

ADULT HEART TRANSPLANTATION

PROTOCOL

Revised June 2002

**LOMA LINDA UNIVERSITY MEDICAL CENTER
LOMA LINDA INTERNATIONAL HEART INSTITUTE
Heart Transplant Program
PO Box 2000
Loma Linda, CA 92354
(909) 824-4201**

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**CARDIAC TRANSPLANTATION
LOMA LINDA UNIVERSITY MEDICAL CENTER**

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INTRODUCTION

Loma Linda University Medical Center (LLUMC) is a 797 bed tertiary medical center operated by the Seventh-day Adventist Church. The Medical Center is located on the campus of Loma Linda University, a private, Seventh-day Adventist university which enrolls over 2,800 students annually in its six schools, including a school of medicine. In 1993, a new state-of-the-art bed Children's Hospital was opened to serve children's unique health-care needs.

The Medical Center is the centerpiece of Adventist Health System/Loma Linda, which also owns the Behavioral Medicine Center, a free-standing 89 bed psychiatric hospital. Adventist Health System/Loma Linda comprises one of the four major divisions of Adventist Health System/US which operates 50 hospitals throughout the nation. Loma Linda University Medical Center is, however, governed locally by its own board of trustees and operates as a not-for-profit corporation.

The Medical Center is licensed by the State of California and accredited by the Joint Commission on Accreditation of Hospitals and Health Organizations. Loma Linda University Medical Center is approved by Health Care Financing Administration as a Medicare provider--Provider No. 050327. The Medical Center clinical laboratory is licensed by the State of California Department of Health Services.

Loma Linda University Medical Center provides the only training and research oriented academic cardiovascular medical/surgical service available to the four Southern California inland counties--Inyo, Mono, Riverside, and San Bernardino--which comprise about one-fourth of the State's land area. Fully approved training programs in general and cardiothoracic surgery, internal medicine, cardiology, and pediatrics have existed for a number of years. More recently, the vascular surgical service has become one of only three fully-approved training programs in vascular surgery in the State of California. In addition, Loma Linda University Medical Center is the only state-designated Level 1 Trauma Center serving the four inland counties of Southern California. The Medical Center is the principal clinical affiliating hospital for the Loma Linda University School of Medicine.

Basic science research in renal and cardiac transplantation at Loma Linda University dates back to early 1968, just one year after the opening of the new Medical Center facility and its 96,000 square foot medical research wing. The early research spawned here at Loma Linda University Medical Center developed into an active clinical kidney transplantation program which continues today. Laboratory research in cardiac, pancreatic islet cell, and liver transplantation has become much intensified since 1975, resulting in active clinical transplant programs. LLUMC began kidney transplantation in 1967; corneal transplantation in 1977; heart transplantation in 1985; combined kidney-pancreas in 1993; combined kidney-heart in 1993, and liver transplantation in 1993.

Heart transplantation is an accepted therapeutic modality for end-stage heart disease and congenital cardiac defects. Since the Cardiac Transplantation Program's inception in November 1985, over three hundred fifty infants, children, adolescents and adults combined have undergone cardiac transplantation.

Loma Linda University Medical Center has been an integral part of the advancement of the science of heart transplantation. LLUMC has been approved by both Medicare and California Medicaid to provide heart transplantation services. The following represents the most current management guidelines for the adult heart transplant population at this facility.

RECIPIENT INCLUSION CRITERIA

1. Significant functional limitation despite maximum medical therapy. New York Heart Association Class III to IV.
2. Heart disease not amenable to surgical correction or left ventricular volume reduction surgery (Batista Procedure).
3. Refractory angina or refractory life-threatening arrhythmia despite maximal medical therapy and or surgical modalities.
4. Age \leq 65 years, older ages in selected patients with isolated heart disease.
5. Medically compliant and capable of following a complex medical regimen with support of family
6. Supportive family structure residing with or near the candidate

RECIPIENT EXCLUSION CRITERIA

1. Severe cardiac cachexia
2. Insulin dependent diabetes
3. Severe atherosclerotic vascular disease and/or cerebrovascular disease
4. Peptic ulcer disease*
5. Malignancy or other disorder that might decrease life expectancy
6. Pneumonia, recent or unresolved pulmonary infarction. Any infiltrate on chest X-ray is a relative contraindication
7. Pulmonary vascular resistance $>$ 5-6 Wood units, unresponsive to vasodilators
8. Serum creatinine \leq 2.0 mg/dl except for acute increase due to severe heart failure
9. Severe obesity: $>$ 140% of ideal body weight
10. Moderate obesity (120 - 140% of ideal body weight)*
11. Severe primary pulmonary disease
12. History of central nervous system disorder*
13. Recent major psychiatric illness that would significantly impair the patient's ability to consistently and reliably comply with the complex post-transplant medical regimen.
14. History of substance abuse (alcohol, tobacco, drugs) or mental illness*
15. HIV positivity, Hepatitis B surface antigenemia, Hepatitis C* (liver biopsy to exclude cirrhosis)
16. Untreated bacteremia
17. Untreated intravenous line sepsis

*Relative contraindication

CANDIDATE EVALUATION TESTING

- I. Clinical Laboratory Studies:
 - A. Blood type and antibody screen
 - B. Random chemistry profile with T4
 - C. Complete blood count with differential
 - D. Percent reactive antibody (send 1 cc in a red top tube to Histocompatibility)
 - E. Urinalysis
 - F. HLA typing and crossmatching (completed when donor is identified)
 - G. Prostatic Specific Antigen (as indicated)
 - H. Stool for occult blood (as indicated)

- II. Other Tests:
 - A. Echocardiogram
 - B. Right heart catheterization
 - C. Chest radiograph
 - D. Coronary angiography (if indicated)
 - E. Pulmonary function test (if indicated)

- III. Consults:
 - A. Social Services
 - B. Dentistry
 - C. Infectious Diseases
 - D. Psychiatry (as indicated)
 - E. Neurology (as indicated)
 - F. Nephrology (as indicated)
 - G. Gastroenterology (as indicated)

- IV. Pre transplantation Infectious Diseases Screening:
 - A. Coccidioidomycosis titer
 - B. Hepatitis B surface antigen
 - C. Hepatitis C antibody
 - D. HIV screen
 - E. RPR or VDRL
 - F. PPD skin test

CARE OF THE POTENTIAL DONOR

Once brain death has been diagnosed, immediate attention must be given to the maintenance of organ function. Prolonged maintenance of brain-dead individuals results in the deterioration of organ function, primarily as a consequence of decline in systemic perfusion. Adherence to an established donor-monitoring protocol ensures that organs are recovered in optimal condition. The following guidelines are essential to such a protocol:

1. Maintenance of optimal tissue and organ perfusion
2. Maintenance of fluid and electrolyte balance
3. Maintenance of adequate blood gases
4. Prevention of secondary infection
5. Maintenance of normal temperature

Hemodynamic management is essential, and hemodynamic status must be meticulously assessed if adequate perfusion of the potential donor organs is to be maintained. Inotropic support may be necessary even after fluid loading is accomplished.

The development of diabetes insidius is common after brain-death as a result of the failure of the hypothalamus of the posterior pituitary gland to produce or release antidiuretic hormone. The result is often an abnormally high output of very dilute urine, leading to hypovolemia, falling blood pressure, hemoconcentration and decreased systemic perfusion. This condition must be treated immediately with fluid replacement and with infusions of vasopressin in order to maintain adequate blood pressure.

Required documents

1. Brain death certified by two physicians. May be recorded on progress notes that document brain death according to state laws
2. Family's consent for organ donation
3. Documentation of coroner's consent (if applicable)
4. Copy of donor chart
5. Copy of echocardiogram tape
6. Donor blood and tissue specimens for infectious disease screen and tissue typing (procured on site)
7. Confirmation of blood type

DONOR INCLUSION CRITERIA

Once a diagnosis of brain death has been made, other considerations in the evaluation of a potential organ donor include the following:

1. Hemodynamically stable with appropriate volume loading and inotropic support
2. Preferably under age 60
3. No occlusive coronary artery disease as identified by coronary angiography*, coronary angiogram for women >50 years old and men > 45 years old)
4. No history of heart disease
5. No sepsis
6. No known malignancy (exception: primary brain tumor)
7. Electrocardiogram, echocardiogram
8. Appropriately signed consent for organ donation
9. ABO blood group compatibility with recipient
10. Appropriate weight compatibility with recipient
11. Donor allocation according to Classification System specified by procurement agency

*relative criteria

DONOR EXCLUSION CRITERIA

1. Does not meet brain death criteria as outlined under Donor Inclusion Criteria
2. Significant cardiac malformations
3. Significant ventricular arrhythmia
4. Significant coronary disease by arteriography or documented previous myocardial infarction
5. Evidence of severe myocardial ischemic injury: e.g., poor ventricular function on echocardiography without improvement after volume replacement and appropriate inotropic support and/or:
 - a. Ejection fraction < 45%
 - b. Shortening fraction < 25%
 - c. Significant valvular abnormality
6. Evidence of significant infection
 - a. Uncontrolled bacterial sepsis
 - b. HIV positivity
 - c. Hepatitis B surface antigenemia
 - d. Hepatitis C positivity*
7. Any acute malignancy, except primary brain tumor
8. Death from carbon monoxide poisoning, with carboxy hemoglobin level > 20%
9. History of intravenous drug use
10. ABO incompatibility with potential recipient
11. Inappropriate size match for potential recipient

DONOR PRE-OPERATIVE PROTOCOL

1. If the individual is found to be a satisfactory donor following the donor evaluation, supportive care is continued until the time of surgery.
2. Heart (multi-organ) procurement is accomplished.
3. Pre-operative donor medications administered in the operating room by anesthesia include:
Methylprednisolone 1000 mg IV
Kefzol 1000 mg IV
50% Dextrose 50 cc IV
4. Roe's Solution for cardioplegia:
NaCl 27 mEq/l
KCl 20 mEq/l
Methylprednisolone 250 mg/liter
MgSO₄ 3mEq/liter
D5W 1000 ml (kept in refrigerator)
pH adjusted to 7.40 with NaHCO₃ (2.25 mEq)
Store in refrigerator. Do not prepare in advance.
5. Graft stored in 4_ C normal saline (500 cc of normal saline to which 10 cc of 50% dextrose has been added).

**INITIAL WORK-UP IN HISTOCOMPATIBILITY LAB
IN IMMUNOLOGY CENTER**

The following studies are obtained on potential recipients and donors:

- A. Laboratory studies - Recipient
 - 1. Pre-Transplantation
 - a. Confirm ABO type
 - b. Panel Reactive Antibody (PRA)
 - c. Take history of presensitization events: # of transfusions (dates, type of blood products, if possible), any previous surgery or transplant, pregnancies
 - 2. At time of transplantation
 - a. HLA - A, B, C, DR, DQ
 - b. Donor specific antibody testing
 - c. CFC Cardiac Transplant Profile
 - d. Crossmatch donor lymphocytes (CDC)
 - e. Donor specific antibody testing (CDC)
 - f. T cell flow cytometry crossmatch
- B. Laboratory studies - Donor
 - a. Confirm ABO type (Blood Bank)
 - b. HLA-A, B, C, DR, DQ
- C. After donor heart is recovered, collect lymph nodes, spleen, and any available blood for "donor-specific antigen", which will be stored in liquid nitrogen in the Histocompatibility Lab of the Immunology Center.

BLOOD BANK TRANSPLANT PROTOCOL

Transplant patients have special needs that require more care by the Blood Bank before products can be given.

Preparing blood and blood products may take up to 6 hours following notification of heart transplant surgery. Demands for shorter turn around time on all tests will depend on circumstances surrounding both recipient and prospective donor. The Blood Bank Supervisor will be notified by the Director of the Immunology Service when the decision has been made to proceed with transplantation.

1. When ABO/Rh typing is completed, appropriate blood products are ordered from the San Bernardino/Riverside Blood Bank.
2. The following blood products are ordered:

Packed Red Blood Cells	8 units
Platelet Concentrate	2 adult units
Fresh Frozen Plasma	6 units
3. When blood products are received, the Histocompatibility technician on call is notified.
4. Red cell antibody screen and crossmatches are accomplished.
5. All blood products must be passed through a leukopore filter to deplete leukocytes, regardless of CMV status.

RECIPIENT PRE-OPERATIVE PROTOCOL

The following are the routine physician orders for the potential recipient upon notification that a suitable donor heart is offered and accepted:

1. NPO at time of notification
2. Heparin lock or IV placed
3. CXR - PA and lateral
4. Urinalysis
5. CBC with differential
6. Random chemistry profile
7. Protime
8. Bleeding time
9. ACT
10. Cytomegalovirus titer
11. Ebstein Barr Virus titer
12. Herpes Simplex titer
13. Rubella titer
14. Toxoplasmosis titer
15. Varicella Zoster titer
16. Pregnancy test, if indicated
17. CFC cardiac transplant profile
18. Donor specific crossmatch
19. HLA - A, B, C, DR, DQ
20. Signed consent for cardiac transplantation and serial endomyocardial biopsies as required
21. Fleets enema
22. When final approval given: surgical prep anterior chest and upper abdomen (clip). Betadine shower after prep.
23. Type and crossmatch for:
 - 8 units PRBC
 - 2 units (6 packs each) platelet concentrate
 - 6 units FFP
24. Aquamephyton if necessary
25. Initial dose of oral Cyclosporine (Neoral 2mg/kg) on admission to medical center or on notification of acceptable donor, if recipient is an inpatient.

**INITIAL POST OPERATIVE RECIPIENT
IMMUNOSUPPRESSION TREATMENT GUIDELINES**

A combination of the following immunosuppressants may be used based upon the recipient's needs and physician's preference.

1. Cyclosporine 2.0 - 3.0 mg/kg PO every 12 hours*
If unable to tolerate PO, administer cyclosporine IV (1 mg/ml) by a continuous intravenous infusion at 1/3 the oral dose.
2. Azathioprine 1.0 - 3.0 mg/kg P.O./IV daily**
3. Methylprednisolone taper - 500 mg IV every 12 hours x 6 doses
4. Tacrolimus (FK-506) .05 - .15 mg/kg PO BID to obtain a trough level of 10-15 ng/ml for the first 3 weeks and then a target trough drug level of 8-10 ng/ml using the Abbott IMX Microparticle EIA - whole blood.
5. Mycophenolate Mofetil - 500 mg to 1500 mg/day in divided doses - BID.**
6. Prednisone to start after course of Methylprednisolone is completed.
Taper to start at 50-60 mg PO q 12 hours x4 doses and reducing by 10 mg q 4 doses.
e.g. 50 mg q 12 hours x 4 doses then,
40 mg q 12 hours x 4 doses then,
30 mg q 12 hours x 4 doses then,
20 mg q 12 hours x 4 doses then,
10 mg q 12 hours until QD dosing is initiated
7. ATGAM - Horse antihuman thymocyte gamma globulin dose is 10 - 15 mg/kg of body weight daily for 14 days, then QOD for 14 days for a total of 21 doses in 28 days.

* Cyclosporine dose adjusted to maintain whole blood RIA trough levels between 200-350 nanograms per ml and/or creatinine below 2.0 mg/dl.

** Dose adjusted based upon white blood cell count, maintaining WBC>4000/UL.

CARDIAC ALLOGRAFT REJECTION

DIAGNOSIS

Surveillance for rejection is based upon routine endomyocardial biopsies. Routine physical examination and periodic echocardiography complement the surveillance and diagnosis of rejection. Clinical findings of rejection may include: fatigue, fever, hypotension, elevated jugular venous pressure, and the presence of an S3 gallop. echocardiography may reveal a decrease in systolic or diastolic function, A-V valve regurgitation, or pericardial effusion..

TREATMENT

The decision as to the course of treatment of rejection, if any, is based upon the recipient's rejection history and clinical status. Follow up endomyocardial biopsies are performed to determine status of rejection following treatment. The following are options available:

1. Mild rejection - Grade 1
 - a. No treatment with follow-up biopsy
 - b. Adjustment of current dose of immunosuppressants
 - c. Additional immunosuppressant, e.g. Methotrexate
 - d. Prednisone taper

2. Moderate rejection - Grade 3
 - a. Adjustment of current dose of immunosuppressants
 - b. Addition of immunosuppressant drug to current regimen, e.g. Methotrexate
 - c. Prednisone taper
 - d. Methylprednisolone - 1.0 gm IV every 24 hours x 3 days, usually followed by prednisone taper

3. Severe rejection - Grade 4
 - a. Methylprednisolone - 1.0 gm IV every 24 hours x 3 days, usually followed by a prednisone taper
 - b. ATGAM - 10-15 mg/kg of body weight for 14 days
 - c. OKT3 - 5 mg/day IV for 10-15 days
 - d. ATS - 0.5 mg/kg/day I.V. x 7-10 days, mixed = 1 mg/1 ml dilution of .45 N.S. per Nashville ATS Protocol.

ADULT OUTPATIENT FOLLOW-UP GUIDELINES

1. Echocardiogram every 4-6 months depending upon rejection history and recent endomyocardial biopsy results.
2. Endomyocardial biopsy - weekly x 4 weeks, then as indicated by clinical course.
3. MUGA - may perform instead of echocardiogram
4. Laboratory - CBC, random chemistry profile, and an immunosuppressant drug level are completed with clinic visits.
5. Clinic visits - once a week x 4 weeks, then every other week x 3, then every 3rd week x 3, then monthly x 3-6, then every 2 months x 2-3, then every 3-4 months. Visit schedule may be altered depending upon patients course post-transplant.
6. Toxoplasmosis titer, Cytomegalovirus titer and/or Epstein Barr Virus titers shall be done on those recipients that are originally sero-negative at 3 months, 6 months, and 12 months post-transplant, then yearly until known seroconversion.

ADULT ANNUAL PATIENT VISIT GUIDELINE

Outpatient Studies

1. Chest X-ray, PA and Lateral (optional)
2. Electrocardiogram/echocardiogram - if not done recently
3. Clinical Laboratory
 - a. CBC, Random Chemistry Profile without T4
 - b. Prothrombin time (optional)
 - c. Cyclosporine or Tacrolimus drug level
- 4.. Cardiac Catheterization
 - a. Right and left heart catheterization
 - b. Coronary arteriography
 - c. Endomyocardial biopsy

or
5. Treadmill Stress Test (one of the following)
 - a. Thallium
 - b. Cardiolute
 - c. Metabolic
6. If patient is not considered suitable for re-transplantation, studies directed at the diagnosis of coronary artery disease may be deferred.

PROTECTIVE ISOLATION MEASURES

1. Sign posted on patient's door identifying the protective isolation.
2. The following personnel, family or visitors MAY NOT ENTER the transplant room:
 - Anyone with signs or symptoms of a cold, flu, cough or allergy
 - Anyone with an open cut, skin fungus, rash, boils or other skin abnormalities to include open wounds, rash, infection
 - Anyone with signs or symptoms of infection
 - Anyone who has been assigned to a room with an infected patient
 - Anyone under age 14 years
3. The primary nurse is responsible for:
 - Monitoring all personnel and visitors for appropriate isolation requirements
 - Maintaining continuity of care with other services and technicians
 - Regulating the number of individuals in the room per unit policy
4. Isolation Requirements:
 - Three minute Betadine or Hibiclens hand scrub OR thorough hand washing and wearing of gloves for all entering the room
 - Gloves to be worn during all direct patient contact and discarded and replaced with each episode of patient contact
 - The isolation requirements must be repeated with every re-entry into the patient's room
 - Thorough cleaning of the room by housekeeping daily
 - The patient should wear a mask upon leaving the room
 - The patient should wash his/her hands thoroughly upon returning to the room
 - The room should be kept clean and clutter free
 - Universal precautions should be in effect at all times
5. Family Education:
 - The family will be given a card reviewing isolation and visiting guidelines
 - The need for isolation and visiting guidelines will be explained to patient and family
 - If the patient is in isolation for a prolonged period, there may be the opportunity to visit with children under age 14 years in the day room. This must have the prior approval of the physician.

PROCEDURE AT TIME OF DEATH

At the time of death, the patient should have the following specimens obtained:

Specimen	Container	Amount	Send to:	Assay
urine	sterile	12 ml	Clinical Lab	urinalysis routine bacterial culture viral culture fungal culture
blood (via CVP line)	culture bottles	10 ml	Clinical Lab	aerobic and anaerobic cultures
blood (via CVP line)	heparin tube (green top)	2 ml	Clinical Lab	buffy coat for CMV viral culture
blood (via CVP line)	red top tube	10 ml	Clinical Lab	HBsAG Toxoplasmosis titer CMV titer EBV - IgM EBV - IgG

PROTOCOL FOR ADULT HEART TRANSPLANT AUTOPSIES

Since each recipient's course is unique and continues to teach us more about transplantation in this group, it is vitally important that a thorough autopsy be performed whenever a death occurs and consent is given. The aim of the autopsy should be not only to establish the cause of death as accurately as possible, but also to evaluate the effects of current forms of therapy.

At Loma Linda University Medical Center, the families of cardiac transplant recipients are encouraged to agree to an autopsy in the event of the recipient's death. Most families readily agree when they understand the very important contribution their family member can make by furthering our understanding of transplantation. This, of course, is a delicate subject, but should be approached in a timely manner in order not to delay the commencement of the autopsy. The pathologist should be notified immediately of the death.

We have found the following guidelines useful:

1. The pathologist on call will communicate immediately with the transplant surgeon/coordinator on call in order to establish as accurately and as quickly as possible the following data:
 - a. Age of patient
 - b. Age of donor
 - c. Length of time the allograft was in situ
 - d. Whether the donor heart was distantly procured; if so, the length of ischemic time
 - e. The original heart disease of the recipient. e.g., cardiomyopathy, coronary artery disease, congenital heart disease, or other.
 - f. List of diseases (by system) documented and suspected prior to death
 - g. The clinical mode of death
 - h. If infectious etiology is suspected, all the details should be known to the pathologist. This includes:
 - 1) All positive cultures
 - 2) All antibiotics used
2. Photographs of major and interesting lesions should be taken during or immediately after the dissection for teaching purposes with the team during review of the case.
3. Because of the increased possibility of infection, blood cultures must be taken. Cultures should also be taken routinely from the lung and anywhere else where there is a suspicion of infection. Blood cultures will be obtained at the moment of death while the patient is still on the patient care unit.
4. Fresh sections of liver, kidney and lung, together with samples of blood, feces and urine should be sent for viral culture. The Virology lab should be notified so that adequate containers and the appropriate labels are available and someone is available to receive them.
5. While conventional autopsy technique will be satisfactory in most instances, the dissection should be modified to the individual case when necessary. All organ systems should be thoroughly examined and sampled. Wall sections of the heart should include, at least, sections from the right ventricle, left ventricle, and interventricular septum. The papillary muscles often show evidence of acute rejection and should be sampled. Sections of all three major epicardial coronary arteries should be taken. Sections through the atrial and aortic suture sites should also be taken.
6. Because of the degree of immunosuppression, particular attention should be paid to samples of bone marrow, spleen, para-aortic nodes, and other lymph nodes taken for examination for possible signs of opportunistic infection or malignancy.
7. Lymphomas and other malignancies have been reported in transplanted patients as early as six months post cardiac transplantation; therefore there should be a high level of suspicion.

8. The brain and full spinal cord should be taken in all cases if possible, but especially if there were any clinical signs of impairment of the central nervous system. Herpes zoster may be found in posterior root ganglia, etc. The lymphomas described and many of the infections, particularly opportunistic infections, have a predilection for the brain.
9. The lungs are the most common source of infection in transplant recipients. After securing appropriate cultures, one lung should be fixed by bronchial perfusion of 10% formaldehyde or Brady's solution for 24 hours at room temperature before further cutting.
10. Most specimens should be saved "fresh" in the refrigerator for teaching purposes. Gastrointestinal specimens and selected specimens with teaching value which might be damaged by prolonged fresh storage may be saved in Brady's solution at room temperature.
11. Blocks of unfixed tissues, including but not necessarily limited to myocardium, liver, and kidney, should be snap frozen and stored at -70° C in anticipation of any future studies requiring frozen tissue.
12. Samples of heart, kidney, and other organs deemed appropriate should be fixed in glutaraldehyde for electron microscopy.

APPENDIX

**GUIDELINES FOR
DETERMINATION OF BRAIN DEATH** **Code:M-22.A**
Effective: 12/78
Page: 1 or 2

1. **Purpose of the Guidelines.** To serve as a general guide for physicians in evaluating patients for brain death.
2. **Definition of Terms.*** The distinction between irreversible coma and brain death is vital for the physicians who must make a judgment in this most sensitive area of practice and for all other professionals involved in the care of terminally ill patients.
 - 2.1 "Irreversible coma refers to a vegetating state in which, a) all functions attributed to the cerebrum are lost, but b) certain vital functions as respiration, temperature, and blood pressure regulation may be retained."
 - 2.2 "Cerebral death implies total destruction of the brain so that both volitional and reflex evidences (except the possibility of spinal reflex action) of responsiveness are absent."
3. **Prerequisites for Determination of Brain Death.** The patient's unresponsiveness is not due to hypothermia or drug intoxication.
4. **Clinical Criteria for Determination of Brain Death.*****
 - 4.1 Unresponsiveness.
 - 4.2 Absence of spontaneous movements (other than those due to possible spinal reflexes) and breathing.
 - 4.3 Absence of cephalic reflexes. e.g., pupillar, corneal, oculovestibular, oculocephalic, cough, pharyngeal, swallowing.
 - 4.4 Electrocerebral silence.
 - 4.5 Persistence of the above for a minimum of a six-hour period.
5. **Alternative and/or Supporting Confirmation** if above criteria not present/cannot be evaluated.
 - 5.1 Demonstrated absence of cerebral circulation** by use of the Radioisotope Bolus Technique, or cerebral angiography.
6. **Recorded Time of Death** is the time a second medical confirmation of brain death is expressed on the clinical chart. (An independent conformation of death in such cases is a legal requirement in the State of California)

*Summary Statement: "An Appraisal of the Criteria of Cerebral Death," JAMA, March 7, 1977; 237(10): 982.

**Veith et al. "Brain Death," JAMA, October 10, 1977, 238 (15), and October 17, 1977, 238(16).

OPERATING POLICY

CATEGORY: Patient Care

SUBJECT: Determination of Brain Death

PURPOSE: To assure a course of action related to pronouncement of death which is clinical, ethically, and legally sound.

- 1. Brain death shall be:
 - 1.1 Determined by an Attending Physician using criteria defined in the attached guidelines; alternative and/or supporting confirmation measures utilized as needed.
 - 1.2 Documented on the medical record.
- 2. A second clinical confirmation* of death shall be made and documented on the medical record by a consulting physician. (See Guidelines PS-4A regarding precautions when organ transplantation is considered.)
- 3. Neither the Attending Physician determining the brain death diagnosis nor the concurring consultant shall participate in any procedure involving removal of an/or transplantation of any part of the deceased pursuant to the Uniform Anatomical Gift Act.
- 4. A copy of this policy and attached guidelines shall be made readily available to staff at each critical care unit nursing station.

*California Health and Safety Code, Section 7180.

APPROVED:

Chairman, Critical Care Committee, Date

Administrator, Date

President, Medical Staff, Date

Secretary, Medical, Date
Center Board

Assistant Administrator, Date

DISTRIBUTION: Secretary, Medical Center Board
Administrative Officers
Chiefs of Services
Legal Counsel

**OPERATING ROOM PROTOCOL
CARDIAC TRANSPLANT**

OBJECTIVE:

To provide a controlled, organized, safe environment in which to perform cardiac transplantation.

IMPORTANT POINTS:

1. Because of immunosuppression, the cardiac transplant candidate has an increased susceptibility to infection.
2. Persons not actively involved in the transplant will be limited to a maximum of three (to be determined by the operating surgeon). The circulating nurse is authorized to maintain control of personnel and traffic in the operating room.

METHODS	KEY POINTS
<ol style="list-style-type: none"> 1. Receive notification of the following: <ol style="list-style-type: none"> a. Name, age and identification number of recipient b. Location of the recipient c. Time of surgery d. Name of surgeon and assistants 	Cardiac Transplant Coordinator or surgeon will notify the OR.
<ol style="list-style-type: none"> 2. Prepare operating room for cardiac surgery. 	Place transplant sign on the door.
<ol style="list-style-type: none"> 3. Prepare instruments, drapes and supplies for cardiac surgery. 	Use Doctor's Preference Card.
<ol style="list-style-type: none"> 4. Receive patient into operating room. 	
<ol style="list-style-type: none"> 5. Make the following preparations for surgery: <ol style="list-style-type: none"> a. Wet shave if needed b. Routine iodophor skin scrub 	<p>Foley catheter is routinely inserted.</p> <p>Preferably the patient will have been clipped on the unit immediately prior to surgery.</p> <p>Cardiac Transplant is performed as soon as the donor heart is available. Donor and recipient surgeries may take place simultaneously.</p>
<ol style="list-style-type: none"> 6. Relay messages to family. 	By the circulating nurse. The chaplain will not be permitted in the room.
<ol style="list-style-type: none"> 7. Notify ICU of the progress in surgery. 	By the circulating nurse. The "Patient Report for Unit" will be sent in the usual manner.

**OPERATING ROOM PROTOCOL
DISTANT CARDIAC PROCUREMENT**

OBJECTIVE:

To aseptically recover and transport a heart donated in another hospital to LLUMC-OR for transplant.

IMPORTANT POINT:

Professional and courteous interaction with personnel in the distant hospital could positively influence future organ procurement.

METHOD	KEY POINTS
1. Receive notification.	On call OR nurse is notified by Transplant Coordinator that a possible distant cardiac donor has been identified.
2. Alert O.R. nurse assigned to do distant cardiac procurement.	Nurse does not need to come in until confirmed information is received.
3. Obtain the following information when confirmed notification has been received: <ul style="list-style-type: none"> a. Name, age and identification number of donor b. Name and telephone number of donor hospital c. Expected time of departure d. Type of transplantation 	Telephone number necessary for communication regarding OR preparation.
4. Ask Pharmacy to prepare two liters of cardioplegic solution.	Send one recipient IBM card. Keep solution in O.R. refrigerator at 4° C.
5. Prepare transplant suitcase and ice chest.	Kept in Storeroom. Procurement nurse checks and verifies that the necessary items are included.
6. Proceed to departure area with supply case and ice chest.	Ground transportation departs from Emergency Room. Helicopter departs from 7th floor heliport.
7. Identify donor by name and identification number upon arrival in donor hospital.	Transplant Coordinator assumes responsibility for identifying proper consents, time of death, and other required documents.

- | | | |
|-----|---|---|
| 8. | Scrub and set up instruments and supplies. Assist surgeon with cardiac procurement and packaging. | Use separate table/Mayo tray from donor hospital's routine setup to expedite collecting LLUMC instruments and equipment at end of procedure. Follow "Cardiac Procurement Duties and Responsibilities" for scrub nurses. |
| 9. | Collect all instruments and equipment for return trip to LLUMC. | Transplant Coordinator communicates progress of surgery to LLUMC OR. |
| 10. | Deliver heart to LLUMC O.R. | By procurement team. Heart is in ice chest. |
| 11. | Repack and restock transplant supply case using content list, and turn in appropriate supply charges. | By procurement nurse. Use recipient IBM card for charges. Return supply case and ice chest. |

**OPERATING ROOM PROTOCOL
IN-HOUSE CARDIAC PROCUREMENT**

OBJECTIVE:

To provide a controlled environment in which organ recovery can be done safely and smoothly with direct transfer to the recipient.

IMPORTANT POINTS:

1. Documents that must accompany the donor to the Operating Room.
 - Pronouncement and time of death, signed by two physicians other than operating surgeons.
 - Coroner's Consent.
 - Family Consent.
 - Completed Deceased Patient List (if body will go to the morgue).

2. Persons not actively involved in the transplant will be limited to a maximum of three (to be determined by the operating surgeon). The circulating nurse is authorized to maintain control of personnel and traffic in the operating room.

3. Cardiopulmonary bypass may rarely be used in multiple organ procurement.

METHODS	KEY POINTS
1. Receive notification.	On call O.R. nurse is notified by Transplant Coordinator that a possible in-house cardiac donor has been identified.
2. Alert OR nurses assigned to do in-house cardiac procurement.	Nurses do not need to come in until confirmed information is received.
3. Obtain the following information when confirmed notification has been received: <ol style="list-style-type: none"> a. Name, age and identification number of donor. b. Location of donor. c. Time of surgery. d. Name of surgeons and assistants. e. Organs to be recovered. f. Whether cardiopulmonary bypass is needed. 	
4. Ask Pharmacy to prepare two 1-liter of cardioplegic solution.	Send one recipient IBM card. Keep solution in O.R. refrigerator at 4° C.

Use an adjacent room for direct transfer of heart to recipient. Place transplant sign on the door.

5. Prepare O.R. for cardiac and/or multiple organ procurement.

6. Receive donor into operating room.

7. Assist surgeon in preparing the heart for transplant or for transport to other hospital.

8. Follow "Care at Time of Death" technique to prepare the donor body.

Follow "Cardiac Procurement Duties and Responsibilities" for scrub and circulating nurses.

Circulating nurse clears subroom or hallway for surgeon to transfer heart aseptically to recipient room.

**CARDIAC PROCUREMENT SCRUB NURSE
DUTIES AND RESPONSIBILITIES**

METHODS	KEY POINTS
1. Set up instrument table.	1. Distant Procurement: ask for separate table/Mayo tray for own instruments and supplies. Open 3 sterile basins on the table, fill with iced/cold saline.
2. Drape the donor.	2. See "Method of Chest Draping." Distant Procurement: follow the donor hospital's routine.
3. Pass the bovie suction tubing, cardioplegic tubing, pump tubing (if CPB is used).	3. Ask for separate bovie and suction for the cardiac team.
4. Place 2 laparotomy sponges on chest area. Skin incision made with #10 blade.	4. Surgeon likes to wipe gloves with wet laps before making skin incision. (See Doctor's Preference Card.)
5. Hand sternal saw to surgeon.	5. Test saw before the surgeon uses.
6. Hand sternal spreader to surgeon	
7. Hand pericardial sutures to surgeon.	7. Universal pericardial sutures: 2-0 silk, T-5 D-tach.
8. Hand O-silk ties on the passer.	8. With right angle, the O-silks are passed through the vessels. This is to mobilize the aorta, main pulmonary artery and superior vena cava.
9. Prepare cardioplegic line.	9. Cardioplegic purse string: 5-0 prolene T-16 cardioplegic needle: Adult: #14 gauge angiocath 5 1/4".
10. Remove heart from the cavity.	10. Surgeon uses scissors to do cardiectomy.
11. Rinse heart in cold saline.	11. Heart is rinsed in 3 separate basins with cold/iced saline. Add 10 cc 50% Dextrose to preservation solution.
	*In house recipient: heart is transferred with the basin filled with cold saline (last rinsing basin) by surgeon to recipient's room.

***Distant Procurement:** heart is aseptically packed in heart container, put inside the ice chest and covered with crushed ice.

12. Close the chest.

12. Done by the assistant or other organ procurement team.

***Distant Procurement:** procurement nurse needs to pack the instruments and supplies and be ready to leave with the team.

Note: Specimens needed for immunology center:

Blood (5 red top and 5 green top vacutainers), thymus, spleen and lymph nodes.

**CARDIAC PROCUREMENT CIRCULATING NURSE DUTIES
AND RESPONSIBILITIES**

METHOD	KEY POINTS
1. Prepare O.R. for organ procurement.	1. In-house Recipient: prepare procurement room adjacent to recipient room. Keep O.R.'s temperature warm. Use K-thermia blanket, heating light (peds only, or per request of Anesthesiologist).
2. Receive donor in operating room.	2. Identify donor through the I.D. band. Check donor's chart and obtain the following information: a. pronouncement and time of death, signed by two physicians other than the operating surgeons. b. coroner's consent c. family consent d. completed deceased patient list.
3. Proceed with routine preparations for surgery.	3. Skin Prep: Cardiac Procurement only: from chin to umbilical line. Multi-organ Procurement: from chin to mid-thighs. Use separate suction and Bovie machine for heart.
4. Connect Sarn's saw to the motor, help run the foot pedal.	4. Needs to be done as soon as the skin incision has taken place.
5. Connect I.V. tubing/cardioplegic line to the cardioplegic solution bag.	5. Cardioplegic solution is kept cold in the refrigerator/freezer.
6. Pour cold/iced saline into the sterile basins (3 basins).	6. Use three 1500 ml saline containers. Make sure the saline is cold enough (4° C).
7. Clear the subroom/hallway for the surgeon to transfer the heart (in-house recipient).	
8. Complete paper work.	8. Donor's chart needs to be sent out with the body
9. Prepare body according to "Care at Time of Death Procedure" (Technique D #11).	9. Out of state donor: communicate with transplant coordinator for the disposition of the body.

**MINIMUM BLOOD VOLUME REQUIREMENTS FOR TRANSPLANT
LABORATORY TESTING**

TEST	AMOUNT OF BLOOD	TUBE
ABO Type & Cross	1.5 ml+ few gtts	Red Top Tube Green
Aldosterone (Plasma)	3.0 ml	Green Top Tube on Ice
Amylase	1.0 ml	Red Top Tube
Anemia Studies		
a) CBC with Platelets	0.5 ml	Lavender Bullet
b) Erythropoietin Level	2.0 ml	Red Top Tube
c) Ferritin	0.6 ml	Red Top Tube
d) HgB Electrophoresis	1.0 ml	Lavender Tube
e) Retic Count	0.5 ml	Lavender Tube
f) Serum Immunoglobulins A E, G, M	3.0 ml	Red Top Tube
g) TIBC	1.0 ml	Red Top Tube
Basic Lytes	0.7 ml	Red Bili Tube
Bilirubin (T & D)	Infant: 2 cap tubes Child: 1.2 ml	Red Top Tube
Blood Cultures	0.5 ml each bottle	Pink & Yellow Bottles
BUN	0.6 ml	Red Bili Tube
Calcium	0.3 ml	Red Top Tube
Calcium (Ionized)	0.9 ml	Green Top Tube on ice
Carnitine	2.0 ml	Green Top Tube
CBC with Platelets	0.5 ml	Lavender Bullet
CFC Cardiac Transplant Profile (needs a CBC)	0.5 ml	Green Top Tube
Cell Profile	0.4 ml	Lavender Bullet
CK Isoenzymes	1.5 ml	Red Top Tube
CMV Ab Titer	0.6 ml	Red Top Tube
CMV IgG & IgM	2.0 ml	Red Top Tube
CMV Buffy Coad (Mon-Fri)	1.0	Green Top Tube (small)
CMV Titer	1.5	Red Top Tube
Creatinine	0.3 ml	Red Bili Tube
Cyclosporine	0.5 ml	Lavender Tube
Digoxin	0.3 ml	Red Bili Tube
Dilantin	0.15 ml	Red Bili Tube
Donor Specific Ab	0.2 ml	Red Top Tube
DPT Titer	1.0 ml	Red Top Tube
EBV IgG	1.0 ml	Red Top Tube
EBV IgM	1.0 ml	Red Top Tube
Erythropoietin	2.0 ml	Red Top Tube
Expanded Lytes	2.4 ml	Red Top Tube
FEP	1.0 ml	Lavender Top Tube
Ferritin	0.6 ml	Red Top Tube
FK506	0.5 ml	Lavender Tube
Flecainide	1.5 ml	Red Top Tube

Free Thyroxine Index	0.6 ml	Red Top Tube
Gentamycin	0.3 ml	Red Bili Tube
Hemophilus Influenza Titer	1.5 ml	Red Top Tube
Hepatitis BcAtG	1.0 ml	Red Top Tube
Hgb Electrophoresis	1.0 ml	Lavender Top Tube
HIV	1.0 ml	Red Top Tube
HLA ABC & DR	5.0 ml	Red Top Tube
IgE	0.9 ml	Red Bili Tube
IgG	0.9 ml	Red Bili Tube
IgM	0.9 ml	Red Bili Tube
Liver Profile	2.0 ml	Red Top Tube
Magnesium	1.0 ml	Red Top Tube
Myoglobin	1.0 ml	Red Top Tube
Osmolality (Serum)	1.0 ml	Red Bili Tube
Percent Reactive Atb	1.0 ml	Red Top Tube
Phenobarbital Level	0.2 ml	Red Bili Tube
Plasma Renin	3.0 ml	Special Lavender Tube
Potassium	0.3 ml	Red Bili Tube
Polio Titer	1.0 ml	Red Top Tube
Pneumococcal Ab Titer	4.0 ml	Red Top Tube
Protoporphyrin	3.0 ml	Lavender Top Tube
PSCE	2.7 ml+	Red Top Tube
	0.4 ml	Lavender Bullet
PT, PTT	2.7 ml	Blue Top Tube (small)
Random Chem Profile	1.5 ml	Red Top Tube (small)
Retic Count	0.5 ml	Lavender Bullet
RPR	0.7 ml	Red Top Tube
Serum Fe	0.6 ml	Red Top Tube
Serum Immunoglobulins (IgA, IgG, IgM)	3.0 ml	Red Top Tube
Sodium	0.3 ml	Red Bili Tube
Spontaneous Blastogenesis (Needs CBC)	0.5 ml	Green Top Tube
TB Cell Enumeration	3.0 ml	Yellow Top Tube
TIBC	1.0 ml	Red Top Tube
Theophylline	0.2 ml	Red Bili Tube
Toxoplasmosis Titer	2.4 ml	Red Top Tube
Triglycerides (Fasting)	2.0 ml	2 Red Bili Tubes
TSH, T3, Free Thyroxine Index	3.6 ml	Red Top Tube
Vancomycin	4.5 ml	Red Top Tube
Varicella Zoster Titer		

FINANCES

Patients accepted into the Loma Linda University Medical Center Heart Transplant Program must have financial resources available to pay for the cost of transplantation. Sufficient insurance coverage and authorization for transplant must be verified prior to listing the patient as a potential recipient for an available organ.

If sufficient insurance reimbursement is not available, private arrangements must be made with the Loma Linda University Medical Center Patient Business Office in advance.

Sufficient resources for outpatient follow-up care and pharmaceuticals must be available and confirmed prior to surgery.

The patient/family will be responsible for providing resources for living expenses, including transportation to and from the heart transplant clinic during the pre-transplant period and the post-transplant follow-up period. The patient must reside temporarily within a 45-60 minute travel time to Loma Linda University Medical Center for up to six months post transplantation.

SOCIAL SERVICES

The major purpose of Social Work participation in this program is to enhance the coping skills of the patient and family members with the long-term stresses inherent in heart transplantation, recovery, and rehabilitation.

Potential areas of concern will be perception and impact of illness and disability; motivation for compliance with medical regime; impact on marital and family adjustment; coping capabilities; and the need for community resources.

Early in the pre-transplant screening, the social worker will obtain a psychosocial history and marital/family history of patient and spouse in order to provide the medical team with an in-depth awareness and understanding of the significant family members.

To initiate this process the social worker will be informed by the transplant coordinator of the prospective recipient. The social worker will schedule the family for interviewing and will meet with the patient and spouse (or significant other), individually and jointly.

During hospitalization for transplant and recovery, the social worker will follow patient, family members, and significant others for supportive counseling. During this period the social worker will continue to focus on the previously mentioned areas of concern as well as preparation for discharge, discharge planning and rehabilitation.

The social worker will meet regularly with hospital staff members to assist in providing comprehensive care to the patient, family, and significant others.

The social worker will be available for consultation and in-service sessions for staff members as needed.

After hospital discharge, the social worker will keep in contact with the patient, family members, and significant others on a regular basis to determine the presence of stressors/problems and intervene as appropriate by counseling or referring to outside resources.

CLINICAL SOCIAL WORK ROLE ON THE HEART TRANSPLANT TEAM

The Clinical Social Work role on the Heart Transplant Team involves three areas: facilitation, psychosocial services, and advocacy.

I. Facilitation and Management of Resources

The Clinical Social Worker will function as a central person in facilitating interaction:

- Between the patient, patient's family, significant others, and various hospital departments and personnel; and
- Between the patient, patient's family, significant others, and community resources.

A. Coordination of Appropriate Resources.

1. Financial assistance
 - a. Referral to the Department of Public Social Services and other community agencies.
 - b. Food - hospital meal ticket, grocery money.
 - c. Transportation - gasoline money, bus fare.
 - d. Miscellaneous funding
2. Housing
 - a. Assistance with relocation.
 - b. Hospital housing - Judeline House and Apartment.
3. Child Care
 - a. Assist patient and family with child resources in our area.

B. Coordination of Communication Issues.

1. Mail distribution to the family from the Medical Center.
 2. Assist in communication between patient, patient's family, significant others, and various hospital departments as needed.

II. Psychosocial Services

As a therapeutic agent, the Clinical Social Worker provides psychosocial services to the patient, family, and significant others to meet their emotional and social needs. This is done by psychosocial assessment, intervention, follow-up care and consultation.

The purpose of the psychosocial assessment is to identify the psychosocial resources, strengths, and vulnerabilities of the patient's family in adapting to and coping with emotional and social crises which are precipitated by the heart transplant. The assessment serves to determine the degree of emotional stability, level of social functioning, and nature of supportive network.

A. Psychosocial Assessment

A psychosocial assessment will be included in the patient's chart and shall cover, but not be limited to, the following areas:

1. Identifying information.
 2. Current life situation (financial, stressors, family constellation, and marital status)
 3. Coping pattern/personality, structure/history of life experience (early life situation, life changes and events).
4. Support system.
5. Family's reaction to illness and transplantation.
6. Assessment.
7. Recommendation.

When psychosocial risk or vulnerability is identified and is potentially contraindicated to the transplant, the Clinical Social Worker will inform team members.

B. Psychosocial Intervention

Psychosocial intervention in the preoperative period, during hospitalization, and after discharge from the hospital will be provided through supportive counseling, crisis intervention, enhancement of existing support systems, and consultation with team members.

1. The Clinical Social Worker will be available to the patient, family, and significant others on an ongoing basis for crisis intervention and supportive counseling.
2. The Clinical Social Worker will also provide follow-up counseling post-discharge or death and any referrals needed for psychotherapy.

III. Advocacy

Frequently, patients, families, and significant others are unfamiliar with the hospital setting and need help in order to deal with the system successfully.

- A. The Clinical Social Worker mediates and coordinates issues between the patient, family, significant others, medical staff, and the hospital personnel to facilitate optimal communication.
- B. The Clinical Social Worker educates and sensitizes the team members and others concerned to increase their understanding of the feelings, concerns, and needs of the patient, family, and significant others.
- C. The Clinical Social Worker represents the patient, family, and significant others to ensure that their rights are protected and their needs met.

ADULT HEART TRANSPLANT PSYCHOSOCIAL EVALUATIONS

- I. Identifying Information
 - A. Name
 - B. Address, home telephone
 - C. Marital status
 - D. Employment status, work telephone
 - E. Insurance coverage.

- II. Interviewing Situation and Observation
 - A. Where the interview took place
 - B. Non-verbal communication
 - C. Appearance

- III. Current Living Situation and Observation
 - A. Family constellation
 - B. Sources of stress
 - C. Finances
 - D. Housing and transportation
 - E. Health of family members
 - F. Involvement in community, church, or other groups

- IV. Marital Relationship
 - A. Length of marriage/relationship
 - B. Previous marriages, length, and reason for termination
 - C. Strengths and risks in present relationship
 - D. Conflict resolution
 - E. Commitment to relationship
 - F. Communication and decision-making patterns

- V. Emotional State of Response to Illness and Cardiac Transplant
 - A. Understanding of illness
 - B. Emotional reaction to diagnosis
 - C. Reaction to cardiac transplantation
 - D. Significant other's reaction to illness and cardiac transplantation
 - E. Expectation of transplant
 - F. Perception of post-transplant issues

- VI. Background Information
 - A. Family background of patient and/or significant others
 - B. Education, vocation, military experience
 - C. History of major psychosocial traumas - illness, change, deaths
 - D. History of coping with stress
 - E. History of mental illness
 - F. History of conviction, arrests, charges
 - G. Substance abuse
 - H. Ethnic and cultural background
 - I. Religious background

- VII. Psychosocial Resources, Strengths, Risks
 - A. Personality traits
 - B. Emotional stability
 - C. Communication skills and ability to relate to medical staff
 - D. Medical regimen compliance

- E. Social network and support system
- F. Ability to cope with long-term stress
- G. Frustration tolerance and impulse control
- H. Intelligence
- I. Ability to accept authority and responsibility
- J. Ability to accept and incorporate change

VIII. Assessment

IX. Recommendation

The evaluation is presented at the Heart Transplant Team meeting for review and consideration. It also serves as the initial guide for provision of social work services to the patient and family.

Upon acceptance into the program, the social worker's role becomes one of the general case management, facilitator, and counselor. The social worker helps the patient and family cope with treatment, locate needed resources, and make transitional and adjustment arrangements. Social work support and involvement continue throughout hospitalization. During post-hospitalization the social worker periodically review the patient's circumstances and provide services as needed.

ADULT CARDIAC TRANSPLANTATION

QUALITY ASSURANCE PLAN

Statement of Purpose:

The purpose of the Quality Assurance Plan for Adult Cardiac Transplantation is to ensure the highest standard of patient care. This plan has been designed to monitor clinical outcome and to provide a method of re-evaluation.

Goals and Objectives:

The goals of this Quality Assurance Plan include:

1. To provide a framework for the systematic, objective monitoring and evaluation of patient care.
2. To provide a mechanism of documenting Quality Assurance activities.
3. To provide a mechanism for problem identification and solution.
4. To provide a mechanism to evaluate the quality, content and completeness of medical record entries.

Organization:

The Transplant Patient Care Committee includes: cardiothoracic surgeons, adult cardiologists, pathologists, social workers, transplant coordinators, infectious diseases specialist, nursing staff educator and nurse manager. The committee meets on a monthly basis or more frequently if needed.

Quality Assurance Process:

The essential elements of the Quality Assurance Plan include:

1. Reviews are performed both retrospectively and concurrently.
2. Reviews must be clinically significant.
3. Reviews include on-going clinical monitors.
4. Results of monitors will be presented at the appropriate committee(s), actions taken and follow-up documented.
5. Monitors will be reviewed periodically to insure continued clinical relevance.

Quality Assurance Mechanism:

Concurrent Reviews:

1. Actuarial statistics will be reviewed during the patient care conferences.
2. A weekly review of the most recent data on the patients seen in clinic during the week. Changes in treatment are documented on progress notes.

SUMMARY:

Those involved in providing care to the transplant recipients are committed to assuring the highest quality of care possible. This program of monitors and reviews has been developed to be used as a tool for the cardiac transplant program in its ongoing process to provide a high standard of care.

METROPOLITAN HEIGHT AND WEIGHT TABLES - WOMEN

(Height and weight without clothing or shoes)

HEIGHT		SMALL FRAME		MEDIUM FRAME			LARGE FRAME	
Ft/In	Cms	Pounds	Kilograms	Pounds	Kilograms	Mid-medium frame (#/kg)	Pounds	Kilograms
4'9"	144.8	99-108	45.0-49.1	106-118	48.2-53.6	112/50.9	115-128	52.3-58.2
4'10"	147.3	100-110	45.4-50.0	108-120	49.1-54.5	114/51.8	117-131	53.2-59.5
4'11"	149.9	101-112	45.9-50.9	110-123	50.0-55.9	116/52.7	119-134	54.1-60.9
5'0"	152.4	103-115	46.8-52.3	112-126	50.9-57.3	119/54.1	122-137	55.4-62.3
5'1"	154.9	105-118	47.7-53.6	115-129	52.3-58.6	122/55.4	125-140	56.8-63.6
5'2"	157.5	108-121	49.1-55.0	118-132	53.6-60.0	125/56.8	128-144	58.2-65.4
5'3"	160.0	111-124	50.4-56.4	121-135	55.0-61.4	128/58.2	131-148	59.5-67.3
5'4"	162.6	114-127	51.8-57.7	124-138	56.4-62.7	131/59.5	134-152	60.9-69.1
5'5"	165.1	117-130	53.2-59.1	127-141	57.7-64.1	134/60.9	137-156	62.3-70.9
5'6"	167.6	120-133	54.5-60.4	130-144	59.1-65.4	137/62.3	140-160	63.6-72.7
5'7"	170.2	123-136	55.9-61.8	133-147	60.4-66.8	140/63.6	143-164	65.0-74.3
5'8"	172.7	126-139	57.3-63.2	136-150	61.8-68.1	143/65.0	146-167	66.4-75.9
5'9"	175.3	129-142	58.6-64.5	139-153	63.2-69.5	146/66.4	149-170	67.7-77.3
5'10"	177.8	132-145	60.0-65.9	142-156	64.5-70.9	149/67.7	152-173	69.1-78.6
5'11"	180.3	135-148	61.4-67.3	145-159	65.9-72.3	152/69.1	155-176	70.4-80.0

METROPOLITAN HEIGHT AND WEIGHT TABLES - MEN

(Height and weight without clothing or shoes)

HEIGHT		SMALL FRAME		MEDIUM FRAME			LARGE FRAME	
Ft/In	Cms	Pounds	Kilograms	Pounds	Kilograms	Mid-medium frame (#/kg)	Pounds	Kilograms
5'1"	154.9	123-129	55.9-58.6	126-136	57.3-61.8	131/59.5	133-145	60.4-65.9
5'2"	157.5	125-131	56.8-59.5	128-138	58.2-62.7	133/60.4	135-148	61.4-67.3
5'3"	160.0	127-133	57.7-60.4	130-140	59.1-63.6	135/61.4	137-151	62.3-68.6
5'4"	162.6	129-135	58.6-61.4	132-143	60.0-65.0	142/64.5	139-155	63.2-70.4
5'5"	165.1	131-137	59.5-62.3	134-146	60.9-66.4	140/63.6	141-159	64.1-72.3
5'6"	167.6	133-140	60.4-63.6	137-149	62.3-67.7	143/65.0	144-163	65.4-74.1
5'7"	170.2	135-143	61.4-65.0	140-152	63.6-69.1	146/66.4	147-167	66.8-75.9
5'8"	172.7	137-146	62.3-66.4	143-155	65.0-70.4	149/67.7	150-171	68.2-77.7
5'9"	175.3	139-149	63.3-67.7	146-157	66.4-71.4	152/69.1	153-175	69.5-79.5
5'10"	177.8	141-152	64.1-69.1	149-161	67.7-73.2	155/70.4	156-179	70.9-81.4
5'11"	180.3	144-155	65.4-70.4	152-165	69.1-75.0	158/71.8	159-183	72.3-83.2
6'0"	182.9	147-159	66.8-72.3	155-169	70.4-76.8	161/73.2	163-187	74.1-85.0
6'1"	185.4	150-163	68.2-74.1	159-173	72.3-78.6	165/75.0	167-192	75.9-87.3
6'2"	187.9	153-167	69.5-75.9	162-177	73.6-80.4	168/76.4	171-197	77.7-89.5
6'3"	190.5	157-171	71.4-77.7	166-182	75.4-82.7	172/78.2	176-202	80.0-91.8