SPRMC and to reflect the progress that has been made toward meeting objectives that the prior year's criteria were based on. It should also be noted that a low rating does not imply that the criterion has no importance at all. If that were the case it would not be included. A low rating means only that the criterion has less weight than the other criteria in determining the sequence of projects.

D. INFORMATION SYSTEM PRIORITIES (Continued)

3. Evaluate Remaining Systems Against Criteria

To determine the extent to which the remaining systems would satisfy the criteria, an analysis was prepared ranking each remaining system against each criterion. Two questions were asked relative to each system:

- Does the proposed system meet the specific criteria?

- If so, to what extent compared to all other systems?

Based on the answers, a rating was established indicating the degree to which the system meets the criteria:

3 - best meets criteria

2 - meets criteria

1 - marginally meets criteria

4. Summarize Evaluation and Establish a Preliminary Project Sequence

To determine a preliminary priority sequence of the proposed projects, the rating for each project was multiplied by the weighting established for each criteria. The accumulation by project resulted in a preliminary ranking of the proposed systems. (See Exhibit II-A.) The results of the preliminary rankings are shown as follows:

D. INFORMATION SYSTEM PRIORITIES (Continued)

Rank	System	Type of Project	System Group
1	Patient and Financial Accounting	Convert to Enhanced System	Patient and General Accounting
1	Order Communications	New System	Communication
3	Laboratory	Interface to New System	Ancilliary Departments
3	Pharmacy	New System	Ancilliary Departments
5	Radiology	New System	Ancilliary Departments
6	Patient Scheduling	New System	Patient Control
7	Materials Management/ Inventory	Convert to Enhanced System	Resource Control
8	Case Mix Reporting	New System	Financial Control
9	Productivity Reporting	New System	Financial Control
10	Patient Classification	New System	Patient Control
11	Dietary	New System	Ancilliary Departments
12	Records Management	New System	Records Processing
12	ADT	Convert to Enhanced System	Communications
14	Surgery Scheduling	New System	Patient Control
15	Employee Scheduling	New System	Resource Control
15	Quality Assurance	New System	Records Processing
17	Personnel Information	New System	General Support
18	Word Processing	New System	General Support
19	Modeling and Forecasting	New System	Financial Reporting
19	Physician Billing	New System	Patient Accounting
21	Marketing/Referral Analysis	New System	Financial Reporting
22	Student/Resident Education	New System	General Support
23	Capital Funds Development	New System	Financial Control

D. INFORMATION SYSTEM PRIORITIES (Continued)

5. Prepare the Final Project Bar Chart

The final step in the determination of project sequence involved scheduling the projects into the five-year planning period so that a number of conditions could be met.

- The project sequencing described above is adhered to.
- Overall personnel requirements are balanced.
- Major user groups are not committed to a large number of concurrent projects.

The step resulted in the final project sequence and the overall data processing personnel requirements. Part F of this section contains the results of this final step.

E. HARDWARE AND SOFTWARE STRATEGY

This section presents the alternative hardware and software approaches that best support the overall SPRMC systems strategy. The following activities were performed during this phase of work:

1. Identify and summarize the trends in health care information processing that may have an impact on SPRMC hardware/software strategy.

2. Describe an overall hardware approach that addresses the requirements of proposed and existing systems.

3. Develop an overall systems approach that supports the hardware and application development activities.

4. Formulate hardware and software migration plans.

The objective of this section is to provide direction (or criteria) for later selecting financial and patient care systems vendors once the overall plan is approved. SPRMC is in a unique position because of the phase down of HSS and relatively minimal investment made to date in the major patient care applications. That is, SPRMC can determine its future hardware and software strategy with little consideration given to the constraints of the Hospital's current data processing environment. The approaches selected need not compromise the use of the state-of-the-art technologies and integration of information systems because of existing system limitations.

The available hardware and software environments and examples of vendors by alternative are summarized in Exhibit II-B.

As the exhibit illustrates, three major areas must be considered in determining the best hardware/software approach.

1. Processing Mode - Two major classifications are possible: shared processing with other organizations or in-house processing on equipment dedicated to a particular user. In-house processing can be further classified as central or distributed (or some combination of each). Centralized processing implies a single source of computing power accessible by users via communication links. Distributed processing can be defined in this context as placing some level of processing capability (and data storage) at user locations with communications among processors.

E. HARDWARE AND SOFTWARE STRATEGY (Continued)

2. Software Type - Three major classifications of software are possible: custom developed with in-house DP support, purchased packages with in-house DP support, or purchased packages with on-going vendor maintenance support (turnkey).

3. Application Types - For purposes of determining hardware/software strategy, two classifications of software were identified: financial systems and patient care systems. This distinction is made because SPRMC must select an approach that supports both application classifications. It should be noted that combinations of strategies are also possible. For example, an in-house patient care package can be interfaced with a shared financial system.

   The relationship of the above considerations to trends in health care information processing is shown in Exhibit II-C.

The use of a distributed minicomputer based strategy versus an integrated data base large system strategy should also be considered. In recent years, an increasing number of dedicated minicomputer systems have been made available to the hospital marketplace. The applications installed on these minicomputers cover a wide range of ancillary departments and communication functions. Although these systems, taken individually or in total, are less expensive than large mainframe computer systems they usually do not provide features and functions comparable to systems based on large mainframe devices. In some instances they cannot support certain applications at all. This is especially noticeable with regard to on-line communications of test results. Further, by their nature they are not integrated, in that redundant information such as patient name, location, or other demographic information must be carried on more than one computer system and cannot be made available to all the required points in a communications network.

The integrated data base large system has been under development by a number of vendors for over fifteen years. These systems make pertinent data available to all appropriate points in a network. Currently, the computer hardware required to organize and handle the data base as well as the computer network is generally larger and more expensive. The applications that are provided by these types of systems, however, frequently have more functions and share more data between applications and areas.

In order to determine which approach best meets the requirements of SPRMC it was necessary to establish selection criteria. Exhibit II-B illustrates an evaluation of the above alternatives against the selection criteria. The criteria included:

E. HARDWARE AND SOFTWARE STRATEGY (Continued)

1. Data processing staff size and skill level requirements
2. Ease of migration to the alternative given SPRMC's current environment
3. Ability to control changes to applications
4. Access to research and development activity
5. Overall cost
6. Integration of applications
7. Ability to support phased growth
8. Degree to which the approach is supported by trends in health care information systems at hospitals of a similar size

After comparing the alternatives against the selection criteria based on the SPRMC environment, the following recommendations were developed. These recommendations will serve as the primary criteria for selecting specific financial and patient care packages and equipment.

1. An in-house processing mode is preferable for both financial and patient care systems. Patient care systems currently require in-house equipment; there are no sites in this region established for sharing patient care systems. Therefore, since an in-house operations and support staff will be required for patient care systems, the incremental cost for operating in-house financial applications is minimal.

2. A single vendor hardware approach to supporting both financial and patient care systems is recommended to minimize operations and technical support requirements. For example, if the best patient care strategy requires IBM hardware, then in selecting financial systems give preference to IBM based applications.

3. Software selection should take precedence over hardware selection. The type of computing hardware should be determined by selecting the best software/hardware combination. Computers should not be obtained unless packaged software for the computers has been thoroughly evaluated.

4. Packaged software directly supported by a software vendor should be used whenever feasible. Custom development of systems should be undertaken only if there is no packaged software available that meets the Hospital's requirements.

E. HARDWARE AND SOFTWARE STRATEGY (Continued)

5. Software should generally be obtained from vendors whose principle business is installing and supporting application software. Software packages that are not supported by a vendor should be used only if there is no viable alternative.

6. Integrated software packages should be given preference over packages that must be interfaced by the Hospital. For example, a system that combines Patient Accounting, Accounts Payable, General Ledger, Materials Management and Payroll will be preferred over separate systems available from different vendors.

7. Software products that minimize the need for in-house technical data processing skills should be preferred over those requiring a large in-house staff to support the software. The Hospital should concentrate its data processing resources on strengthening the use of patient care and business information rather than on technical complications of computer systems. Some technical capabilities in house will of course be required. The Hospital should attempt to leverage these skills with good software products.

8. There are financial and patient care system alternatives available that meet the major portion of SPRMC's information requirements. In selecting specific application packages and vendors, emphasis should be placed on in-house turnkey and package approaches for both financial and patient care applications. Major vendors for consideration should at least include:

   Datacare
   Dynamic Control Corporation
   IBM's PCS
   Medicus
   Nadacom
   Shared Medical Systems (In-house)
   Technicon

9. The Hospital should select proven systems. Software package alternatives should be evaluated as part of the systems design phase of developing each new system. User personnel should be involved in comparing the functional capabilities of each software package based on documented functional requirements. The technical soundness of each software package should be evaluated by qualifed data processing personnel.

E. HARDWARE AND SOFTWARE STRATEGY (Continued)

10. The comparative costs of integrated data base systems versus minicomputer based strategies can be contrasted by comparing patient care systems from Technicon (integrated) and IBM (integrated) to HBO MEDPRO (minicomputer) and SMS Action (minicomputer). Although the total annual cost estimates today for a hospital SPRMC's size for an integrated strategy range from $7 to $9 per patient day versus $3 to $5 per patient day for the mini-based strategy, it should be concluded that the potential advantages and benefits from the integrated strategy outweigh the disadvantage of the additional cost.

11. Since a centralized hardware approach is recommended, minicomputer-based systems should be considered for specialized ancillary applications as long as these systems meet the functional requirements of the user, provide sufficient capacity to process current and future transaction volumes and can be interfaced with the mainframe processor(s). The current Laboratory system should be interfaced as part of the Order Communications project.

F. IMPLEMENTATION PLAN

This section summarizes the implementation effort required each month over the next five years to install all systems defined. The phasing of implementation for all systems is shown on the "Project Timetable and Personnel Requirements," Exhibit II-D. The exhibit also summarizes personnel requirements by skill levels needed for selecting, modifying and installing the application packages in the planned sequence.

Because of the HSS phase down, the first project must be to select and install financial systems to replace the current shared systems. Implementation of all other systems was planned based on the following assumptions:

1. Systems are installed based on the priority ranking approved by the MAC.

2. All current HSS financial applications would be implemented within the first year of the plan. A detailed vendor selection project must be performed to select the software vendor(s). This project is shown in the bar chart. Because it is the first project, additional details on the steps to be performed during the project are given in Part H of this section.

3. All systems identified by the MAC would be implemented within the five-year horizon of the Systems Plan.

4. A totally integrated patient care system would be installed beginning in year 2 after the benefits of the financial systems implementation are realized. An elapsed time of 31 months is assumed before all patient care applicatons are installed.

5. Packages are available for all systems required.

6. Estimated work days are based on Arthur Andersen & Co. Method/I estimating guidelines and actual Arthur Andersen & Co. experience in implementing health care applications. The information contained in the system descriptions in Section III provide the variables upon which estimates are based. These estimating variables include, for example:

   - number of user departments impacted
   - number of reports
   - number of screens
   - number of interfaces
   - application complexity
   - functions and features
   - technical scope

F. IMPLEMENTATION PLAN (Continued)

7. SPRMC does not have the current in-house data processing experience to install the required systems. Significant additions to the in-house data processing staff are included. SPRMC fully intends to utilize its own personnel resources to the fullest extent possible. However, use of outside assistance on a joint effort basis is reflected where required to facilitate the timely completion of the project and allow SPRMC to develop the expertise it will need to operate and maintain the systems once installed.

8. SPRMC uses an in-house integrated data base hardware strategy and turnkey in-house software strategy.

Exhibit II-F, "Data Processing Personnel Plan," defines the staffing needs by quarter for the five years of the plan. It translates the personnel requirements from Exhibit II-D into needs for additional staff and outside assistance. This can be used as a guide for hiring staff at the appropriate times. Hiring plans must also consider lead time for orientation and training of new personnel. The organization plan and system project management approach is explained in Section IV, "Organization Strategy."

This plan should be used to monitor progress implementing the Systems Plan. It should be updated when new projects arise or circumstances change. For example, if the effort required exceeds the resources available, the implementation can be spread over a longer period of time. Also if a package is not available at the time planned for implementation, that system should be deferred until a package is available or until all other package systems have been installed and the systems development staff is available to develop custom systems.

G. FINANCIAL REQUIREMENTS

This section provides order of magnitude estimates for annual data processing costs during the next five years. The following schedule summarizes total costs and benefits estimated for implementing all systems in the plan.

1. Total Planned Costs

   a. Total costs for implementation, operation and support for all systems identified in the plan.

   b. Includes personnel, hardware and software.

2. Current Costs

   - Current data processing budget adjusted for items which duplicate costs in the section above.

3. Benefits

   a. Business office savings are from improved financial systems and improved policies and procedures to complement financial systems. A separate two-day study was performed which identified specific areas of savings for the business office. The purpose of the study was to evaluate business office procedures to determine if improvements in policies, procedures and systems could more effectively support business operations. The potential benefits based on actual experience at other hospitals are included in Exhibit II-L.

   b. Patient care savings are from more efficient order entry and better patient care staff productivity from nursing care plans and on-line results reporting.

      Patient care savings are more difficult to quantify. There are, however, substantial economic benefits to be gained from implementing a full patient care system, in the form of improved productivity of personnel and maximizing the utilization of existing facilities. Such a system makes all record keeping more accurate and more complete, while making it easier to do. It provides information about, orders for and results of tests and procedures performed. It saves substantial nursing time through care planning and determining accurate staffing requirements. The

benefits estimated herein use guidelines based on reviews of the major assumptions used by other hospitals to justify their decisions to implement full patient care systems. Detail material regarding benefits justification at other hospitals has been previously distributed to SPRMC project team members.

In reviewing the cost data contained in this section, it should be recognized that:

1. The HSS phase down can be accomplished in one year. If the HSS phase down requires two years, SPRMC would incur an additional $410,000 in year 2. It is in the best interest of SPRMC and the HSS member hospitals to convert to new financial applications within one year.

2. These schedules were prepared to highlight the cost impact of changes in hardware, personnel, communication, application and system software which will occur due to projects contained in the Systems Plan. All other costs in the current data processing budget have been held constant over the period of the plan. A more detailed analysis of these other costs must be made in preparing actual data processing budgets for future years.

3. Key assumptions related to the cost and benefit categories are contained in the "Notes" following the overall cost schedule.

4. All cost data is expressed in constant dollars and has not been adjusted for inflation.

5. The effect of cost reimbursement has not been included in either the costs or benefits.

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
COST/BENEFIT SUMMARY

TOTAL PLANNED COSTS	ANNUAL COSTS/BENEFITS (1) ($000) Year 1	Year 2	Year 3	Year 4	Year 5
Personnel					
- Systems (2)	$ 175	$ 210	$ 280	$ 280	$ 280
- Systems Maintenance (2)	0	70	70	70	70
- Operations (3)	0	215	215	215	215
Installation Assistance (2)	421	713	810	454	162
Hardware					
- CPU, disks, etc. (4)	0	218	218	218	218
- Hospital terminals and printers (5)	0	100	200	200	200
Financial Systems Software (6) including MCSI	610	400	400	400	400
Patient Care Systems Software (7)	0	109	194	263	263
Business Systems Packages (8)	0	145	25	385	25
Total	$1,206	$ 2,180	$ 2,412	$ 2,485	$ 1,833
CURRENT DP COSTS					
Current Budget (9)	$1,078	$ 1,078	$ 1,078	$ 1,078	$ 1,078
Less Costs Included Above:					
HSS Costs	(318)	(318)	(318)	(318)	(318)
MCSI Costs	(200)	(200)	(200)	(200)	(200)
Salaries (10)	(35)	(35)	(35)	(35)	(35)
Datapoint Rental	(0)	(0)	(194)	(194)	(194)
Net Recurring Costs	$ 525	$ 525	$ 331	$ 331	$ 331
Total Costs for Current and Planned Systems	$1,731	$ 2,705	$ 2,743	$ 2,816	$ 2,164
Incremental Costs Over Current Budget	$ 653	$ 1,627	$ 1,665	$ 1,738	$ 1,086
BENEFITS					
Business Office (11)	$ 0	$ 4,000	$ 4,000	$ 4,000	$ 4,000
Patient Care (12)	0	0	1,500	1,500	1,500
Total Benefits	$ 0	$ 4,000	$ 5,500	$ 5,500	$ 5,500
Net Costs (Benefits)	$1,731	$(1,295)	$(2,757)	$(2,684)	$(3,336)
Net Incremental Costs (Benefits)	$ 653	$(2,373)	$(3,835)	$(3,762)	$(4,414)

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
COST/BENEFIT SUMMARY

ASSUMPTIONS

(1) Numbers do not include adjustments for inflation or salary/rate increases.

(2) See the Data Processing Personnel Plan, Exhibit II-F, for the staffing needs by quarter. The SPRMC staff costs were estimated at $28,000 per year plus 25% benefits. The outside assistance required was estimated at $600 per person per day. Costs were determined based on the quarterly staffing needs. SPRMC's permanent staff requirements were projected as follows:

- Development
  - . 1 Project Manager
  - . 5 Systems Analysts
  - . 2 Programmers

- Ongoing Software Support (Maintenance)
  - . 2 Programmer-Analysts

(3) Assumes an operations staff of 8 operators for 24-hour, 7-day coverage and one systems programmer.

	Operators	Systems Programmer
Salaries	$144,000	$ 28,000
25% Fringe	36,000	7,000
	$180,000	$ 35,000

(4) Costs include lease prices for IBM hardware. See the configuration diagram in Exhibit II-G and the hardware cost schedule in Exhibit II-H. For the first two years not all of the items would be used, so the lease cost will actually be less than the full price shown. The costs assume implementation of a full patient care system. If less than the full system were to be implemented, hardware costs would be lower.

(5) Cost estimates include 48 printers and 55 terminals. (See Exhibits II-I and II-J.) Because of the phasing of patient care systems, it was assumed only half the terminals would be needed in year 2.

ASSUMPTIONS
(Continued)

(6) Year 1 assumes NIBS, FMIS and MCSI for the financial systems. Years 2 through 5 assume a product similar to those of large national shared vendors. The business planning project for Hospital Shared Systems included a competitive analysis, where prices for the systems of large national shared vendors were estimated. This study indicated that SPRMC could save about $210,000 per year by using another shared vendor. This difference is between the current HSS costs assumed in year 1 versus an alternative vendor in subsequent years.

The Hardware/Software Strategy section recommends SPRMC pursue in-house financial systems. However, the national shared vendors estimates from the Business Plan were used to establish the financial systems cost included here. The costs include the hardware, software, communications and support required for financial applications. Experience indicates that in-house turnkey or package systems would cost the same or less. Use of current HSS applications on an in-house basis would cost very close to current HSS cost. More definite costs would be determined in the actual vendor selection project when a final decision on vendors is made.

(7) These estimates assume phasing of patient care systems over 3 years beginning in year 2. The costs include software lease and maintenance figures for turnkey applications. They are estimates for a full patient care system such as Technicon's Matrix Medical Information System or Datacare's Patient Care Information System.

(8) The following are package cost estimates:

Year 2	Materials Management and Inventory	$ 50,000
	Word Processing	95,000
		$145,000
Year 3	Case Mix Reporting	$ 25,000
Year 4	Productivity	$150,000
	Employee Scheduling	60,000
	Personnel Information	100,000
	Modeling Forecasting	25,000
	Physician Billing	50,000
		$385,000
Year 5	Capital Fund Development	$ 25,000

ASSUMPTIONS
(Continued)

There are no packages currently on the market which meet the requirements of Marketing/Referral Analysis or Student/Resident Education; both are planned for year 5. However, staffing estimates for implementing these systems are included in the plan, assuming packages will be available for the scheduled implementation time. If packages are not available on time, the plan should be revised to delay implementation until a package is developed.

(9) See the "Present Systems Costs" schedule, Exhibit II-K.

(10) Assumes one full-time equivalent analyst currently on staff will be used for new systems development.

Salary	$28,000
25% Fringe	7,000
	$35,000

(11) Experience indicates there are significant tangible and intangible benefits which will accrue to St. Paul-Ramsey Medical Center when the financial systems are converted and good policies and procedures are implemented. Conservative estimates of tangible benefits, based on the Hospital's third-party payment patterns, current reimbursement formulas and experience in hospitals of similar size and in similar demographic areas, are shown in Exhibit II-L.

(12) Experience also indicates there are significant savings from installing a patient care system. Estimates of these savings are shown in Exhibit II-M.

H. NEXT STEPS

The first project St. Paul-Ramsey Medical Center must undertake is the financial system vendor selection. Because of the HSS phase down, the following systems must be replaced:

- General Ledger
- Accounts Payable
- Billing
- Accounts Receivable
- Census
- Payroll
- Property Ledger
- Materials Management

It is important to note that SPRMC's patient care systems strategy must be considered during this project. Although the actual patient care vendor selection project is planned for the end of year 1, the hardware and software direction must be set now. Since it is advisable to plan all systems to run on compatible hardware, SPRMC should position itself with financial systems on the hardware most likely to be chosen for patient care systems.

The standard methodology for implementing a package-based system is illustrated in Exhibit IV-G. It consists of three major phases: package evaluation, design and installation. Exhibit II-D shows the timing of the financial systems project phases. The package evaluation phase would be performed in the first three months of the plan. The design and installation phases would be performed in months 4 through 12. The methodology for these phases is described in the remainder of this section.

The major steps in the Software Package Evaluation Phase are described below:

1. Perform High-Spot Review - Evaluates current systems to determine the scope of the project.
2. Define Business Objectives - Defines the Hospital's business objectives as they relate to the systems to be developed.
3. Define Critical Function Requirements - From the user's standpoint, this step defines the basic functions necessary to operate.
4. Define Technical Requirements - This step defines the technical functions required. This covers areas such as data entry mode, interfaces and communication capabilities.
5. Investigate Application Software Alternatives - Identifies potential vendors based on the critical functional and technical requirements.
6. Develop Conceptual Design Report - Produces a report illustrating the functional and technical relationships and functions required.

H. NEXT STEPS (Continued)

7. Establish Selection Criteria - Involves developing and approving a list of criteria to be used in selecting the vendor finalists. The criteria are ranked and weighted according to their relative importance.

8. Obtain Software Information - This step includes developing request for proposal, distributing it to the vendors identified in step 5 and doing site visits to hospitals where the systems are installed.

9. Evaluate and Make Preliminary Selection - The vendor finalists are chosen in this step, based on the information gathered in step 9 and on the criteria developed in step 7. There are usually two or three finalists.

10. Negotiate Software Acquisition - Includes negotiation with the finalists to get the optimum mix of functionality and cost. The final vendor is chosen in this step.

11. Obtain Management Approval to Complete Design - Approval from the Management Advisory Committee is required before proceeding to the next phase.

The major steps in the Software Package-Based Design Phase are described below.

1. Conduct Training and Testing - This step provides training to the project team by the vendor. It gives the project team a working knowledge of the system, enabling them to perform the next step.

2. Define Functional Adaptation and Options - In this step the project team reviews the selected package in detail. All desired functions and features modifications and enhancements are defined.

3. Define Package Inputs and Outputs - This step involves identification of reports and forms required. It also identifies any system interfaces needed.

4. Issue Preliminary Functional Specifications - In this step, all package options are chosen and all required modifications are documented.

5. Design Interfaces and Modifications - Provides the specifications for all work to be done to implement the package.

H. NEXT STEPS (Continued)

6. Develop Installation Work Plan - Estimates the effort required to install the package, based on the specifications developed in step 5. These estimates are documented in a work plan, which defines work day requirements for each step to be done.

7. Develop Cost/Benefit Analysis - Defines costs of installing the package as well as the expected cost savings. This analysis must be presented to the MAC for approval.

8. Obtain Management Approval for Installation Phase - This is the final step in the design phase. Once the MAC approves the work plan and cost/benefit estimates, work can begin on the installation phase.

The Installation Phase is a subset of the standard methodology for Systems Installation, Exhibit IV-E. The major steps for a package-based installation are described below.

1. Plan Conversion and Systems Test - Conversion time frame and cutoff dates are set in this step. Also, users develop test conditions and test data in preparation for the next step.

2. Create Files and Test Data - This step creates the testing environment in preparation for the completion of program modifications.

3. Develop Procedures - This can be done concurrently with step 2. It involves developing procedures and providing user manuals and training materials to prepare users for the system test.

4. Programming and Testing - Involves making the program changes identified in the previous phase as well as developing the conversion programs.

5. Conduct the System Test - This step requires participation from systems, user and operations personnel. It consists of two basic tasks: integration testing, which ensures the system works as designed; and user testing, which ensures the system meets user functional requirements.

6. Convert the System - This is the actual conversion by the user departments. It includes users monitoring the conversion, analysts and programmers providing support and actual acceptance of the operational system by all groups involved.

H. NEXT STEPS (Continued)

7. Perform Post Conversion Review - This is the final review to ensure the installed system meets its stated objectives. Objectional problems are identified and resolved. Also, actual costs and benefits are compared to projections and differences reconciled.

The above steps generally describe SPRMC's implementation strategy. The organization strategy which is required to support the systems implementation process is described in Section IV, "Organization Strategy."

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
SYSTEMS RANKING WORKSHEET

LEGEND:

Points	Explanation
3	Best
2	Better
1	Minimum
0	None

Weight	Criteria	FINANCIAL & PATIENT ACCOUNTING	PERSONNEL	MARKETING	CASE MIX	PRODUCTIVITY	ADT	MODELING & FORECASTING	PATIENT CLASSIFICATION	EMPLOYEE SCHEDULING	ORDER COMMUNICATIONS	PATIENT SCHEDULING	QUALITY ASSURANCE	RECORDS MANAGEMENT	SURGERY SCHEDULING	PHARMACY	RADIOLOGY	MATERIALS MANAGEMENT	STUDENT / RESIDENT ED.	WORD PROCESSING	DIETARY	CLINIC BILLING	LABORATORY	CAPITAL FUNDS
4	1. Improved Information for Decision Making	3	1	3	3	2	1	2	1	1	1	1	1	0	1	1	1	1	0	0	1	1	1	0
4	2. Enhanced Patient Care	1	0	0	1	1	1	0	1	1	3	2	1	1	1	2	2	1	0	1	1	0	2	0
3	3. Improved Timeliness & Accuracy of Information	3	2	1	2	2	2	1	2	1	2	2	1	2	1	2	2	2	1	1	2	1	2	1
3	4. Flexibility for Operational Changes	2	2	0	1	1	1	1	2	1	1	2	1	2	1	2	2	2	0	2	1	1	2	1
2	5. Improved Staff & Physician Convenience	1	1	0	0	1	1	0	1	2	2	2	1	2	2	2	2	2	1	1	1	1	2	1
2	6. Ability to Provide Favorable Cost/Benefit	0	0	0	1	1	1	0	1	1	2	1	2	1	1	2	2	2	1	1	2	1	2	1
1	7. Increased Revenues	2	0	1	1	1	1	1	1	0	2	2	0	0	1	2	1	2	0	0	1	1	2	0
	Total (Weight x Points)	35	18	10	28	26	22	15	25	20	35	32	20	22	21	34	33	30	7	17	24	15	34	10
	Rank	1	17	21	8	9	12	19	10	15	1	6	15	12	14	3	5	7	22	18	11	19	3	23

EXHIBIT II-A

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
HARDWARE/SOFTWARE STRATEGY

ALTERNATIVES				CRITERIA								
Processing Mode	Software Type	Application Type	Representative Vendor Examples (List not exhaustive)	Support Trends	DP Staff Size	Ease of Migration	Control and Flexibility To Change	Phased Growth	Access To R & D	Cost	Integration	OVERALL RATING
HARDWARE/SOFTWARE STRATEGY — Shared	custom	financial	HSS developed applications	poor	large	current environment (HSS)	excellent	limited	poor	high	NIBS-excellent	○
		patient care	not applicable									
	turnkey	financial	McAuto Shared Medical Systems	good	small	medium	poor/good	good	excellent	medium	good	◒
		patient care	Technicon	poor	small/medium	hard	poor/good	good	excellent	medium/high	good	○
In-house • centralized or • distributed or • combination	custom	financial	HSS developed applications	poor	large	medium	excellent	limited	poor	high	NIBS-excellent	◒
		patient care	not applicable									
	turnkey	financial	Medicus	excellent	small/medium	medium	poor/good	good	excellent	low/medium	excellent	●
		patient care	Technicon HBO	excellent	small/medium	medium	poor/good	good/excellent	excellent	medium/high	excellent	●
	package	financial	Dynamic Control Corporation	good	medium	medium	excellent	good	poor/good	medium	excellent	◒
		patient care	PCS (IBM)	good	large	hard	excellent	good	good	high	excellent	◒

● Best meets SPRMC requirements

◒ Partially meets SPRMC requirements

○ Does not meet requirements

MARKET TRENDS
BY APPLICATION TYPE

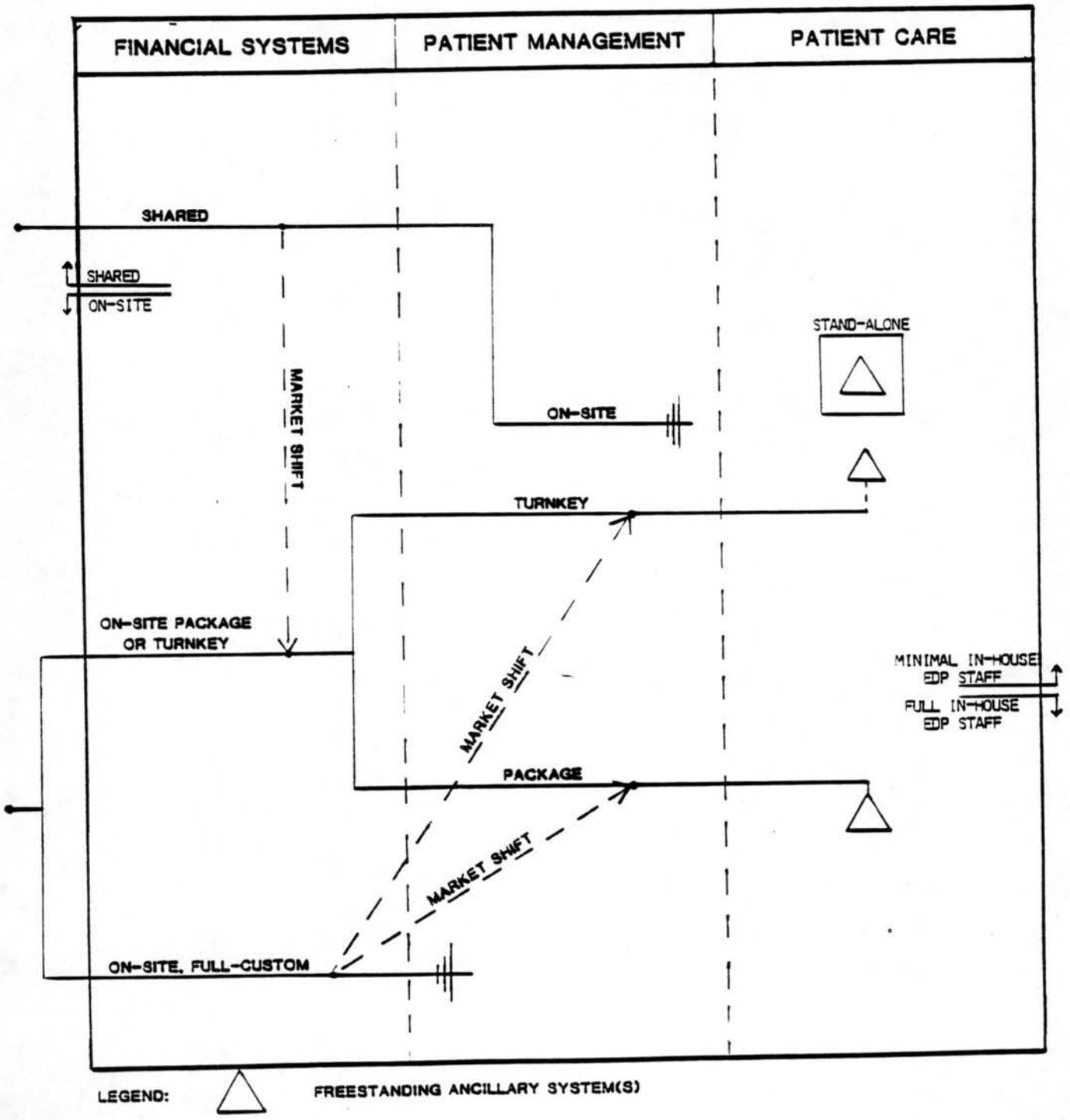


EXHIBIT II-D

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
PROJECT TIMETABLE AND PERSONNEL REQUIREMENTS

PROJECT	Approximate Workdays	YEAR 1												YEAR 2											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Financial Systems Selection	160	3	3	3																					
Install Financial Systems	1,130				7	7	7	7	7	7	7	7	7												
Quantify Patient Care Benefits and Select Patient Care Vendor	290									4	4	4	4												
Install Patient Care Systems (See Patient Care Project Timetable)	4,200													2	2	2	9	9	9	9	9	8	8	9	11
Materials Management	480													3	3	3	4	4	4	4	4				
Inventory	600																					3	3	3	5
Case Mix Reporting	400																								
Productivity	600																								
Employee Scheduling	250																								
Personnel Information	290																								
Word Processing	130																					2	2	2	
Modeling and Forecasting	120																								
Physician Billing	480																								
Marketing/Referral	600																								
Student/Resident Education	300																								
Capital Funds Development	380																								
TOTAL WORKDAYS	10,410																								
TOTAL WORK MONTHS		3	3	3	7	7	7	7	7	11	11	11	11	5	5	5	13	13	13	13	13	13	13	14	16
PERSONNEL REQUIREMENTS																									
Project Manager		1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3
Systems Analyst		2	2	2	4	4	4	4	4	8	8	8	8	3	3	3	8	8	8	8	7	7	7	8	10
Programmer		0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	2	2	2	2	3	3	3	3	3

PROJECT	YEAR 3												YEAR 4											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Financial Systems Selection																								
Install Financial Systems																								
Quantify Patient Care Benefits and Select Patient Care Vendor																								
Install Patient Care Systems (See Patient Care Project Timetable)	13	10	10	10	10	11	11	11	10	9	11	10	10	10	9	5	6	3	3					
Materials Management																								
Inventory	5	5	5	5	5																			
Case Mix Reporting						2	2	2	4	4	4	4												
Productivity													3	3	3	5	5	5	5	5				
Employee Scheduling																2	2	3	3	3	3			
Personnel Information																				2	2	3	3	3
Word Processing																								
Modeling and Forecasting																					2	2	2	2
Physician Billing																					2	2	2	4
Marketing/Referral																								
Student/Resident Education																								
Capital Funds Development																								
TOTAL WORKDAYS																								
TOTAL WORK MONTHS	18	15	15	15	15	13	13	13	14	13	15	14	13	13	12	12	13	11	11	10	14	7	7	9
PERSONNEL REQUIREMENTS																								
Project Manager	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2
Systems Analyst	12	9	9	9	9	7	7	7	8	7	9	8	8	8	7	7	8	6	6	5	9	3	3	5
Programmer	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2

PROJECT	YEAR 5											
	1	2	3	4	5	6	7	8	9	10	11	12
Financial Systems Selection												
Install Financial Systems												
Quantify Patient Care Benefits and Select Patient Care Vendor												
Install Patient Care Systems (See Patient Care Project Timetable)												
Materials Management												
Inventory												
Case Mix Reporting												
Productivity												
Employee Scheduling												
Personnel Information	3											
Word Processing												
Modeling and Forecasting												
Physician Billing	4	4	4	4	4							
Marketing/Referral		3	3	3		5	5	5	5	5		
Student/Resident Education		2	2	4	4	4	4					
Capital Funds Development					2	2	2	4	4	4	4	
TOTAL WORKDAYS												
TOTAL WORK MONTHS	7	9	9	11	10	11	11	9	9	9	4	
PERSONNEL REQUIREMENTS												
Project Manager	1	1	1	1	1	1	1	1	1	1	1	
Systems Analyst	4	6	6	8	7	8	8	6	7	7	2	
Programmer	2	2	2	2	2	2	2	2	1	1	1	

EXHIBIT II-E

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
PATIENT CARE PROJECT TIMETABLE

PROJECT	Approximate Required	YEAR 1												YEAR 2												YEAR 3												YEAR 4												YEAR 5											
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
ADT	500	2	2	2	5	5	5	5	5																																																
Order Communications	1,200				4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4																																				
Pharmacy	400													2	2	2	4	4	4	4																																				
Radiology	200																2	2	3	3	3																																		
Patient Scheduling	450																				2	2	2	4	4	4	4	4																												
Patient Classification	350									2	2	2	4	4	4	4																																									
Nurse Scheduling	250																					2	2	2			3	3	3	3																										
Dietary	200																						2	2	3	3	3																												
Records Management	200									2	2	3	3	3																																									
Surgery Scheduling	250																				2	2	3	3	3	3																														
Quality Assurance	200																											2	2	3	3	3																								
TOTAL WORKDAYS	4,200																																																					
TOTAL WORK MONTHS		2	2	2	9	9	9	9	9	8	8	9	11	13	10	10	10	10	11	11	11	10	9	11	10	10	10	9	5	6	3	3																						

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
DATA PROCESSING PERSONNEL PLAN

Full-Time Equivalent Personnel Requirement	YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current Staff Available:																				
Systems Analyst	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
New Staff Required for Development:																				
Project Manager	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Systems Analyst	0	2	2	2	2	2	2	3	4	4	4	4	4	4	4	4	4	4	4	4
Programmer	0	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
New Staff Required for Maintenance:																				
Programmer/Analyst	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Outside Assistance Required:																				
Project Manager	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	0	0	0	0
Systems Analyst	1	1	2	5	0	5	4	4	5	3	2	3	3	2	2	0	0	3	2	0
Programmer	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0
TOTAL	3	7	8	11	8	15	15	16	18	16	15	16	15	14	14	11	10	13	12	10

ST. PAUL-RAMSEY MEDICAL CENTER
COMMUNICATIONS NETWORK
CONFIGURATION

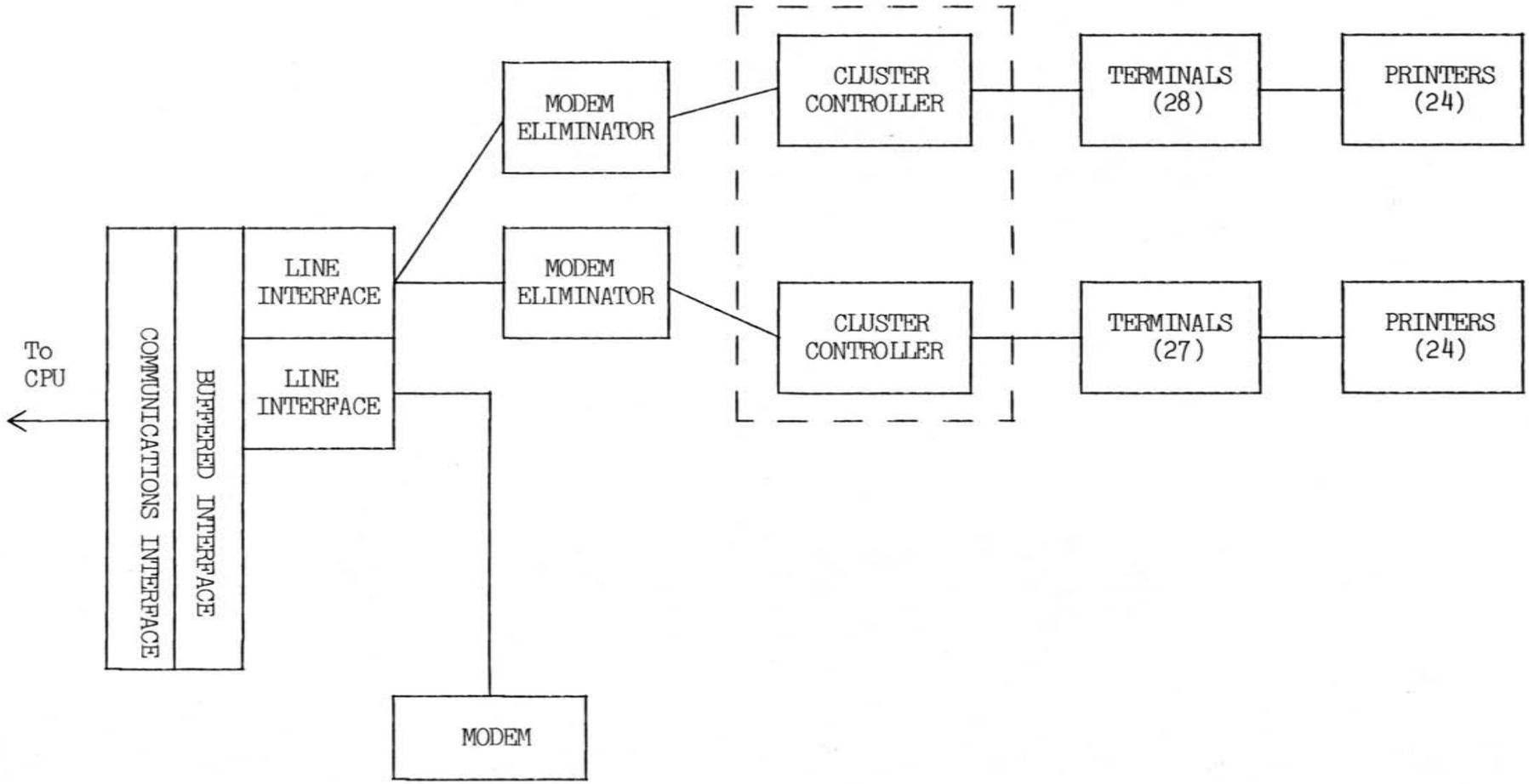


EXHIBIT II-G

ST. PAUL-RAMSEY MEDICAL CENTER
PATIENT CARE HARDWARE REQUIREMENTS
PURCHASE AND LEASE PRICES

NUMBER	DESCRIPTION	QTY	UNIT PURCHASE	EXTENSION	UNIT MML	EXTENSION	UNIT LEASE	EXTENSION
CPU								
4341-KI	CPU 2 MB	1	$270,000	$270,100	$601	$ 601	$7,670	$ 7,670
#1870	Additional Channels	1	17,790	17,790	6	6	517	517
I/O								
3278-2A	Display Station	1	2,410	2,410	25	25	88	88
#4632	Keyboard	1	972	972	7	7	34	34
3203-5	Line Printer	1	38,320	38,320	391	391	1,475	1,475
1442-N1	Card Read Punch	1	24,040	24,040	278	278	924	924
1416-1	Print Train Cartridge	1	2,930	2,930	T&M	-	134	134
TAPES								
3803-1	Tape Control	1	24,850	24,850	120	120	713	713
3420-5	Magnetic Tape Unit	2	19,230	38,460	171	342	551	1,102
6631	Single Density Tape	2	3,450	6,900	47	94	96	192
DISKS								
3830-2	Disk Controller	1	35,690	35,690	166	166	1,781	1,781
3350-A2	DASD	1	40,000	40,000	170	170	1,350	1,350
3350-B2	DASD	2	31,680	63,360	128	256	1,075	2,150
				$565,822		$2,456		$18,130

EXHIBIT II-H

EXHIBIT II-I

ST. PAUL-RAMSEY MEDICAL CENTER
PATIENT CARE SYSTEMS
COMMUNICATIONS NETWORK
BY DEPARTMENT

Department	Terminals	Printers
Nursing Units	30	30
Radiology	3	2
Pharmacy	2	3
Laboratory	2	2
Admitting	2	1
Emergency Room	2	1
Outpatient	5	1
Central Service	1	1
Dietary	1	1
Medical Records	2	1
Business Office	1	1
Computer Room	1	1
OT/PT/RT	3	3
	55	48

ST. PAUL-RAMSEY MEDICAL CENTER
PATIENT CARE SYSTEMS
COMMUNICATIONS NETWORK
MONTHLY LEASE PRICES

DESCRIPTION	QTY	UNIT PRICE	EXTENSION
Video Matrix Terminal	55	$ 149	$ 8,195
Communications Interface	1	1,646	1,646
Buffered Interface	1	135	135
RS232 Line Interface	2	56	112
Modem Eliminator	2	19	38
Cluster Controller	2	500	1,000
Line Driver Card	14	38	532
Cluster Controller	2	20	40
Multiprinter II	48	85	4,080
Printer Pedestal	48	5	240
Printer Forms Basket	48	1	48
Forms Control Option	48	4	192
9.6k bps Modem	1	300	300
Equipment Rack, Single	1	39	39
			$16,597

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
PRESENT SYSTEMS COSTS

	1982 Budget
Hospital Shared Systems	$ 410,000
MCSI	200,000
Datapoint Rental	193,880
Other Purchased Services	18,000
Salaries and Related Expenses	234,939
Supplies and Other Expenses	20,712
Total	$1,077,531

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
POTENTIAL BUSINESS OFFICE SAVINGS

	($000) From	To
One-Time Cash Flow Benefit:		
Reduction in Gross Accounts Receivable (10-20 days)	$2,000	$4,000
Annual Recurring Benefits:		
Lost Charges (2-3%)	$1,400	$2,100
Bad Debt and Free Care (1-1 1/2%)	700	1,050
Interest*	600	1,100
	$2,700	$4,250
* Reduction in A/R	$2,000	$4,000
Lost Charges Savings	1,400	2,100
Bad Debt and Free Care	700	1,050
	$4,100	$7,150
@ 15% interest	$ 615	$1,073

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
POTENTIAL PATIENT CARE SAVINGS

HOSPITAL CHARACTERISTICS

A)	Number of Employees	2,100
B)	Revenue Total (millions)	$ 71.75
	- Cost-based	$ 35.88
C)	- Noncost-based	$ 35.87
D)	Patient Days	123,000

SAVINGS

Nonpersonnel Savings:	
Lost charge elimination (1% of C)	$ 358,700
Interest on one-time pickup of two days' revenue in A/R (12% of B ÷ 365 x 2)	47,178
Late charge writeoff (0.1% of C)	35,870
Forms, supplies, dietary (40¢ per D)	49,200
Total nonpersonnel savings	$ 490,948
Personnel savings (3% of A):	63
2/3 Nonnursing ($14,000 salary)	$ 588,000
1/3 Nursing ($18,000 salary)	378,000
Total personnel savings	$ 966,000
TOTAL SAVINGS	$1,456,948
Savings per patient day	$ 11.85

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
III. SYSTEMS DESCRIPTIONS

Table of Contents

III. SYSTEMS DESCRIPTIONS

ST. PAUL-RAMSEY MEDICAL CENTER
SYSTEMS PLAN
III. SYSTEM DESCRIPTIONS

A. INTRODUCTION

This section explains the details of all systems included in the Systems Plan. It provides an overview of how each system fits into a totally integrated system, as well as detailed functions and features as requested by users. SPRMC should use this section as a guide for implementing the Systems Plan by selecting packages that most closely fit user needs and by identifying detailed modifications to those packages selected. User needs will be identified in more detail during the vendor selection phase for each application (see section IV-D on methodology).

Part B describes the fully integrated system that SPRMC would ultimately have, assuming all systems are implemented.

Part C describes the data required to support the systems. It takes the data items required by the entire system and divides them into logical groups called Data Models. This will help the Data Processing staff understand system relationships by recognizing what data items are required and which systems require them.

Part D provides descriptions of each system in the plan. It is a summarization of the system requirements identified by users during the interview process.

B. INFORMATION SYSTEMS SCHEMATICS

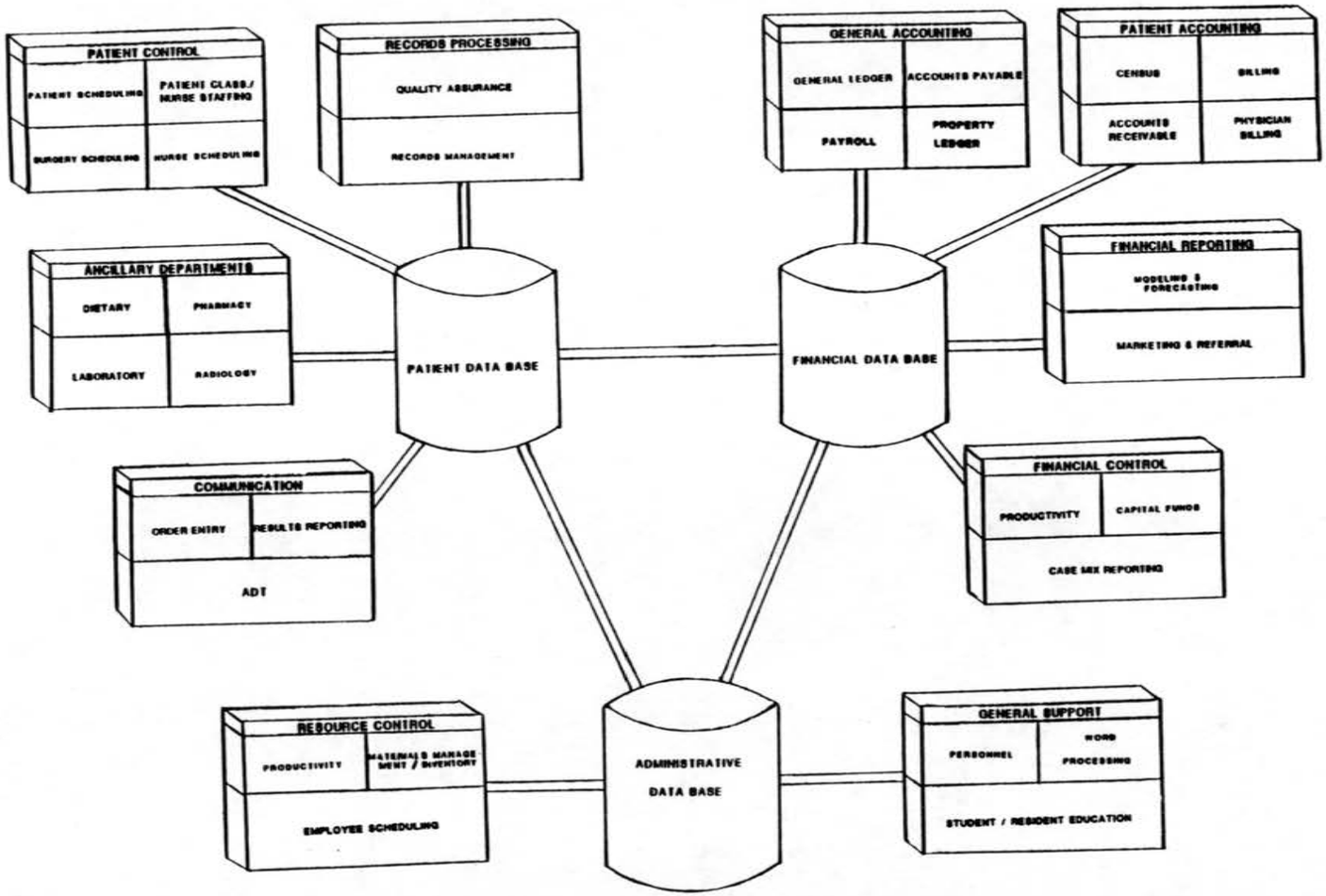
The following exhibits show the relationships between the systems in the plan. Exhibit III-A, "Systems Schematic," groups the systems according to which category of data the systems use. These categories are Patient Data, Financial Data and Administrative Data.

Exhibit III-B, "Systems Relationships," identifies which systems share data with other systems. For example, Patient Classification shares data with ADT, Order Communications, Productivity Reporting and Payroll/Personnel. This exhibit will be particularly useful when selecting packages to determine which other systems must be interfaced with the chosen package.

ST. PAUL-RAMSEY MEDICAL CENTER

INFORMATION SYSTEMS PLAN

SYSTEMS SCHEMATIC



ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
SYSTEMS RELATIONSHIPS

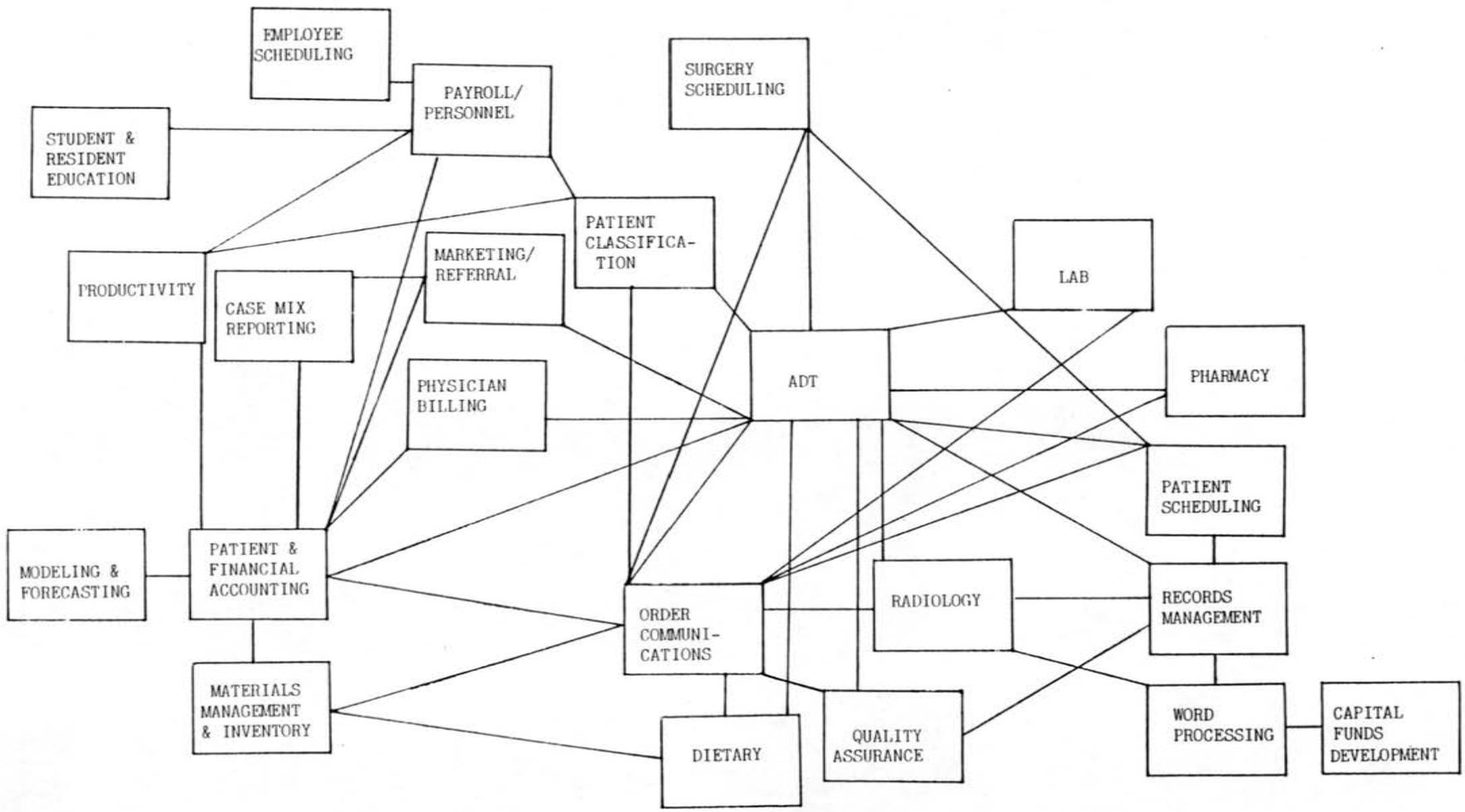


EXHIBIT III-B

C. SYSTEMS GROUP DATA MODEL

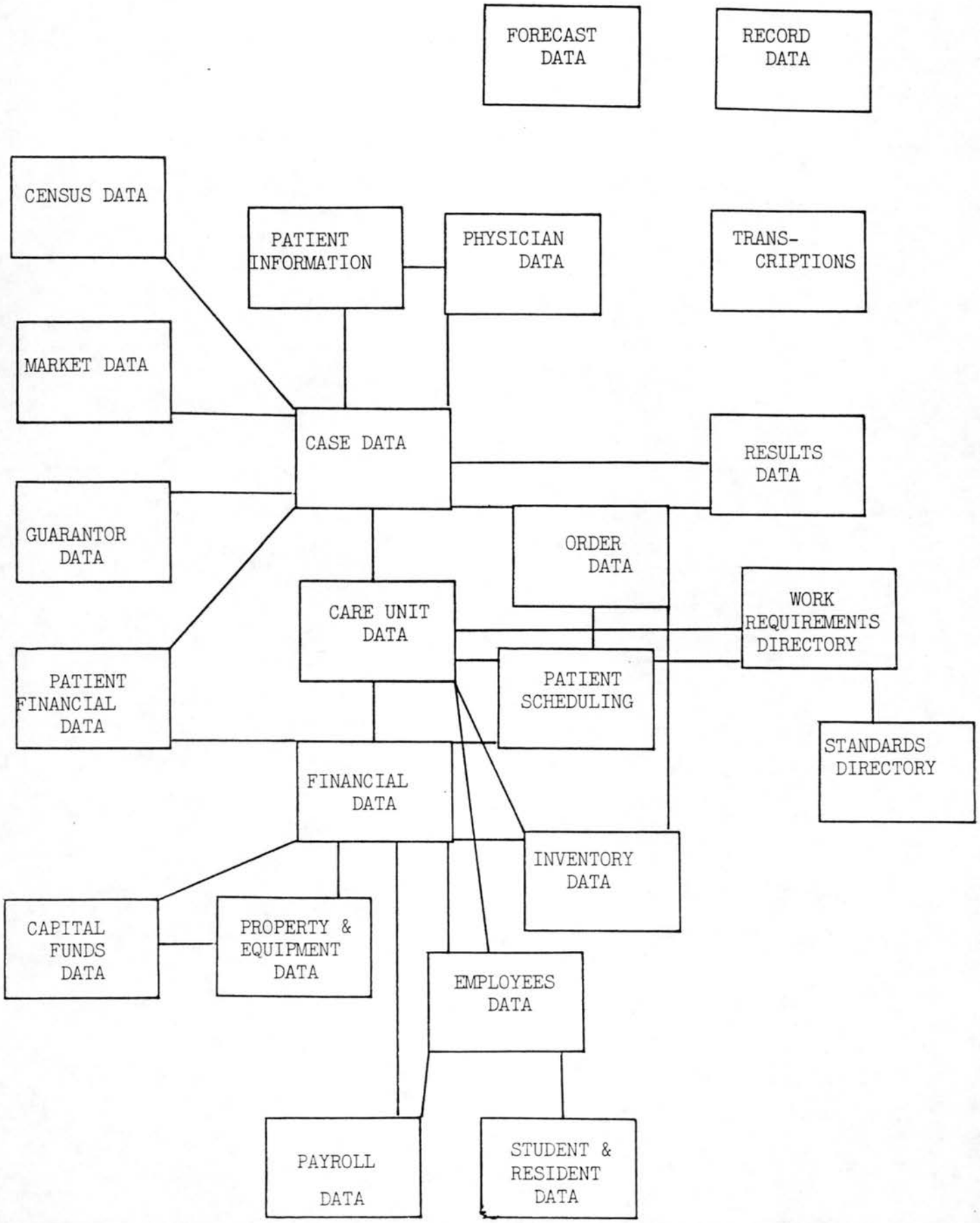
The conceptual data base design prepared as part of the Information System Plan addresses a key problem that frequently exists when attempting to integrate information. When the data is structured for the first systems that are implemented, the structure may not be adequate for later systems that need to use the same data. For example, it may be adequate to store patient information on a case by case basis if only a rudimentary billing system is planned. When collection functions are added, however, it will probably be necessary to associate all the cases for a single patient and to associate all the patients for which a single guarantor is responsible. Therefore, the intent of the conceptual data base design is to avoid the expensive changes that may otherwise be required for early systems when their data base designs do not adequately consider the data structures required for the later systems.

The conceptual data base design presented here considers the collective requirements of all the planned systems. In selecting applications it is important that these relationships be supported.

A high level summary of the logical data base design is shown in Exhibit III-C. This Systems Group Data Model shows the major groupings of data and indicates how they relate to each other. The System/Data Model Matrix in Exhibit III-D shows the usage of the basic data types by the various application system planned for the next five years.

Usually the kinds of data that go into each of the logical records in the data base are apparent from the names of the data models. In order to convey this information more clearly, however, a brief description of each of the data types is provided in Exhibit III-E.

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
SYSTEMS GROUP DATA MODEL



ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
SYSTEMS/DATA MODEL MATRIX

	CENSUS DATA	MARKET DATA	GUARANTOR DATA	PATIENT FINANCIAL DATA	CAPITAL FUNDS DATA	PATIENT INFORMATION	CASE DATA	CARE UNIT DATA	FINANCIAL DATA	PAYROLL DATA	FORECAST DATA	PHYSICIAN DATA	ORDER DATA	PATIENT SCHED-ULING DATA	INVENTORY DATA	EMPLOYEE DATA	STUDENT & RESIDENT DATA	RECORD DATA	TRANSCRIPTIONS	RESULTS DATA	WORK REQUIRE-MENTS DIRECTORY	STANDARDS DIRECTORY
Order Communications	X					X	X	X				X	X							X		X
Laboratory	X												X							X		
Pharmacy	X					X							X		X							X
Radiology	X					X							X					X	X	X		X
Patient Scheduling	X					X							X	X								X
Materials Management/Inventory									X				X		X							X
Patient and Financial Accounting	X		X	X		X		X	X	X												
Case Mix Reporting		X		X				X	X													X
Productivity								X		X		X	X		X							X
Patient Classification	X					X	X	X								X						X
Dietary	X					X	X	X					X		X							
Records Management																		X				
ADT	X			X		X							X									
Surgery Scheduling	X					X							X							X	X	X
Employee Scheduling								X		X						X					X	
Quality Assurance	X					X	X											X				
Personnel										X						X						X
Word Processing/Transcription																		X	X			
Modeling/Forecasting				X		X		X	X		X											
Physician Billing				X		X																X
Marketing/Referral Analysis		X		X		X																
Student/Resident Education										X						X	X					X
Capital Funds Development					X														X			

EXHIBIT III-D

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
SYSTEMS GROUP DATA MODEL DESCRIPTIONS

Systems Group Data Model Descriptions

CAPITAL FUNDS DATA
- Donors
- Donations
- Pledges

CASE DATA
- Physicians (primary, consulting, referring)
- Progress notes
- Billing and collection
- Patient classification and diagnosis
- Orders and results
- Procedures
- Insurance

CARE UNIT DATA
- Ancillary, nursing and other units performing services
- Unit volume statistics
- Unit costs

CENSUS DATA
- Admissions
- Discharges
- Transfers
- Beds
- Patient room and bed

EMPLOYEE DATA
- Demographic/biographic
- Work schedule
- Exit interview

FINANCIAL DATA
- Overhead
- Budget
- Revenues and expenses

FORECAST DATA
- Item and units
- Variables
- Constraints

GUARANTOR DATA
- Income source
- Eligibility
- Insurance coverage
- Contract terms

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
SYSTEMS GROUP DATA MODEL DESCRIPTIONS

Systems Group Data Model Descriptions (continued)

INVENTORY DATA
- Item and cost (supplies, equipment, etc.)
- Request for purchase or stock
- Usage
- Inventory status
- Vendor
- Volume statistics

MARKET DATA
- Demographic/biographic (population, age, etc.)
- Market definition
- Market share

ORDER DATA
- Item and cost
- Normal test values
- Interactions
- Nursing requirement
- Specimen information

PATIENT FINANCIAL DATA
- Outstanding bills
- Employer
- Credit status

PATIENT INFORMATION
- Medical record index
- Demographic data
- Visit history
- Religion

PATIENT SCHEDULING DATA
- Unit
- Patient
- Time, room

PAYROLL DATA
- Name
- Department
- Salary
- Hours worked

PHYSICIAN DATA
- Demographic
- Revenue
- Statistics

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
SYSTEMS GROUP DATA MODEL DESCRIPTIONS

Systems Group Data Model Descriptions (continued)

PROPERTY & EQUIPMENT DATA
- Item
- Purchase date & amount
- Depreciation
- Maintenance history
- Salvage value

RECORD DATA
- Record type
- Location
- Completion status

RESULTS DATA
- Order
- Narrative result
- Numeric result

STANDARDS DIRECTORY
- Item
- Standard characteristics

TRANSCRIPTIONS
- Letters
- Radiologist reports
- Progress notes

WORK REQUIREMENTS DIRECTORY
- Task
- Staffing needed
- Equipment needed

D. SYSTEM DESCRIPTIONS

The following pages contain brief descriptions of each of the systems identified in this plan. The descriptions on the following pages are sequenced by the priority determined by the Management Advisory Committee. The categories in each system description are as follows:

Purpose - States the purpose of the particular system.

Functions and Features - Lists the needs identified by users during the interview process.

Major Inputs - Lists items that must be entered into the system, either through direct data entry or from other systems.

Major Outputs - Lists major reports and forms produced by the system.

Major Information Categories - Identifies major types of information used by the system.

Interfaces - Lists other systems that the system must interface with. This corresponds with the relationships shown on the "Systems Relationships" diagram in part B of this section.

Benefits - Identifies the tangible and intangible benefits expected from implementing the system.

Major Users - Lists the users most likely to use the system.

Approximate Work Days - Shows the approximations of design and installation time required for implementation.

There is a function chart in each system description that shows the major function of the system. These major functions are broken down into subfunctions.

The System Overview Schematic shows the system interfaces, files used by the system and the major inputs and outputs. The files shown correspond with the Systems Group Data Model in Part C.

Order Communications

1. System Name: Order Communications

2. Purpose:

   - Provide a communications network to link Administration, Ancillary and Patient Care areas

   - Gather, process and communicate vital patient information on a timely and accurate basis

3. Functions and Features:

   - Order entry and results reporting

     . On-line order entry and results capture with ability to hold pending physician approval and/or pharmacist approval

     . Automated generation of requests for standing or stop orders

     . Tracks order status and processing times

     . On-line order status and results inquiry

     . Automated generation of patient charges

     . Handles orders and charges for inpatients, clinics, HMO's and Gillette Children's Hospital

   - Statistics reporting

     . Number of services and visits

     . Volumes by department

   - Patient care plan

     . Builds patient care plan based upon physician orders, nurse orders and standard care plan

     . Monitors patient services against actual and standard care plans

Order Communications (Continued)

4. Major Inputs:

   - Nursing and physician orders
   - Order requisitions and cancellations
   - Results and results confirmations
   - Surgical time

5. Major Outputs:

   - Patient care orders by department
   - Care plans
   - Order status
   - Patient care results
   - Patient charges
   - Department activity statistics
   - Summary of orders by:
     . Type
     . Physician
   - Summary of results by:
     . STAT or Regular
     . Patient
     . Day
     . Physician

6. Major Information Categories:

   - Orders
   - Standard order data
   - Available facilities and resources

Order Communications (Continued)

6. Major Information Categories (Continued):

   - Results
   - Patient care plans
   - Physician data

7. Interfaces:

   - Patient and Financial Accounting
   - Admissions, Discharges and Transfers
   - Laboratory
   - Radiology
   - Pharmacy
   - Dietary
   - Materials Management/Inventory
   - Patient Scheduling
   - Quality Assurance
   - Patient Classification
   - Surgery Scheduling

8. Benefits:

   - Increase effective communication between nursing units, surgery, ancillary services and pharmacy
     - . Reduce use of telephone
     - . Improve physician-nurse-ancillary relations
     - . Improve patient transportation
   - Improve patient care
     - . Reduce time on patient related paperwork, allowing more time for patient care functions

Order Communications (Continued)

8. Benefits (Continued):

   - . Timely results reporting
   - . Increased coordination or multiple procedures
   - . Reduce length of stay

- Facilitate special studies
  - . Availability of accurate procedure data
  - . Increase time available for studies
- Facilitate nursing services
  - . Care planning
  - . Characterize pattern of health care provided
- Provide basis for productivity reporting in ancillary services
- Develop accessible data base for audit, review, study and research of medical information

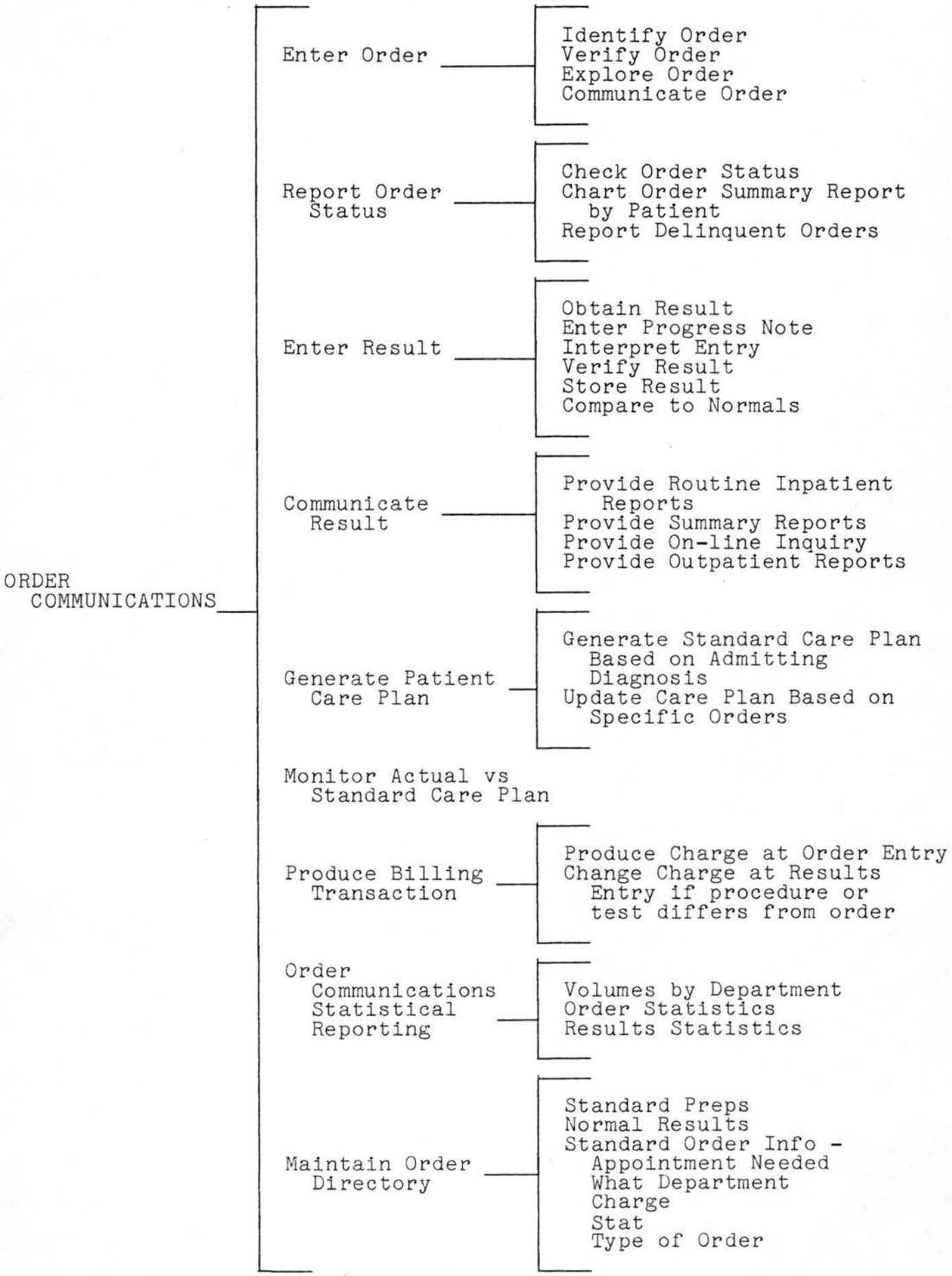
9. Major Users:

- Admitting
- Physicians
- Nursing
- Other Ancillary Departments
- Dietary
- Housekeeping

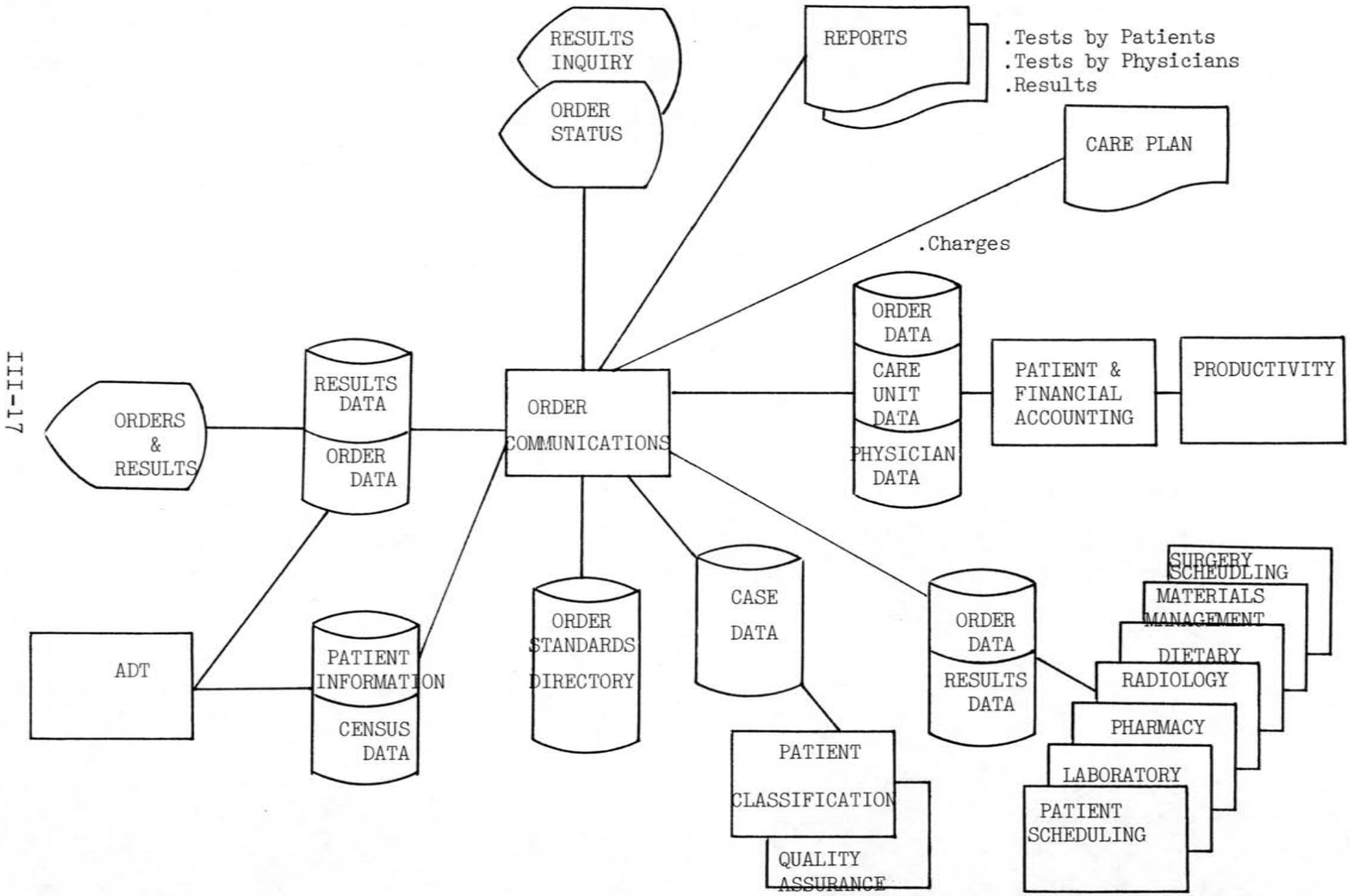
10. Approximate Workdays Required:

	Data Processing	User
Design	400	160
Installation	800	200
Total	1,200	360

Order Communications (Continued)



ORDER COMMUNICATIONS
SYSTEM OVERVIEW SCHEMATIC



Pharmacy

1. System Name: Pharmacy

2. Purpose:

   - Provides automated assistance for activities related to the management of the patient's medication care plan

   - Facilitates drug dispensing, dissemination of patient medication information, inventory management and drug expensing

3. Functions and Features:

   - On line medication order entry and printing of prescription labels

   - Historical data retention for special studies

   - Perpetual inventory system

   - Unit dose distribution and charging

   - Monitoring controlled substances (narcotics)

   - Transfer of interdepartmental expenses for drug items to Nursing Unit

   - Patient medication profiles

   - Medication administration records

   - Drug interaction and allergy screening

   - IV compatibility screening

4. Major Inputs:

   - Patient drug, I.V. orders

   - Patient order discontinuation dates

Pharmacy (Continued)

4. Major Inputs (Continued):

- Inventory
  - . Additions
  - . Usage/spoilage
- Interdepartmental transfer of expenses
- Drug administration information
  - . time given
  - . nurse
- Patient information
  - . patient registration information
  - . patient medical history
  - . patient diagnosis and condition

5. Major Outputs:

- Patient Medication Profiles
- Medication Administration Records
- Medication/I.V. Solution Schedules
- Medication/I.V. Solution Labels
- Unit Dose Cart Replenishment List
- Refills Due List
- Stop Order Notices
- Formulary Listing
- Daily Billing/Prescription Log
- Controlled Substance Log
- Pharmacokinetic Evaluations
- Drug Interaction Notices

Pharmacy (Continued)

5. Major Outputs (Continued):

- Drug Prepackaging Schedules
- Discharge Summary Report
- Discontinued Drug Notification Labels
- Workload by Hour Report
- Discontinued I.V. List
- Unit Cost Report
- Patient Care Information
  - . Patient Medication Profile
- Statistics
  - . Department activity statistics
  - . Patient statistics
  - . Resource utilization

6. Major Information Categories:

- Patient information
- Open orders (current hospital stay)
- Closed orders (current and previous hospital stays)
- Vendor information
- Inventory status (including lot numbers and expiration dates)
- Unit census information
- Formulary
- Drug interaction information
- I.V. compatibility information

Pharmacy (Continued)

7. Interfaces:

   - ADT
   - Order Communications

8. Benefits:

   - Provide a higher quality service to patients
   - Facilitate required audits and formulary recordkeeping
   - Increase quality of patient care through drug compatibility analysis
   - Reduce professional time spent on patient-related paperwork and label printing
     . Increase quality of documentation through automation

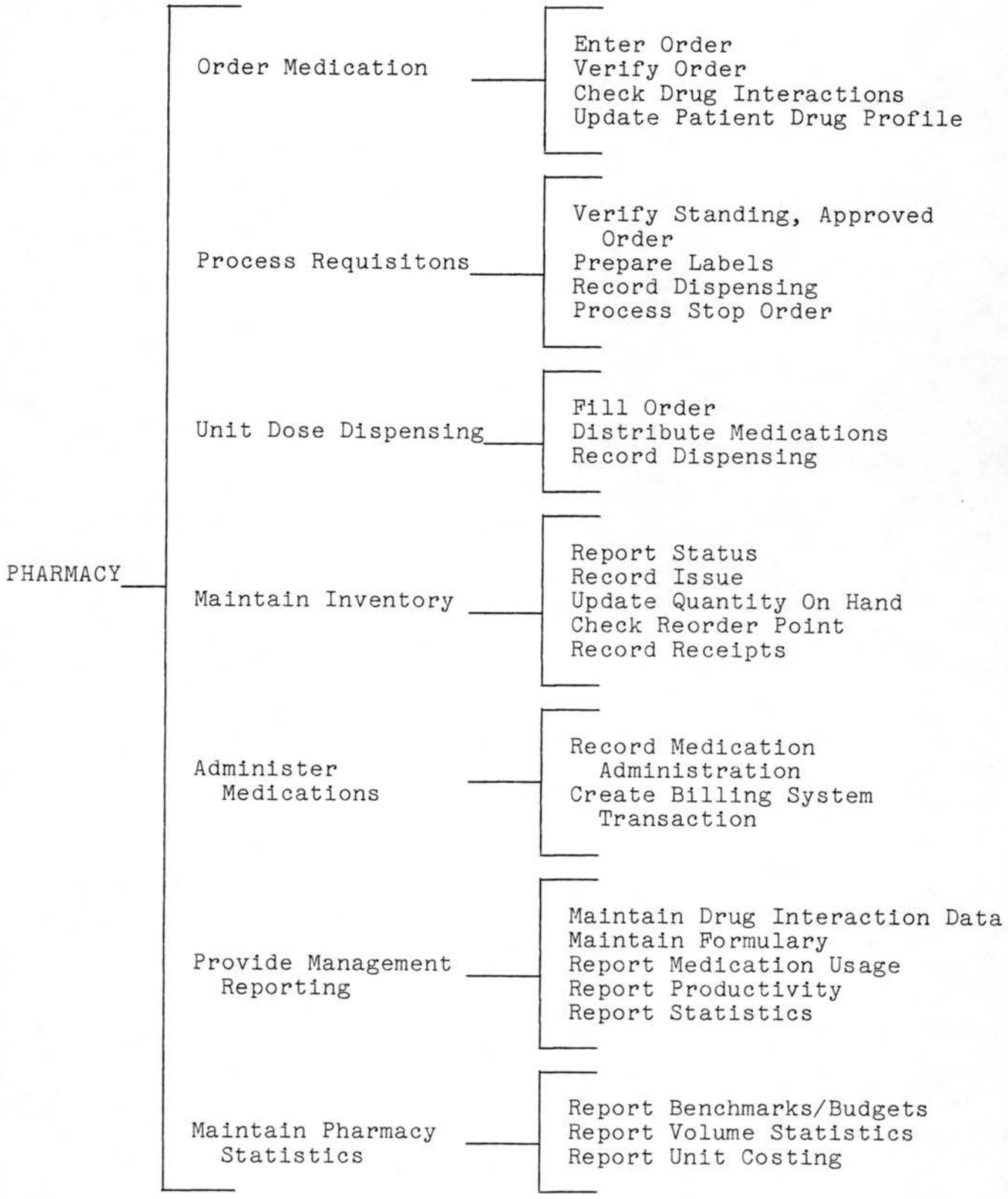
9. Major Users:

   - Pharmacy
   - Nursing
   - Other Ancillary Departments, as needed

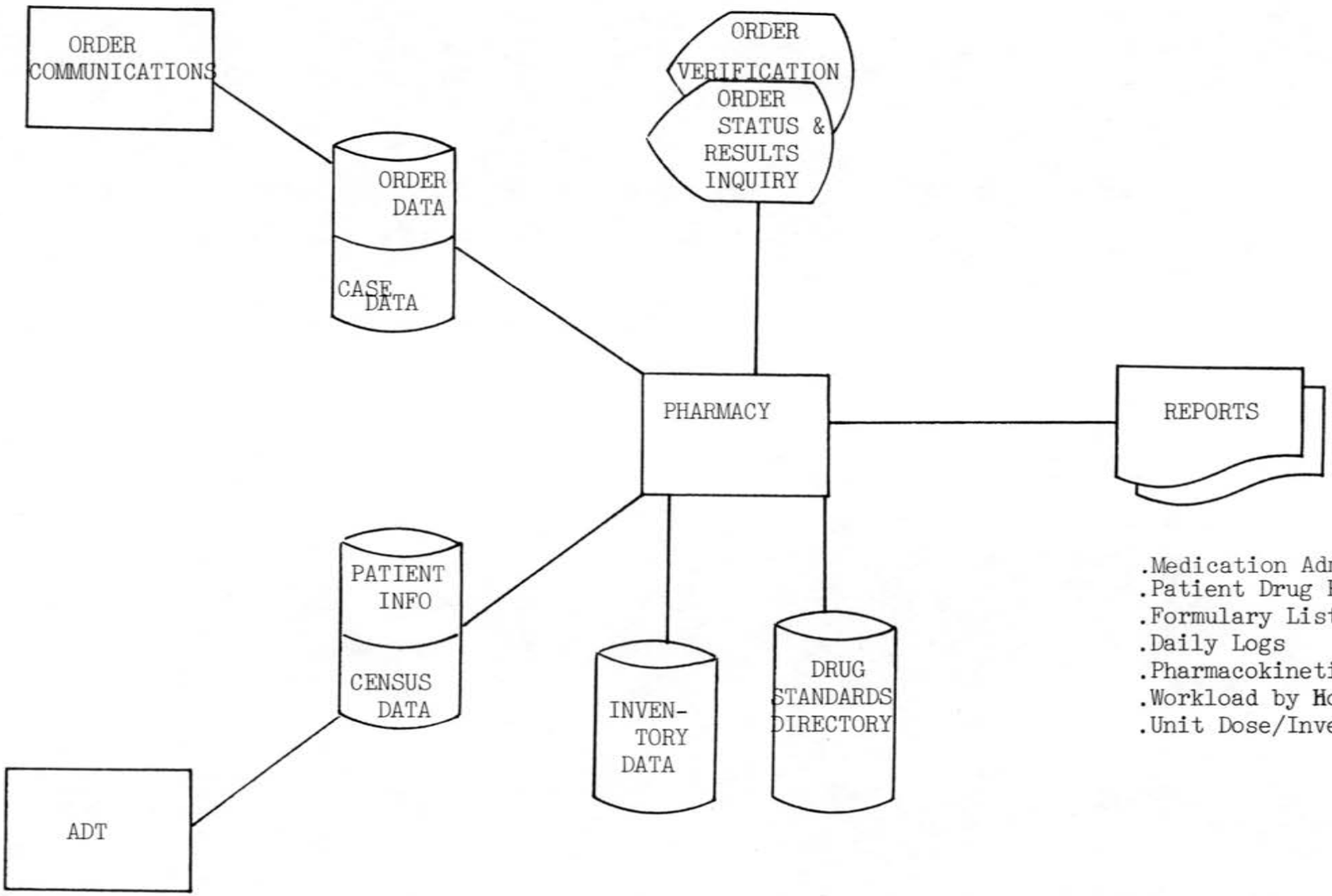
10. Approximate Workdays Required:

	Data Processing	User
Design	100	40
Installation	300	70
Total	400	110

Pharmacy (Continued)



PHARMACY
SYSTEM OVERVIEW SCHEMATIC



- .Medication Administration Summary
- .Patient Drug Profile
- .Formulary Listing
- .Daily Logs
- .Pharmacokinetic Evaluations
- .Workload by Hour
- .Unit Dose/Inventory Reports

Radiology

1. System Name: Radiology

2. Purpose:

   - Provide prompt patient processing and accurate record keeping for radiological services

3. Functions and Features:

   - Create and maintain patient record
   - Retrieve patient information and exam history on line
   - Monitor patient movement through department
   - Monitor time spent on procedures, patient wait time
   - Quality control over repeat procedures and exposure times and dosage
   - Build interpretations based on standard results maintained in data base
   - Generate Radiology report of procedures by Radiology code

4. Major Inputs:

   - Patient registration information
   - Orders
   - Order status
   - Exam results indication
   - Waiting times

5. Major Outputs:

   - Flash Card for identifying Radiology films
   - Film Labels

Radiology (Continued)

5. Major Outputs (Continued):

   - List of patients with incomplete readings
   - List of patients with incomplete procedures
   - List of patients with complete procedures
   - Alphabetic list of radiology patients and assigned numbers
   - Film file location list by location
   - Film file location list by patient
   - Radiology results list by patient
   - Radiology results list by exam
   - Statistics
     - . Department activity
     - . Patient activity
     - . Waiting time summary
   - Physicians' film interpretation

6. Major Information Categories:

   - Radiology patient records
   - Patient location
   - Patient demographics
   - Standard interpretations directory

7. Interfaces:

   - ADT
   - Order Communications
   - Word Processing/Transcriptions
   - Records Management

Radiology (Continued)

8. Benefits:

   - Increase quality of care
     - Speeds results back to nursing floors
     - Expedite patient location and movement through department
     - Builds historical file for research and evaluations
   - Facilitates results reporting by building interpretations from standard results in data base; reduces radiologist time spent on each case
   - Reduces clerical effort
   - Reduces patient waiting times and improves convenience

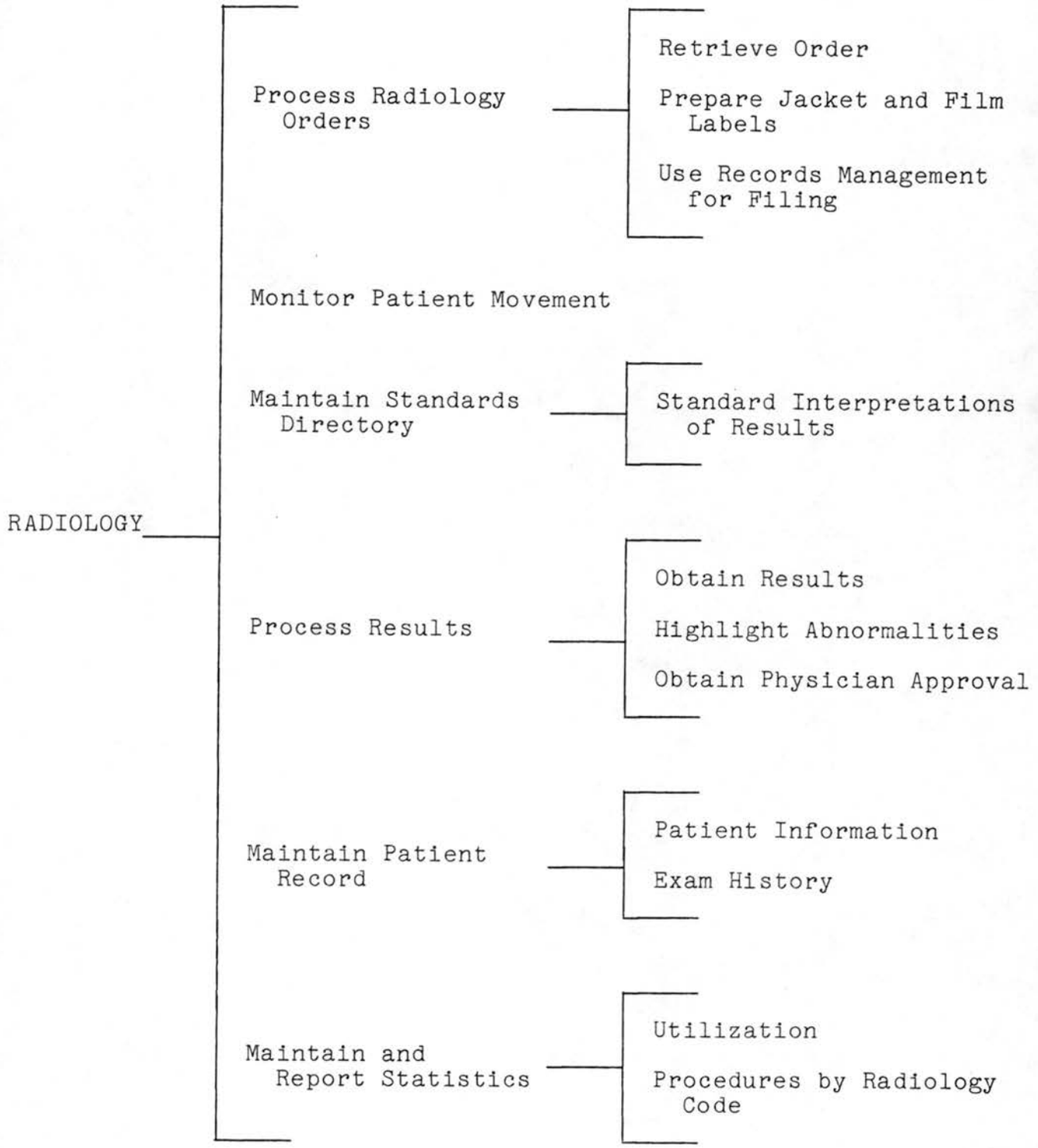
9. Major Users:

   - Radiology
   - Medical Records

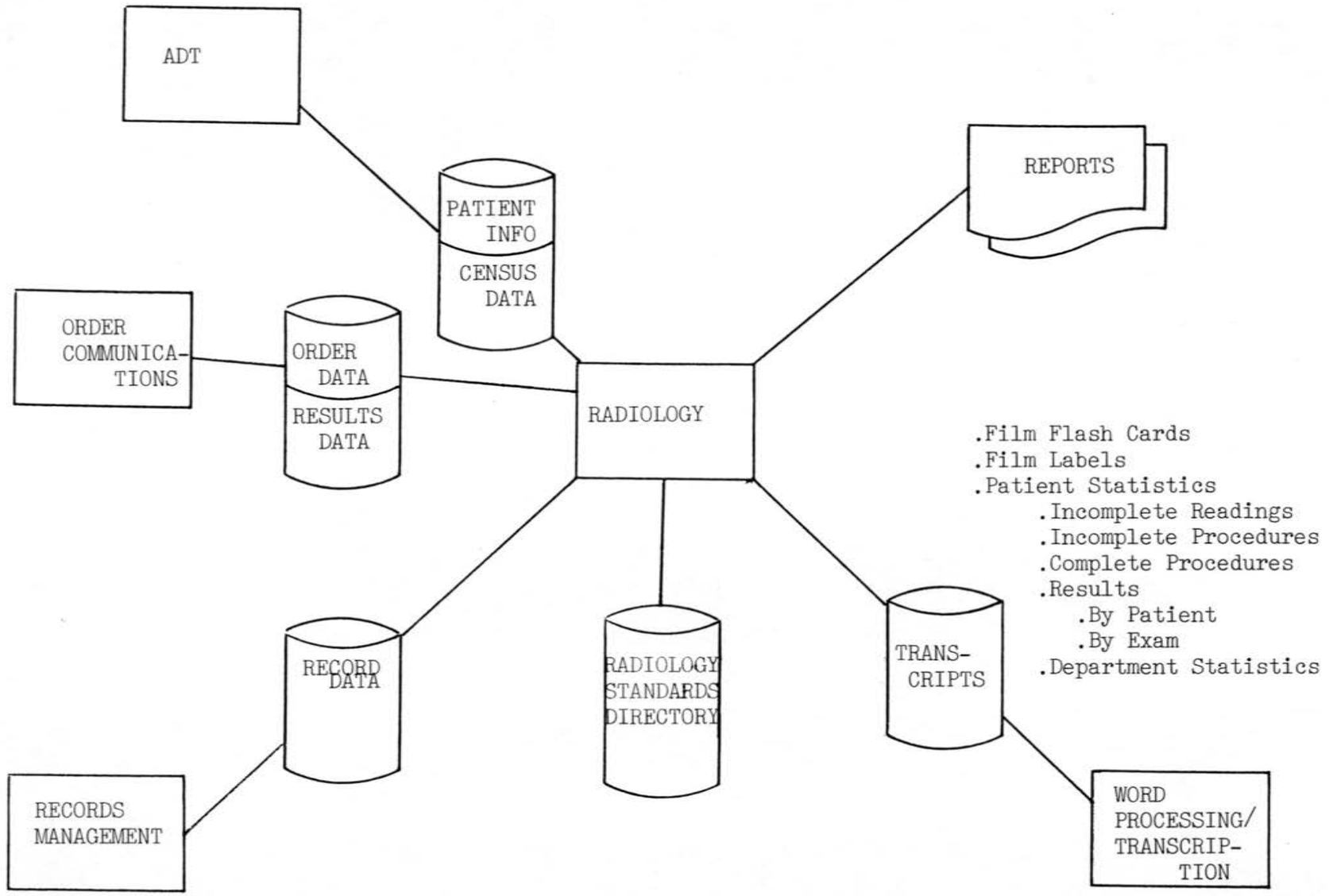
10. Approximate Workdays Required:

	Data Processing	User
Design	50	20
Installation	150	40
Total	200	60

Radiology (Continued)



RADIOLOGY
SYSTEM OVERVIEW SCHEMATIC



Patient Scheduling

1. System Name: Patient Scheduling

2. Purpose:

   - To maximize and control effective utilization of limited hospital resources

   - To provide coordinated schedules for both St. Paul-Ramsey and Gillette Children's

3. Functions and Features:

   - Schedules services based on requested time and resources available, substitutes first available time and like resource if initial request cannot be met.

   - Schedule resources on a priority basis

   - Requests processed on-line

   - Schedules multiple services per patient, checking for schedule conflicts in both St. Paul-Ramsey and Gillette Children's

   - Produces schedules by service, room and physician

   - Automatically adjusts schedule when delays/changes occur

   - Schedules based on time estimates supplied or standard times for procedures

   - Checks for HMO status, to verify account number and other data

4. Major Inputs:

   - Schedule requests and changes

   - Orders requiring scheduling

   - Room availability data

   - Staffing availability data

   - Patient location

   - Procedure preps

   - Escort requirements

Patient Scheduling (Continued)

5. Major Outputs:

   - Department Schedules and Updates
   - Patient Schedules and Updates
   - Physician Schedules and Updates
   - Procedure Prep Directory
   - Escort Schedule
   - Escort Requirement Directory
   - Unscheduled Procedures
   - Performance Reporting
     - . Actual vs. planned appointments
     - . Wait time
     - . Average time

6. Major Information Categories:

   - Physician utilization
   - Service schedules
   - Standard times for procedures or tests
   - Room and resource data
     - . Staffing requirements
     - . Type of room and procedure limitations

7. Interfaces:

   - ADT
   - Records Management
   - Order Communications

Patient Scheduling (Continued)

8. Benefits:

   - Facilitate locating and escorting patients
   - Improve utilization of limited facilities

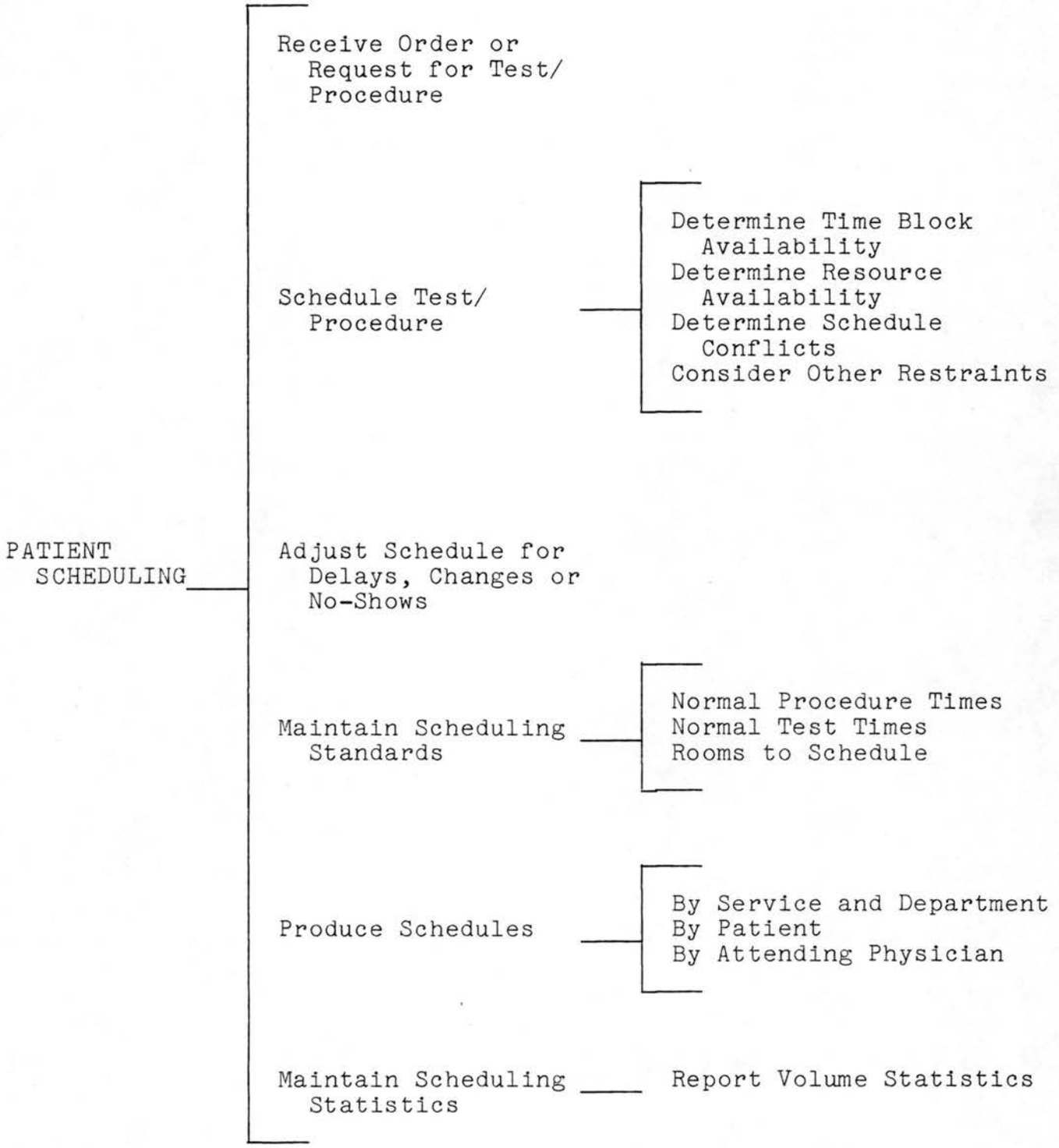
9. Major Users:

   - Outpatient clinics
   - Ancillary departments
   - Physicians

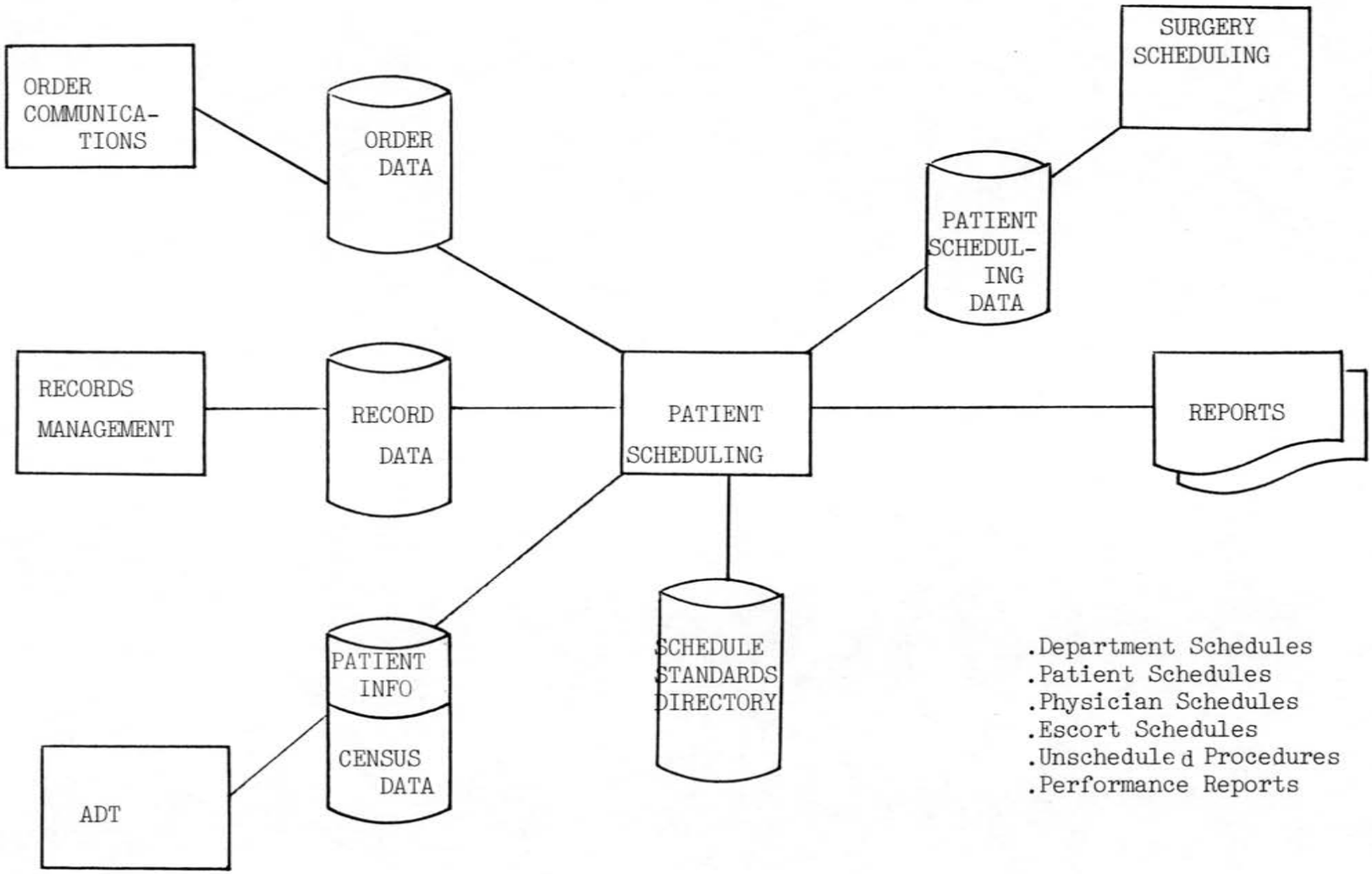
10. Approximate Workdays Required:

	Data Processing	User
Design	100	40
Installation	350	90
Total	450	130

Patient Scheduling (Continued)



PATIENT SCHEDULING
SYSTEM OVERVIEW SCHEMATIC



- Department Schedules
- Patient Schedules
- Physician Schedules
- Escort Schedules
- Unscheduled Procedures
- Performance Reports

Materials Management/Inventory

1. System Name: Materials Management/Inventory

2. Purpose:

   - Maintain physical and financial control over inventory items

   - Ensure effective and efficient use of materials and supplies

3. Functions and Features:

   - Monitors stock levels, backorders and usage for all inventories

   - On-line item status inquiries

   - Uses economic order quantity, reorder points and safety stock levels to control and generate purchase requests

     . Monitors stock levels and replenishment points at processing and distribution areas (Warehouse, Surgery, Nursing Units, Ancillary Areas), automatically issuing an inventory request at replenishment point

   - Maintains vendor information related to order times

   - Converts quantity from unit of measure purchased or stored to unit of measure issued

   - Calculates cost per unit of issue

   - Expenses charged back to cost centers for distributed items; also allows for returns and redistribution to other cost centers

   - Supports cycle counting

     . Specify items due for cycle count

     . Cycle count intervals based on relative level of control needed for each item (ABC categories)

Materials Management/Inventory (Continued)

3. Functions and Features (Continued):

   - Supports annual physical inventory through generation of item count reports
   - Calculates value of inventory on-hand
   - Monitors inventory turnover
   - Picking lists
   - Packing lists
   - Generates charges

4. Major Inputs:

   - Inventory requests
   - Inventory issues
   - Inventory receipts
   - Inventory returns
   - Departmental stock usage
   - Quantity conversion factors (for unit of measure calculations)
   - Inventory level adjustments
   - Adjustments to economic order quantity, reorder points, safety levels
   - Vendor information

5. Major Outputs:

   - Stock Status Report/Inquiry
   - Purchase Orders
   - Aged Backorder Items List
   - Reorder Items List
   - Usage by Item and by Department Report

Materials Management/Inventory (Continued)

5. Major Outputs (Continued):

   - Charge Tags
   - Physical Inventory Item Count Tickets
   - Turnover Analysis
   - Open Purchase Order Status Report by vendor and item
   - Item Price Catalog
   - Items Received List
   - Suggested Exchange Cart Level
   - Vendor Analysis Report
   - Suggested EOQ, ROP and Safety Level Reports

6. Major Information Categories:

   - Item data
     . Vendor
     . Description
     . On-hand on on-order quantity
     . Reorder and safety levels
   - Inventory item activity history
   - Vendor information
   - Contract agreements

7. Interfaces:

   - Patient and Financial Accounting
   - Order Communications
   - Dietary

Materials Management/Inventory (Continued)

8. Benefits:

   - Increase inventory and distribution internal control

     . Facilitate control of operating costs

   - Reduce chance of a stock shortage

   - Reduce amount of inventory on hand to minimum level necessary

9. Major Users:

   - Materials Management

   - Dietary

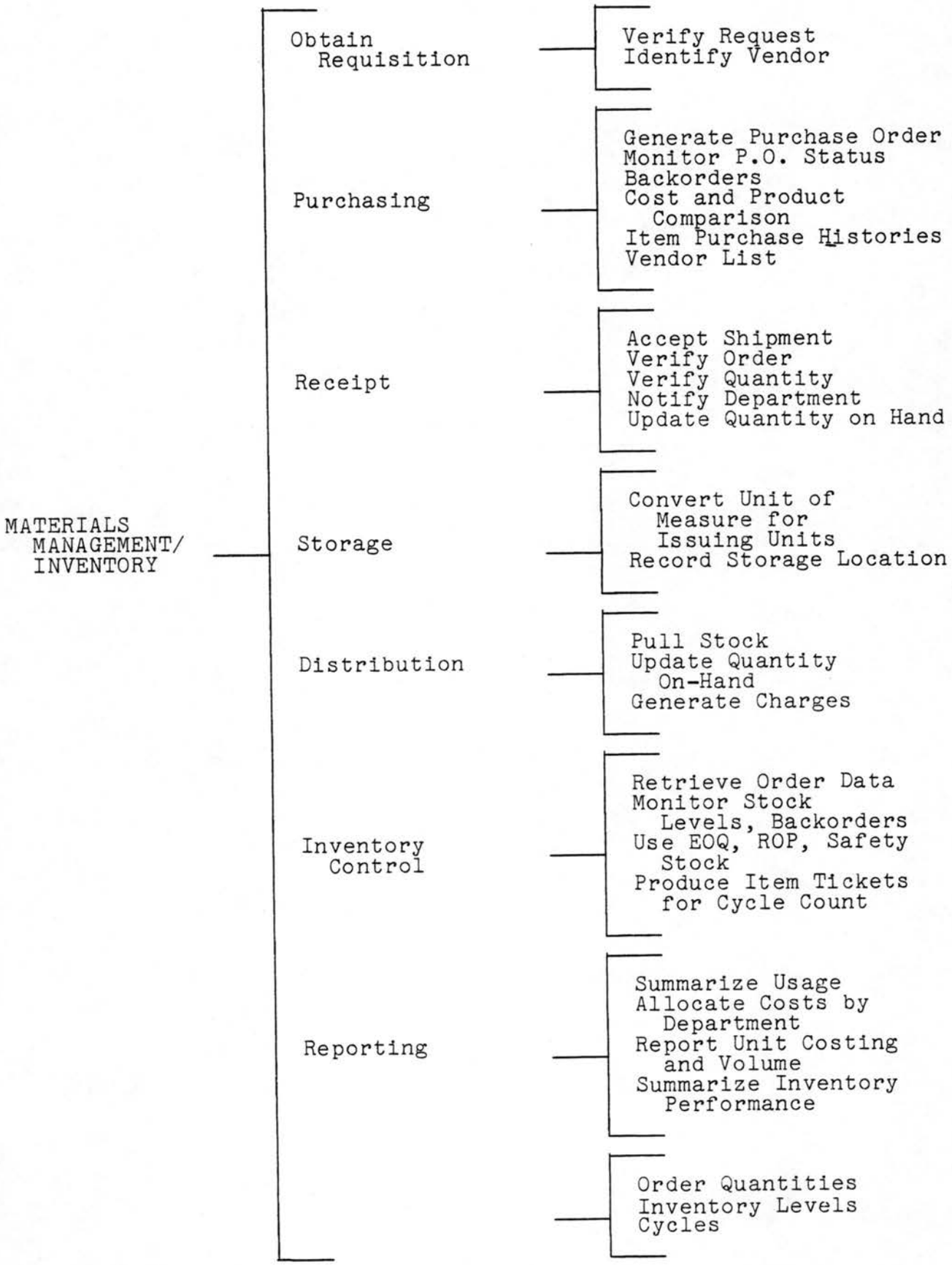
   - Pharmacy

   - Nursing

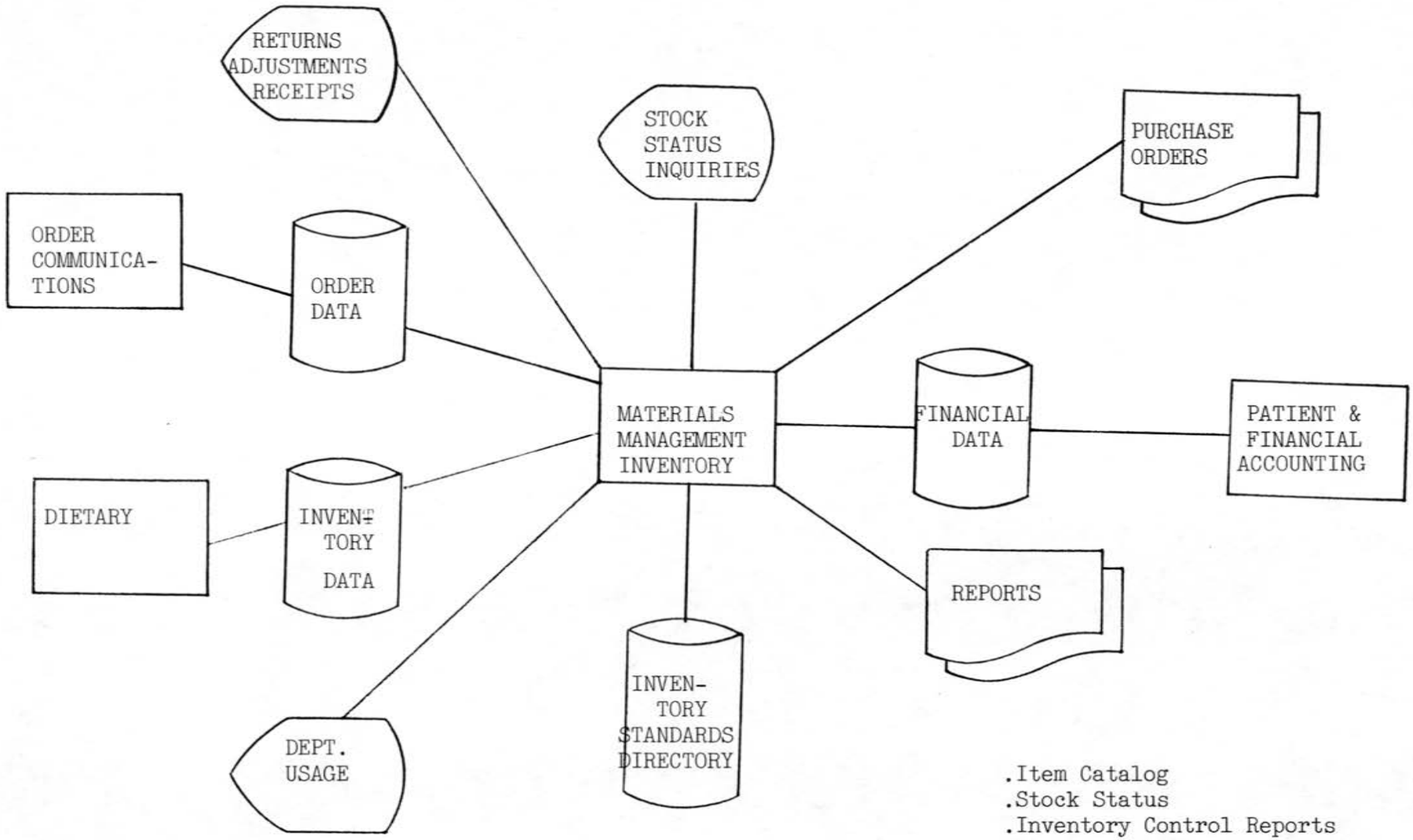
   - Other departments, with own inventory

10. Approximate Workdays Required:

	Data Processing	User
Design	240	100
Installation	840	210
Total	1,080	310


MATERIALS MANAGEMENT/ INVENTORY
Obtain Requisition
Verify Request
Identify Vendor
Purchasing
Generate Purchase Order
Monitor P.O. Status
Backorders
Cost and Product Comparison
Item Purchase Histories
Vendor List
Receipt
Accept Shipment
Verify Order
Verify Quantity
Notify Department
Update Quantity on Hand
Storage
Convert Unit of Measure for Issuing Units
Record Storage Location
Distribution
Pull Stock
Update Quantity On-Hand
Generate Charges
Inventory Control
Retrieve Order Data
Monitor Stock Levels, Backorders
Use EOQ, ROP, Safety Stock
Produce Item Tickets for Cycle Count
Reporting
Summarize Usage
Allocate Costs by Department
Report Unit Costing and Volume
Summarize Inventory Performance
Order Quantities
Inventory Levels
Cycles

MATERIALS MANAGEMENT/INVENTORY
SYSTEM OVERVIEW SCHEMATIC



.Item Catalog
.Stock Status
.Inventory Control Reports
.Inventory Usage

Patient and Financial Accounting

1. System Name: Patient and Financial Accounting

   - General Ledger
   - Accounts Payable
   - Billing
   - Accounts Receivable
   - Census
   - Payroll
   - Property Ledger
   - Materials Management

2. Purpose:

   - Select a vendor and convert the current systems to meet user needs for report detail and summarization, timeliness and accuracy of information, and compatibility of systems throughout SPRMC

3. Functions and Features:

   - Details of required functions and features must be documented in the vendor selection project to provide a means of identifying vendor finalists.

4. Interfaces: /Forecasting

   - Modeling/Forecasting
   - Productivity
   - Payroll/Personnel
   - Materials Management/Inventory
   - Physician Billing
   - Case Mix Reporting
   - Marketing/Referral
   - ADT
   - Order Communications

Patient and Financial Accounting (continued)

5. Benefits:

   - Improved information for daily management decisions and overall planning

   - Increased compatibility of the various organizations connected with SPRMC

   - More effective business office procedures and system to reduce billing and collection time and ultimately reduce the level of accounts receivable

6. Major Users:

   - Administration

   - All departments

Case Mix Reporting

1. System Name: Case Mix Reporting

2. Purpose:

   - Provide costs and related revenue by diagnosis to facilitate pricing and program decisions.

3. Functions and Features:

   - Captures true costs data by patient stay, relates it to diagnosis and severity

   - Flexibility to summarize these costs in multiple ways

   - Totals revenues and costs by diagnosis to provide profitability measures (revenues from charge based case mix system)

   - Anticipates future reimbursement reporting requirements based on diagnoses

4. Major Inputs:

   - Reporting categories

   - Routine, ancillary and overhead costs

   - Charges

   - Summarization requirements
     - Diagnosis or groups
     - Demographics
     - Acuity
     - Referring physician
     - Attending physician
     - Responsible party
     - Nursing station
     - Program

5. Major Outputs:

   - Cost and Revenue Summaries

   - Price Lists

Case Mix Reporting (continued)

6. Major Information Categories:

   - Costs
   - Revenues
   - Diagnoses and groups
   - Report requirements

7. Interfaces:

   - Patient and Financial Accounting
   - Marketing/Referral Analysis

8. Benefits:

   - Relates costs and revenues to patient information, to facilitate marketing and planning functions
   - Provides data for competitive pricing decisions
   - Provides data to defend pricing policy to regulators
   - Provides data for evaluating profitability of current and potential programs and services

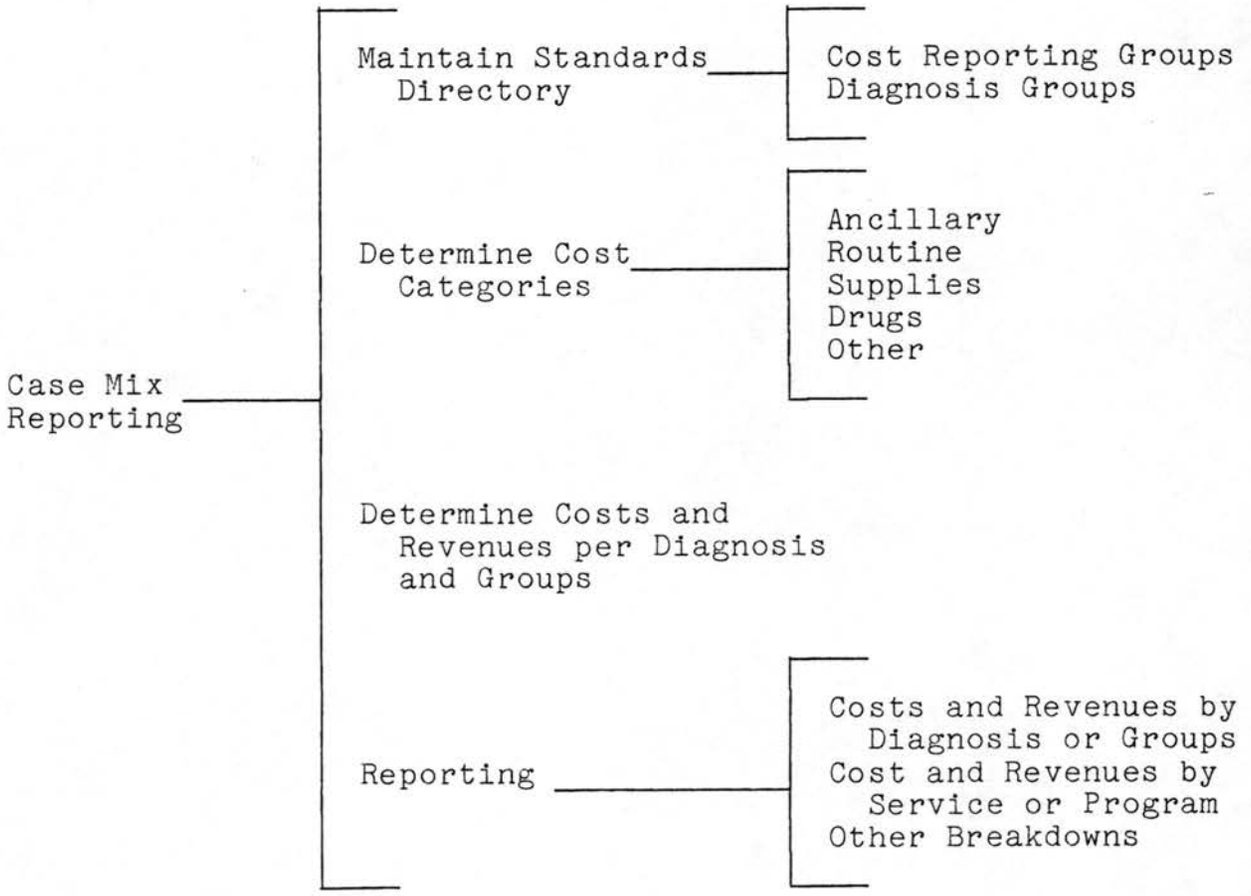
9. Major Users:

   - Administration
   - Planning
   - Finance

10. Approximate Workdays Required:

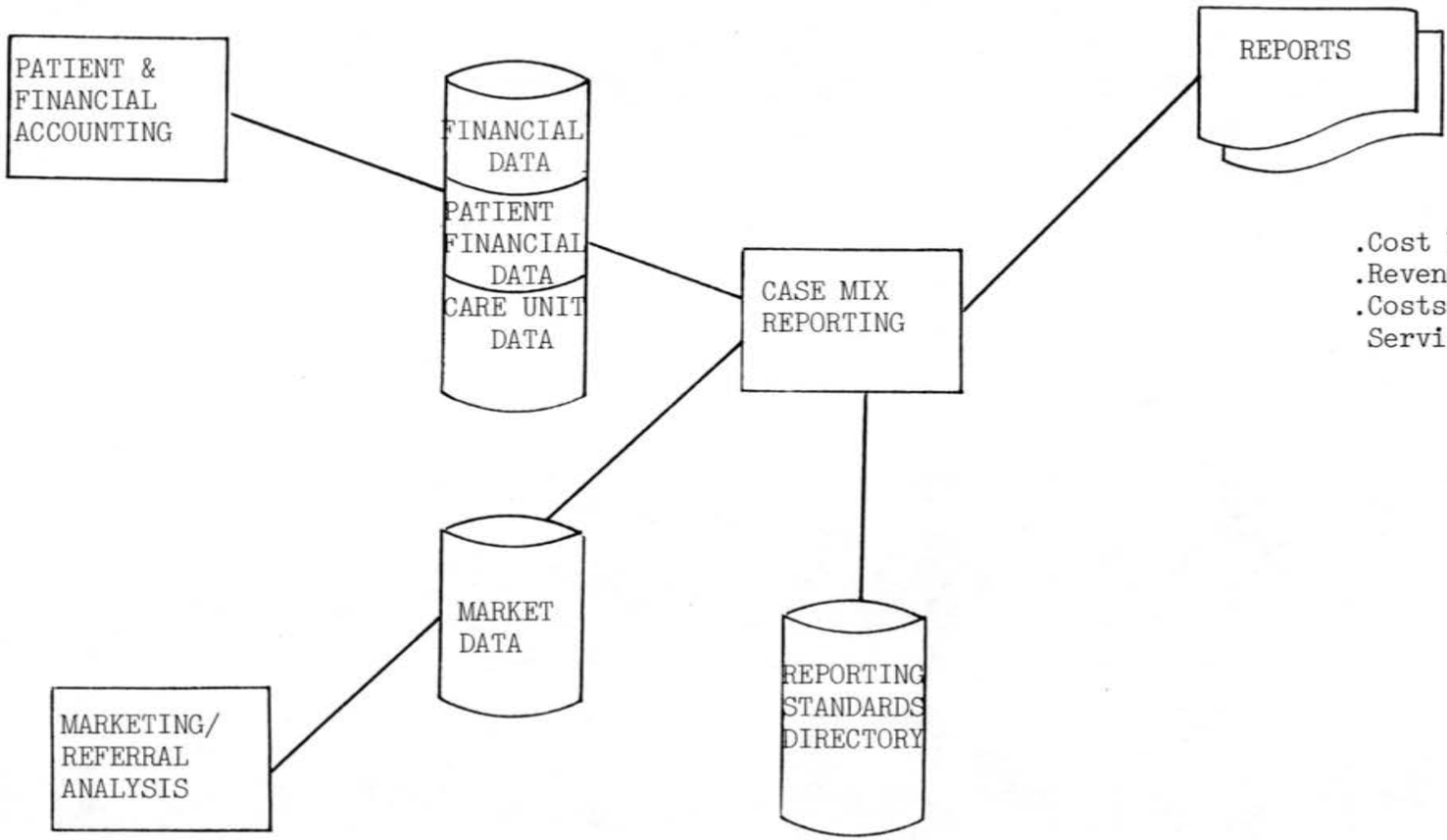
	Data Processing	User
Design	100	40
Installation	300	70
Total	400	110

Case Mix Reporting (continued)



CASE MIX REPORTING

SYSTEM OVERVIEW SCHEMATIC



.Cost by Diagnosis or Groups
.Revenues by Diagnosis or Groups
.Costs and Revenues by Service/Program

Productivity Reporting

1. System Name: Productivity Reporting

2. Purpose:

   - Evaluate productivity based on standards

3. Functions and Features:

   - Monitor and report productivity by department, based on predetermined standards, reported volumes and employee hours

4. Major Inputs:

   - Hours worked
   - Department volumes
   - Productivity standards

5. Major Outputs:

   - Productivity by Department
     . Volumes
     . Productivity Index vs. Standards

6. Major Information Categories:

   - Productivity standards
   - Productivity criteria

7. Interfaces:

   - Payroll/Personnel
   - Patient Classification
   - Patient and Financial Accounting

Productivity Reporting (Continued)

8. Benefits:

   - Improved management information for monitoring and evaluating employee performance

   - Reduce excess paperwork

9. Major Users:

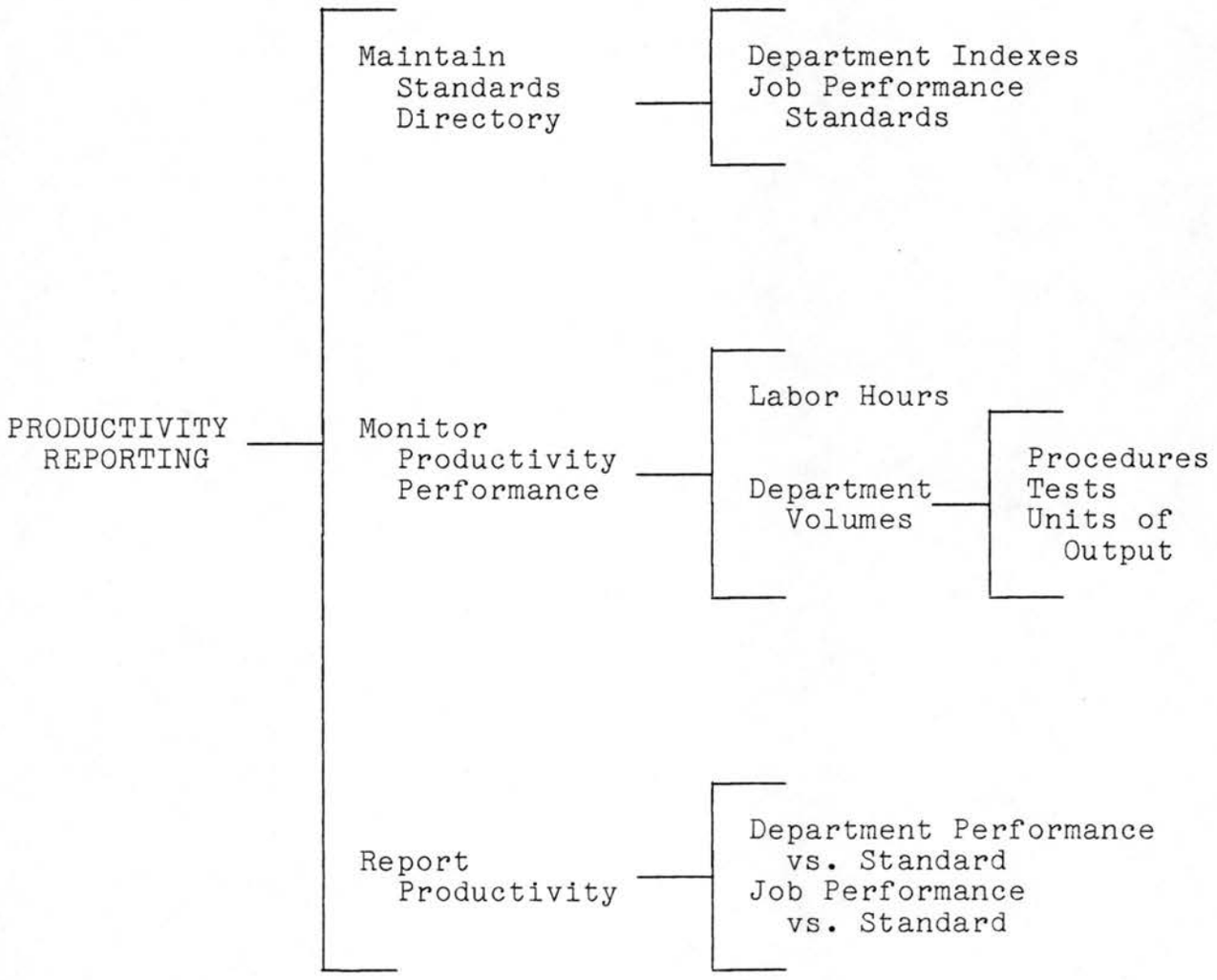
   - Administration

   - All departments

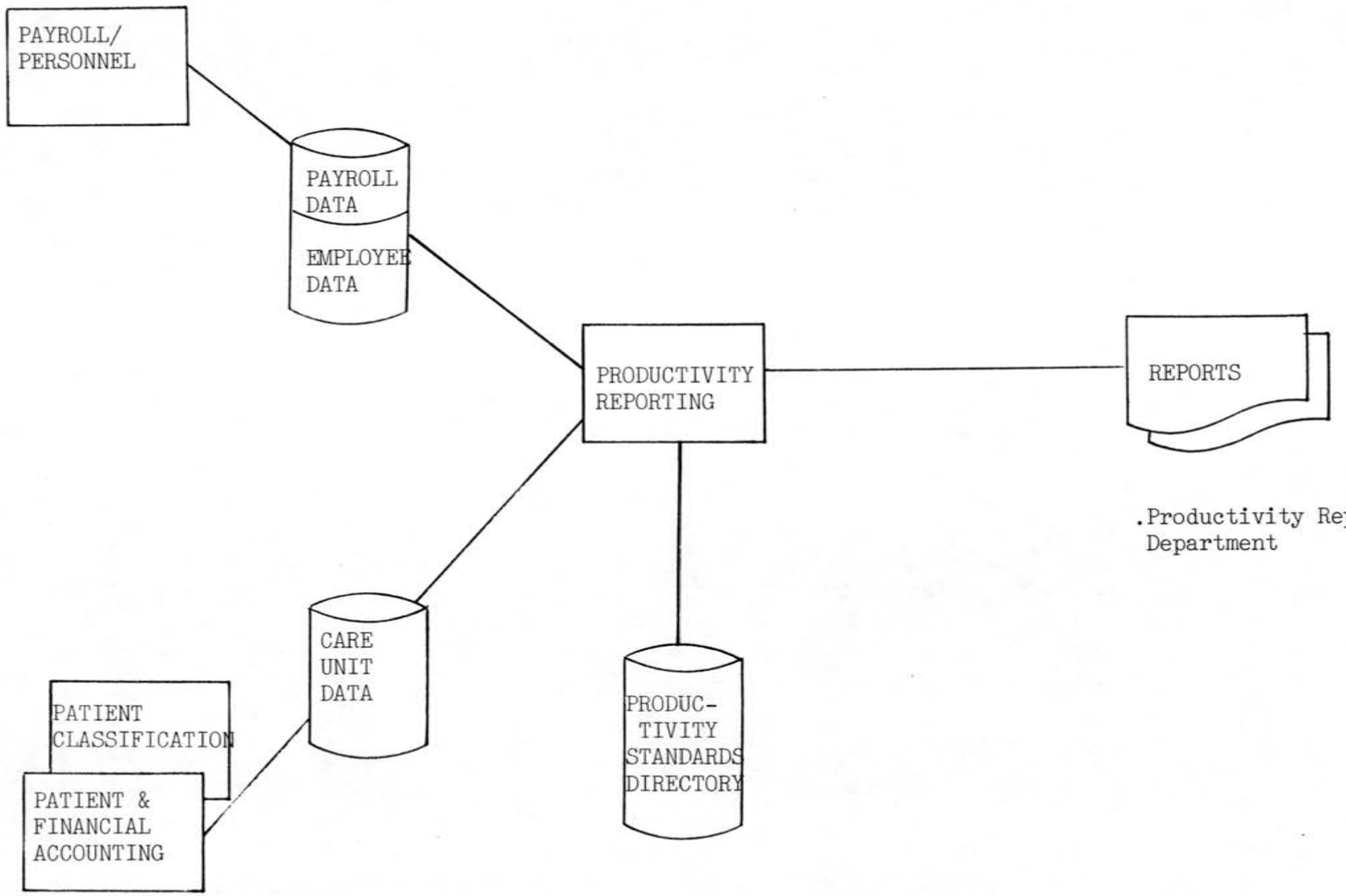
10. Approximate Workdays Required:

	Data Processing	User
Design	200	80
Installation	400	100
Total	600	180

Productivity Reporting (Continued)



PRODUCTIVITY REPORTING
SYSTEM OVERVIEW SCHEMATIC



.Productivity Reporting by Department

Patient Classification

1. System Name: Patient Classification

2. Purpose:

   - Use patient acuity levels to determine the nurse staffing requirements
   - Facilitate nursing service productivity through effective personnel scheduling

3. Functions and Features:

   - Determine patient classification
   - Maintain patient care requirements directory
   - Determine nurse staffing requirements
   - Create employee schedules from staffing requirements, available personnel and scheduling parameters
   - On-line schedule adjustments prior to each shift
   - Adjust employee assignments to meet final staffing requirements
   - Report variance of actual vs. plan

4. Major Inputs:

   - Patient acuity
   - Patient registration information
   - Patient care requirements
   - Employee availability
   - Staffing requirements:
     . Requested staff level
     . Anticipated units of service

Patient Classification (Continued)

4. Major Inputs (Continued):

   - Hours worked
   - Adjustments to staffing levels

5. Major Outputs:

   - Patient Volume Report
   - Staffing Requirements
   - Patient Acuity Summary
   - Care Standards Directory
   - Nursing Master Schedule
   - Nursing Unit Schedule
   - Actual vs. Planned Staffing

6. Major Information Categories:

   - Patient classification
   - Staffing requirements
   - Scheduling parameters
     . Shifts
     . Patient time requirements by patient acuity level
     . Personnel policy considerations
     . Personnel qualifications
     . Personal preferences
   - Tentative and completed schedules

7. Interfaces:

   - ADT
   - Order Communications

Patient Classification (Continued)

7. Interfaces (Continued):

   - Payroll/Personnel
   - Productivity

8. Benefits:

   - Faster and more accurate identification of staffing needs
   - Facilitates the nurse scheduling process
   - Improves patient care through better identification of staffing needs
   - Able to smooth out workload
   - Better able to meet employee staffing wishes; improves morale
   - Better able to plan and revise plan for staffing; should be able to ultimately use fewer nurses

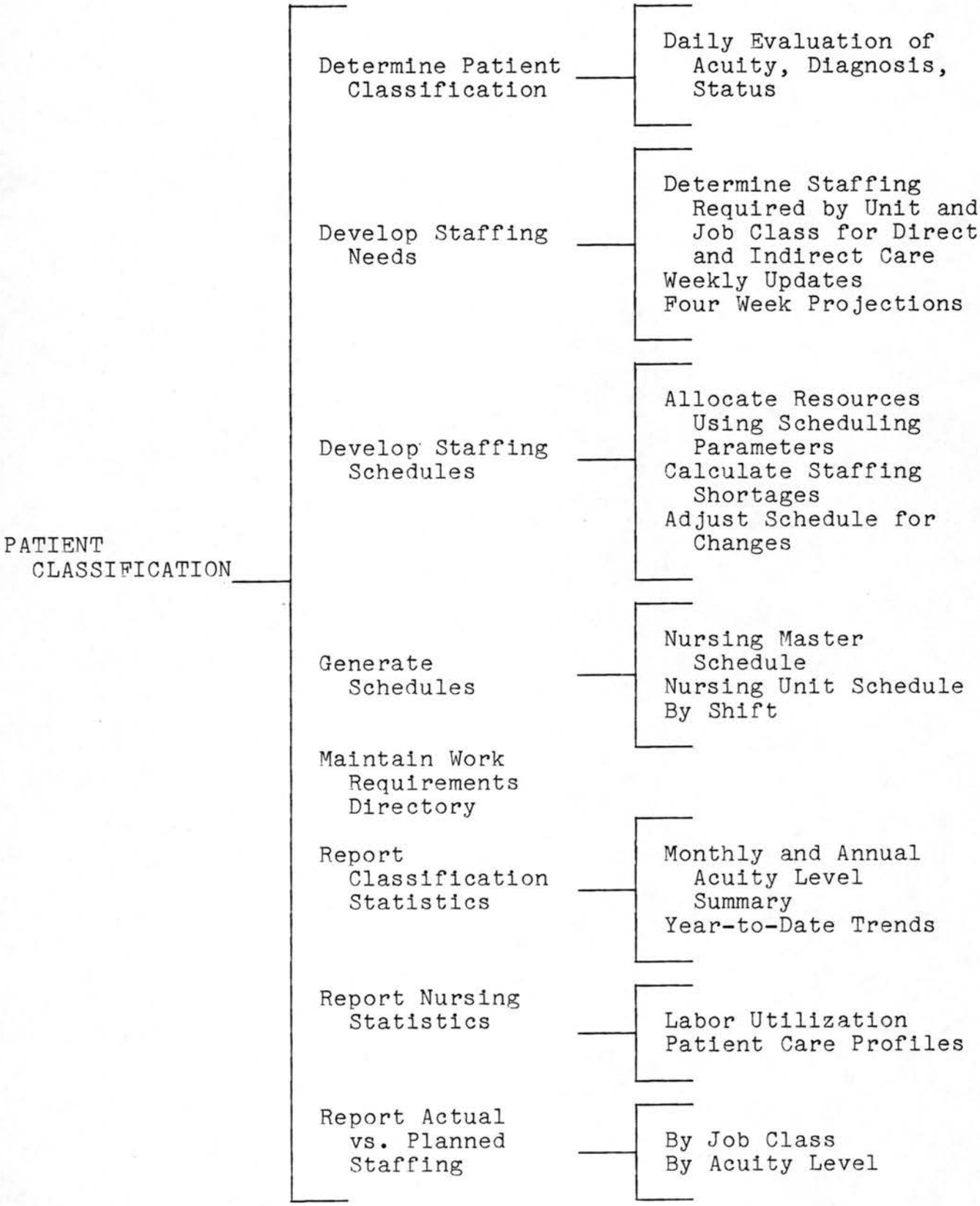
9. Major Users:

   - Nursing
   - Ancillary departments

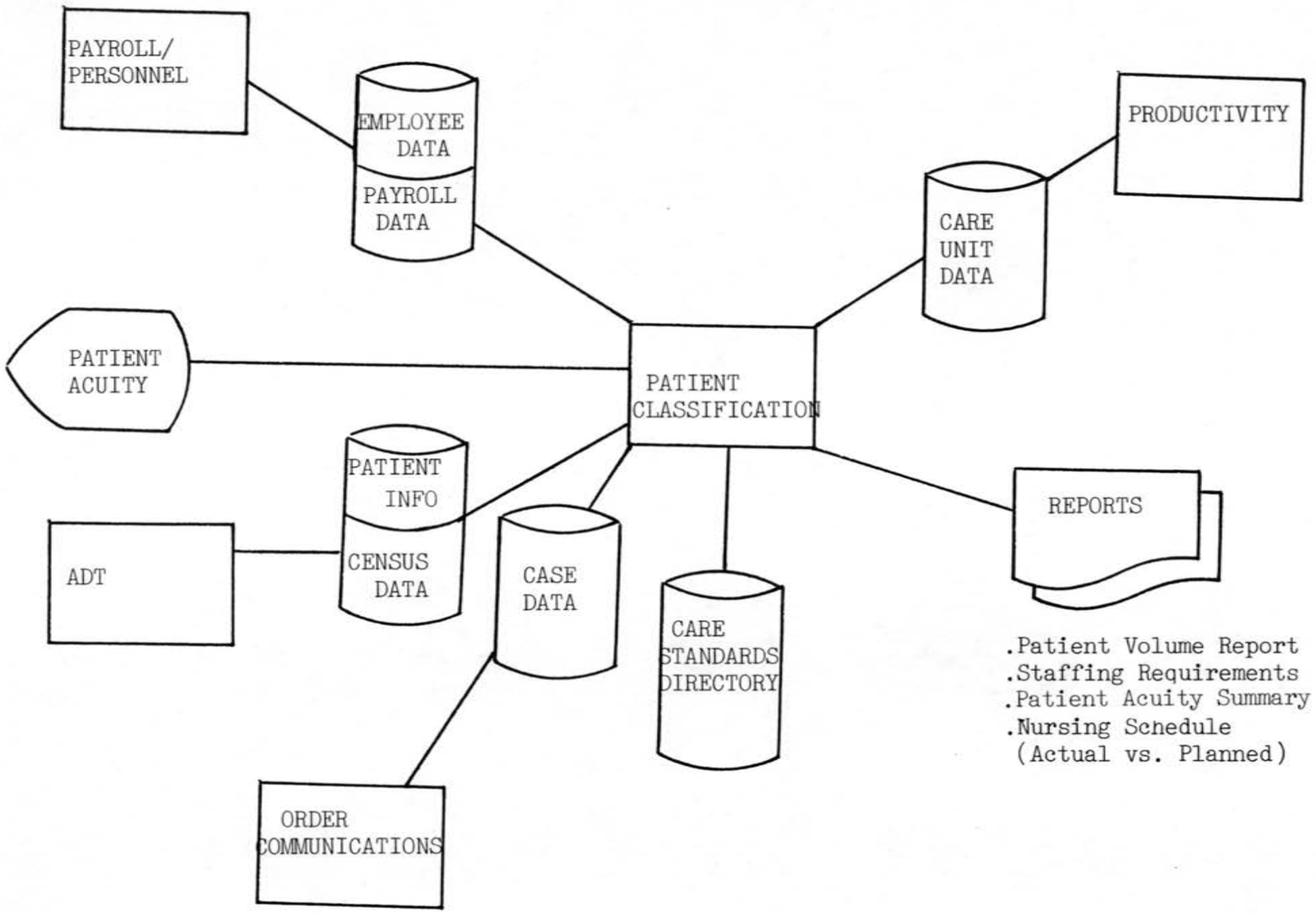
10. Approximate Workdays Required:

	Data Processing	User
Design	100	40
Installation	250	60
Total	350	100

Patient Classification (Continued)



PATIENT CLASSIFICATION
SYSTEM OVERVIEW SCHEMATIC



.Patient Volume Report
.Staffing Requirements
.Patient Acuity Summary
.Nursing Schedule
(Actual vs. Planned)

Dietary

1. System Name: Dietary

2. Purpose:

   - Facilitate processing of dietary orders, patient diet plans and food preparation

3. Functions and Features:

   - Recipe costing by ingredient, serving and total product
   - Costing of special functions
   - Automated meal forecasting from midnight census, and ingredient room recipes calculations
   - Patient diet profiles
   - Food costs by food group
   - Nutrition analysis

4. Major Inputs:

   - Costing information
   - Patient diet orders
   - Recipe and portion information
   - Midnight census

5. Major Outputs:

   - Patient Diet Plans
   - Patient Diet Profile
   - Meal Order Tickets or Labels
   - Patient Nutrition Analysis
   - Food Production Plan
   - Summary of Meals Served

Dietary (Continued)

5. Major Outputs (Continued):

   - Menu Index
   - Customized Menus

6. Major Information Categories:

   - Recipes
   - Recipe serving and ingredient costs
   - Patient diet profiles
   - Nutrition information

7. Interfaces:

   - ADT
   - Order Communications
   - Materials Management/Inventory

8. Benefits:

   - Enhance patient care
   - Reduce manual effort
   - Ensures patient meal orders conform to special requirements
   - Reduces food waste through better planning

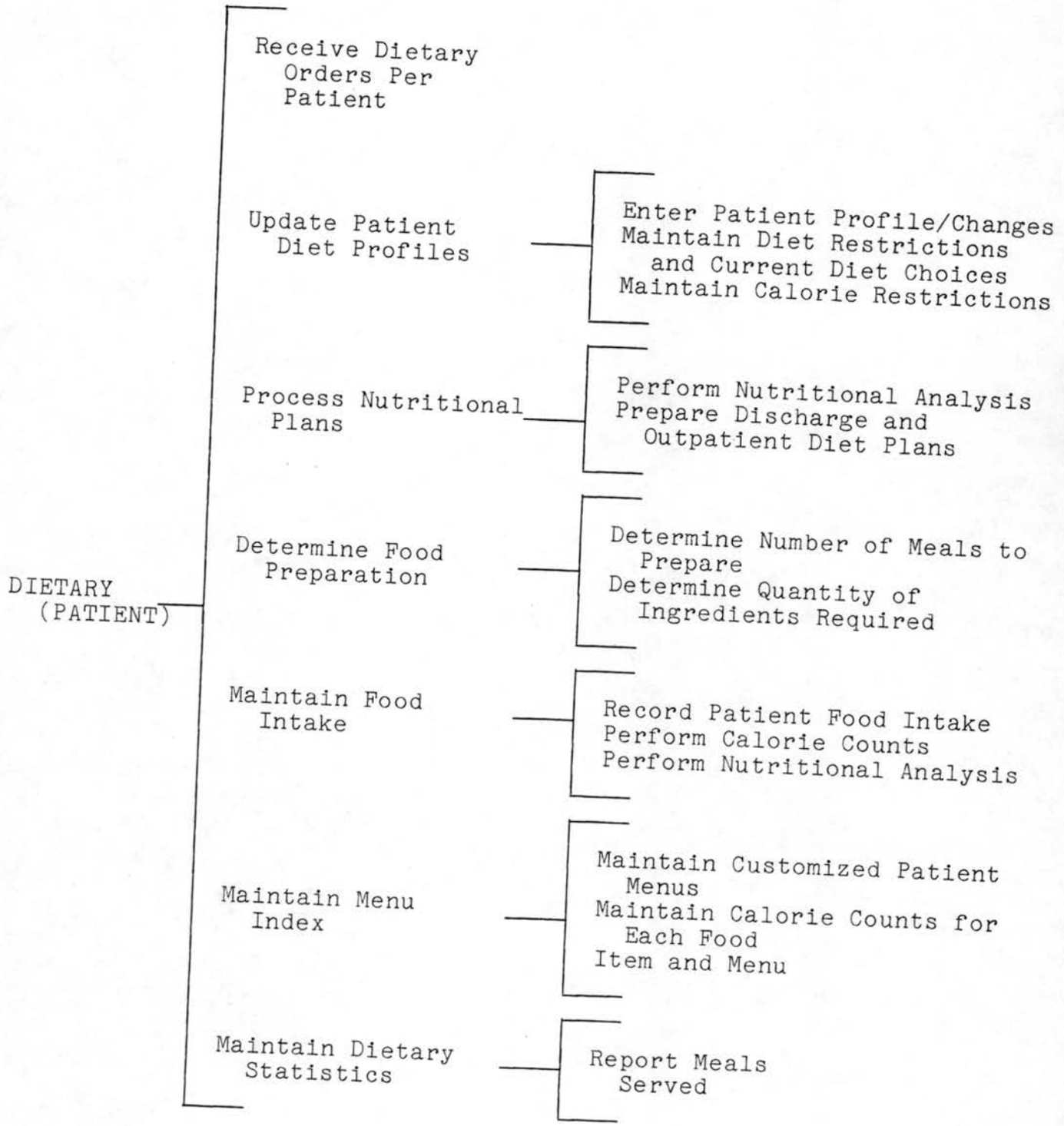
9. Major Users:

   - Dietary

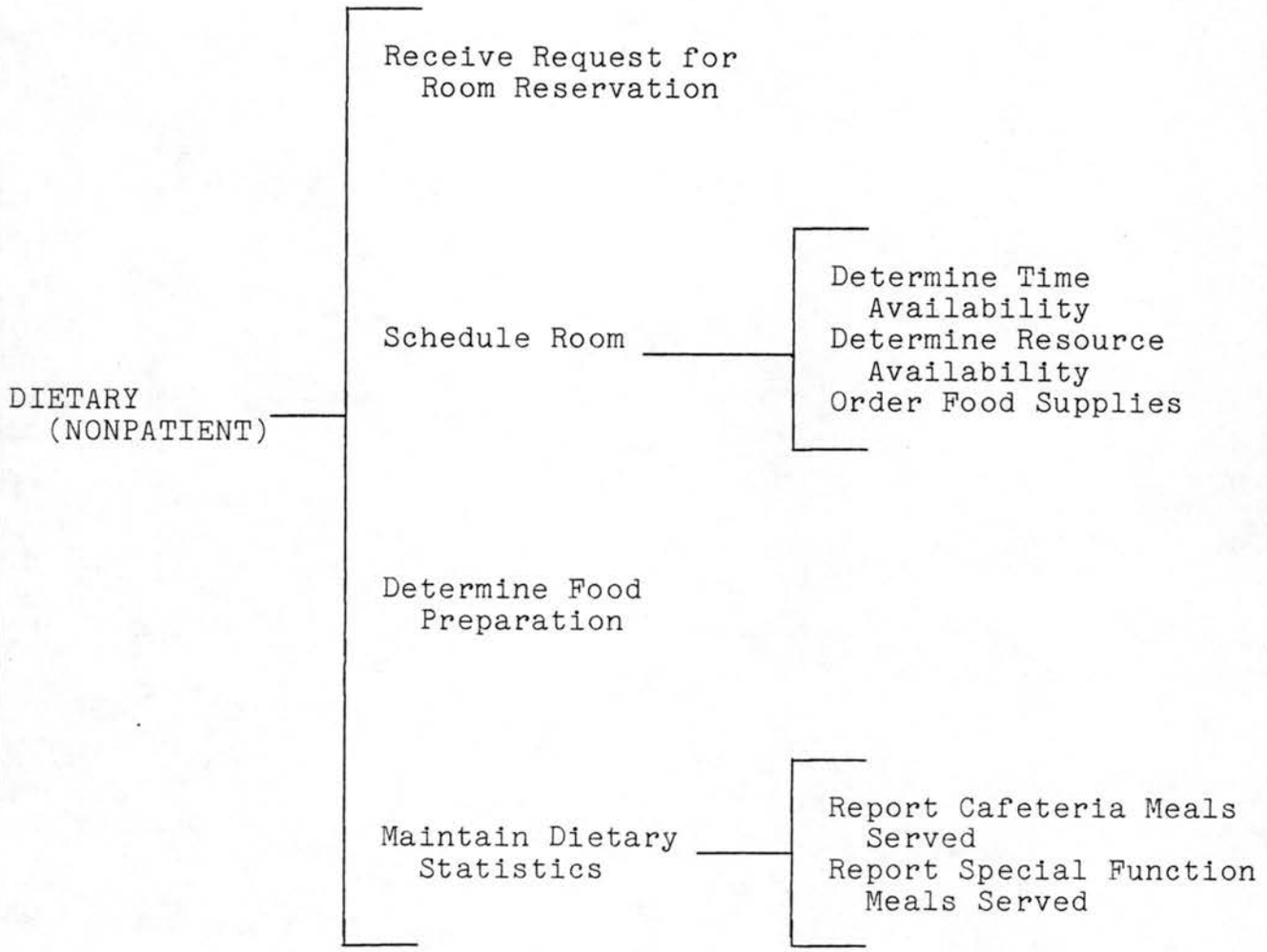
10. Approximate Workdays Required:

	Data Processing	User
Design	50	20
Installation	150	40
Total	200	60

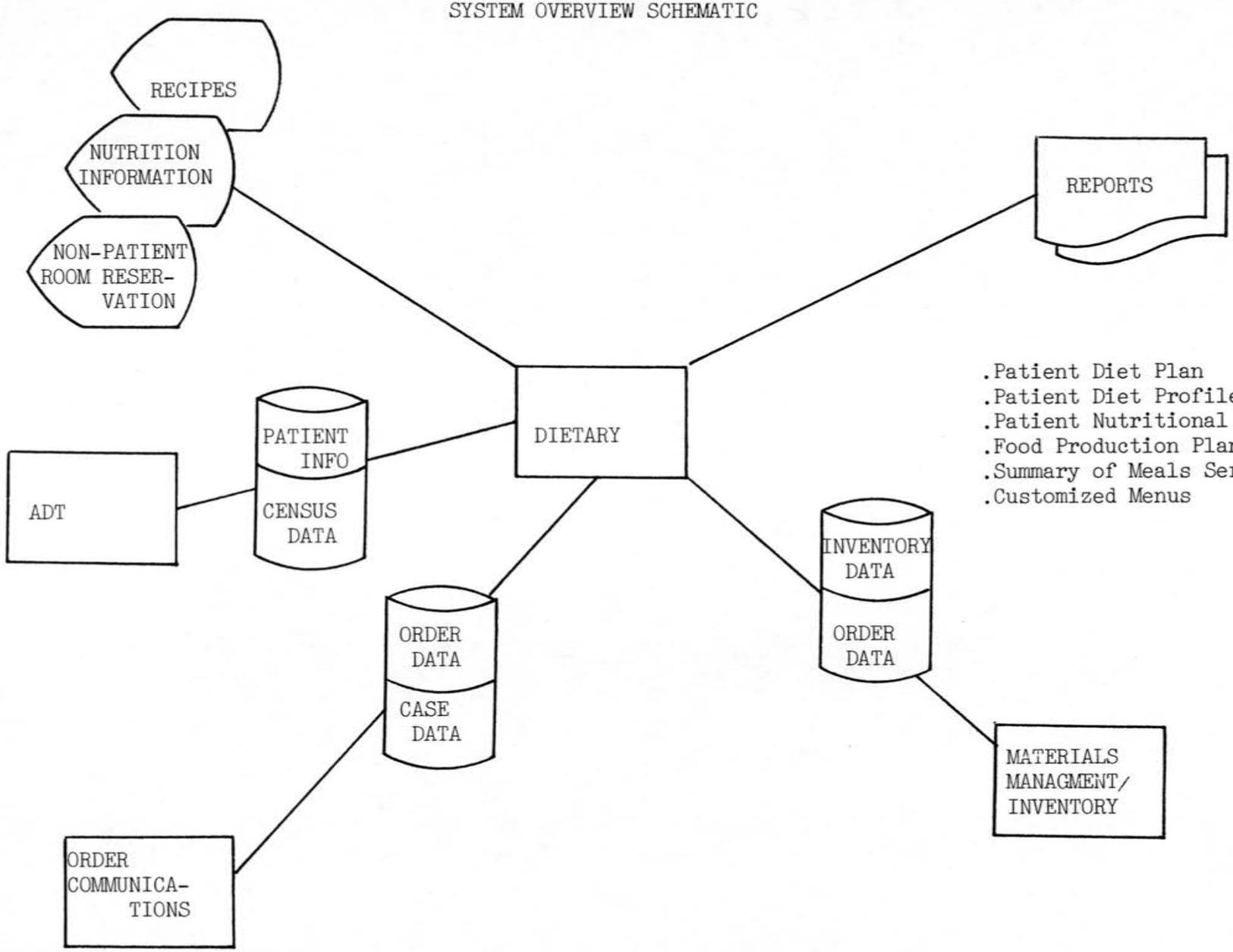
Dietary (Continued)



Dietary (Continued)



DIETARY
SYSTEM OVERVIEW SCHEMATIC



.Patient Diet Plan
.Patient Diet Profile
.Patient Nutritional Analysis
.Food Production Plan
.Summary of Meals Served
.Customized Menus

Records Management

1. System Name: Records Management

2. Purpose:

   - Provide information regarding the location of patient records and Radiology films.

   - Process requests for copies of records

3. Functions and Features:

   - Provides record tracking information

     . Department

     . Borrower's name

     . Item taken

     . Date and time out

     . Estimated return time

   - Ages records for archival transfer

   - Produces records overdue list

   - Monitors record status

   - Monitors requests for copies

   - Monitors records for completion

   - Indexes for department records

4. Major Inputs:

   - Records loan information

   - Requests for copies

5. Major Outputs:

   - Record location and completion status

   - Record loan information

Records Management (Continued)

5. Major Outputs (Continued):

   - Cross-reference of medical record number to department's internal record number

     . Radiology Index

     . Laboratory Index

     . Other

6. Major Information Categories:

   - Record loan information

   - Record tracking information

   - Copy requests

7. Interfaces:

   - Patient Scheduling

   - Radiology

   - ADT

   - Word Processing/Transcription

   - Quality Assurance

8. Benefits:

   - Improve employee and physician convenience by increasing control over records

   - Reduce manual efforts in maintaining loan and location information

9. Major Users:

   - Medical records

   - Radiology

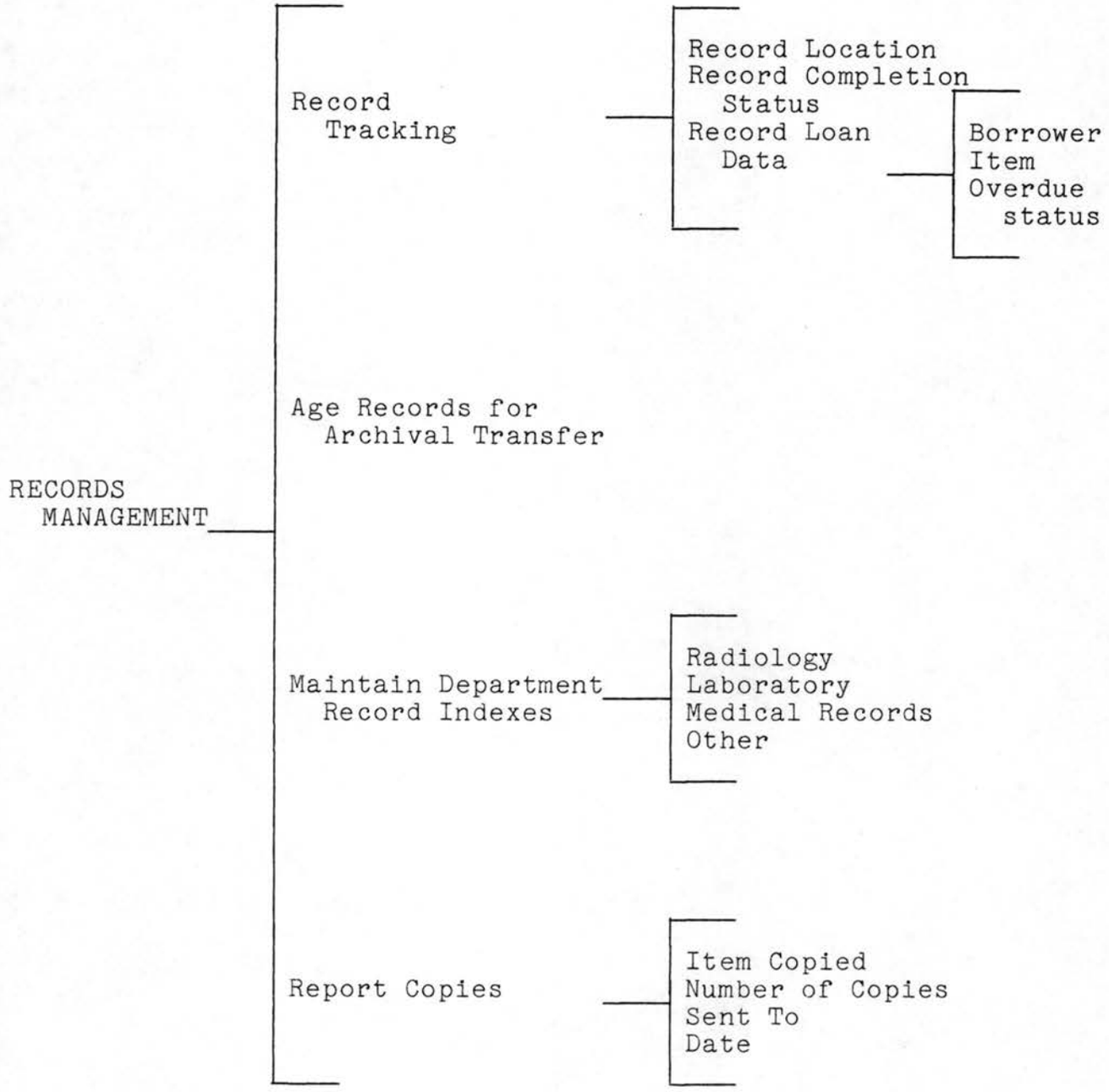
   - Other departments with own records

Records Management (Continued)

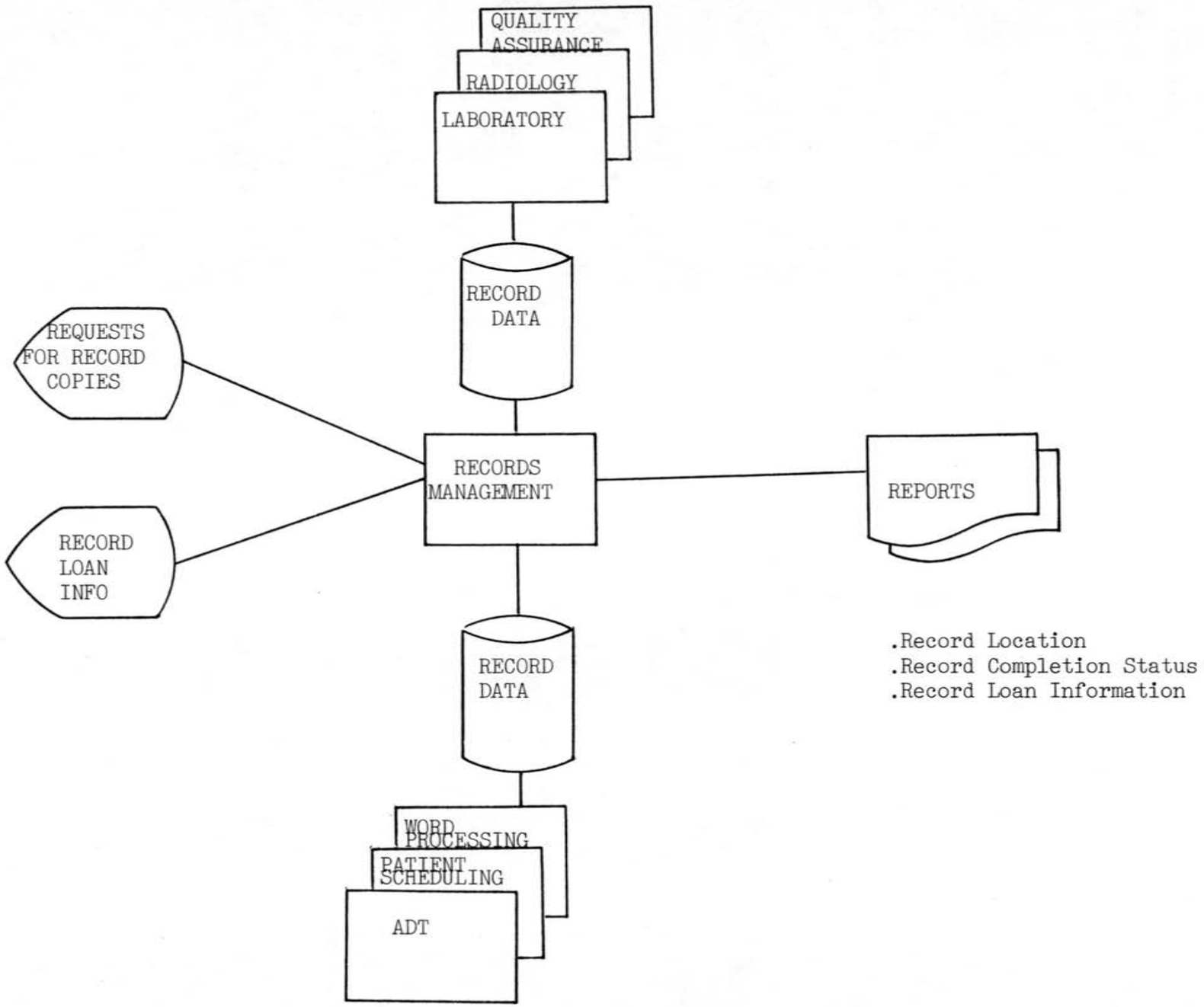
10. Approximate Workdays Required:

	Data Processing	User
Design	50	20
Installation	150	40
Total	200	60

Records Management (Continued)



RECORDS MANAGEMENT
SYSTEM OVERVIEW SCHEMATIC



.Record Location
.Record Completion Status
.Record Loan Information

Admissions, Discharges and Transfers

1. System Name: Admissions, Discharges and Transfers

2. Purpose:

   - Provide a common registration system for Inpatient, Outpatient, and Emergency Room patients

   - Provide immediate processing and availability of patient admission/registration information

3. Functions and Features:

   - Assignment of a unique patient medical and billing number to each patient

   - On-line index to medical record and billing number with demographic and status data

   - Cross-reference to patient's medical record for inpatient, outpatient and emergency room visits

   - On-line soundex name search

   - On-line preadmission and preregistration

     . Bed reservation information

     . Surgery Schedule interface

   - On-line admissions/discharges/transfers

     . Pending discharge/transfer information

     . Standard admission orders

   - On-line ER and outpatient registration

   - On-line insurance capture

   - On-line patient location information and inquiry

   - On-line bed control/census with census projection capability, administrative and statistical reporting

Admissions, Discharges and Transfers (Continued)

3. Functions and Features (continued):

   - On-line patient financial status inquiry
   - On-line verification of HMO status
   - Batch reporting to support above functions and features

4. Major Inputs:

   - Patient demographic, biographic, contact and insurance information
   - Admitting diagnosis
   - Admissions, discharges, transfers

5. Major Outputs:

   - Census
   - Admission Forms
   - Admission Reports
   - Bed Control Report
   - Standard Admission Order

6. Major Information Categories:

   - Patient number information
   - Patient demographic/biographic information
   - Patient contact information
   - Patient insurance information
   - Inpatient location (room and bed)
   - Bed control
   - Patient financial status

7. Interfaces:

   - Patient and Financial Accounting
   - Laboratory

Admissions, Discharges and Transfers (Continued)

7. Interfaces (Continued):

   - Pharmacy
   - Order Communication
   - Patient Classification
   - Patient Scheduling
   - Surgery Scheduling
   - Marketing/Referral Analysis
   - Radiology
   - Physician Billing
   - Dietary
   - Quality Assurance
   - Records Management

8. Benefits:

   - Increase staff morale
     . Experienced with current on-line functions
   - Improve physician-hospital relations
     . More effective bed control (minimize times when the house is full)
   - Improve internal communications
     . Improve nursing-admitting relations
   - Facilitate patient admission process
   - Assist preadmission order capture information
   - Provide immediate patient location ability
   - Provide discharge and transfer notification

Admissions, Discharges and Transfers (Continued)

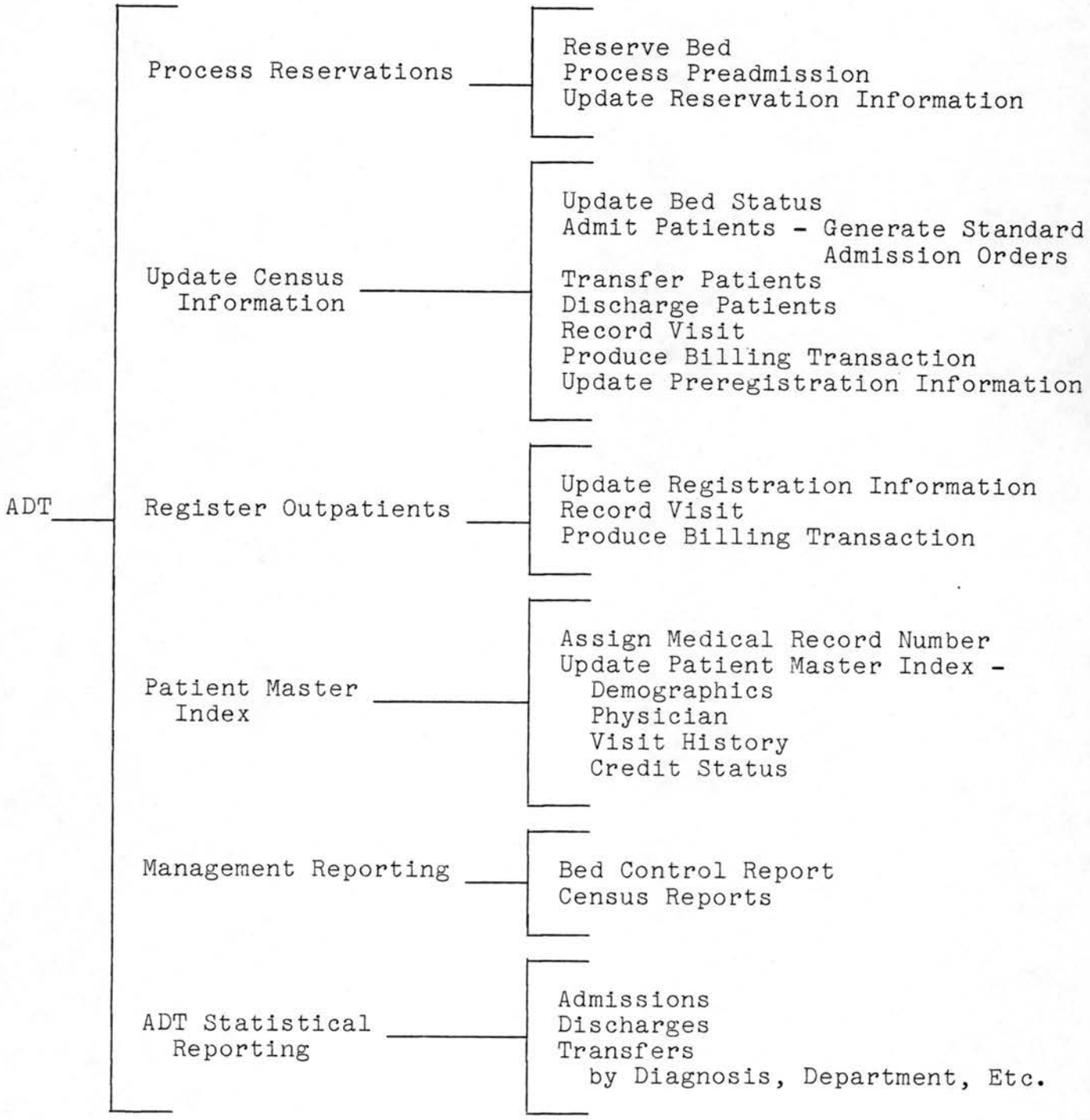
9. Major Users:

   - Admitting
   - Housekeeping
   - Nursing
   - Other departments, as needed

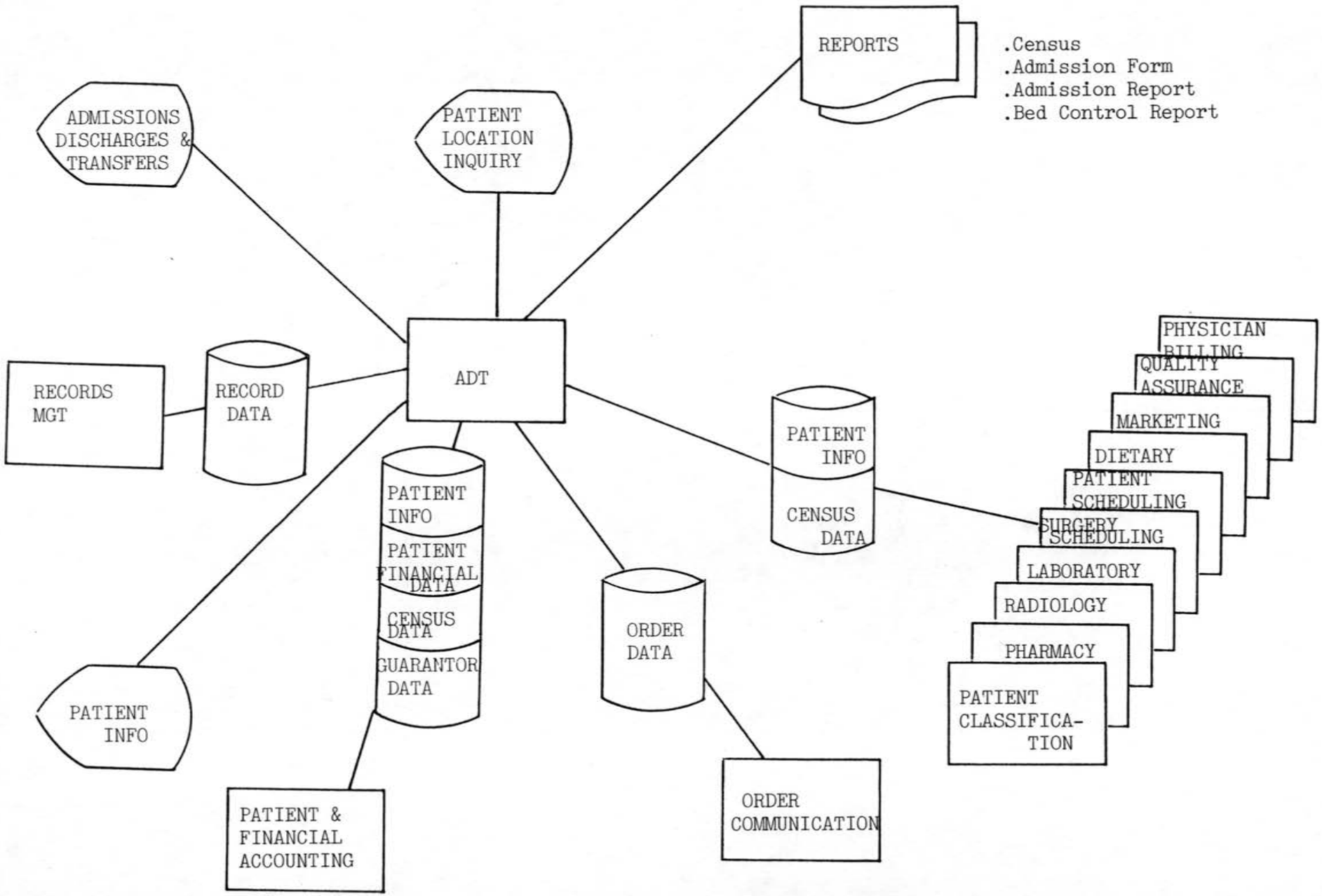
10. Approximate Workdays Required:

	Data Processing	User
Design	100	40
Installation	400	100
Total	500	140

Admissions, Discharges and Transfers (Continued)



ADMISSIONS, DISCHARGES AND TRANSFERS
SYSTEM OVERVIEW SCHEMATIC



Surgery Scheduling

1. System Name: Surgery Scheduling

2. Purpose:

   - Provide Operating Room personnel with the information and system capabilities to effectively manage the surgical function

3. Functions and Features:

   - Schedules surgery suites
   - Automatically registers patient
   - Coordinates the surgical schedule with bed assignment before and after surgery
   - Assigns and schedules surgery personnel
   - Provides expected elective surgery schedule for next two weeks
   - Schedules special equipment
   - Reports surgical suite utilization
   - Verifies blood units available for surgery candidates
   - Prints surgery schedule for nursing units and other departments
   - Generates surgical logs

4. Major Inputs:

   - Orders for surgery
   - Patients to be scheduled
   - Personnel to be scheduled
   - Resources available
   - Standards for equipment needed for surgical procedures

Surgery Scheduling (Continued)

4. Major Inputs (Continued):
   - Escort requirements
   - Actual procedures performed
   - Surgery times in and out
5. Major Outputs:
   - Surgery Schedule and Updates
     . Master
     . By department
   - Surgery Productivity
   - Average Time per Procedure
   - Surgery Volumes
   - Escort Schedule
   - Planned vs. Actual Procedures
   - Surgical Logs
   - Resource Usage
6. Major Information Categories:
   - Patient schedule
   - Personnel schedule
   - Utilization statistics
7. Interfaces:
   - ADT
   - Order Communications
   - Patient Scheduling
8. Benefits:
   - Enhances patient care in OR
   - Improves productivity of OR personnel

Surgery Scheduling (Continued)

8. Benefits (Continued):

   - Better utilization of surgical resources
   - Better control over charges

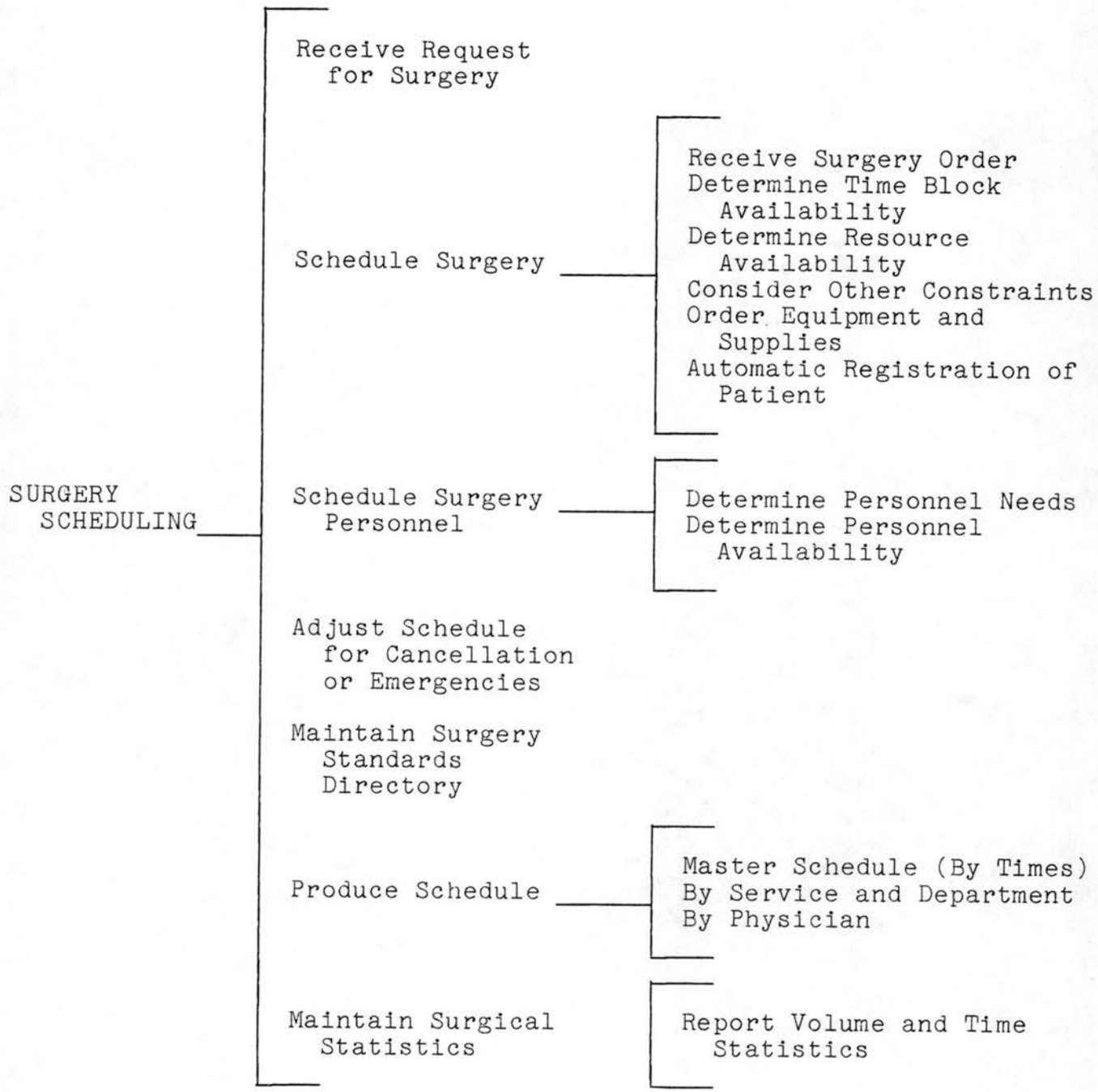
9. Major Users:

   - Operating Room staff
   - Surgeons
   - Anesthesia
   - Nursing

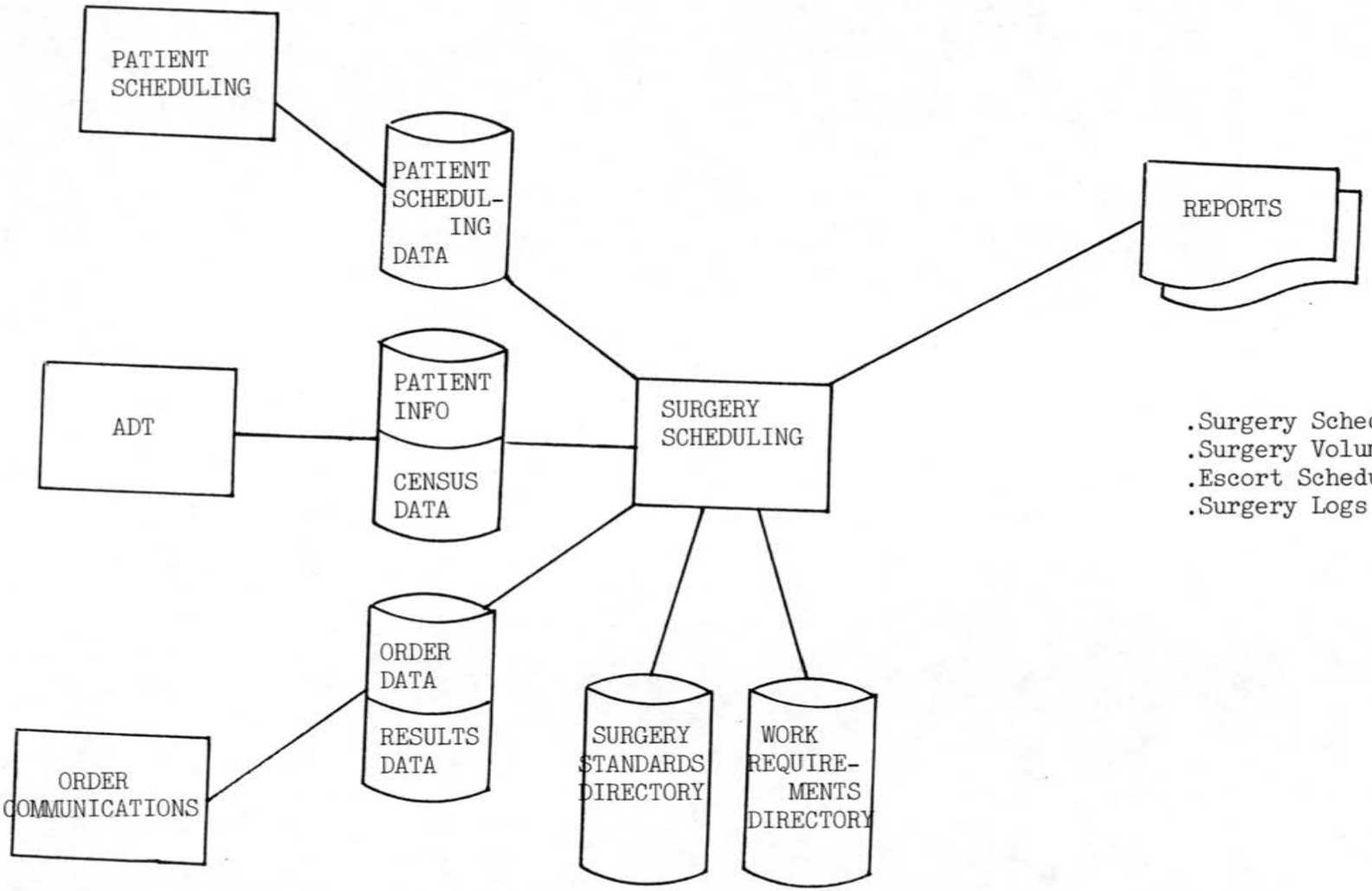
10. Approximate Workdays Required:

	Data Processing	User
Design	50	20
Installation	200	50
Total	250	70

Surgery Scheduling (Continued)



SURGERY SCHEDULING
SYSTEM OVERVIEW SCHEMATIC



.Surgery Schedules and Updates
.Surgery Volumes
.Escort Schedules
.Surgery Logs

Employee Scheduling

1. System Name: Employee Scheduling

2. Purpose:

   - Provide automated scheduling of employees to facilitate planning and control

3. Functions and Features:

   - Creates employee schedules from staffing requirements, available personnel and scheduling parameters

   - Adjusts schedules for changes in requirements or employee preferences, illness

   - Reports actual vs. planned staffing, with total FTE's per day by cost center and job class

4. Major Inputs:

   - Work load

   - Staffing requirements standards

   - Employee availability

   - Employee preferences

   - Scheduling constraints

   - Hours worked

5. Major Outputs:

   - Staffing Requirements for Departments by shift, pay, week or month

   - Staff Schedule for Departments by shift, day, week, or month

   - Employee Work History/Personnel File

   - Actual vs. Planned Staffing

Employee Scheduling (Continued)

6. Major Information Categories:

   - Scheduling parameters
   - Employee parameters
   - Tentative and complete schedules

7. Interfaces:

   - Payroll/Personnel

8. Benefits:

   - Reduces manual effort
   - Helps control costs through more effective planning

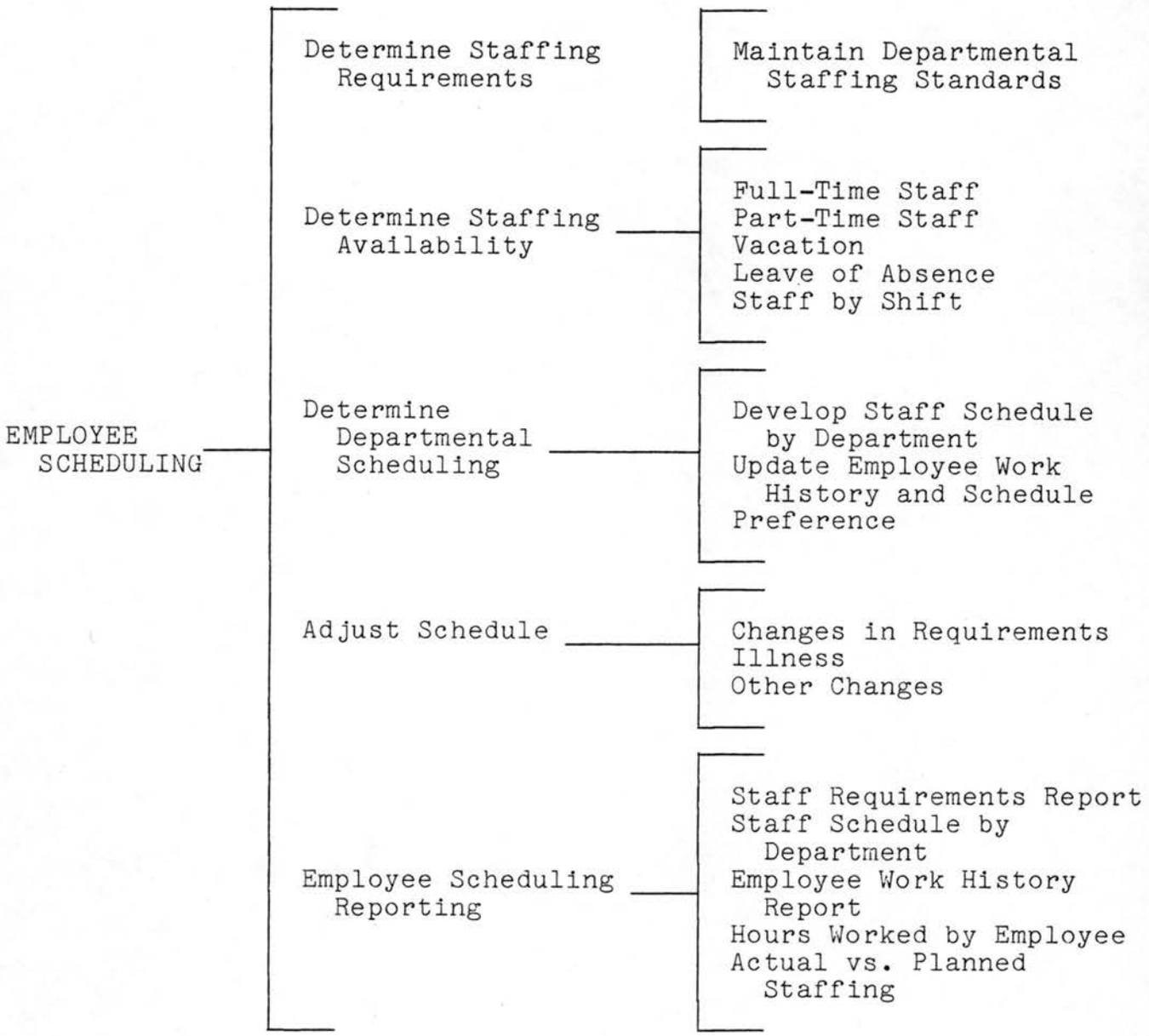
9. Major Users:

   - Large departments with specific staffing needs, such as Pharmacy, Laboratory and Emergency Medicine

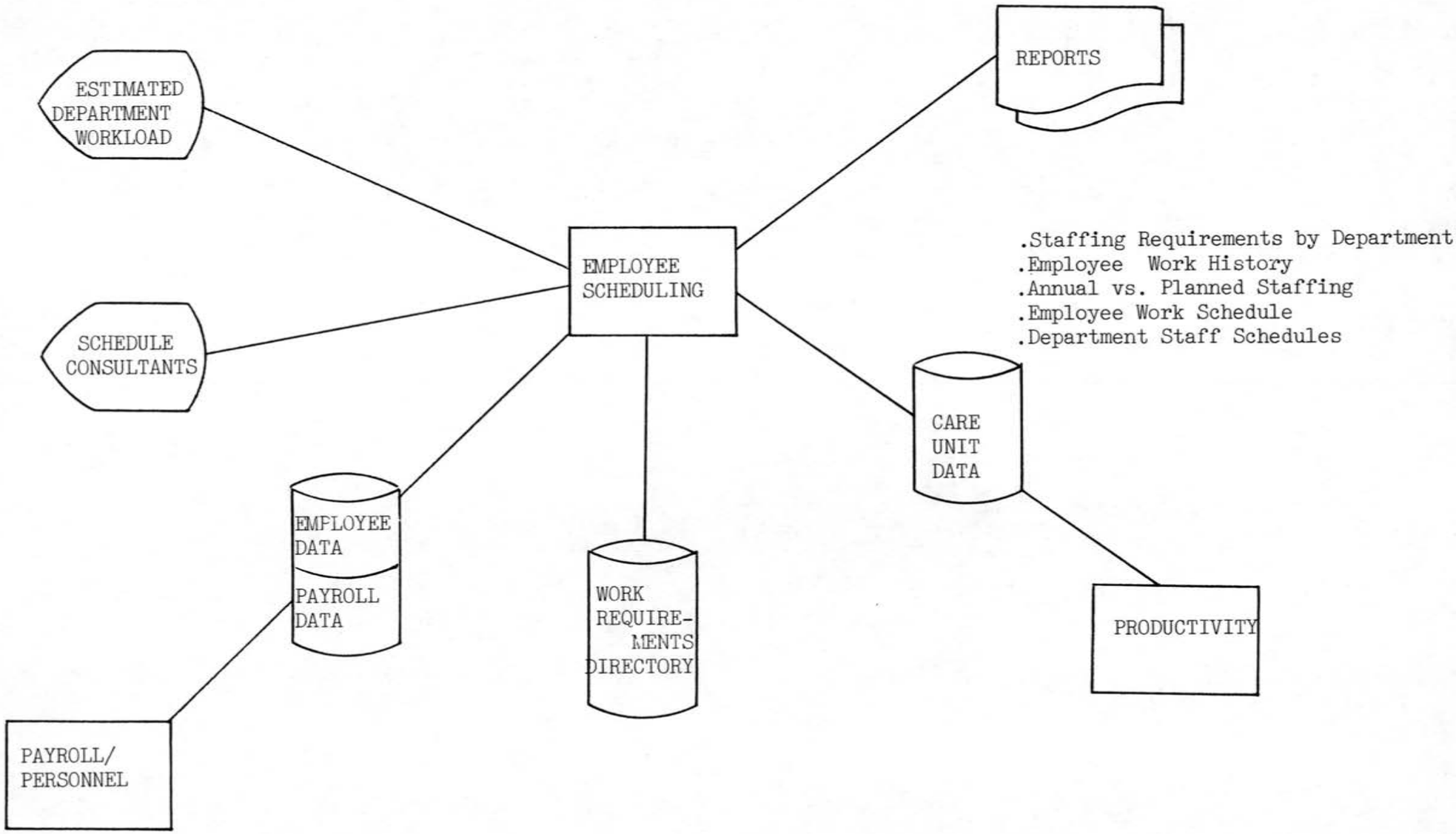
10. Approximate Workdays Required:

	Data Processing	User
Design	50	20
Installation	800	50
Total	250	70

Employee Scheduling (Continued)



EMPLOYEE SCHEDULING
SYSTEM OVERVIEW SCHEMATIC



Quality Assurance

1. System Name: Quality Assurance

2. Purpose:

   - Collect and summarize data for reviewing, comparing and evaluating the medical care provided

   - Provide information to minimize risk in the hospital

3. Functions and Features:

   - Gathers and reports medical care information for:

     . Medical audits

     . PSRO

     . Teaching and research

   - Records data from employee and patient incident reports

   - Gathers data on infections

   - Patient abstracting

     . Analyzes patient medical and demographic data

     . Utilization review

     . Discharge summary

     . Comparisons with other system users (competition)

   - Patient care exception reporting, following discharge

   - Statistics

     . Tracks utilization of services and physicians, by diagnosis and demographic categories (flags HMO patients)

     . Productivity by physician, broken down by HMO, clinics, Gillette and inpatients

Quality Assurance (Continued)

4. Major Inputs:

   - Requirements for patient care reviews
   - Incident Reports
   - Infections
   - Demographics and other abstracting data

5. Major Outputs:

   - Discharge Summary
   - Incident Reports Summary
   - Infection Control Report
   - Patient Abstracts
   - Patient Care Exception Reports

6. Major Information Categories:

   - Incidents
   - Infections

7. Interfaces:

   - ADT
   - Records Management
   - Order Communications

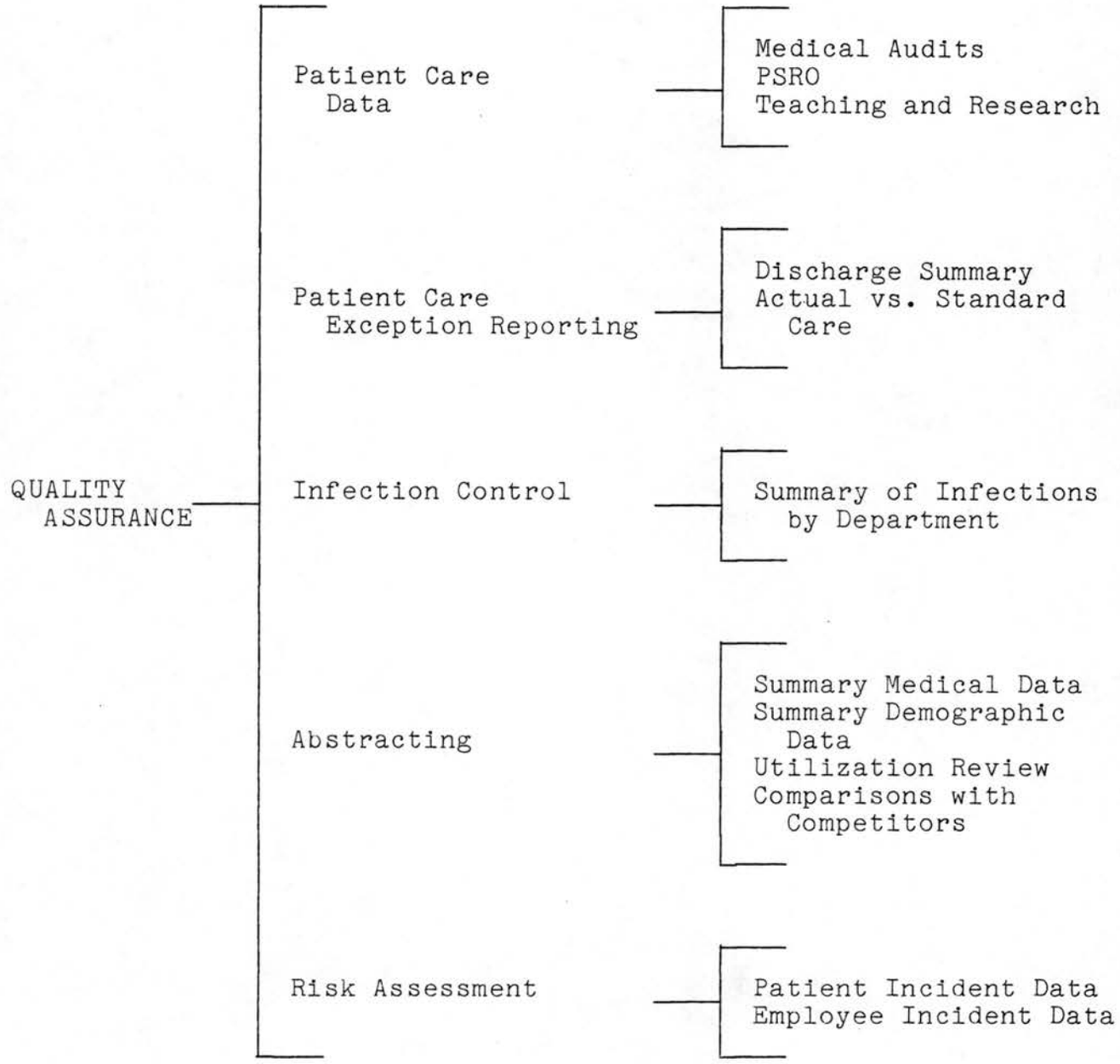
8. Benefits:

   - Provides information to facilitate quality assurance reviews
   - Saves tedious manual data gathering
   - Statistics provide basis for soliciting HMO patients and pricing services to them

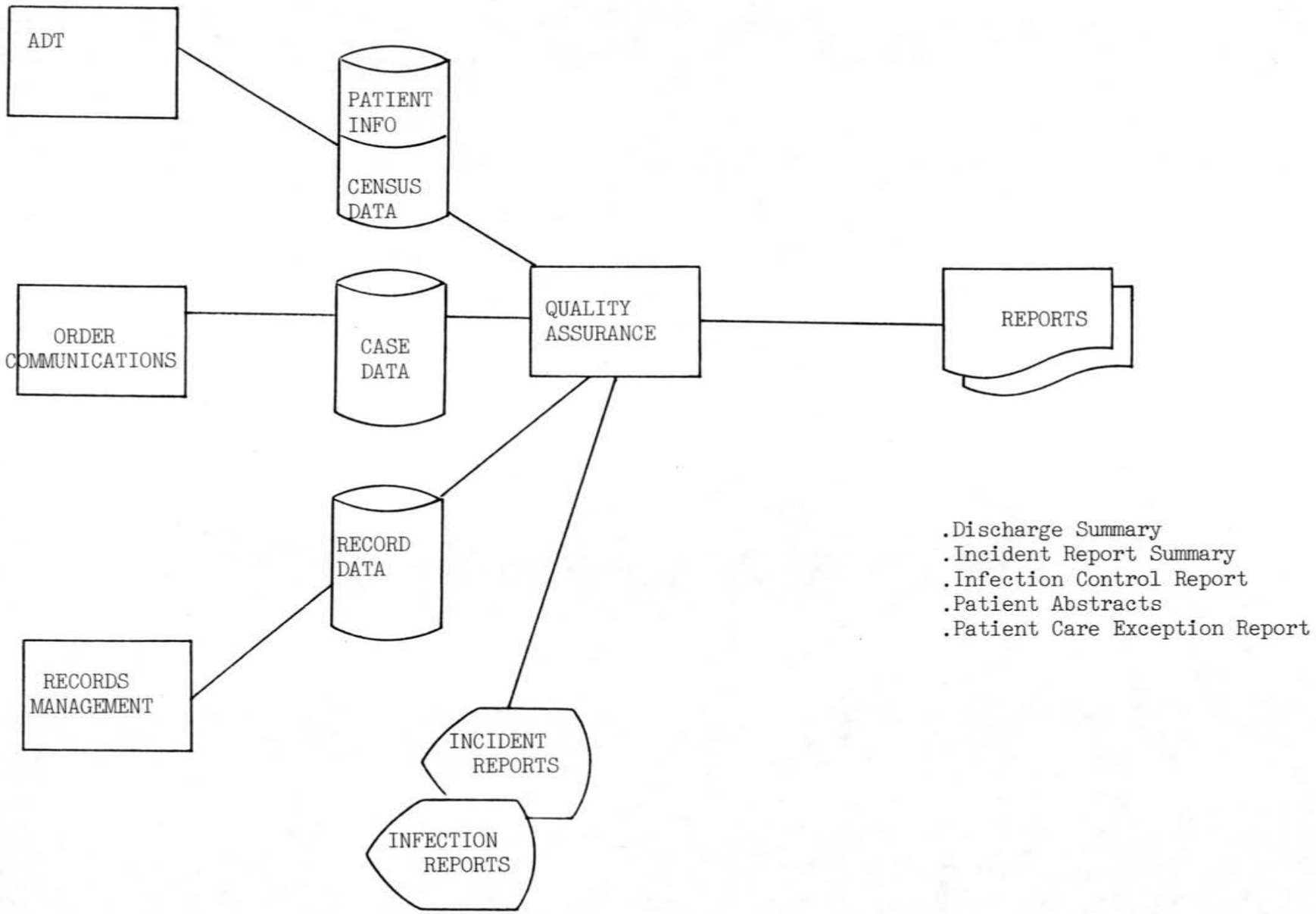
9. Major Users:

   - Quality Assurance
   - Physicians

Quality Assurance (Continued)



QUALITY ASSURANCE
SYSTEM OVERVIEW SCHEMATIC



.Discharge Summary
.Incident Report Summary
.Infection Control Report
.Patient Abstracts
.Patient Care Exception Report

Personnel Information

1. System Name: Payroll/Personnel
   Personnel Information Subsystem

2. Purpose:

   - Assist all services, including medical affairs and nursing, with the monitoring of hospital personnel education requirements

   - Maintain statistics on educational programs

3. Functions and Features:

   - Records employee and physician course completion

   - Records continuing medical and educational units; compares units recorded to licensing requirements

   - Summarizes data for reporting to external agencies such as EEO, Affirmative Action and Worker's Compensation

   - Retrieves and combines data on employees for managing the Personnel area

   - Exit interview analysis

   - Employee turnover analysis

   - Applicant tracking

4. Major Inputs:

   - Education credits

   - License requirements

   - Exit interviews

   - Applicant status

5. Major Outputs:

   - Education Summaries by Individual

   - License Requirements Control Report

   - Exit Interview Analysis

   - Summary of Applicant Status

   - External Reporting

Personnel Information (Continued)

6. Major Information Categories:

   - Education data
   - Employee data
   - Applicant data

7. Interfaces:

   - Productivity
   - Patient Classification
   - Student/Resident Education
   - Patient and Financial Accounting
   - Employee Scheduling

8. Benefits:

   - Provide education data to employees and physicians
   - Better information for decision making on personnel policies and procedures

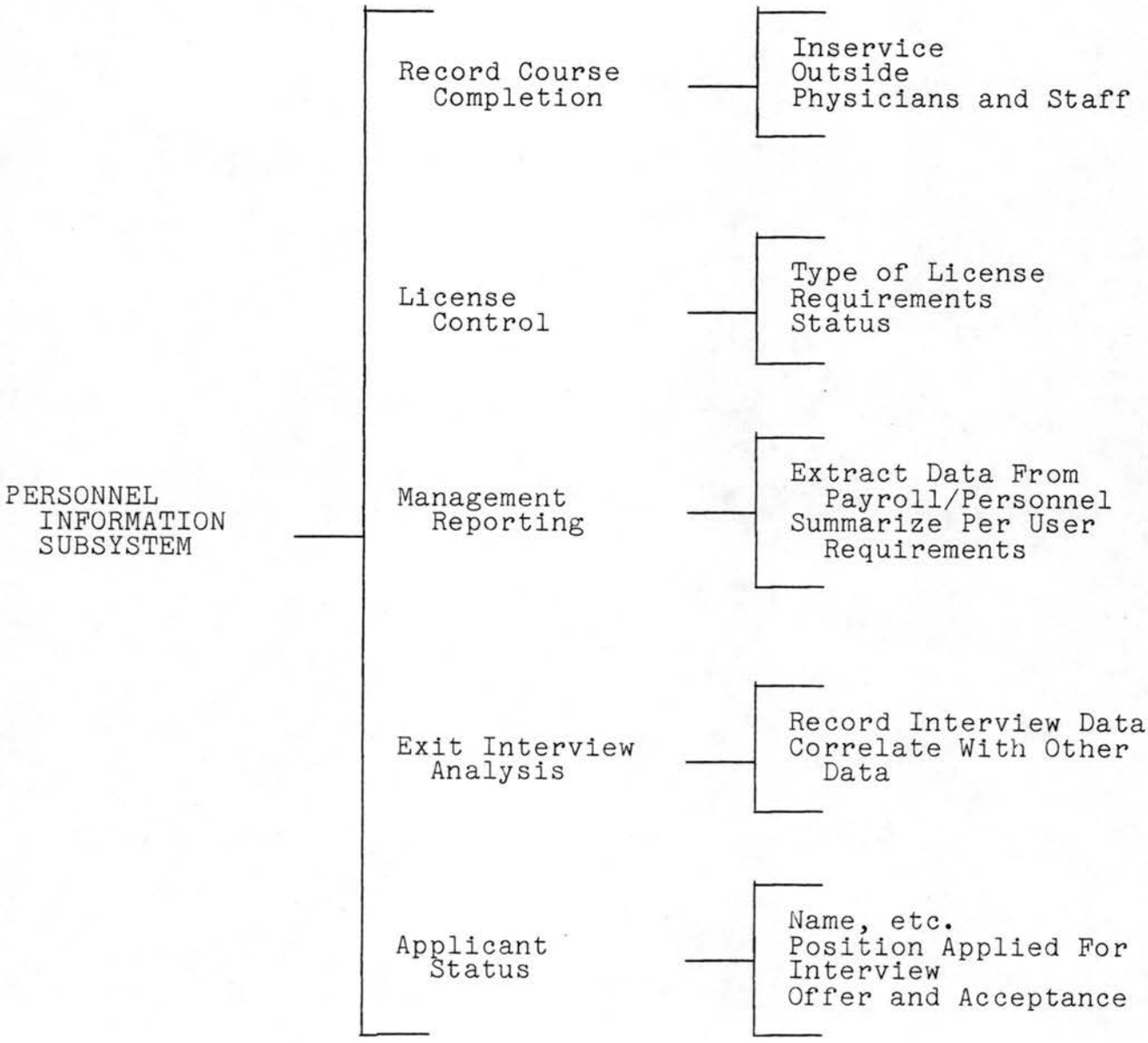
9. Major Users:

   - Personnel
   - Nursing
   - Physicians

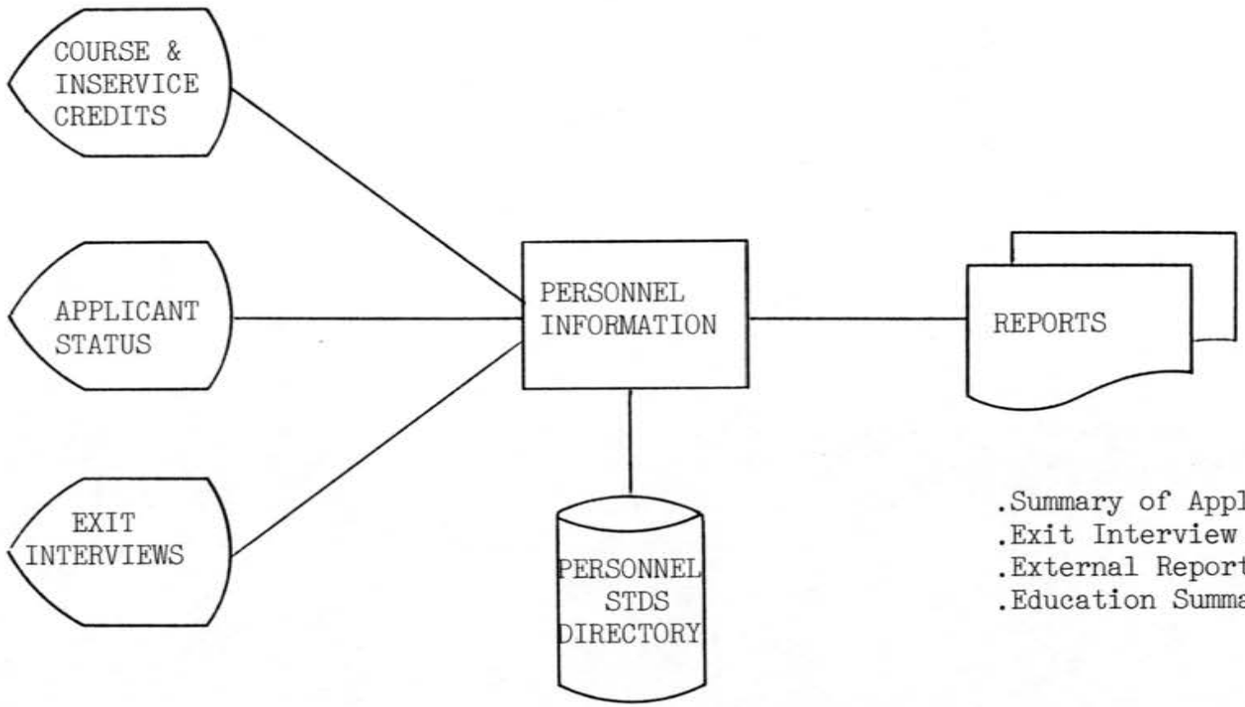
10. Approximate Workdays Required:

	Data Processing	User
Design	80	30
Installation	210	50
Total	290	80

Personnel Information (Continued)



PERSONNEL INFORMATION
SYSTEM OVERVIEW SCHEMATIC



.Summary of Applicant Status
.Exit Interview Analysis
.External Reporting
.Education Summaries

.License Requirements
.Position Requirements

Word Processing and Transcription

1. System Name: Word Processing and Transcription

2. Purpose:

   - Assist in faster turnaround of transcriptions
   - Provide storage and immediate access to processed information
   - Provide more efficient procedures for generating standard letters

3. Functions and Features:

   - Print form letters
   - Transcribe results and progress notes
   - Store and edit letters and other texts
   - Mailing lists

4. Major Inputs:

   - Text dictations
   - Radiology and other patient care notes
   - Standard form letters
   - Names and addresses

5. Major Outputs:

   - Letters
   - Patient Care Transcriptions
   - Texts

6. Major Information Categories:

   - Standard forms

Word Processing and Transcription (Continued)

6. Major Information Categories (Continued):

   - Transcription by department
     - . Progress notes
     - . Results

7. Interfaces:

   - Radiology
   - Records Management
   - Capital Funds Development

8. Benefits:

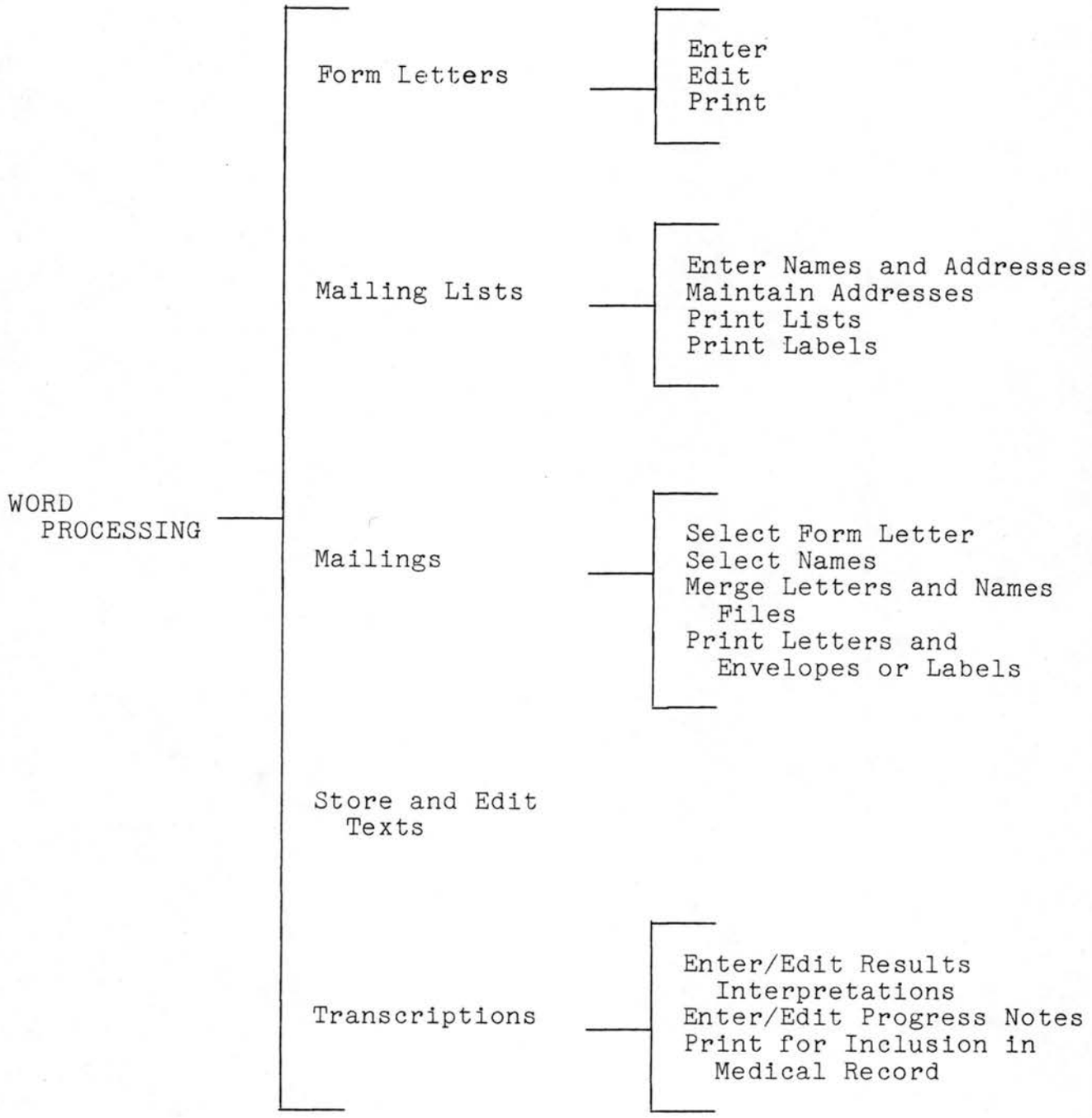
   - Reduce typing and correction time
   - Faster turnaround for transcriptions
   - Ease in generating multiple copies because of disk storage
   - Reduced file space and paper costs
   - Better use of managers' time

9. Major Users:

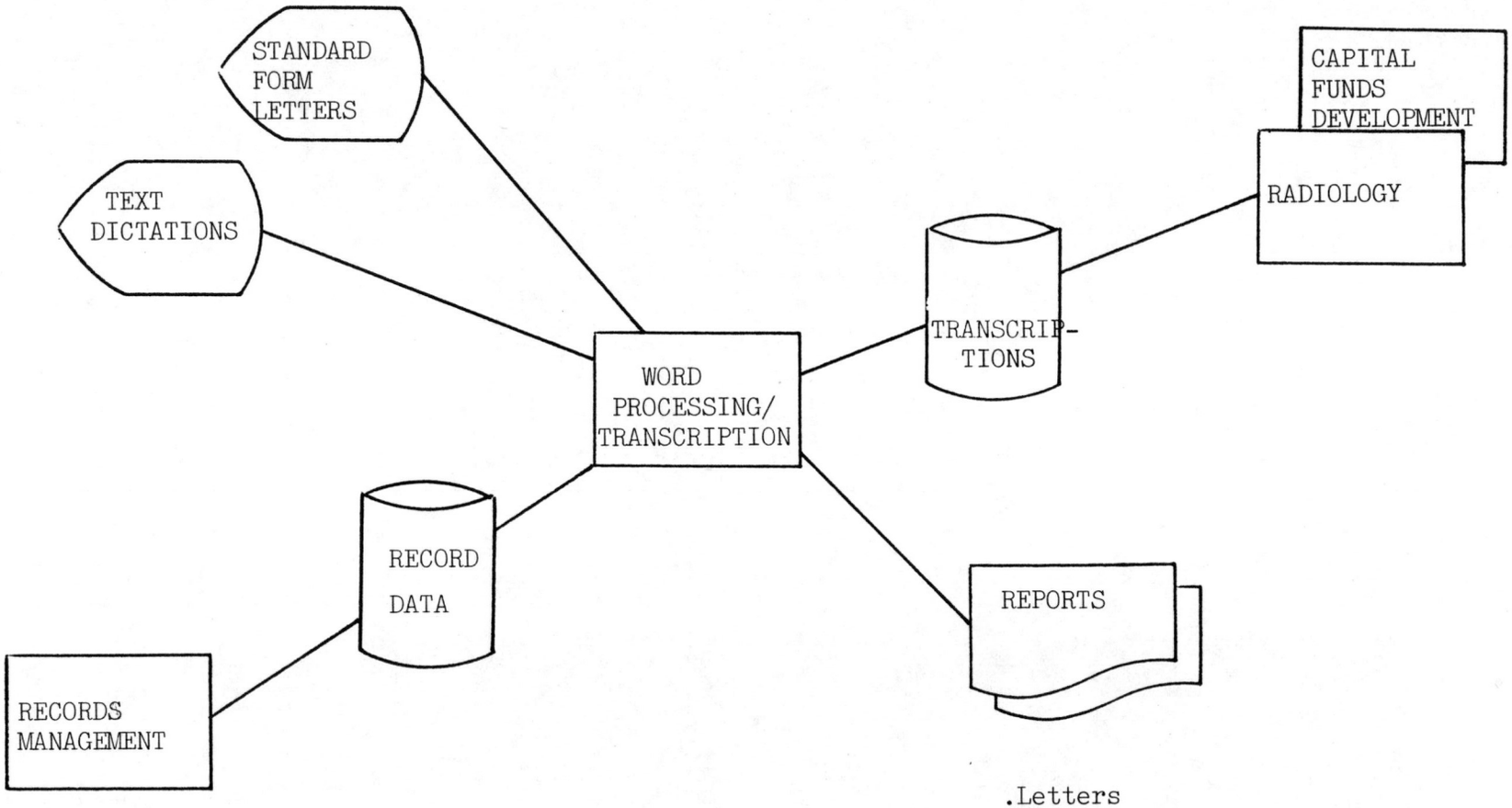
   - Medical Records
   - Radiology

10. Approximate Workdays Required:

	Data Processing	User
Design	40	20
Installation	90	20
Total	130	40


WORD PROCESSING
Form Letters
Enter
Edit
Print
Mailing Lists
Enter Names and Addresses
Maintain Addresses
Print Lists
Print Labels
Mailings
Select Form Letter
Select Names
Merge Letters and Names Files
Print Letters and Envelopes or Labels
Store and Edit Texts
Transcriptions
Enter/Edit Results Interpretations
Enter/Edit Progress Notes
Print for Inclusion in Medical Record

WORD PROCESSING/TRANSCRIPTION
SYSTEM OVERVIEW SCHEMATIC



.Letters
.Patient Care Transcriptions
.Texts

Modeling and Forecasting

1. System Name: Modeling and Forecasting

2. Purpose:

   - Provide management the ability to determine the impact of alternative decisions

3. Functions and Features:

   - Produces high-level projected financial statements
   - Computes ROI and other key ratios
   - Facilitates PPE acquisition decisions
   - Evaluates financial statement impact of various pricing structures
   - Projects costs and benefits of diagnoses, groups and new programs
   - Estimates future volumes based on historical data
     - Patient days
     - Surgery procedures
     - Other departments' activities

4. Major Inputs:

   - Constraints for projecting financial statements
   - Mathematical relations of underlying assumptions
   - Revenues and costs for programs
   - Pricing structures
   - Decision variables

5. Major Outputs:

   - Projected Financial Statements
     - Revenues and expenses
     - Return on investment
     - Key ratios

Modeling and Forecasting (Continued)

5. Major Outputs (Continued):

   - Cost/Benefit Analysis
   - Projected Volumes
     . Total hospital
     . By department

6. Major Information Categories:

   - Key ratios
   - Financial statement constraints
   - Variables (to do 'what if' tests)

7. Interfaces:

   - Patient and Financial Accounting

8. Benefits:

   - Facilitate the budgeting process by providing better information
   - Enhance management ability to make major decisions through understanding the impacts of the alternatives

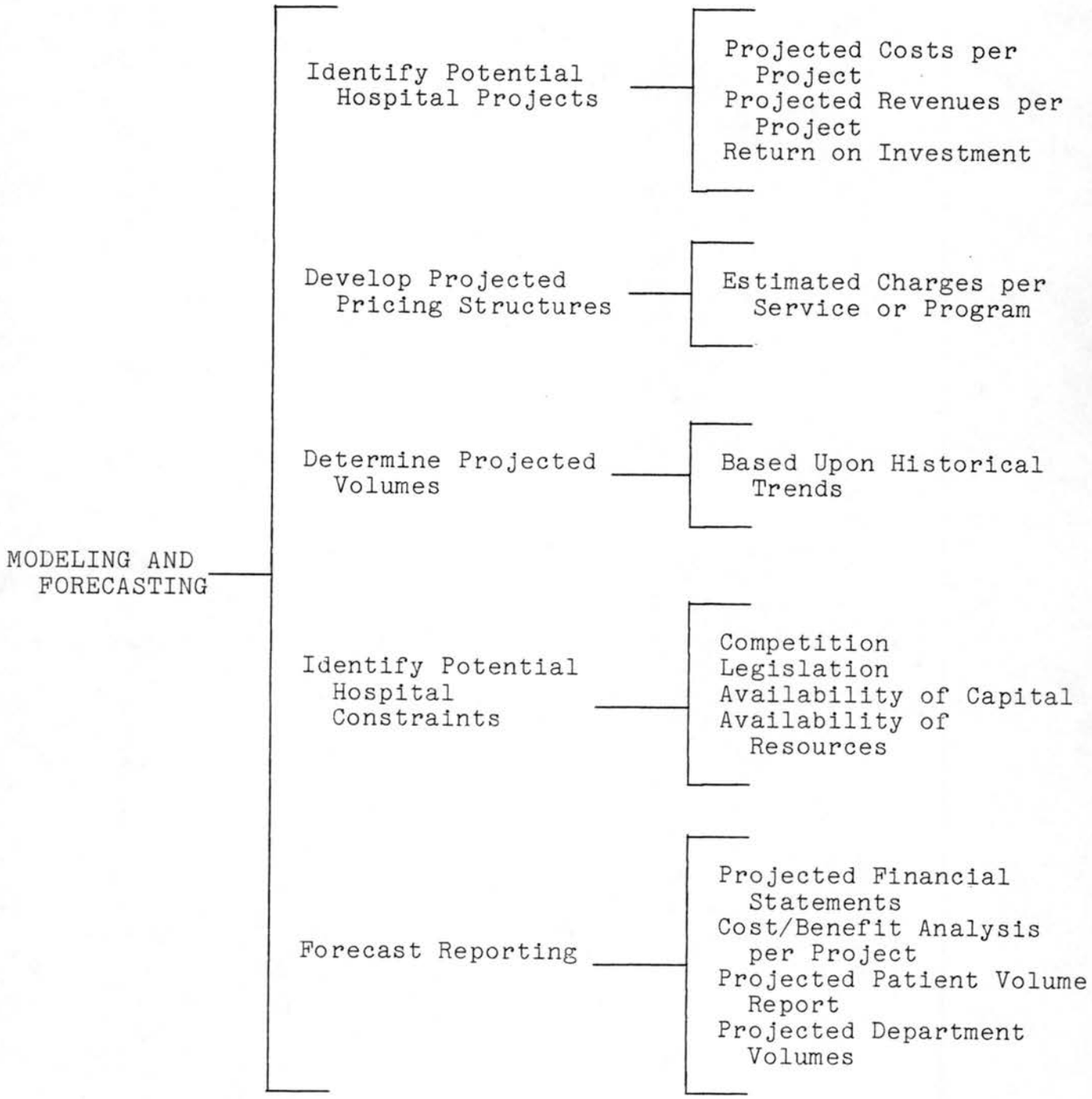
9. Major Users:

   - Administration
   - Surgery
   - Other departments needing volume predictions

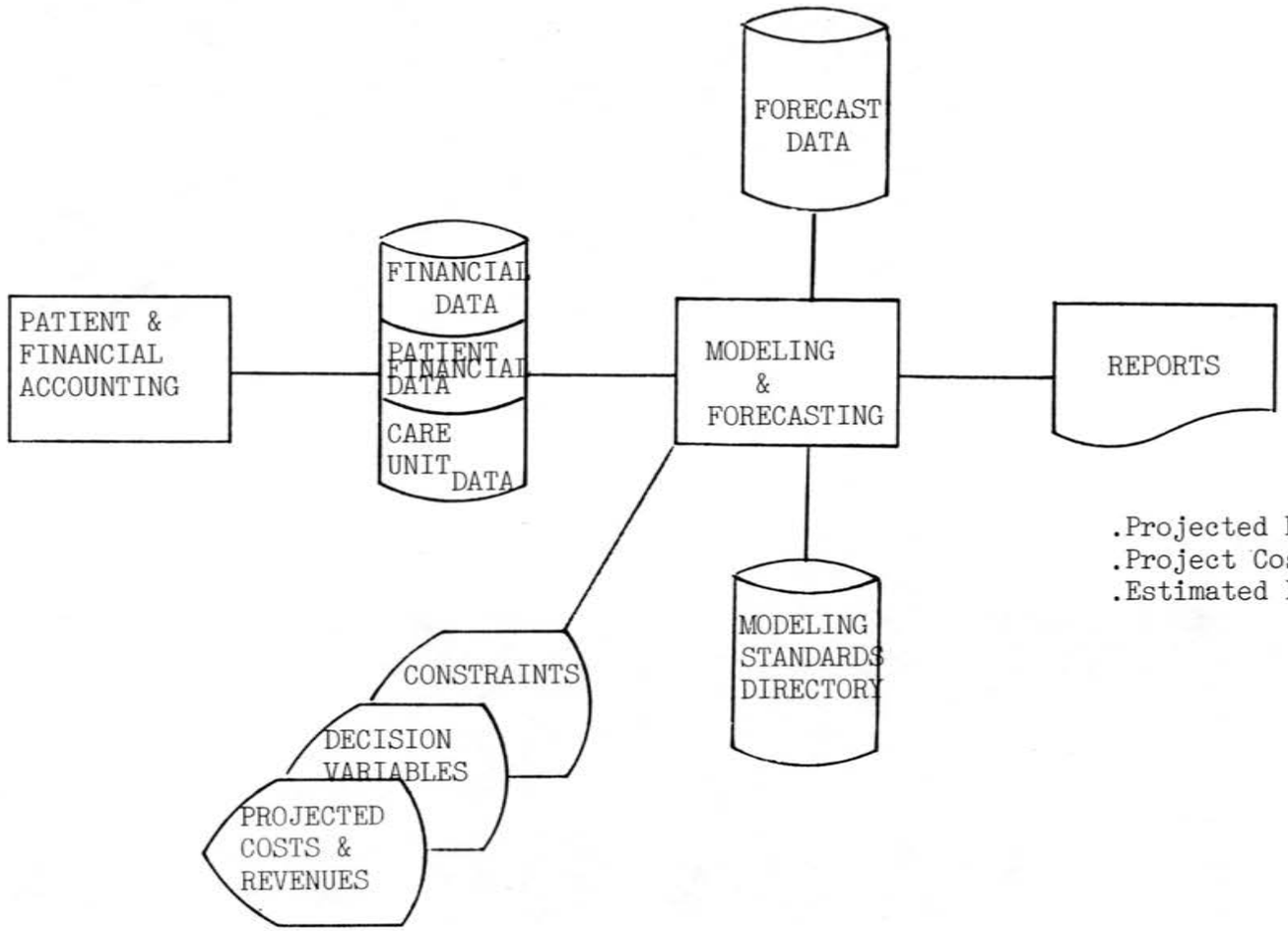
10. Approximate Workdays Required:

	Data Processing	User
Design	30	10
Installation	90	20
Total	120	30

Modeling and Forecasting (Continued)



MODELING AND FORECASTING
SYSTEM OVERVIEW SCHEMATIC



.Projected Financial Statements
.Project Cost/Benefit Analysis
.Estimated Patient Volumes by Department

Physician Billing

1. System Name: Physician Billing

2. Purpose:

   - Bill for all physician services provided at St. Paul Ramsey and Gillette

3. Functions and Features:

   - Bills for RCA and MERA
   - Interfaces with the Wausau Medical Management Information System for summary reporting
   - Summarizes revenue data by:
     . Physician
     . Group
     . Responsible party
     . Clinic
     . Other

4. Major Inputs:

   - Registration
   - Billing
   - Third-party requirements
   - Payments
   - Adjustments

5. Major Outputs:

   - Bills
   - Accounts Receivable Statements
   - Collection Notices

Physician Billing (Continued)

5. Major Outputs (Continued):

   - Aged Receivables Listing
   - Revenue Summary
   - Medicare/Medicaid Reporting

6. Interfaces:

   - Patient and Financial Accounting
   - ADT

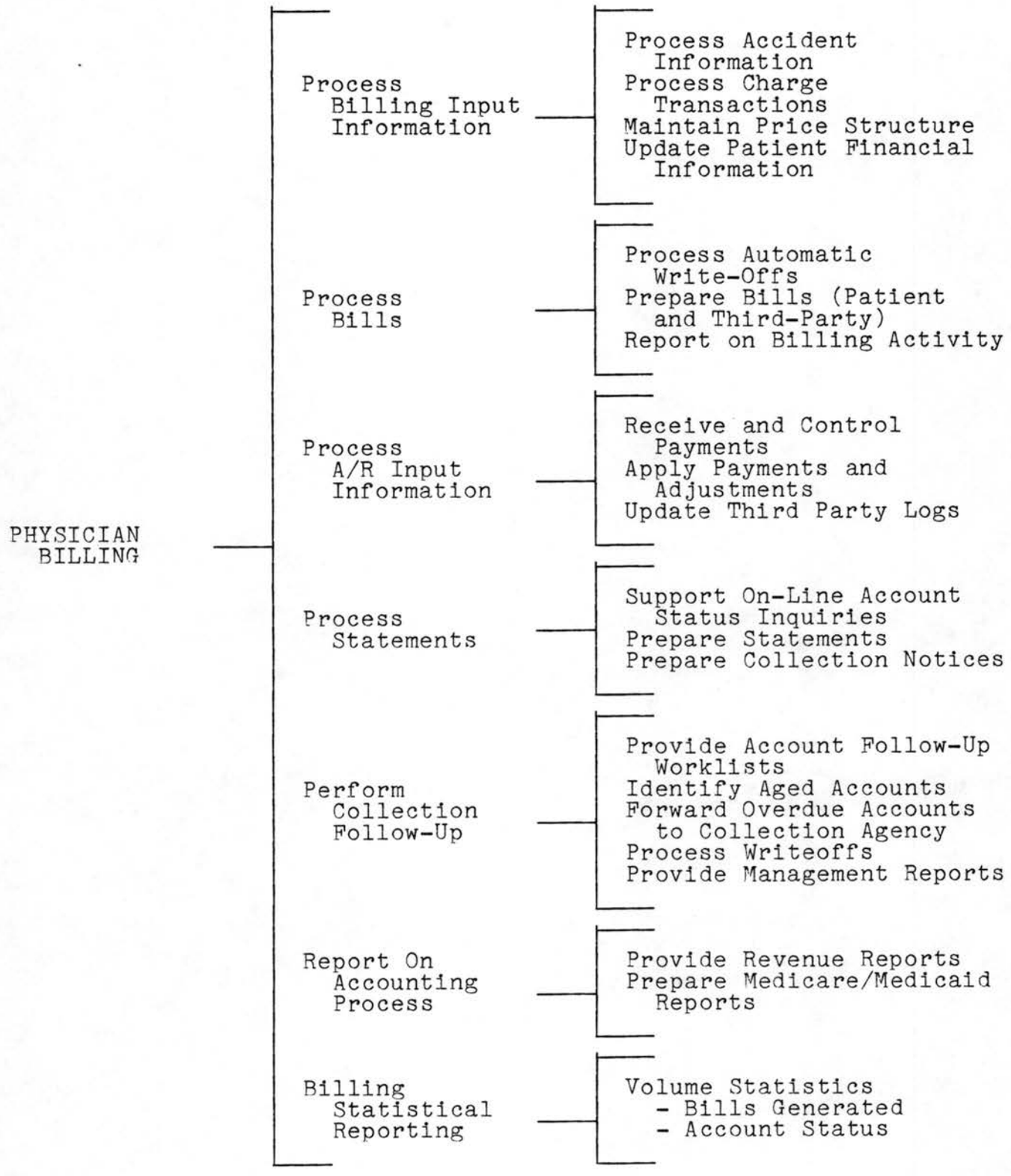
7. Benefits:

   - Improves relations with physicians
   - Automates a tedious manual task
   - Provides statistics on physician utilization

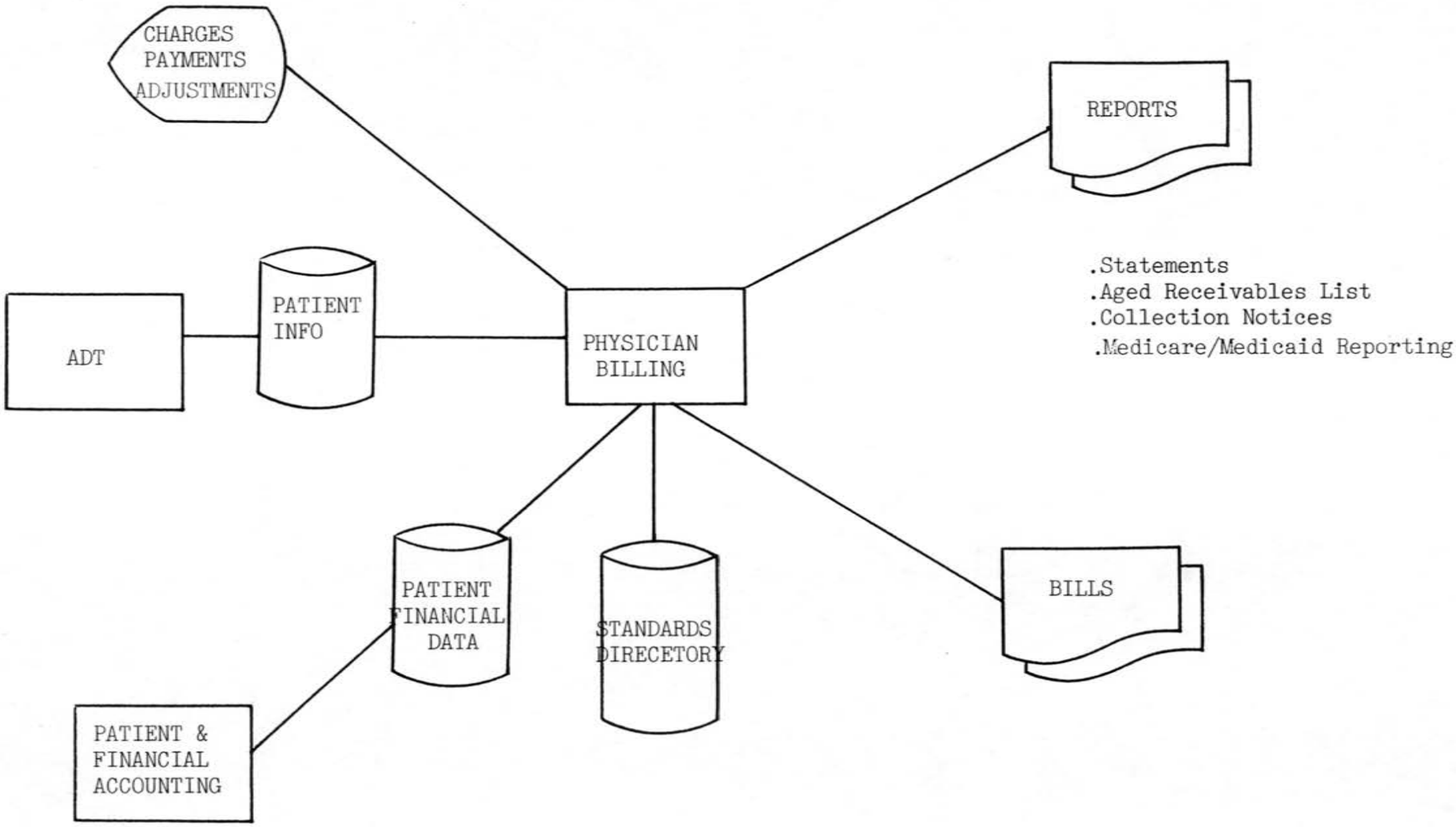
8. Major Users:

   - Health services
   - Business office

Physician Billing (Continued)



PHYSICIAN BILLING
SYSTEM OVERVIEW SCHEMATIC



Marketing/Referral Analysis

1. System Name: Marketing/Referral Analysis

2. Purpose:

   - Support marketing and planning efforts by identifying current and potential patient origins and referring physicians

3. Functions and Features:

   - Summarizes patient demographic data to identify referral patterns by area, diagnosis, referring physicians, and combinations of the above

   - Compares performance with competitors

   - Summarizes external demographics data, and determines changes and trends in demographics

   - Interfaces with FHCE for input, and has flexibility for different summarization of their data

4. Major Inputs:

   - External data bases (FHCE)
     . External Demographics
     . Population of diagnoses by zip code and referring physician
     . Demographic breakdowns of diagnoses; total and by zip code
     . Percent of service area being served by each hospital

   - Competitor Performance
     . Percent of service area being served by competitors
     . Patient days per competitor hospitals
     . Occupancy rate per competitor hospitals

5. Major Outputs:

   - Market Analysis Summary

   - Patient Origin Summary

   - External Demographic Trends

   - Competitor Performance Report

Marketing/Referral Analysis (continued)

6. Major Information Categories:

   - Patient Demographics
   - External Demographics (total population)
   - Competitor Performance
   - Market Share

7. Interfaces:

   - Tape-to-tape with
     . FHCE
   - Case Mix Reporting
   - ADT

8. Benefits:

   - Facilitates marketing and planning efforts through providing data necessary to make reasonable decisions
   - Provides a means for the Hospital to continue to grow and increase revenues
   - Compares performance to competition
   - Identifies potential programs

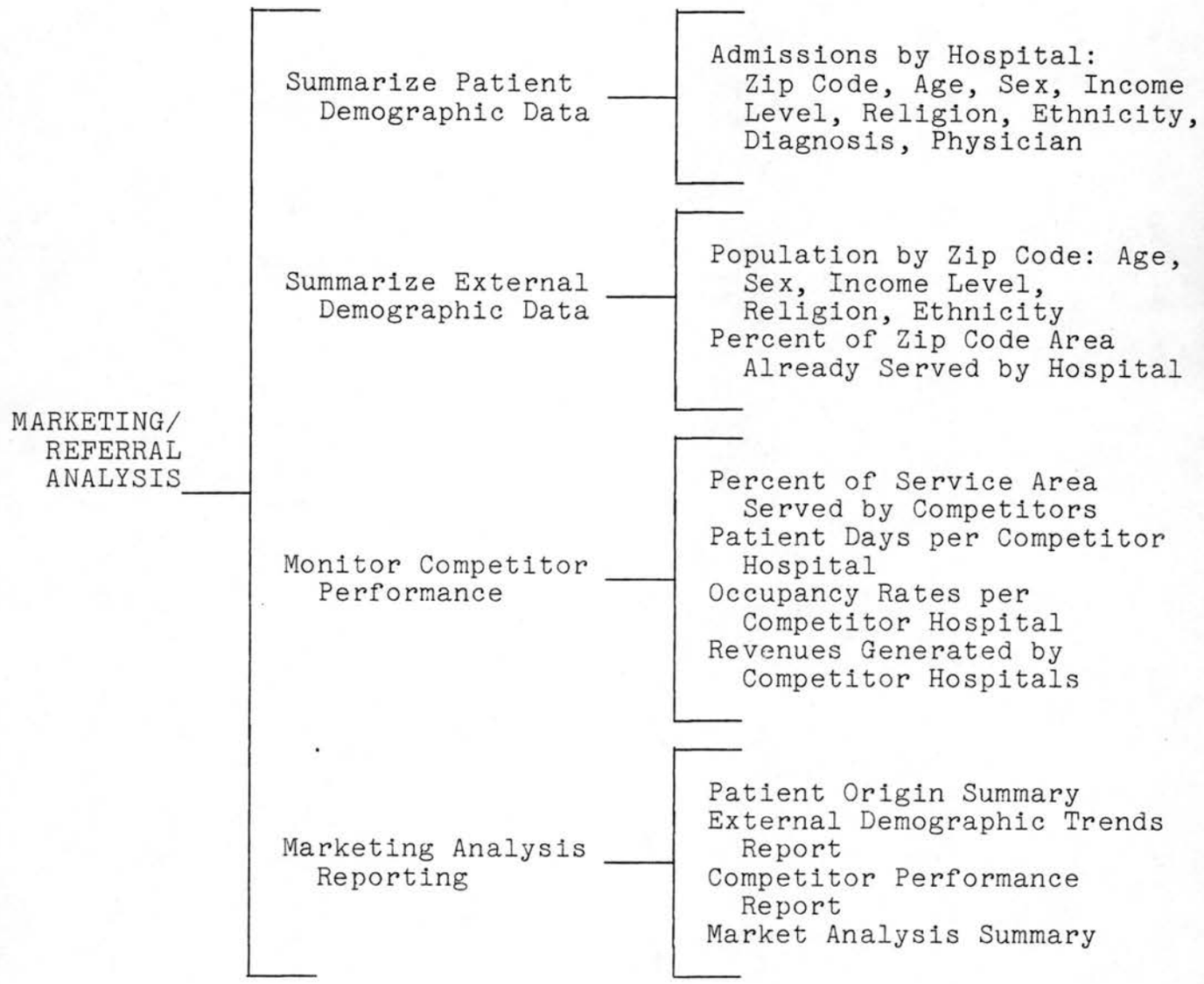
9. Major Users:

   - Administration
   - Planning
   - Marketing

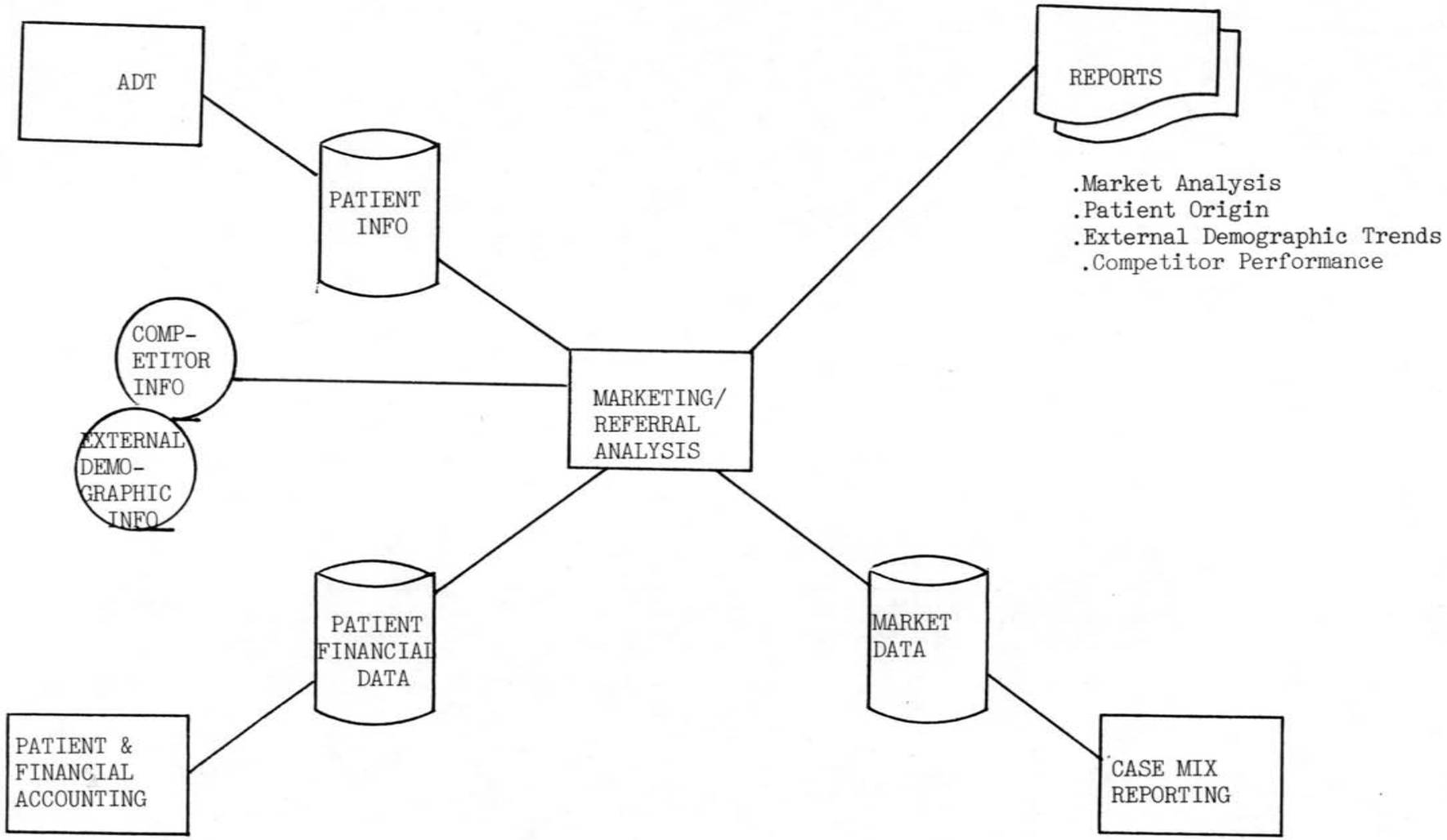
10. Approximate Workdays Required:

	Data Processing	User
Design	150	60
Installation	450	110
Total	600	170

Marketing/Referral Analysis (Continued)



MARKETING/REFERRAL ANALYSIS
SYSTEM OVERVIEW SCHEMATIC



Student/Resident Education

1. System Name: Student/Resident Education

2. Purpose:

   - Provide records on education credits earned at St. Paul Ramsey Medical Center for verification to requesting organizations.

3. Functions and Features:

   - Gathers data on students and residents:

     . Dates at St. Paul Ramsey

     . Rotations done

     . Experience

   - Stores data to allow easy retrieval in the future

4. Major Inputs:

   - Shifts worked

   - Educational credits received

5. Major Outputs:

   - Individual Education/Experience Records

   - Statistical Summaries

6. Major Information Categories:

   - Student data

   - Resident data

   - Work data

7. Interfaces:

   - Payroll/Personnel

Student/Resident Education (Continued)

8. Benefits:

   - Facilitates organized record keeping for responding to future requests for verification of experience gained at St. Paul Ramsey Medical Center.

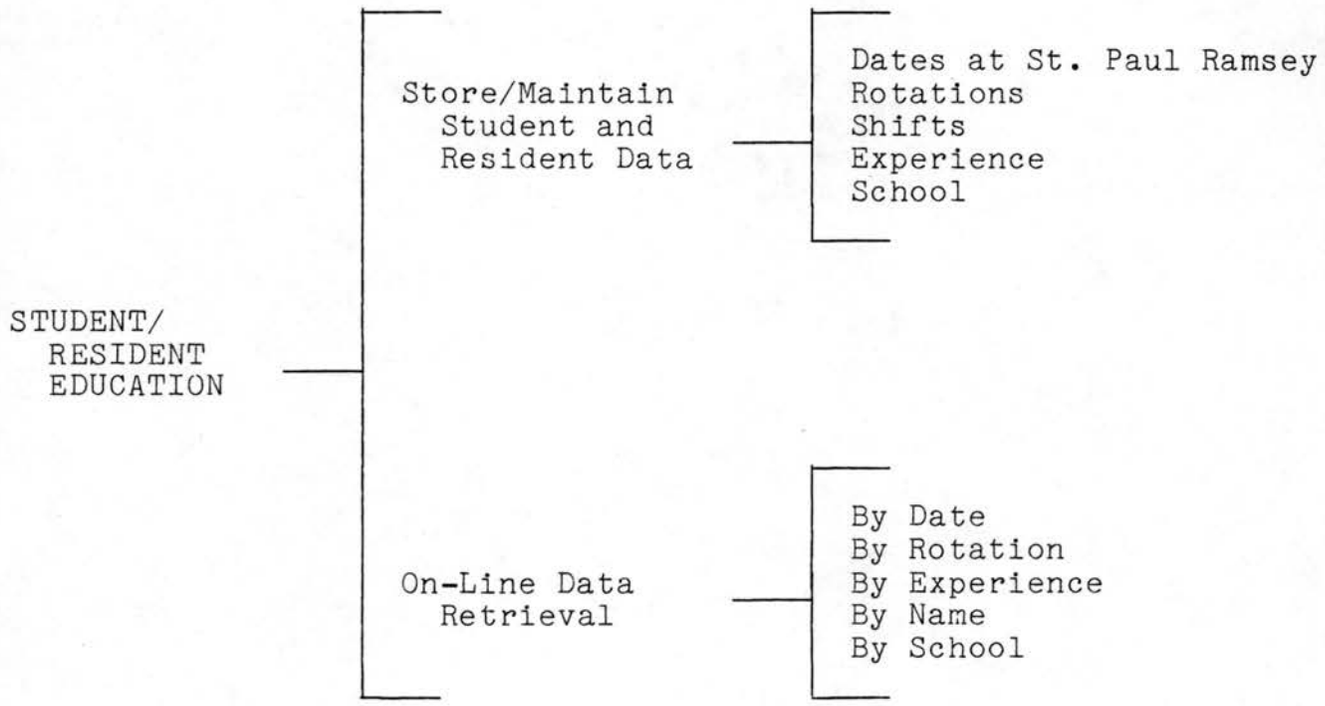
9. Major Users:

   - Administration
   - Students and residents
   - Teaching physicians

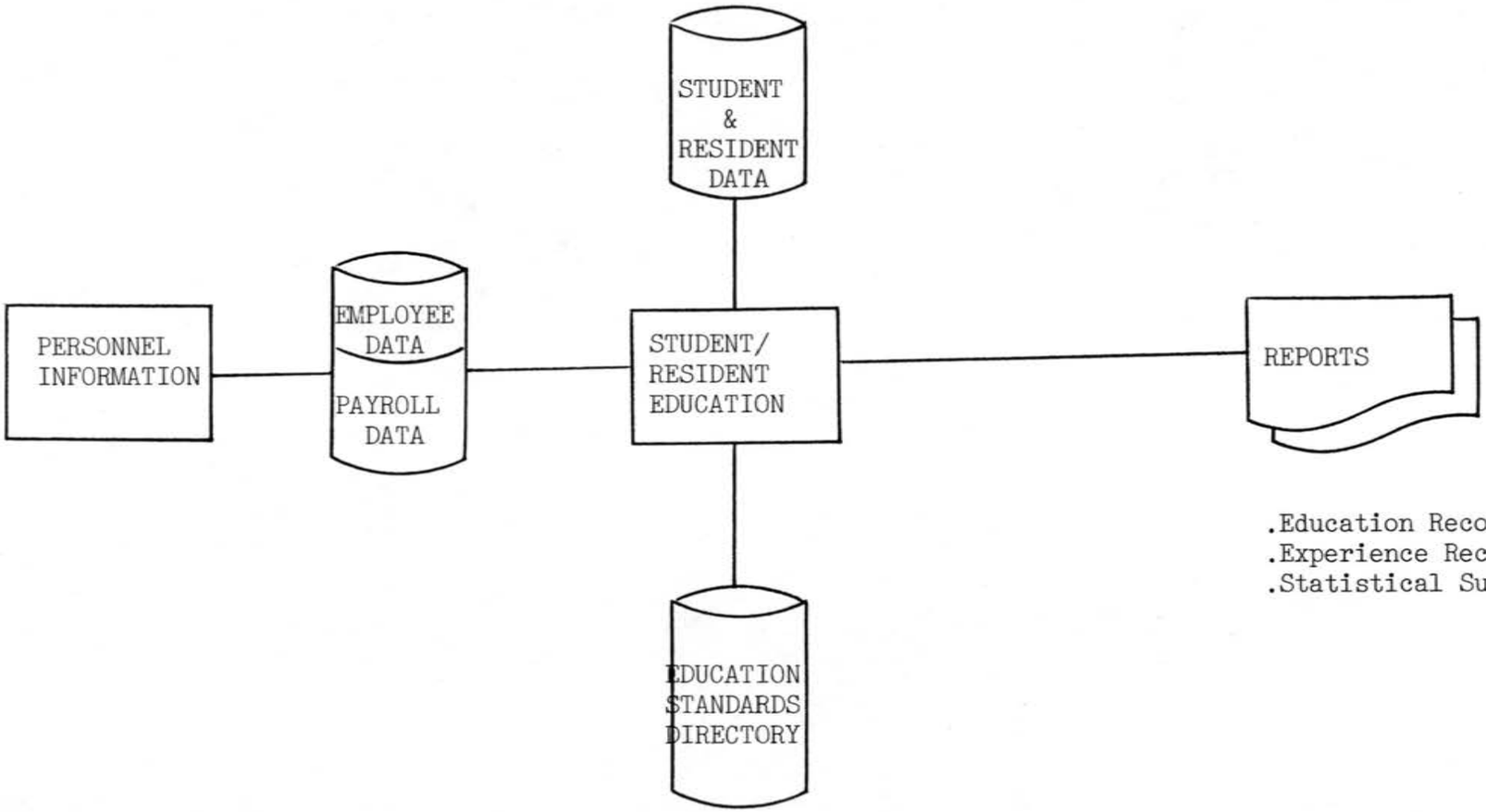
10. Approximate Workdays Required:

	Data Processing	User
Design	50	20
Installation	250	60
Total	300	80

Student/Resident Education (Continued)



STUDENT/RESIDENT EDUCATION
SYSTEM OVERVIEW SCHEMATIC



.Education Records
.Experience Records
.Statistical Summaries

Capital Funds Development

1. System Name: Capital Funds Development

2. Purpose:

   - Provide a mechanism for raising funds through appeals and pledges

3. Functions and Features:

   - Selects names from mailing lists based on past giving history and identifies potential donors
   - Maintains giving histories
   - Categorizes givers and prospects
   - Generates solicitations, reminders and acknowledgements

4. Major Inputs:

   - Inquiries
   - Pledges
   - Payment receipts
   - Report requests

5. Major Outputs:

   - Donor List by Contribution Category
   - Appeal Control
   - Correspondence with Donors

6. Major Information Categories:

   - Giving history
   - Giver Demographics
   - Other pertinent data for name selection

Capital Funds Development (Continued)

7. Interfaces:

   - Word Processing

8. Benefits:

   - Immediate payback through revenues from more complete and accurate solicitations

   - Becomes more important to solicit donations as government funds are cut back

   - Effective solicitation of individuals and organizations

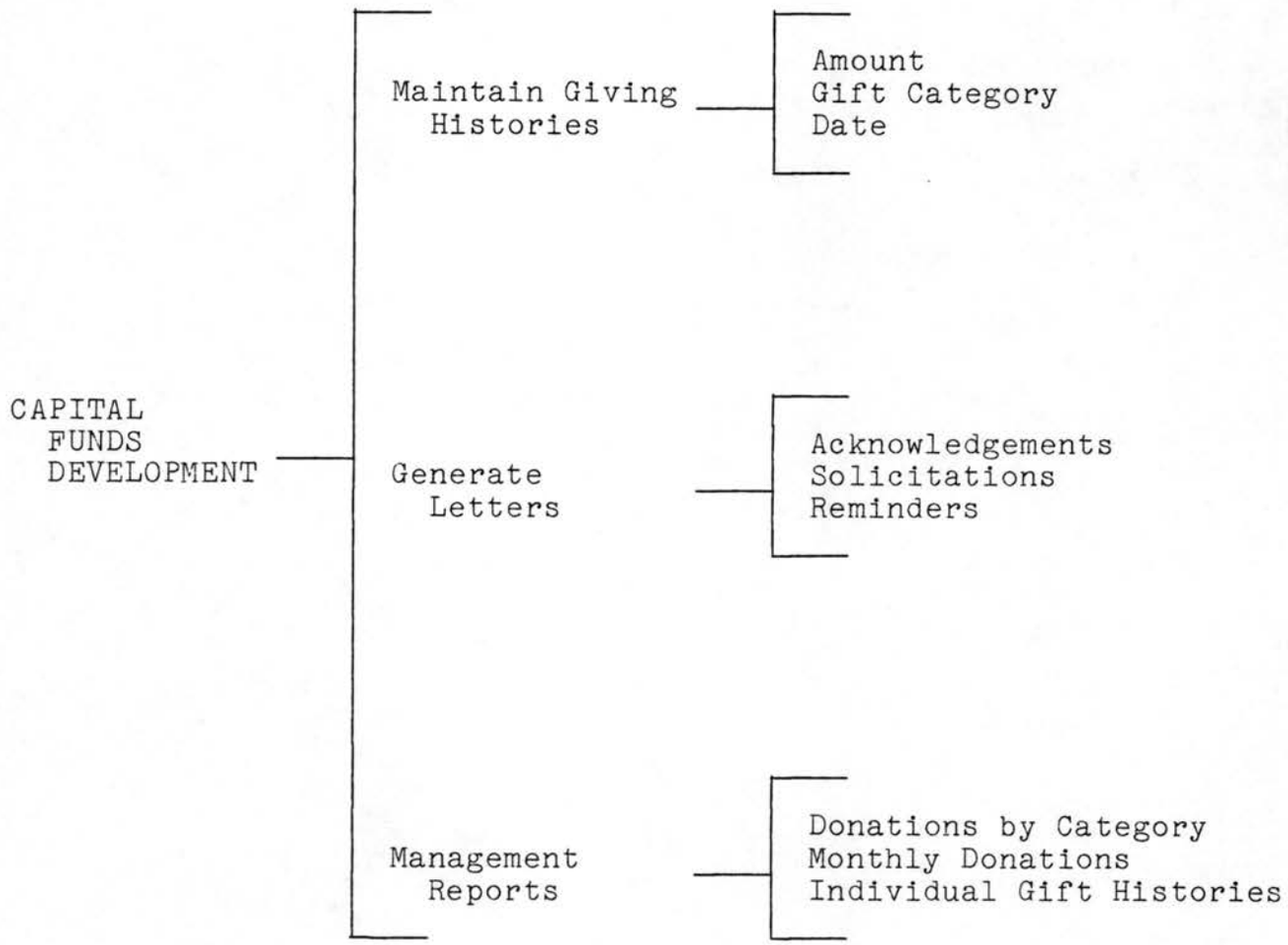
9. Major Users:

   - Administration

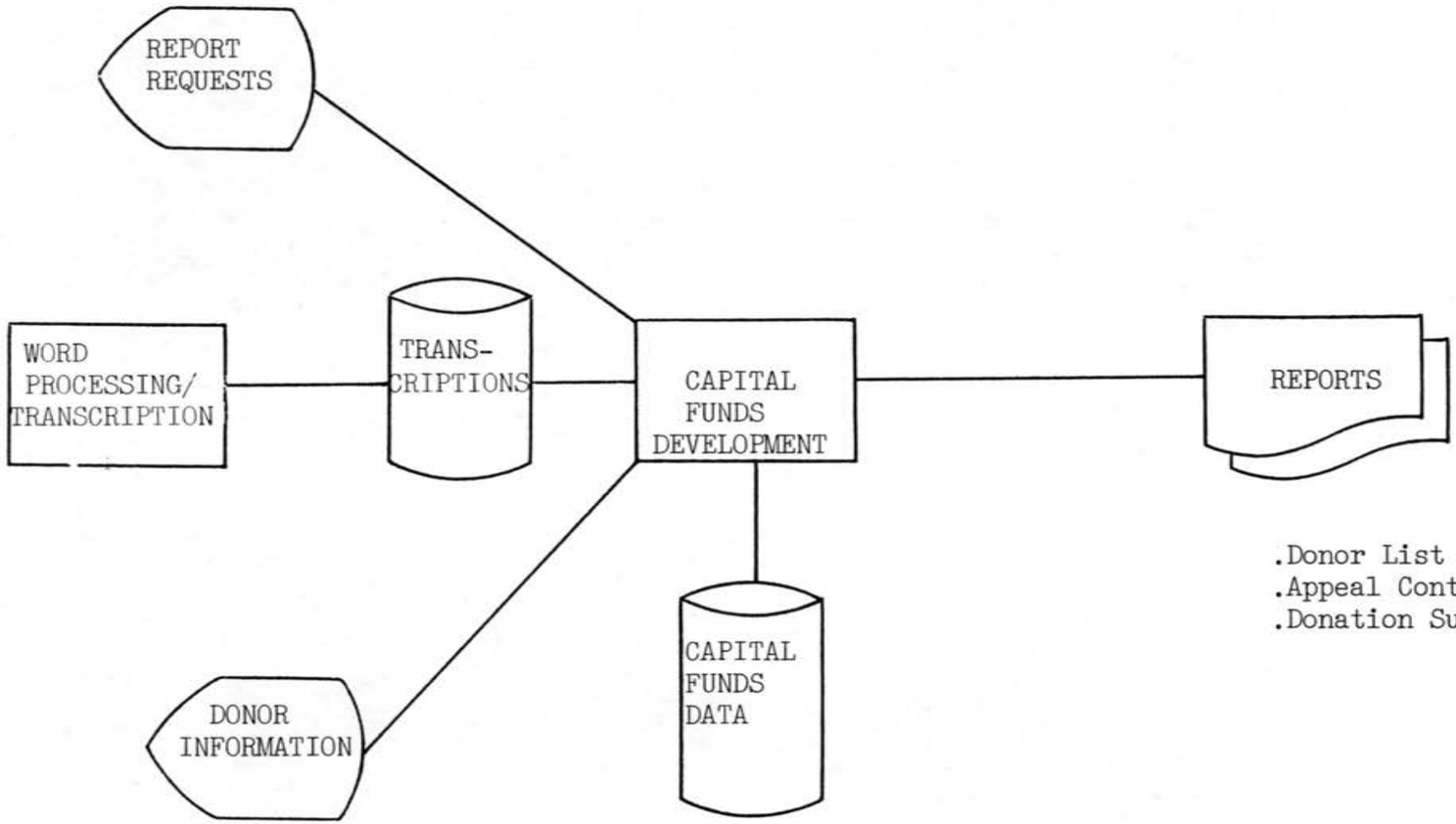
10. Approximate Workdays Required:

	Data Processing	User
Design	80	30
Installation	300	80
Total	380	110

Capital Funds Development (Continued)



CAPITAL FUNDS DEVELOPMENT
SYSTEM OVERVIEW SCHEMATIC



ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEM PLAN
IV. ORGANIZATION STRATEGY

A. INTRODUCTION

The successful use of data processing at St. Paul-Ramsey Medical Center is dependent upon several specific factors:

- Executive leadership
- Sound management controls
- Operating management involvement
- Competent systems development and technical personnel
- Strong central direction and control

This introduction identifies the elements necessary to achieve the successful use of the computer, and summarizes the recommendations below in the areas of the committee organizational structure, the Data Processing Organization and the specific planning and control practices.

1. Overview of the Section

The purpose of this section is to recommend an approach for achieving the successful use of data processing facilities at SPRMC in meeting business needs and objectives. The essential ingredient is the commitment from management to become involved in the planning and control of data processing activities. The section is intended to provide an overview of the recommended organization and planning and control practices. This approach involves the following ingredients:

a. An organizational structure of committees, representing various levels of management, which allows effective involvement in the data processing function.

b. An internal data processing organization which accommodates this management involvement and responds to the direction set by management.

c. A series of planning and control practices which allows for the qualitative and quantitative monitoring of the work of the data processing function. This element provides for effective information feedback to management.

The specific elements of this approach are the following:

a. Executive Management Guidance and Control

b. User Management Participation

c. The Data Processing Organization

d. Systems Development Standards and Procedures

e. Project and Personnel Planning and Reporting

2. Recommendations

The recommendations developed by the project are the following:

a. Executive Management Guidance and Control - To ensure management involvement, a charter for the Management Advisory Committee (MAC) should be developed and its members should be given appropriate training for executing its assigned responsibilities. The primary purpose of the MAC is to ensure effective utilization of data processing equipment and personnel in the solution of SPRMC's business problems.

b. User Management Participation - To ensure effective user participation on systems projects, it is recommended that task forces be established to direct systems efforts. The task forces should consist of user, data processing, internal audit and other affected personnel.

With Items a and b, a hierarchical structure for the effective involvement in the control of systems activities by senior and operating management has been built. Exhibit IV-A attached to this section of the chapter illustrates this hierarchical structure.

c. Data Processing Department Organization - It is recommended that a Director of Information Systems be appointed and a data processing staff built consistent with the hardware/software strategy chosen. In addition, the Systems Development area should be realigned to ensure that each major user has a specific Systems Development Group Manager as its primary contact.

This organization should establish appropriate career paths and structures to support systems development and operations in an on-line and data base environment.

d. Systems Development Standards and Procedures - To allow a consistent approach to designing and maintaining computer systems, uniform systems development standards are recommended. With a consistent approach to systems projects, uniform status reporting can become a reality. This uniformity facilitates senior management's planning and control over data processing areas; improves communication between the user, data processing and management; and ensures proper understanding of responsibilities in the development of data processing projects.

e. Project and Personnel Planning and Reporting - To establish uniform reporting to all parties within the organizational control structure and to establish a basis for effective status reporting, a uniform, mechanized progress reporting system and the basic standards for progress reporting are recommended. This mechanized progress reporting system should include time recording, progress reporting and data processing cost reporting. Time would be reported against specific, standard project tasks, and estimates to complete each task would be prepared monthly. This system would be the basis for providing quantitative reporting to the MAC.

B. ORGANIZATIONAL CONCEPTS FOR PLANNING AND CONTROL OF DATA PROCESSING ACTIVITIES

To ensure effective management and user participation in the planning and control of data processing activities, an organizational structure of committees is recommended. This approach consists of two levels of organizational participation:

. Executive Management Guidance and Control

. User Management Participation

Each of these levels will be described, using the following categories.

- Overview
- Purpose of Committee
- Membership
- Duties
- Meetings

ORGANIZATION STRATEGY (Continued)

1. Executive Management Guidance and Control

Overview - Executive Management Guidance and Control is concerned with senior management's involvement in data processing activities. The emphasis of this involvement is upon senior management's role in the following areas:

a. Establishment of data processing goals and objectives and their relationship to Hospital goals and objectives.

b. Assessment of data processing resource commitments in conjunction with other Hospital interests.

c. Knowledge of progress on major data processing efforts.

d. Monitoring of major project budgets and cost estimates.

e. Assessment of the implications of major hardware and software decisions.

In order for senior management to be involved effectively in the above activities, it is recommended that the Management Advisory Committee be responsible for all data processing activities.

Purpose of Management Advisory Committee (MAC) - The purpose of the MAC is to serve as a vehicle for senior management to ensure that data processing equipment and personnel are effectively utilized. This utilization should improve the quality and timeliness of information reporting at a cost commensurate with improvement in operating results. In addition, the extension of information to the various levels of management who can best utilize it to maximize their performance and profitability contributes to the overall Hospital profitability and competitive position.

Membership - The membership of the Management Advisory Committee should be appointed by the CEO, and consist of senior officers.

The membership should represent line management of the three major functions of the Hospital: medical, administration and fiscal. Other personnel can be invited from time to time to provide special counsel. The permanent membership should be limited to about six to eight individuals.

Duties -

a. Establish overall data processing policies and procedures -- Review existing data processing policies and procedures and make changes as necessary to meet continuing business needs.

b. Approve the initiation of specific major data processing projects and the continuation of projects at the completion of key development phases.

c. Monitor the progress on systems projects over a specified development period and within a specified operating cost.

d. Approve the data processing budget.

e. Provide representation for all departments in EDP project decision making.

f. Provide operating management with a vehicle for discussion and approval of systems concepts.

g. Provide a means for assuring adequate assignment of user personnel to data processing task forces.

h. Provide guidance to the Director of Information Systems and assist him in resolving problems which cross departmental boundaries and involve various Hospital management personnel.

i. Review and Approve the Information Systems Plan.

j. Initiate postinstallation reviews of operational systems as required -- In monitoring performance, the MAC should, at an appropriate time, conduct a follow-up review on each completed systems project to determine that the systems improvements and economic advantages expected are being realized.

k. Establish task forces to accomplish specific systems development efforts.

Meetings - The MAC should meet on a regularly scheduled basis. Initially, monthly meetings will be required. However, after the control elements described in this chapter are put in place, less frequent meetings may be adequate.

2. User Management Participation

Overview - User Management Participation is concerned with user involvement in day-to-day data processing activities. The emphasis in this section is upon:

a. The role of the user in the development of a project;

b. The level of user participation in a project;

c. And, the effectiveness of user commitments to the development effort.

In order to achieve effective user participation it is recommended that task forces and project teams be established for all major systems efforts. The remainder of this section describes the Task Force and Project Team's purpose, membership and duties.

Purpose of the Task Force - Task Forces should be established to direct major systems efforts. The Task Forces would be comprised of user, data processing, audit, computer operations and Technical Support personnel and would report to the MAC. Participation on the Task Force by audit, legal and computer operations personnel would not necessarily be full time, occurring at those points in the development of a project where they have defined responsibilities. The MAC will have the responsibility of formulating the Task Forces, designating individual memberships, outlining Task Force responsibilities and required commitments, and appointing a Management Committee representing key user areas. A user, designated by the MAC, will chair the Task Force and assume responsibility for directing the overall systems effort.

Project Teams would each be assigned to a Project Manager from their own department, who would be administratively and technically responsible for the performance of personnel from his or her department.

Typical responsibilities for all areas normally represented on a project are illustrated in Exhibit IV-A.

These recommendations build a structure which brings together the diversified interests and skills necessary to ensure successful installation of major data processing systems: the user to identify business specifications in terms of reporting requirements, operating concepts, etc.;

the data processor to build the technical design and logic to meet those specifications; audit personnel to assess the appropriateness of systems controls; and computer operations personnel to determine operating impact and requirements. The establishment of Task Forces and Project Teams provides the framework for these shared responsibilities and commitments by means of the joint participation of user, data processing and other personnel.

Recognizing the importance of the user and the need for his commitment to the systems efforts, it is recommended that a user be designated by the Management Advisory Committee to serve as the chairman of the Task Force and direct the overall effort. This places the responsibility and accountability for the successful implementation with the major beneficiary of the system.

Management must recognize that task force involvement is an important assignment not only for the user task force manager, but for all participants. In this regard, management must ensure that responsibilities are not delegated to subordinate levels and that the participants are allowed sufficient time to participate meaningfully in task force assignments.

Membership - The membership of the Task Force should consist of the following:

- Designated User Chairman
- User Representatives
- Audit Representatives
- Data Processing Representatives
  - Systems Representative
  - Technical Support Representative
  - Operations Representative

The membership of the Project Team will consist of a project manager from each department represented and appropriate personnel from that department.

Duties - The duties of the Task Force Manager are:

a. Direct phase and task duties.

b. Approve work schedules and implementation plans.

c. Monitor and report progress to the MAC.

d. Recommend continuation of the project at the completion of a phase.

e. Recommend systems changes due to design changes or deviations in the budget.

f. Perform other duties as directed by the Task Force.

Meetings - The Task Force should meet as often as required to satisfy the objectives given by the MAC. In the design stages of a project, weekly meetings might occur, while during the installation stages less frequent meetings may be necessary.

Since the project team is the primary work unit of this organizational structure, it will normally function on a fulltime day-to-day basis.

C. DATA PROCESSING ORGANIZATION

1. Effective Data Processing Organization

The Data Processing Organization should be structured around the project management concept to facilitate the involvement of the various levels of management in computer systems activities. Further, since the Data Processing Organization may have to solve a multitude of functionally different problems, it is essential to have a variety of professional skills within the group.

St. Paul-Ramsey Medical Center should staff the position of Director of Information Systems. This individual should report to the Vice President of Operations or to the Vice President of Finance and have the following responsibilities:

a. Plan, organize and direct systems review, design and installation projects for the Hospital; review project agreements, work plans, progress reports and results of quality assurance reviews; and direct the implementation of corrective measures for identified problem areas.

b. Evaluate and approve recommendations of the project team regarding system capabilities and features.

c. Assist the project team in resolving problems delaying progress.

d. Verify that project objectives are being met.

e. Make recommendations for modification to the scope of projects, resource requirements and policies.

f. Prepare a career development plan for Data Processing personnel.

g. Ensure that the number of personnel and the skill mix in data processing is consistent with the Hospital's hardware and software environment. Staffing levels will be reviewed by the Management Advisory Committee.

h. Coordinate preparation of department budget and monitor expenses against budget

i. Perform quality assurance review at critical points in key projects.

j. Maintain the Information Systems Plan.

The organization should be built upon three distinct, yet integrated, areas of specialization reporting to the Director of the Department (Exhibit IV-B).

a. Systems Development - Systems Development is responsible for the following:

1) developing in-depth knowledge of existing systems and maintenance of those systems;

2) developing appreciation and understanding of the business area they support;

3) providing project leaders for development projects;

4) and, providing personnel with appropriate analytical and programming skills for all projects.

b. Data Processing Operations - Responsible for computer operations and input/output control.

c. Technical Support - Responsible for providing an efficient and cost effective hardware and software environment, and providing specialized technical services to specific projects.

1) Software Support - selection, generation and maintenance of systems software.

2) Hardware Support - selection, installation and performance analysis of hardware.

3) Data Base Administration - maintenance of data relationships, with direct project involvement in data base design.

4) On-line Technical Support - definition and maintenance of the on-line environment.

5) Network Management - network design and day-to-day operational management.

Examples of job descriptions for data processing professionals are included in the Appendix.

2. External Organizations

There are certain inherent checks and balances in the type of organization that has been outlined. In addition, given the increasing emphasis and concern with data and physical security, it is expected that the Internal Audit Department would be involved in certain activities of the Data Processing Organization. Specifically, the Internal Audit Department should participate in the following:

- Identifying and describing systems controls;
- Verifying adherence to standards;
- Independently assessing system benefits and development costs;
- Determining the adequacy of physical and data security and backup procedures;
- And, establishing systems "auditability."

The Legal Department should consult with the systems analysts in determining legal requirements of systems in the design stage. In addition, they should continue to approve all vendor contracts under consideration by the Data Processing Organization.

D. DATA PROCESSING PLANNING AND CONTROL PRACTICES

The purpose of this section is to describe the necessary planning and control practices which allow the qualitative and quantitative monitoring of the work performed by the Data Processing Organization.

1. Systems Development Standards

Systems development standards and procedures provide guidelines for the design, installation and maintenance of data processing systems. Their objective is to provide a method for achieving consistency in approach, quality and control of systems efforts. Any major data processing project should be divided into subparts or phases to allow for more manageable and controllable segments of work. Each phase should have a detailed description of the tasks that are to be completed within that phase. Through the use of a standard phase/task approach, understanding and communication can be improved between management and data processing personnel, between hospital analysts and programmers, between users of the system and systems personnel, and among individuals in each group, now and in the future.

It is important to note that every task required to complete a systems project should be described in detail, in a Systems Development Standards manual and that training programs of varying length and emphasis should be established to familiarize user management and data processing personnel with them.

a. Project Classification - Systems projects can normally be classified as:

- Normal, Phased Approach Projects
- Maintenance or Systems Support Projects
- Special Projects

Standards should exist, detailing a methodology for each of the above project types.

b. Systems Development Phases - For Data Processing projects, the systems development cycle can be separated into distinct phases. These phases can be defined as follows (see Exhibits IV-C, D, E and F for a graphic representation of the development cycle):

1) Phase I -- Project Definition and Survey - This phase involves a brief investigation of the potential benefits and associated costs for a particular system. The Project Definition and Survey is essentially a fact-finding mission and is done to properly define a proposed project or to organize the planning of a prospective EDP effort.

This phase must provide the answers to five basic questions concerning the proposed system:

- What are the business factors involved in this project?
- What are the scope and nature of the problem?
- What personnel and other resources are required for Preliminary Systems Design?
- What is the broad range of potential benefits?
- Do the potential benefits warrant proceeding with the Preliminary Systems Design?

This preliminary analysis and determination of requirements should proceed only far enough to give a reviewer a sense of familiarity with the situation. It is not a study and will normally be complete with about one man-month of effort.

The results of this phase are presented in a written memorandum or report. Since it is to be regarded as the basis for a management decision, it should be designed to emphasize those aspects of the plan which most clearly assist in making that decision.

2) Phase II - Preliminary Systems Design - The basic purpose of the Preliminary Systems Design is to design the system in sufficient detail to ensure that the users and their management are conscious of all the implications of the system before it is approved for installation. Thus a primary objective of this phase is to define and document the elements of the systems design in terms of the output reports, source documents, and processing flow, file requirements, and accounting and operating controls.

This phase includes developing estimates of hardware and software requirements necessary to test and operate the new system and the anticipated implementation costs that will be required for the next phase - Systems Installation.

The Preliminary Systems Design concludes with a written report that will serve to document the proposed system for the many people responsible for its approval, implementation and ultimate use.

The effect of using packages and selecting vendors on this phase of work is shown in Exhibit IV-G. This special methodology is highlighted because it will be used in the initial project to select financial systems.

3) Phase III -- Systems Installation - The objective of this phase is to develop all programs and procedures relating to the Preliminary Systems Design effort just completed. This phase of the work includes detailed block diagramming, coding, test data preparation, debugging and installation of the individual programs. To accomplish this, the overall system is decomposed into more and more detailed specifications until adequate documentation of individual program requirements is available for the programmers. These specifications provide system documentation which can be used as an effective communications vehicle for all the people involved with the installation project; that is, for the users of the system, the systems analysts, project leaders and supervisors, and the programmers.

This phase includes the physical preparation of the equipment site and the installation of the necessary local and remote data processing equipment. It also includes operational and user training, the systems test, and the conversions from the old to the new system. The conversion effort requires the creation of all necessary files and may include last minute programming changes. The final version of the procedure manual is also produced in this phase.

This phase ends with an impartial evaluation of the new system to determine if the benefits of the system are being realized.

4) Phase IV -- Production Systems Support - The objective of this phase is to modify one or more programs in a system. This may originate with a user's request from the Data Processing Department. This phase includes all work required to modify an existing system, using an evaluation of the proposed modification as a starting point. Once approval has been obtained, the program changes are coded, compiled and tested. After the modified system is operating, procedures and documentation must be updated as required. As a final step, the modified system must be evaluated to determine whether the stated objectives were achieved.

5) Phase V -- Special Projects - Special Projects Phase has been established in order to design and control projects that, because of their scope and/or nature, should not go through Phases I - III of systems development. An example of a project falling into this cateogry would be an operations review project. The standards would be designed for planning and controlling data processing projects; therefore, it may be impractical to apply these standards to projects which are nondevelopmental in nature and whose efforts vary widely in scope and nature. For this reason a separate standard methodology should be developed to control this type of project. This methodology would be based on the same elements as Phases I - III:

- procedure networks,
- standard tasks,
- established documentation,

and would be tailored for each special project.

2. Project and Personnel Planning and Reporting

a. Overview - An automated progress reporting system is recommended in order to accomplish the following:

- Facilitate progress reporting on project activities in order to highlight problem areas and schedule deviations so that corrective action may be initiated.
- Facilitate the review of estimated schedules and overall project control.
- Serve as a progress reporting vehicle for a structured project control environment (MAC, Task Force, etc.)
- Document chronologically those changes or delays in the project which result in re-estimates or cost changes.

b. Description of the Process - Toward the end of the fiscal year, the annual budget is developed by the Data Processing Organization. This budget is established for systems development, program maintenance and computer operations and is approved by the Management Advisory Committee. Work plans (see Exhibit IV-H) are developed to support the budget, and progress against plans is reported monthly. A computer-based project control and reporting system is used as the basis for these actions.

Once the work plan is developed, it is submitted along with a narrative for review and approval by the MAC. At this point, the plan has been assigned a project number and, once approved by the MAC, is entered into the project control system. All subsequent work on this project is charged, by task against this number. Work on a Phase can now begin with progress reported to the MAC by several reports generated from the project control system. These reports will be used to monitor progress throughout the project on a monthly basis with the MAC.

The project progresses through the remaining phases, as each phase is approved by the MAC, until it becomes operational.

The project control system produces control reports dealing with project and personnel progress and effectiveness. The basic input to the system is the project work plan. Individuals routinely report their time on tasks and steps contained in the work plan by means of system-generated time sheets.

The project work plan represents the step-by-step analysis of the tasks that are required to complete the particular phase and it is based on the System Development Standards described above. Manpower estimates are made for each step and task, based upon the estimating guidelines in the System Development Standards. The work plan 1) indicates the elapsed time required to complete the tasks, 2) forms the basis for dollarizing project development manpower estimates, 3) serves as the document against which individuals record their time, and 4) serves as the base against which progress is tracked.

The implementation of these approaches will provide a healthy check and balance relationship between the Data Processing Department and the user.

TASK FORCE ORGANIZATION

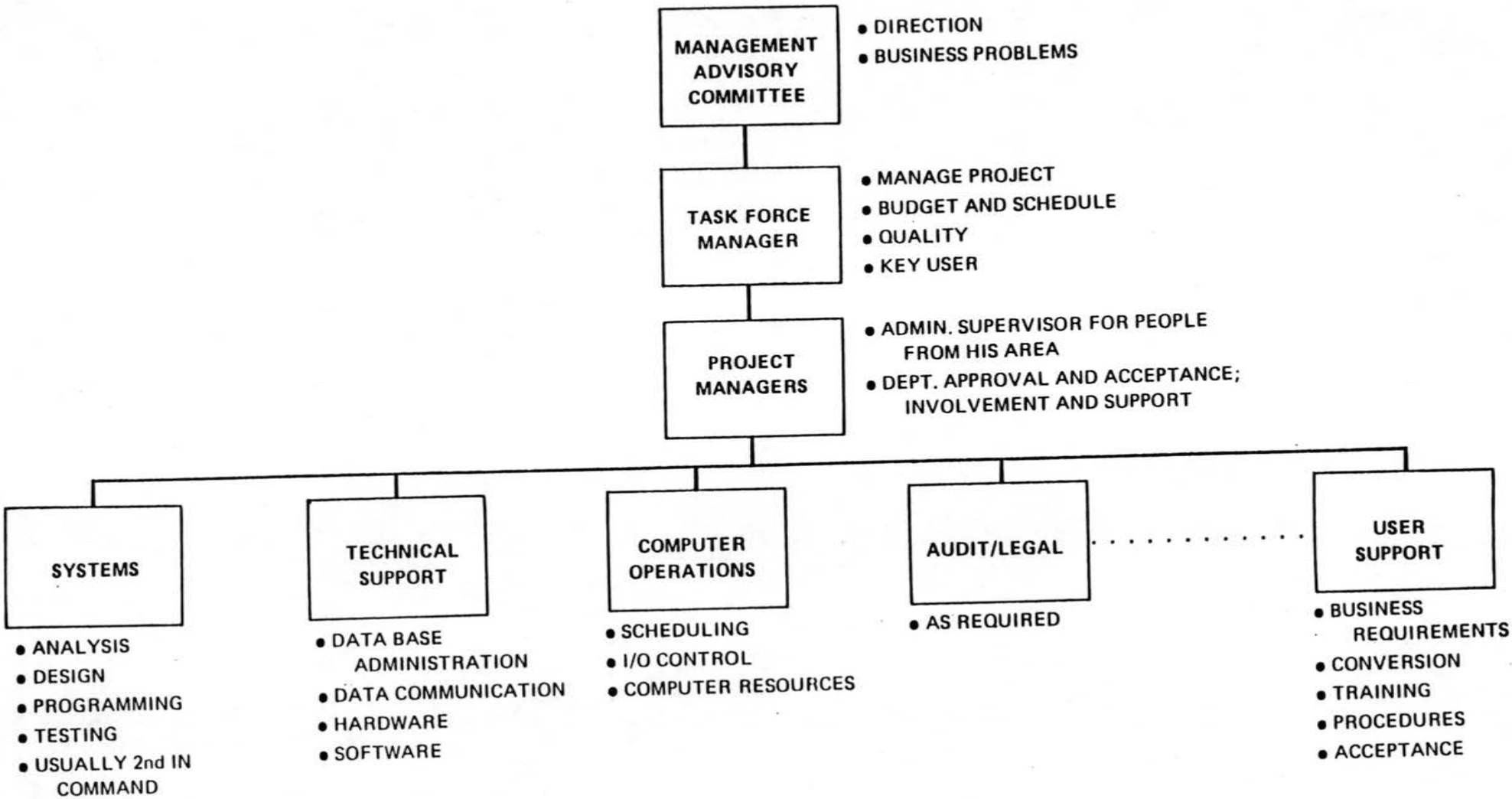
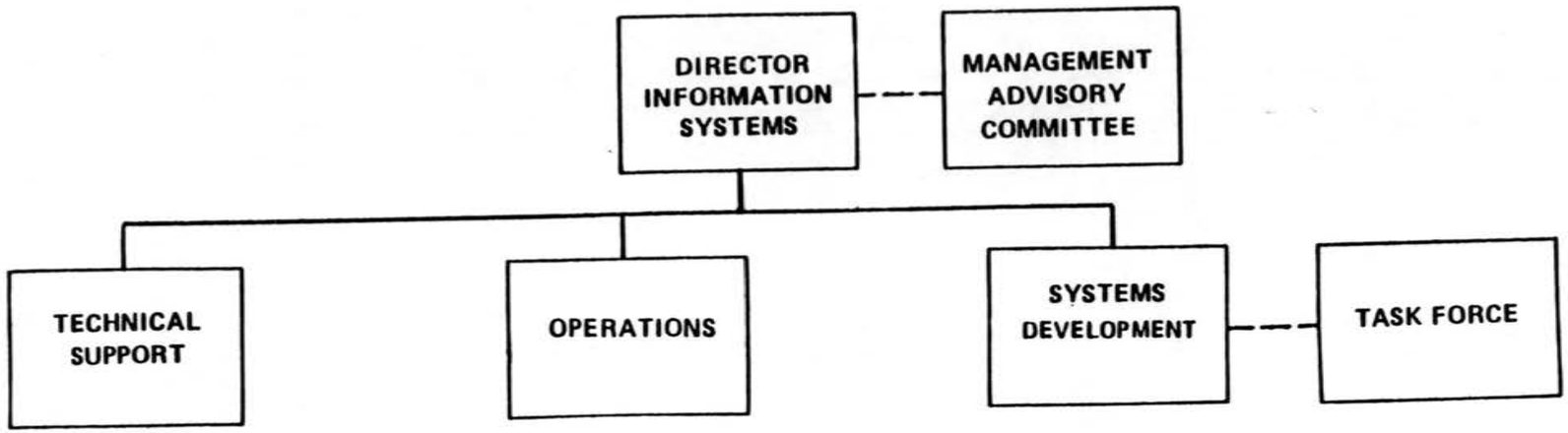


EXHIBIT IV-A

PROPOSED INFORMATION SYSTEMS ORGANIZATION



- SOFTWARE SUPPORT
- HARDWARE ANALYSIS/ SELECTION
- DATA BASE ADMINISTRATION
- ON-LINE TECHNICAL SUPPORT
- NETWORK MANAGEMENT

- COMPUTER OPERATIONS
- I/O CONTROL

- SYSTEM DESIGN
- IMPLEMENTATION
- MAINTENANCE
- TRAINING
- STANDARDS

EXHIBIT IV-B

SYSTEMS PLANNING CHARTS

OVERALL APPROACH

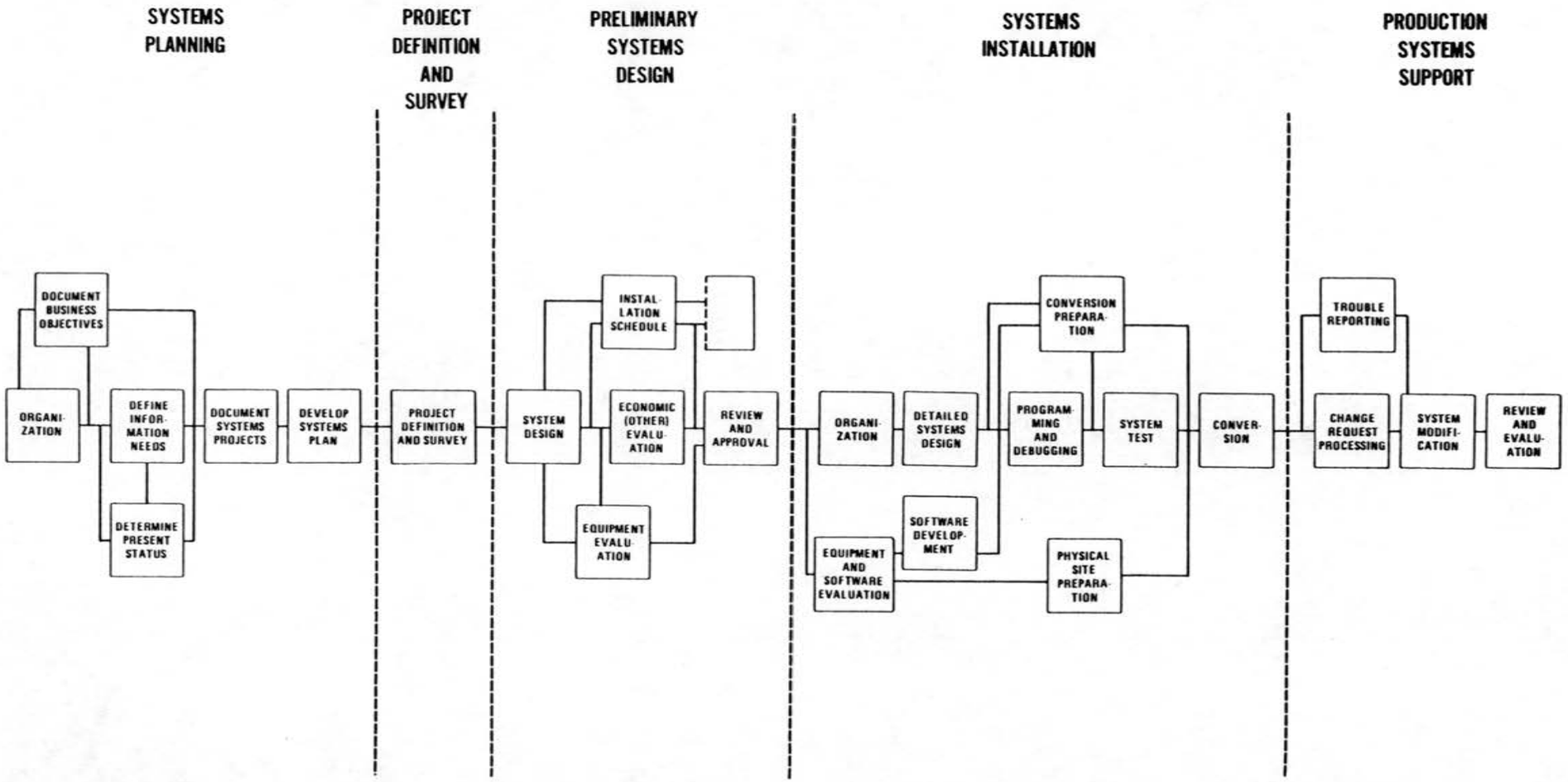


EXHIBIT IV-C

PLANNING CHARTS FOR COMPUTER SYSTEM

■ PROJECT DEFINITION AND SURVEY ■ PRELIMINARY SYSTEM DESIGN

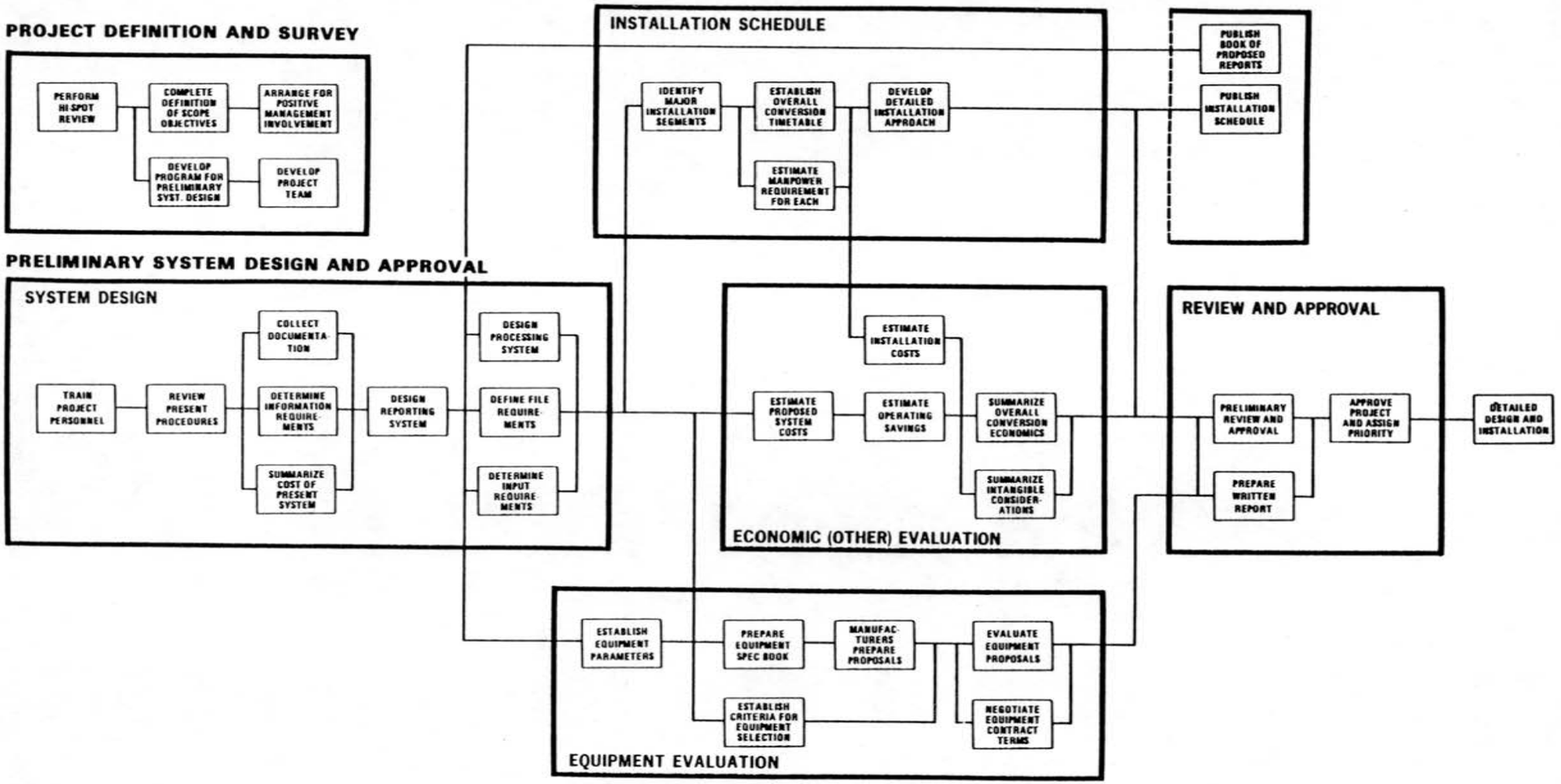


EXHIBIT IV-D

PLANNING CHARTS FOR COMPUTER SYSTEM

■ SYSTEMS INSTALLATION

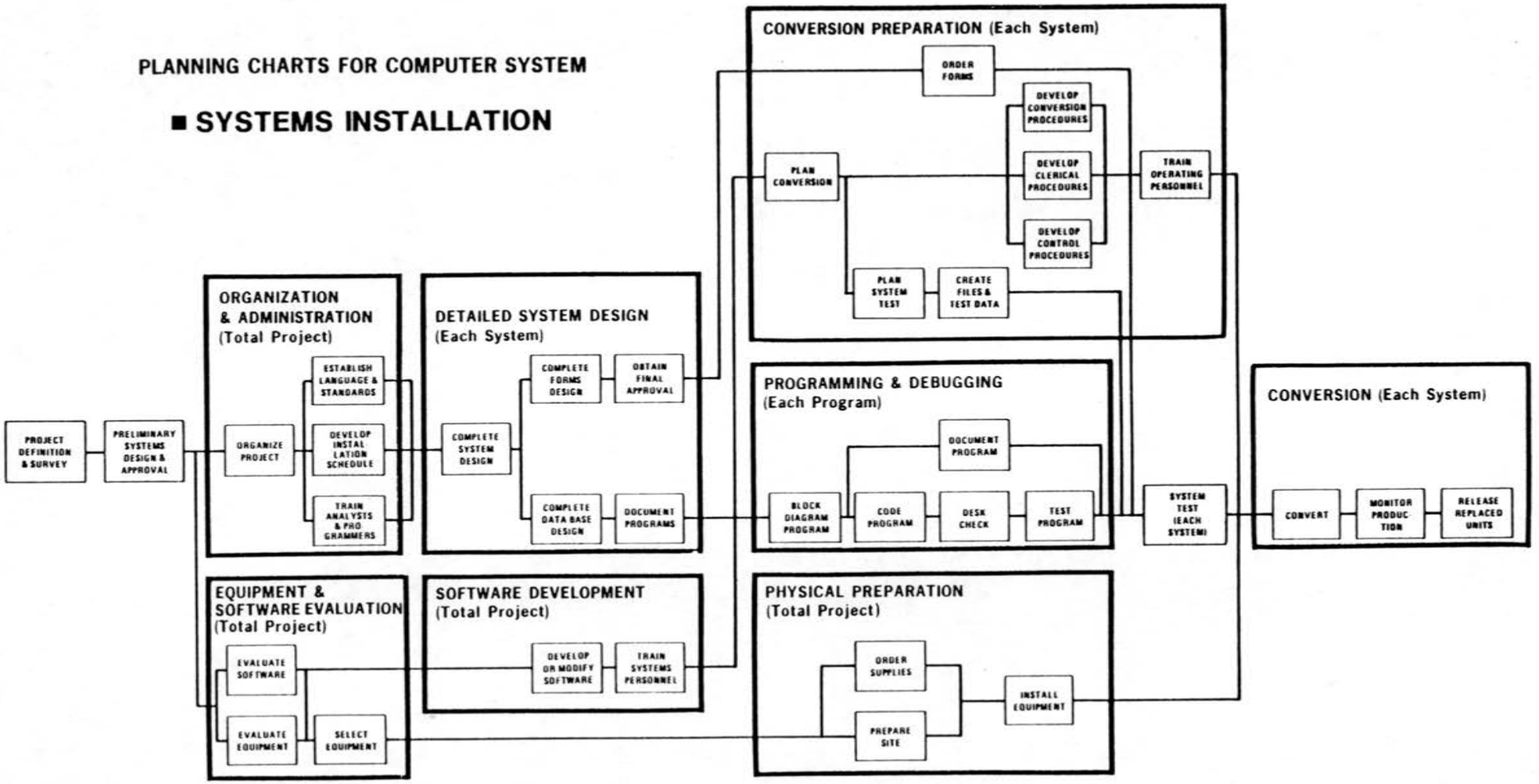


EXHIBIT IV-E

PLANNING CHARTS FOR COMPUTER SYSTEM

■ PRODUCTION SYSTEM SUPPORT

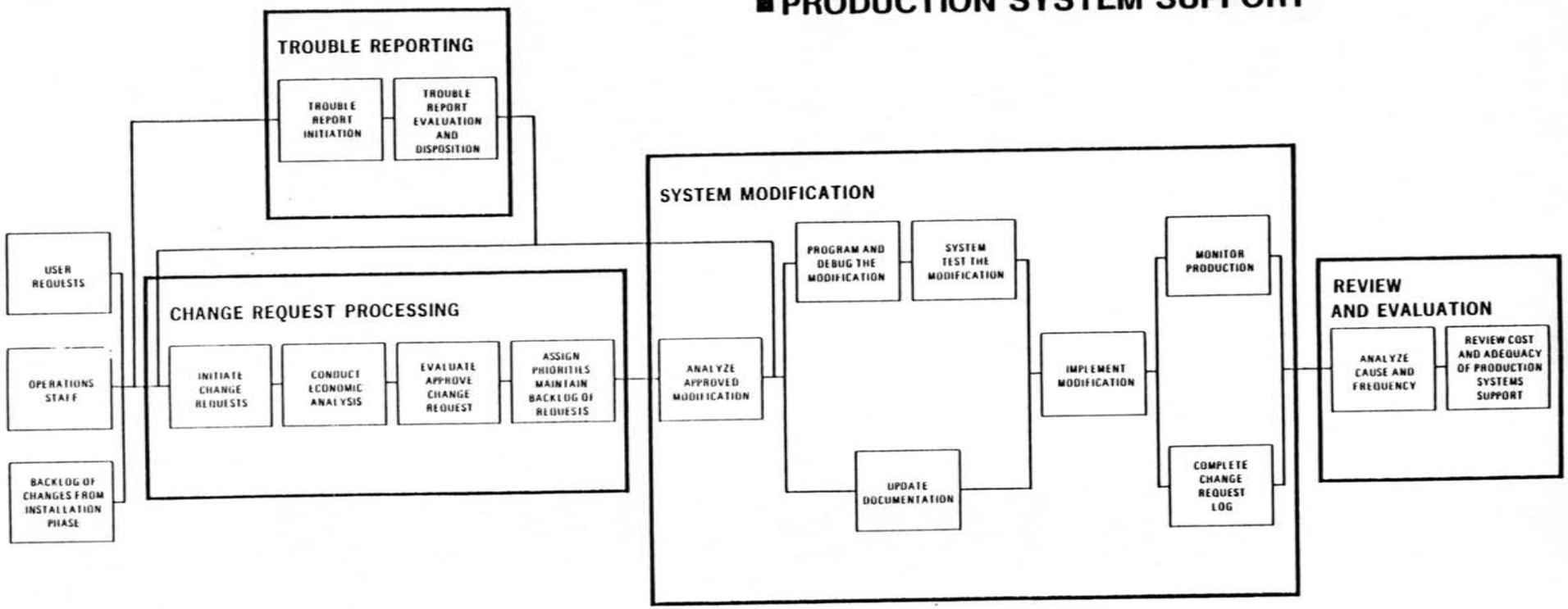


EXHIBIT IV-H

PLANNING CHARTS FOR COMPUTER SYSTEM

■ PACKAGE-BASED SYSTEMS DEVELOPMENT

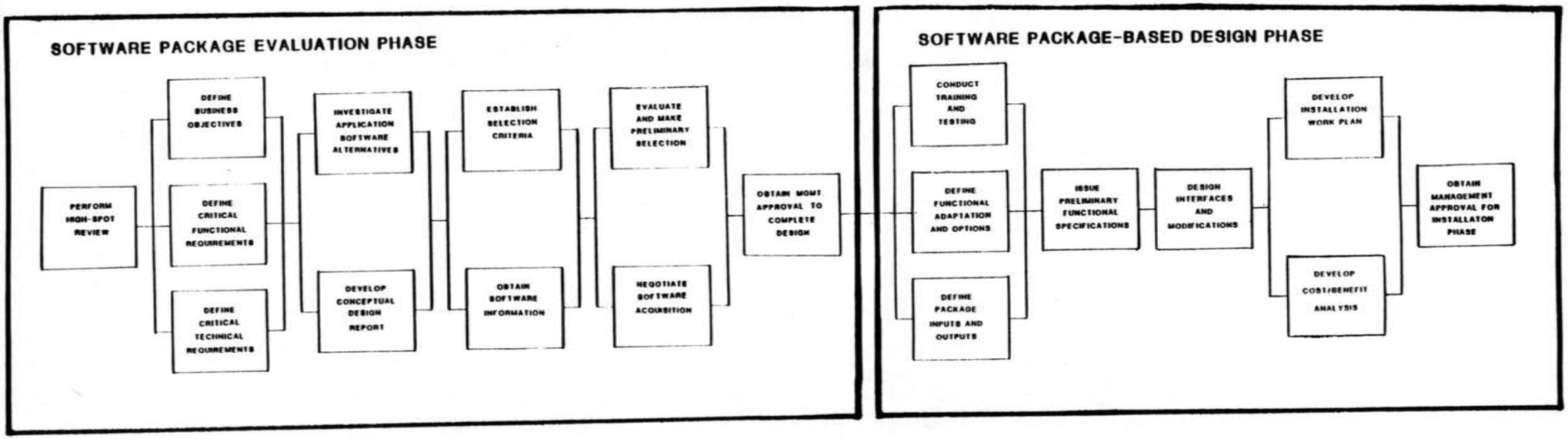


EXHIBIT IV-G

PROJECT WORK PLAN

Project No. W-EAF **Phase** 8/1 **User Dept.** Financial

Project Name Financial Information System **Prepared by** G. Robinson **Date** 3/15/76

Task	Step	Description	Assigned to	Est M/D	Start Date	Complete Date	Comments
104	01	Collect source documents, reports and user documentation a. Obtain filled-in copies of all documents b. Obtain filled-in copies of all reports	Analyst No. 2	1	3/30/76	3/30/76	
	02	Prepare inventory of source documents	Joe Campbell	10	4/2/76	4/19/76	Step 01 must be completed
	03	Prepare inventory of reports	Joe Campbell	3	4/20/76	4/21/76	
105	01	Data Gathering: Interview personnel and review manuals a. Determine number of employees b. Review the procedures noting all exceptions to normal processing	Analyst No. 2	10	4/2/76	4/19/76	

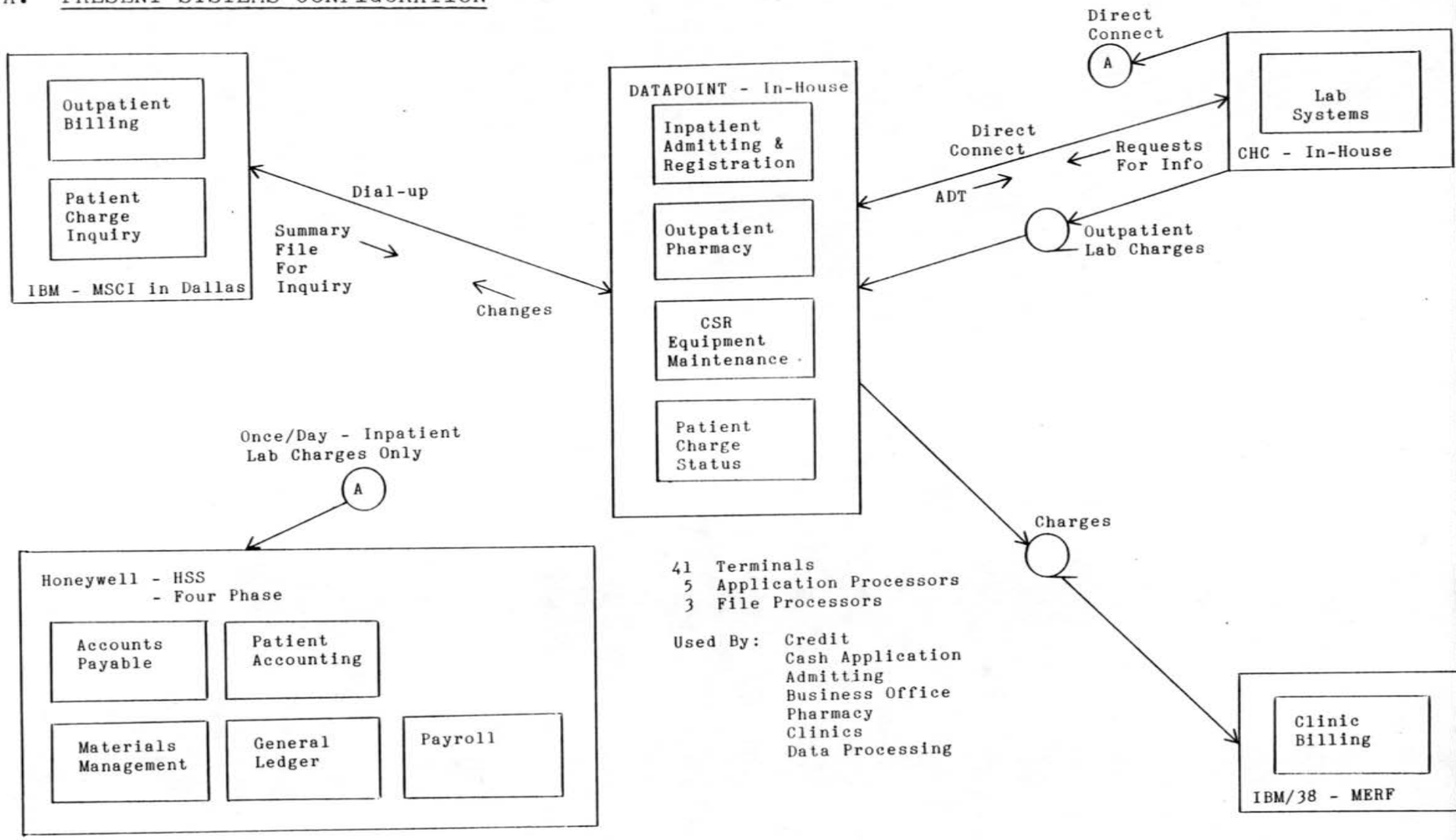
(etc.)

EXHIBIT IV-H

APPENDIX

ST. PAUL-RAMSEY MEDICAL CENTER
INFORMATION SYSTEMS PLAN
APPENDIX

A. PRESENT SYSTEMS CONFIGURATION



B. POSITION DESCRIPTIONS

JOB TITLE	Director of Information Systems
DEPARTMENT	Systems and Data Processing
SUPERVISOR	Vice President of Operations or Finance
JOB SUMMARY	Direct and coordinate planning, development and production activities of the Systems and Data Processing Department

TASK LISTING

1. Direct all system development projects and assign personnel to a project team as required.

2. Translate the requirements of top management to systems staff. Consult with hospital management to define boundaries and priorities of tentative projects, to discuss equipment acquisitions, to determine specific information requirements of management and medical staff and to allocate operating time of the computer system.

3. Develop work programs for all system development projects and monitor and control project status. Review recommendations to revise work program and make necessary revisions.

4. Direct the system development effort by establishing short-range and long-range budgetary and schedule goals and measure progress against these goals.

5. Develop amd maintain, in concert with systems and operations personnel, objectives and plans for systems to obtain maximum cost/effectiveness and system efficiency. Integrate Systems and Data Processing Department objectives with Hospital objectives.

DIRECTOR OF INFORMATION SYSTEMS (Continued)

6. Confer with Hospital department heads involved with proposed projects to ensure cooperation and to further define the nature of the project.

7. Establish work standards and procedures for systems and operations functions. Assign, schedule and review work of systems and operations personnel.

8. Coordinate systems development work with management consultants.

9. Assist the Systems Development Project Leader in coordinating the activities of the Systems Analyst(s) and Programmer(s) to include problem definition, problem analysis, system design proposal analysis, system programming and debugging, and system implementation. Provide assistance in these activities as required.

10. Review reports of computer and peripheral equipment production, malfunction and maintenance to ascertain costs and to plan operating changes in the department.

11. Consult with Supervisor of Computer Operations and Systems Development Project Leader to define hardware and software needs. Approve new or changes in hardware and software.

12. Perform user service reviews.

13. Develop and maintain the security plan for the Systems and Data Processing Department. Periodically perform security checks.

14. Perform other duties as assigned by appropriate authority.

JOB SPECIFICATIONS

Essential Knowledge and Training

- Bachelor Degree in Computer Science or Business Administration is required. Master of Business Administration degree is preferred. Individual must also have some technical training in Programming, Systems Development and Computer Operations.

Experience

- Four years of experience in a managerial capacity preferably in a health care environment. Experience should include some exposure to computer operations and hardware/software planning.

Character of Supervision Given

- Supervision of the Supervisor of Computer Operations and Systems Development Project Leader(s) to include recruiting, hiring, training, performance evaluation and disciplinary action.

Other Specifications

- Must be able to communicate effectively in writing and verbally, exercise a high degree of independent judgment, work well with other professionals both internally and externally to the Hospital, maintain a high degree of accuracy in work, handle confidential information and work well under pressure.

POSITION DESCRIPTIONS

JOB TITLE — Systems Development Project Manager

DEPARTMENT — Systems and Data Processing

SUPERVISOR — Director of Information Systems

JOB SUMMARY — Plan, schedule and direct systems analysis and programming for a systems development project. Coordinate the design of computer systems and programs to implement new information systems, ensuring that proper controls are included and that sound programming techniques are part of the design.

TASK LISTING

1. Assign, coordinate and review work of Systems Analysts and Programmers assigned to the project team.

2. Assist in developing the project work program for the systems analyst and programming functions and monitor and control project status. Discuss recommendations for revision to the work program with the Director.

3. Define the project and the scope of the project to be analyzed. Provide Systems Analyst with the data information requirements of a project and the reasons for them. Review any existing system with analyst, emphasizing constraints and weaknesses, and reach agreement as to the project approach.

4. Coordinate the activities of the Systems Analyst to include problem definition, problem analysis, system design proposal analysis and system implementation. Provide assistance in these activities as required.

SYSTEMS DEVELOPMENT PROJECT MANAGER (Continued)

5. Analyze program test runs on computer to correct or direct correction of coding programs and input data. May develop and test new programs. Write manual for and compile documentation of new programs.

6. Clarify program intent, coding techniques to use, and answer any problems relating to programming.

7. Exert concurrent review over the Systems Analyst's and Programmer's output. Review the proposed system for accuracy to prevent major problems from occurring in the implementation stages. Evaluate the new system as meeting its original goals, originally determined specifications and needs, and original cost estimates. Determine if system is debugged.

8. Perform system followup as necessary. Continually monitor the system and its environment. Request modifications when necessary. Direct revision of programs to increase operating efficiency or adapt to new requirements.

9. Responsible for liaison between the user and systems development in matters of system design, programming, system implementation and system followup.

10. Aid in hardware and software planning and evaluation.

11. Perform other duties as assigned by appropriate authority.

JOB SPECIFICATIONS

Essential Knowledge and Training

- A Bachelor Degree in Computer Science or equivalent education or work experience to include four years of technical training in programming and systems development.

SYSTEMS DEVELOPMENT PROJECT MANAGER (Continued)

Experience

- Four years of experience as a Systems Analyst, preferably in a health care environment. Included should be some supervisory experience.

Character of Supervision Given

- Supervision of project team Systems Analyst(s) and Programmer(s) to include recruiting, hiring, training, performance evaluation and disciplinary action.

Other Specifications

- Must be able to communicate effectively in writing and verbally, exercise a high degree of independent judgment, work well with other professionals both internally and externally to the department and the Hospital, maintain a high degree of accuracy in work, handle confidential information and work well under pressure.

POSITION DESCRIPTIONS

JOB TITLE — Systems Programmer

DEPARTMENT — Systems and Data Processing

SUPERVISOR — Director of Information Systems

JOB SUMMARY — Responsible for development of a consolidated hardware/system software plan, execution of the plan and general technical support for the systems and Data Processing Department. Maintain operating systems and general utility software. Assist in systems development of communications and data base applications.

TASK LISTING

1. Perform hardware planning and analysis for central and data communications hardware. Analyze new products, provide configurations to support processing needs, monitor utilization and report trends. Analyze system component activity to balance the use of components of the system to maximize system throughput within work load and economic constraints and suggest modifications. Estimate existing and future demand and its resulting impact on desirable hardware configurations.

2. Study available software and make recommendations concerning purchase of software packages from vendors or development of in-house programs. May modify existing software programs. Assist in software installation and implementation.

3. Accept, install and maintain vendor-supplied operating systems and utilities. May develop extensions or modifications to vendor-supplied software.

SYSTEMS PROGRAMMER (Continued)

4. Develop and secure acceptance for standards and common procedures for software systems.

5. Maintain communications software and assist the Systems Development Group in design of communications applications.

6. Maintain data base management software, plan data base, assist the Systems Development Group in the design of data base application.

7. Ascertain when technical specialist support is necessary in the solution of operating problems. Provide technical assistance to operations by reviewing all production processing problems related to software and hardware and coordinate necessary activities to resolve such conditions.

8. Provide technical support to the programming function.

9. Perform other duties as assigned by appropriate authority.

JOB SPECIFICATIONS

Essential Knowledge and Training

- Bachelor Degree in Computer Science or equivalent education or work experience to include four years of technical training in programming, hardware/software systems design and computer operations.

Experience

- Three years of experience as a Systems Programmer, preferably in a health care environment.

Character of Supervision Given

- Minimal; may instruct programming or operations personnel in a technical task assignment.

SYSTEMS PROGRAMMER (Continued)

Other Specifications

- Must possess ability to work at the highest level of technical complexity on operating systems and general utility software. Must be able to communicate effectively in writing and verbally, exercise a high degree of independent judgment, work well with other professionals both internal to the department and external to the Health Center, maintain a high degree of accuracy in work, handle confidential information and work well under a high degree of pressure.

POSITION DESCRIPTIONS

JOB TITLE — Systems Analyst

DEPARTMENT — Systems and Data Processing

SUPERVISOR — Systems Development Project Manager

JOB SUMMARY — Survey, analyze, and document the needs of prospective users of the system and define the objectives and outputs of the proposed system (functional analysis and design). Perform systems design by translating user requirements into a viable systems approach encompassing equipment and program specifications, file design, communications network design and other system features (technical analysis and design).

TASK LISTING

Functional Analysis and Design (User Analyst)

1. Perform a thorough and accurate review of the existing system. Define the problem by determining the scope, objectives and information requirements of a particular function.

2. Design a system to meet the necessary information needs of the operational unit. Consider alternative solutions to the system design problem to reach final determination of outputs and inputs, data collection, computer system design and the development of procedures to devise workflow sequence.

3. Prepare systems flow charts to describe existing and proposed applications.

4. Convert the operating unit from the existing system to a new one. Write procedures for the installation of the system and training of the user and operations people.

Technical Analysis and Design (Technical Analyst)

1. Develop process flow charts or diagrams in detailed form for programming, indicating external verification points, such as audit trail printouts.

SYSTEMS ANALYST (Continued)

Technical Analysis and Design (continued)

2. Participate in program design, coding, debugging, installation and documentation of the computer programs.

3. Aid in hardware and software planning and evaluation.

4. Develop conversion programs and procedures.

5. Develop internal system controls such as run-to-run controls, backup and recovery controls and programmed batch controls.

User and/or Technical Analyst

1. Audit newly installed system.

2. Instruct or assist in instruction of trainees in system analysis and design as required.

3. Perform other duties as assigned by appropriate authority.

JOB SPECIFICATIONS

Essential Training and Experience

User Analyst

- Formal education in nursing or ancillary services with on-the-job experience in systems development or formal data processing training with on-the-job experience in the health care industry.

Technical Analyst

- Bachelor Degree in Computer Science or equivalent education or work experience to include four years of technical training in programming and systems development. Prefer two years of experience as a Systems Analyst in a health care environment.

Character of Supervison Given

- Minimal; may instruct a programmer in a task assignment.

SYSTEMS ANALYST (Continued)

Other Specifications

- Must be able to communicate effectively in writing and verbally, exercise a high degree of independent judgment, work well with other professionals both internally and externally to the department, maintain a high degree of accuracy in work, handle confidential information and work well under pressure.

POSITION DESCRIPTIONS

JOB TITLE: Programmer

DEPARTMENT: Systems and Data Processing

SUPERVISOR: Systems Development Project Manager

JOB SUMMARY: Translate the system design into program steps and procedures. Perform flow charting, coding and program testing.

TASK LISTING

1. Design computer programs to meet the program description; write detailed logical flow charts.
2. Write computer programs to meet design criteria.
3. Compile and test programs for completeness and accuracy.
4. Prepare block diagrams to specify equipment configuration.
5. Compile documentation of program development and subsequent revisions. Prepare written instructions to guide operating personnel during production runs.
6. Prepare written instructions to guide operating personnel during production runs.
7. Participate in the installation of the system.
8. Analyze, review, and rewrite programs to increase operating efficiency or adapt to new requirements.
9. Instruct or assist in the instruction of trainees in principles of programming and program coding as requried.

PROGRAMMER (Continued)

10. Perform other duties as assigned by appropriate authority.

JOB SPECIFICATIONS

Essential Knowledge and Training

- Associate Degree in Data Processing or equivalent education or work experience to include two years of technical training in general principles of programming and coding. A Bachelor Degree in Computer Science or related field is highly desirable.

Experience

- One to two years of programming experience preferably in a health care environment.

Character of Supervision Given

- None.

Other Specifications

- Must be able to communicate effectively in writing and verbally; exercise a high degree of independent judgment; work well with other professionals, mainly internal to the department; maintain a high degree of accuracy in work; handle confidential information and work well under pressure.

POSITION DESCRIPTIONS

JOB TITLE — Supervisor of Computer Operations

DEPARTMENT — Systems and Data Processing

SUPERVISOR — Director of Management Information Systems

JOB SUMMARY — Supervise and coordinate activities of workers who perform the data conversion, production control and computer operations functions for the Systems and Data Processing Department. Write procedures and set standards for computer operations.

TASK LISTING

1. Assign, direct and control the work of the data conversion, production control and computer operations personnel. Also direct training of all operations personnel.

2. Schedule the flow of jobs to facilitate production, obtain maximum utilization of equipment, and assure timely delivery of output to users. Modify schedule as necessary. Determine job priorities. Coordinate flow of work between shifts to assure continuity.

3. Maintain liaison between the user and operations in matters of scheduling, problems in processing, implementation of new applications and special forms and supplies. Expedite special user requests and advise user of conditions affecting processing or scheduling.

4. Direct insertion of program instructions and input data into computer, and observe operations. May operate the console and peripheral units to run programs.

SUPERVISOR OF COMPUTER OPERATIONS (Continued)

5. Work with programming personnel in testing new and revised programs.

6. Develop technical standards and procedures to assure consistency within operations to include, for example, hardware utilization standards, data entry standards and tape library control procedures. Implement written detailed documents.

7. Perform technical analysis of workload, equipment loading, performance bottlenecks and software changes. Review new applications and make scheduling changes to improve workflow.

8. Assist operators in locating and overcoming error conditions. Make minor program and input data revisions through computer console to maintain operations. Notify programming if unable to locate and correct cause of error or failure.

9. Review records and reports of production, operations and downtime as a basis for recommending and implementing change to programs, routines and quality control standards. Consult with Director about problems.

10. Review and analyze job documentation in preparation for final installation of job changes, deletions or initial implementation. Resolve technical or procedural questions to arrive at acceptable formats for particular cases.

11. Perform physical planning for installation and maintenance of all Data Center facilities and coordinate implementation. Coordinate with maintenance, management and vendors the maintaining of and planning and executing changes in power, air conditioning, housekeeping, preventive maintenance and other facility requirements.

12. Maintain the operations security plan by periodically performing security checks.

13. Perform other duties as assigned by appropriate authority.

JOB SPECIFICATIONS

Essential Knowledge and Training

- Associate Degree in Data Processing or equivalent education or work experience to include one to two years of training in data processing and courses in data processing, basis programming, computer operations, business and supervision. A Bachelor of Science Degree in Computer Science is highly desirable.

Experience

- Three to four years of computer operations experience. Included should be some supervisory experience.

Character of Supervision Given

- Supervision of a number of Data Entry Operators, Computer Operators and Control Clerks to include recruiting, hiring, training, performance evaluation and disciplinary action.

Other Specifications

- Must be able to communicate effectively in writing and verbally, exercise a high degree of independent judgment, work well with other professionls both internal and external to the Hospital and especially system users, maintain a high level of accuracy in work and work well under pressure.

POSITION DESCRIPTIONS

JOB TITLE: Computer Operator

DEPARTMENT: Systems and Data Processing

SUPERVISOR: Supervisor of Computer Operations

JOB SUMMARY: Operate, monitor and control a computer to process data input and scheduled runs according to operating instructions. Maintain hardware and assist in performing hardware analysis.

TASK LISTING:

1. Operate the console and/or peripheral units of the computer to accomplish the complete processing of production and test programs as specified in written operating instructions.

2. Select and load input and output units with materials, such as tapes and printout forms, for operating runs.

3. Monitor processing operations and determine probable cause of any malfunction, taking independent corrective action when appropriate. Type alternate commands into computer console to correct error or failure and resume operations.

4. Review error listing on printout to ascertain nature of output errors. Determine required corrections by comparing output with original data input. Compile list of errors and corrections and submit corrected data for repunching.

5. Notify Supervisor of Computer Operations of errors or equipment stoppage. Also, record and report operating and downtimes.

6. Complete and maintain computer operating time log.

7. Perform other duties as assigned by appropriate authority.

JOB SPECIFICATIONS

Essential Knowledge and Training

- High school graduate plus an additional one to two years of technical school training in data processing to include courses in data processing, elementary programming and operation of computers and peripheral equipment.

Experience

- Two years of experience as Computer Operator.

Character of Supervison Given

- None.

Other Specifications

- Job requires a moderate amount of manual dexterity. Must be able to communicate verbally in an effective manner, exercise independent judgment, work well with professionals internal to the department and with system users, maintain a high level of accuracy in system operation, work well under pressure and stand and walk frequently when loading and monitoring computer.

POSITION DESCRIPTIONS

JOB TITLE — Data Entry Operator

DEPARTMENT — Systems and Data Processing

SUPERVISOR — Supervisor of Computer Operations

JOB SUMMARY — Keypunch all source documents submitted to department.

TASK LISTING

1. Transcribe alpha/numeric data from source documents into form suitable for data processing using keypunch, key-to-tape or key-to-disk devices. Work flows through the control function.

2. Edit and return all source documents that cannot be keypunched due to incorrect or missing data. Return all unprocessed transactions to the control function.

3. Transmit data to computer at regularly scheduled updates.

4. Perform other duties as assigned by appropriate authority.

JOB SPECIFICATIONS

Essential Knowledge and Training

- High school graduate with some courses in data processing, typing and preferably data entry training.

Experience

- One year of experience as a Data Entry Operator.

Character of Supervision Given

- None.

Other Specifications

- Job requries a high degree of manual dexterity. Must be able to follow written procedures, maintain a high degree of accuracy in daily work and work well under pressure.

POSITION DESCRIPTIONS

JOB TITLE: Control Clerk

DEPARTMENT: Systems and Data Processing

SUPERVISOR: Supervisor of Computer Operations

JOB SUMMARY: Perform all clerical duties related to the computer operations function to include operating machines, handling and checking the accuracy of input and output, compiling statistics, maintaining logs, maintaining and controlling tape/disk library and assisting in staging jobs per written instructions.

TASK LISTING

1. Operate machines to print, burst and decollate output and break down, separate and assemble completed jobs for delivery.

2. Perform pickup and delivery function for reports and data entry forms.

3. Move input materials for staging to machine area. Audit input prepared by others before releasing to operations and stage jobs per written instructions. Resolve any matters related to staging.

4. Log out completed work and check to ensure that output processing instructions have been followed. Report status of jobs upon request.

5. Pull required input tapes and/or disks as final step in assembling job packages for processing. Transport tapes and disks between machine area and the library. Perform tape/disk library control procedures.

6. Screen and correct daily computer time logs and coordinate data entry requirements. Compile and chart various daily, weekly and monthly performance statistics.

7. Store and deliver data processing forms and supplies. Perform form and supplies inventory control.

CONTROL CLERK (Continued)

8. Operate a microfiche machine to reproduce output on microfiche.

9. Perform batch control procedures. Log batches in and out of operations.

10. Determine input errors and return source documents to department for resubmission.

11. Perform other clerical duties as assigned by appropriate authority.

JOB SPECIFICATIONS

Essential Knowledge and Training

- High school graduate with some courses in data processing and business. Preferably has some technical training in data processing operations.

Experience

- One year of experience in a business office or preferably in a data processing environment.

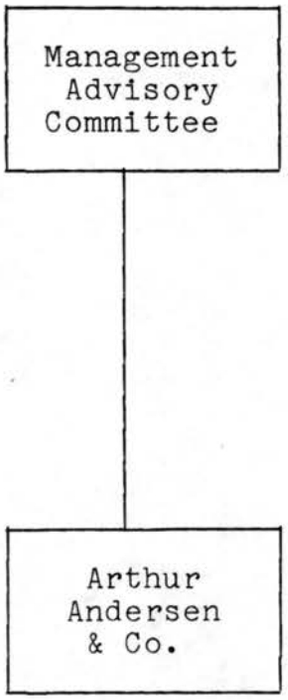
Character of Supervision Given

- None.

Other Specifications

- Job requires varying degrees of manual dexterity. Must be able to communicate verbally in an effective manner, follow written procedures, work well with department staff and users, maintain accuracy in daily work, work well under pressure and walk frequently when performing certain tasks.

C. SYSTEMS PLAN PROJECT ORGANIZATION CHART



Norman Allan	Director, Gillette Children's Hospital
Michael Bronk	Administrator C.H.C.
Dick Culbertson	Senior Associate Director
Dave Gitch	Executive Director
Dr. Robert Gumnit	Chief of Neurology
Dr. Erhard Haus	Chairman Pathology Department
Don Landis	Administrative Director, R.C.A.
Marlene Marschall	Senior Associate Director

LaRoy Luther	Engagement Partner
Clark Higgins	Quality Assurance Partner
Tom Grudnowski	Engagement Manager
Ben Jones	Consulting Manager
Susan Tobison	Senior Consultant
David Jacobson	Staff Consultant
Jack Fisher	Staff Consultant