



ORGAN DONATION SYSTEM FOR NON-PROFIT  
ORGAN DONATION CENTER

by

Ms. Mayuree Tiaumnouychai

A Final Report of the Three - Credit Course  
CS 6998 System Development Project

Submitted in Partial Fulfillment  
of the Requirements for the Degree of  
Master of Science  
in Computer Information Systems  
Assumption University

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Project Title            Organ Donation System for Non-Profit Organ Donation Center

Name                    Ms. Mayuree Tiaumnouychai

Project Advisor        Assoc.Prof.Dr. Suphamit Chitsayasothron

Academic Year        November 2000

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The Graduate School of Assumption University has approved this final report of the three-credit course, CS 6998 System Development Project, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer Information Systems.

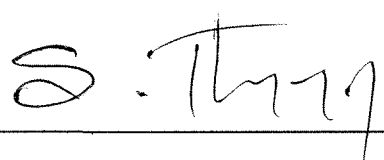
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## ABSTRACT

Transplant of donated organs is one of the most efficient means of medical treatment. Acquisition of organs such as hearts, kidneys, and lungs, come only from donations by benign, intended donors only in the case of brain death.

As the various transplant systems around the world are examined in an effort to improve our own, it is fundamental to understand each nation's framework. The Non profit organ donation of Thailand is manual and seems to be simple but has many problems. The demands and needs of reliable, accurate, and timeliness by members and staffs also grows at a faster than the past. So a computerized system for information is more important to day.

This system is developed to improve the work efficiency and capability of providing the service on time plus providing accurate information about the organ donation service. The scope of this project, Organ Donation System of Non Profit Organ Donation Center, is mainly involved in developing a computerized system to the staffs in the organ donation center to carry out their work; both in donation service and statistical reports to be more efficient and accurate to meet the increasing demand.

The new system proposed is developed in accordance to the System Analysis System Design techniques. The new system project discusses the user requirements, system design, hardware and software requirements, cost and benefits analysis, security and control and also includes the design of the input and output screen. This system has been successfully tested and implemented on PowerBuilder.



## ACKNOWLEDGEMENTS

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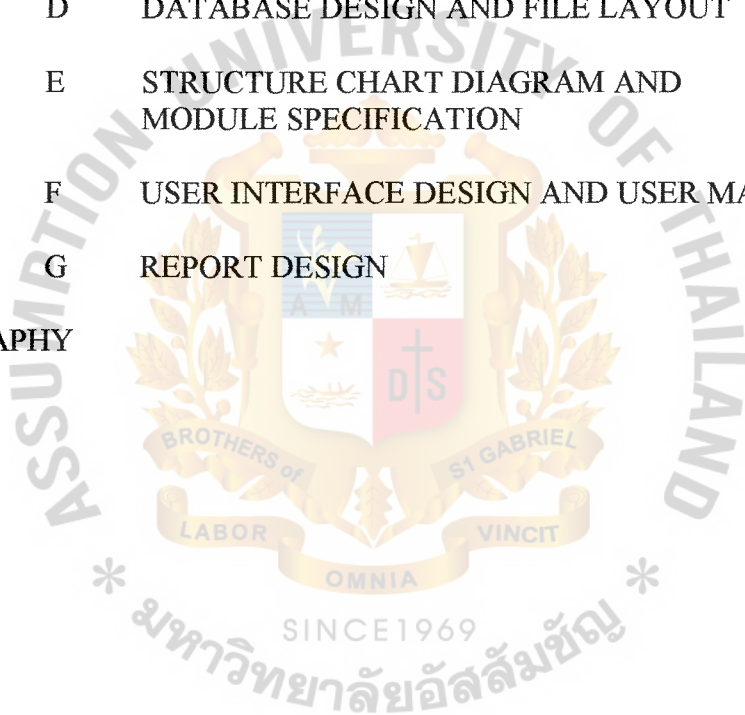
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## **I. INTRODUCTION**

### **1.1 Background of the Project**

All patients accepted onto a transplant hospital's waiting list registered with the organ procurement organizations and transplant centers by telephone calls and faxes. Staffs work 24 hours a day, 365 days a year. The Organ Center is responsible for assisting transplant centers throughout Thailand matching, transporting and sharing organs.

The Organ Center works to decrease organ wastage, increase sharing, lower transportation costs and provide data on organ sharing. The Non profit Organ Donation Organization has established organ-sharing policies that increase the probability of a successful transplant. A formula for matching based upon objective medical criteria for each type of organ ensures equitable allocation of donated organs among patients medically qualified for a transplant. Transplant centers, tissue typing laboratories and organ donation organization are all involved in the organ sharing process.

Its scope of activities include recruitment of donors, registration of potential recipients, tissue typing and tissue matching between donors and recipients, equitable distribution of harvested prospective recipients are being looked after. It provides information both for medical profession as well as for general public and will act as collaborative center in the field of organ donation with neighboring countries in the future.

The center produces its own public relation materials, instruction manuals for doctors and nurse involved in the organ donation process and in the care of brain the center also publish dead patients.



The Non profit Organ Donation Center, has divided the country into approximately 6 areas and designated an organ donation organization to be responsible for recovering organ and transporting those organs to transplant hospitals in their territories. The center has already engaged international cooperation with similar organizations in Asia and Pacific Region, in Europe and North America.

Within the next 2 years, the Center hopes to have a new office, more use of computers and office automation will ensure up-to-date and complete information on donors, recipients and transplantation results.

## **1.2 Objective of the Project**

The aim of the project is to develop a computerized information system to support organ donation system. The objectives of the project are as follows:

- (1) To study the general processes of existing system of organ donation system and design the new process and solve various problems.
- (2) To develop and implement prototype software for a new organ donation system in order to avoid redundancy in registration of donors and recipients works, and operating a unified system for transplantation.
- (3) To design a formula for matching program based upon objective medical criteria for each type of organ ensures equitable allocation of donated organs among patients medically qualified for a transplant.
  - (a) Improving accesses to organ transplantation for all who can benefit from it (Increase sharing and decrease organ wastage).
  - (b) Maximizing the number of organs available for transplantation through policies and programs.
  - (c) That improves quality, efficiency, efficacy and survival continually improving clinical outcomes for patients with organ failure.

- (d) Establishing standards, access to the allocation of organs, organ acceptability
  - (e) Organ Donation Organization performance, and
  - (f) Information collecting and reporting.
- (4) To control the initial distribution of organs within the country, encouraging participation by the public and every sector of the transplant community.
  - (5) To provide reports for determination of future need.

### **1.3 Scope of the Project**

The Organ Donation System works to decrease organ wastage, increase sharing, lower transplantation costs and provide data on organ tissue, which are summarized as follows:

- (1) Generate a list of potential donors.
- (2) Generate a list of potential recipient ranked according to objective medical criteria (i.e. blood type, tissue type, size of the organ, medical urgency of the patient as well as time already spent on the waiting list and distance between donor and recipient.) each organ has its own specific criteria.
- (3) The match program designed to measure the compatibility between the donor organ and recipients are necessary for some transplants. Sharing is based upon medical and scientific criteria.
- (4) Data are available on request to any one who asks. However, to protect the privacy of all transplants with a code number of registration.

### **1.4 Project Plan**

The project plan is represented in the Gantt Chart shown in Figure 1.1.

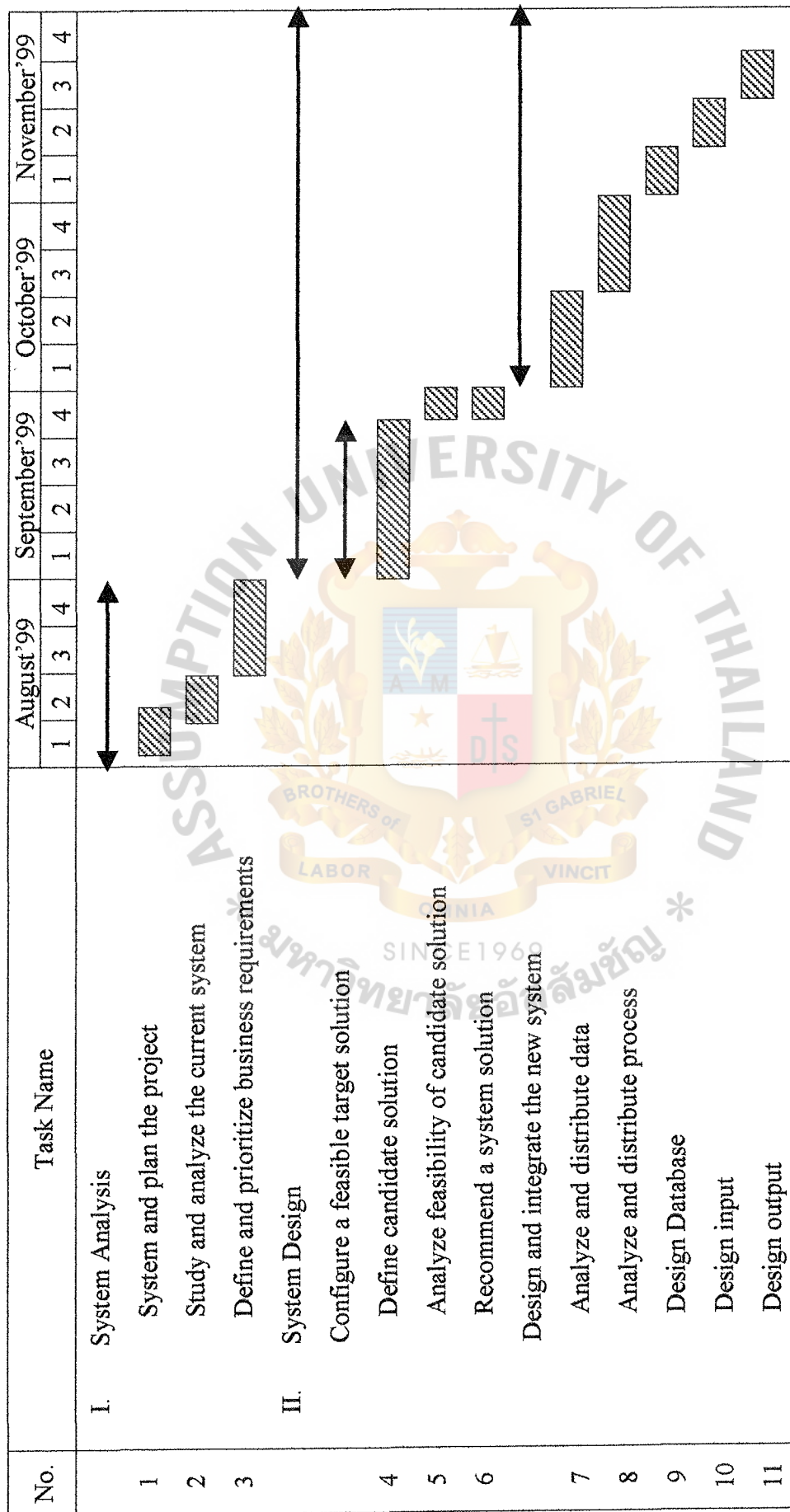


Figure 1.1. Project Plan of Organ Donation System.



Figure 1.2. Project Plan of Organ Donation System (Continued).



## II. EXISTING SYSTEM

### 2.1 Background of the Organization

In 1993, The Non Profit Organ Donation Organization, was established to commemorate the Society's Century.

In 1994, the territory was chosen in which the organ donation Center's operation are principally to be conducted and began operation in February 1,1994.

The Organ Donation Center is located on 2nd Floor, Thai Volunteer Building, Rajdamri Road Phatumwan Bangkok.

Non profit Organs Donation Center, established 3 years ago to commemorate the Society's Centenary, now acts as co-ordination agency for education, recruitment of donors, information on prospective recipients, organs procurement leading to transplants at all major hospitals throughout the country.

Founded only 6 years ago, employing 8 full-time staff with an annual budget of approximately 2,400,000.00 bath, the Center has been very active in the field of organ donation.

Business functions of Non profit Organ Donation is divided into two main areas operated by the following section. The major sections are shown in the Figures 2.1 and 2.2.

#### (1) General Administrator

##### (a) The President shall be the Chief Executive Officer of the Corporation.

Subject to the supervision of the Board of Directors, he shall have general charge and control of the affairs of the Corporation. The President shall preside at all meetings of the Members and Directors.

The President shall not succeed himself in office.

- (b) The Vice President shall be the president-elect of the Corporation and shall serve as chairman of the membership and Professional Standards Committee. The Vice President shall perform all duties incumbent upon the President's absence, and shall perform such other duties as the bylaws may provide or the Board of Directors may prescribe.
- (c) The treasurer shall have general control of the finances of the Corporation and shall report to the Board of Directors of the financial condition of the Corporation at such time as the Board may request. The treasurer shall cause an annual report and audit of the Corporation to be made, and shall deliver copies thereof to the Direction and Executive Director.
- (2) Operation Division
- (a) The Secretary shall attend all meetings of the Members, and Board of Directors and keep the minutes of the business transacted at such meetings. Whenever the signature of the Secretary of the Corporation is required on any document, the Treasurer or Executive Director shall have authority to sign in place of the Secretary
- (b) An Assistant Secretary may perform all duties incumbent upon the Secretary during his absence.

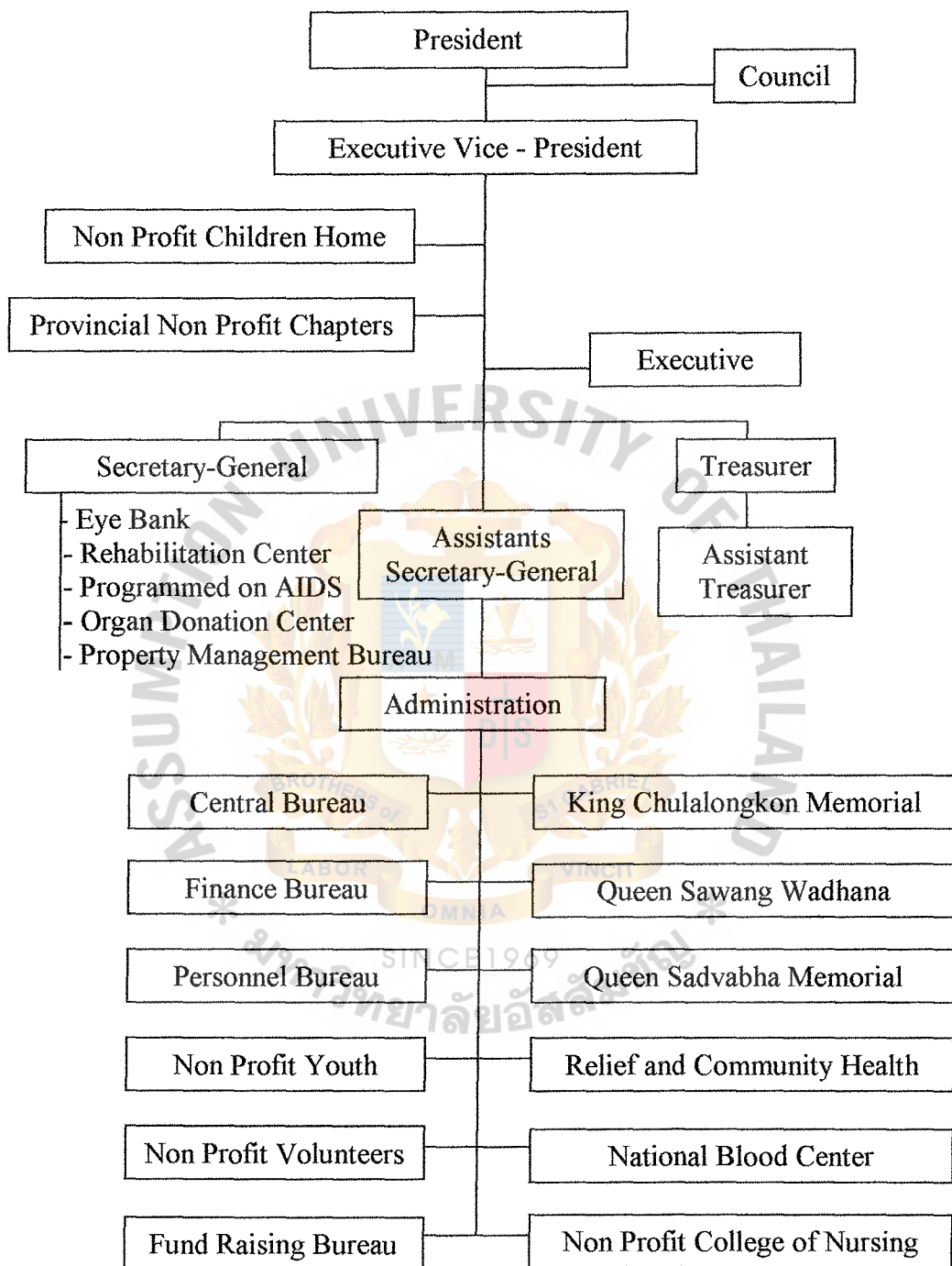


Figure 2.1. The Non Profit Society Organization Chart.

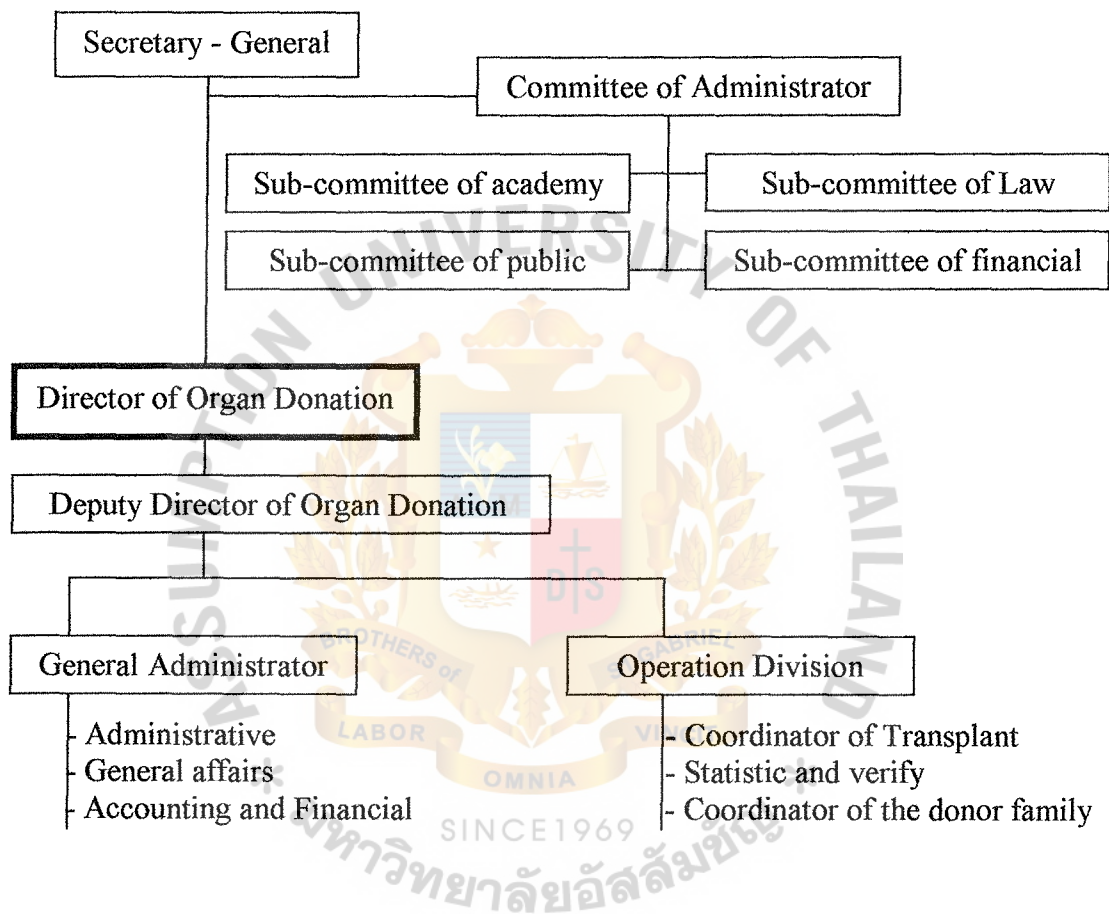


Figure 2.2. Organ Donation Organization Chart.



## **2.2 Existing Business Function**

The existing business functions of The Non Profit Organization are manual; staffs manage all Organ Transplant transaction records shown in Figures 2.3 and 2.4.

There are 3 main functions in the existing organization:

- (1) Transplant Registration.
- (2) Match System.
- (3) Organ Distribute, Procurement, and Allocation System.

### **Transplant Registration**

The Host ODC is the Organ Donation Center which, having identified a potential organ donor, assumed responsibility for donor management and organ allocation.

ODS members must submit, to the ODS transplant registry, data on all donor referrals and utilize the ODS standardized form. Data requirements include submission of information on all donors, potential transplant recipients, and actual transplant recipients. When available, the Host ODC shall perform the following evaluations and provide this information to the ODS transplant center which will make the clinical decision whether to accept or reject the organ based decision; whether to accept or reject the organ based on the available data or the need for additional information.

ODS members can add potential recipients to the waiting list. Following wait list registration, the recipient registration is generated.

### **Match Program**

Histocompatibility Laboratory which provide histocompatibility testing for ODS member transplant centers are eligible for membership in the ODS. To attain membership in ODS, such a laboratory must conform to the ODS standards. The evaluation of each applicant laboratory will be performed by ODS.

The ODS Match System is the computerized algorithm used to prioritize patients waiting for organs. It eliminates potential recipients whose size or ABO type is incompatible with potential recipients whose size or ABO type is incompatible with that approved by the ODC Board. ODS computer match program means a set of computer-based instructions which compares data on a cadaver organ donor with data on transplant candidates on the ODS list and ranks the candidates according to ODS policies to determine the priority for allocating the donor organ(s).

#### Organ Procurement, Distribution, and Alternative Systems for Organ Distribution or Allocation

Organ allocation is a medical function, and the medical criteria for allocation are based upon considerations of justice and medical utility.

Organ-specific criteria: Under the proposed revised Regulations, the ODS develops principles and objectives of equitable organ allocation upon which to base organ allocation policies, including broad organ-specific policy objectives to be considered along with such principles and objectives.

Kidneys: For kidneys these factors include: graft and patient survival potential, patients' medical circumstances that, for example, make it difficult for them to receive a transplanted kidney without rejecting it, and waiting time, to the extent medically appropriate.

Livers, Hearts, Lungs: For livers, hearts, and lungs, they include: medical urgency, likelihood of patient and graft survival, and other medical circumstances with waiting time, to the extent medically appropriate, used to break ties within status groups.

Other organs: For other organs, medical criterions appropriate to the organ being allocated are to be developed.

Geography: Under the proposed revised Regulations, the ODS reasonably assures that neither place of residence, nor place of listing is a major determinant of access to a transplant. This, however, would not preclude fixed boundaries and other defined areas of organ allocation to the extent that they are appropriately authorized or supported by medical criteria and the ethical principles and objectives of equitable organ allocation. This approach supports the recommendations of the Institute of Medicine, which recommended establishment of organ allocation areas for livers consisting of combined ODC service areas of approximately 9 million populations. While the ODS has not yet considered this specific recommendation or performed computer modeling analysis to determine its impact on patients awaiting transplantation, the approach taken in the proposed revised Regulations make it possible for the ODS to consider such alternatives.

Retransplantation: The proposed revised Regulations include the goal of minimizing the need for retransplantation and provide that ODS allocation policies should promote effective use of the limited supply of organs so that, considering all policy objectives, as many patients will benefit as possible. Therefore, policies must avoid increasing the retransplantation rate, which reduces the number of patients who will ultimately have access to a transplant.

Ischemia: The proposed revised Regulations address the issue of ischemia by supporting allocation policies designed to avoid incurring medically unacceptable ischemia because prolonged ischemia can cause increased organ wastage as well as increased graft loss.

The Secretarial authority is exercised through response to public comments, policy oversight and appellate review, and contract oversight. (Award, administration, change orders, and cancellation).

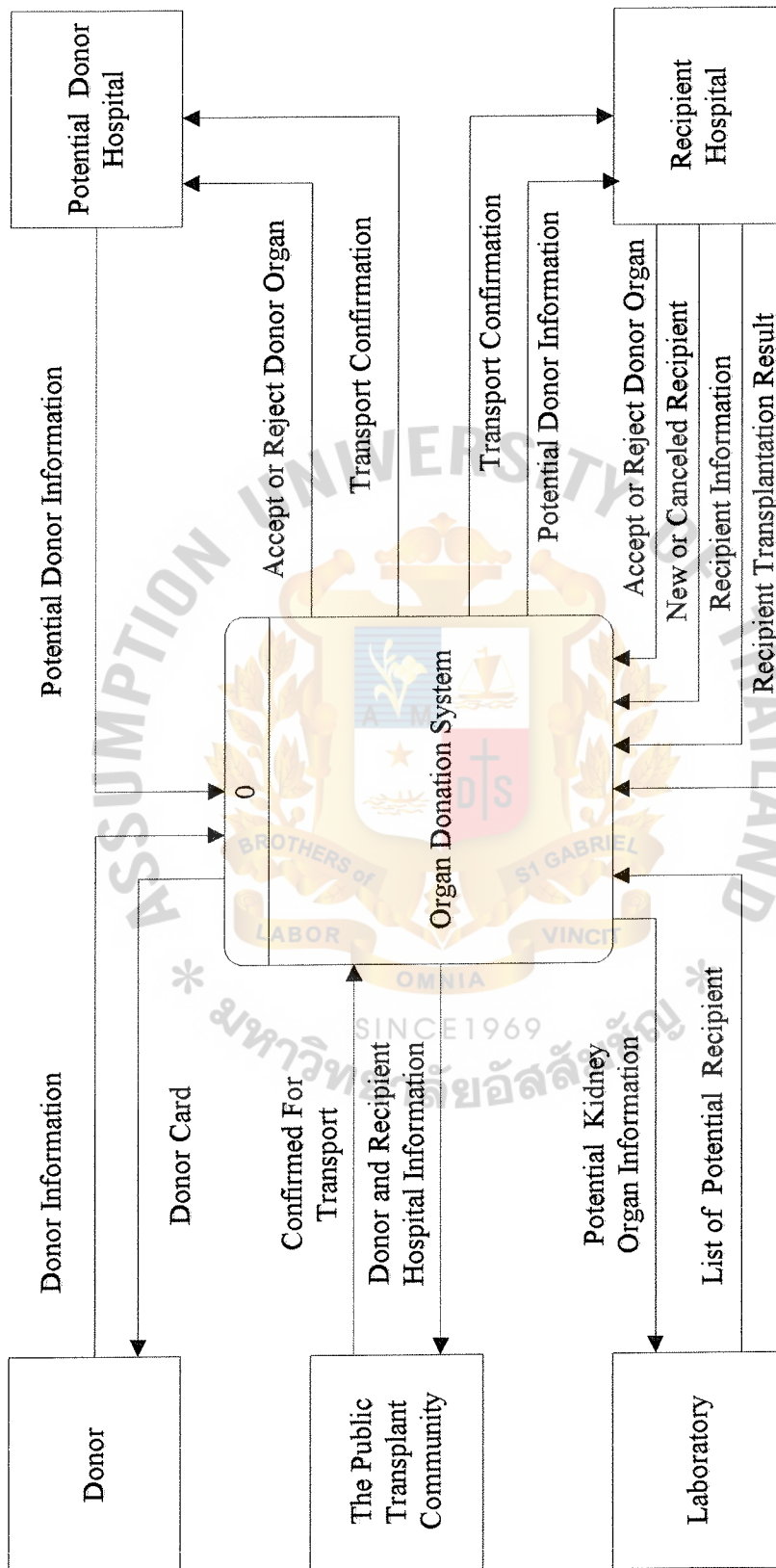


Figure 2.3. Context Diagram of Existing System.

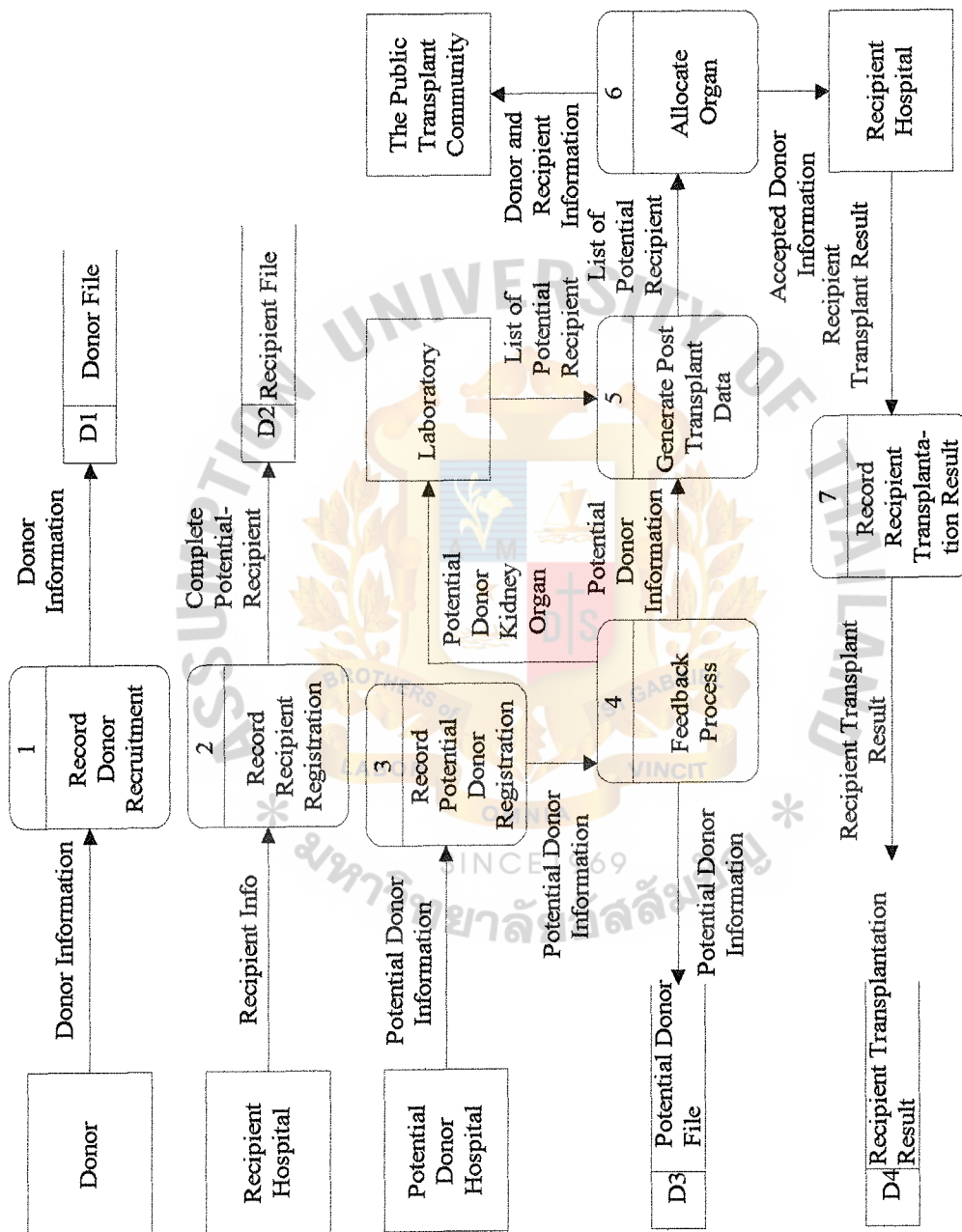


Figure 2.4. Data Flow Diagram Level 0 of Existing System.



## 2.3 Current Problems and Areas for Improvement

### 2.3.1 Current Problems

The existing system is a manual system. So there are many problems that occur in the Organ Donation System as follow:

- (1) Quality of each record
  - (a) Data are redundant and not updated.
  - (b) There are too many data inconsistency of incorrect typing and misunderstanding while recording the data.
  - (c) Lack of statistic report to support the decision-making process.
  - (d) It is difficult to collect the necessary record for creating reports.
  - (e) The files that keep all records in the Non Profit Organization have no back up and only one user can access it at the same time.
- (2) Staffs take much time for the following tasks:
  - (a) Using many of the telephone calls and fax required coordinating the donation, allocation and transplantation of live saving organs.
  - (b) Matching donors to recipients.

Sadly, some 5,000 patients will die in 2000 because an organ did not come in time. Because organs remain viable for limited time periods once they are removed from the donor, time is of the essence.
  - (c) Providing the latest statistics on survival rate, information about the size of waiting list and waiting time, and the current supply of donated organs, nationally, by province, and by transplant center.
  - (d) Collecting too many data is inconvenient and spends a lot of time.
- (3) Human errors can occur from:
  - (a) Typing or writing incorrect records.

- (b) Providing incorrect or misunderstood information to the member.
- (4) The process of matching service operation is very slow.
- (5) Lacks a good managed database.

ODS data are at the core of many services to the patients and professionals in the transplant community. ODS data help drive research of transplant scientists, policymakers, pharmaceutical companies and organ specialists.

- (6) Having Overhead Costs

#### 2.3.2 Areas for Improvement

For this section, we try to understand the existing problems and try to find the ways to improve the current situation and solve the problems. This operation depends on the highest technology we can develop in order to get biologically compatible organs to the people who need them.

The following are the criteria that need to be developed:

- (1) Making more efficiency in collecting and distributing data, and permanent recording of files.
- (2) The record files should have backup systems to prevent the loss of data and have security to prevent unauthorized people changing the record.
- (3) Providing faster transaction and information for members.
- (4) Reduce the staff workload and human errors by using the computer-based systems.
- (5) To reduce word of printing, input data in worksheet and let computers generate many printouts. It makes work correct and faster than using manual.

- (6) Collect the statistical information using the computer-based system that will keep all information in database and retrieve the information in the report form in the required format.
- (7) The computer information system provides a more reliable and correct information that produces the statistical reports to support the decision making and forecasting for the Board of Director.
- (8) Using the computerized system to make it more systematic and easy to improve in the world's most technologically advanced transplant system in the future.



### III. PROPOSED SYSTEM

#### 3.1 User Requirements

This is the user requirements or system specifications of the proposed system after interviewing the relevant users and managers for analyzing the existing system that must be achieved. It contains a narrative description of the new system that users and the Board of Director requires in the proposed system.

- (1) The proposed system must be easy to use, should not be difficult to learn and provide faster transaction to the member and users.
- (2) All records in the proposed system are centralized and updated.
- (3) All record files are permanent, have back up, and security.
- (4) The staffs take less time to obtain required information from the member.
- (5) The proposed system allows multiple users to access the database at the same time.
- (6) The proposed system could generate reports that show the statistical information and trends for better decision making.
- (7) The computer enables the staff to match organs as quickly as possible.
- (8) The input and output screens are designed in a user-friendly format that is easy for new users to learn.
- (9) The language to be used is natural and the ways to understand will be easy in order that only minimal training is necessary to use the program.
- (10) Lowering Overhead Costs and Operating Efficiently.

## **3.2 System Design**

The system design categories are divided into the following parts:

### **3.2.1 Design of Input Screen**

The input screen provides convenience for staffs to key in data to the form. The input screen keeps the screen simple, create an attractive screen, good layout, keep forms easy to fill out, ensure that the forms meet the purpose and design forms to assure accurate completing.

The input screen is the user interface designs for the proposed system that is shown in the Appendix F.

### **3.2.2 Design of Output Screen**

The output screen will display the data for reference of printing reports. The output screen should keep the screen simple and create an attractive screen. The output reports are represented in Appendix G.

### **3.2.3 Design of Context Diagram and Data Flow Diagram**

The Context Diagram of the proposed system represents an overview of the Organ Donation system. It depicts the relationship between Organ Donation system with each external entity. Because the system must keep track of all the number of organs donated that a member has requested, the external entity Member has the most data flow in and out of it. The Context Diagram should be kept relatively simple.

The Data Flow Diagram at level 0 represents the major activities for the Organ Donation System. Each process is analyzed to determine the data required and the output produced. The proposed system's Context Diagram and Data Flow Diagram level 0 are shown in the Figures 3.1 and 3.2 and more detailed Data Flow Diagram's can be found in the Appendix A.



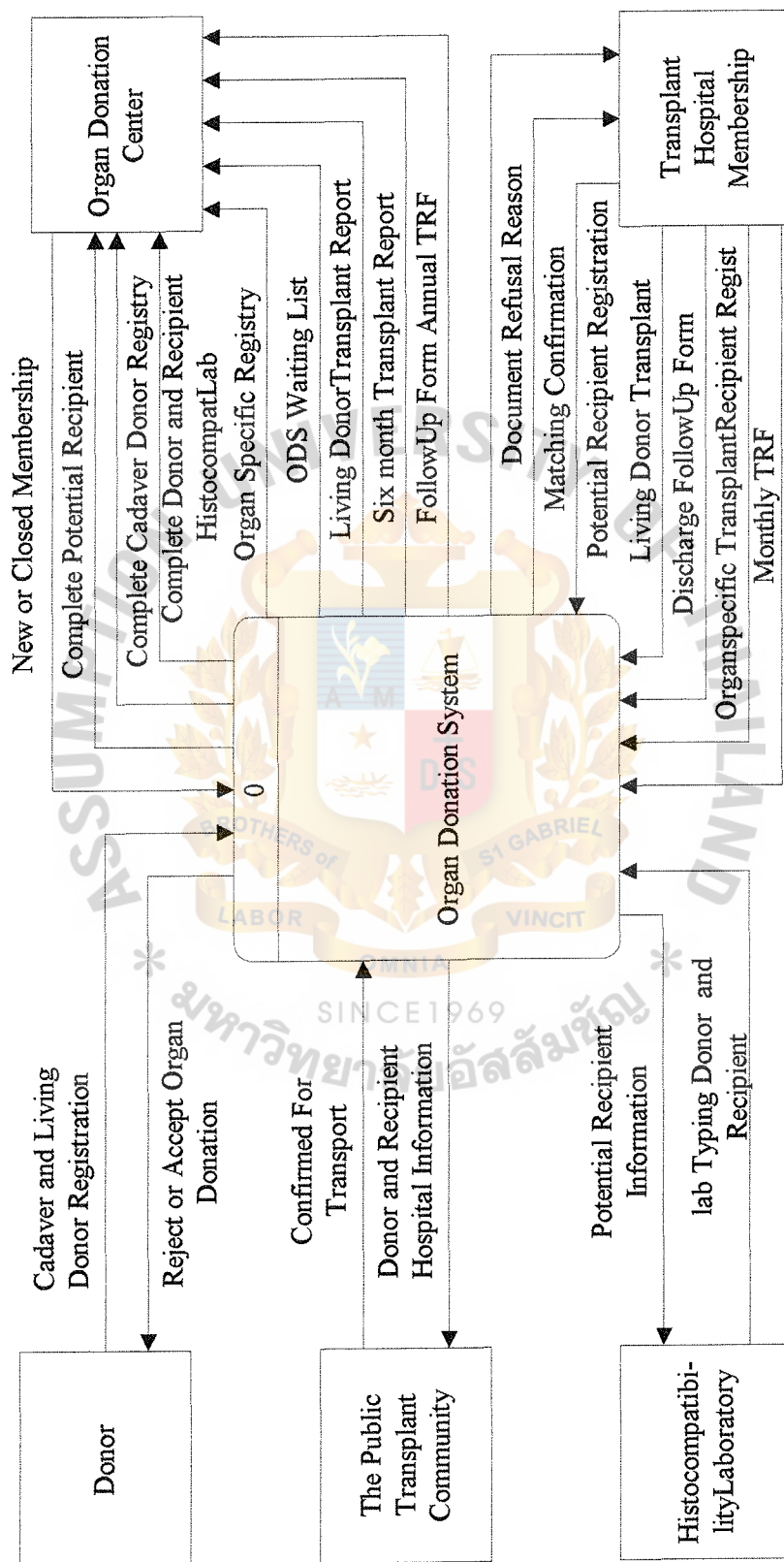
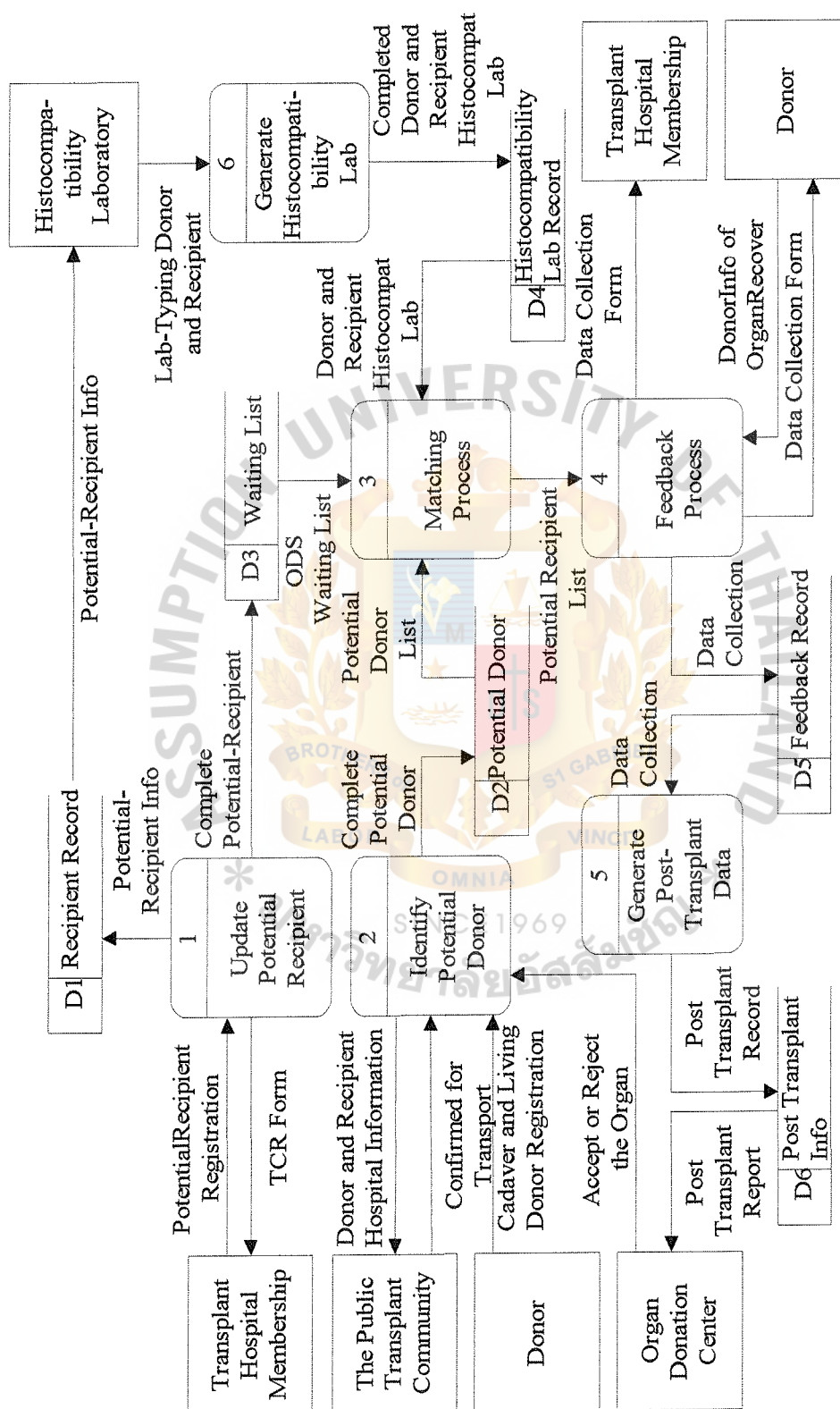
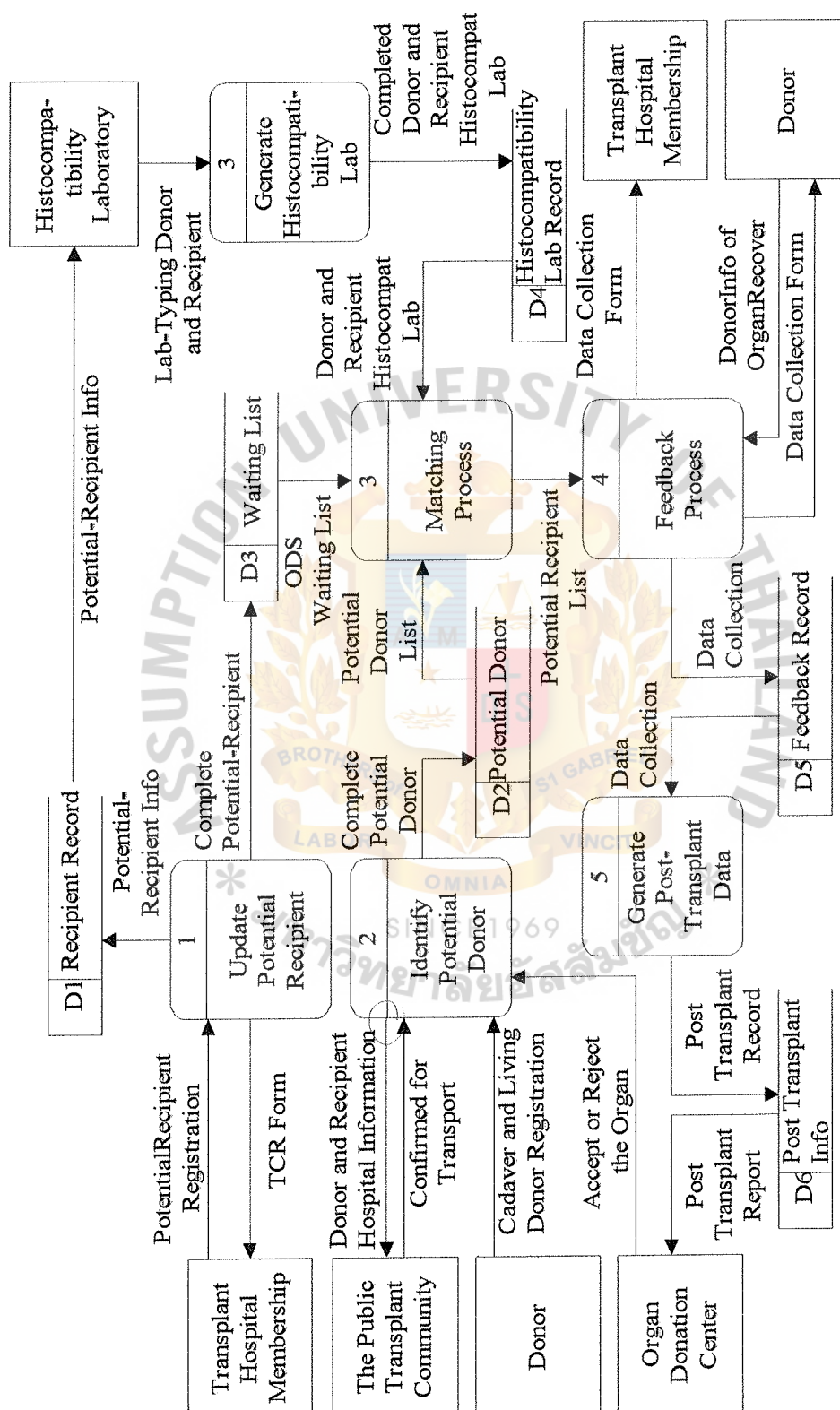


Figure 3.1. Context Diagram of Proposed System.





The function of the proposed system can be summarized as follows:

#### Data Flow

##### Cadaver Donor Transplants

Data flow within the ODS database begins with the initial waiting list registration. ODS members can add potential transplant recipients to the waiting list through a variety of means. Following wait list registration, the Transplant Candidate Registration (TCR) is generated. Information on this form is utilized to create the initial record for each potential recipient. Demographic information supplied by members on the TCR will provide the basis for creation of all subsequent transplant records and donor-recipient links.

When a donor organ becomes available, the match process begins. Matching utilizes donor information entered by ODS members at the time of the match and existing potential recipient data from the ODS waiting list. Utilizing an allocation algorithm, the matching process generates a listing of potential recipients for each available organ. The match run is utilized to allocate the donor organs and document refusal reasons for each potential recipient on the match list above the actual recipient.

Electronic feedback records are created utilizing data from each match run. ODS members provide match confirmation through on-line verification of each match and notification of intended and actual recipients for each available donor organ. The match confirmation feedback process enables ODS to produce the necessary data collection forms for each transplant event. When all actual recipients are verified, the feedback records are closed and the donor and recipient forms are generated for mailing to the appropriate ODS member.

The cadaver Donor Registration and Potential Recipient, Donor and Recipient Histocompatibility forms are completed by the ODC recovering the donor organs and the labs typing the donor and recipient. These forms are returned to ODS for processing.

The organ-specific Transplant Recipient Registration and Discharge Follow-up forms are completed by the center performing the transplant.

Recipient forms are sent to the appropriate organ-specific registry for processing. Following entry of kidney and liver forms at the ODS sub-contractor registries, the data is electronically transmitted to ODS on a monthly basis for upload into the ODS database. Thoracic and pancreas forms are sent directly to ODS for processing.

Transplant Recipient Follow-up forms for each organ are generated at six months, one year and annual intervals until death or graft failure is reported. Follow-up forms will be generated by ODS based on the transplant date. The follow-up forms will be mailed to the center currently following the transplant recipient. Follow-up data utilizes the same flow as registration data through the organ specific registries.

#### Living Donor Transplants

Living donor transplants are reported to ODS via the Living Donor Feedback Fax Sheet completed by the transplant center performing the living donor transplant. When the fax sheet information is received by ODS, it is entered into the computer system as a feedback record.

#### 3.2.4 Design of Data Dictionary

The data dictionary of the proposed system contains information about data and procedures, information about data maintained by the system including data flows, data structures, data elements, and data stores. Data dictionary is represented in Appendix B.



### 3.2.5 Design of Database Design

The design of files includes decision about the nature and content of files itself. It shows field name, type of field name, length of field name, and number of decimal of field name. The file layout is represented in Appendix D.

### 3.2.6 Design of Program Specification

The program specification design describes the transformation of the system for input and output file and processing of the computer software. In designing the computer software, it is important to ensure that the structure of the software divided into modules permits suitable testing and validation to make sure the procedures are correct, and the actual program produced must perform all the tasks and in the manner intended for the application.

The process specification provides further description of element-level processes as shown in Appendix C.

### 3.3 Hardware and Software Requirements

#### 3.3.1 Hardware Requirements

The present hardware can be used for keeping only details of Organs transplant information. To prepare for increasing performance in the near future, all hardware list that should be in the Non Profit Organ Donation Center are listed below:

(1) File server (1 unit)

Pentium III 450 MHz

128 MB SDRAM PC-100

8.4 GB.HDD Ultra DMA/66

Floppy Disk Drive 1.44 MB

PCI Sound Yamaha and Boston Acoustic 635

CD-ROM 45X Speed

Modem 56K V.90/LAN card on board

Serial Mouse

Keyboard Multimedia

DVD 5X Sony

Monitor 17" NEC V700

Medium Tower Case 235 watts.

(2) Workstations (3 units)

Pentium II 400 MHz.

64 MB SDRAM PC-100

6.4 GB. HDD Ultra DMA/66

Floppy Disk Drive 1.44 MD

3D PCI Digital Stream 128 and Final Sparker 120 watt.

CD-ROM 45X Speed

56K Rockwell Internal V.90

Serial Mouse

Keyboard Win98

Monitor 15” Sony Super Trinitron

Final ATX Middle Tower Case

(3) Printer

HP DeskJet 810 C (1 unit)

HP LaserJet 1100 (1 unit)

(4) UPS (1unit)

UPS Leonic Green II-500 VA

(5) Network Peripherals

3 COM Super Stack II (Hub) 10:12 ports

HP JetDirect Ex plus printer server, 1 serial ports

(6) Cabling

UTP Cable

RJ-45 Connector

### 3.3.2 Software Requirements

The present software has to be upgraded to new version and add more software for Organ Donation System for Non Profit organization. All software listed for the new system are listed below:

- (1) Application Software-Power Builder 6
- (2) Operating systems-Microsoft Windows NT Server 4.0
- (3) Database Server -Sybase SQL Anywhere

### 3.4 Data Communication and Network

The existing system of The Organ Donation System is a manual system to manage their work. Now we will design a computer-based system to use automatic in full function on their work. So in the future, if staff want some detail or information of each organ or member, they can search that information from the computer at their place.

We design to use the work group feature of Windows for the new system. It will provide a better means to access, share data and resources, and no redundancy.

The network diagram of The Organ Donation System for Non Profit Organization is shown in the Figure 3.3.



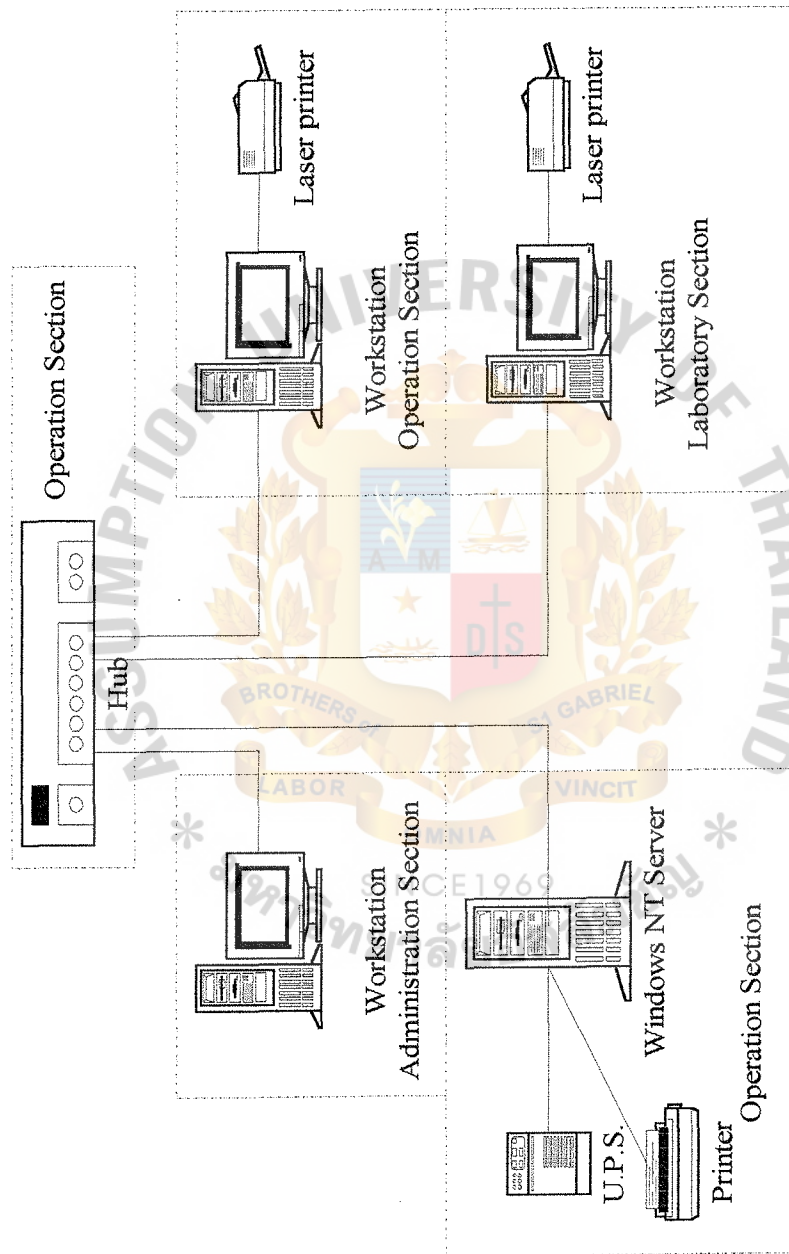


Figure 3.3. Network Configuration of Proposed System.



### 3.5 Security and Control

The Non-Profit Organ Donation Organization will be more complex when changed from manual system to computerized. Security and control is very important when a computer-based information system is involved. It encompasses not only the day-to-day protection of all physical facilities, and avoidance of disastrous losses. Many security controls attempt to prevent or detect unauthorized access to data, computer equipment, or other physical facilities. Other security controls are corrective in nature since they enable losses technical and sophisticated especially when providing security for centralized database and data communication networks.

The risk and threat to the computer system in any advance situation or unfortunate event that would interrupt the service operations of the organ donation center. The security and controls may include:

- (1) To protect data from unauthorized person access.
  - (a) Use Log-in name and Password before entering to the system.
  - (b) Force to change password within specific time.
- (2) To protect and prevent the loss of data or errors from any accident that may destroy the files.
  - (a) Staffs have to back up the important information to protect the damage of files in the hard disk used to recover any destroyed or error on files.
  - (b) Using UPS (Uninterruptible Power Supply) used to supply power in stead of the main electricity supply.
  - (c) The source documents will be stored in a secure cabinet that is located outside the organ donation center in order to prevent unauthorized

changes and to prevent loss of source documents due to a natural disaster such as a fire or flood.

- (3) To assure data completeness and accuracy starting from input to output.
  - (a) Check list report
  - (b) Edit report
  - (c) Data entry must be double-checked and verified. The director should review all forms of authorization signatures.
  - (d) The historical and current data reports must be kept in categorized files for managerial planning.
  - (e) The formats for reports should include a proper heading, the data prepared, and the date printed for easy reference.
- (4) To assure right function for each level users.
  - (a) Setting menus for each user to log into the system depend on related function tasks.
- (5) A virus-checking program will be installed for scanning virus before running any program. Service information system will update the virus checking every 6 months.

### 3.6 Cost and Benefit Analysis

#### 3.6.1 Cost Analysis

To consider the financial aspects of the new system that is to be implemented, a cost comparison should be made between the existing system and the proposed system. Cost analysis of the proposed system should be considered on the investment costs, implementation costs, and annual operating costs.

##### I. Investment Costs

Hardware Specification:

Total (Baht)

(1)	File server	1 Unit*50,000	50,000
	Pentium III 450 MHz		
	128.4 GB. HDD Ultra DMA/66		
	Floppy Disk Drive 1.44 MB		
	PCI Sound Yamaha and Boston Acoustic 635		
	CD-ROM 45X Speed		
	Modem 56K V.90/LAN card on board		
	Serial Mouse		
	Keyboard Multimedia		
	DVD 5X Sony		
	Monitor 17" NEC V700		
	Medium Tower Case 235 watts.		
(2)	PC workstation	3 Unit*40,000	120,000
	Pentium II 400 MHz.		
	64 MB SDRAM PC-100		
	6.4 GB. HDD Ultra DMA/66		
	Floppy Disk Drive 1.44 MD		
	3D PCI Digital Stream 128 and Final Sparker 120 watt.		
	CD-ROM 45X Speed		
	56K Rockwell Internal V.90		
	Serial Mouse		
	Keyboard Win98		
	Monitor 15" Sony Super Trinitron		
	Final ATX Middle Tower Case		
(3)	Printer		

HP DeskJet 810 C	2 Unit*8,130	16,260
Hp LaserJet 1100	1 Unit*20,950	20,950
(4) UPS		
UPS Leonic Green II-500 VA	3 Unit*3,500	10,500
(5) Network Peripherals		
3 COM Super Stack II (Hub) 10;12 ports	1 Unit*8,500	8,500
HP JetDirect Ex Plus Printer Server	1 Unit*5,500	5,500
(6) Cabling		
UTP Cable	10 Unit*300	3,000
RJ-45 Connector		
Total Hardware Cost		234,710
Software Specification		
(1) Operating systems-Sybase SQL Anywhere		25,000
(2) PowerBuilder 6		25,000
(3) Network operation systems-Windows NT Server Ver 4.0		6,450
(4) Norton Anti Virus		3,500
Total Software Cost		59,950
Total Investment Cost		294,660
II. Implementation Costs		
Software developments and training cost		40,000
Total Implementation Costs		40,000
III. Annual Operating Costs		
Paper		3,000
Diskettes		2,500
Stationary		12,000

Maintenance costs (per year)	10,000
Miscellaneous costs	5,000
Total Annual Operating Costs	32,500

### 3.6.2 Benefits Analysis

Benefits analysis is the method for evaluating the proposed computer information system. The benefits of the Organ Donation System is not only that it increased the efficiency of service but also many more things can be gained from the proposed system. The probability can be projected in both tangible and intangible benefits as follows:

#### (1) Tangible Benefits

Tangible benefits can be measured in value. Tangible benefits are realized when the proposed system is projected to make or save money of this bookshop.

	Baht
(a) Reduction of stationary and paper cost	25,000
(b) Reduction of human labor	
Salary	1 Person*7,000 baht
	84,000
(c) Reduction of overtime	36,000
(d) Increase efficiency in processing	100,000
Total Tangible Benefits	245,000

#### (2) Intangible Benefits

Intangible benefits are benefits that accrue in the organization due to the information system that are difficult to measure but are important. The proposed system provides the intangible benefits as follows:

- (a) Improve the decision-making process



- (b) Reduce the risk of errors that can be made by human
- (c) Reduce the volume of paper work produced and handled
- (d) Faster information retrieval
- (e) Reduce time and salary for staff work
- (f) Smooth the operation
- (g) Provide on time, accurate and efficient operations

Tables 3.1 and 3.2 show the comparison cost of the proposed and the existing system and figure 3.4 in the form of graph. It shows that the cost of the proposed system is rather higher than that of the existing system at the earlier period but for just about two years. The cost of the proposed system will decline to meet the cost of the existing system because there is higher requirement of records. The operation requires more staff members, and the cost of staff will be increased in the existing system. In reality, for the long term, the cost is high in the first investment and will come down year by year because only the operation staffs are required to handle all the operations.

Table 3.1. Cost Comparison between the Existing System and the Proposed System, Baht.

Cost Items	1 <sup>st</sup> year	2 <sup>nd</sup> year	3 <sup>rd</sup> year	4 <sup>th</sup> year	5 <sup>th</sup> year
<u>Existing System</u>					
Officer Salary	400,000.00	420,000.00	455,250.00	490,000.00	557,500.00
Equipment	170,000.00	187,000.00	195,700.00	215,270.00	236,797.00
Utility Cost	95,000.00	104,500.00	114,950.00	126,445.00	139,090.00
Total Cost	665,000.00	711,500.00	765,900.00	831,715.00	933,387.00
Cumulative Existing System Cost	665,000.00	1,376,500.00	2,142,400.00	2,974,115.00	3,907,502.00
<u>Proposed System</u>					
Development Cost	334,660.00				
Computer Cost					
- Hardware Costs	46,942.00	46,942.00	46,942.00	46,942.00	46,942.00
- Software Costs	11,990.00	11,990.00	11,990.00	11,990.00	11,990.00
- Maintenance	15,000.00	18,000.00	20,000.00	21,000.00	22,000.00
- Training	30,000.00	25,000.00	20,000.00	17,000.00	15,000.00
Peopleware	264,000.00	290,400.00	320,440.00	381,384.00	406,522.00
Stationary	47,500.00	50,000.00	52,400.00	55,987.00	58,000.00
Utility Cost	35,000.00	38,500.00	42,350.00	46,585.00	51,244.00
Total Cost	785,092.00	480,832.00	514,122.00	580,888.00	611,698.00
Cumulative Proposed System Cost	785,092.00	1,265,924.00	1,780,046.00	2,360,934.00	2,972,632.00

Table 3.2. The Comparison of the System Costs, Baht.

Cost Items	1 <sup>st</sup> year	2 <sup>nd</sup> year	3 <sup>rd</sup> year	4 <sup>th</sup> year	5 <sup>th</sup> year
Existing System	665,000.00	711,500.00	765,900.00	831,715.00	933,387.00
Proposed System	785,092.00	480,832.00	514,122.00	580,888.00	611,698.00
Total Different Cost	-120,092.00	230,668.00	251,778.00	250,827.00	321,689.00

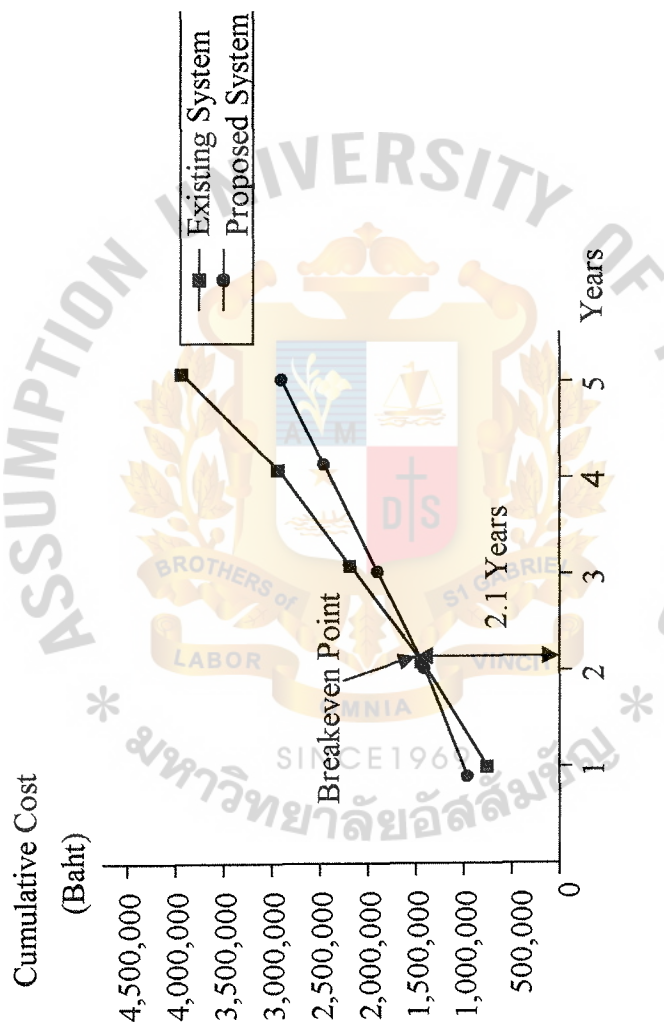


Figure 3.4. Cost Comparison between the Existing System and the Proposed System.

### 3.6.3 Payback Analysis

There are many well-known techniques for comparing the costs and benefits of the proposed system. For this project, payback analysis is suitable.

System development costs are incurred long before benefits begin to accrue so it will take time period for the benefits to overtake the costs. Payback period is the number of years required to accumulate earnings sufficient to cover the investment cost.

The payback period formula is shown as follow:

$$P = \frac{I}{(1-T)R}$$

Where

P = Payback Period

I = Initial or Investment Cost

R = Annual Saving realized by investment

T = Tax Rate in percent (30%)

The payback period of the proposed system can be calculated as follows:

$$\begin{aligned} I &= 294,660 + 40,000 \\ &= 334,660 \quad \text{Baht} \end{aligned}$$

$$\begin{aligned} R &= 245,000 - 32,500 \\ &= 212,500 \quad \text{Baht} \end{aligned}$$

$$\begin{aligned} P &= \frac{I}{(1-T)R} \\ &= \frac{334,660}{(1-0.3)(212,500)} \\ &= 2.24 \text{ Years} \end{aligned}$$

The payback period of the proposed system is 2.24 Years.



Table 3.3. Payback Analysis for Proposed System, Baht.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development Cost	-334,660.00					
Operation & Maintenance Cost	0	-32,500.00	-44,000.00	-48,500.00	-52,500.00	-55,000.00
Discount Factor for 12 %	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	-334,660.00	-29,022.50	-35,068.00	-34,532.00	-33,390.00	-31,185.00
Cumulative Time-adjusted cost over lifetime	-334,660.00	-363,682.50	-398,750.50	-433,282.50	-466,672.50	-497,857.50
Benefits derived from operation of new system	0	245,000.00	275,000.00	295,000.00	320,000.00	365,000.00
Discount Factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	0	218,785.00	219,175.00	210,040.00	203,520.00	206,955.00
Cumulative Time-adjusted costs over lifetime	0	218,785.00	437,960.00	648,000.00	851,520.00	1,058,475.00
Cumulative lifetime time-adjusted cost+benefit	-334,660.00	-144,897.50	39,209.50	214,717.50	384,847.50	560,617.50

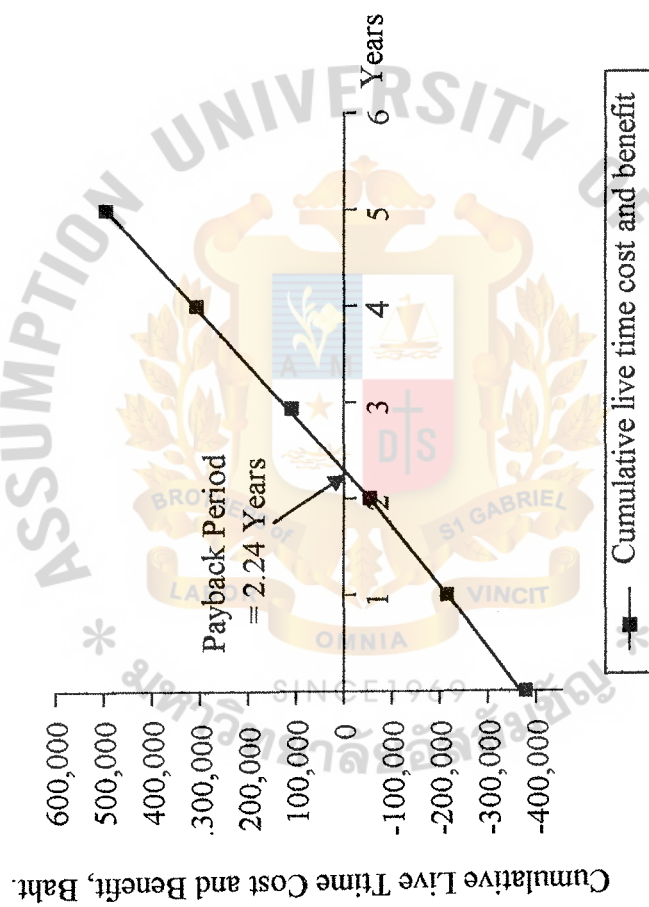


Figure 3.5. Payback Analysis for the Proposed System.

Table 3.4. Net Present Value for Proposed System, Baht.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Development Cost	-334,660.00						
Operation & Maintenance Cost		-32,500.00	-44,000.00	-48,500.00	-52,500.00	-55,000.00	
Discount Factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567	
Present Value of Annual costs	-334,660.00	-29,022.50	-35,068.00	-34,532.00	-33,390.00	-31,185.00	
Total present value of lifetime costs							-497,857.50
Benefits derived from operation of new system	0	245,000.00	275,000.00	295,000.00	320,000.00	365,000.00	
Discount Factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567	
Present value of annual benefits	0	218,785.00	219,175.00	210,040.00	203,520.00	206,955.00	
Total present value of lifetime benefits							1,058,475.00
Net Present Value of proposed system							560,617.50

Table 3.3 shows the payback analysis for the proposed system. The cumulative lifetime costs and the benefits are gradually increasing over the six-year period because the operating costs are being incurred. Lifetime benefits will overtake the lifetime costs between years 2 and 3. By charting the cumulative lifetime time-adjusted costs and benefits as shown in Figure 3.5. It can be estimated that the benefits will cover the cost approximately 2.24 years after the proposed system begins operating.

#### Net Present Value (NPV)

Net Present Value is a sophisticated capital budgeting technique that is calculated by subtracting the project's initial investment from the present value of cash inflows discounted at a rate to the firm's cost of capital.

Costs are represented by negative cash flows while benefits are represented by positive cash flows. Table 3.4 shows net present value of the proposed system. If the sum of the discounted benefits is positive, the investment is good and vice versa.

## IV. PROJECT IMPLEMENTATION

### 4.1 System Implementation

The system implementation will begin after The Board of Director agrees with proposal outlining of the new system. The system implementation can be the most frustrating time of the project due to problems that were not discovered during development. The users may have new requirements after using new system. So development team should prepare for these problems and the possible modifications of program too.

#### 4.1.1 Testing

After the system is implemented, the company will have a review to determine whether the system is meeting expectations and where improvements are needed; to check that proposed system could be compatible and improvements are needed; to check that proposed system can be compatible and suitable for the existing or not. There are many activities to test the proposed system.

- (1) Network testing: To test the new computer networks after we built network according to network design requirements.
- (2) Database testing: This task must immediately precede other programming activities because databases are the resources shared by the computer programs to be written.
- (3) Program testing: Program testing should be defined after the entire program has been written.

#### 4.1.2 Training

Training must involve the capability to support staff familiarization with the new system and general basic tasks system. The staffs must know the method and processes



in order to succeed in the work. They also know the method to solve the non-serious problem of operation, malfunctions and how to detect these problems.

Training can be performed one by one, however, group training is generally preferred to save your time and encourage group learning possibilities. For Non Profit Organization, there are several staffs who work with this new system so we will train one by one staff for specific tasks later. But we will use group training to train the principle or basics to use computers such as turn on/off computer, save information to diskette and so on.

#### 4.1.3 Conversion

Conversion is the process of changing the old system to the new system and evaluate the project experience and final system. There are four conversion methods of handling systems conversion that are abrupt cut-over, parallel, location, and staged conversion. This project selected the use of parallel system method. This method converts the old system to new system carefully since the bookshop did not have a computer system before but just a manual system.

The existing system of the Non-Profit organization is manual operation. So it should convert the system step to prevent all works stopping immediately from unsuitable process. We must give the staff time to be familiar with the computerized system and their training. The parallel conversion is operated for a period both with the old and new systems. This is done to ensure that all major problems in the new system have been met and solved before the old system is discarded. Parallel conversion minimizes the risk of major flaws in the new system causing irreparable harm to the business. Parallel conversion is suitable for changing from manual system to computerized system, although it increased the cost of running two systems over some period and consumes more time with double workload of staffs. When the staffs can run

the new system smoothly and all major problems can be solved, the double workloads will be reduced.



## V. CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusions

The Non Profit Organ Donation Center for Organ Sharing is a private, not-for profit charitable membership organization that encompasses every transplant program, organ procurement organization, and tissue typing laboratory in Thailand. Members represent the general public as well as transplant recipients and donor families; and major health and scientific Organizations. To fulfill our mission, We:

- (1) Maintain the country's organ transplant waiting list;
- (2) Coordinate the matching and distribution of donated organs to waiting patients;
- (3) Establish required quality standards and administer quality assurance programs for all Thailand organ transplant programs;
- (4) Create and refine consensus-based medical criteria for equitable organ sharing to maximize use of donated organs;
- (5) Manage the country's most comprehensive medical database and publish more consumer health data than any organization in any field of medicine;
- (6) Stimulate ongoing improvement in transplant success through data research and analysis;
- (7) Serve as a national educational resource for information about organ procurement and transplantation; and
- (8) Aggressively promote organ donation through extensive education programs aimed at the general public, patients, and the medical profession.

These are the main things that the system should be able to do. At present, these activities are either done manually or not at all. It is also possible that accusations of corruption make such behavior more difficult.

The World Health Organization has been looking into the issue and would like to see both better control and better records.

The Table 5.1 shows the time performance on each process of the proposed system compared with the existing system. It shows that each process of the proposed system performs less time than each process of the existing system which has to operate many work steps in manual system. So, it can be concluded that the proposed system is more efficient and effective than the existing system.

Table 5.1. The Degree of Achievement of the Proposed System.

Process	Existing System	Proposed System
Update Potential Recipient Process	1.5 hrs.	30 mins.
Identify Potential Donor Process	1.5 hrs.	30 mins.
Matching Process	1 hr.	30 mins.
Feedback Process	30 mins.	10 mins.
Generate Post Transplant Data Process	30 mins.	15 mins.
Generate Histocompatibility Lab Process	15 mins.	5 mins.
Total	5 hrs. 15 mins.	2 hrs.

In order to improve the situation, various computing services will be required. In the proposed system, a computerized system is recommend to the management to help in solving all defined problems. To have it done, The Organ Donation system links transplant tissue-matching laboratory and organ procurement organization so that the community can work in a real-time, fully secure network environment Through ODS, we manage the Thailand's organ transplant waiting list. We also operate the ODS Organ Center, where we use technology to match donated organs to transplant candidates

faster and more efficiently, and should eliminate many of telephone calls and faxes required to coordinate the donation, allocation, and transplant of life saving organs. It is requiring automation of system that is providing database for all records in the ODS. We use our systems to collect and manage the data that drives research, guides policy-making, and helps doctors and patients alike make informed clinical and personal decisions. The accomplishment of system is to increase member's satisfaction in providing faster transaction, and reduce cost of paper work, processing time and human labor.

The system has been developed by using PowerBuilder that is a matured technology and easy to use and understand. So it is guaranteed that the system implement and support will operate smoothly. The database management will bring Window NT server to use.

## **5.2 Recommendations**

Organ Donation Technology has been at the heart of every transplant. For this project, Organ Donation System has designed a network only in the Non Profit Organ Donation Center in order to share the system information. However, in the future, the Organ Donation System may extend to have other organ centers or develop a system for online service. Among its many resources, the web site features Transplant Patient Data Source, and a step-by step introduction designed to guide patients and their families through every stage of the organ transplant process. There is helpful information or financing transplants, local support groups, instructions on how to get on waiting list-even at multiple centers, as well as past experiences from transplant recipients, professionals and family members of organ donors. Beyond the new, improve outreach to patients and their families, ODS is launching a similar, but secure, Internet-based transplant information resource to help doctors and the transplant community match



donors to recipients faster and more efficiently. ODS replaces an older, more difficult to use computer system, and should eliminate many of the telephone calls and faxes required to coordinate the donation, allocation, and transplantation of life saving organs.

Keeping pace with technology is very important in system efforts to speed the matching process and provide reliable scientific data, as quickly as is possible, to transplant doctors, scientific researches, policy-makers, public health officials and of course, the thousands of individuals who need transplant.

The new system definitely changes staff operation from manual to a computerized system. Most staff may resist the new system at first. In order to make conversion easier, the Board of Directors should make the users have positive attitudes to a new system and provide more training courses to cause familiarization soon. The Board of Directors should provide two sessions of training, one for skillful staff and the other for inexperienced staff. The organization develops numerous programs that train organ procurement specialists and transplant nurses and doctors to be more effective.

The ODS Organ Center has informed staff and the advanced technology necessary to make the most of every precious organ that is donated, and to help increase transplant successes.

In addition, the Non Profit Organization must improve its security system. It should be careful about unauthorized personnel accessing the confidential information. The hardware and software should be checked periodically to resolve the problems in time.

The Non Profit Organization should prepare all the time for special problems caused by the computer. It should have capable staffs that have sufficient knowledge of computer technology to deal with the problems that may stop the service transaction.



**APPENDIX A**

**DATA FLOW DIAGRAM**

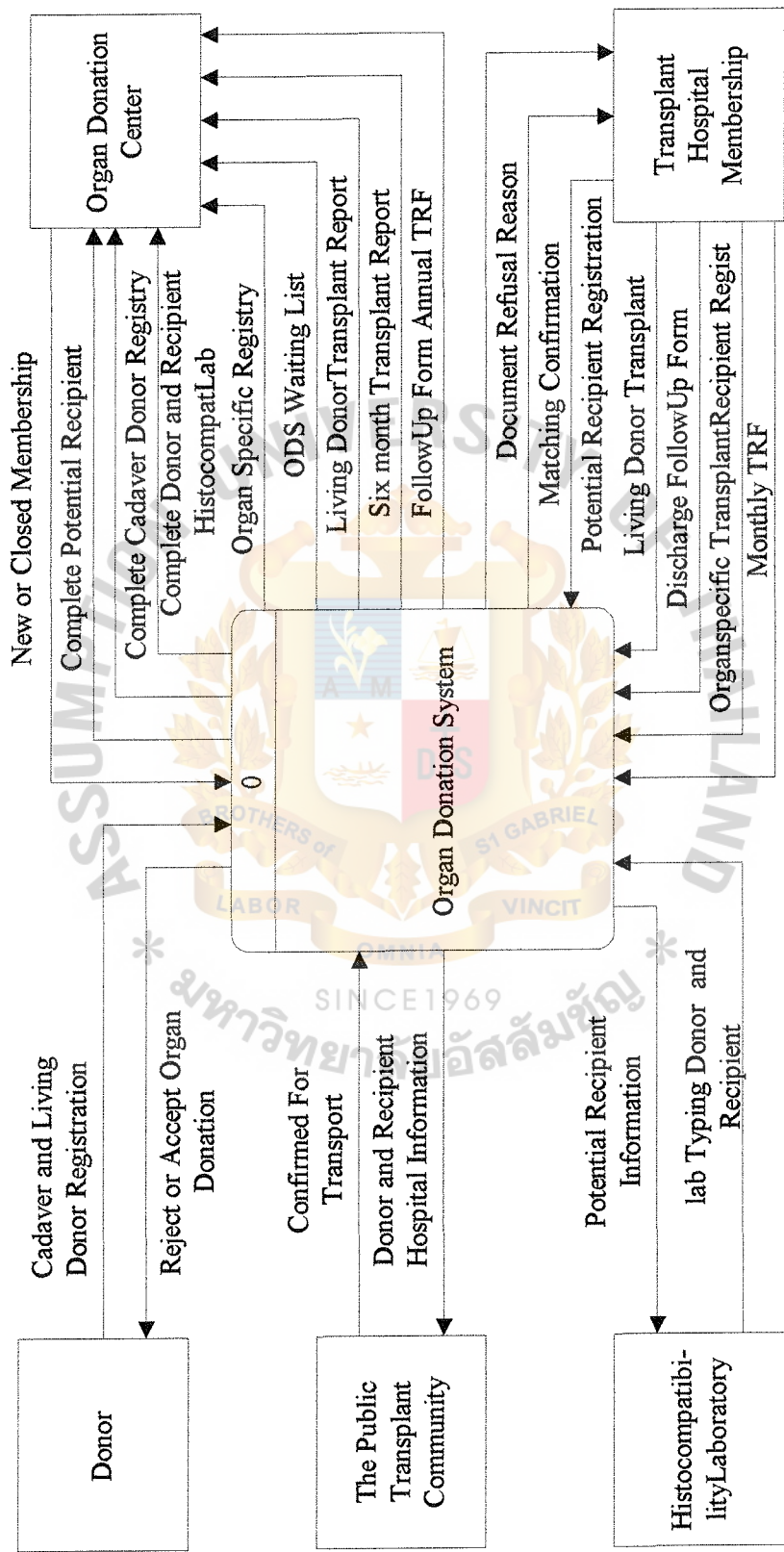


Figure A.1. Context Diagram of Proposed System.

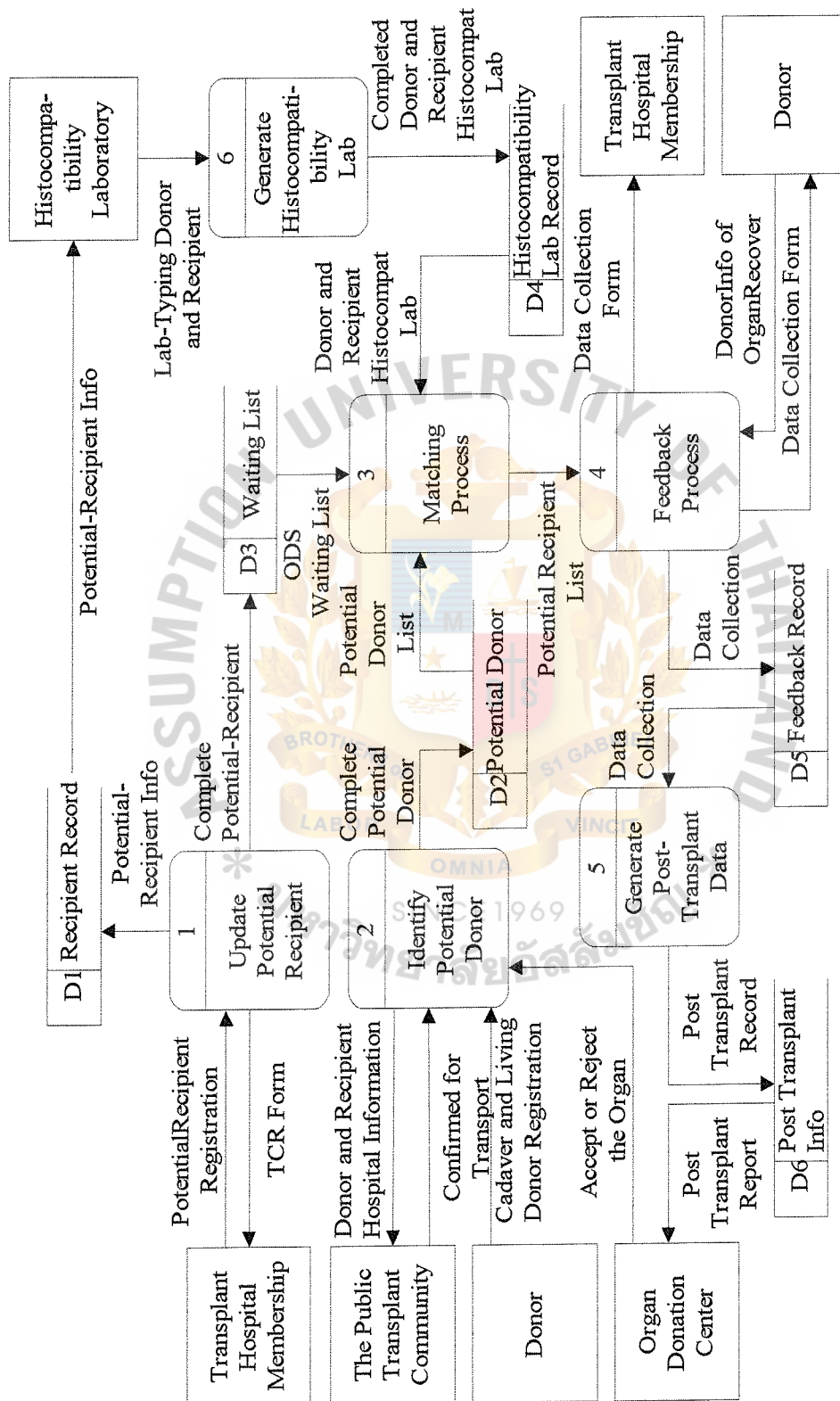


Figure A.2. Data Flow Diagram Level 0 of Proposed System.

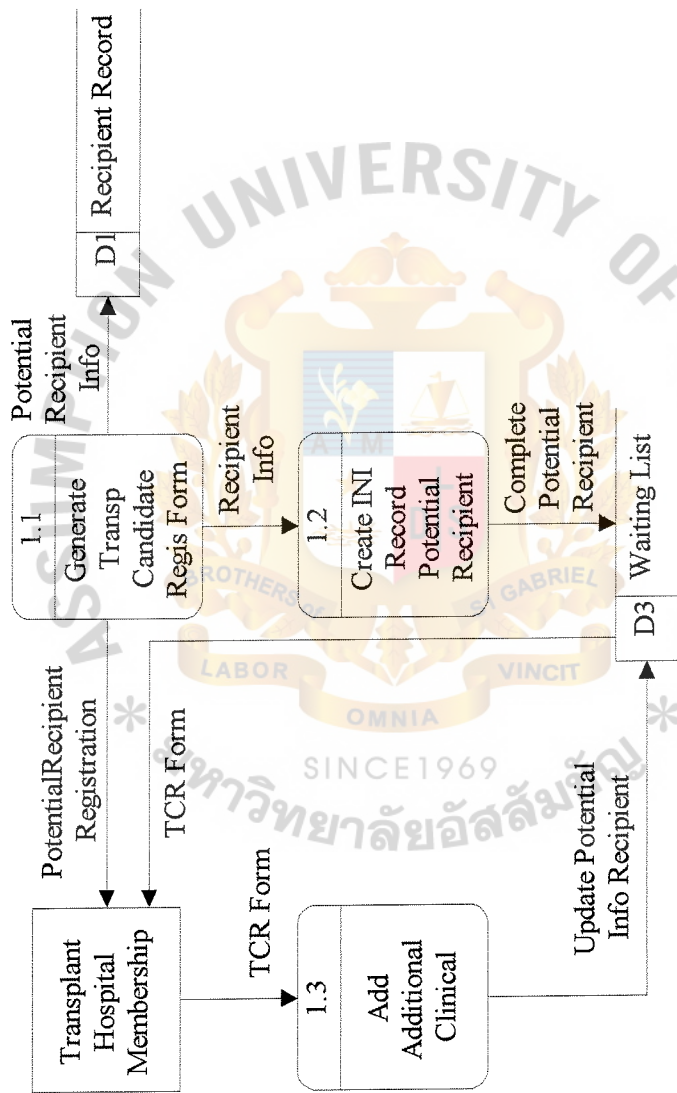


Figure A.3. Data Flow Diagram Level 1 of Proposed System.



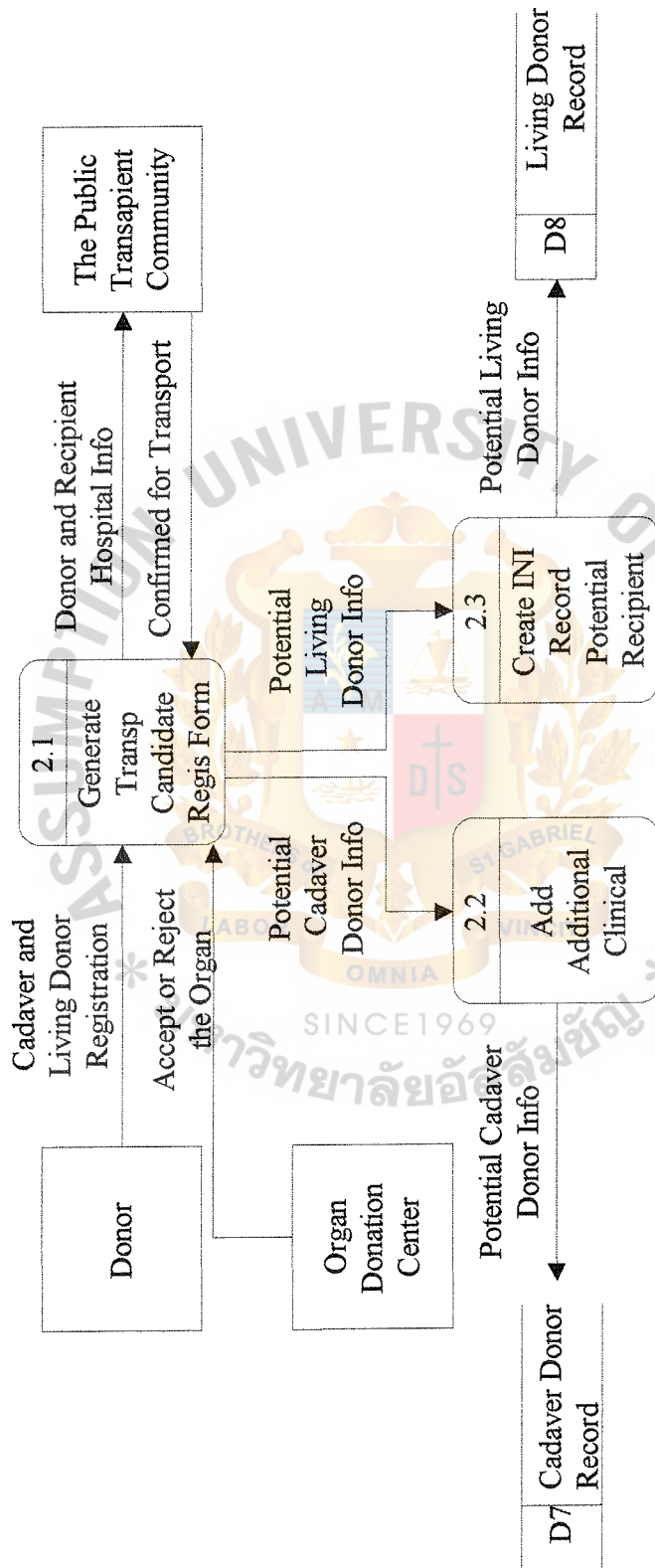


Figure A.4. Data Flow Diagram Level 1 of Proposed System.

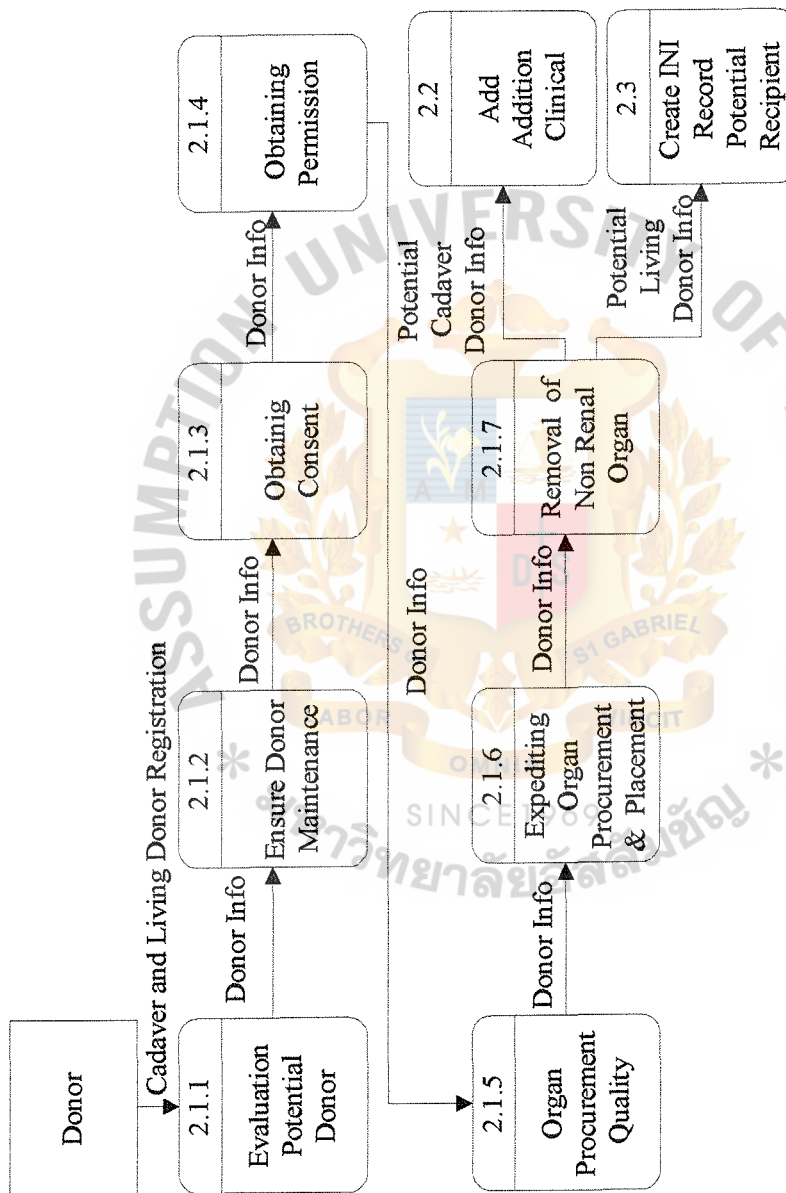


Figure A.5. Data Flow Diagram Level 2 of Proposed System.

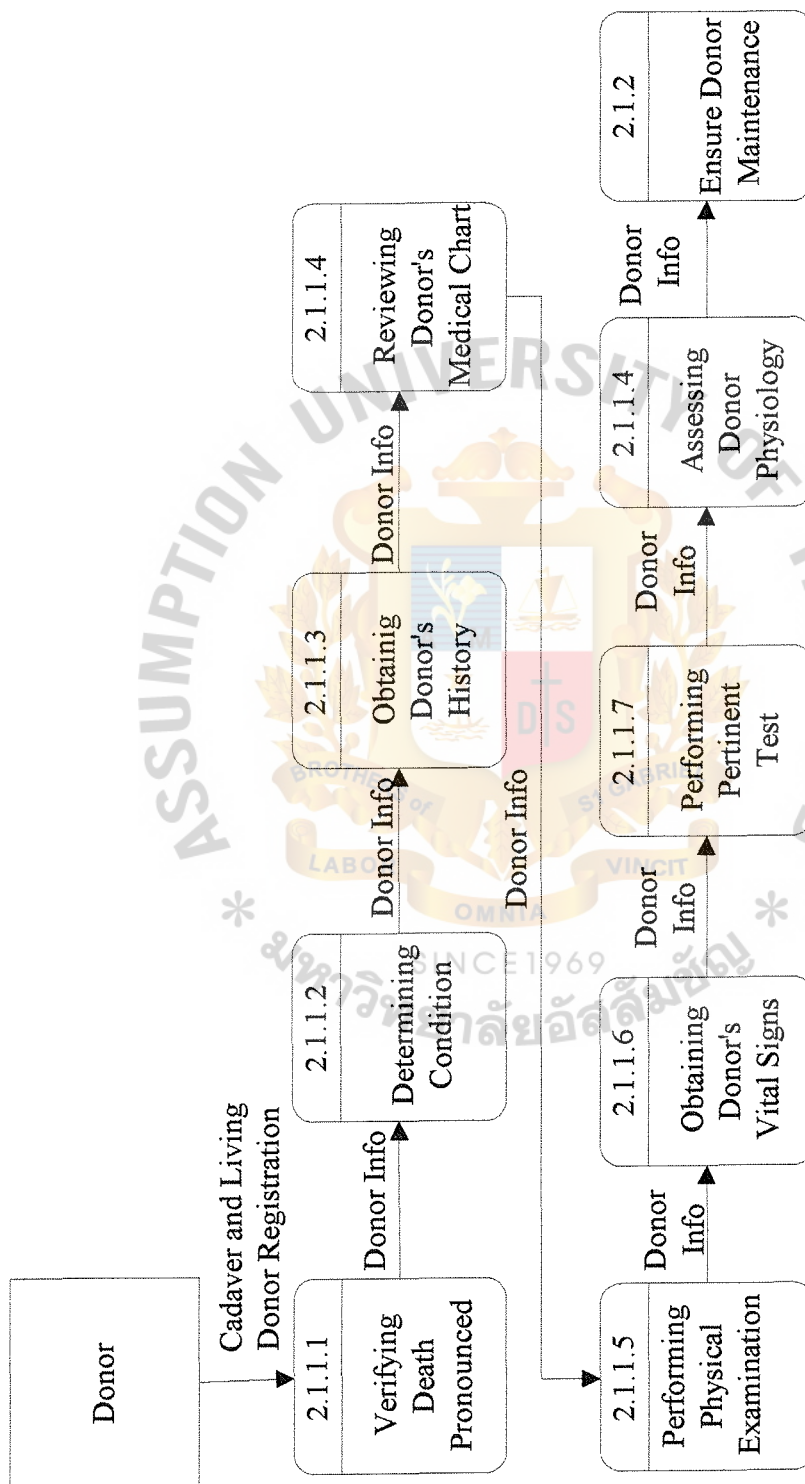


Figure A.6. Data Flow Diagram Level 3 of Proposed System.

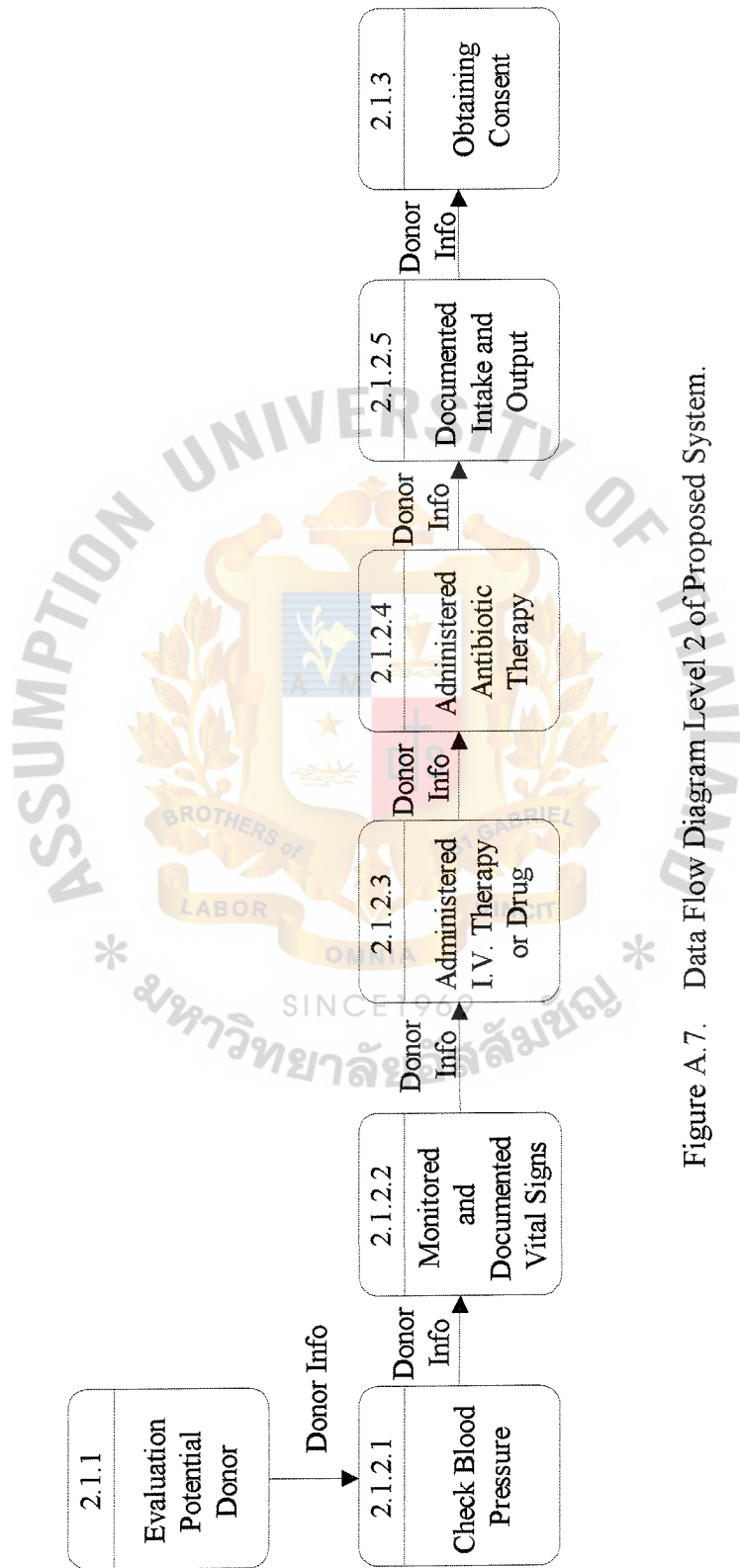


Figure A.7. Data Flow Diagram Level 2 of Proposed System.

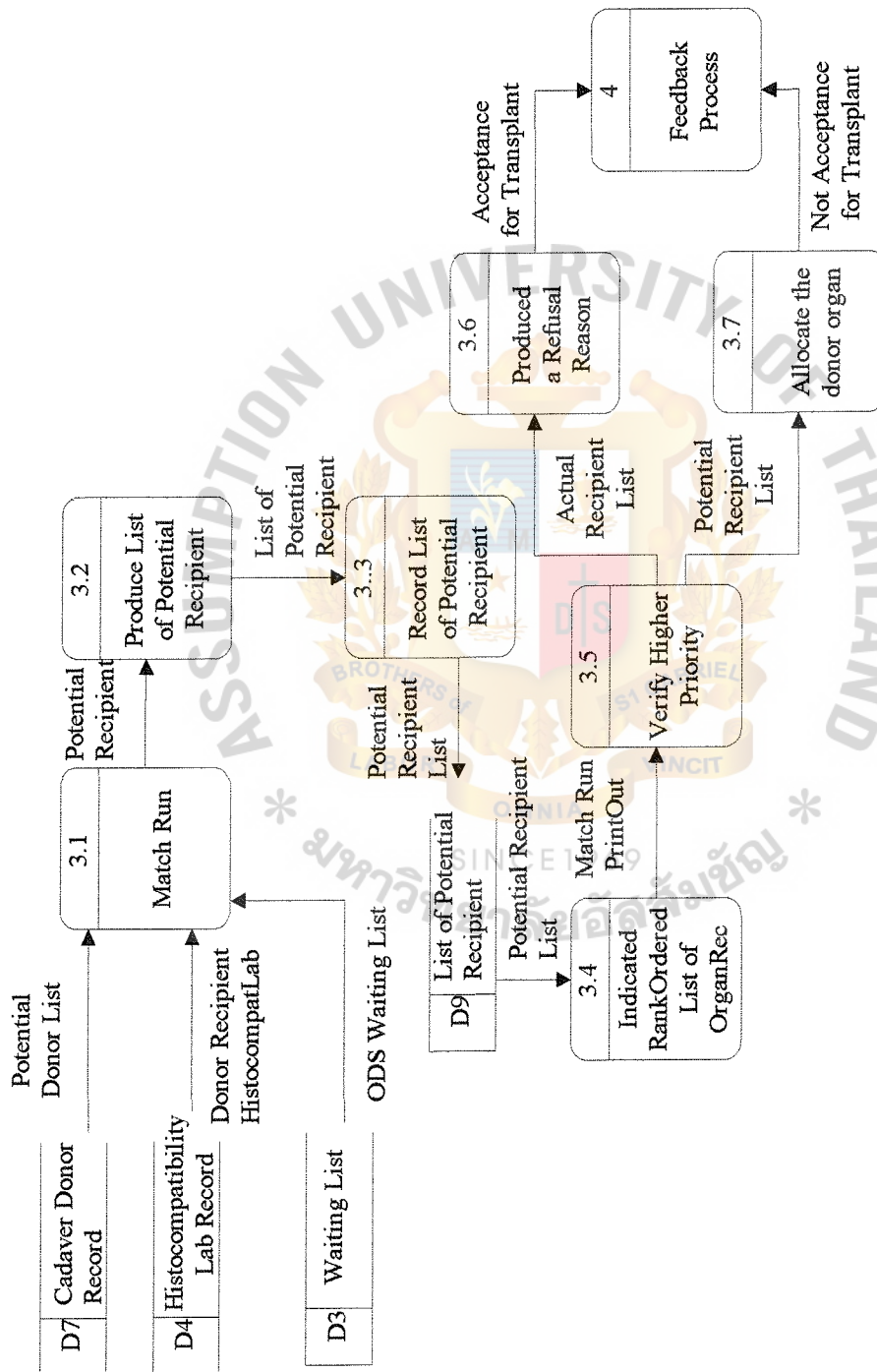


Figure A.8. Data Flow Diagram Level 1 of Proposed System.

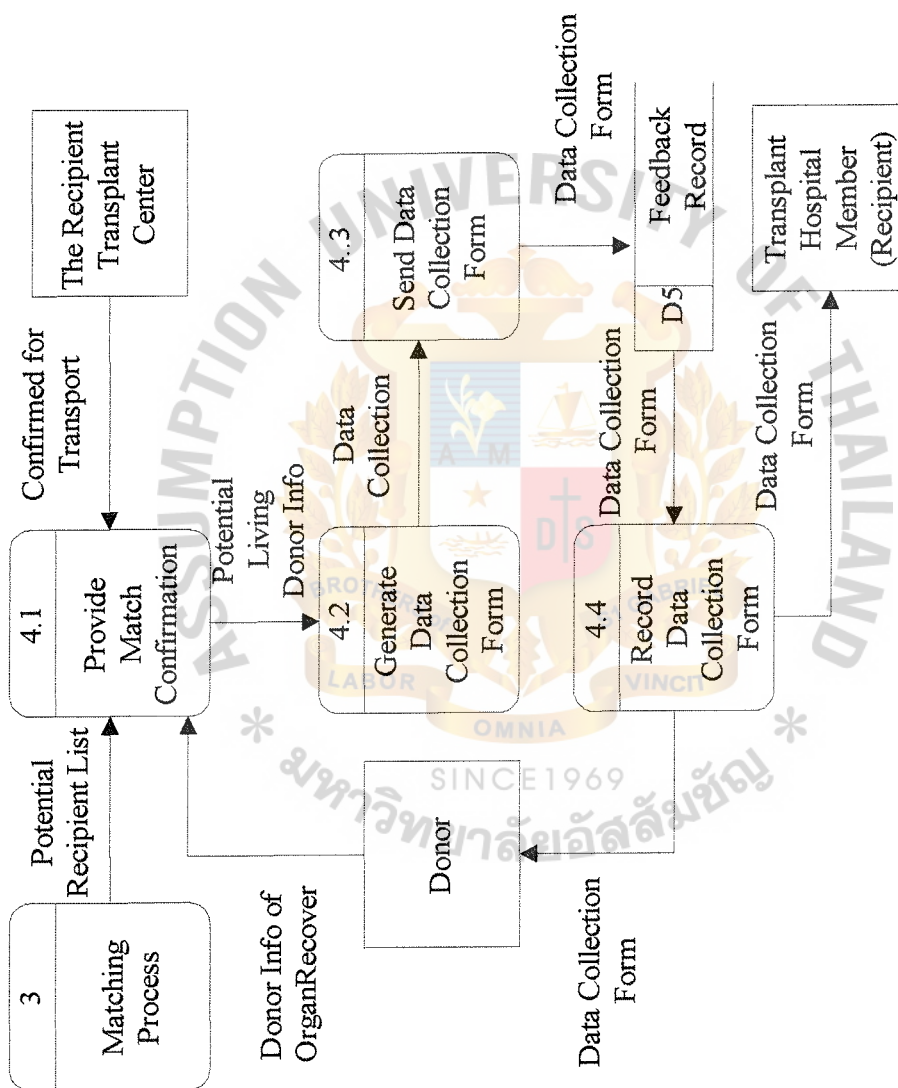


Figure A.9. Data Flow Diagram Level 1 of Proposed System.



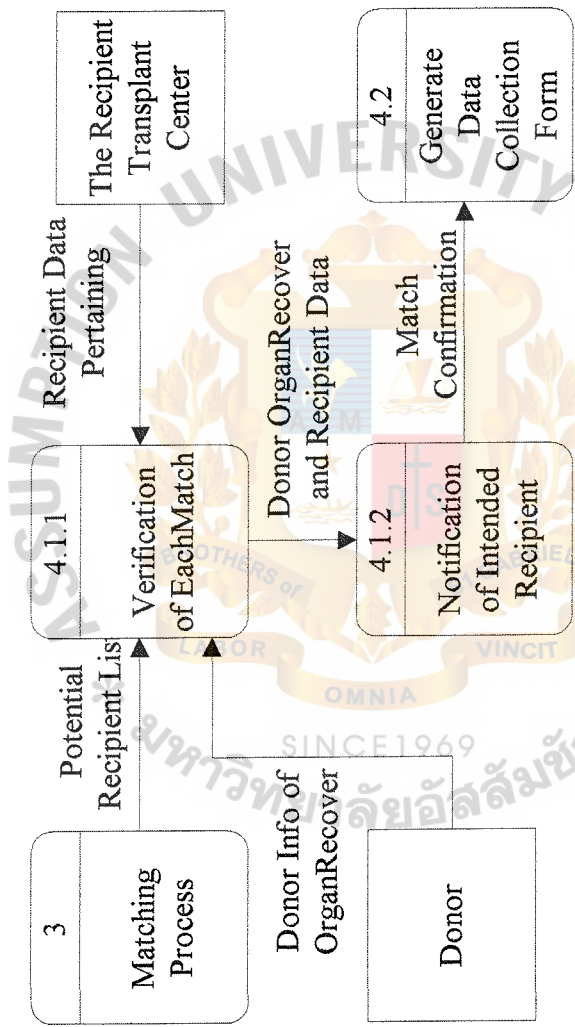


Figure A.10. Data Flow Diagram Level 2 of Proposed System.

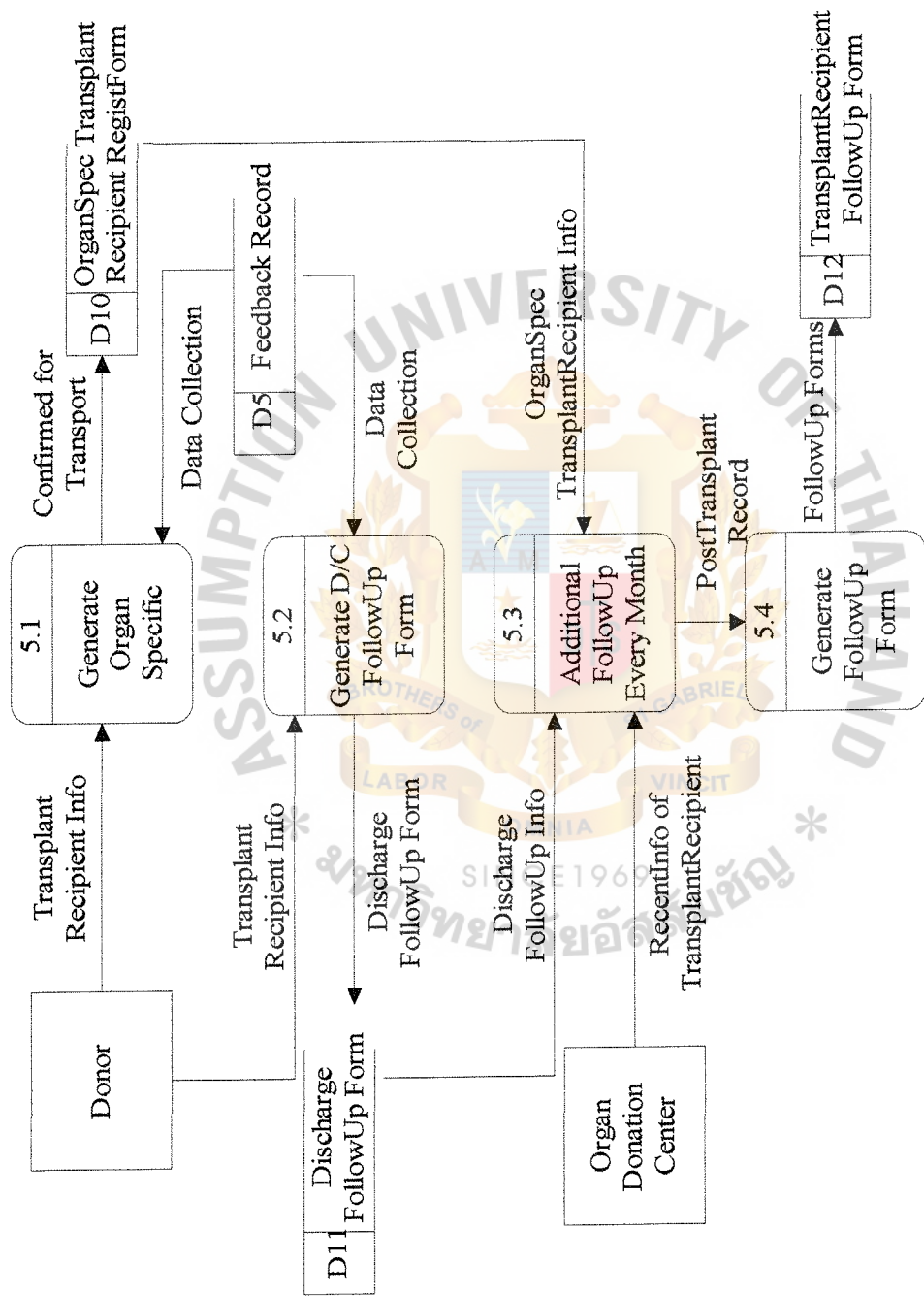


Figure A.11. Data Flow Diagram Level 1 of Proposed System.

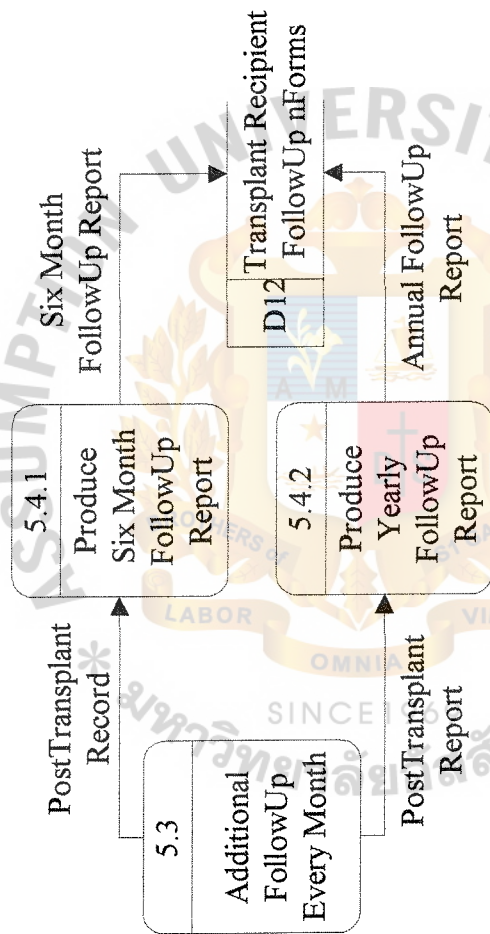


Figure A.12. Data Flow Diagram Level 2 of Proposed System.

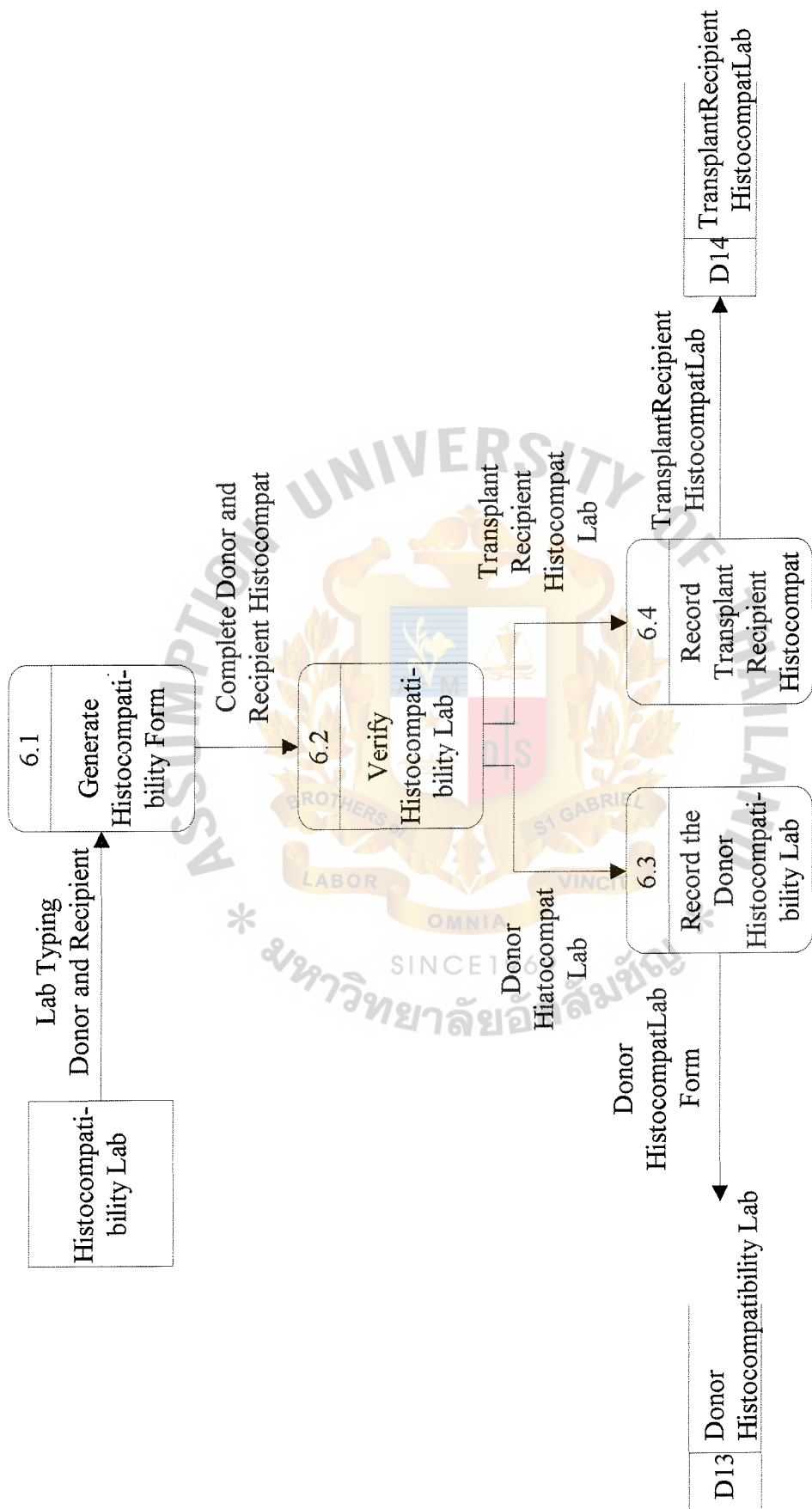


Figure A.13. Data Flow Diagram Level 1 of Proposed System.



**APPENDIX B**  
**DATA DICTIONARY**

## DATA DICTIONARY

Add additional clinical	Process
Description: Demographic information supplied by members on the Transplant Candidate Registration (TCR) will provide the basis for creation of all subsequent transplant records and donor-recipient links.	
Administered I.V. therapy drug	Process
Description: I.V. therapy or drugs are administered as required (I.e. casopressors, vasodilators; etc.).	
Administered Antibiotic therapy	Process
Description: Antibiotic therapy is administered as required.	
Allocate the donor organ	Process
Description: The match run is utilized to allocate the organs for each potential recipient on the match list above the actual recipient.	
Assessing Donor Physiology	Process
Description: Assessing Donor Physiology.	
Cadaver Donor Record	Data Store
Description: The file that keeps record of cadaver donor.	
Cadaver Organ available	Data Flow
Description: Cadaver organ becomes available.	
Check Blood Pressure	Process
Description: The process that checks blood pressure is adequate to maintain perfusion of vital organs.	



Complete Potential Recipient	Data Flow
Description: An individual who has been identified as medically suited to benefit from an organ transplant and has been placed on the ODS list.	
Create INI record PotentialRecipient	Process
Description: Information on the transplant candidate registration form is utilized to create the initial record for each potential recipient.	
Determining condition	Process
Description: Determining whether there are conditions, which may influence donor acceptance.	
Documented Intake and Output	Process
Description: Intake and output are documented.	
Donor	External Entity
Description: A human being who is the source of an organ for transplantation into another human being.	
Donor HistocompatLab	Data Flow
Description: ODC information and donor HLA typing. If the donor is living, information is provided regarding relationship of donor to recipient and degree of haplotype match.	
Donor HistocompatLab Form	Data Flow
Description: The Donor Histocompatibility Form.	
Donor Histocompatibility Lab	Data Store
Description: The file that keeps record of lists of donor histocompatibility forms.	
Evaluation of Potential Donor	Process
Description: The Host ODC shall perform the following evaluations and provide this information to the transplant center which will make the clinical decision	

whether to accept or reject the organ based on the available data or the need for additional information.

Expediting Organ Procurement And Placement Process

Description: The entire organ procurement process shall be expedited in order to maximize the number of transplantable donor organs. Tissue typing and crossmatching of an organ donor shall commence immediately after consent for donation and final declaration of death are obtained and before organs are procured. If pre-procurement tissue typing is not initiated, the Host OPO shall provided a written explanation of the reasons to ODS.

Feedback Process Process

Description: Feedback Record Initial confirmation that a transplant has been performed occurred during the feedback process. The Feedback Record is a data file created after the Match Run.

Follow up Forms Data Flow

Description: Patient status + cause of death + patient description (at time of follow up) most recent Lab information + graft status, and cause of graft failure.

Generate Data Collection Form Process

Description: The match confirmation feedback process enables ODS to produce the necessary data collection form for each transplant event.

Generate Discharge Follow-up Form Process

Description: Discharge follow up forms is completed by the center performing the transplant.

Generate Follow up forms Process

Description: Transplant Recipient Follow up forms for each organ are generated

at six months, one year, and annual intervals until death or graft failure is reported. Follow up forms will be generated by ODC based on the transplant date.		
Generate Histocompatibility Form		Process
Description: Donor and Recipient Histocompatibility forms are completed by the ODC recovering the donor organs and the lab typing the donor and recipients.		
Generate Transp-Candidate Regis-From		Process
Description: The transplant candidate registration (TCR) form is generated.		
Generate the Organ Specific		Process
Description: Transplant date + patient description (at time of transplant), primary renal diagnosis, pre-transplant serology, organ preservation description, and surgical information.		
Living Donor Record		Data Store
Description: The file that keeps record of living donor.		
Listing of potential recipient		Data Flow
Description: A listing of potential recipient for each available organ.		
Lists of Potential Recipients		Data Store
Description: The file that keeps record of lists of potential recipients.		
Match process		Process
Description: Match potential organ recipients with available organ donors.		
Match Run		Process
Description: The computerized comparison process is known as match run. A computer program compares donor information with transplant candidate characteristics store on the ODS waiting list.		

Monitored and Documented Vital signs	Process
Description: Vital signs are monitored and documented.	
Notification of intended and recipients	Process
Description: ODC provide match confirmation through verification of each match and notification of intended and actual recipients for each available donor organ.	
Obtaining the donor's history	Process
Description: Obtaining the donor's history.	
Obtaining the donor's vital signs	Process
Description: Obtaining the donor's vital signs.	
Obtaining Consent	Process
Description: The Host OPO must document consent by the donor's next of kin and the medically legally responsible person, (e.g. medical examiner).	
Obtaining Permission	Process
Description: Obtaining Permission for Visiting Organ Procurement Teams To Enter The O.R. And Surgically Remove Organs. The Host OPO must document authorization by the hospital administration for visiting surgical teams to enter the operation room and remove organs.	
Organ Donation Center (ODC)	External Entity
Description: An Organ Donation Center (ODC) is an organization, accepted as a member of ODS, and authorized by the Non-Profit Organization to procure organs for transplantation. For each ODC, ODS defines a geographic procurement territory within which the ODC concentrates its procurement efforts. No ODC is limited to or granted exclusive procurement rights to procure organs in its territory.	

## Organ Procurement Quality

Process

Description: Organ Procurement Quality. Minimum standards of quality shall include documentation of the following: Final urinalysis, Monitoring and recording of blood pressure and temperature, Use of sterile technique, Maintenance of flush solutions and preservation, Use of sterile technique, Organ procurement organizations will establish minimum requirements for tissue typing material required for local disposition of livers, hearts and lungs.

## Organ-specific Transplant Recipient Registration Form

Data Store

Description: The file that keeps record of Organ-specific Transplant Recipient Registration Form.

## Performing a physical examination of the donor

Process

Description: Performing a physical examination of the donor.

## Performing pertinent tests

Process

Description: Performing pertinent tests.

## Pertaining to the actual the transplants.

Process

Description: ODS members provide match confirmation through on-line verification of each match and notification of intended and actual recipients for each available donor organ.

## Potential Cadaver Donor Info

Data Flow

Description: The Donor ODS + Donor demographic + Consent for donation + Organ recover + Organ preservation + Donor serology + Intended organ recipient.

## Potential Living Donor Info

Data Flow

Description: Donor ODC + Donor demographic + Organ recovery + Donor serology + Certain data about recipient.



#### PotentialRecipient Info

Data Flow

Description: Information of a transplant candidate who has been ranked by the ODS computer match program as the person to whom an organ from a specific cadaveric organ donor is to be offered.

#### PotentialRecipient Registration

Data Flow

Description: The registry of information an organ transplants recipients established pursuant to section.

#### Produce a refusal reason

Process

Description: The match run is utilized to document refusal reasons for each potential recipient on the match list above the actual recipient.

#### Produce list of Potential Recipient

Process

Description: For each donor organ, computerized matching algorithm use to produce rank order lists of potential recipients. The matching algorithms used are based on ODC organ allocation policies, transplant center acceptance criteria, and local variances.

#### Provide Match Confirmation

Process

Description: The organ donation center or its representative enters information regarding the donor and the organ recovered for transplantation.

The recipient transplant center or its representative enters data.

#### Recipient Data Pertaining

Data Flow

Description: Data pertaining to the actual the transplants.

#### Recipient Info

Data Flow

Description: Information of a person who has received an organ transplant.

#### Recipient Record

Data Store

Description: The file that keeps record of recipient.



# St. Gabriel's Library

Record Cadaver Donor	Process
Description: The process that keeps records about information of cadaver donor.	
Record Data Collection Form	Process
Description: Data Collection Forms generate as a result of the feedback process.	
Record Living Donor	Process
Description: The process that keeps records about information of living donor.	
Reviewing the donor's vital signs	Process
Description: Reviewing the donor's vital signs.	
Send Data Collection Form	Process
Description: Data Collection Forms are mailed to the appropriate ODS members; ODCs are sent forms pertaining to donors and transplant centers are sent forms pertaining to recipients.	
The Donor Info of organ recovered	Data Flow
Description: Information regarding the donor and the organ recovered for transplantation.	
TransplantRecipient HistocompatLab	Data Flow
Description: Transplant center information, recipient HLA typing, recipient PRA level, crossmatch data and information about non-local donor HLA typing.	
TransplantRecipient HistocompatLab	Data Store
Description: The file that keeps record of lists of transplant recipient histocompatibility forms.	
TransplantRecipient HistocompatLab Form	Data Flow
Description: The Recipient Histocompatibility Form.	

TCR Form

Data Flow

Description: The transplant candidate registration (TCR) form.

Transplant Hospital Membership or Transplant Center

External Entity

Description: A transplant center is a hospital that is a member of ODS in which transplants are performed. A transplant center may also be called a transplant hospital.

Update-Potential Recipient Info

Data Flow

Description: Demographic information supplied by members on the Transplant Candidate Registration (TCR).

Verifying death pronounce

Process

Description: Verifying that death has been pronounced according to applicable laws pertaining to organ donation

Verification of each match

Process

Description: ODC provide match confirmation through verification of each match, all actual recipients are verified.

Waiting list

Data Store

Description: Existing potential recipient data.



**APPENDIX C**  
**PROCESS SPECIFICATION**

Table C.1. Process Specification of Process 1.

Process Name	Update Potential Recipient
Data In:	Potential Recipient Info
Data Out:	1. Update Potential Recipient Info 2. TCR Form 3. Complete Potential-Recipient
Process:	1. Get necessary recipient data, recipient name, address, phone number, etc. and assign new Recipient ID. 2. Record the recipient data into Recipient record and Waiting list database.
Attachment:	<ul style="list-style-type: none"><li>• Transplant Hospital Recipient</li><li>• Data Store Recipient</li><li>• Data Store Waiting List</li></ul>

Table C.2. Process Specification of Process 1.1.

Process Name	Generate Transplant Candidate Registration Form
Data In:	Potential Recipient Registration
Data Out:	Potential Recipient Info
Process:	1. Data flow within the ODS database begins with the initial wait list registration. 2. ODS Members can add potential transplant recipients to the waiting list through a variety of means.
Attachment:	<ul style="list-style-type: none"><li>• Transplant Recipient Hospital</li><li>• Data Store Recipient Record</li><li>• * Process Create INI Record Potential Recipient</li></ul>

Table C.3. Process Specification of Process 1.2.

Process Name	Create INI Record Potential Recipient
Data In:	Recipient Info
Data Out:	Complete Potential Recipient
Process:	Following wait list registration, the Transplant Candidate Registration (TCR) is generated Information on this form is utilized to create the initial record for each potential recipient.
Attachment:	<ul style="list-style-type: none"><li>• Waiting List</li><li>• Process Generate Transplant Candidate Registration Form</li></ul>

Table C.4. Process Specification of Process 1.3.

Process Name	Add Additional Clinical
Data In:	TCR form
Data Out:	Update Potential Information Recipient
Process:	Information on the TCR form is utilized to create the initial record for each potential recipient. Demographic information supplied by members on the TCR will provide the basis for creation of all subsequent transplant records and donor-recipient links.
Attachment:	<ul style="list-style-type: none"><li>• Transplant Hospital Membership</li><li>• Data Store Waiting List</li></ul>

Table C.5. Process Specification of Process 2.

Process Name	Identify a Potential Donor
Data In:	<ol style="list-style-type: none"><li>1. Cadaver and Living Donor Registration</li><li>2. Accept or Reject the Organ</li><li>3. Confirmed for Transport</li></ol>
Data Out:	<ol style="list-style-type: none"><li>1. Donor and Recipient Hospital Information</li><li>2. Complete Potential Donor</li></ol>
Process:	<ol style="list-style-type: none"><li>1. Get necessary donor data, donor name, address, phone number, etc. and assign new Donor ID.</li><li>2. Record the donor data into corporate Donor database.</li></ol>
Attachment:	<ul style="list-style-type: none"><li>• The Public Transapient Community</li><li>• Data Store Potential Donor</li><li>• Donor</li></ul>

Table C.6. Process Specification of Process 2.1.

Process Name	Verifying Donor Info
Data In:	<ol style="list-style-type: none"><li>1. Cadaver and Living Donor Registration</li><li>2. Accept or Reject the Organ</li><li>3. Confirmed for Transplant</li></ol>
Data Out:	<ol style="list-style-type: none"><li>1. Potential Cadaver Donor</li><li>2. Potential Living Donor Info</li></ol>
Process:	Verifying Donor Information
Attachment:	<ul style="list-style-type: none"><li>• Donor</li><li>• Organ Donation Center</li><li>• The Public Transaplant Community</li></ul>

Table C.7. Process Specification of Process 2.1.1.

Process Name	Evaluation of Potential Donors
Data In:	Donor Info
Data Out:	Donor Info
Process:	When available, the Host ODO shall perform the following evaluations and provide this information to the transplant center which will make the clinical decision whether to accept or reject the organ based on the available data or the need for additional information.
Attachment:	<ul style="list-style-type: none"><li>• ODC</li></ul>

Table C.8. Process Specification of Process 2.1.1.1.

Process Name	Verifying death pronounced
Data In:	Donor Info
Data Out:	Donor Info
Process:	Verifying that death has been pronounced according to applicable laws pertaining to organ donation.
Attachment:	<ul style="list-style-type: none"><li>• Evaluation of Potential Donors</li></ul>

Table C.9. Process Specification of Process 2.1.1.2.

Process Name	Determining Conditions
Data In:	Donor Info
Data Out:	Donor Info
Process:	Determining whether there are conditions which may influence donor acceptance including: <ol style="list-style-type: none"><li>1. Malignant Tumor(s) (Primary brain tumors are acceptable unless Cerebral Venus Shunts or Cerebral Peritoneal Shunts have been put in place);</li><li>2. Current Sepsis; or</li><li>3. Confirmed Human Immunodeficiency Virus antibody sero-positive results.</li></ol>
Attachment:	<ul style="list-style-type: none"><li>• Verifying death pronounced</li></ul>



Table C.10. Process Specification of Process 2.1.1.3.

Process Name	Obtaining the donor history
Data In:	Donor Info
Data Out:	Donor Info
Process:	Obtaining the donor's history
Attachment:	<ul style="list-style-type: none"><li>• Determining Conditions</li></ul>

Table C.11. Process Specification of Process 2.1.1.4.

Process Name	Reviewing the donor medical chart
Data In:	Donor Info
Data Out:	Donor Info
Process:	Reviewing the donor's vital signs
Attachment:	<ul style="list-style-type: none"><li>• Obtaining the donor history</li></ul>

Table C.12. Process Specification of Process 2.1.1.5.

Process Name	Performing a Physical examination
Data In:	Donor Info
Data Out:	Donor Info
Process:	Performing a physical examination of the donor
Attachment:	<ul style="list-style-type: none"><li>• Reviewing the donor medical chart</li></ul>

Table C.13. Process Specification of Process 2.1.1.6.

Process Name	Obtaining the donor's vital signs
Data In:	Donor Info
Data Out:	Donor Info
Process:	Obtaining the donor's vital signs
Attachment:	<ul style="list-style-type: none"><li>• Performing a Physical examination</li></ul>

Table C.14. Process Specification of Process 2.1.1.7.

Process Name	Performing pertinent test
Data In:	Donor Info
Data Out:	Donor Info
Process:	Performing pertinent tests including: 1. For all potential donors: CBC+ Electrolytes +ABO typing + Hepatitis screen; including HbsAg and Anti-HCV + VDRL or RPR + FDA licensed Anti-HIV 1 and Anti-HIV 2 + Anti-HTLV 1 + Anti-CMV and Blood and urine cultures if the donor is hospitalized 72 hours or longer. 2. For potential renal donors: Urinalysis + Creatinine and +B.U.N. 3. For potential liver donors : Liver enzymes + Total bilirubin, Direct bilirubin + PT, PTT and + Blood group subtyping of ABO=A donors. 4. For potential heart donors: 12 Lead EKG + Cardiology consult + Chest X-ray; and Blood Gases. 5. For potential pancreas donors: Serum amylase + Serum lipase and +Glucose.
Attachment:	• Process Obtaining the donor's vital signs

Table C.15. Process Specification of Process 2.1.1.8.

Process Name	Assessing Donor Physiology
Data In:	Donor Info
Data Out:	Donor Info
Process:	Assessing Donor Physiology
Attachment:	Performing pertinent test

Table C.16. Process Specification of Process 2.1.2.

Process Name	Ensure Donor Maintenance
Data In:	Donor Info
Data Out:	Donor Info
Process:	Donor Maintenance. The Host ODC must ensure that the donor is maintained.
Attachment:	• Performing pertinent test

Table C.17. Process Specification of Process 2.1.2.1.

Process Name	Check Blood Pressure
Data In:	Donor Info
Data Out:	Donor Info
Process:	Blood pressure is adequate to maintain perfusion of vital organs.
Attachment:	<ul style="list-style-type: none"><li>• Ensure Donor Maintenance</li></ul>

Table C.18. Process Specification of Process 2.1.2.2.

Process Name	Monitored and documented Vital Signs
Data In:	Donor Info
Data Out:	Donor Info
Process:	Vital signs are monitored and documented;
Attachment:	<ul style="list-style-type: none"><li>• Check Blood Pressure</li></ul>

Table C.19. Process Specification of Process 2.1.2.3.

Process Name	Administered I.V. therapy or drug
Data In:	Donor Info
Data Out:	Donor Info
Process:	I.V. therapy or drugs are administered as required (i.e.casopressors, vasodilators; etc.).
Attachment:	<ul style="list-style-type: none"><li>• Monitored and documented Vital Signs</li></ul>

Table C.20. Process Specification of Process 2.1.2.5.

Process Name	Documented Intake and Output
Data In:	Donor Info
Data Out:	Donor Info
Process:	Intake and output are documented.
Attachment:	<ul style="list-style-type: none"><li>• Administered I.V. therapy or drug</li></ul>

Table C.21. Process Specification of Process 2.1.3.

Process Name	Obtaining Consent
Data In:	Donor Info
Data Out:	Donor Info
Process:	Obtaining Consent. The Host ODO must document consent by the donor's next of kin and the medically legally responsible person, (e.g. medical examiner).
Attachment:	<ul style="list-style-type: none"><li>Documented Intake and Output</li></ul>

Table C.22. Process Specification of Process 2.1.4.

Process Name	Obtaining Permission
Data In:	Donor Info
Data Out:	Donor Info
Process:	Obtaining Permission For Visiting Organ Procurement Teams To Enter The O.R. And Surgically Remove Organs. The Host ODC must document authorization by the hospital administration for visiting surgical teams to enter the operation room and remove organs.
Attachment:	<ul style="list-style-type: none"><li>Obtaining Consent</li></ul>

Table C.23. Process Specification of Process 2.1.5.

Process Name	Organ Procurement Quality
Data In:	Donor Info
Data Out:	Donor Info
Process:	<p>Organ Procurement Quality. Minimum standards of quality shall include documentation of the following:</p> <ol style="list-style-type: none"> <li>1. Final urinalysis;</li> <li>2. Monitoring and recording of blood pressure and temperature;</li> <li>3. Use of sterile technique;</li> <li>4. Maintenance of flush solutions and preservation media at appropriate temperatures;</li> <li>5. Organ procurement organizations will establish minimum requirements for tissue typing material required for local disposition of livers, hearts and lungs. In view of the frequent need for regional shipment of pancreas and kidney allografts, however, sufficient specimens for several crossmatches are required.</li> <li>6. Proper packaging of organs for transport ; and</li> <li>7. Proper packaging of all paperwork containing complete donor information to accompany organ to recipient institution. Written documentation accompanying each organ must include: Donor evaluation + Complete record of donor maintenance + Documentation of consents + Documentation of death pronouncement and + Documentation for determining organ quality.</li> <li>8. The Host ODC is responsible for ensuring that the desired donor medications are given at appropriate times and that medication administration is duly recorded during the retrieval process. Complete information must be maintained by the Host ODC on any and all organs taken, and must include any abnormal anatomy found during the retrieval process. The Host ODC is responsible for ensuring that additional procurement teams have appropriate transportation to and from the local airport.</li> </ol>
Attachment:	<ul style="list-style-type: none"> <li>• Obtaining Permission</li> </ul>

Table C.24. Process Specification of Process 2.1.6.

Process Name	Expediting Organ Procurement and Placement
Data In:	Donor Info
Data Out:	Donor Info
Process:	Expediting Organ Procurement And Placement. The entire organ procurement process shall be expedited in order to maximize the number of transplantable donor organs. Tissue typing and crossmatching of an organ donor shall commence immediately after consent for donation and final declaration of death are obtained and before organs are procured. If pre-procurement tissue typing is not initiated, the Host ODO shall provide a written explanation of the reasons to ODC. Notification of Donor Blood Type. Before kidneys are procured from a donor the Host ODO shall inform the ODS Organ Center of the donors ABO blood type.
Attachment:	• Organ Procurement Quality



Table C.25. Process Specification of Process 2.1.7.

Process Name	Removal of Non- Renal Organ
Data In:	Donor Info
Data Out:	Donor Info
Process:	<p>Removal Of Non-Renal Organs. When a non-renal organ is offered for transplantation, the recipient center procurement team must be given the option of removing the non-renal organ unless extenuating circumstances dictate otherwise. Cases in which this option is not given to the recipient transplant team must be reported in writing by the Host ODC to the appropriate organ-specific ODS committee.</p> <ol style="list-style-type: none"><li>1. Abdominal Organ Procurement. Both the liver and pancreas are to be procured from a donor if each is transplantable. In the case of the pancreas, the following are generally accepted donor criteria for pancreas recovery: (a) age Between 8-55, (b) weight between 30-120 kg., and (c) absence of gestational diabetes; the Host ODC should attempt to retrieve the pancreas from any donor that meets these criteria. If, for anatomical reasons, both organs the liver and pancreas cannot be procured, liver procurement is of higher priority. If a liver team offered the opportunity to procure and/or transplant a liver does not agree to also allow pancreas procurement (at the time the organ is offered), the liver offer may be withdrawn from that team's center and made to the center with the patient of next highest priority. Cooperation between liver and pancreas teams is expected.</li><li>2. Multiple Thoracic Organ Procurement. Both the heart and lungs are to be procured from a donor if they are transplantable. If a heart team offered the opportunity to procure and/or transplant a heart does not agree to also allow lung procurement, the heart offer may be withdrawn from that team's center and made to the center with the patient of next highest priority. Cooperation between thoracic teams is expected such that every effort is made to successfully procure the heart and lungs from a donor.</li></ol>
Attachment:	<ul style="list-style-type: none"><li>• Expediting Organ Procurement and Placement</li></ul>

Table C.26. Process Specification of Process 2.2.

Process Name	Record Cadaver Donor
Data In:	Potential Cadaver Donor Info
Data Out:	Potential Cadaver Donor Info
Process:	<ol style="list-style-type: none"><li>1. Get necessary cadaver donor data, donor name, address, phone number, etc. and assign new cadaver donor ID.</li><li>2. Record the cadaver donor data into corporate Cadaver Donor database</li></ol>
Attachment:	<ul style="list-style-type: none"><li>• Data Store cadaver donor record</li></ul>

Table C.27. Process Specification of Process 2.2.

Process Name	Record Living Donor
Data In:	Potential Living Donor Info
Data Out:	Potential Living Donor Info
Process:	<ol style="list-style-type: none"><li>1. Get necessary living donor data, donor name, address, phone number, etc. and assign new living donor ID.</li><li>2. Record the living donor data into corporate living Donor database.</li></ol>
Attachment:	<ul style="list-style-type: none"><li>• Data Store living donor record</li></ul>

Table C.28. Process Specification of Process 3.

Process Name	Matching Process
Data In:	<ol style="list-style-type: none"><li>1. ODS Waiting List</li><li>2. Potential Donor List</li><li>3. Donor Histocompatibility Lab</li></ol>
Data Out:	Potential Recipient List
Process:	<p>When a donor organ becomes available, the match process begins. Matching utilizes donor information entered by ODS members at the time of the match and existing potential recipient data from the ODS waiting list. Utilizing an allocation algorithm, the matching process generates a listing of potential recipients for each available organ. The match run is utilized to allocate the donor organs and document refusal reasons for each potential recipient on the match list above the actual recipient.</p>
Attachment:	<ul style="list-style-type: none"><li>• Data Store Waiting List</li><li>• Data Store Potential Donor</li><li>• Data Store Recipient Histocompatibility Lab Record</li></ul>

Table C.29. Process Specification of Process 3.1.

Process Name	Match Run
Data In:	1. Potential Donor List 2. Donor and Recipient Histocompatibility Lab 3. ODS Wating List
Data Out:	Potential Recipient
Process:	The computerized comparison process. A computer program compares donor information with transplant candidate characteristics store on the ODS waiting list.
Attachment:	<ul style="list-style-type: none"><li>• Data Store Donor Record</li><li>• Data Store Histocompatibility Lab Record</li><li>• Data Store Waiting List</li></ul>

Table C.30. Process Specification of Process 3.2.

Process Name	Produce List of Potential Recipient
Data In:	Potential Recipient
Data Out:	List of Potential Recipient
Process:	For each donor organ ,computerized matching algorithms are use to produce rank ordered list of potential recipients. The matching algorithms used are based on ODC organ allocation policies, transplant center acceptance criteria, and local variances. After each cadaveric organ is allocated, The donor ODS initiates completion of a potential recipient form.
Attachment:	<ul style="list-style-type: none"><li>• Process Match Run</li><li>• Process Record List of Potential Recipient</li></ul>

Table C.31. Process Specification of Process 3.3.

Process Name	Record List of Potential Recipient
Data In:	List of Potential Recipient
Data Out:	Potential Recipient List
Process:	Record List of Potential Recipient
Attachment:	<ul style="list-style-type: none"><li>• Data Store List of Potential Recipient</li></ul>

Table C.32. Process Specification of Process 3.4.

Process Name	Indicated a partial rank ordered listing of potential organ recipient
Data In:	Actual recipient
Data Out:	Match run print out
Process:	Indicated a partial rank ordered listing of potential organ recipient
Attachment	<ul style="list-style-type: none"> <li>• Data Store List of Potential Recipient</li> </ul>

Table C.33. Process Specification of Process 3.5.

Process Name	Verify higher priority
Data In:	match run print out
Data Out:	<ol style="list-style-type: none"> <li>1. Actual recipient</li> <li>2. Potential recipient</li> </ol>
Process:	The ODS computer Match System will then print only those patients with a number of antigens mismatched with a donor equal to or less than such maximum mismatch criteria.
Attachment	<ul style="list-style-type: none"> <li>• Process produce a refusal reason</li> <li>• Process allocate the donor organ</li> </ul>

Table C.34. Process Specification of Process 3.6.

Process Name	Produce a refusal reason
Data In:	Actual recipient
Data Out:	Not accept for transplant
Process:	The match run is utilized to document refusal reasons for each potential recipient on the match list above
Attachment	<ul style="list-style-type: none"> <li>• the actual recipient.</li> <li>• Process verifying higher priority</li> </ul>

Table C.35. Process Specification of Process 3.7.

Process Name	Allocate the donor organ
Data In:	Actual recipient
Data Out:	Potential Recipient
Process:	The match run is utilized to allocate the donor organs for each potential recipient on the match list above the actual recipient.
Attachment	<ul style="list-style-type: none"> <li>• Process verifying higher priority</li> </ul>

Table C.36. Process Specification of Process 4.

Process Name	Feedback Process
Data In:	1. Potential Recipient List 2. Donor Info of Organ Recover
Data Out:	1. Data Collection 2. Data Collection Form
Process:	Feedback records are created utilizing data from each match run. ODS members provide match confirmation through on-line verification of each match and notification of intended and actual recipients for each available donor organ. The match confirmation feedback process enables ODS to produce the necessary data collection forms for each transplant event. When all actual recipients are verified, the feedback records are closed and the donor and recipient forms are generated for mailing to the appropriate ODS member.
Attachment:	<ul style="list-style-type: none"><li>• Transplant Hospital Membership</li><li>• Donor Info of Organ Recover</li><li>• Data Store Feedback Record</li></ul>

Table C.37. Process Specification of Process 4.1.

Process Name	Provide Match Confirmation
Data In:	1. Potential Recipient List 2. Recipient Data Pertaining 3. Donor Info Organ Recover
Data Out:	Match Confirmation
Process:	1. The ODC or its representative enters information regarding the donor and the organ recovered for transplantation . 2. The Recipient transplant center or its representative enter information regarding the pertaining to the actual organ recipient.
Attachment:	<ul style="list-style-type: none"><li>• The Recipient Transplant Center</li><li>• Donor</li><li>• Data Store List of Potential Recipient</li></ul>



Table C.38. Process Specification of Process 4.1.1.

Process Name	Verification of Each Match
Data In:	1. Potential Recipient List 2. Donor Info of Organ Recover
Data Out:	Donor Organ Recover and Recipient Data
Process:	ODC provide match confirmation through verification of each match, all actual recipients are verified
Attachment:	<ul style="list-style-type: none"> <li>List of Potential Recipient</li> <li>Donor</li> <li>Data Store List of Potential Recipient</li> </ul>

Table C.39. Process Specification of Process 4.1.2.

Process Name	Notification of Intended Recipient
Data In:	Donor Organ Recover and Recipient Data
Data Out:	Match Confirmation
Process:	ODC provide match confirmation through verification of each match and verification of intended and actual recipients for each available donor organ.
Attachment:	<ul style="list-style-type: none"> <li>Process Verification Each Match</li> </ul>

Table C.40. Process Specification of Process 4.2.

Process Name	Generate Data Collection Form
Data In:	Match Confirmation
Data Out:	Data Collection
Process:	Once these data are entered, ODC uses them to generate forms for collection of additional data about the transplants.
Attachment:	<ul style="list-style-type: none"> <li>Process Provide Match Confirmation</li> </ul>

Table C.41. Process Specification of Process 4.3.

Process Name	Record Data Collection Form
Data In:	Data Collection
Data Out:	Data Collection Form
Process:	Data Collection forms, generated as a result of the feedback process.
Attachment:	<ul style="list-style-type: none"> <li>Data Store Feedback Record</li> </ul>



Table C.42. Process Specification of Process 4.4.

Process Name	Send Data Collection Form
Data In:	Data Collection Form
Data Out:	Data Collection Form
Process:	Data Collection forms are mailed to the appropriate ODC members; OPOs are sent forms pertaining to donors and transplant centers are sent forms pertaining to recipients
Attachment:	<ul style="list-style-type: none"><li>• Data Store Feedback Record</li><li>• Donor</li><li>• Transplant Hospital Member(recipient)</li></ul>

Table C.43. Process Specification of Process 5.

Process Name	Generate Post Transplant Data
Data In:	Data Collection Form
Data Out:	Post Transplant Report
Process:	The organ-specific Transplant Recipient Registration and Discharge Follow-up forms are completed by the center performing the transplant. Recipient forms are sent to the appropriate organ-specific registry for processing. Following entry of kidney , and liver forms at the ODS sub-contractor registries, the data is electronically transmitted to ODS on a monthly basis for upload into the ODS database. Thoracic and pancreas forms are sent directly to ODS for Transplant Recipient Follow-up forms for each organ are generated at six months, one year and annual intervals until death or graft failure is reported. Follow-up forms will be generated by ODS based on the transplant date. The follow-up forms will be mailed to the center currently following the transplant recipient. Follow-up data utilizes the same flow as registration data through the organ specific registries.
Attachment:	<ul style="list-style-type: none"><li>• Data Store Feedback Record</li><li>• Post Transplant Info</li></ul>

Table C.44. Process Specification of Process 5.1.

Process Name	Generate Organ Specific
Data In:	1. Transplant Recipient Info 2. Data Collection
Data Out:	Complete Organ specific Transplant Recipient Registry
Process:	The organ-specific Transplant Recipient Registration forms are completed by the center performing the transplant. Recipient forms are sent to the appropriate organ-specific registry for processing. Following entry of kidney , and liver forms at the ODS sub-contractor registries, the data is electronically transmitted to ODS on a monthly basis for upload into the ODS database.
Attachment:	<ul style="list-style-type: none"><li>• Data Store Feedback Record</li><li>• Data Store Organ Specific Transplant Recipient Registration Form</li><li>• Center Performing Transplant</li></ul>

Table C.45. Process Specification of Process 5.2.

Process Name	Generate Discharge Follow Up Form
Data In:	1. Transplant Recipient Info 2. Data Collection
Data Out:	Discharge Follow Up Form
Process:	The Discharge Follow Up forms are completed by the center performing the transplant. Recipient forms are sent to the appropriate organ-specific registry for processing. Following entry of kidney , and liver forms at the ODS sub-contractor registries, the data is electronically transmitted to ODS on a monthly basis for upload into the ODS database.
Attachment:	<ul style="list-style-type: none"><li>• Data Store Feedback Record</li><li>• Center Performing Transplant</li></ul>

Table C.46. Process Specification of Process 5.3.

Process Name	Additional Follow Up every month
Data In:	1. Recent Info of Transplant Recipient 2. Organ Specific Transplant Recipient Registry Form 3. Discharge Follow Up Form
Data Out:	Post Transplant Record
Process:	Recipient forms are sent to the appropriate organ-specific registry for processing. Following entry of kidney , and liver forms at the ODS sub-contractor registries, the data is electronically transmitted to ODS on a monthly basis for upload into the ODS database.
Attachment:	<ul style="list-style-type: none"><li>• Data Store Organ Specific Transplant Recipient Registration Form</li><li>• Discharge Follow Up Record</li></ul>

Table C.47. Process Specification of Process 5.4.

Process Name	Generate Follow Up Form
Data In:	Post Transplant Record
Data Out:	Follow Up Forms
Process:	Following entry of kidney , and liver forms at the ODS sub-contractor registries, the data is electronically transmitted to ODS on a monthly basis for upload into the ODS database. Thoracic and pancreas forms are sent directly to ODS for Transplant Recipient Follow-up forms for each organ are generated at six months, one year and annual intervals until death or graft failure is reported. Follow-up forms will be generated by ODS based on the transplant date. The follow-up forms will be mailed to the center currently following the transplant recipient. Follow-up data utilizes the same flow as registration data through the organ specific registries.
Attachment:	<ul style="list-style-type: none"><li>• Data Store Transplant Follow Up Form</li></ul>

Table C.48. Process Specification of Process 5.4.1.

Process Name	Produce Six-month Follow Up Report
Data In:	Post Transplant Record
Data Out:	Six-month Follow Up Report
Process:	Following entry of kidney , and liver forms at the ODS sub-contractor registries, the data is electronically transmitted to ODS on a monthly basis for upload into the ODS database. Thoracic and pancreas forms are sent directly to ODS for Transplant Recipient Follow-up forms for each organ are generated at six months, one year and annual intervals until death or graft failure is reported. Follow-up forms will be generated by ODS based on the transplant date. The follow-up forms will be mailed to the center currently following the transplant recipient. Follow-up data utilizes The same flow as registration data through the organ specific registries.
Attachment:	<ul style="list-style-type: none"> <li>• Data Store Transplant Recipient Follow Up Forms</li> </ul>

Table C.49. Process Specification of Process 5.4.2.

Process Name	Produce Yearly Follow Up Report
Data In:	Post Transplant Record
Data Out:	Annual Follow Up Report
Process:	Following entry of kidney , and liver forms at the ODS sub-contractor registries, the data is electronically transmitted to ODS on a monthly basis for upload into the ODS database. Thoracic and pancreas forms are sent directly to ODS for Transplant Recipient Follow-up forms for each organ are generated at six months, one year and annual intervals until death or graft failure is reported. Follow-up forms will be generated by ODS based on the transplant date. The follow-up forms will be mailed to the center currently following the transplant recipient. Follow-up data utilizes the same flow as registration data through the organ specific registries.
Attachment:	<ul style="list-style-type: none"> <li>• Data Store Transplant Follow Up Form</li> </ul>

Table C.50. Process Specification of Process 6.

Process Name	Generate Histocompatibility Lab
Data In:	Lab Typing Donor and Recipient
Data Out:	Complete Donor and Recipient Histocompat
Process:	The cadaver Donor Registration and Potential Recipient, Donor and Recipient Histocompatibility forms are completed by the ODS recovering the donor organs and the labs typing the donor and recipient. These forms are returned to ODC for processing.
Attachment:	<ul style="list-style-type: none"><li>• Histocompatibility Laboratory</li><li>• Data Store Histocompatibility Lab Record</li></ul>

Table C.51. Process Specification of Process 6.1.

Process Name	Generate Histocompatibility Form
Data In:	Lab Typing Donor and Recipient
Data Out:	Complete Donor and Recipient Histocompat
Process:	The cadaver Donor Registration and Potential Recipient, Donor and Recipient Histocompatibility forms are completed by the ODS recovering the donor organs and the labs typing the donor and Recipient.
Attachment:	<ul style="list-style-type: none"><li>• Histocompatibility Laboratory</li></ul>

Table C.52. Process Specification of Process 6.2.

Process Name	Verify Histocompatibility Lab
Data In:	Complete Donor and Recipient Histocompat
Data Out:	<ol style="list-style-type: none"><li>1. Donor HistocompatLab</li><li>2. Recipient HistocompatLab</li></ol>
Process:	<ol style="list-style-type: none"><li>1. Get necessary ODC information and donor HLA Typing. If the donor is living ,information is provided regarding relationship of donor to recipient and degree of haplotype match.</li><li>2. Get necessary transplant information ,recipient HLA Typing, recipient PRA level, crossmatch data and information about non-local donor HLA Typing.</li></ol>
Attachment:	<ul style="list-style-type: none"><li>• Process Generate Histocompatibility Form</li></ul>



Table C.53. Process Specification of Process 6.3.

Process Name	Record the Donor Histocompatibility Lab
Data In:	Donor HistocompatLab
Data Out:	Donor HistocompatLab-Form
Process:	Record the donor Histocompatibility Lab data into corporate Donor Histocompatibility Lab database.
Attachment:	<ul style="list-style-type: none"><li>• Data Store Donor Histocompatibility Lab</li></ul>

Table C.54. Process Specification of Process 6.4.

Process Name	Record the TransplantRecipient Histocompat
Data In:	Transplant Recipient HistocompatLab
Data Out:	Transplant Recipient HistocompatLab Form
Process:	Record the recipient Histocompatibility Lab data into corporate Recipient Histocompatibility Lab database.
Attachment:	<ul style="list-style-type: none"><li>• Data Store Transplant Recipient Histocompat Lab</li></ul>





**APPENDIX D**  
**DATABASE DESIGN AND FILE LAYOUT**

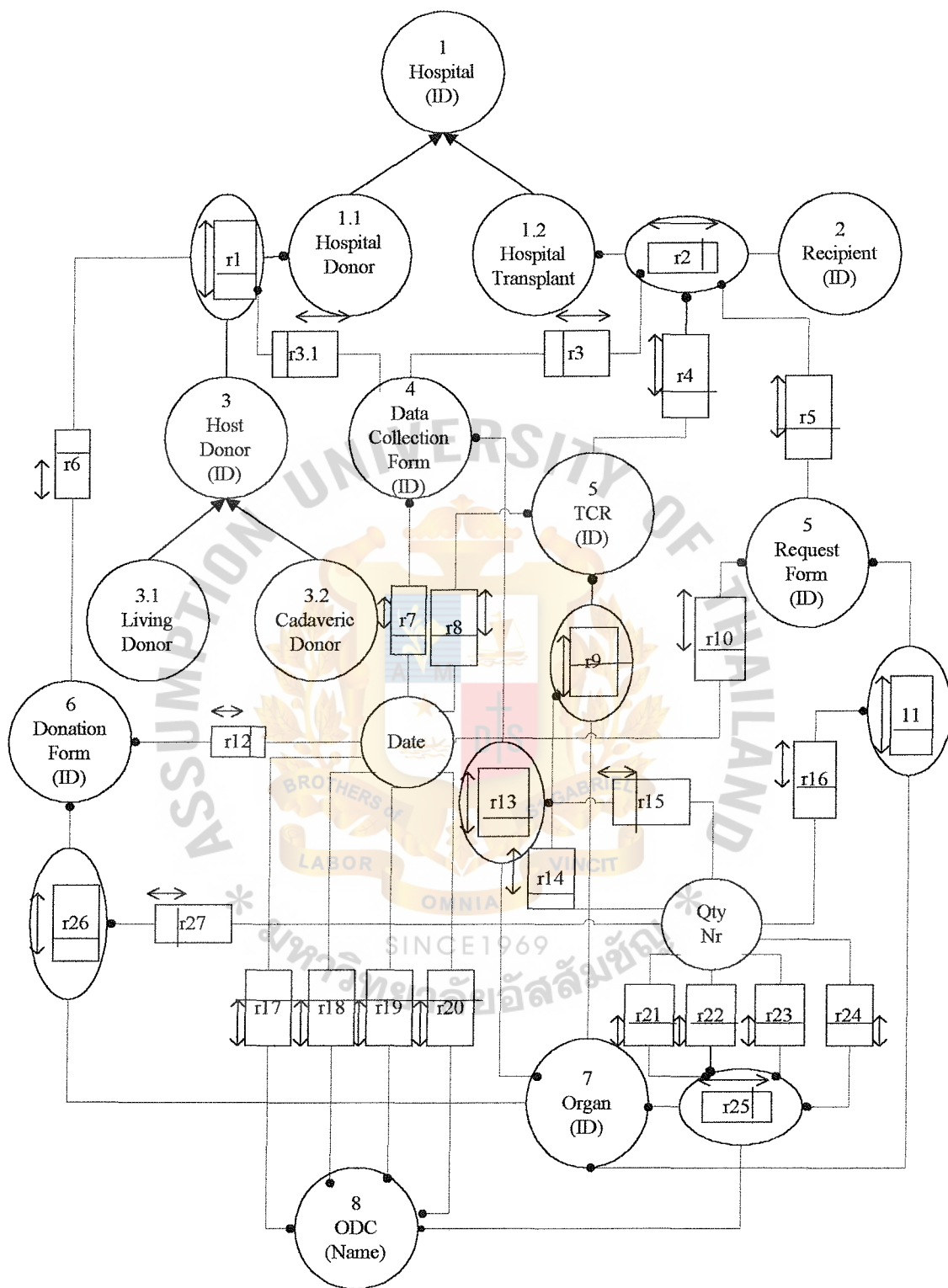


Figure D.1. A Conceptual Schema Diagram for Organ Donation System.

r1 = has donor

r2 = has recipient

r3, r3.1= donated organ

r4 = was issued to

r5, r6 = was issued from

r6 = contains request of

r7, r8 , r10, r12, r17, r18, r19, r20 = was issued on

r9 = contains request for

r11 = is number of unit of organ requested in

r13 = contains request or donation for

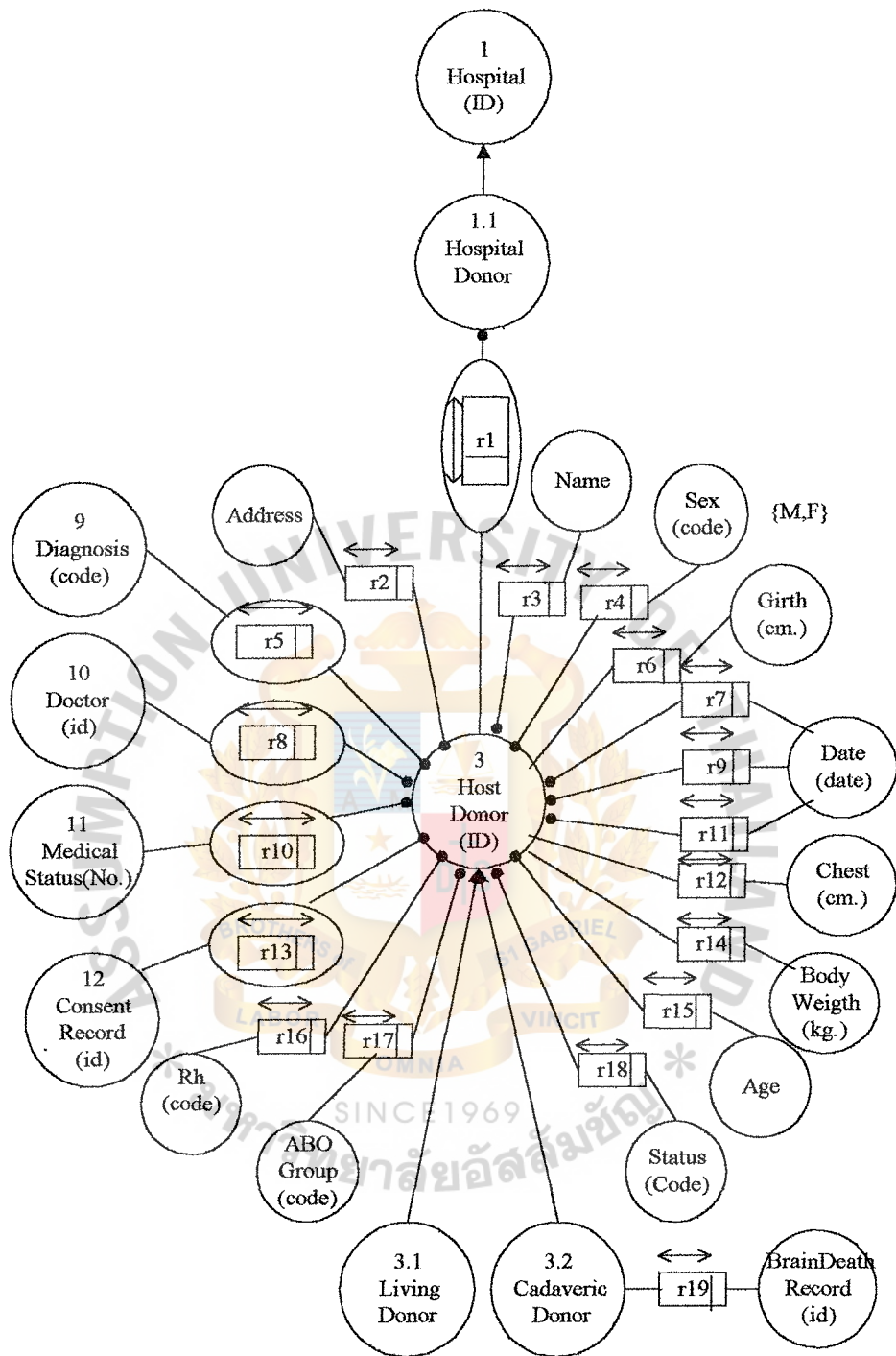
r14, r16 = contains request of

r15 = contains request or donation of

r21, r22 = is stocked in ODC in quantity

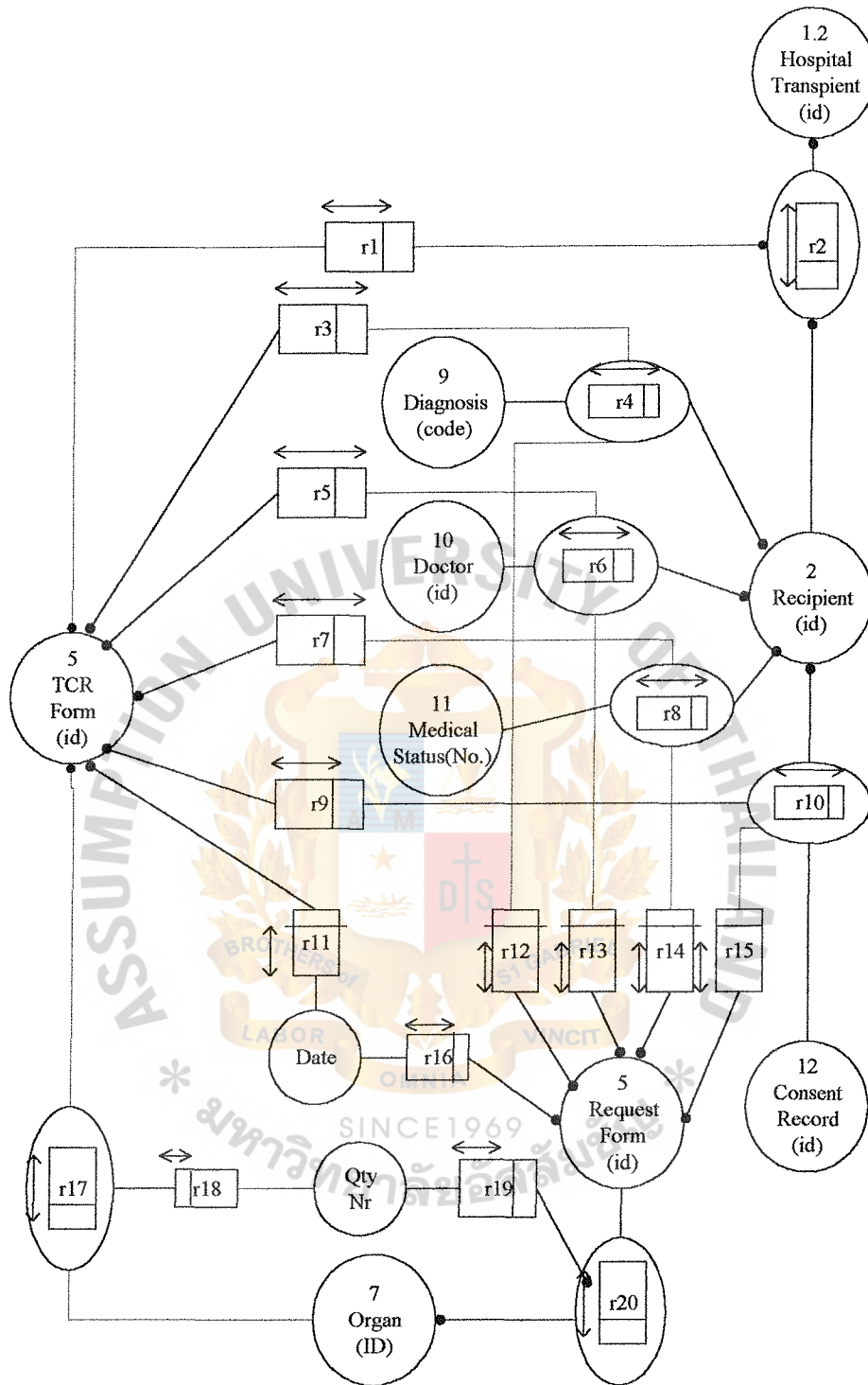
r23, r24 = is requested in ODC in quantity

r25 = is stocked in ODC



r1 = has donor,                      r2 = is located at  
 r3 , r5, r8, r10 , r13, r14, r16, r17, r18, r 19 = has  
 r4 = is of,                              r6, r12 = has size,                      r7 = was born on  
 r8 = is treated by,                      r9 = admission on ,                      r11 = death on

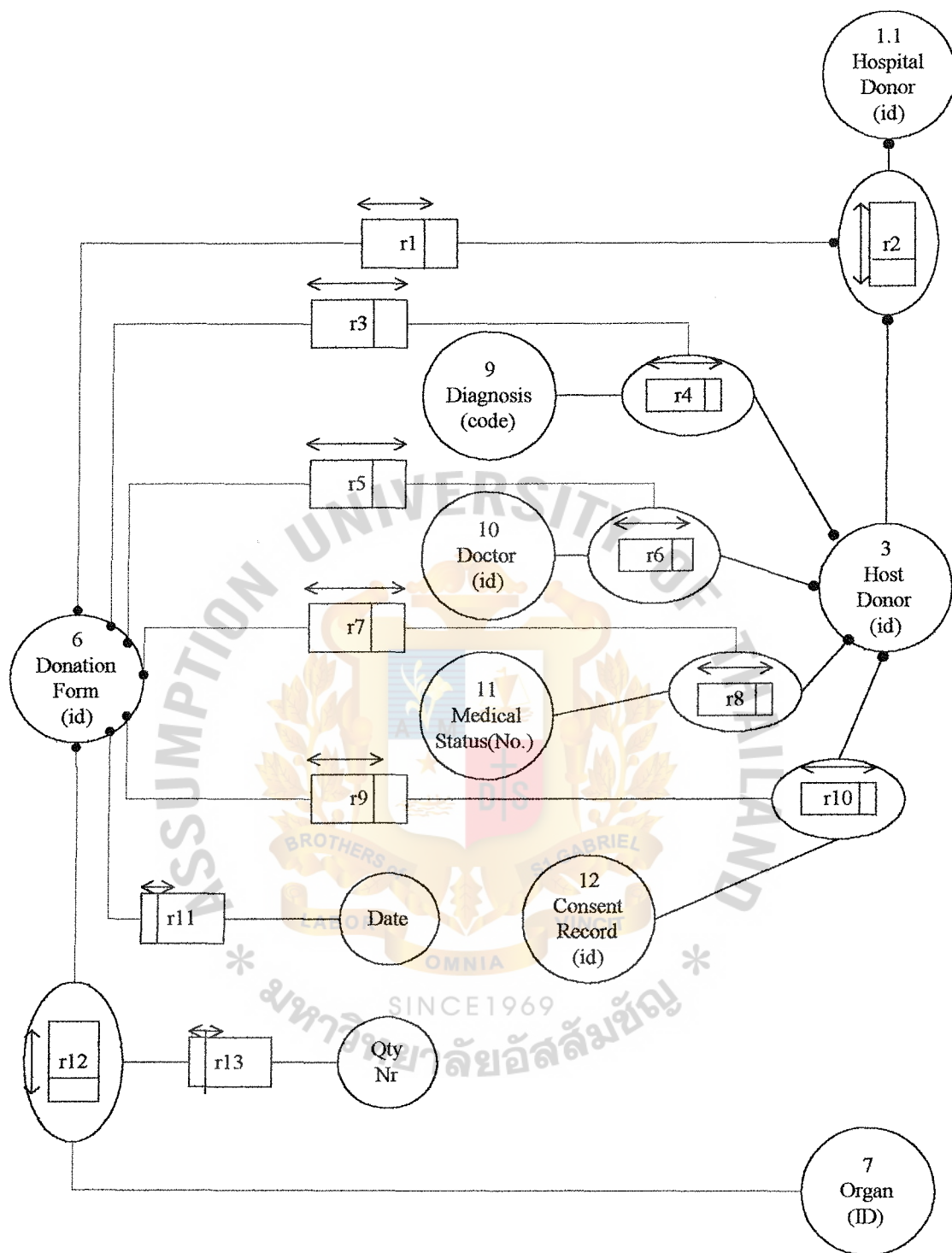
Figure D.2. A Conceptual Schema Ddiagram for Organ Donation System (Continued).



r1 = was issued to,  
 r3, r4 , r12 , r7 ,r8 ,r14, r9, r10, r15 = has,  
 r17, r20 = contains request for  
 r18, r19 = is number of unit of organ requested in

r5, r6, r13 = is treated by  
 r11, r16 = was issued on

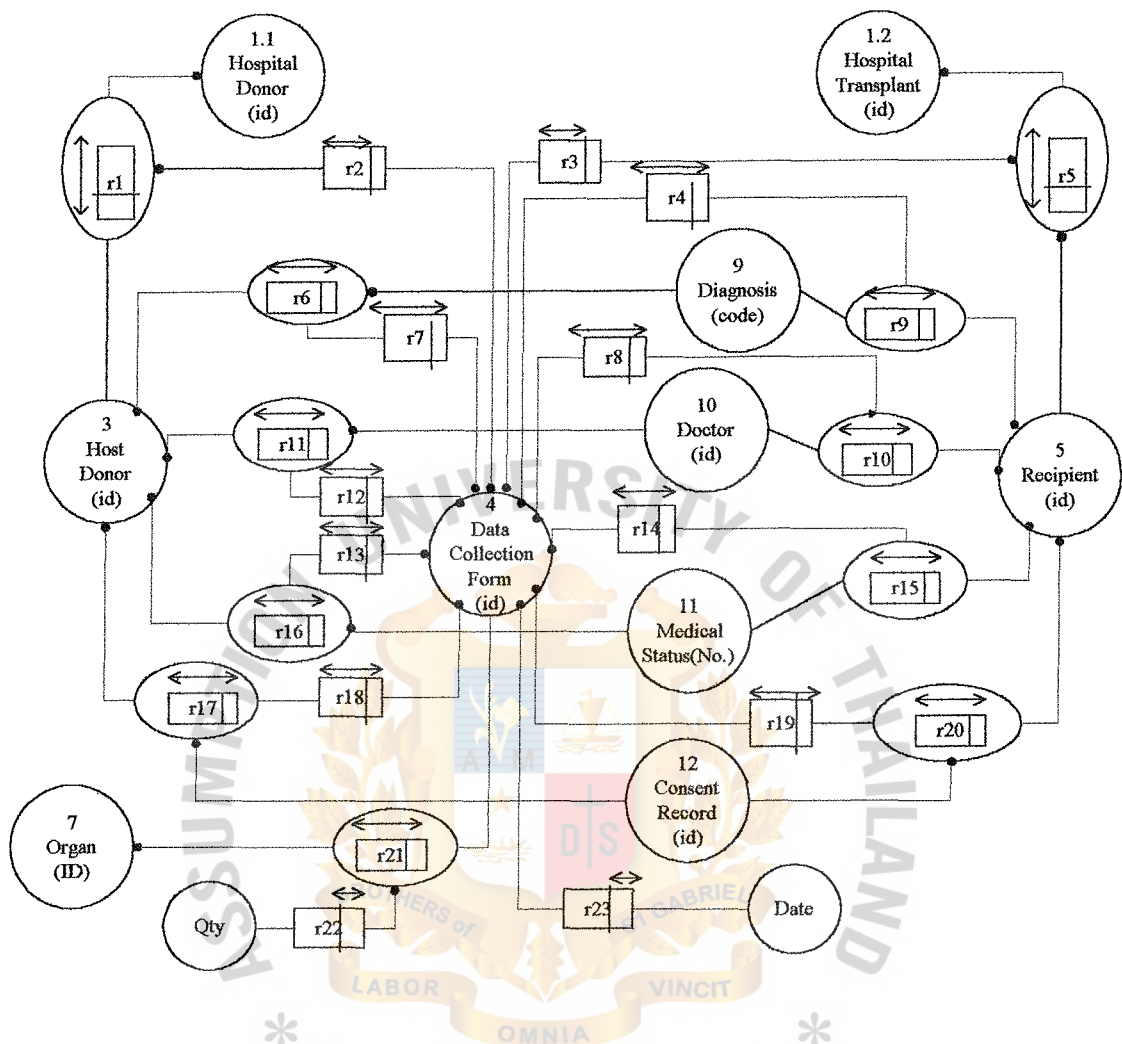
Figure D.3. A Conceptual Schema Diagram for Organ Donation System (Continued).



r1= was issued to,                      r2 = has donor,                      r5, r6 = is treated by  
r3, r4 r7 ,r8 ,r14, r9, r10 = has,                      r11 = was issued on  
r12 = contains donation for    r13 = is number of unit of organ requested in

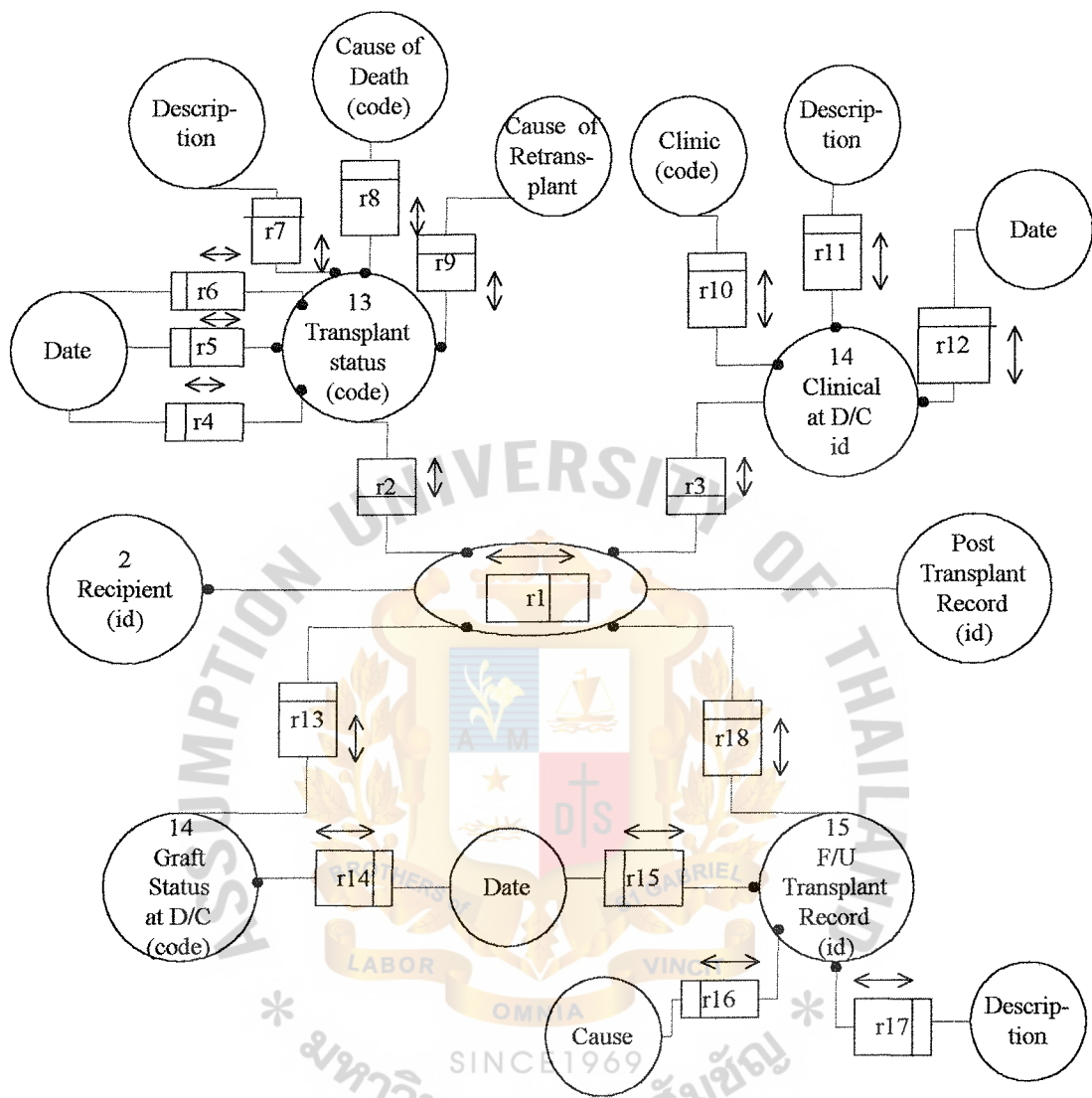
Figure D.4. A Conceptual Schema Diagram for Organ Donation System (Continued).





r1 = has donor,                      r2, r3 = was issued to,                      r5 = has recipient  
 r4, r6, r7, r9, r13, r14, r15, r16, r17, r18, r19, r20 = has  
 r8, r10, r11, r12 = is treated by  
 r21 = contains request or donation for,  
 r22 = contains request or donation of,                      r23 = was issued to

Figure D.5. A Conceptual Schema Diagram for Organ Donation System (Continued).



r1 = was issued from,      r4 = transplant on,      r5 = discharge on  
 r2, r3 , r8 , r9 ,r13 ,r17, r18 = has,      r6, r12, r14, r15 = was issued on  
 r7, r11 = is described as,      r10 = in

Figure D.6. A Conceptual Schema Diagram for Organ Donation System (Continued).

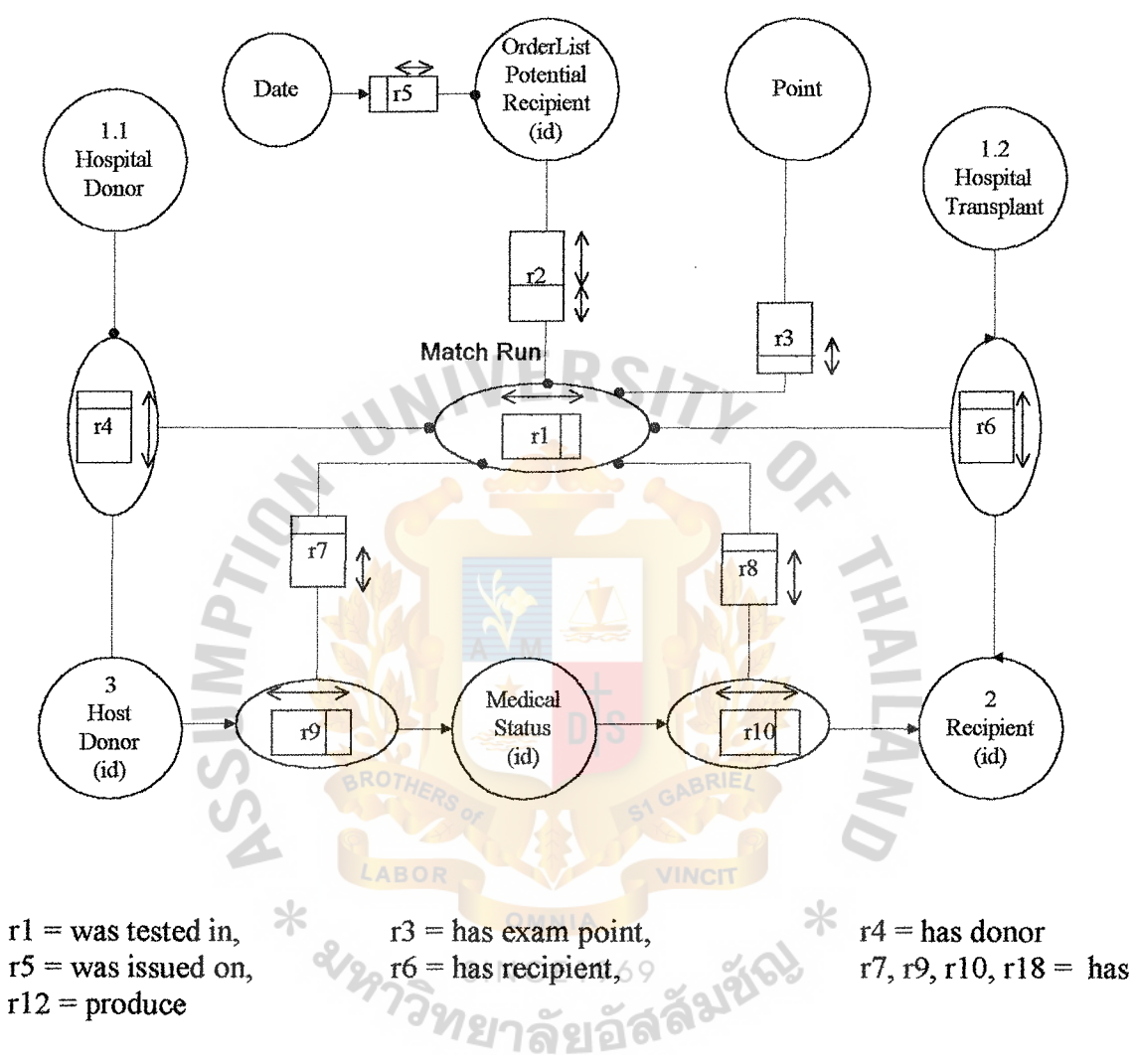
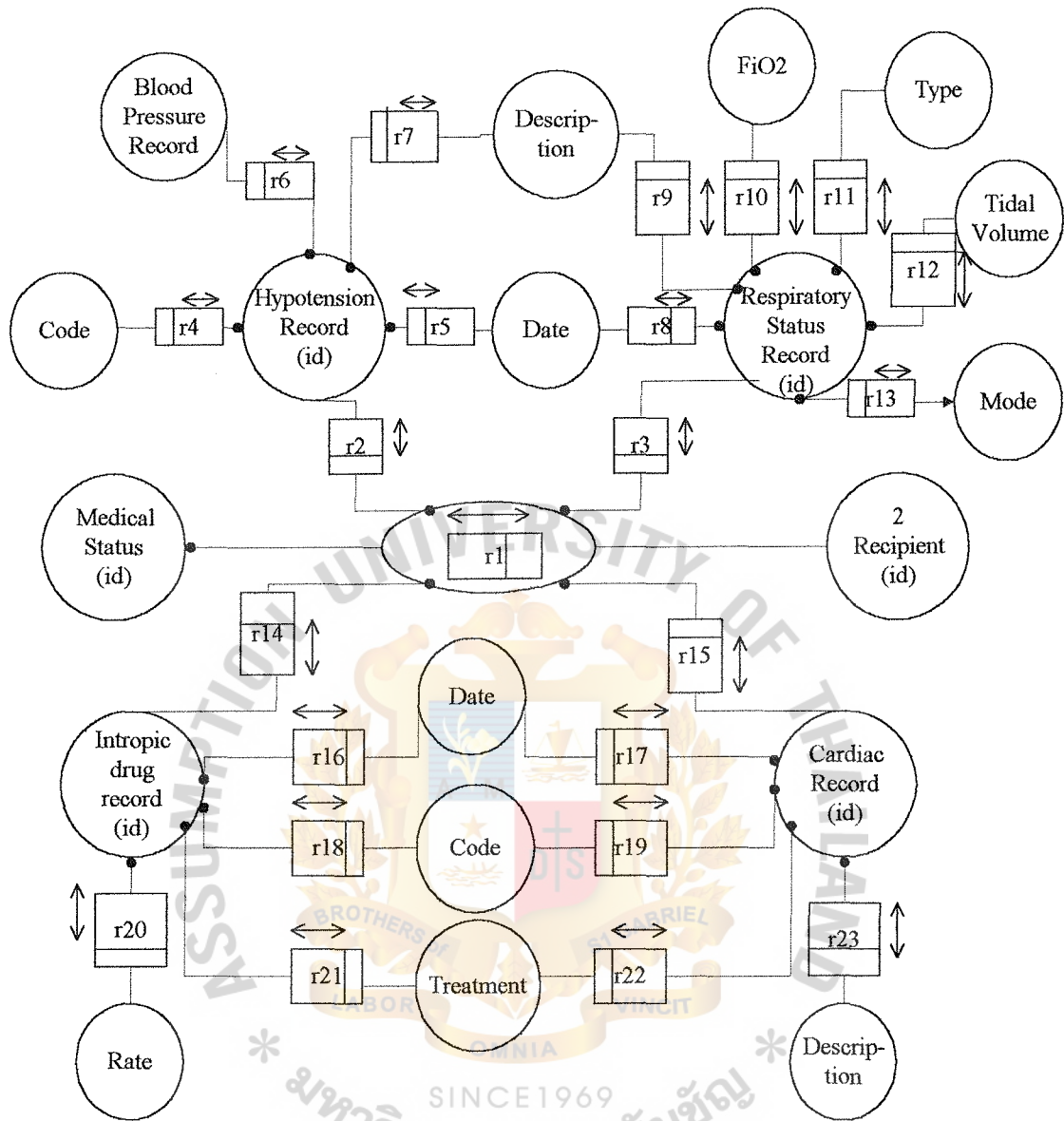


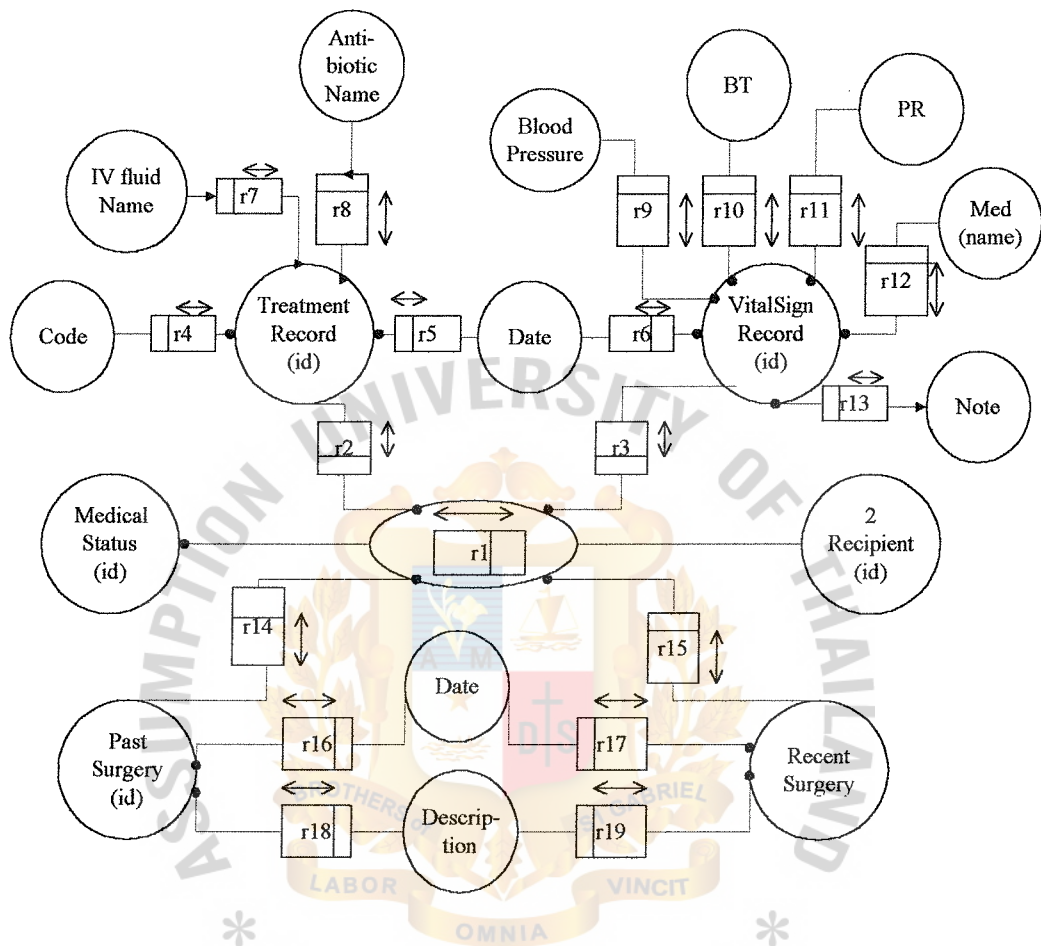
Figure D.7. A Conceptual Schema Diagram for Organ Donation System (Continued).



r1 = was issued from,  
r5, r8, r16, r17 = was issued on,  
r21, r22 = uses,

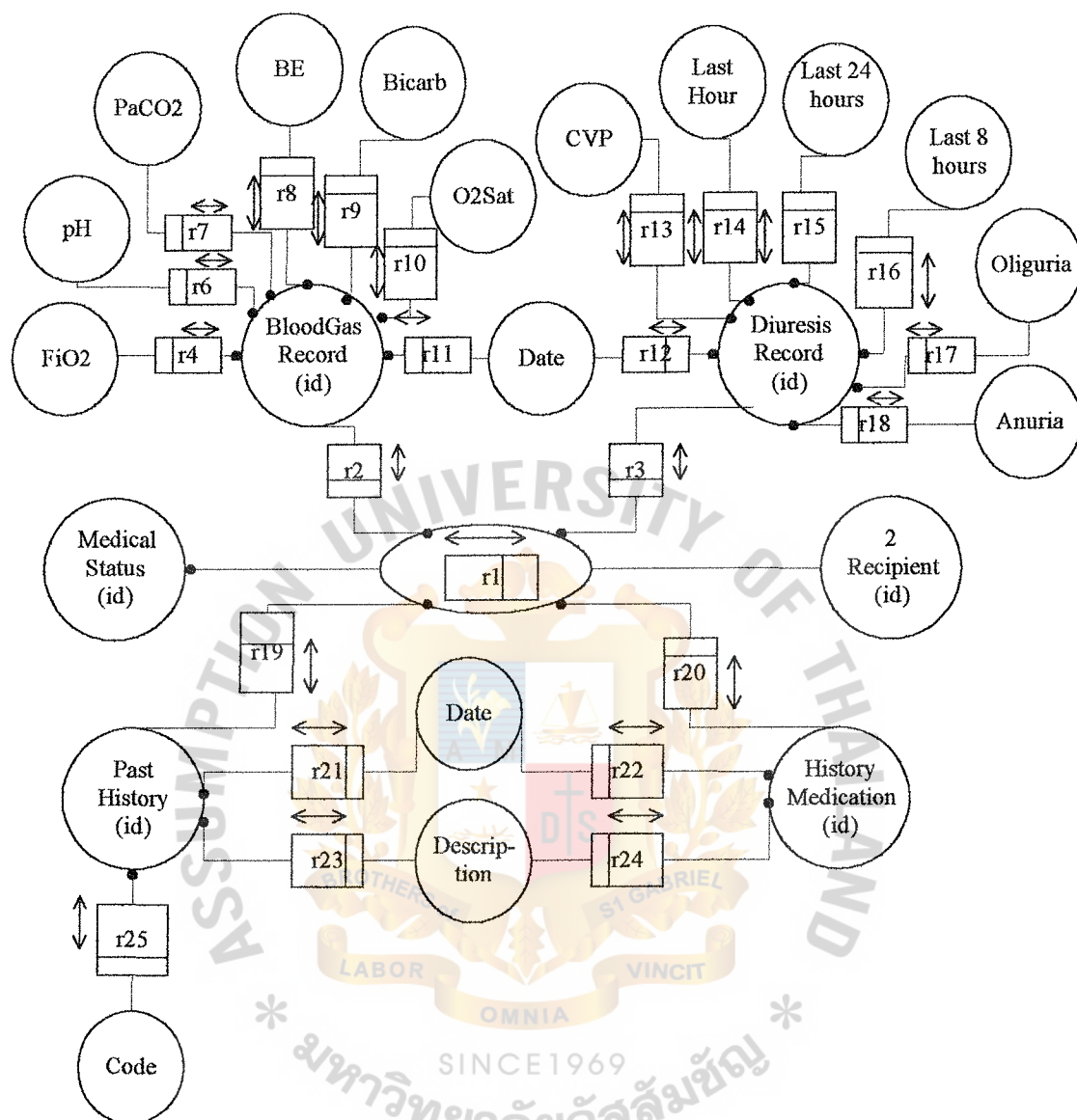
r2, r3, r6, r10, r11, r12, r13, r14, r15 = has  
r7, r9, r18, r19, r23 = is described as  
r20 = on

Figure D.8. A Conceptual Schema Diagram for Organ Donation System (Continued).



r1 = was issued from,  
 r2, r3, r4, r5, r6, r7, r8, r9, r10, r11, r12, r13, r14, r15 = has  
 r5, r6, r8, r16, r17 = was issued on,  
 r7, r8, r12 = uses  
 r18, r19 = is described as

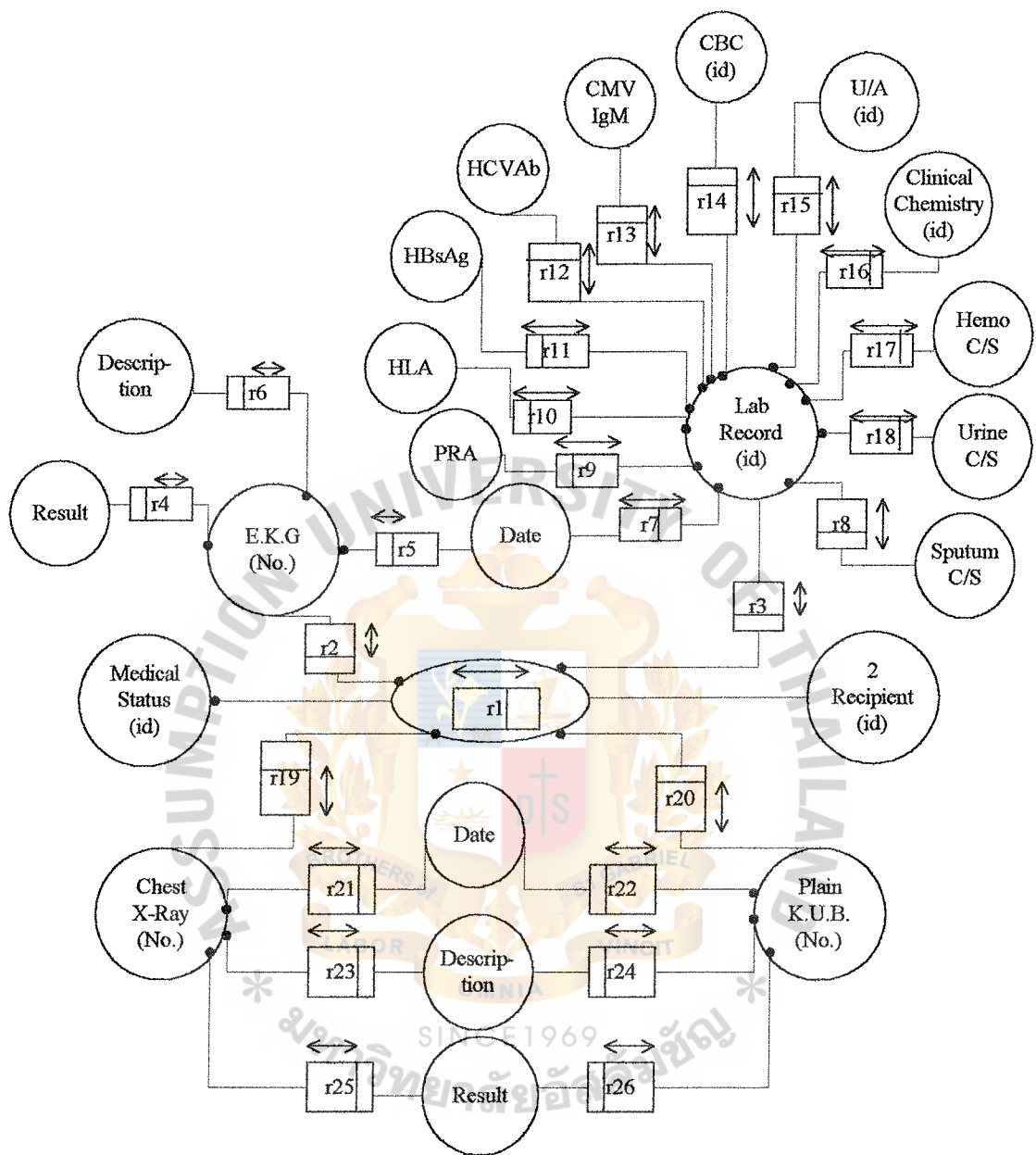
Figure D.9. A Conceptual Schema Diagram for Organ Donation System (Continued).



r1 = was issued from,  
 r2, r3, r4, r6, r7, r8, r9, r10, r13, r14, r15, r16, r17, r18 , r19, r20, r25 = has  
 r11, r12, r21, r22 = was issued on,                      r23, r24 = is described as

Figure D.10. A Conceptual Schema Diagram for Organ Donation System (Continued).





r1 = was issued from,  
 r2, r3, r4, r8, r9, r10, r11, r12, r13, r14, r15, r16, r17, r18, r19, r20, r25, r26 = has  
 r5, r7, r21, r22 = was issued on,                      r6, r23, r24 = is described as

Figure D.11. A Conceptual Schema Diagram for Organ Donation System (Continued).

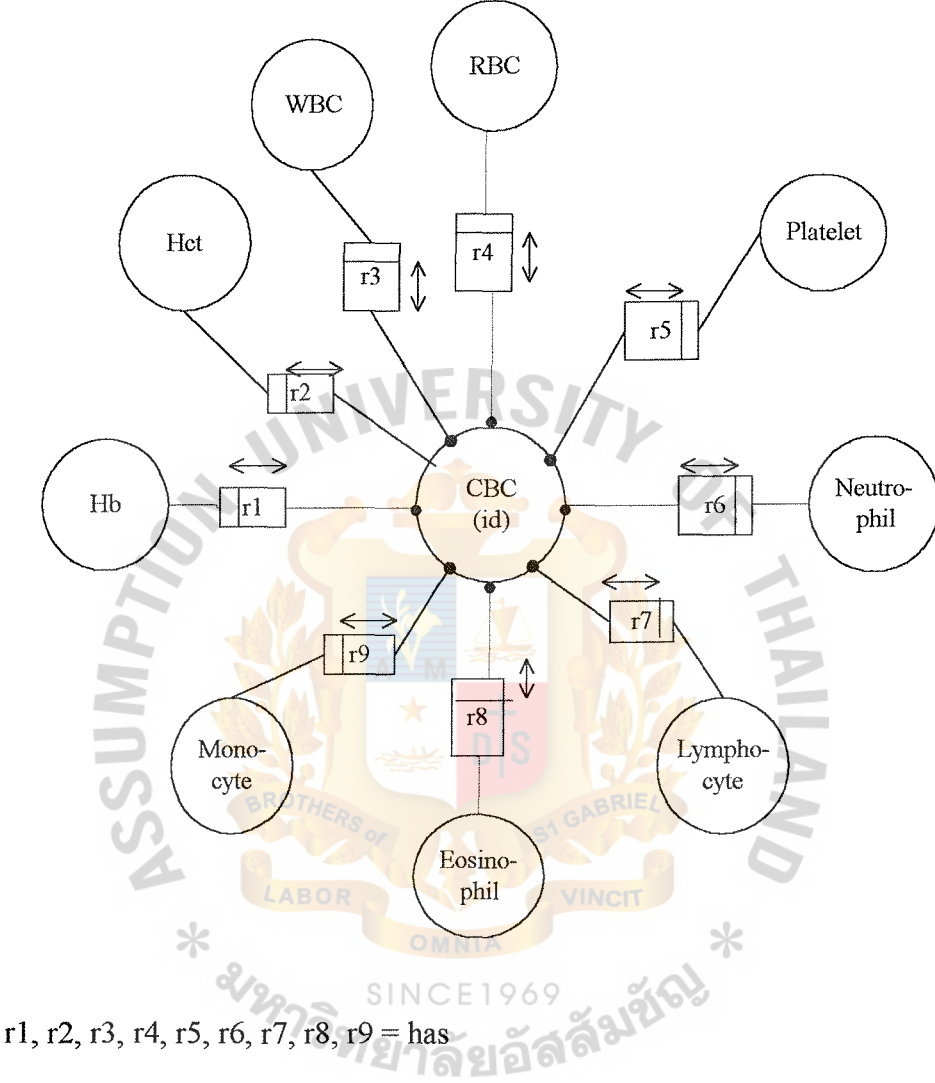
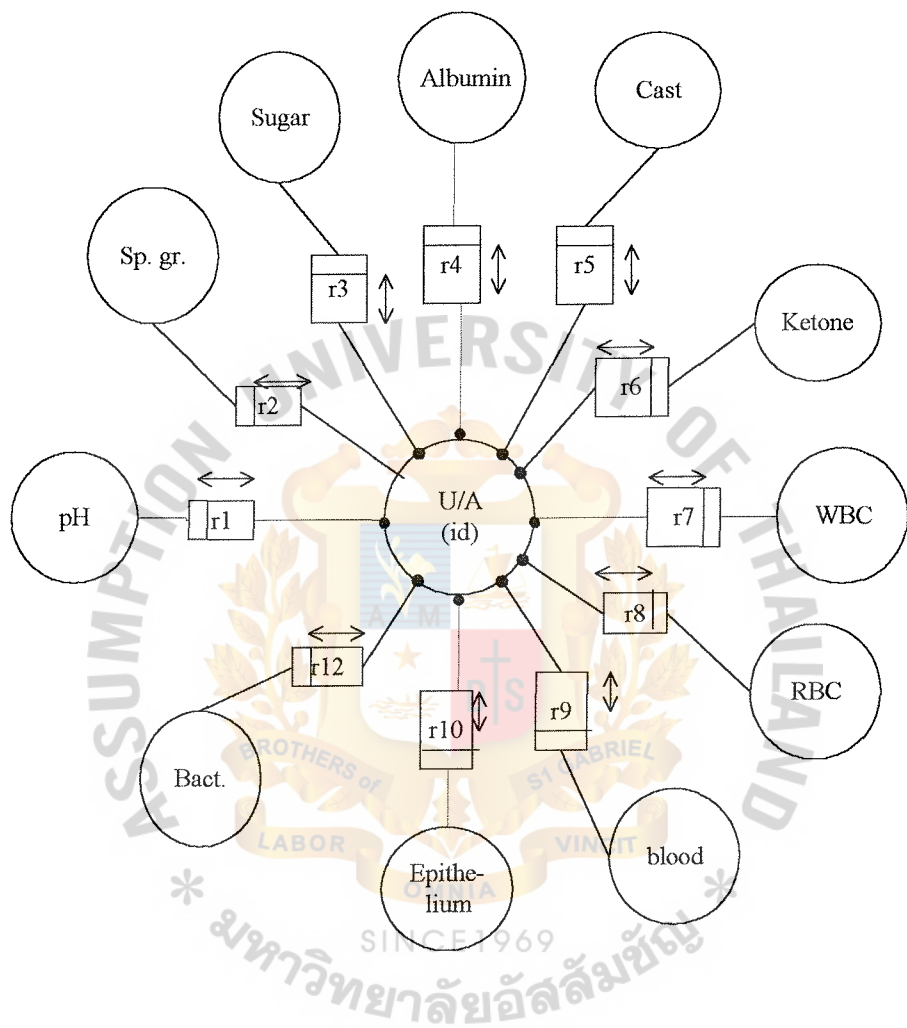
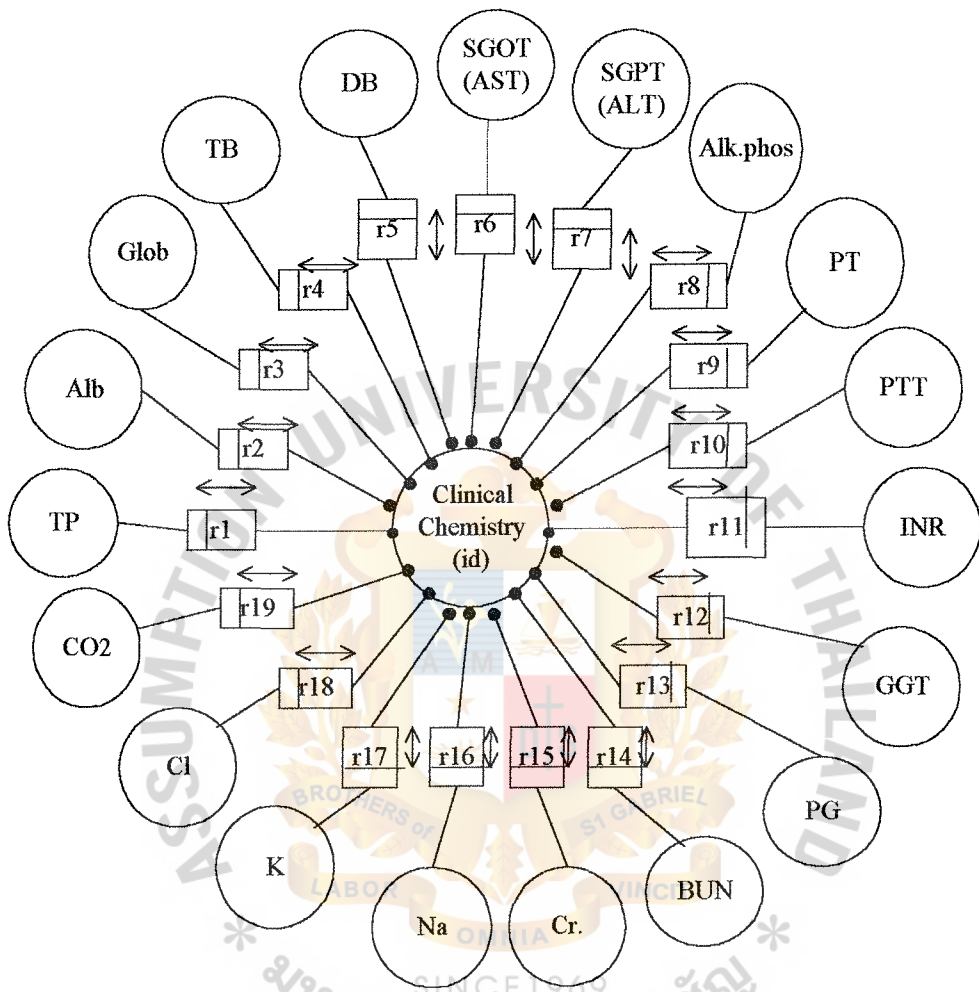


Figure D.12. A Conceptual Schema Diagram for Table CBC.



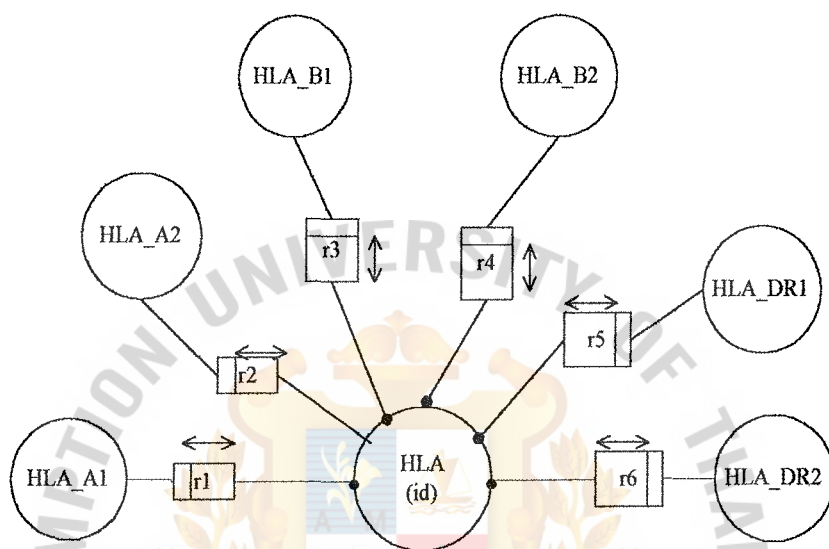
r1, r2, r3, r4, r5, r6, r7, r8, r9, r10, r12 = has

Figure D.13. A Conceptual Schema Diagram for Table Urine Analysis (U/A).



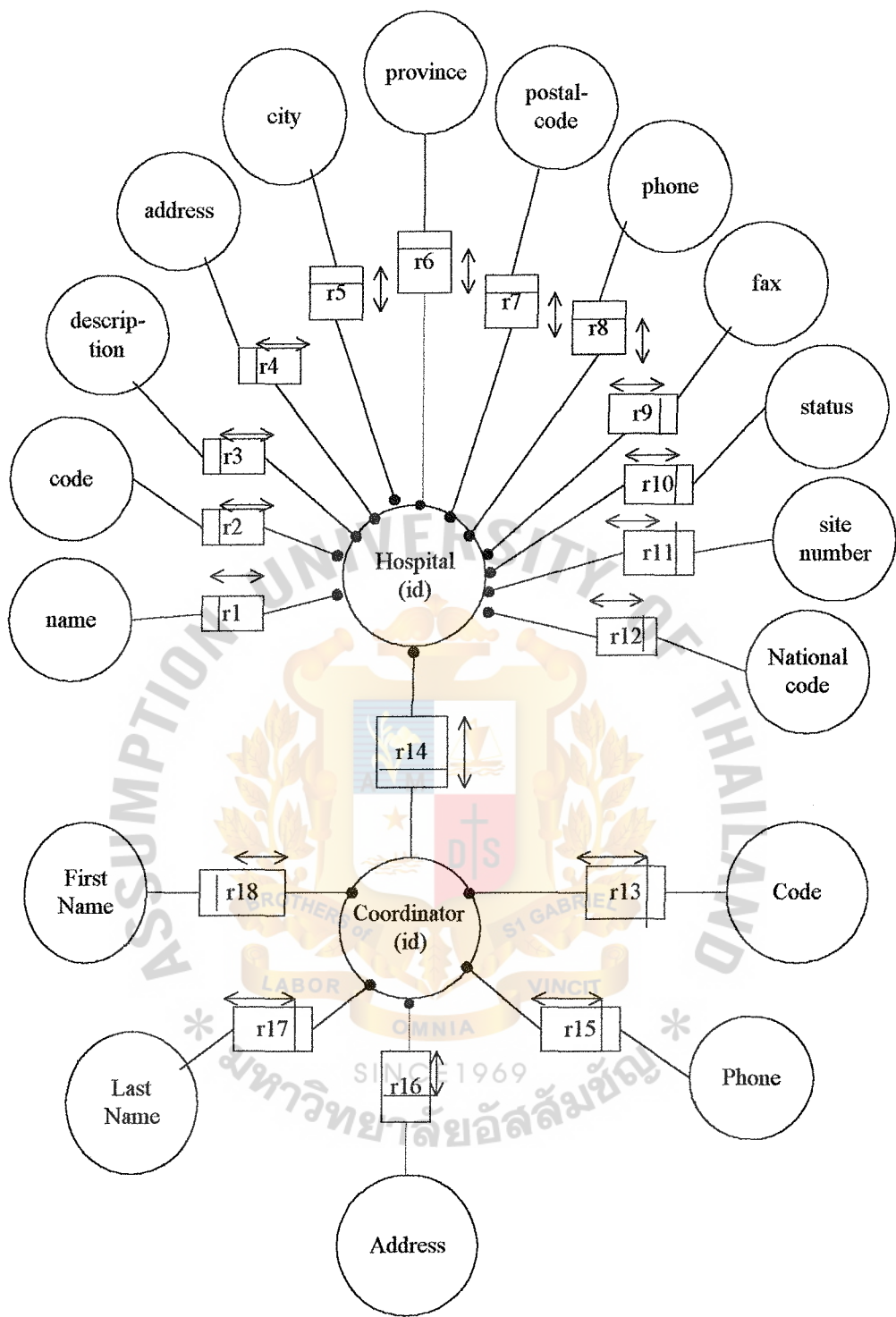
r1, r2, r3, r4, r5, r6, r7, r8, r9 , r10, r11, r12, r13, r14, r15, r16, r17, r18, r19 = has

Figure D.14. A Conceptual Schema Diagram for Table Clinical Chemistry.



r1, r2, r3, r4, r5, r6 = has

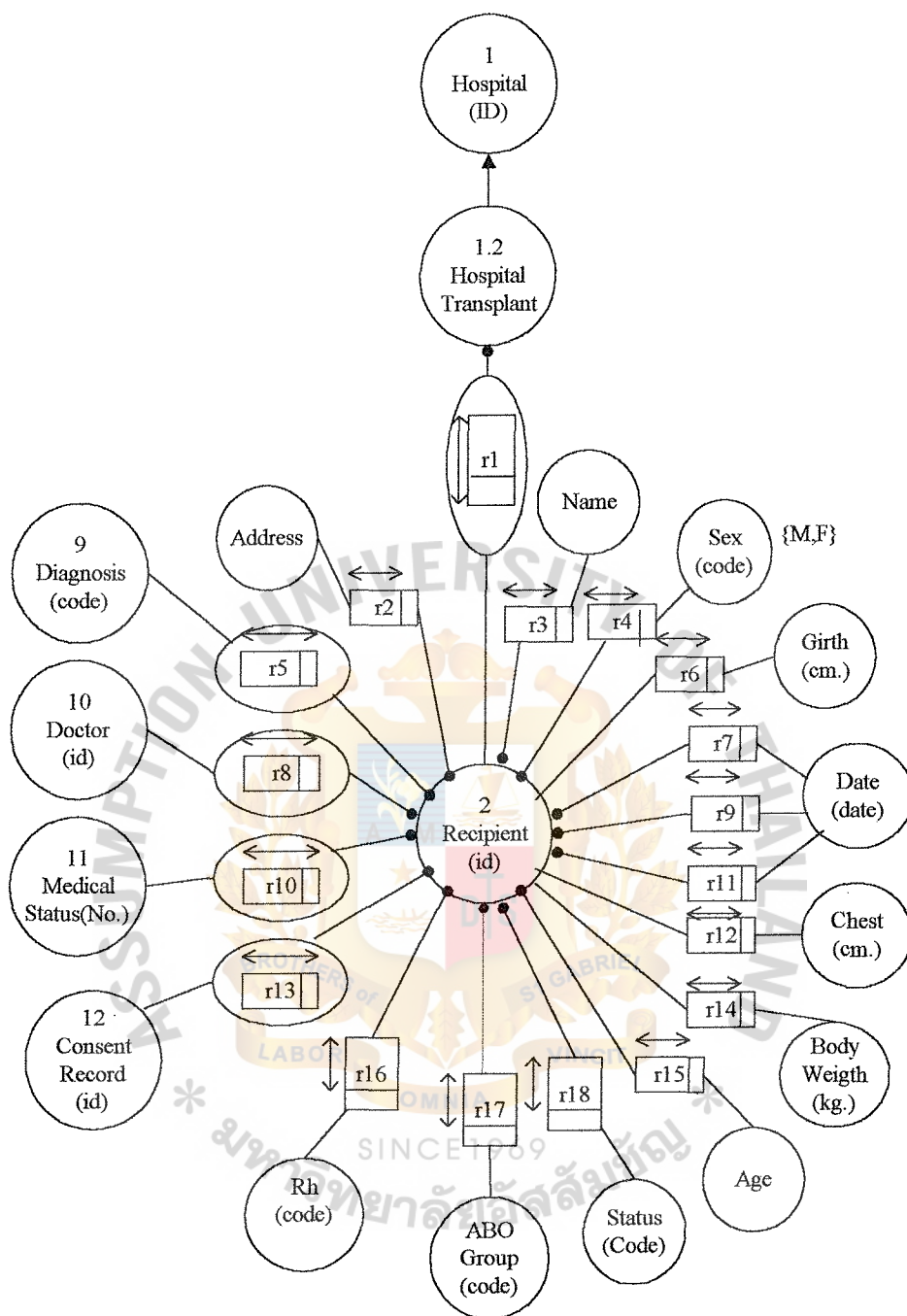
Figure D.15. A Conceptual Schema Diagram for Table HLA.



r1, r2, r7, r10, r12, r13, r15, r16, r17, r18 = has, r3 = is described as  
r4, r5, r6 = lives in, r8, r9 = may be contact on, r11 = is located at

Figure D.16. A Conceptual Schema Diagram for Organ Donation System (Continued).





r1, r3, r5, r8, r10, r13, r14, r16, r17, r18 = has  
 r2 = is located at, r4 = is of, r6, r12 = has size, r7 = was born on  
 r8 = is treated by, r9 = admission on, r11 = death on

Figure D.17. A Conceptual Schema Diagram for Organ Donation System (Continued).

Table D.1.1. Structure of Blood Gas Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	integer	Y	Y.				Primary Key
2	FiO2	numeric						Attribute
3	Ph	numeric						Attribute
4	PaCO2	numeric						Attribute
5	BE	numeric						Attribute
6	Bicarb	numeric						Attribute
7	O2 sat	integer						Attribute
9	Date	date						Attribute

Table D.2. Structure of Cadaver Donor Brain Death Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Host donor ID	integer	Y	Y		Donor		Primary Key
2	Brain Death Record ID	integer		Y				Primary Key

Table D.3. Structure of Cardiac Record Table.\*

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	integer	Y	Y				Primary Key
2	Code	Character(7)						Attribute
3	Description	Character(30)			Y			Attribute
4	Datetime	date						Attribute
5	Treatment	Character(50)			Y			Attribute

Table D.4. Structure of CBC Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	integer	Y	Y		Lab Record		Primary Key
2	Hb	numeric*						Attribute
3	Hct	numeric						Attribute
4	WBC	numeric						Attribute
5	RBC	numeric						Attribute
6	Platelet	numeric						Attribute
7	Neutrophil	numeric						Attribute
8	Lymphocyte	numeric						Attribute
9	Eosinophil	numeric						Attribute
10	Mono	numeric						Attribute
11	Date	timestamp						Attribute

Table D.5. Structure of Clinical Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	integer	Y	Y				Primary Key
2	Code	Character(10)			Y			Attribute
3	Description	Character(50)			Y			Attribute
4	Date	date						Attribute

Table D.6. Structure of Clinical Chemistry Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	integer	Y	Y		Lab Record		Primary Key
2	PG	integer			Y			Attribute
3	BUN	integer			Y			Attribute
4	Cr	integer			Y			Attribute
5	Na	integer			Y			Attribute
6	K	integer			Y			Attribute
7	Cl	integer			Y			Attribute
8	CO2	integer			Y			Attribute
9	TP	integer			Y			Attribute

Table D.6. Structure of Clinical Chemistry Table (Continued).

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
10	Albumin	integer			Y			Attribute
11	Glob	integer			Y			Attribute
12	TB	integer			Y			Attribute
13	DB	integer			Y			Attribute
14	SGOT(AST)	integer			Y			Attribute
15	SGPT(ALT)	integer			Y			Attribute
16	Alk.phos	integer			Y			Attribute
17	PT	integer			Y			Attribute
18	PTT	integer			Y			Attribute
19	INR	integer			Y			Attribute
20	GGT	integer			Y			Attribute
21	Date	Timestamp						Attribute



Table D.7. Structure of Consent Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	Integer	Y	Y				Primary Key
2	Type	character(50)						Attribute
3	Description	character(50)			Y			Attribute
4	Relate_fname	character(50)			Y			Attribute
5	Relate_lname	character(50)			Y			Attribute
6	Witness_fname	character(50)			Y			Attribute
7	Witness_lname	character(50)			Y			Attribute

Table D.8. Structure of Coordinator Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	Integer	Y	Y		Coordinator Hospital		Primary Key
2	Fname	Character(50)						Attribute
3	Lname	Character(50)						Attribute
4	Address	Character(50)						Attribute
5	Phone	Integer			Y			Attribute

Table D.9. Structure of Coordinator Hospital Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	integer	Y	Y				Primary Key
2	Coordinator ID	integer				Coordinator		Primary Key

Table D.10. Structure of CXR (Chest X-ray) Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	No.	integer	Y	Y				Primary Key
2	Desc	Character(50)			Y			Attribute
3	Date	date						Attribute
4	Result	Character(100)			Y			Attribute

Table D.11. Structure of Data Collection Form (DCF) Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	Integer	Y	Y				Primary Key
2	Date	date						Attribute

Table D.12. Structure of DCF Consent Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	DCF ID	integer		Y		DCF		Primary Key
2	Consent Record ID	integer				Consent Record		Primary Key
3	Donor ID	integer		Y		Donor		Primary Key

Table D.13. Structure of DCF Diagnosis Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	DCF ID	integer		Y		Data Collection Form		Primary Key
2	Diagnosis Code	integer				Diagnosis		Primary Key
3	Donor ID	integer		Y		Donor		Primary Key

Table D.14. Structure of DCF doctor Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	DCF ID	Integer		Y		Data Collection Form		Primary Key
2	Doctor ID	Integer				Doctor		Primary Key
3	Donor ID	Integer		Y		Donor		Primary Key

Table D.15. Structure of DCF MedStatus (Medication Status) Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	DCF ID	integer		Y		Data Collection Form		Primary Key
2	Med Status No.	integer				MedStatus		Primary Key
3	Donor ID	integer		Y		Donor		Primary Key

Table D.16. Structure of DCF Organ Qty Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	DCF ID	Integer		Y		Data Collection Form		Primary Key
2	Organ ID	Integer		Y		Organ		Primary Key
3	Qty	Smallint						Attribute

Table D.17. Structure of Donation Form (DF) Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	integer	Y	Y				Primary Key
2	Date donation	timestamp						

Table D.18. Structure of DF Consent Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Donation Form ID	Integer		Y		Donation Form		Primary Key
2	Consent Record ID	Integer		Y		Consent Record		Primary Key
3	Donor ID	Integer		Y		Donor		Primary Key

Table D.19. Structure of DF diagnosis Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Donation Form ID	integer	Y	Y		Donation Form		Primary Key
2	Doctor ID	integer				Doctor		Primary Key
3	Donor ID	integer		Y		Donor		Primary Key

Table D.20. Structure of DF doctor Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Donation Form ID	Integer		Y		Donation Form		Primary Key
2	Doctor ID	Integer				Doctor		Primary Key
3	Donor ID	Integer		Y		Donor		Primary Key



Table D.21. Structure of DF MedStatus (Medication Status) Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Donation Form ID	Integer		Y		Donation Form		Primary Key
2	Med Status No.	Integer				MedStatus		Primary Key
3	Donor ID	Integer		Y		Donor		Primary Key

Table D.22. Structure of Diagnosis Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Code	character(5)		Y				Primary Key
2	Name	character(50)						Attribute
3	Group	character(50)						Attribute



Table D.23. Structure of Diuresis Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	integer	Y	Y				Primary Key
2	Lasthour	integer			Y			Attribute
3	last 8 hours	integer			Y			Attribute
4	Last 24 hours	integer			Y			Attribute
5	Oliguria	integer			Y			Attribute
6	Anuria	integer			Y			Attribute
7	CVP	integer			Y			Attribute

Table D.24. Structure of Doctor Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Doctor ID	integer		Y				Primary Key
2	Name	character(100)			Y			Attribute
3	Special	character(50)			Y			Attribute

Table D.25. Structure of Donor Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Host Donor ID	Integer	Y	Y				Primary Key
2	Name	character(50)						Attribute
3	Birth date	Date						Attribute
4	Age	Integer						Attribute
5	Girth	Integer						Attribute
6	Chest	Integer						Attribute
7	Salutation	character(50)						Attribute
8	date admission	Date						Attribute
9	Date propose donor operation	Date						Attribute
10	Living Donor	Character(2)						Attribute
11	Cadaver Donor	Character(2)						Attribute

Table D.26. Structure of EKG Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	No.	integer		Y				Primary Key
2	Description	character(50)						Attribute
3	Date	date						Attribute
4	Result	character(100)			Y			Attribute

Table D.27. Structure of Graft Status Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Code	Character(3)						Primary Key
2	Date	Date						Attribute
3	Cause	Character(3)						Attribute

Table D.28. Structure of HLA Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	integer	Y	Y				Primary Key
2	HLA_A1	character(5)						Attribute
3	HLA_A2	character(5)						Attribute
4	HLA_B1	character(5)						Attribute
5	HLA_B2	character(5)						Attribute
6	HLA_DR1	character(5)						Attribute
7	HLA_DR2	character(5)						Attribute
8	Date	timestamp						Attribute

Table D.29. Structure of Hospital Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	Integer	Y	Y				Primary Key
2	Name	Character(50)						Attribute
3	Code	Character(10)						Attribute
4	Description	Character(50)			Y			Attribute
5	Address	Character(100)						Attribute
6	City	Character(50)						Attribute
7	Province	Character(50)						Attribute
8	Postal Code	Integer						Attribute
9	Phone	Integer			Y			Attribute
10	Fax	Integer			Y			Attribute
11	Status	Character(10)						Attribute
12	Site No.	Integer						Attribute
13	National Code	Character(10)						Attribute
14	Hospital Donor	Character(50)				Hospital Donor		Attribute
15	Hospital Transaction	Character(50)						Attribute

Table D.30. Structure of Hospital Donor Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Host Donor ID	integer	Y	Y		Donor		Primary Key
2	Living Donor	integer						Attribute
3	Cadaver Donor	integer						Attribute
4	Hospital ID	integer		Y		Hospital		Primary Key
5	DCF ID	integer		Y		Data Collection Form		Attribute
6	Donation Form ID	integer		Y		Donation Form		Attribute

Table D.31. Structure of Hospital Recipient Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Recipient ID	Integer		Y		Recipient		Primary Key
2	Hospital ID	Integer		Y		Hospital		Primary Key
3	Request Form ID	Integer		Y		Request Form		Attribute
4	TCR ID	Integer		Y		TCR		Attribute
5	DCF ID	Integer		Y		DCF		Attribute



Table D.32. Structure of Hypotention Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	Integer	Y	Y				Primary Key
2	Description	character(50)						Attribute
3	BP record	character(7)						Attribute
4	Date	Date						Attribute
5	Code	character(7)						Attribute
6	Inotropic drug record ID	Integer				Inotropic drug record		Attribute

Table D.33. Structure of Inotropic Drug Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	integer						Primary Key
2	Code	character(50)						Attribute
3	Treatment	character(50)						Attribute
4	Rate	integer						Attribute
5	Datetime	date						Attribute

Table D.34. Structure of Lab Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Id	Integer	Y	Y				Primary Key
2	HIVAb	Integer						Attribute
3	HbsAg	Integer						Attribute
4	HCVAb	Integer						Attribute
5	CMVlgM	Integer						Attribute
6	CBC ID	Integer				CBC		Attribute
7	U/A ID	Integer			Y	U/A		Attribute
9	ClinicalChem ID	Integer			Y	Clinical Chemistry		Attribute
10	HemoC/S ID	Integer			Y	Hemo C/S		Attribute
11	UrineC/S ID	Integer			Y	Urine C/S		Attribute
12	SputumC/S ID	Integer			Y	Sputum C/S		Attribute
13	Date	Date			Y			Attribute
14	HLA ID	Integer				HLA		Attribute
15	PRA ID	Integer				PRA		Attribute

Table D.35. Structure of Match Run Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Orderlist ID	integer	Y	Y				Primary Key
2	Hospital donor ID	integer				Hospital Donor		Attribute
3	RecipientID	integer				Recipient		Attribute
4	Hospital RecipientID	integer				Hospital Recipient		Attribute
5	Date	timestamp						Attribute
6	Point	integer						Attribute
7	Donor ID	integer				Donor		Attribute

Table D.36. Structure of Medical Status Blood Gas Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	No.	integer						Primary Key
2	Donor ID	integer		Y		Donor		Primary Key
3	Blood Gas Record ID	integer				Blood Gas Record		Primary Key

Table D.37. Structure of Medical Status Cardiac Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	No.	integer						Primary Key
2	Donor ID	integer		Y		Donor		Primary Key
3	Cardiac Record ID	integer				Cardiac Record		Primary Key

Table D.38. Structure of Medical Status Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	No.	integer						Primary Key
2	Donor ID	integer		Y		Donor		Primary Key
3	History Med comment	integer						Primary Key

Table D.39. Structure of Medical Status CXR Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	No.	integer						Primary Key
2	Donor ID	integer		Y		Donor		Primary Key
3	CXR No.	integer				CXR		Primary Key

Table D.40. Structure of Medical Status Diuresis Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	No.	integer						Primary Key
2	Donor ID	integer		Y		Donor		Primary Key
3	Diuresis Record ID	integer				Diuresis Record		Primary Key

Table D.41. Structure of Medical Status EKG Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	No.	integer						Primary Key
2	Donor ID	integer		Y		Donor		Primary Key
3	EKG No.	integer				EKG		Primary Key

Table D.42. Structure of Medical Status Hypotension Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	No.	integer						Primary Key
2	Donor ID	integer		Y		Donor		Primary Key
3	Hypotension ID	integer				Hypotension		Primary Key



Table D.43. Structure of Medical Status Lab Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	No.	integer						Primary Key
2	Donor ID	integer		Y		Donor		Primary Key
3	Lab Record ID	integer				Lab Record		Primary Key

Table D.44. Structure of Medical Status Past History Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	No.	integer						Primary Key
2	Donor ID	integer		Y		Donor		Primary Key
3	Past History Record ID	integer				Past History Record		Primary Key

Table D.45. Structure of Medical Status Plain KUB Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	No.	integer						Primary Key
2	Donor ID	integer		Y		Donor		Primary Key
3	Plain KUB No.	integer				Plain KUB		Primary Key



Table D.46. Structure of Medical Status Recent Surgery Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	No.	integer						Primary Key
2	Donor ID	integer		Y		Donor		Primary Key
3	Recent Surgery Record ID	integer				Recent Surgery Record		Primary Key

Table D.47. Structure of MedicalStatus RespiratoryStatus Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	No.	integer						Primary Key
2	Donor ID	integer		Y		Donor		Primary Key
3	Respiratory Status Record ID	integer				Respiratory Status Record		Primary Key

Table D.48. Structure of Medical Status Treatment Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	No.	integer						Primary Key
2	Donor ID	integer		Y		Donor		Primary Key
3	Treatment Record ID	integer				Treatment Record		Primary Key

Table D.49. Structure of Medical Status V/S Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	No.	integer						Primary Key
2	Donor ID	integer		Y		Donor		Primary Key
3	V/S Record ID	integer				V/S Record		Primary Key

Table D.50. Structure of Organ Donated Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Donation Form (ID)	integer		Y		Donation		Primary Key
2	Organ (ID)	integer		Y		Organ		Primary Key
3	Qty	smallint						Attribute

Table D.51. Structure of Past Surgery Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	Integer		Y				Primary Key
2	Description	Character(50)			Y			Attribute
3	Datetime	Date						Attribute

Table D.52. Structure of Past Surgery Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Code	Integer		Y				Primary Key
2	Cause of death	Character(3)						Attribute
3	Description	Character(50)			Y			Attribute
4	Date of hospital report	date						Attribute
5	Date of death	date			Y			Attribute

Table D.53. Structure of Plain KUB Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	No.	Integer		Y				Primary Key
2	Description	Character(10)			Y			Attribute
3	Date	Date						Attribute

Table D.54. Structure of Post Transplant Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Recipient ID	integer		Y		Recipient		Primary Key
2	Post Transplant Record ID	integer						Primary Key

Table D.55. Structure of Post Transplant Clinical Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Record ID	Integer		Y				Primary Key
2	Post Transplant Record ID	Integer		Y		Post Transplant Record		Primary Key
3	Clinical Record ID	Integer		Y		Clinical Record		Primary Key

Table D.56. Structure of Post Transplant Follow up (F/U) Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Recipient ID	Integer		Y		Recipient		Primary Key
2	Post Transplant ID	Integer		Y		Post Transplant		Primary Key
3	F/U Transplant Record ID	Integer		Y				Primary Key

Table D.57. Structure of Post Transplant Graft Status Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Record ID	Integer		Y				Primary Key
2	Post Transplant ID	Integer		Y		Post Transplant Record		Primary Key
3	Graft Status Code	Character(10)						Attribute

Table D.58. Structure of Post Transplant Status Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Post Transplant ID	Integer						Primary Key
2	Transplant Status(Code)	Integer				Transplant Status		Primary Key
3	Recipient ID	Integer				Recipient		Primary Key
4	Date	Date						Attribute



Table D.59. Structure of Recipient Respiratory Status Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	integer	Y	Y				Primary Key
2	Code	character(1)						Attribute
3	Description	character(50)			Y			Attribute
4	Type	character(50)			Y			Attribute
5	FiO2	integer			Y			Attribute
6	TV	integer			Y			Attribute
7	Rate	integer			Y			Attribute
8	Mode	character(50)			Y			Attribute
9	Date	date			Y			Attribute

Table D.60. Structure of Recent Surgery Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	Integer		Y				Primary Key
2	Description	Character(50)			Y			Attribute
3	Datetime	Date						Attribute



Table D.61. Structure of Request Form Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Request Form ID	Integer	Y	Y				Primary Key
2	Consent Record ID	Integer		Y		Consent Record		Primary Key
3	Recipient ID	Integer		Y		Recipient		Primary Key

Table D.62. Structure of Request Form Diagnosis Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Request Form ID	Integer		Y				Primary Key
2	Diagnosis Code	Character(3)				Diagnosis		Primary Key
3	Recipient ID	Integer				Recipient		Primary Key

Table D.63. Structure of Request Form Doctor Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Request Form ID	Integer		Y		Request Form		Primary Key
2	Doctor ID	Integer				Doctor		Primary Key
3	Recipient ID	Integer				Recipient		Primary Key

Table D.64. Structure of Request Form MedStatus Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Request Form ID	Integer		Y		Request Form		Primary Key
2	Med Status ID	Integer		Y		MedStatus		Primary Key
3	Recipient ID	Integer		Y		Recipient		Primary Key

Table D.65. Structure of Request Form Organ Qty Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	Request Form ID	Integer		Y		Request Form		Primary Key
2	Organ ID	Integer				Organ		Primary Key
3	Qty	Smallint						Attribute

Table D.66. Structure of TCR (Transplant Candidate Recipient) Form Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	Integer		Y				Primary Key
2	Date	Date						Attribute

Table D.67. Structure of TCR Consent Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	TCR ID	Integer		Y		TCR		Primary Key
2	Consent Record ID	Integer				Consent Record		Primary Key
3	Recipient ID	Integer		Y		Recipient		Primary Key

Table D.68. Structure of TCR Diagnosis Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	TCR ID	Integer				TCR		Primary Key
2	Diagnosis Code	Integer				Diagnosis		Attribute
3	Recipient ID	Integer				Recipient		Primary Key

Table D.69. Structure of TCR Doctor Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	TCR ID	Integer		Y		TCR		Primary Key
2	Doctor ID	Integer		Y		Doctor		Primary Key
3	Recipient ID	Integer		Y		Recipient		Primary Key

Table D.70. Structure of TCR MedStatus Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	TCR ID	Integer		Y		TCR		Primary Key
2	Med Status ID	Integer				MedStatus		Primary Key
3	Recipient ID	Integer		Y		Recipient		Primary Key

Table D.71. Structure of TCR Organ Qty Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	TCR ID	Integer				TCR		Primary Key
2	Organ ID	Integer		Y		Organ		Primary Key
3	Qty	Smallint						Attribute

Table D.72. Structure of Treat Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	Integer		Y				Primary Key
2	IV Fluid	Character(50)			Y			Attribute
3	Antibiotic	Character(50)			Y			Attribute
4	Steroid name	Character(50)			Y			Attribute

Table D.73. Structure of U/A (Urine Analysis) Table.

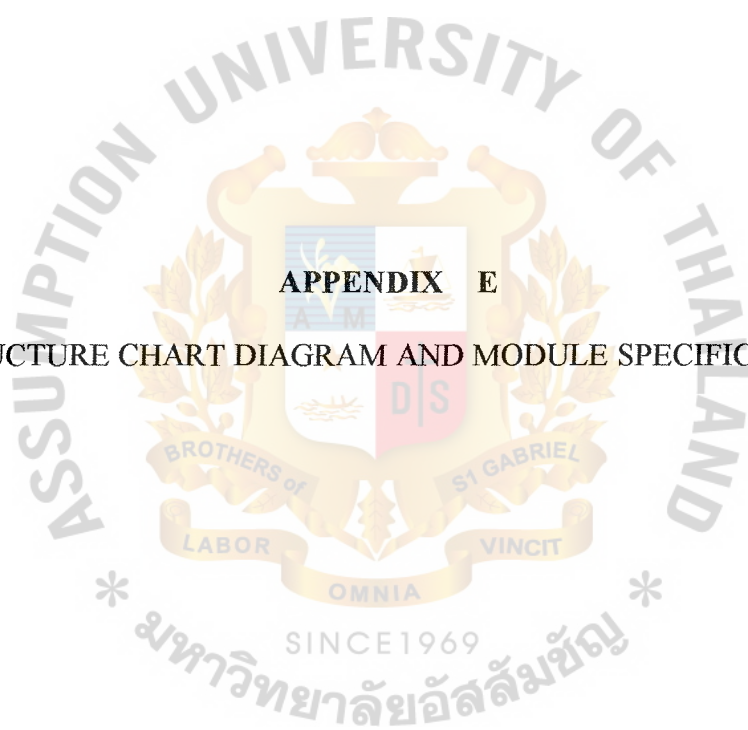
No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	Integer						Primary Key
2	PH	Numeric						Attribute
3	Sp-gr	Numeric						Attribute
4	Sugar	Character(8)						Attribute
5	Alb.	Character(8)						Attribute
6	Ketone	Character(8)						Attribute
7	WBC	Integer						Attribute
8	RBC	Integer						Attribute
9	Epi	Integer						Attribute
10	Bact	character(8)						Attribute
11	Cast	character(8)						Attribute
12	Blood	Integer						Attribute



Table D.74. Structure of V/S (Vital Signs) Record Table.

No.	Field Name	Field Type	Index	Unique	Nullable	References to table	Check	Key Type
1	ID	Integer						Primary Key
2	BT	Numeric						Attribute
3	BP	character(7)						Attribute
4	PR	Integer						Attribute
5	Med name	character(30)			Y			Attribute
6	Date	Date						Attribute
7	Note	character(100)			Y			Attribute

**APPENDIX E**  
**STRUCTURE CHART DIAGRAM AND MODULE SPECIFICATION**





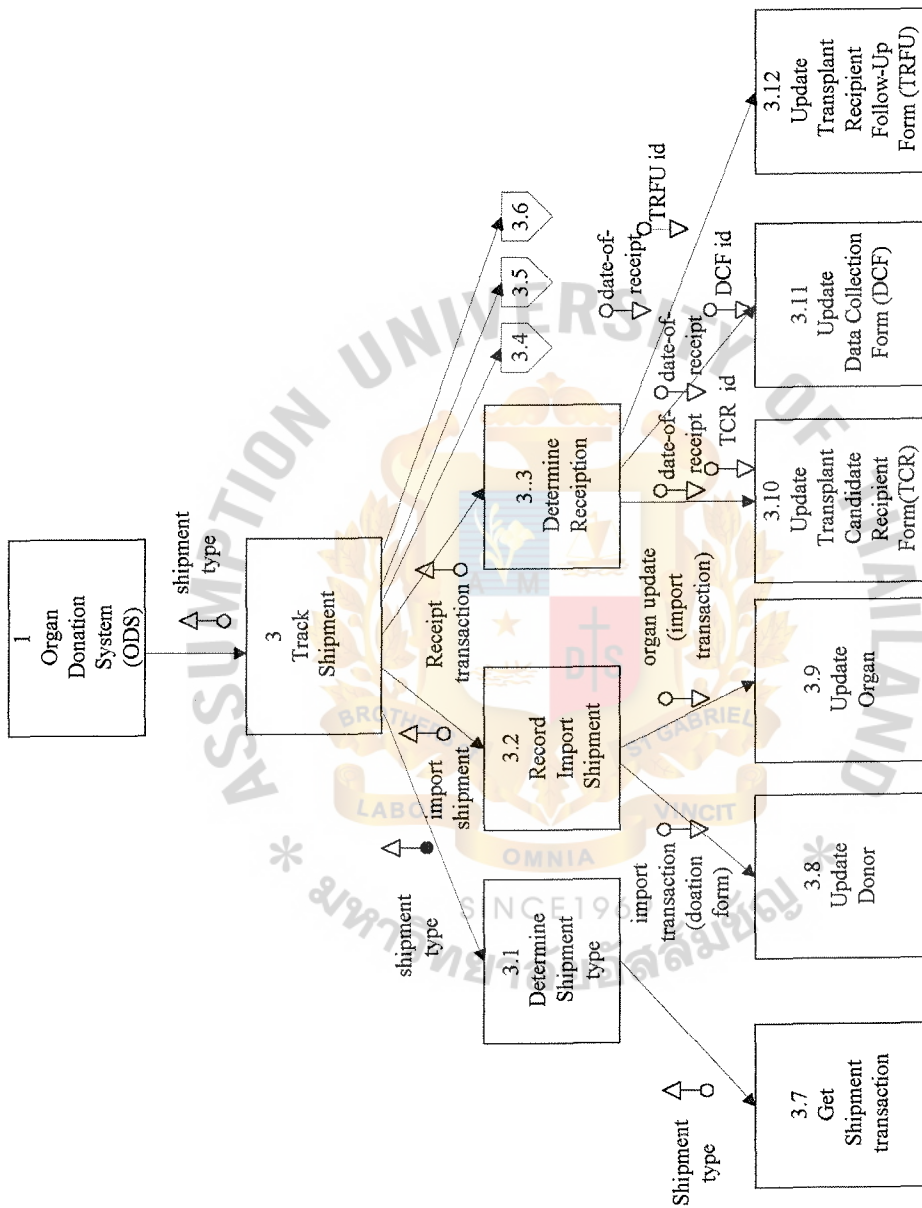


Figure E.2. Structure Chart of Organ Donation System (Continued).

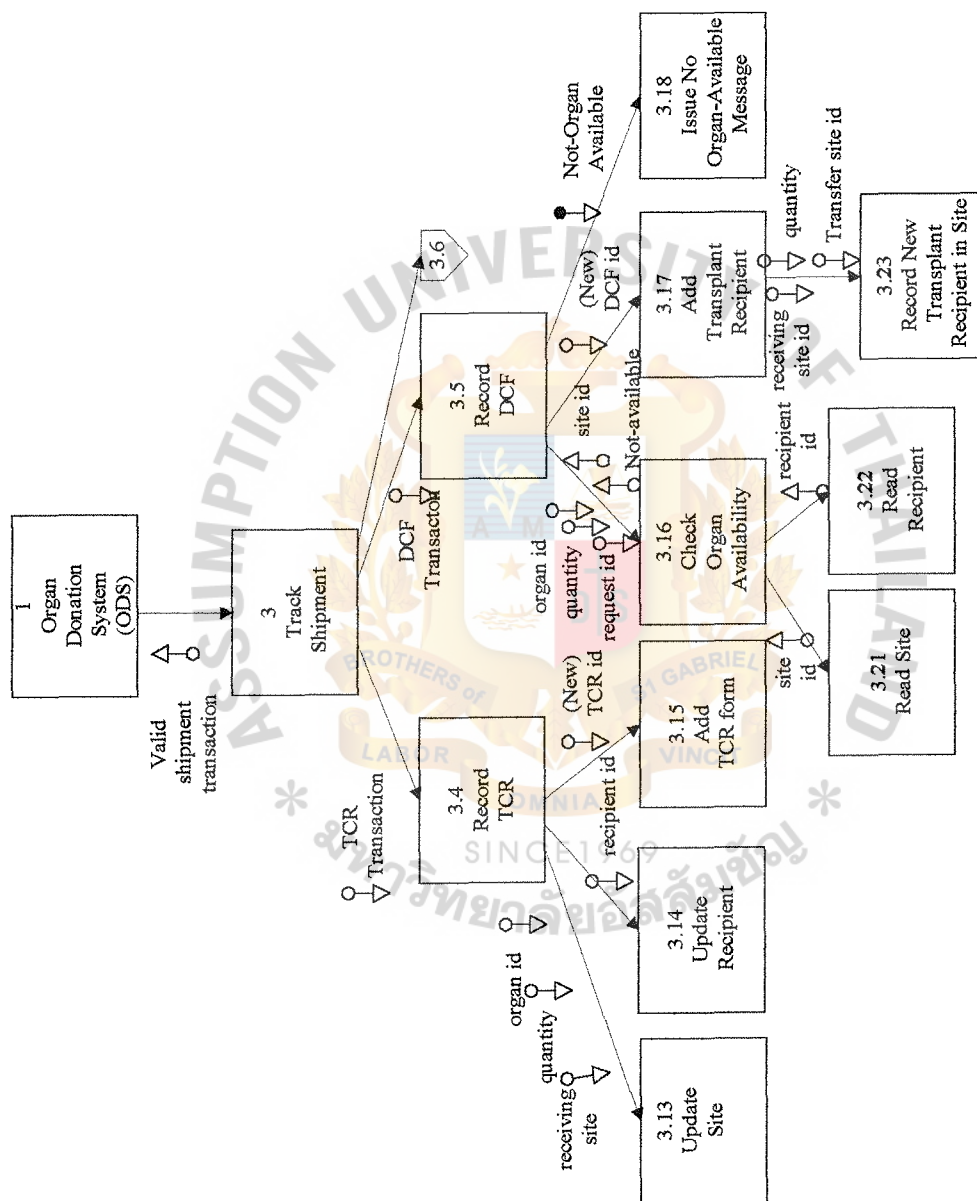


Figure E.3. Structure Chart of Organ Donation System (Continued).

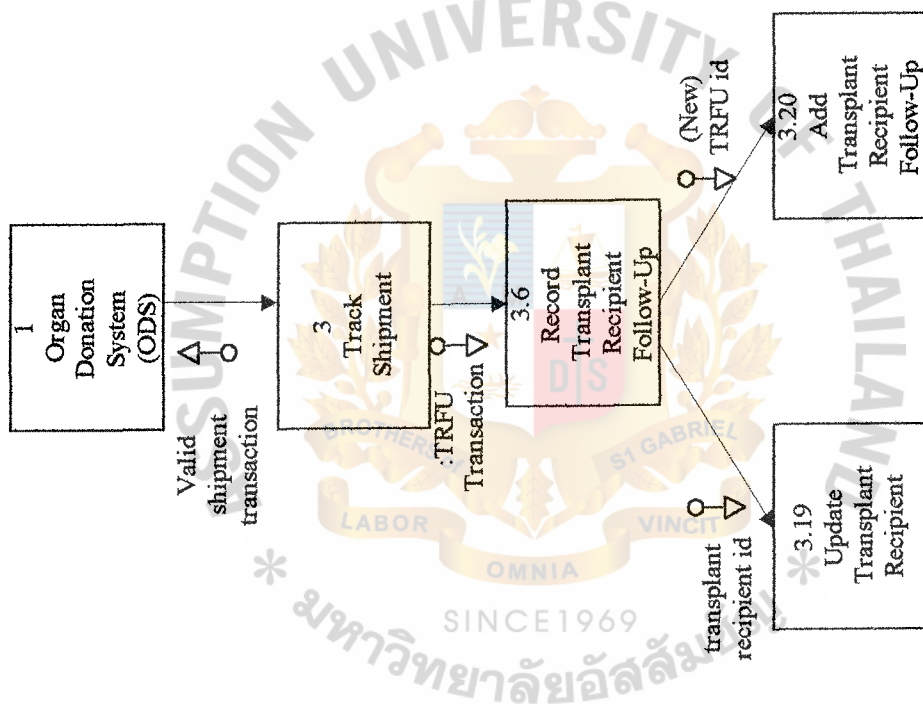


Figure E.4. Structure Chart of Organ Donation System (Continued).



## MODULE SPECIFICATION

Organ Donation System (M.1)

Module

**Module Description:** A set of computer-based instructions which compares data on a cadaver organ donor with data on transplant candidates on the ODS list and ranks the candidates according to ODS policies to determine the priority for allocating the donor organ(s).

**Location:**

Structure Chart

Calls: Record Inventory Change (Module)

Passed Couples:

Transaction (Data Couple)

Returned Couples:

Valid Transaction (Data Couple)

Calls: Track shipments

Passed Couples:

Shipment Transaction (Data Couple)

Returned Couples:

Valid Shipment Transaction (Data Couple)

Record Inventory Change (M.2)

Module

**Module Description:**

Determine Transaction Type

If Transaction is a hospital Membership

Update Sites to show site available and Assign site-ID

If Transaction is a Donor Donation

Update Donor to show donor available

Create donation and Assign Donation-ID, Donor-ID, and Organ-ID

Otherwise

Report unknown transaction

Location:

Structure Chart

Calls: Determine Transaction (Module)

Pass Couples:

ODS Transaction (Data Couple)

Return Couples:

Not-a-good transaction (Data Couple)

Calls: Report unknown Transaction (Module)

Pass Couples: Unknown-Transaction

Determine Transaction (M.2.1)

Module

Location:

Structure Chart

Calls: Get transaction (Module)

Pass Couples:

ODS Transaction

Return Couples:

Transaction type (Data Couple)

Calls: Update Hospital Transplant Membership (Module)

Pass Couples:

Site Transaction (Data Couple)

Returns Couples: (None)

Calls: Update Donor (Module)

Pass Couples:

Donation Form (Data Couple)

Return Couples: (None)

Calls: Update Organ (Module)

Pass Couples:

Donation Form (Organ detail) (Data Couple)

Return Couple: (None)

Report Unknown Transaction (M.2.2)

Module

Location:

Structure Chart

Calls: (None)

Pass Couples:

Return Couples:

Invalid Transaction (Data Couple)

Get ODS Transaction (M2.3)

Module

Location:

Structure Chart

Calls: (None)

Pass Couples:

ODS Transaction (Data Couple)

Return Couples:

Transaction Type (Data Couple)

## Update Hospital Transplant Membership (M.2.4)

Module

Location:

Structure Chart (Module)

Calls: Add New site

Pass Couples:

New site (Data Couple)

Return Couples: (None)

Calls: Delete Closed Site (Module)

Passed Couples:

Site ID (Data Couple)

Return Couples: (None)

## Update Donor (M.2.5.)

Module

Location:

Structure Chart

Calls: Add New Donor (Module)

Pass Couples:

New Donor (Data Couple)

Return Couples: (None)

Calls: Delete Donor (Module)

Pass Couples:

Donor ID (Data Couple)

Return Couples: (None)

## Update Organ (M.2.6.)

Module

Location:

Structure Chart

Calls: Add New Organ (Module)

Pass Couples:

New organ (Data Couple)

Return Couples: (None)

Calls: Delete Organ (Module)

Pass Couples:

Organ ID (Data Couple)

Return Couples: (None)

Track Shipment (M 3.)

Module

Calls: Determine Shipment type (Module)

Pass Couples:

ODS shipment (Data Couple)

Return Couples:

Shipment Type (Data Couple)

Calls: Record Import Shipment (Module)

Pass Couples:

ODS Import Shipment (Data Couple)

Return Couples: (None)

Calls: Determine Receipt Type (Module)

Pass Couples:

ODS Receipt Transaction (Data Couple)

Returns: (None)

Calls: Record Transplant Candidate Recipient Form (Module)

Pass Couples:

## Transplant Candidate Recipient Form ID

Return Couples: (None)

Calls: Record Data Collection Form ID (Module)

Pass Couples:

Data Collection Form (Data Couple)

Return Couple: (None)

Calls: Record Transplant Recipient Follow up Form (Module)

Pass Couples:

Transplant Recipient Follow up Form (Data Couple)

Return Couples: (None)

Determine Shipment Type (M.3.1)

Module

Module Description:

Get Shipment Transaction

Determine Shipment Type

Location:

Structure Chart

Calls: Get Shipment Transaction (Module, M 3.7.)

Pass Couples:

ODS Shipment Transaction (Data Couple)

Return Couples:

ODS Shipment Type (Data Couple)

Record Import Shipment (M3.2)

Module

Module Description:

If Shipment is a import shipment

Update donor to show new quantity-available



At donation-site

Update organs to show correct site-amount

For donation-site

Create Donation in Donations.

Record Date-of –donation in Donations.

Location:

Structure Chart

Calls: Update Donor (Module, M.3.8.)

Pass Couples:

Donor ID (Data Couple)

Donation Form ID (Data Couple)

Return Couples: (None)

Calls: Update Organ (Module, M.3.9)

Pass Couples:

Donation Form ID (Data Couple)

Organ ID (Data Couple)

Return Couples: (None)

Determine Receipt Type (M3.3)

Module

Module Description:

Determine Receipt Type

If Receipt is a Transplant Candidate Recipient Form

Record Date-of-receipt in Transplant Candidate Recipient Forms

If Receipt is a Data Collection Form

Record Date-of-receipt in Data Collection Forms

If Receipt is a Transplant Recipient Follow-up Form

## Record Date-of-receipt in Transplant Recipient Follow-up Forms

Location:

Structure Chart

Calls: Update TCRF (Module, M.3.10)

Pass Couples:

Receipt Transaction ID (Data Couple)

Date of receipt (Data Couple)

Return Couples:

TCRF ID (Data Couple)

Calls: Update DCF (Module, M.3.11)

Pass Couples:

DCF ID (Data Couple)

Date of Receipt (Data Couple)

Return Couples:

DCF ID (Data Couple)

Calls: Update Transplant Recipient Follow up (Module, M.3.12)

Passed Couples:

Transplant Recipient Follow up ID (Data Couple)

Date of Receipt (Data Couple)

Return Couples:

Transplant Recipient Follow up ID (Data Couple)

Record Transplant Candidate Recipient Form (M3.8)

Module

Module Description:

If Receipt is a TCR

Update Sites to show site available and Assign site-ID

Update Recipient to show recipient available

Create TCR and Assign TCR-ID

Location:

Structure Chart

Calls: Update Site, Update Recipient (Module, M.3.13, M.3.14)

Pass Couples:

Organ ID (Data Couple)

Quantity (Data Couple)

Receiving-site-ID (Data Couple)

Recipient-ID (Data Couple)

Return Couples:

TCR ID (Data Couple)

Calls: Add TCR (Module, M.3.15)

Pass Couples:

TCR ID (Data Couple)

Return Couples: (None)

Record Data Collection Form (M3.5)

Module

Module Description:

Check Organ Availability

If organ is available

Create Data Collection Form and Assign Data Collection Form-ID

Otherwise

Issue no organ available message

Location:

Structure Chart

Calls: Check Organ Availability (Module, M3.16)

Pass Couples:

Organ ID (Data Couple)

Quantity (Data Couple)

Requested ID (Data Couple)

Return Couples:

Site ID (Data Couple)

Not available (Data Couple)

Calls: Add Transplant Recipient (Module, M.3.17)

Pass Couples:

Hospital Transplant ID (Data Couple)

Quantity (Data Couple)

Organ ID (Data Couple)

Hospital Donor ID (Data Couple)

Return Couples: (None)

Calls: issue no organ available message (Module, M.3.18)

Pass Couples:

Not Available (Data Couple)

Return Couples: (None)

Record Transplant Recipient Follow up (M.3.6)

Module

Module Description:

If Receipt is a TRFU

Update Transplant Recipient to show Transplant available

Create TRFU and Assign TRFU-ID

Location:

## Structure Chart

Calls: Update Transplant Recipient (Module M3.19)

Pass Couple:

Hospital Transplant ID (Data Couple)

Recipient ID (Data Couple)

Organ ID (Data Couple)

Return Couples: (None)

Calls: Add Transplant Follow up (Module, M.3.20)

Pass Couples:

Hospital Recipient ID (Data Couple)

Recipient ID (Data Couple)

Organ ID (Data Couple)

Return Couples:

Transplant Follow up ID (Data Couple)

Check Organ Availability (M3.16)

Module

Calls: Read site (Module, M3.21)

Pass Couples:

Site ID (Data Couple)

Return Couples:

Site ID (Data Couple)

Calls: Read Recipient (Module, M.3.22)

Pass Couple:

Recipient ID (Data Couple)

Return Couple:

Recipient ID (Data Couple)

## Add Transplant Recipient (M3.17)

Module

Calls: New Transplant In sites (Module, M3.23)

Pass Couples:

Hospital Transplant (Data Couple)

Quantity (Data Couple)

Hospital Donor ID (Data Couple)

Return Couples:

Hospital Transplant ID (Data Couple)







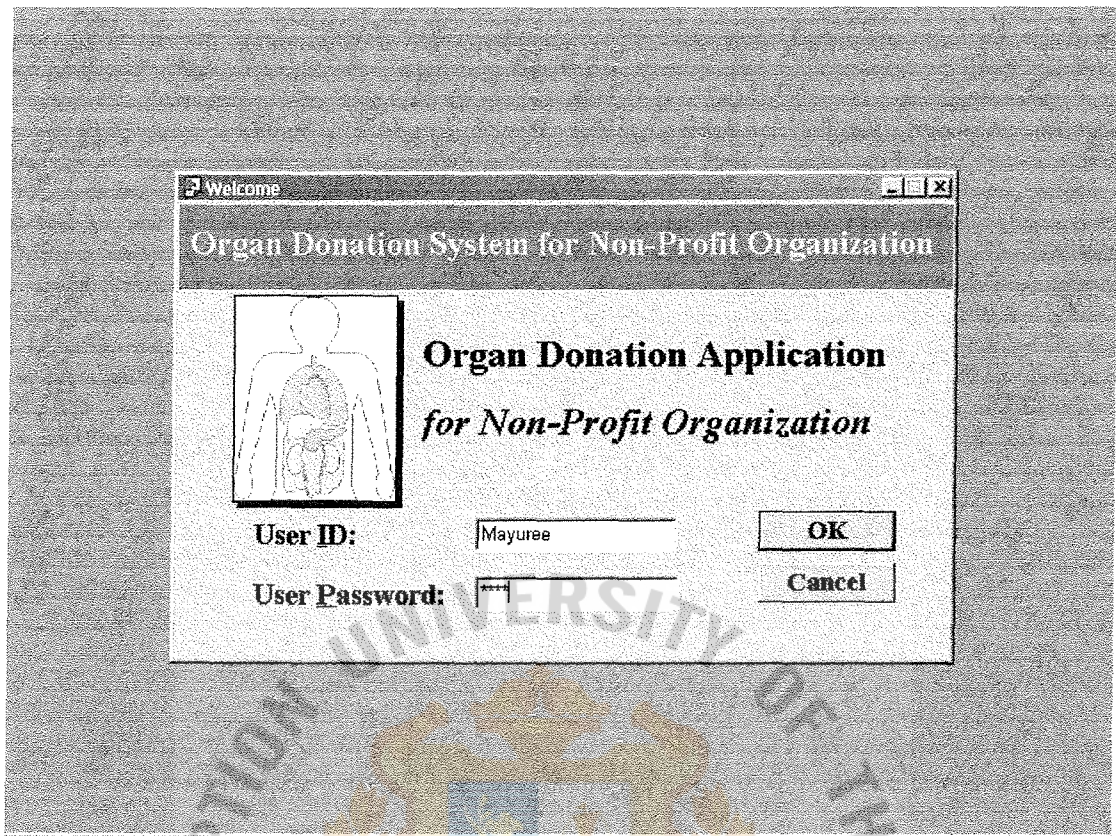


Figure F.1. Login Screen.

#### Login Screen

##### - Screen Definition

Welcome to the Organ Donation application of the Non-Profit Organization. To begin, let's log on to the application's main database (which in this case is a SQL Anywhere database). Once that's done, the application can display its first major window.

##### - Input

User ID and Password

##### - Command Buttons

O.K. Verify login user ID and password, if correct access to program

Cancel                      Exit ODS System

-      Output

Access to program





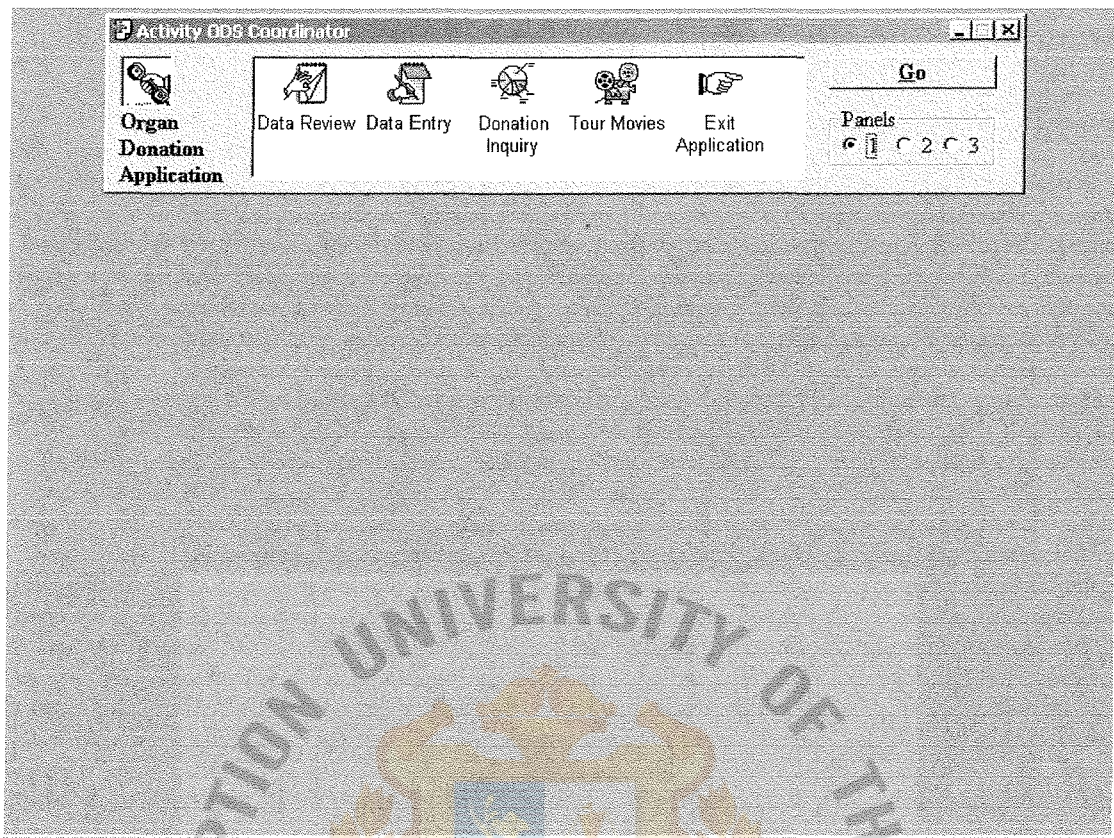


Figure F.2. Home Base Screen.

- Screen Definition

This Activity staff window serves as a home base for users of the application. From here, you can go to various branches of the application to do different kinds of work.

- Input

The Data Review activity lets you display multiple sheets of donors, recipients and organ request data, as well as a wide variety of reports. This activity uses the MDI interface style.

The Data Entry activity lets you enter and maintain data about donors, recipients, and their organ requests. This activity uses the SDI interface style.

The Donations Inquiry activity lets you log onto the Organ Donations database and analyze (or extract) data about organ donations by each representative and regions. It provides various graphs and crosstabs to help you.

The Tour Movies activity lets you run a selection of movies that give narrated tours of the ODS Organ Donation application. The Exit Application activity lets you quit the ODS Organ Donation application.

- Command Buttons

Go      Access to a required screen.

- Output

Access to a required screen.





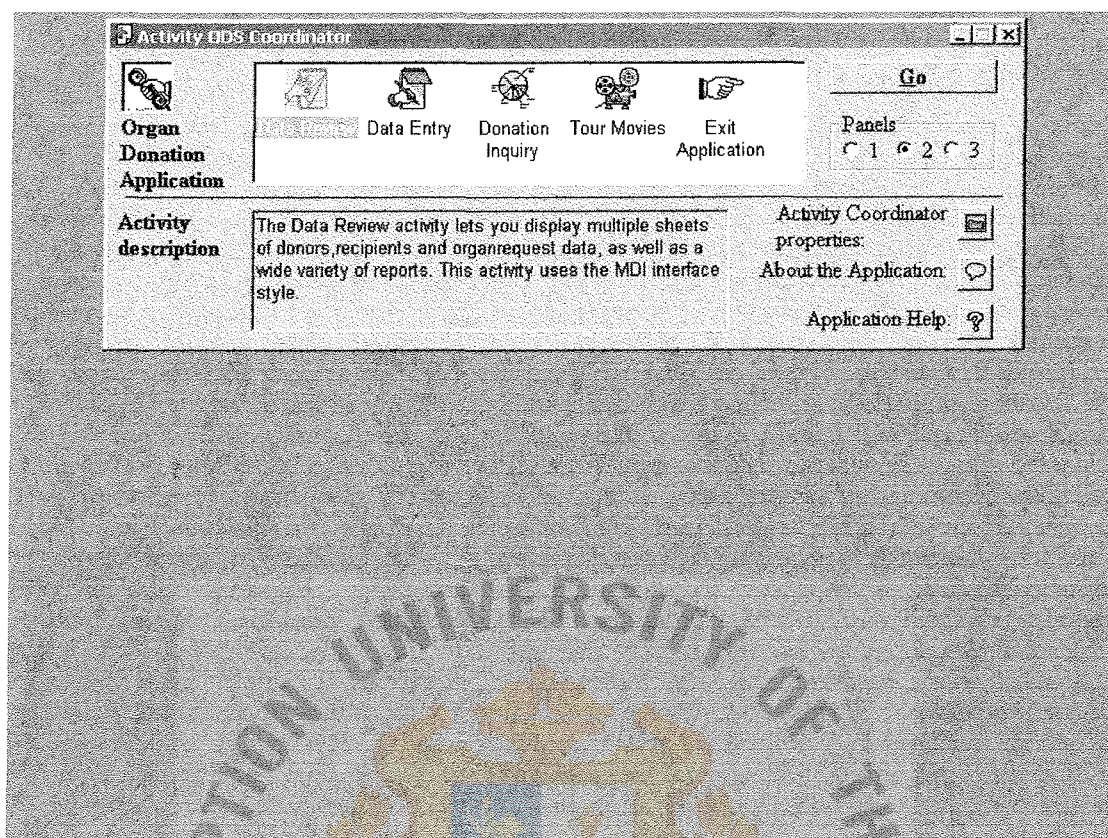


Figure F.3. Home Base Screen (Continued).

- Screen Definition

Click Activity Coordinator properties button, the Activity staff also includes a property dialog that shows how you can use several of these user-interface and language techniques together.



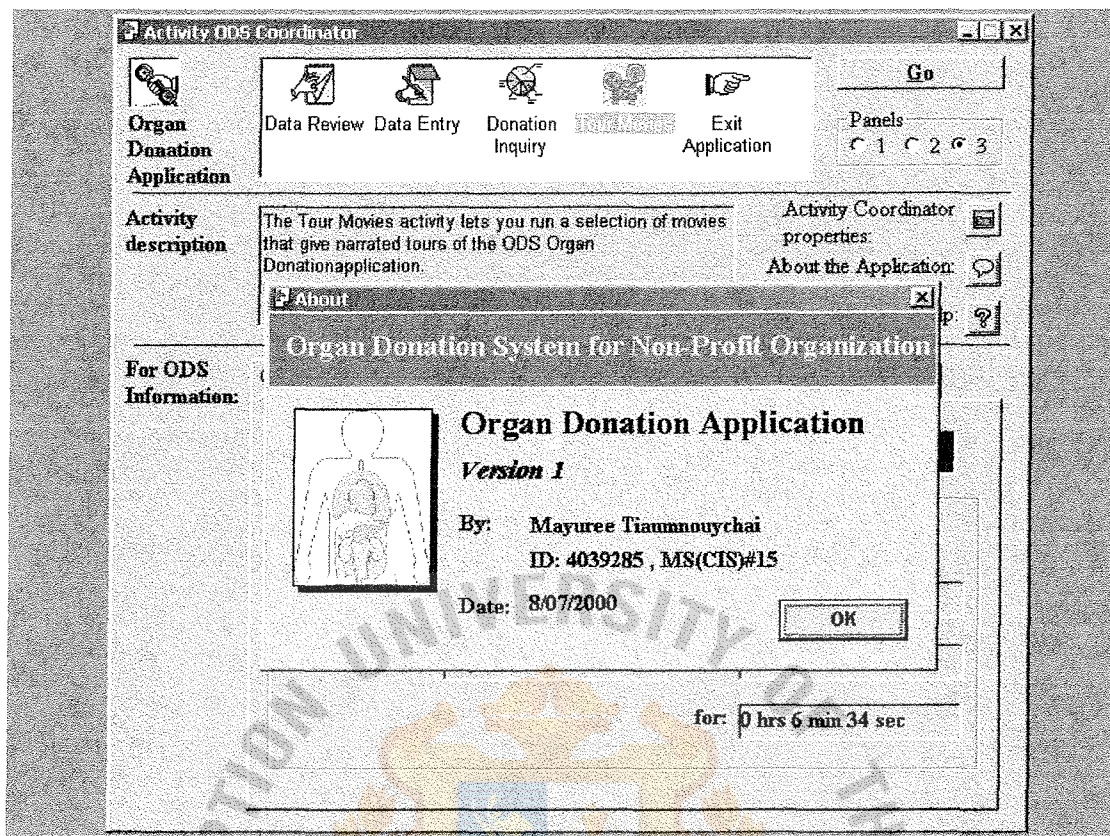


Figure F.4. Home Base Screen (Continued).

#### About Organ Donation Application Screen.

- Screen Definition  
The About window conveys information about system to the end user.
- Navigation  
To display the About window, click About the application button.

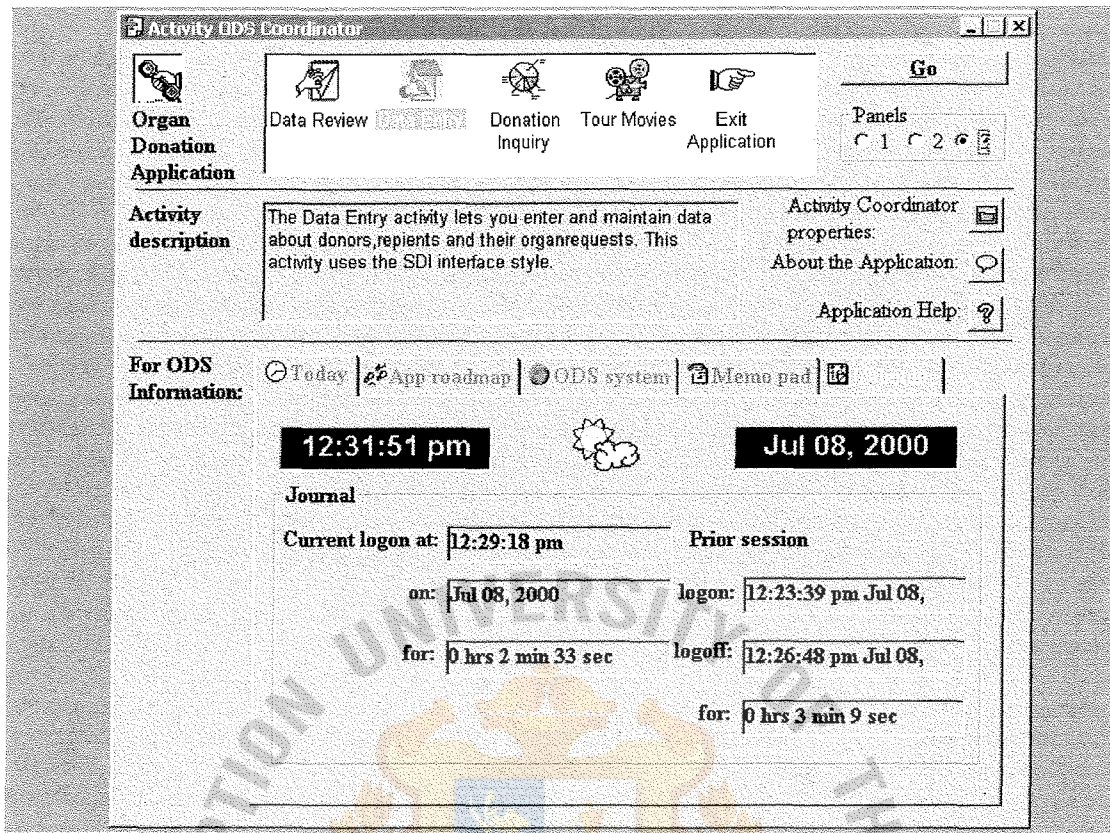


Figure F.5. Home Base Screen (Continued).

- Screen Definition
  - Show information of today, current logon times, and duration times on screen.
- Navigation
  - Click today tab on Home base screen.
- Output
  - Show information of today, current logon times, and duration times.



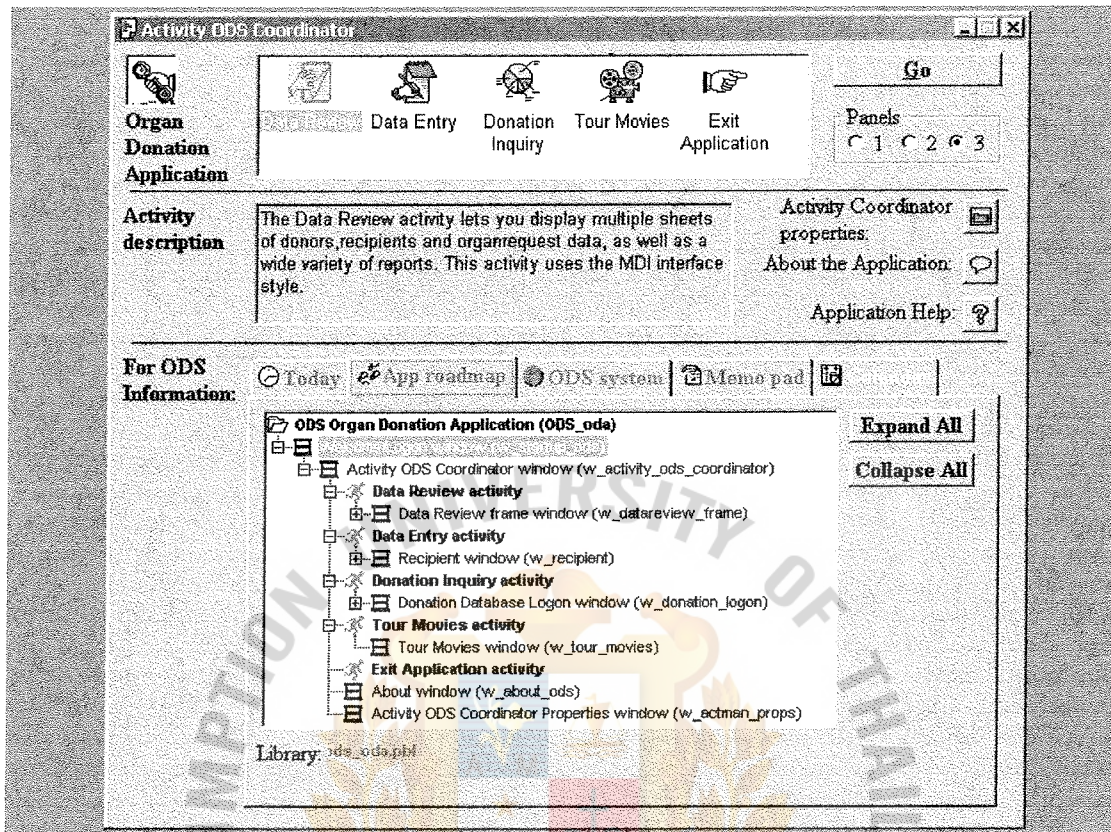


Figure F.6. Home Base Screen (Continued).

Application Roadmap Screen.

- Screen Definition
  - Show information of Application roadmap on screen.
- Navigation
  - Click App Roadmap tab on Home base Screen.

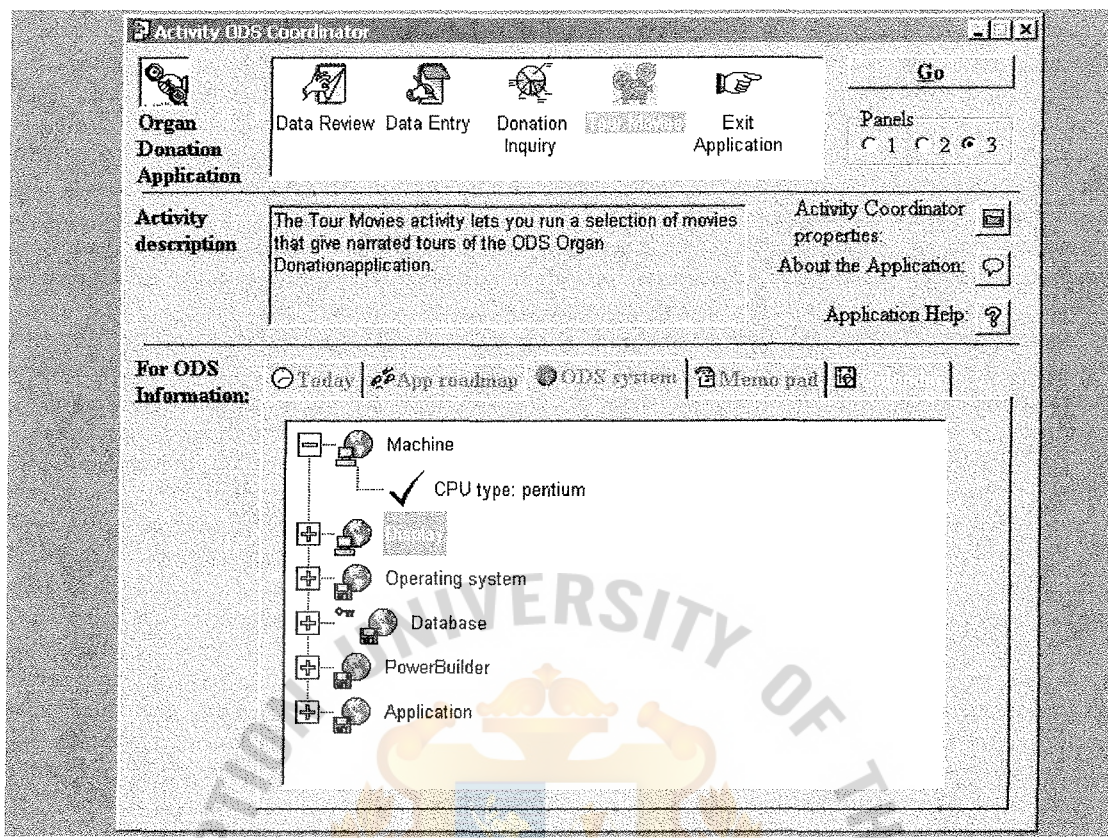


Figure F.7. Home Base Screen (Continued).

Application System details Screen.

- Screen Definition
  - Show information of Application System on screen.
- Navigation
  - Click ODS System tab on Home base Screen.



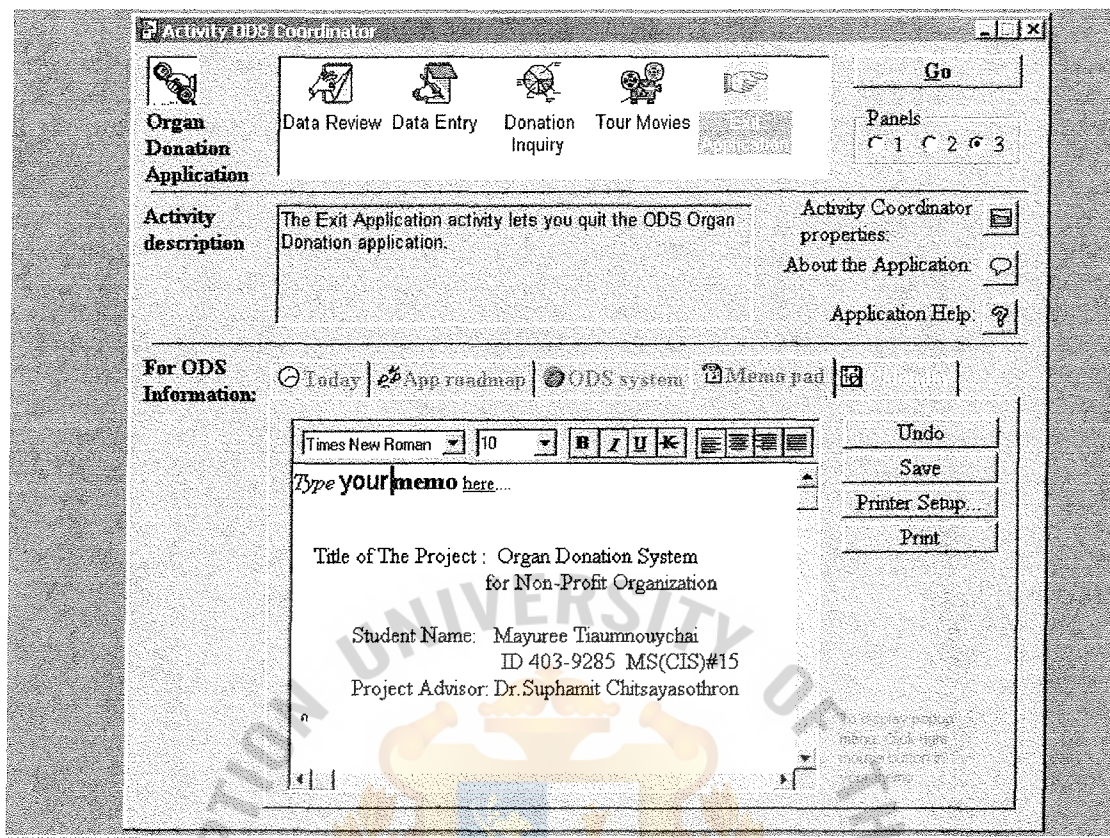


Figure F.8. Home Base Screen (Continued).

#### Memo Pad Screen

- Screen Definition
  - Type your memo here.

- Navigation

Click Memo Pad System tab on Home base Screen.

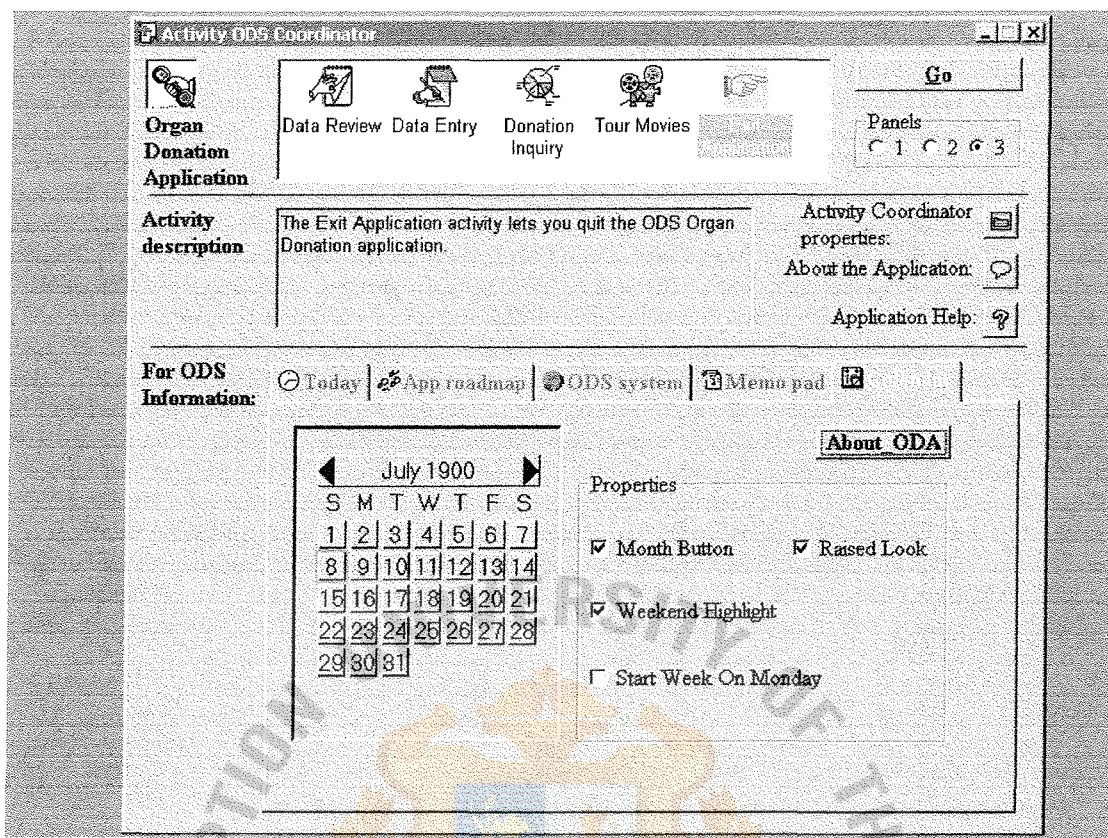


Figure F.9. Home Base Screen (Continued).

#### Calendar Screen.

- Screen Definition

Show Calendar detail Screen.

- Navigation

Click Calendar System tab on Home base Screen.



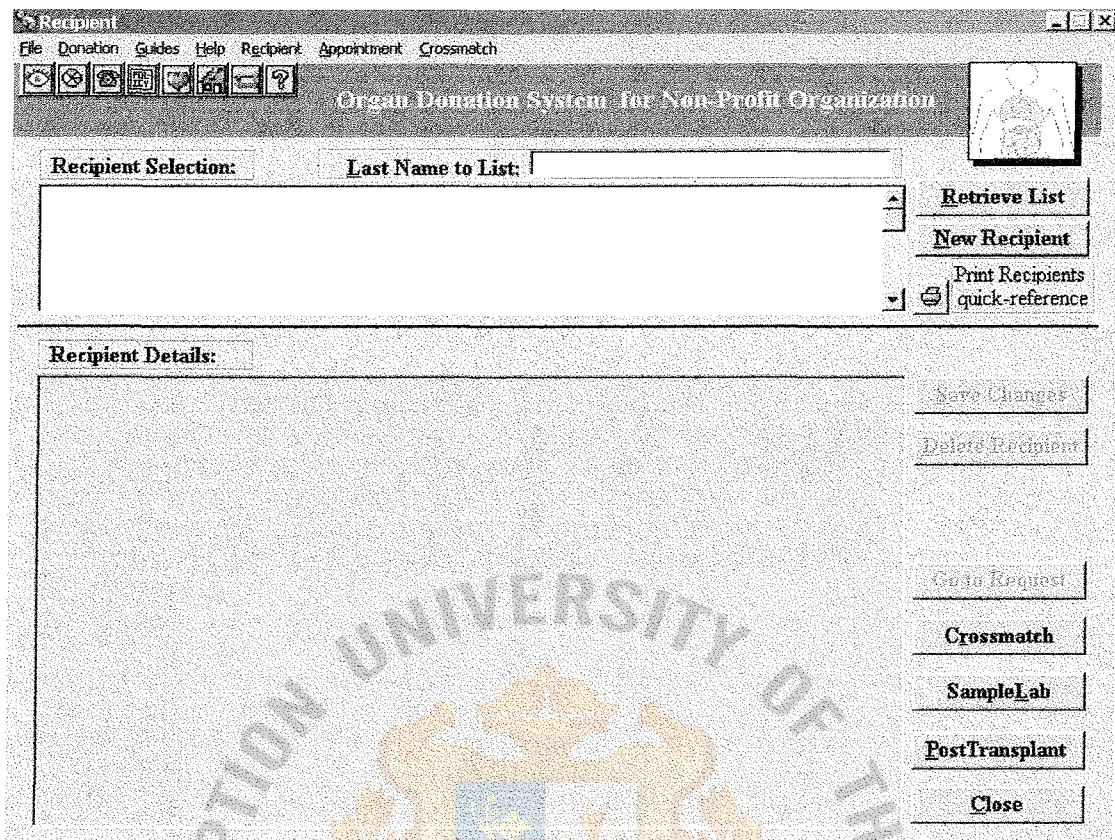


Figure F.10. Recipient Screen.

#### Recipient Screen.

##### - Screen Definition

The Data Entry branch of the ODS application is a data maintenance sample, demonstrating basic creates, retrieve, update, and delete techniques. It begins by displaying a Recipient window, in which you can enter a new recipient or retrieve an existing one. This PictureBox control (Print recipients quick reference) uses a DataStore behind the scenes to access and print a DataWindow object without displaying it on the screen. Under the covers, the Data Entry branch of the application also demonstrates many useful PowerBuilder language features and

coding techniques (such as data validation and error checking, to name just a couple).

- Navigation

Select Data Entry, and click Go button from Home Base Screen.

- Input

Detail of new recipient.

Recipient ID and date of being will generate automatically when you input recipient information.

- Command Buttons

Retrieve List                      Access to Recipient List.

Print Recipient quick reference              To access and print a list recipients in the database without displaying it on the screen.

Save Change                      Save new recipient information.

Delete Recipient                      Delete the selected recipient.

Go to Request                      Access to request screen.

Cross Match                      Access to match run program.

Sample Lab                      Access to laboratory screen.

Post Transplant                      Access to Post Transplant Screen.

Close                      Exit to Main menu Screen.

- Output

Show information of recipients on screen and save data into database.

**Recipient**

File Request Donor Match Run ODS Member Guides Toolbar Help

Organ Donation System for Non-Profit Organization

Recipient Selection: Last Name to List:

Recipient ID	Full Name	Diagnosis	Hospital	ABO	Rh	Organ Request
29	iSiripom,test, Tiaumnouychai	TestKidney	JL	O	Rh-	Kidney
30	Mayuree,test, Tiaumnouychai	TestKidney	SPR	A	Rh-	Kidney

Retrieve List  
New Recipient  
Print Recipients quick-reference

Recipient Details:

Today: 7/7/00 15:09:19 Sex: F BirthDate: 8/7/70  
 Recipient ID: 30 Salutation: Ms Age: 30 Month  
 First Name: Mayuree,test Marital Status: Single  
 Last Name: Tiaumnouychai Body Weight: 66 kg. Height: 156 cm.

Diagnosis: TestKidney Address: 126B/4 NWtok  
 Organ Request: Kidney Province: Bangkok County: NV  
 ABO Group: A City: Nakhonsawan  
 Blood Rh: Rh- Country: Thailand Zipcode: 60000  
 PRA: B0 Hospital: SPR  
 HLA A: A1 A31 Coordinator: Tawatchai Tiaumnouychai  
 HLA B: B8 B14 Phone: 056223596  
 HLA DR: DR2 DR2 ProgramDesc: ICU  
 Status: ☐ Active ☒ Urgent RegtypeDesc: PD  
☐ Suspended ☐ Withdraw

Save Changes  
Delete Recipient  
Go to Request  
Match Rm  
SampleLab  
PostTransplant  
Close

Figure F.11. Recipient Screen (Continued).

#### - Screen Definition

This window includes two DataWindows. One is used to list recipients in the database. The other retrieves the details for the currently selected recipient. Let's add a new recipient. And save that recipient to the database.



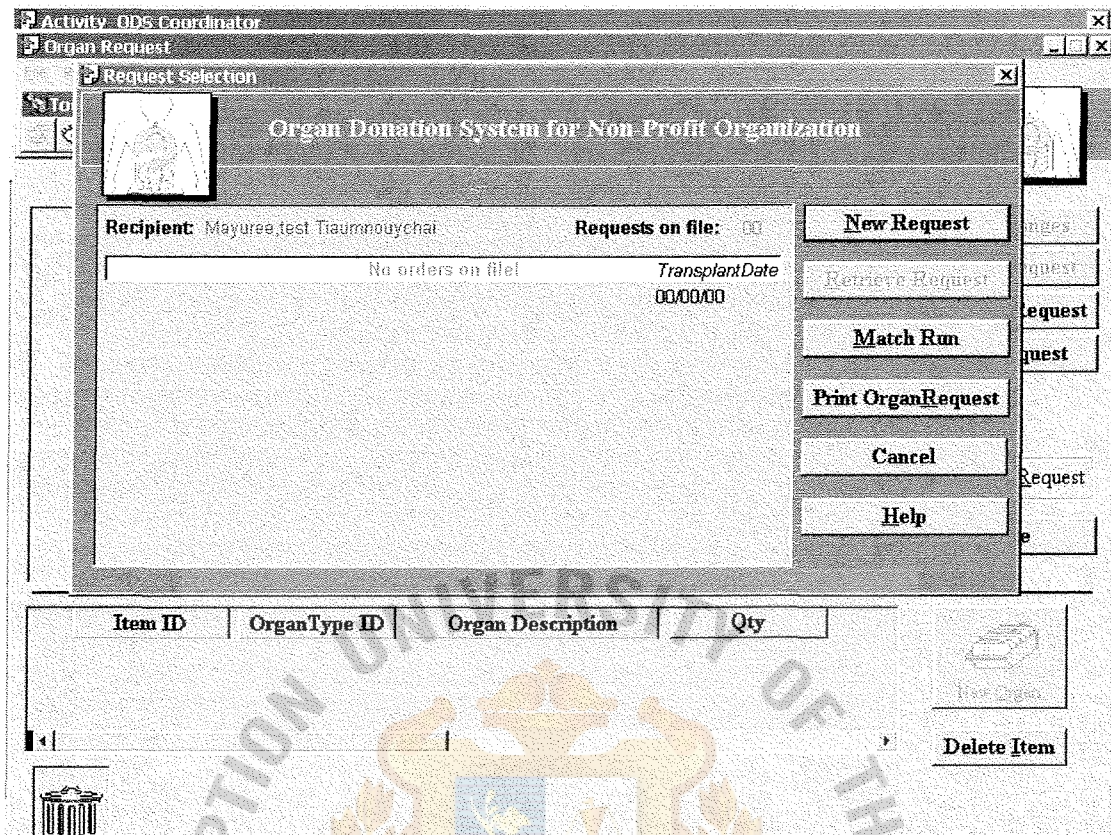


Figure F.12. Selecting Request Screen.

#### Selecting Request Screen.

##### - Screen Definition

Now, let's go to the requests for another recipient. Let's add a new request.

##### - Navigation

Click Go to Request button form Recipient Screen.

##### - Command Buttons

New Request

Access to new request Screen.

Retrieve Request

Show all recipient request information records.

Match Run

Access to match run screen.

Print Organ Request

Print preview of organ request

Cancel

Exit to Recipient Screen.

- Output

Shows current organ request information.





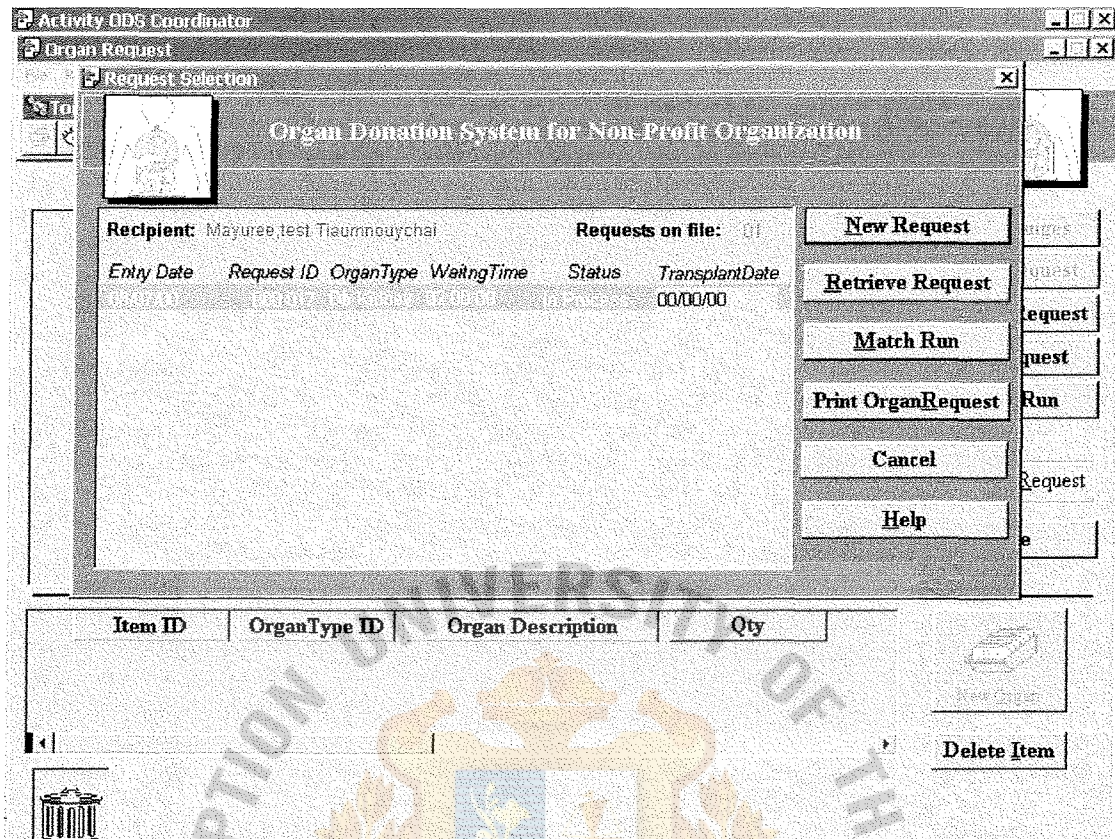


Figure F.13. Selection Request Screen (Continued).

- Screen Definition

You might want to retrieve a request and update it with some new information.

**Organ Request**

File Recipient Donor Appointment Match Run ODS Member Guides Toolbar Help

Tools

**Organ Donation System for Non-Profit Organization**

Recipient: Mayuree test Tiaumnouychai Phone: 0561223-3586

Request ID: 000-009	Recipient ID: 80	<b>Save Changes</b> <b>Delete Request</b> <b>Retrieve Request</b> <b>New Request</b> <b>Match Run</b>  <b>Print Request</b> <b>Close</b>
Date: 08/07/00	Transplant Hospital: SPR	
Status: <input checked="" type="radio"/> In Process <input type="radio"/> Backorders	Physician: Pichai Tiaumnouychai	
<input type="radio"/> Fulfilled <input type="radio"/> Canceled	Diagnosis: TestKidney	
Ship: \$0.00	Organ Request: Left Kidney	
Total: \$0.00	Program Desc: ICU	
Balance: \$0.00	Coordinator: Tawatchai Tiaumnouychai	
Ship Date:	Coord. Phone: 0201864-7059	
Recipient Status: <input type="radio"/> Active <input checked="" type="radio"/> Urgent	Rh: Rh- PRA: B0	
<input type="radio"/> Suspended <input type="radio"/> withdraw	ABO Group: A	
First Dialysis Date: 05/05/00	HLA A: A1 A31	
	HLA B: B8 B14	
	HLA DR: DR2 DR2	

Item ID	OrganType ID	Organ Description	Qty
1			0
Grand			

**New Organ**

**Delete Item**

Figure F.14. Request Screen.

## Request Screen.

### - Screen Definition

This window lets you work with both the header and item rows for a request by implementing master and detail DataWindows. You might also want to delete another requests. Let's add a new request. And save that request to the database.

### - Navigation

Click new request button or retrieve request button form Selecting Recipient Screen.

### - Command Buttons

New Request

Access to new Request Screen.

Retrieve Request	Show all recipient request information records.
Match Run	Access to match run screen.
Print Organ Request	Print preview of organ request.
New Organ	Add new organ.
Delete Item	Delete a selected item.
Cancel	Exit to Recipient Screen.
- Output	
Shows current organ request information.	





Activity DDS Coordinator

Organ Request

File Recipient Donor Appointment Match Run DDS Member Guides Toolbar Help

Tools

Organ Donation System for Non-Profit Organization

Recipient: Mayuree, test Tiaumnouychai Phone: (056)223-3596

Request ID: 000-017 Date: 12/07/95 Status: ☒ In Process ☐ Backorders ☐ Fulfilled ☐ Canceled Ship: \$11.32 Total: \$123.79 Balance: \$123.79 Ship Date: Recipient Status: ☐ Active ☒ Urgent ☐ Suspended ☐ withdraw First Dialysis Date: 5/5/00

Recipient ID: 80 Transplant Hospital: SPR Physician: Pichai Tiaumnouychai Diagnosis: TestKidney Organ Request: Kidney Program Desc: ICU Coordinator: Tawatchai Tiaumnouychai Coord. Phone: (056)223-596 Rh: Rh- PRA: B0 ABO Group: A HLA A: A1 A31 HLA B: B8 B14 HLA DR: DR2 DR2

Save Changes  
Delete Request  
Retrieve Request  
New Request  
Match Run  
Print Request  
Close

Item ID	OrganType ID	Organ Description	Qty
1	14	RT Kidney	1
2	12	LT Kidney	1

Delete Item

Figure F.15. Request Screen (Continued).

- Screen Definition

Let's add a new organ request. And save that organ request to the database. You might also want to delete another organ requests.

**Organ Request**

File Recipient Donor Appointment Match Run ODS Member Guides Toolbar Help

Tools

**Organ Donation System for Non-Profit Organization**

Recipient: Mayuree Test Tiaumnouychai Recipient ID: 000000-0030

SampleLab ID	Request ID	Organ Type	Recipient Status	Physician	Record Date	Record By
1	30	Kidney	Urgent	Pichai Tiaumnouychi	6/7/00	Siriporn Krisuwan
Grand Totals						1

New Record

Delete Record

Retrieve Record

Save Changes

Match Run

Print SampleLab

Close

SampleLab ID: 000-001 Recipient Status: Urgent

Request ID: 30 Transplant Hospital: SPR

Date ReceiveBlood: 08/07/00 Diagnosis: TestKidney

Date Testing: 6/7/00 Coordinator: Tawatchai Tiaumnouychai

Rh: Rh- PRA: 30 Coord.Phone: (001)621-9383

ABO Group: A O cell: +1 Organ Request: Kidney

Serum Group A cell: +4 Physician: Pichai Tiaumnouychai

Serum Group B cell: +4 First Dialysis Date: 6/5/00

Serum Group C cell: +4

Direct Coombs Test: +4

Allow Antibody: C

HLA A: A1 A31 Test By: Yantawe Patimalikit

HLA B: B8 B14 Record By: Siriporn Krisuwan

HLA DR: DR2 DR2 Record DateTime: 6/7/00 05:42:00

Figure F.16. Laboratory Screen.

## Laboratory Screen.

### - Screen Definition

This window lets you work with both the header and item rows for a sample lab by implementing master and detail DataWindows. This window includes two DataWindows. One is used to list sample labs in the database. The other retrieves the details for the currently selected sample lab. Let's add a new sample lab. And save that sample lab to the database. You might also want to delete another sample lab.

### - Navigation

Click sample lab button form Recipient Screen



- Input

Laboratory information

- Command Buttons

New Record

Add new sample lab record.

Retrieve Record

Show all sample lab information records.

Match Run

Access to match run screen.

Print Sample Lab

Print preview of sample lab.

Save Change

Save new information of current sample lab.

Close

Exit to Recipient Screen

- Output

Show information of sample lab on screen and save data into database.



**Donor Selection:** Last Name to List:

**Donor Details:**

Today: 9/7/00 02:28:25 BirthDate:  Age:  Mont:

Donor ID:  Marital Status:

Salutation:  Sex:  BW:  kg. Height  cm. Girth:  cm

First Name:  DonorType: ☐ Cadaveric ☐ Living

Last Name:  Organ Donation:

ABO Group:  Rh:  Address:

Diagnosis:  Province:  County:

RegtypeDesc:  City:

ProgramDesc:  Country:  Zipcode:

Admit Date:  Relative:

Hospital:  Phone:

Coordinator:  Relative Address:

Coor.Phone:

Status: ☐ Active ☐ Suspended ☐ Urgent ☐ Withdraw

**Right-hand Column Buttons:** Retrieve List, New Donor, Print Donors quick-reference, Save Changes, Delete Donor, Go to Donation, Match Run, Sample Lab, Present Medical Status, Print Donor Checklist, Close

Figure F.17. Donor Screen.

#### Donor Screen.

##### - Screen Definition

The Data Entry branch of the ODS application is a data maintenance sample, demonstrating basic creates, retrieve, update, and delete techniques. Selecting the Donor Toolbar from menu opens the Donor window, in which you can enter a new donor or retrieve an existing one.

##### - Navigation

Select Data Entry, and click Go button from Home Base Screen.

##### - Input

Detail of new donor



**Donor Selection:** Last Name to List:

Donor ID	Donor Type	Full Name	Diagnosis	Hospital	ABO	Rh	Organ Type	Donor ID
15	Cadaveric	Carter, Kiki	Accident	SPR	O	Rh-	Kidney	9/7/00
2	Cadaveric	Ford, Fred	Accident	SPR	O	Rh-	Kidney	9/7/00

**Donor Details:**

Today: 9/7/00 03:21:44 Birth Date: 5/7/71 Age: 29 Mont:

Donor ID: 2 Marital Status: Double

Salutation: Mr. Sex: M BW: 80 kg. Height: 170 cm. Girth: 55 cm

First Name: Ford Donor Type: ☒ Cadaveric ☐ Living

Last Name: Fred Organ Donation:

ABO Group: O Rh: Rh+ Address: 300 Mango Road

Diagnosis: Accident Province: Bangkok County: OH City: Toledo

RegtypeDesc: IPD Country: Thailand Zipcode: 30290

ProgramDesc: ICU Trauma Relative: Ford Join

Admit Date: 07:07:00 Phone: 7217000

Hospital: SPR Relative Address: 99 Banana Rd. Bangkok Thailand

Coordinator: Yantawe patimalikit

Coord. Phone: 4885550600

Status: ☒ Active ☐ Suspended ☐ Urgent ☐ Withdraw

**Buttons:** Retrieve List, New Donor, Print Donors quick-reference, Save Changes, Delete Donor, Go to Donation, Match Rm, Sample Lab, Present Medical Status, Print Donor Checklist, Close

Figure F.18. Donor Screen (Continued).

## Screen Definition

This window includes two DataWindows. One is used to list donors in the database. The other retrieves the details for the currently selected donor. Let's add a new donor. And save that donor to the database.



**Donor** File Donation Recipient Match Run ODS Member Guides Toolbar Help

Organ Donation System for Non-Profit Organization

**Donor Selection:** Last Name to List:

Donor ID	Donor Type	Full Name	Diagnosis	Hospital	ABO	Rh	Organ Type	Donation
15	Cadaveric	Carter, Kiki	Accident	SPR	O	Rh-	Kidney	9/7/00
2	Cadaveric	Ford, Fred	Accident	SPR	O	Rh-	Kidney	9/7/00

Retrieve List  
New Donor  
Print Donors quick-reference

**Donor Details:**

Hospital: SPR Phone: 7217000  
Coordinator: Yantawe patimalikit Relative Address: 99 Banana Rd. Bangkok Thailand  
Coor. Phone: 4885550600  
Status: ☒ Active ☐ Suspended ☐ Urgent ☐ Withdraw

**Potential Donor Checklist:** ☒ Test for Brain Stem Death Record ☒ Consent of Donor's Relative  
☐ Infectious Markers

**Lab for all potential donors:** ☒ CBC ☒ Electrolyte ☒ ABO typing  
☒ Anti-CMV ☒ Hepatitis Screen, HBSAg, HIV2  
☒ Blood and Urine Culture (If the donor is hospitalized 72 hours.)

**Lab for potential renal donors:** ☒ Unanalysis ☒ Creatinine ☒ BUN

**Lab for potential liver donors:** ☐ Liver Enzymes ☐ Total Billirubin, ☐ PT, PTT  
☐ Blood group Subtyping of ABO = A donor

**Lab for pancrease donors:** ☐ 12 Lead EKG ☐ Cardiology Consult ☐ Chest x-ray ☐ Blood Gas

**Special for heart donors:** ☐ Serum Amylase ☐ Serum Lypase ☐ Glucose

Save Changes  
Delete Donor  
Go to Donation  
Match Run  
Sample Lab  
Present Medical Status  
Print Donor Checklist  
Close

Figure F.19. Donor Screen (Continued).

Donor Screen.

- Input

Null

Potential Donor checklist will generate automatically when you input present medical status information.



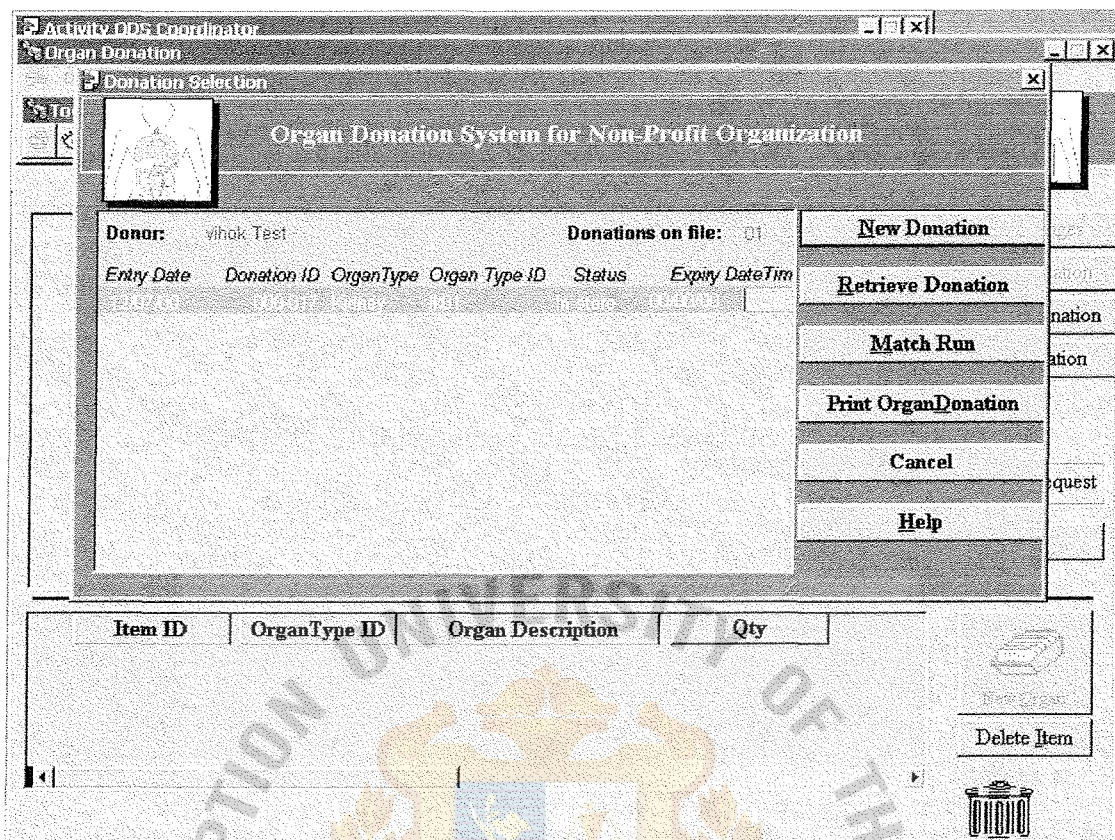


Figure F.20. Selecting Donation Screen.

#### Selecting Donation Screen.

##### - Screen Definition

Now, let's go to the donations for another donor. Let's add a new donation. You might want to retrieve a donation and update it with some new information.

##### - Navigation

Click Go to Donation button form Donor Screen.

##### - Command Buttons

New Donation                      Access to new donation Screen.

Retrieve Donation                  Show all donor donation information records.

Match Run                          Access to match run screen.

- |                      |                                  |
|----------------------|----------------------------------|
| Print Organ Donation | Print preview of organ donation. |
| Cancel               | Exit to Donor Screen.            |
| New Organ            | Add new organ.                   |
| Delete Item          | Delete a selected item.          |
- Output
- Shows current organ donation information.



**Organ Donation System for Non-Profit Organization**

Donor: **Wihok Test** Phone: **(001)621-9383**

Donation ID: **000-017** Donor ID: **f3**  
 Date: **08/07/00** Transplant Hospital: **SPR**  
 Donation Type:  Physician: **Chompoonik Jieamjitpolc**  
 Times of Donation: **1** Diagnosis: **Accident**  
 Donation Status: **In store** Organ Donation: **Kidney**  
 Donor Status: ☒ Active ☐ Urgent ☐ Suspended ☐ withdraw  
 Program Desc: **ICU**  
 Birth Date: **08/07/70** Coordinator: **Siriporn Tiaumnouychai**  
 Coord.Phone: **(001)621-9383**  
 ABO Group: **A**  
 Rh: **Rh-** PRA: **90**  
 HLA A: **A1 A31**  
 HLA B: **B2 B2**  
 HLA DR: **DR2 DR**

Item ID	Organ Type ID	Organ Description	Qty
1	8	LT Kidney	1
Grand Totals			2

Buttons: Save Changes, Clear Donation, Retrieve Donation, New Donation, Print Donation, Close, New Organ, Delete Item

Figure F.21. Donation Screen.

## Donation Screen.

### - Screen Definition

This window lets you work with both the header and item rows for a donation by implementing master and detail DataWindows. You might also want to delete another donations. Let's add a new donation. And save that donation to the database. Let's add a new organ donation. And save that organ donation to the database. You might also want to delete another organ donations.

### - Navigation

Click new donation button or retrieve donation button form Selecting Donation Screen.

- Command Buttons

New Donation	Access to new Donation Screen.
Retrieve Donation	Show all donor donation information records.
Match Run	Access to match run screen.
Print Organ Donation	Print preview of organ donation.
Close	Exit to Donor Screen.

- Output

Shows current organ donation information.





**Donor Medical Status**

File Donor Recipient Appointment Match Run ODS Member Guides Toolbar Help

Tools

Organ Donation System for Non-Profit Organization

Donor: Vihok Test Donor ID: 000000-0009

MedRecord ID	Donation ID	Donor Type	Organ ID	Organ Type	Hospital	Physician	Record Date	Re
1	10	Cadaveric	1	kidney	Spr	Nattaya Patanasak	9/7/00	Yanta

Grand

MedStatus ID: 000-001 Age: 30 Sex: M  
 Donation ID: 9 Girth: 55 cm.  
 Donor Type: cadaveric Physician: Kanjana Budsalakun  
 Donor Status: active Hospital: SPR  
 Organ Donation: kidney Diagnosis: Accident  
 Admission Date: 05/07/00 Coordinator: Laoopngtip Uatchariyavorn  
 Date Registry: 10/7/00 Coord.Phone: (056)213-342

**Present Medical Status:**

ABO Group: O Rh: Rh-

**Current History:** Abdominal Injury

Recent surgery: ☐ No ☐ Yes Procedure:   
 Date Time:   
 Tests For Brain stem Death: Date Time:   
☐ Spontaneous Respiratory

New Record  
 Delete Record  
 Retrieve Record  
 Save Changes  
 Go to Donation  
 Print Donor Medical Status  
 Close

Figure F.22. Donor Medical Status Screen.

Donor Medical Status Screen.

#### - Screen Definition

This window lets you work with both the header and item rows for a present medical status by implementing master and detail DataWindows. This window includes two DataWindows. One is used to list Donor Medical Status records in the database. The other retrieves the details for the currently selected Donor Medical Status record. Let's add a new Donor Medical Status record. And save that Donor Medical Status record to the database. You might also want to delete another Donor Medical Status record.



- Navigation

Click Donor Medical Status button form Donor Screen

- Input

Donor Medical Status information of the currently selected donor.

- Command Buttons

New Record                      Add new present medical status record.

Retrieve Record                Show all medical status information records.

Go to Donation                Access to donation screen.

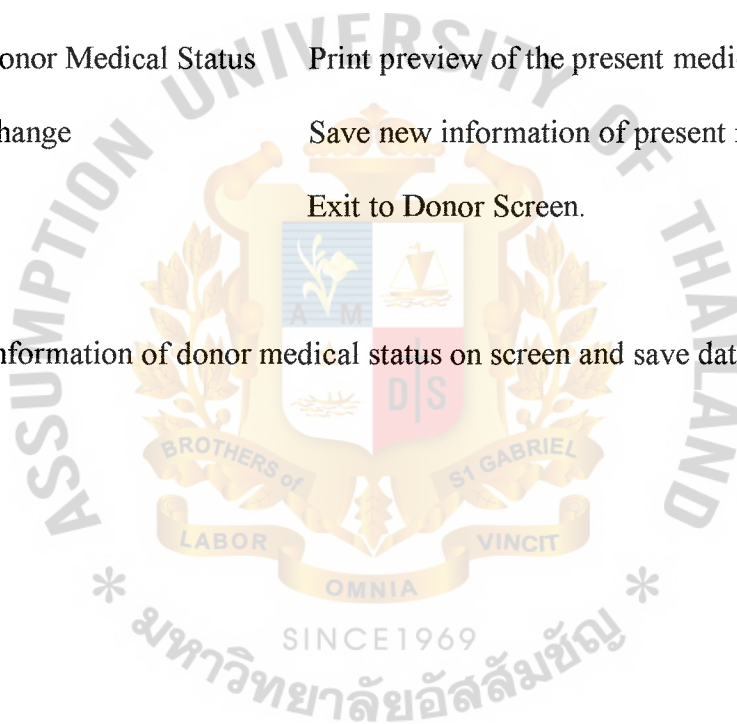
Print Donor Medical Status    Print preview of the present medical status.

Save Change                    Save new information of present medical status.

Close                            Exit to Donor Screen.

- Output

Show information of donor medical status on screen and save data into database.



**Donor Medical Status**

File Donor Recipient Appointment Match Run ODS Member Guides Toolbar Help

Tools

Organ Donation System for Non-Profit Organization

Donor: Vihok Test Donor ID: (000)000-0009

MedRecord ID	Donation ID	Donor Type	Organ ID	Organ Type	Hospital	Physician	Record Date	Re
1	1	1	1	Kidney	SPR	Kanjana Budsarakul	10/7/00	Yanta

Grand

**Present Medical Status:**

ABO Group: O Rh:   
**Current History:** Abdominal Injury: No   
**Recent surgery:** ☐ No ☒ Yes **Procedure:** Craniotomy   
**Date Time:** 5/7/00   
**Tests For Brain stem Death:** **Date Time:** 10/07/00   
☐ Spontaneous Respiratory   
☒ On Ventilator **Date Time:** 5/07/00   
**Type:** Bird's Respir **Mode:** **FioO2:** 100 **TV:** 12 **Rate:** 20   
**Cardiac Arrest:** ☒ No ☐ Yes **Date Time:** **Duration:**   
**Hypotension:** ☐ No ☒ Yes **BP:** 80/50 **mmHg** **Date Time:** 9/7/00 **Duration:** 1 hrs   
**Intropic drugs:** ☒ No ☐ Yes **Rate:** **Date Time:**   
**Medical Treatments:** **IV Fluid:**   
**Antihistires:**

New Record

Delete Record

Retrieve Record

Save Changes

Go to Donation

Print Donor Medical Status

Close

Figure F.23. Donor Medical Status Screen (Continued).

- Input

Detail of Present medical status, Tests for Brain stem Death, Cardiac Arrest, Hypotension, and Medical treatment.

**Donor Medical Status**

File Donor Recipient Appointment Match Run ODS Member Guides Toolbar Help

Tools

Organ Donation System for Non-Profit Organization

Donor: Vihok Test Donor ID: (000)000-0009

MedRecord ID	Donation ID	Donor Type	Organ ID	Organ Type	Hospital	Physician	Record Date	Re
1	10	Cadaveric	1	Kidney	SPR	Kanjana Budsalakul	10/7/00	Yanta

Grand

Medical Treatments: IV Fluid: RLS 1000 ml. vein drip 30 cc/hr  
Antibiotics: Cloxa 1 gm vein q 6 hrs  
Steroid:

DateTime	BT	BP	PR	RR	CVP	Urine(cc.)	Medication	Note
10/07/00 12:00	97c	120/60	80	20	12	200		

DateTime	Diuresis	Last hour	Last 8 hours	Last 24 hours	Oliguria	Anu
10/07/00 12:00	500	100	250	500		

Pertinent Past Medical or Social History:

☐ Asthma  
☒ Smoking Sometime  
☐ C.V.S.  
☐ Liver Disease  
☐ Drugs Abuse  
☐ Alcohol Abuse  
☐ Renal disease  
☐ Hypertension

New Record  
Delete Record  
Retrieve Record  
Save Changes  
Go to Donation  
Print Donor Medical Status  
Close

Figure F.24. Donor Medical Status Screen (Continued).

- Input

Detail of Pertinent Past Medical or Social History.



**Donor Medical Status**

File Donor Recipient Appointment Match Run ODS Member Guides Toolbar Help

Tools

**Organ Donation System for Non-Profit Organization**

Donor:  Donor ID:

MedRecord ID	Donation ID	Donor Type	Organ ID	Organ Type	Hospital	Physician	Record Date	Re
1	10	Cadaveric	1	Kidney	SPR	Kanjana Budsalakul	10/7/00	Yanta

Grand

**Laboratory Information:**

Date	Time	Test	HBs Ag	HIV Ab	HCV Ab	VDRL	CMV IgM
06/07/00	9:00		-ve	-ve	-ve	-ve	-ve

Date	Time	Test	CHC	Hb	Hct	WBC	RBC	Platelet	Neutrophile	Lymphocyte	Monocyte	Eosino
09/07/00	8:30			28	32	60	40	32	60	30	30	40

Date	Time	Test	PG	BUN	Cr	Na	K	Cl	CO2
10/07/00	9:00		80	8	1.6	140	3.9	100	30

Date	Time	Test	TP	Alb	Glob	TB	DB	SGOT(AST)	SGPT(ALT)	Alk phos	PT	PTT	INR	GG

Date	Time	Test	Blood Gases	FiO2	pH	PO2	PCO2	BE	Bicarb	O2 sat
10/07/00	9:00									0

Date	Time	Test	Hemo c/s
6/07/00	12:00		NO Growth

Date	Time	Test	Urine c/s
8/07/00	10:30		No Growth

New Record

Delete Record

Retrieve Record

Save Changes

Go to Donation

Print Donor Medical Status

Close

Figure F.25. Donor Medical Status Screen (Continued).

- Input

Detail of laboratory information.

**Donor Medical Status**

File Donor Recipient Appointment Match Run ODS Member Guides Toolbar Help

Tools

**Organ Donation System for Non-Profit Organization**

Donor:  Donor ID:

MedRecord ID	Donation ID	Donor Type	Organ ID	Organ Type	Hospital	Physician	Record Date	Re
1	10	Cadaveric	I	Kidney	SPR	Kanjana Budsalakul	10/7/00	Yanta

Grand

**DateTimeTest** **Echo**

**DateTimeTest** **Chest X-ray**

10/07/00 8:00 Normal

**DateTimeTest** **Plain KUB**

10/07/00 8:30 Normal

DateTimeTest	A	A	B	B	DR	DR
10/07/00 9:30	A1	A31	B8	B-	DR2	DR2

**Relative's Consent** ☒ Yes ☐ No

**Proposed Donor Operation (Date/Time)** 10/07/00 12:00

**Result Cross Match Organ Donated To:** Tida Tidatap **Test by:** Siriporn Krisuwan

**Date/Time Received Result Cross Match:** 10/07/00 10:00

**Organ Procurement, Distribution and Allocation:**

☒ Yes ☐ No **Refusal Reason:**

**Record By:** Mayuree Tia **Record Date/Time:** 10/7/00 10:00

**New Record**

**Delete Record**

**Retrieve Record**

**Save Changes**

**Go to Donation**

**Print Donor Medical Status**

**Close**

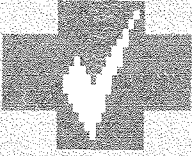
Figure F.26. Donor Medical Status Screen (Continued).

- Input

Date time of being record will generate automatically when you input Medical status information.



Crossmatching

 Organ Donation System for Non-Profit Organization

Organ Id	Hospital	Sample ID	ABO Group	Rh	HLA A1	A2	HLA B1	B2	HLA DR1	DR2	Organ Type	Qty.	Donation Date
43000437	Mayuree	1	A	+	A1	A2	B8	B14	DR2	DR2	DR2	1	17/7/01

Donor: 43000437 Mayuree, Naumouychai Delete Match Run

CrossMatching

OK	Result	Request ID	Recipient	Hospital	Point	A1	A2	B1	B2	DR1	DR2	PRA	Mismatch	Serum	Test Date	Test
<input checked="" type="checkbox"/>	COMPATIB1	▼	Nok	SPR	0	A1	A31	B8	B14	DR2	DR2	30	16DR	1	18/07/254	17
<input type="checkbox"/>	COMPATIB2	▼	Nok	SPR	1	A1	A-	B8	B14	DR2	DR2	30	16DR	1	18/07/254	17
<input type="checkbox"/>	COMPATIB3	▼	Mee	SR	5	A1	A31	B8	B8	DR2	DR2	70	16DR	1	18/07/254	17
<input type="checkbox"/>	COMPATIB4	▼	Chit	SR	2	A1	A31	B8	B3	DR2	DR3	70	16DR	1	18/07/254	17

Save Cancel Print CrossMatchResult

Figure F.27. Match Run Screen.

#### Match Run Screen.

##### - Screen Definition

This window includes two DataWindows. One is used to list potential donors in the database. The other retrieves the details of potential recipients for the currently selected potential donor.

##### - Navigation

Click Match Run button form Donor Screen or Recipient Screen.

##### - Input

Null

- Comman Buttons

Delete	Delete the currently selected potential donor.
Match Run	Activated Match Run program.
Save	Save Crossmatch result information.
Cancel	Exit to Donor screen or Recipient screen.
Print Crossmatch Result	Print preview of Crossmatch result.

- Output

For each organ, computerized matching algorithms are use to produce rank ordered list of potential recipients.



TransplantRecipient Follow-Up

File Donor Recipient Appointment Match Run ODS Member Guides Toolbar Help

Tools

Organ Donation System for Non Profit Organization

Recipient: Mhok Test Recipient ID: (000)000-0030

Transplant F/U No.	Recipient ID	Organ Transplant	Hospital Transplant	Physician	Transplant D:
1	30	Lt Kidney	SPR	Ckompoonik J.	10/07/00
2					
Grand Totals					

Transplant F/U No.: 000-017 Birth Date: 12/07/95 Age: 30

Recipient ID: 30 Occupation: SA

First Name: Mhok Diagnosis: Test Kidney

Last Name: Test ABO Group: A

Sex: F Rh: Rh-

HLA	A	A	B	B	DR	DR
A1	A31	B2	B2	DR2	DR	

Transplant Hospital: SPR

Organ Transplant: Lt Kidney

Transplant surgery: Procedure: Lt Nephrectomy

Date Time: 10/7/00

Transplant Surgeon: Paramin Jieamjitpolchai

Transplant Physician: Chompoonik Jieamjitpolchai

Retrieve Record

Save Changes

Print Transplant FollowUp

Close

Figure F.28. Transplant Recipient Follow-up Screen.

#### Transplant Recipient Follow-up Screen.

##### - Screen Definition

This window lets you work with both the header and item rows for a Transplant Recipient Follow-up by implementing master and detail DataWindows. This window includes two DataWindows. One is used to list Transplant Recipient Follow-up in the database. The other retrieves the details for the currently selected Transplant Recipient Follow-up. Let's add a new Transplant Recipient Follow-up. And save that Transplant Recipient Follow-up to the database.

##### - Navigation

Click Post Transplant button from Recipient Screen

- Input

Post transplant information of the currently selected Transplant Recipient Follow-up.

- Command Buttons

New Record

Add new Transplant Recipient Follow-up.

Retrieve Record

Show all Transplant Recipient Follow-up information records.

Go to Donation

Access to donation screen.

Print Transplant Follow-up

Print preview of the Transplant Recipient Follow-up.

Save Change

Save new information of Transplant Recipient Follow-up.

Close

Exit to Recipient Screen.

- Output

Show information of Transplant Recipient Follow-up on screen and save data into database.



TransplantRecipient Follow-Up

File Donor Recipient Appointment Match Run ODS Member Guides Toolbar Help

Tools

Organ Donation System for Non-Profit Organization

Recipient:  Recipient ID:

Transplant F/U No.	Recipient ID	Organ Transplant	Hospital Transplant	Physician	Transplant Date
1	30	L1 Kidney	SPR	Ckompoonik J.	10/07/00
2					
Grand Totals					

Patient Status (all organ):

☒ Living Date of hospital report:

☐ Dead Date:

Cause of Death:

☐ Re-transplant prior to hospital discharge date

Cause of retransplant (thoracic only)

Clinical Information at discharge (Kidney only)

☒ Most recent serum creatinine prior to discharge

☒ Did Kidney produce > 40 ml. of urine in first 24 hours

☐ Did patient need dialysis within first week

☐ Did creatinine decline by 25% or more in first 24 hours on two separate serum sample taken within first 24 hours

Graft Status at Discharge (Kidney, Liver and Pancreas only)

Buttons: New Record, Delete Record, Retrieve Record, Save Changes, Print Transplant FollowUp, Close

Figure F.29. Transplant Follow-up Screen (Continued).

- Input

Detail of patient status, clinical information at discharge, and graft status at discharge.



TransplantRecipient Follow Up

File Donor Recipient Appointment Match Run ODS Member Guides Toolbar Help

Tools

Organ Donation System for Non-Profit Organization

Recipient:  Recipient ID:

Transplant F/U No.	Recipient ID	Organ Transplant	Hospital Transplant	Physician	Transplant Date
1	30	LT Kidney	SPR	Ckompoonik J.	10/07/00
2					

Grand Totals

☐ Did patient need dialysis within first week  
☐ Did creatinine decline by 25% or more in first 24 hours on two separate serum sample taken within first 24 hours

**Graft Status at Discharge (Kidney, Liver and Pancrease only):**

Graft Nephrectomy Date:

Graft Status: ☒ Functioning ☐ Failed DateTime:

Cause of Failed:

Donor ID:  Hospital Donor:

First Name:

Last Name:

Record by:

Date of Record:

New Record  
 Delete Record  
 Retrieve Record  
 Save Changes  
 Print Transplant FollowUp  
 Close

Figure F.30. Transplant Follow-up Screen (Continued).

- Input

Date time of being record will generate automatically when you input Transplant Recipient information.

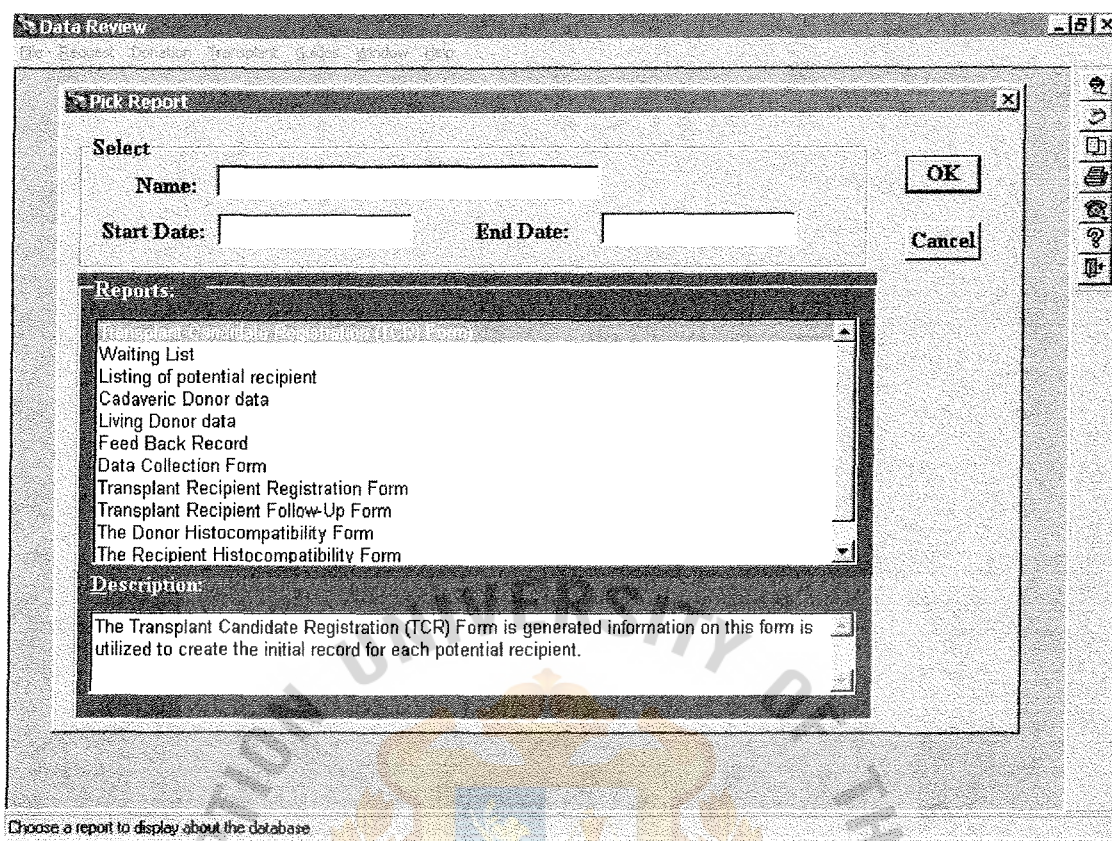


Figure F.31. Data Review Screen.

#### - Screen Definition

The data Review branch of the ODS application is a data retrieval and reporting. It also shows the basics of using an MDI interface, consisting of a frame window and multiple sheet windows. Within the Data Review frame, you can retrieve sheets of recipient data, donor data, organ data, and sheets of transplant data. You can also display a wide variety of reports that take advantage of the versatility of PowerBuilder DataWindows Reports that gets data from stored procedures and a lot more. Under the covers, the Data Review branch of the application also demonstrates the use of many powerful object-oriented features (such as function overriding and overloading).



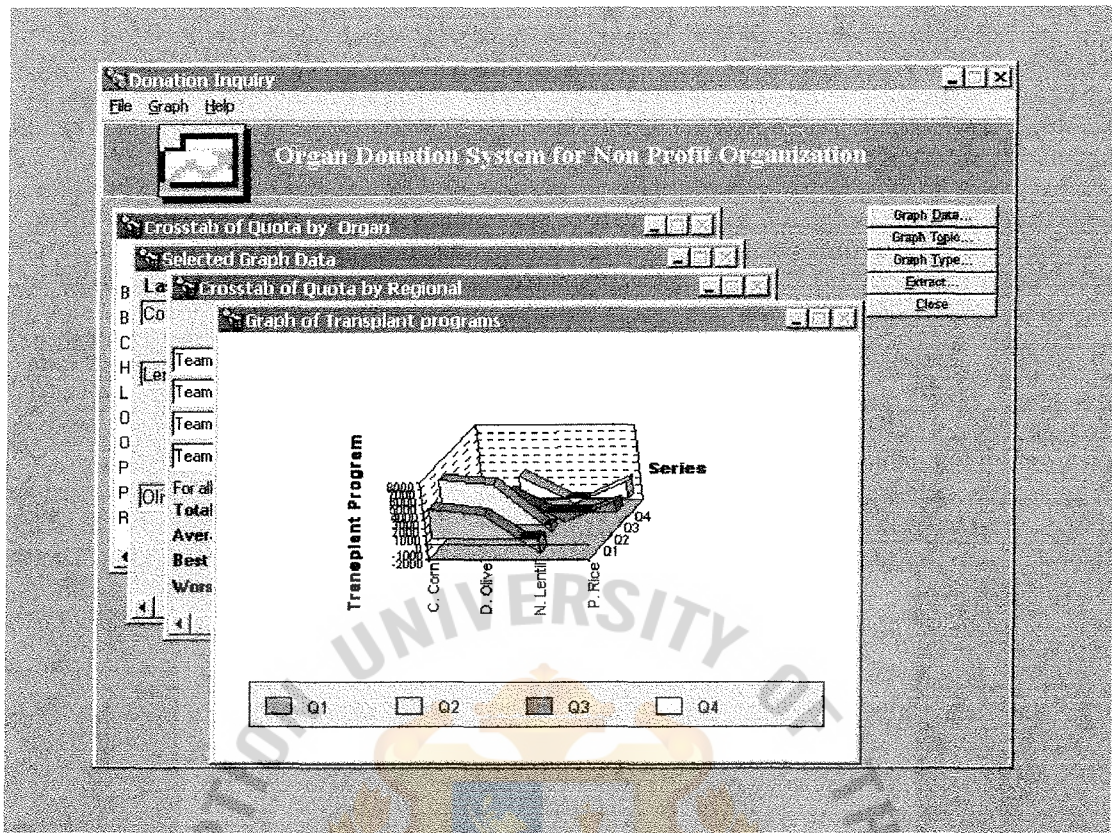


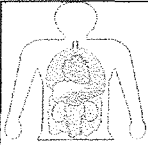
Figure F.32. Donation Inquiry Screen.

#### - Screen Definition

The ODS application includes several supplementary components in addition to its major Data Review and Data Entry branches. These components are used to guide, assist, or inform users in various ways. The most visible of these components is the Donation Inquiry activity. It prompts the user to log on to a second (donations) database, and then. It displays donation data in several DataWindows. To help the user analyze the data, these DataWindows use a variety of different formats, including; graphs crosstabs, and a tabular report. It also lets you manipulate graphs in various ways by using dynamic DataWindow features.



**APPENDIX G**  
**REPORT DESIGN**



## Organ Donation System for Non-Profit System

No. \_\_\_\_\_

### Donor Check Lists

Name ..... Age..... Bloodgroup..... Date..... Time.....  
Hospital ..... Ward ..... Phone ..... Fax .....  
Physician .....  
Coordinator..... Phone.....  
1. ☐ Test For Brain Stem Death Record 2. ☐ Consent of Donor's Relatives  
3. ☐ Laboratory Record ☐ HLA ☐ LFT ☐ Infectious Markers  
☐ CMV ☐ VDRL  
Proposed Donor Operation Date ..... Time ..... Clamp time. ...

#### Allocation Organ Procurement

**Heart**  
1. .... Accept ☐ Yes ☐ No Because.....  
2. .... Accept ☐ Yes ☐ No Because.....  
3. .... Accept ☐ Yes ☐ No Because.....  
4. .... Accept ☐ Yes ☐ No Because.....  
5. .... Accept ☐ Yes ☐ No Because.....  
**Liver**  
1. .... Accept ☐ Yes ☐ No Because.....  
2. .... Accept ☐ Yes ☐ No Because.....  
3. .... Accept ☐ Yes ☐ No Because.....  
4. .... Accept ☐ Yes ☐ No Because.....  
5. .... Accept ☐ Yes ☐ No Because.....  
**Kidney**  
1. .... Accept ☐ Yes ☐ No Because.....  
2. .... Accept ☐ Yes ☐ No Because.....  
3. .... Accept ☐ Yes ☐ No Because.....  
4. .... Accept ☐ Yes ☐ No Because.....  
5. .... Accept ☐ Yes ☐ No Because.....

#### Donor's Relative

Name ..... Phone.....  
Address .....

Reported by.....  
Date..... Time.....

Figure G.1. Donor Check List Report.





Organ Donation System for Non Profit Organization

No.

Data Collection Form

Donor Id.....  
Donor Name.....Age..... Blood Group.....  
Hospital..... Admission DateTime.....  
Physician.....

Current History (Abdominal Injury).....  
Diagnosis.....  
Recent Surgery....Procedure.....Date..... Time.....

Test for brain stem Death

First Date..... Time.....  
Second Date..... Time.....  
☐ Spontaneous Respiratory  
☐ On Ventilator Date..... Time.....  
Type..... Mode..... FiO2..... TV..... Rate.....  
Cardiac Arrest ☐ No ☐ Yes Date..... Time..... Duration.....  
Hypotention ☐ No ☐ Yes BP..... mmHg. Date..... Time.....  
Duration.....  
Intropic drugs ☐ No ☐ Yes Rate.....  
Date..... Time.....

Medical Treatment

IV Fluid.....  
Antibiotic.....  
Steroid.....

DateTime	BT	BP	PR	RR	CVP	Urine	Medication	Note

Urine Out Put in 8 hours(..... ) =..... ml. in 24 hours(.....) =..... ml.

I/O.....

Past History.....

Record By.....

Date..... Time.....

Figure G.2. Data Collection Form Report.



Organ Donation System for Non Profit Organization

No.

Donor Histocompatibility Lab

Donor ID..... Name.....  
BW.....kg. Height.....cm. Chest.....cm. Girth.....cm.  
Hospital..... Physician.....

Laboratory Information

Date Time			Date Time			Date Time		
			CBC			UA		
HIV Ab			Hb			pH		
HBs Ag			Hct			Sp.gr.		
HCV Ab			WBC			Sugar		
VDRL			RBC			Albumin		
CMV-IgM			Platelet			Ketone		
CMV-IgG			Neutrophil			WBC		
-----			Lymphocyte			RBC		
-----			Mono			Epithelium		
-----			-----			Bact.		
-----			-----			Cast		
-----			-----			Blood		

Date Time			DateTime			Date Time		
TP			PG			FiO2		
Alb			BUN			pH		
Glob			Cr			PO2		
TB			Na			PCO2		
DB			K			BE		
SGOT			Cl			Bicarb		
SGPT			CO2			O2 sat.		
Alk phos.			-----			-----		
PT			-----			-----		
PTT			-----			-----		
INR			-----			-----		
GGT			-----			-----		

Hemo C/S..... Urine C/S.....

Sputum C/S.....

EKG..... Echo.....

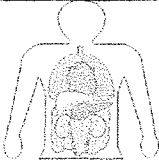
Chest X-ray..... Plain KUB.....

Reported By.....

Date .....Time.....

.....Histocompatibility Lab

Figure G.3. Laboratory Information Report.



**Organ Donation System for Non Profit Organization**

No.

---

HLA of

Donor Name.....

Date.....

Time.....

A	A	B	B	DR	DR

---

HLA Matching Result

Name	Hospital	Point	PRA	Mismatch	Serum	Time	Note
1.....							
2.....							
3.....							
4.....							
5.....							
6.....							
7.....							
8.....							
9.....							
10.....							

Cross Match Result

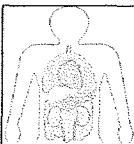
Donation to Recipient Name.....
Recipient ID.....
Transplant Hospital.....

---

Reported By.....

Date .....Time.....

Figure G.4. Cross Match Result.



## Organ Donation System for Non Profit Organization

### Transplant Recipient Follow Up

#### Part 1 Recipient Demographic

1. Recipient  
(Name, Surname) .....  
Sex .....
2. Birth Date ..... Occupation .....
3. Diagnosis.....
4. ABO Group ..... Rh.....
5. HLA .....

Date.....  
No. ....

#### Part 2 Transplant Hospital Detail

1. Hospital Name .....
2. Organ Transplant ☐ Liver ☐ Lung  
☐ Kidney ☐ Heart and Lung  
☐ Heart ☐ Other .....
3. Donor Operation .....
4. Operation Date ..... Time ..... O'clock
5. Transplant surgeon.....
6. Transplant Physician .....

#### Part 3 Patient Status (All Organ)

- ☐ 1. Living – date of hospital report.....
- ☐ 2. Dead – date and cause of death .....
- ☐ 3. Re – transplanted prior to hospital discharge date .....
- ☐ 4. Cause of retransplant (thoracic only).....

#### Part 4 Clinical Information at discharge (Kidneys only)

- ☐ 1. Most recent serum creatinine prior to discharge .....
- ☐ 2. Did Kidney produce >40 ml. Of urine in first 24 hours .....
- ☐ 3. Did patient need dialysis within first week .....
- ☐ 4. Did creatine decline by 25 % or more in first 24 hours on two separate serum samples taken with in first 24 hours .....

#### Part 5 Graft Status at Discharge (Kidney, Liver and pancreas only)

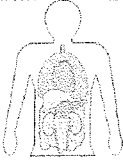
1. Functioning or failed .....
2. If failed, date and cause .....

#### Part 6 Donor Demographic

1. Donor Name .....
2. Hospital .....

Record by .....  
Sign ..... Date Record .....

Figure G.5. Transplant Recipient Follow Up Report.



## Organ Donation System for Non Profit Organization

---

### Recipient Registration

Organ Request

☐ Liver
 ☐ Kidney

☐ Heart
 ☐ Lung

☐ Heart and Lung
 ☐ Other.....

No. ....

Date .....  
(Officer only)

Name ..... Surname ..... Sex ☐ Male ☐ Female  
 Age ..... Body Weight ..... kg. Height ..... cm.  
 Diagnosis .....  
 ABO Group ..... Rh ..... PRA .....  
 HLA

A	A	B	B	DR	DR

Date of First Dialysis.....  
 Status
 

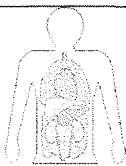
☐ ACTIVE
 ☐ SUSPENDED

☐ URGENT
 ☐ WITHDRAW

Transplant Hospital.....  
 Physician .....  
 Coordinator ..... Coordinator Phone .....  
 Date Registration .....  
 Received By .....

Figure G.6. Recipient Registration Report.





Organ Donation System for Non Profit Organization

No.

Waiting List

Print at 08/07/00  
Page Number 1

Renal Candidate

Recipient ID 00-0701

Name.....  
Gender..... Race..... Age..... ABO Blood Group.....  
PRA..... HLA.....  
Hospital.....  
Organ Type.....

Recipient ID 00-0702

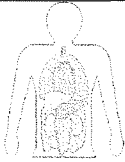
Name.....  
Gender..... Race..... Age..... ABO Blood Group.....  
PRA..... HLA.....  
Hospital.....  
Organ Type.....

Recipient ID 00-0703

Name.....  
Gender..... Race..... Age..... ABO Blood Group.....  
PRA..... HLA.....  
Hospital.....  
Organ Type.....

Total Number of existing potential recipient : 3

Figure G.7. Waiting List (Renal Candidate) Report.



Organ Donation System for Non Profit Organization

No.

Waiting List

Print at 08/07/00  
Page Number 1

Non- Renal Candidate

Recipient ID 00-0701

Name.....  
Gender.....Race.....Age.....ABO Blood Group.....  
Patient status code (reflecting degree of medical urgency) for heart and  
liver.....  
Number of previous transplant.....  
Hospital.....  
Organ Type.....  
Acceptable donor characteristics.....

Recipient ID 00-0702

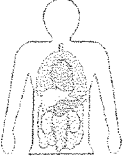
Name.....  
Gender.....Race.....Age.....ABO Blood Group.....  
Patient status code (reflecting degree of medical urgency) for heart and  
liver.....  
Number of previous transplant.....  
Hospital.....  
Organ Type.....  
Acceptable donor characteristics.....

Recipient ID 00-0703

Name.....  
Gender.....Race.....Age.....ABO Blood Group.....  
Patient status code (reflecting degree of medical urgency) for heart and  
liver.....  
Number of previous transplant.....  
Hospital.....  
Organ Type.....  
Acceptable donor characteristics.....

Total Number of existing potential recipient : 3

Figure G.8. Waiting List (Non Renal Candidate) Report.



Organ Donation System for Non Profit Organization

No.

Organ Request Summary

Page 1

-Organ Request Summary as of 08-07-00 -

Organ Type	Organ Category	Current Month's Organ Transplant	Current Year Organ Transplant

Total:

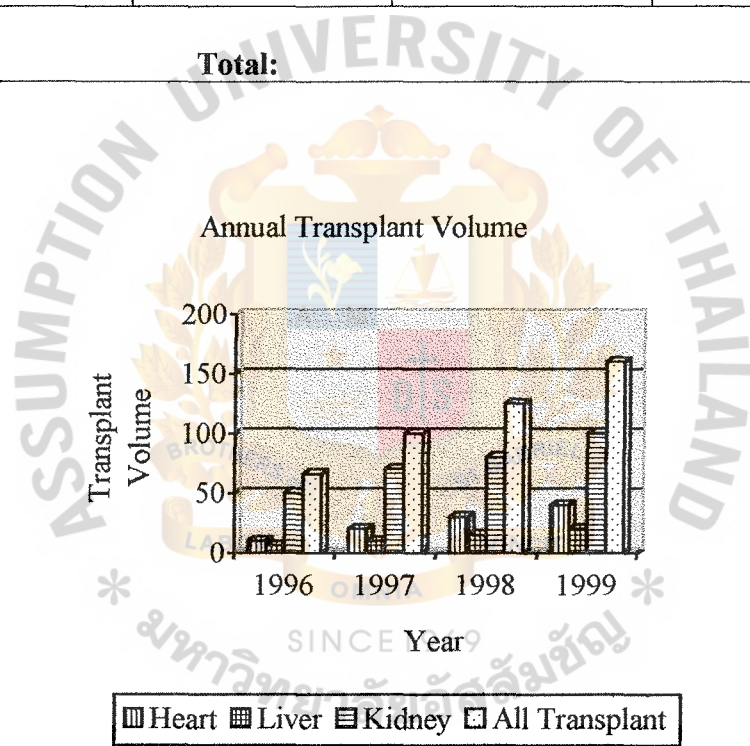


Figure G.9. Organ Request Summary Report and Annual Transplant Volume Graph.



## Organ Donation System for Non Profit Organization

No.

### Organ Donation Summary

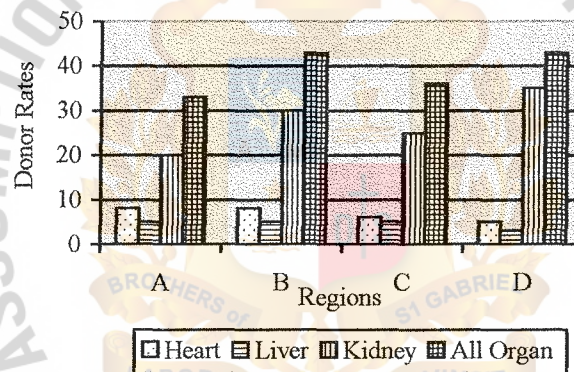
Page 1

-Organ Donation Summary as of 08-07-00 -

Hospital Name	Donor Type	Organ Type	Current Month's Donor Rates	Current Year Donor Rates

Total:

Regional Donor Rates



Cadaveric Organ Donations

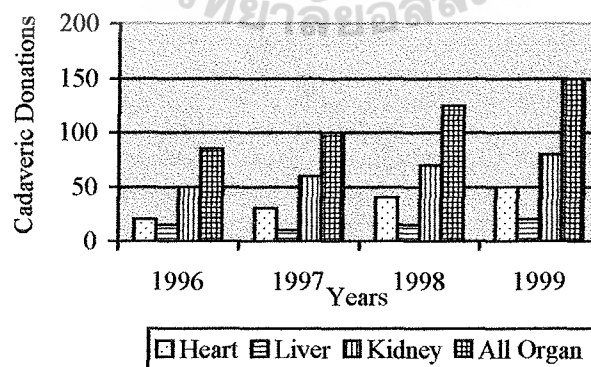


Figure G.10. Organ Donation Summary Report, Regional Donor Rates, and Cadaveric Organ Donations Graphs.

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