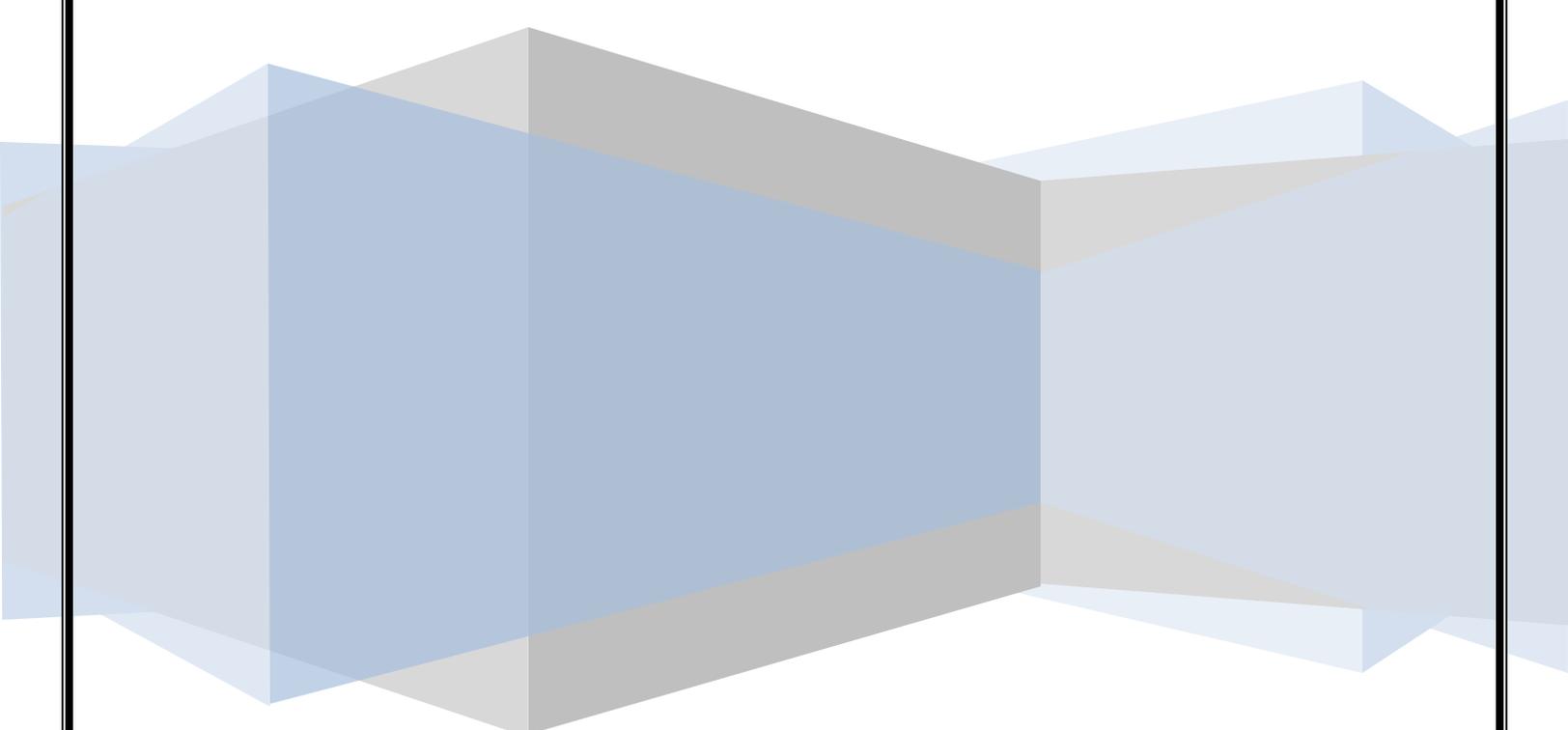


PENNSTATE HERSHEY



**PATIENT
INFORMATION
HANDBOOK
LIVER TRANSPLANT**

**Division of Abdominal Transplant
Surgery**



HOW TO CONTACT THE TRANSPLANT OFFICE

PLEASE CALL YOUR SPECIFIC COORDINATOR DURING OFFICE HOURS FOR ALL ROUTINE CARE AND/OR QUESTIONS- REFER TO THEIR BUSINESS CARD OR CALL 717-531-6092 AND REQUEST TO SPEAK WITH YOUR COORDINATOR.

Location: Penn State Milton S. Hershey Medical Center
Penn State College of Medicine

Telephone: (717) 531-6092 or 1-800-525-5395

Fax: (717) 531-0124 or 717-531-3717

Address: Penn State Milton S. Hershey Medical Center
Division of Transplantation
Mail Code H062, RM 3190
500 University Drive
Hershey, PA 17033-0850

Office Hours: 8:00 a.m. to 4:00 p.m. / Monday through Friday

Contact Information After Hours For Emergencies Only!

While waiting for transplant:

Holidays, evenings, and weekends

Call (717) 531-8521 and ask for the

Gastroenterology fellow on-call.

Do not mention transplant to the hospital operator –
after you are connected to the Gastroenterology fellow –
let them know you are on the transplant waiting list.

After you receive your transplant:

Holidays, evenings, and weekends

Call (717) 531-8521 and ask for the

kidney/liver transplant coordinator on-call

STAFF CAN BE CONTACTED BY CALLING THE MAIN OFFICE NUMBER

Transplant Program Management

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Kelly Rotondo, RN, DNP

Post Liver Transplant Coordinator

Allison Wick, RN, BSN

Living Donor Coordinator

Vicky Reilly, RN, CPTC

Transplant Financial Counselor

Kim Cox

Transplant Staff Assistants

Carol Hershey - Senior Staff Assistant
Jessica Giansanti - Transplant Staff Assistant
Martha Kleinfelter - Transplant Medical Assistant
Monica Progin - Transplant Staff Assistant
Angela Shortt - Transplant Staff Assistant

Transplant Nutritionist

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Transplant Pharmacist

Tracy Valania, PharmD

Transplant Social Workers

Cindy Royer, MSW, LSW
Velma Carter-Dryer, MSW, ACSW
Teresa Bruno, MSW, LSW

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INTRODUCTION

Welcome to the Abdominal Transplantation Program of the Penn State Milton S. Hershey Medical Center. Like many individuals beginning the evaluation process for an organ transplant, you may have many questions and concerns. We encourage you to read this entire manual and to ask questions of your doctors, nurses, and other staff if there is something you do not understand. As your transplant team, we are aware that you and your family have likely encountered a great deal of stress and many hurdles related to your health. Living with serious health issues involves many physical, emotional, and financial changes. We are available to support you through this process as you gather information and face upcoming decisions.

Please keep this manual handy and put all of your correspondence regarding the transplant process in this manual. You will also need to bring this manual with you when you are called in for your actual transplant, as we will need to review the post-transplant care with you at that time. It will help you to know what to expect each step of the process if you read the whole manual.

The manual provides a brief discussion of what your diseased organ does normally, what happens when that organ is damaged, and specific information about the Abdominal Transplant Program of the Penn State Milton S. Hershey Medical Center. The evaluation and selection process for an organ transplant, the wait for a donor organ, the operation and immediate post-operative period are also described. Of particular importance is information regarding what you should do after transplantation. It is necessary to learn about your medicines and how to maintain good health with a newly transplanted organ. Being well informed about how you can take good care of yourself before and after the transplant is a vital part of your recovery process. Remember, if you have any questions, call your Transplant Coordinator who is available Monday through Friday from 8:00 a.m. to 4:00 p.m.

The United Network for Organ Sharing (UNOS) provides a toll-free patient services line to help transplant candidates, recipients, and family members understand organ allocation practices and transplantation data. You may also call this number to discuss a problem you may be experiencing with your transplant center or the transplantation system in general. The toll-free patient services line number is 1-888-894-6361.

Thank you for choosing Penn State Milton S. Hershey Medical Center to learn more about organ transplantation.

OUR STAFF

Transplant Surgeons

Zakiyah Kadry, MD

Chief, Division of Abdominal Transplant

R. Ali Shah, MD

Surgical Director for Kidney Transplant Program

Tadahiro Uemura, MD

Surgical Director for Pancreas Transplant Program

Minimally Invasive Surgeon

Randy Haluck, MD

Chief of the Division of Minimally Invasive and Bariatric Surgery

Certified Registered Nurse Practitioner

Physician Assistant

Brooke Olenowski, PA-C

Transplant Hepatologists

Thomas Riley, MD

Professor of Medicine/Gastroenterology
Medical Director of Liver Transplantation

Ian Schreibman, MD

Associate Professor/Gastroenterology

Transplant Nephrologists

W. Brian Reeves, MD

Medical Director for Kidney & Pancreas Transplant Program

Osun Kwon, MD, PhD

Transplant Nephrologist

Nasrollah Ghahramani, MD, MS

Transplant Nephrologist

Umar Farooq, MD

Transplant Nephrologist

MEET OUR TRANSPLANT SURGEONS

Zakiyah Kadry, MD

Dr. Kadry joined the Penn State Milton S. Hershey Medical Center in June 2005, as the Chief, Division of Transplantation. She received her medical degree from the Royal College of Surgeons in Ireland in 1983. She did her transplant fellowship at the Thomas E. Starzl Transplantation Institute from 1991 to 1993 after completing a General Surgery Residency here at the Penn State Milton S. Hershey Medical Center (1986-1990). Dr. Kadry has performed organ transplants at various hospitals around the world, participating in surgery programs in Switzerland and Italy. Over the course of her career, she has participated in a variety of abdominal organ transplantations with her specialty being liver transplant surgery.

Riaz A. Shah, MD

Dr. Shah joined the transplant surgery team in April of 2010 as the Director of the Kidney Program. He is a multi-organ transplant surgeon who specialized in adult and pediatric living and deceased kidney transplants. He completed a 2 year American Society of Transplant (ASTS) recognized Fellowship in Abdominal Transplant Surgery at Rush University Medical Center in Chicago, Illinois. Dr Shah is board certified in general surgery having completed a full general surgery residency at Yale New Haven Hospital in Connecticut (2002-2004) and Rush University Medical Center/Cook County Hospital in Chicago, Illinois (2004-2007).

Tadahiro Uemura, MD

Dr. Uemura joined the transplant surgery team in October, 2006 as an assistant professor of surgery. He also is a multi-organ transplant surgeon. He completed transplant fellowships at Jackson Memorial Hospital-University of Miami and Baylor University Medical Center. He is board certified by the Japanese Board of Surgery. He specializes in liver transplant surgery, but is involved with the liver, kidney, pancreas and living donor transplant programs.

MEET OUR GASTROENTEROLOGY / HEPATOLOGY PHYSICIANS

Thomas R. Riley, MD

Fellowship, Gastroenterology & Hepatology, University of Pittsburgh - University Health Center of Pittsburgh (1996) Residency, Internal Medicine, University of Utah Hospital and Clinics (1993) M.S., Health Evaluation Sciences, Penn State University (2001) M.D., Ohio State University, College of Medicine (1990)

Ian R. Schreibam, M.D.

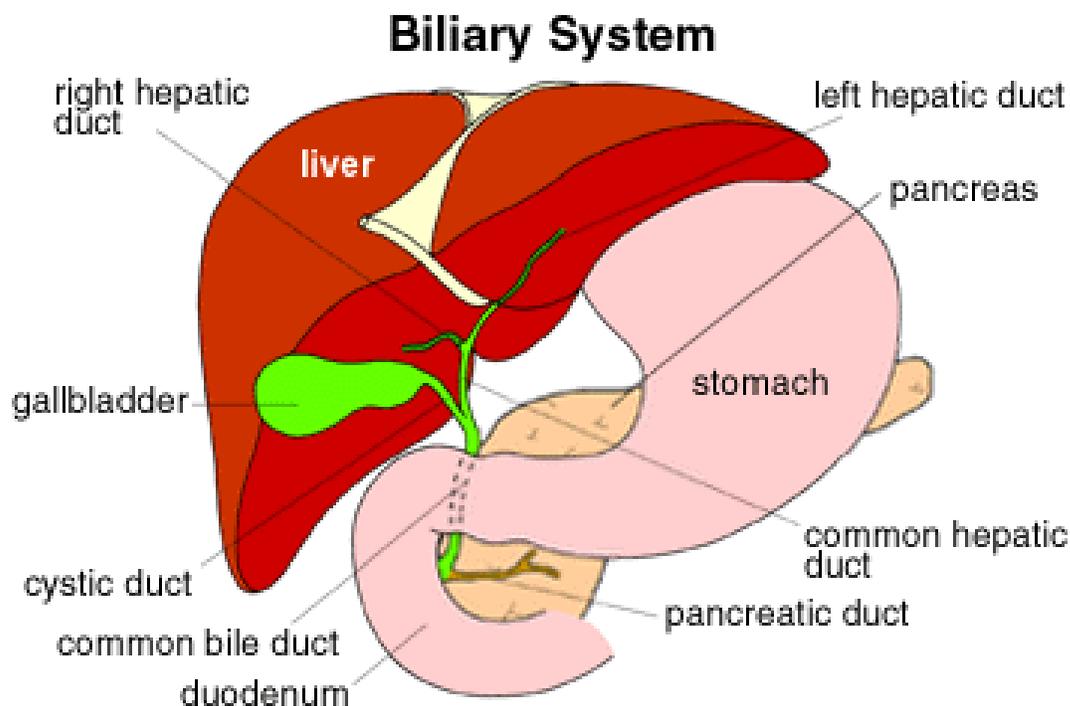
Fellowship, Transplant Hepatology, Penn State Milton S. Hershey Medical Center (2006) Fellowship, Gastroenterology & Hepatology, University of Miami, School of Medicine (2005) Residency, Internal Medicine, Penn State Milton S. Hershey Medical Center (2002) M.D., New York University Medical Center (1999)

HEALTHY AND DISEASED LIVERS

The liver is located on the right side of the abdomen, just behind the lower rim of the rib cage. It is the largest organ in the body, and performs more than 500 functions. A brief list of some of these functions is given below:

- secretes *bile*, a yellowish brown or green fluid that aids in the absorption of fats and minerals;
- converts and stores various foods into substances that are then used for life and growth;
- breaks down and excretes many waste products;
- Manufactures proteins that are vital to normal clotting of the blood.

Liver damage may occur with infections, exposure to toxic drugs or chemicals, alcoholism, genetic disorders, diabetes, heart failure, cancer, and shock. In many cases, the liver is able to repair itself; in others, a variety of treatments may be effective. However, if liver damage is severe, the liver may not recover, resulting in end-stage liver disease. Once this happens, liver transplantation should be considered.



MANAGEMENT OF END STAGE LIVER DISEASE

Complications associated with end-stage liver disease are challenging and difficult to manage. The delicate balance of medications, fluid management, nutrition and education of the patient are best handled by a Hepatologist (a liver specialist).

Common complications of liver disease include:

- **Encephalopathy** - result of an altered circulation pathway around a diseased liver causing increased ammonia levels in the blood. Causes confusion, memory loss, fatigue, agitation; can lead to a coma.
- **Esophageal varices** - collateral vessels form in the abdomen and esophagus from resistance of blood flow through a diseased liver. Vessels rupture easily and cause vomiting of blood, or passing of blood through the rectum.
- **Ascites** - accumulation of fluid in the peritoneal cavity may require diuretics, salt restriction in diet and/or tap to remove fluid.
- **Coagulopathy** - inability of the liver to remove activated clotting factors from the serum, form micro thrombi causing consumption of platelets and other clotting factors. Places patients at risk for bleeding.
- **Malnutrition** - the liver manufactures and stores nutrients; with a diseased liver, patient may become malnourished from inadequate proteins, calories.

IMPORTANT TIPS TO HELP KEEP YOUR LIVER HEALTHY

1. **Avoidance of alcohol of all types** (including beer, wine, mixed drinks). No “Non-Alcoholic” beer or wine they contain alcohol. Even if alcohol is not the cause of your liver failure, once you have cirrhosis, any type of alcohol will make your liver function worse. **The use of alcohol during your evaluation and after your listing is immediate grounds to stop the listing process or be de-listed.**
2. Receive vaccinations against Hepatitis A and B if not already immune (we will let you know your status after checking your blood). Also, the pneumonia vaccine should be done every 5 years and the flu shot should be done on a yearly basis.
3. **Avoid** liver toxic medications, most commonly used are over-the-counter painkillers (do not use aspirin-like medications), **do not** use Excedrin, Anacin, Motrin, Aleve, Advil (Ibuprofen).

***Tylenol** (acetaminophen) **is safe**, use less than 2 grams per day = **1 extra strength (500mg) pill every 6 hours if needed.**

Review other medications with your doctor.

4. **Avoid** use of sedatives such as benzodiazepines and narcotics. Please inform your local doctors that you are to avoid these types of medications when they are prescribing medications for you. If you need sleep aids, your local doctor may prescribe a histamine H1 blocker.
5. **Avoid** iron supplementation unless your doctor has shown that you are iron deficient (if you take a multivitamin, there are brands that do not have iron as a component).
6. If you are having excessive muscle cramping, please talk with your doctor about the use of magnesium supplements. Most can be purchased over the counter without a prescription.
7. Follow a **low salt** diet (2 grams sodium total for 24 hour period.)
8. **Avoid** herbal supplements and other supplements that may be damaging to your liver. If you are unsure about any herbal supplements, please ask our staff prior to use.

9. If you have excess fluid retention in your lower extremities, usage of urea containing moisturizers such as Eucerin can help avoid cellulitis (infection/inflammation).
10. Once cirrhosis develops, you are at risk for developing enlarged blood vessels (varices) in your esophagus (tube that carries food/fluids from mouth to stomach), therefore screening with an upper Endoscopy (EGD) should be done to follow your risk of bleeding. The frequency of follow-up EGD's depends on what is found during your examination. This study can be scheduled with your local doctor and does not have to be done at Hershey Medical Center.
11. Follow-up screening with CT and/or MRI scans along with a blood test measuring your alpha-fetoprotein levels (AFP) should be done on a regular basis for the early detection of liver cancer. **The CT and/or MRI scans need to be done here at HMC** so they can be reviewed by our trained radiologists.
12. General anesthesia is contraindicated with liver disease. You are **NOT** to have any surgical procedures performed without the consent of the liver transplant team. (This includes everything from dental extractions to hernia repairs.)
- 13. Contact your transplant coordinator or the gastroenterology fellow within 24 hours of an admission to any hospital other than the Penn State Milton S. Hershey Medical Center.**
14. If your local doctor wants to transfer your admission to our hospital, he/she should call the MD Network at 717-531-5880 and ask for the Gastroenterology Attending MD to discuss possible transfer.
15. You should have routine screening for osteoporosis by Dual Energy X-ray Absorptiometry (DEXA) scan both before and after transplant. This can be arranged through your local doctor.

The more you know the better you can take care of yourself!

LIVER TRANSPLANTATION OVERVIEW

Over 4,000 liver transplants a year are performed in the U.S. Greater than ninety percent of liver transplant patients are alive and well after five years. While there are some side effects from medications taken to suppress the *immune system* (so the transplanted liver will not be rejected) most patients lead full, productive lives and are able to return to work. The use of new anti-rejection drugs and other medications are constantly improving the results of liver transplantation.

All patients with severe liver disease who are referred to Penn State Milton S. Hershey Medical Center Liver Transplant Program are considered for liver transplantation. Before the decision to place you on the transplant list is made, a thorough evaluation of your case is made to determine the exact cause and extent of your liver disease. Depending upon those findings, it may be determined that your liver disease can be managed appropriately through alternative therapies to transplantation, either on a short- or long-term basis. The decision to transplant is made when all other alternatives have been exhausted.

Transplantation is performed for acute *fulminant* liver failure or progressive chronic liver disease (cirrhosis) that is not able to be treated with medicine or surgery. It is assumed that without receiving a liver transplant, you will die from your liver disease and that the risk of death from the transplant operation is less than that of the liver disease. If you are approved for liver transplantation, it is believed that your life expectancy will be prolonged and that there is a good likelihood that you will be able to resume a productive life.

The pre-transplant evaluation is completed on an outpatient basis over two to four weeks. Additionally, the referring physician can perform many laboratory studies and blood tests if he or she so desires. A transplant surgeon, Hepatologist, nurse coordinator, social workers, financial counselor, and a dietician see candidates for transplantation. Other consultations may be requested as needed. The Liver Transplant Coordinator is the key contact person who facilitates the evaluation process.

You and your family must understand the process of being evaluated, placed on the waiting list and then **the care that will be necessary after transplant** in order to make an educated decision about transplant being the right treatment for you. This is a lifestyle decision for you and your family as you will need to make a commitment to follow a **lifelong, disciplined medical program to prevent injury or rejection of the new liver**. This will require you to take prescribed medication and maintain close contact with your family doctor, Hepatologist, and transplant surgeon.

THE MEDICAL REVIEW

It is important that you and your referring doctor provide the transplant team with a complete record of prior tests and treatments to facilitate the evaluation process.

The transplant team will perform a complete evaluation of your medical history and current health status. Among the many exams and tests you may undergo are:

- A detailed history, physical examination, and laboratory tests to determine the factors responsible for your liver disease.
- A complete laboratory assessment including urine analysis, a complete blood count, and blood chemistry.
- Several radiological tests, including a chest x-ray, ultrasound to check blood flow to the liver, and a CT scan to determine the size of your liver and the presence of any tumors.
- An electrocardiogram and echocardiogram to determine the status of your heart.
- Dobutamine Stress Echo to determine how your heart functions under stress.
- Pulmonary function tests and/or arterial blood gases to measure the capacity of your lungs.
- Upper endoscopy (EGD), which involves passing a tube down your throat into the stomach, to determine if you have *varices*, inflammation, or ulceration.
- Colonoscopy for patients over 50 years of age. This procedure passes a flexible tube into your rectum and colon to determine whether or not you have polyps or other abnormalities.
- Miscellaneous studies, including Pap smear and mammography for women, prostate-specific *antigen* (PSA) for men to detect cancer of the prostate and dental x-rays to detect cavities or infection.

THE PSYCHOSOCIAL ASSESSMENT

A social worker, a psychiatrist and possibly a drug and alcohol counselor will meet with you and your family to assess your psychosocial situation and support system. They will help to determine how your liver disease has affected you and your family, in an effort to provide resources and coping techniques for dealing with stress and your health concerns. Recommendations will be made to both you and the transplant team for strategies to minimize the chances of recurrence of alcohol or substance abuse following transplantation. The psychiatric visit is also, often a requirement of your insurance company.

Patients may be requested to undergo a drug and alcohol rehabilitation program, or continued counseling locally. Patients are expected to follow through with recommendations made by the psycho-social team and often will not be able to be listed until these requirements are met. Your social worker will inform you of transplant support groups and financial resources available to you and is available by phone to assist you with completing listing requirements.

THE NUTRITIONAL EVALUATION

A registered dietitian is available to review your dietary habits with you and your family and help you develop and maintain a healthful diet before and after the transplant. Recommendations may be given to you regarding protein intake and sodium restriction to help manage symptoms of liver disease.

FINANCIAL COUNSELING

A financial counselor will meet with you to discuss any financial issues related to your medical care, both before and after the transplant. If you hold private insurance, the counselor will contact your insurance company to determine the level of coverage for your care. For patients with Medicaid, Medicare, or inadequate health insurance coverage, the counselor will help you review other financial options.

As a transplant patient, you have an important role in regard to the financial aspects of your surgery. You are responsible for reviewing your benefits and reporting any changes in your insurance coverage to the transplant team and your financial counselor. Taking an active role in the reimbursement and payment processes for your particular insurance plan may help your financial affairs run more smoothly before and after your transplant. The financial coordinator is available for consultation of any questions you may have regarding your insurance coverage.

THE LIVER SELECTION COMMITTEE

Once the final evaluation is complete, the final step for you to become a liver transplant candidate involves formal consideration of your case at a Liver Transplant Selection Committee Meeting. Here, a multidisciplinary team including hepatologists, transplant surgeons, social workers, a dietitian, and transplant coordinators, and a financial counselor.

Depending upon the findings of your various assessments, a decision may be made to accept you for transplantation, undertake additional studies, follow your case and with progression of your case, consider you for transplantation at a later date, or not recommend transplantation because of a *contraindication*. If there are no contraindications and if the evaluation is considered complete, the candidate will be listed with United Network for Organ Sharing (UNOS) for a liver transplant. There may be instances when all the studies are complete and the patient is considered acceptable, but requires rehabilitation or observation for a period of time. Those patients who have a history of alcoholism or drug use may need to be sober or drug free for a certain amount of time before being placed on the waiting list. Due to the high demand and low supply of organs, it is important to know that patients will not continue with the high-risk behavior that caused their liver failure. It is also important to know that patients will be *compliant* with the care of their transplanted organ after transplant. Only patients having psychosocial factors predicting long-term sobriety are accepted for transplantation.

The transplant coordinator will contact you after the selection meeting to review the plan of care that was discussed by the team. This may involve coming to clinic to have discussion with the doctors or your coordinator may need to schedule additional studies completed. Post-transplant, all patients are followed for their liver transplant care for life at the Penn State Milton S. Hershey Medical Center. Regular communication by Transplant Coordinators or physicians with patients and referring doctors is implemented to enhance optimal long-term results.

PATIENT SELECTION CRITERIA FOR LIVER TRANSPLANTATION

The goal of the Liver Transplant Program at the Penn State Milton S. Hershey Medical Center (HMC) is to provide liver transplantation to those patients who will obtain the most benefit from having a transplant. The overall goal of receiving a transplant is to prolong life and to improve the quality of life.

At the Penn State Milton S. Hershey Medical Center, the final decision to place a patient on the liver transplant list is made by a Liver Selection Committee. This Committee is composed of liver transplant surgeons, hepatologists, nurse coordinators, social workers, a financial counselor, a dietician, and invited consultants. The purpose of the committee is to review the need for transplantation and the outcome of performing a transplant for each potential recipient.

Liver transplantation may be considered an acceptable treatment for patients under the following circumstances:

1. Patients with irreversible advanced chronic liver disease, i.e., end-stage liver disease. This is defined as *liver disease that has caused the quality of life to deteriorate to an unacceptable level, with the patient unable to perform his/her usual activities, such as work, caring for family or home.*
2. There is **no** reasonable alternative treatment for the patient's liver disease.
3. Debilitating pruritus (itching).
4. Severe progressive metabolic bone disease with spontaneous fractures.
5. Life-threatening upper gastrointestinal bleeding.
6. Development of hepatorenal (kidney failure caused by the liver failure) syndrome.
7. Recurrent encephalopathy (mental confusion) not adequately managed with conventional therapy.
8. Fulminant or sub-fulminant hepatitis.
9. Non-resectable, life-threatening benign tumors of the liver.
10. Certain inborn errors of metabolism.
11. Primary hepatic malignancy without evidence of metastases, in certain highly selected patients.
12. **The patient must be considered an acceptable surgical risk, must be reliable and compliant, and have an adequate support system sufficient to adhere to the required post-transplant treatment program.**

The following contraindications may exclude some patients from liver transplantation:

1. Active alcohol or other chemical abuse.
2. Metastatic malignancy (liver cancer that has spread to other parts of the body) or other non-hepatic primary malignancy (liver in the cancer that originated elsewhere in the body).
3. Other severe co-existing diseases.
4. History of non-compliance with medical regimen.
5. Inadequate family or other support system.
6. HIV positive status.
7. Sepsis (overwhelming infection).
8. Individuals of advanced age may be considered for transplantation, depending on their vigor and absence of complicating medical problems.
9. Evidence of actively replicating Hepatitis B virus.

WHAT HAPPENS AFTER BEING LISTED FOR A LIVER TRANSPLANT?

If you are accepted as a liver transplant candidate, you will be placed on the UNOS national database. You will receive a letter from our office telling you that you are listed and the date your listing is effective. Organs are allocated based on your MELD (Model for End stage Liver Disease) score. Enclosed with your listing letter there will be a lab prescription for your MELD blood work. It is very important to get this blood work on time to keep your listing in the UNOS database current. If lab results are not entered on time according to the UNOS schedule, your score will drop to the lowest rank of 6 until new blood work is entered. It is your responsibility to keep track of due dates for your MELD blood work.

The MELD score calculates the severity of your illness based on a formula that utilizes your bilirubin, creatinine, and INR or clotting time. Your sodium and albumin levels are also reported to UNOS. It is important that all 5 of these lab values are checked every time you get blood work. The MELD score ranges from a low of 6 to a high of 40. Those with a higher score are usually the most ill. You are then ranked against other patients in this region of your blood type based on this score. MELD scores constantly change as patients get sicker or feel better and therefore your rank constantly changes. Most people will get transplanted when their MELD score is in the mid-twenty to mid-thirty range. How soon your MELD advances to that level varies as each patient's liver function will diminish at a different rate.

While waiting for your liver transplant:

- Get blood work according to the MELD prescription sent to you
- It is essential that you continue medical therapy supervised by your family physician with periodic visits to the transplant team.
- **Please** remember to keep your transplant coordinator informed of accurate telephone numbers where you can be reached.
- Notify the transplant office of any changes in your health or medical insurance coverage.
- Be prepared to travel to the hospital the moment a liver becomes available.

GOING TO THE HOSPITAL

When called by your transplant coordinator, you will be instructed to come promptly to the Admissions Department at the Penn State Milton S. Hershey Medical Center. This is located off of the East Lobby. A physician will review your record and start a variety of exams and tests. An intravenous (IV) infusion will be placed in your arm.

* It is important to understand that you can be called in for a transplant, have the entire pre-operative work-up completed and actually be waiting to go to surgery, and then be informed that the transplant is canceled. Emotionally, this can be difficult, so it is good to be prepared for this possibility. If the liver is not in transplantable condition, you will be sent home until the next opportunity arises. When a donor is being evaluated for possible organ donation, many tests are done; however, these tests can never give the complete status of the organ. **It is not until our transplant surgeon has examined the liver** that we can be assured that this is an acceptable organ. Once our surgeon calls to say that the donor organ is acceptable, you will then be taken to surgery. Your own liver is not removed until the “new” liver is in the operating room.

THE TRANSPLANT OPERATION

Liver transplant surgery is extremely complex and may last **6 to 12** hours. Your entire liver will be removed and replaced by the donor liver. To do this, the surgeon must make a large incision in your abdomen (*see Figure 1*). You will also have scars in your shoulder and groin where the bypass cannulas are placed as well as scars from various surgical drains. You will receive several units of blood and plasma during the operation.

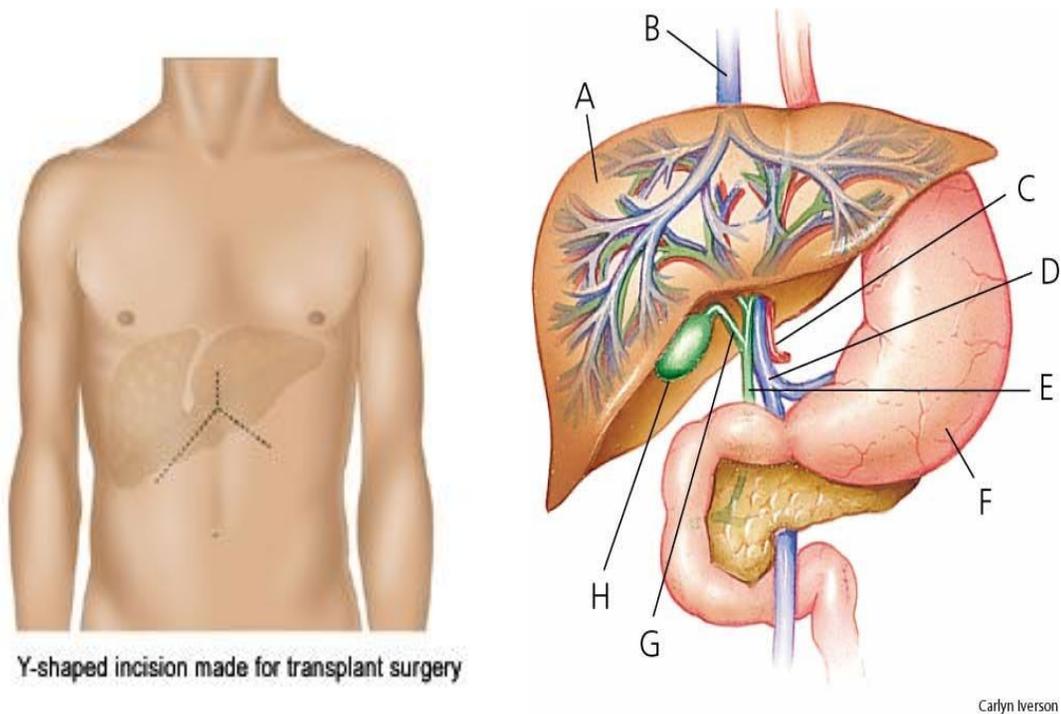


Figure 1: Mercedes Benz Incision

- A: Liver
- B: Hepatic Vein
- C: Hepatic Artery
- D: Portal Vein
- E: Common Bile Duct

- F: Stomach
- G: Cystic Duct
- H: Gallbladder

THE INTENSIVE CARE UNIT

After surgery, you will be moved to the Neurosurgical Intensive Care Unit for recovery. This unit is designed for 24-hour monitoring of your condition. The necessary equipment and a specially trained nursing staff for quick response are available if a problem arises. Patients remain in the Intensive Care Unit until their condition stabilizes following the surgery. This time period varies from patient to patient, but is usually two days. The sicker that you are prior to transplant, the greater the likelihood is that you will be in the intensive care unit for a longer period of time. Family members are welcome to wait in the large waiting room outside the Neurosurgical Intensive Care Unit on the fourth floor, both during and after surgery. The Hospital requests that only two people at a time visit while in the Intensive Care Unit. Infants and small children are not permitted to visit in the Intensive Care Unit or on the fifth floor. In addition, anyone suffering from a cold or individuals who feel sick should visit at a later time when they are feeling better.

Other things you should know while you are in the intensive care unit are:

- You will be asleep for several hours after arriving, but your family may visit you.
- When you awaken, you will have a tube in your mouth and throat attached to a ventilator machine that breathes for you. After you are fully awake and are able to breathe on your own, this tube will be removed.
- There will be an IV catheter in your neck that passes into your heart and provides information on the function of your heart and lungs. Another catheter will be in an artery in your wrist connected to a blood pressure recording machine. A tube will be in your nose and throat, attached to a suction machine, to keep your stomach empty. While this tube is in place, you will not be able to eat or drink. A catheter will be in your bladder to drain urine into a bag attached to the side of the bed. Small tubes will be at your incision lines to drain accumulated blood or fluid. A *T-tube* will be in your bile duct to drain *bile*.
- In order to keep you from pulling out any of these catheters and tubes, your hands may be loosely bound until you are fully awake.
- Your family may visit for longer periods as you recover. To prevent infection, they should not send live flowers, plants, or fruit baskets to you. However, balloons and cards are permissible.
- You will be asked to cough and breathe deeply using a special device called an “incentive spirometer” (ISB) to expand your lungs.
- Soon after your operation, you will be instructed to begin getting out of bed with assistance of your nurse.

THE RECOVERY PERIOD

As soon as you are medically stable, you will be transferred to a room in the transplant surgery unit on the fifth floor of the Penn State Milton S. Hershey Medical Center. Specially trained transplant nurses and your transplant surgeons will care for you during your recovery. You will receive special instruction for your diet by a dietitian, special attention for your medicines aided by a pharmacist, and rehabilitation assisted by a physical therapist and occupational therapist. You will also receive home care and self-care instructions from your coordinator. A major part of your teaching after transplant will involve learning how to take your anti-rejection medicine. Please try to have family members available to learn about the medicine during your teaching sessions with your transplant coordinator.

COMPLICATIONS

Numerous complications can occur after your transplant surgery. Surgical connections involving the bile duct or hepatic artery can leak or become blocked. Bleeding can occur in your abdomen after surgery requiring another operation. Infections can occur in your abdomen or in your chest. On a rare occasion, the new liver will not start working right away and you may require a second transplant. Your condition will be constantly monitored with lab tests taken daily to determine your recovery.

REJECTION

The biggest problem facing all transplant patients is the possibility of donor liver rejection. Rejection is the body's attempt to get rid of a foreign substance, in this case your new liver. There are several kinds of rejection, and they can be a common and life-long issue.

- **Acute** - This is the most common type of rejection, and while it can happen anytime, it usually occurs during the first two weeks to six months after surgery.
- **Chronic** - This type of rejection can happen at any time, including years after the transplant.

A common cause of (chronic) late rejection is not taking your medication, skipping days, or taking the wrong dosage. The medicines that you take will help lessen the number or severity of the rejection episodes, but may not completely prevent them. Almost everyone has a rejection experience at one time or another. Most rejections that happen shortly after surgery can be treated medically. If you have rejection symptoms, come to the hospital immediately for treatment. The quicker you receive treatment, the more successful the treatment is likely to be.

Some of the signs of rejection are:

- fever above 100°F
- swelling or tenderness over the new liver
- flu-like feelings
- gray-colored stools
- back or abdominal pain
- dark, tea-colored urine
- yellow skin or eyes (late sign, this is also called jaundice)
- itching

It is also important to remember that you may be experiencing rejection without any obvious signs or symptoms. That is why it is so important to have your blood tested on a regular basis.

Sometimes it may be necessary to do a biopsy of the transplanted liver to determine if there is rejection or another problem that needs treated. This would necessitate being at the hospital for a day. **You will need to have a driver as you will not be allowed to drive for one day after the procedure.**

INFECTION

The medications you take to prevent rejection will also place you at greater risk for infection, as they suppress your *immune system*. Common areas for infection are your lungs, bladder, intestines or the incision site. Any infection is a big deal in someone who has had a transplant and should be told to your coordinator.

A lung infection can be as simple as a common cold or can be a serious pneumonia. Signs and symptoms of both may include fever, cough, runny nose, a sore throat, or chest pain with breathing. Make sure you let your coordinator know if you are coughing or bringing up any material from your lungs. To prevent getting pneumonia, remember to faithfully follow the exercise program given to you by the physical therapist.

A bladder infection may present with frequency (having to urinate often), burning, pain with urination, or urgency (feeling like you have to urinate but only passing small amounts.) These are important symptoms to call your coordinator about.

A flu-like illness may present with fatigue, fever, upset stomach, vomiting or diarrhea.

An incisional infection may present with increased pain in any of the incisions, redness, swelling, a foul odor, or increased or changing drainage from the wound.

Be sure to tell your family that family members who are ill should not come to visit you.

YOUR MEDICATIONS

You will be taking medication for the rest of your life in order to prevent your body from rejecting your new liver. While hospitalized, you will be told what medicines to take, what each medicine does, and common side effects of each medicine by the pharmacist, your nurses, and coordinator. You must become familiar with the names, dosage, and recording of all your medications. The number and dosage of the medicines will be lowered as you improve. Never stop taking a medicine without talking to the transplant team.

Also, you must never take prescriptions from your family doctor without first talking to the transplant team. Many drugs cause serious side effects in patients taking anti-rejection medications. Call your transplant coordinator office before taking new medicines.

Some Rules for Medicines:

- Take the prescribed doses each day on time and record them in your medication diary.
- Take **ONLY** drugs prescribed for you by your transplant physician.
- Keep medicine in tightly closed bottles and out of the reach of children.
- Unless told otherwise, store medicines in a cabinet at room temperature outside of the bathroom to avoid moisture.
- **NEVER** run out of medicine. Fill your prescriptions well ahead of time. Many of these medications are not readily available at pharmacies.
- Plan ahead for vacations and holidays. Take your medication with you when traveling. **DO NOT** put medicines in luggage, because the temperatures vary, or your luggage could be lost.
- If you forget to take your medicine at the appointed time and remember it later, take it as soon as you remember. Then take the next dose at the appointed time.
- If you cannot remember if you took the medicine, **DO NOT** take an extra dose. Just take the next dose at the appointed time. **DO NOT** take twice as much of the medicine.

PRESCRIPTION REFILLS

All of your prescriptions for immunosuppression were called in or faxed in to your pharmacy with refills available at the time of your transplant. Please contact your pharmacy directly when you need your prescriptions refilled. If the pharmacy informs you that you no longer have refills available, please ask them to fax a refill request to our office at 717-531-3717

Please allow at least 2 business days for refills to be called in.

******If you ever need medications emergently please indicate that on the message or call our office directly to let us know that you need the prescription called in that day******

TYPICAL MEDICATION LIST

Below is a standard list of medications that you may be placed on after transplant. These may or may not be in addition to medications you are currently taking. If your medications are related directly to your liver disease management, the chances are good that you will not need to continue this medication. Each person is different and the final decision for what medications you are taking is made by your doctor. We have included a summary of each medication which reviews the function of the medication and some of the side effects that are more common.

- Prograf
- Prednisone
- Cellcept/Myfortic
- Bactrim
- Nystatin/Mycelex Troche
- Valcyte
- Prilosec/Prevacid
- Aspirin

PROGRAF (FK 506, Tacrolimus)

This is the most common anti-rejection medication used for liver transplant patients. Depending upon your particular condition, your physician may choose to use one or more immunosuppressive drugs in addition to the Prograf. It is dispensed in five milligram (mg) and one milligram (mg) capsules that are taken twice a day.

1. Take the drug twice daily, twelve hours apart. Repeat if the full dose is vomited within one hour, and call your transplant physician if vomiting persists.
2. On days that you are having labs done, take your prograf, after your blood is drawn.
3. **Do not** eat grapefruit or drink grapefruit juice, as this will increase your Prograf drug level.
4. **Keep** Prograf in a cool dark place at room temperature.

Side Effects of Prograf:

As with all medications, Prograf has side effects. Most of these side effects are treatable; **DO NOT** stop taking Prograf because of its side effects. Talk to your transplant physician about appropriate treatment.

Common Side Effects of Prograf are:

- Nausea
- Diarrhea
- Tremors
- Headaches
- Numbness and tingling of hands and feet
- Increased blood glucose – hyperglycemia
- Increased blood pressure – hypertension
- Hair loss
- Renal Insufficiency

PREDNISON

Prednisone is another drug that is used to prevent rejection. All patients will be on prednisone after the transplant. After several weeks, the patient may be gradually tapered off Prednisone as liver function improves. Most patients are off prednisone around three to four months after transplant.

Side Effects of Prednisone

Again, side effects from Prednisone are generally not severe and are treatable. **DO NOT** stop taking Prednisone because of its side effects.

- Ulcers, indigestion
- Salt and water retention, moon face
- Increased appetite
- Increased blood sugar
- Difficulty sleeping, mood changes
- Bone and joint changes
- Cataracts, glaucoma
- Blurry vision - **DO NOT** obtain new glasses until the dosage is stabilized
- Increased susceptibility to infection, delayed wound healing
- Increased sun sensitivity, heat intolerance and acne

CELLCEPT

CellCept is another medicine used to prevent rejection. It decreases the number of white blood cells in your body to help prevent harm to your new organ. CellCept can be used in combination with Prograf and Prednisone. You will take this medicine two times a day; however, the dosage may change depending on your white blood cell count.

1. Store CellCept at room temperature.
2. **DO NOT** open or crush the capsules.
3. If you miss a dose of CellCept or are unsure if you took one of your daily doses, **DO NOT** take a double dose. Call your transplant coordinator.

Common Side Effects Are:

- Diarrhea
- Vomiting
- Decreased white blood cell count
- Increased risk of infection
- Increased risk of developing Lymphoma's and other malignancies, especially of the skin.

MYFORTIC

Myfortic is a medication that is often used in place of cellcept. This medication has the same precautions as cellcept. It is thought that some of the gastric side effects are lessened as the medication has an enteric coating on it that allows it to pass through your stomach and be digested and absorbed in your small bowel.

Common Side Effects Are:

- Decreased white blood cell count
- Increased risk of infection
- Increased risk of developing Lymphoma's and other malignancies, especially of the skin.

***PLEASE NOTE THAT YOU WOULD NOT BE ON BOTH CELLCEPT AND MYFORTIC AT THE SAME TIME**

NYSTATIN or MYCELEX TROCHE

These drugs prevent the occurrence of oral yeast (“thrush”) an infection that is common when a person is on immunosuppression. You will take this three times a day for 6 weeks after transplant.

BACTRIM (TRIMETHIPRINE/SULFAMETHOXAZOLE) or PENTAMADINE

This drug is used to prevent pneumonia, specifically Pneumocystis pneumonia. You will take the Trimeth/Sulfa (TMP-SMZ) once a day for one (1) year to help prevent pneumonia.

VALCYTE or CYTOVENE

This drug is used to prevent or treat a viral infection called cytomegalovirus (CMV). You may take this medicine once a day for three (3) months to prevent this infection.

OTHER DRUGS

You will be given other drugs to counteract the side effects of the immunosuppressive agents as well as for problems independent of the liver. A member of the transplant team will explain these drugs to you. They include:

- Anti-ulcer drugs, such as Prilosec, Prevacid, Protonix or Pepcid to decrease stomach acid production while on prednisone
- Anti-hypertensive (high blood pressure) drugs, such as calcium channel blockers (Procardia), or beta blockers (Lopressor)
- Pain relief medications, such as Tylenol and Oxycodone. You may take up to 500mg of Tylenol every 6 hours (**DO NOT EXCEED** 2 grams in one 24 hour period).
- Vitamin supplements, such as multivitamins with folic acid, or magnesium, calcium, or phosphorus supplements
- Stool softener, such as Colace

MEDICATION FOR FEMALE PATIENTS

The immunosuppressive drugs you are taking may make you more susceptible to fungal infections of the vagina. Miconazole vaginal suppositories known as Monistat 3 or Monistat 7 are prescribed to treat these common infections. The suppositories come with an applicator to insert them into the vagina. If you have any questions about insertion or other matters related to the suppositories and your infections, ask your transplant coordinator. In order to help prevent infection from recurring, do not have sexual intercourse during the time you are using the medication.

If your symptoms do not resolve within seven days, you need to see your gynecologist.

Common side effects of the miconazole vaginal suppositories are irritation around the vaginal area and a skin rash.

COUGH AND COLD PRODUCTS

Antihistamine (chlorpheniramine):

- Chlorpheniramine
- Diabetic Tussin Allergy Relief (sugar free)

Antihistamine and Analgesic Combinations (chlorpheniramine or diphenhydramine and acetaminophen):

- Coricidan HBP Cold and Flu
- Chlor-Trimeton Allergy
- Tylenol Severe Allergy Caplets (sugar free)

Cough Suppressants (dextromethorphan):

- Benylin Adult Formula (sugar free)
- Delsym
- Robitussin Cough Gels (sugar free)
- Tuss DM tablets (sugar free)
- Vicks Formula 44

Expectorant (guaifenesin):

- Diabetic Tussin EX Expectorant (sugar free)
- Robitussin
- Scot-Tussin Expectorant (sugar free)

Expectorant and Cough Suppressant Combinations (dextromethorphan/dextromethorphan)

- Benylin Expectorant (sugar free)
- Coricidin HBP Chest Congestion and Cough
- Diabetic Tussin DM (sugar free)
- Diabetic Tussin Maximum Strength DM (sugar free)
- Humibid DM (sugar free)
- Robitussin DM
- Robitussin Sugar Free Cough Syrup (sugar free)
- Scot Tussin Senior Clear (sugar free)
- Vicks 44E

Antihistamine and Cough Suppressant with or without Analgesic (chlorpheniramine, dextromethorphan, with or without acetaminophen)

Coricidan HBP Cough and Cold

- Scot Tussin Cough and Cold (sugar free)
- Scot Tussin DM (sugar free)
- Coricidan HBP Maximum Strength Flu (contains acetaminophen)
- Diabetic Tussin Cold and Flu gel caps (contains acetaminophen – sugar free)

Sore Throat

- Chloraseptic Sore Throat Spray (sugar free)
- Chloraseptic Sore Throat Gargle (sugar free)
- Diabetic Tussin Sore Throat Spray (sugar free)

Other

- Breathe Right Cold Relief
- Breathe Right Vapor Strips
- Chloraseptic Relief Strips

*** Products that contain pseudoephedrine should not be used if you have high blood pressure or diabetes**

YOUR CARE AT HOME

Provided there are no complications, your liver is performing well, and your wound has healed, you will be allowed to go home about seven days after surgery. Before you can leave the hospital, you must have a thorough understanding of what you need to do to take care of yourself at home. The nurses and transplant coordinator will instruct you about how to care for your new liver and how to take your medicines. A dietitian will give you diet instructions. A social worker will visit you as needed.

POST-OPERATIVE GUIDELINES

1. **T-tube/biliary** tube provides a "window" into the liver by which studies can be done to assess your liver's health. The tube provides support for the tissue where the two bile ducts (or the duct and the bowel) are healing. You will have this tube in place for an average of 3 months. Keep the **t-tube/biliary** tube secure with square bandage (available at drug store) to prevent pulling on clothing.
2. Call the Transplant Coordinator on-call immediately if the tube is comes out or is pulled out partially.
3. This tube will be scheduled to be removed approximately 2 weeks after you have stopped taking prednisone. This time frame varies from patient to patient, but you are usually on the prednisone medication for 3 to 4 months.
4. No heavy lifting for 12 weeks (nothing greater than 10 lbs.)
5. No driving for one month from transplant date.
6. Staples from surgery will be in place approximately 3 weeks. You may shower with staples and tubes in place. Cleanse sites with antibacterial soap. Pat dry being careful not to pull. Do not use powder or lotion around incision or tube site.

GENERAL GUIDELINES

When you leave the hospital, you will have the responsibility for monitoring your health and avoiding infection. The following guidelines should become a natural part of your way of life:

- **NO** mold. Dust generated from construction sites may contain fungi. If you breathe in large numbers of fungi, it is possible that you could get a serious infection. In general, avoid construction sites, do not undertake renovation work in your home without consulting the transplant team, barns and sheds should be avoided due to dust with large numbers of fungi. If you must be exposed to any of

these sites, you must wear a mask that is sensitive enough to protect against tuberculosis (please ask our staff for assistance if you need a mask).

- Wear gloves when working in wet soil.
- You may swim in the ocean or a pool, NO lakes or ponds [fresh water]
- **Do not** handle pet waste. It is advisable not to have birds or turtles as pets, as their waste contains a high level of germs. If you have a pet, make sure it is carefully screened by a veterinarian.
- A healthy diet, exercise, and plenty of rest will help you avoid illness.
- **DO NOT SMOKE!** Smoking will place you at even greater risk of developing lung infections.
- Shower or bathe daily. Wash hands with antibacterial soap before meals and after using the bathroom.
- Minor injuries such as cuts and scrapes should be immediately washed with soap and water. If they do not heal well, call your transplant coordinator.
- Report to your transplant coordinator any blisters, sores, suspicious lumps or growths in armpits, groin, or elsewhere on your body.
- Wash all fruits and vegetables thoroughly. Molds and fungi may be present on their skins.
- Always tell physicians or dentists about your transplant before undergoing any procedures, including routine teeth cleaning.
- Avoid crowds and crowded rooms.
- Stay away from day care centers. You may be exposed to common childhood infections, such as cytomegalovirus, which could cause you to reject your liver.
- **Do not** go near anyone who has a cold, flu, or who does not feel well until that person is free of symptoms.
- Discuss any travel plans with your transplant team. Travel in underdeveloped countries is not advised.

MEDICAL IDENTIFICATION

We recommend that wear your medical bracelet or necklace that identifies you as a transplant patient. In case of an accident, it is very important for health care personnel to know that you have had a liver transplant and that you are immunosuppressed.

DAILY MEDICAL TASKS AND VITAL SIGNS LOG

Please take your temperature, weight, and blood pressure on a daily basis and record them in your medical diary located in the back of this book.

1. Take your temperature in the morning. Record the readings in your diary. Call the transplant team if your temperature rises above 100°F. **Do not** take medication to lower your temperature unless instructed to do so by your transplant physician or coordinator.
2. Check your weight every morning before breakfast, after you have gone to the bathroom. Record your weight in your daily diary. An increase in weight may mean that you are retaining fluids, or that you may need to control your calories.
3. Take your blood pressure every morning, and write it in your diary. If the top number is consistently greater than 160, or if the bottom number is greater than 100, report it to the transplant team.

VACCINES

You must never receive a live or weakened virus vaccine after the transplant. Examples of these are small pox, yellow fever, measles, mumps, rubella, and the oral polio vaccine. This type of vaccination is, in essence, giving you a small dose of the actual virus, which, in you, could turn into a serious complication.

Immunizations that are acceptable are dead or inactivated virus vaccines. Examples of these are flu, diphtheria-tetanus (as a booster only), the mantoux (TB) test, and the pneumococcal vaccine. A tetanus booster is good for 10 years. Transplant recipients may also receive the Hepatitis B vaccine series. That series is a recombinant virus, which is in effect a synthetic virus and is safe for you to receive. Whether or not you opt to receive these vaccines needs to be determined on an individual basis according to your preferences and your risk factors. For example - if you have routinely received a “flu shot” every year, then you probably will want to continue doing so after you pass the 6-month point of your transplant. If you never received the “flu shot” in the past and stayed healthy, it is probably not necessary to get the vaccine now. If you are a health care worker, you will need to get the Hepatitis B vaccine, but if you are not in health care, it probably isn’t necessary. Follow your primary care physician’s advice. If you have any questions, call the transplant office.

Transplant recipients who have young children or that are around young children on a regular basis should be aware of the vaccines that the children are receiving. If possible children who have immediate contact with the transplant recipient should have the inactivated poliovirus vaccine (IPV) rather than the oral poliovirus vaccine (OPV.) If you are exposed to any childhood diseases that you had as a child or you received a vaccine for that disease prior to transplant, you will probably be okay. Just monitor for signs and symptoms of the disease, we do not routinely give any prophylaxis medication for exposure. If you did not have the disease or a vaccine for it, please call the transplant office.

You should wait six months after your transplant date before receiving any immunizations.

DENTAL CARE

Dental care is very important after your transplant. Care includes brushing your teeth after every meal, daily flossing, and gum stimulation. If your physician has ordered Nystatin, use it as prescribed, Nystatin prevents yeast infections in the mouth.

Regular dental check-ups should be scheduled once a year or more frequently if recommended by your dentist. However, your transplant physician will want to start you on a preventative antibiotic before you see your dentist in order to reduce the likelihood of infection. Be sure to inform your transplant coordinator of dental appointments prior to going.

In addition to daily care of the teeth, you should also check in and around your mouth for bleeding gums, lumps, cold sores, and other signs of infection. Report any unusual findings to the transplant coordinator. Overgrowth of the gums (hyperplasia) or temperature sensitivity (hot/cold sensitivity) of the teeth may be a side effect of medication.

HAIR CARE

Hair growth and condition may be affected by the medications you will be taking. Prednisone tends to change the condition of your hair, making it thinner and more brittle. In the early stages after your transplant when you are taking relatively high dosages of Prednisone, you should avoid permanents, tints, dyes and bleaching, as they can cause hair breakage. Let your beautician know that you are on Prednisone and ask for a recommendation for a good shampoo and conditioner.

SKIN CARE

The medications you are taking may increase your susceptibility to skin problems such as skin cancer, dry skin, and acne.

Always wear a sunscreen with an SPF of 15 or higher on all exposed skin before going outside. Make it a habit to wear sunscreen every day and always wear a hat that shades your face. The rays that can cause skin damage and skin cancer are present even on cloudy days. If at all possible, avoid exposure between peak hours of 10 a.m. and 3 p.m. You may also experience bouts of dry skin. Use a mild soap without perfume or deodorants. To soften your skin, use Alpha Keri oil in bath water and Alpha Keri or Lubriderm skin lotion.

Some patients may develop acne. To control acne, wash your face and other affected areas at least three times a day with soap and always use a fresh, clean washcloth. Do not rub or scrub, as this will only increase irritation. Also, do not touch the affected areas. If these measures do not work satisfactorily, try using a lotion containing 10% benzoyl peroxide. If the acne becomes red and infected, consult your transplant physician for treatment.

MINOR FIRST AID:

To treat cuts, scratches and other minor injuries, wash the area thoroughly with soap and water, apply a mild antiseptic on a clean, dry bandage, and change the bandage frequently. Check the area daily for infection. If the area becomes swollen and filled with pus, or if you develop a fever, call the transplant coordinator.

If the cut is large enough to require stitches, remember that you must take antibiotics. Alert the physician who is caring for your injury about your transplant and instruct the physician to contact the transplant team if they have any questions regarding your care.

CONSTIPATION:

Constipation may become a problem due to high doses of Prednisone, a low potassium level, or from the side effects of diabetes. A diet low in roughage may also be the cause of constipation. To prevent or treat constipation, drink plenty of water unless you are on a fluid-restricted diet. Increase the bulk in your diet by eating plenty of fresh fruit and vegetables. Never go longer than two days without a bowel movement contact your transplant coordinator for recommendations about laxatives and stool softeners. Remaining physically active is also an effective way to avoid constipation.

You should also notify your doctor of stool changes such as persistent diarrhea or dark, tar-like stools.

EXERCISE:

To promote general health and prevent muscle deterioration, you should begin an exercise program within days after surgery. A physical therapist will work with you after surgery to design a program suited to your age and physical condition.

In general, on the third or fourth day after surgery, you should begin walking in your room and in the hallway. You should increase the time you walk steadily as your condition improves. By the time you leave the hospital, you should be walking up to 30 minutes a day. Gradually increase your time as tolerated.

For the first three months after your surgery, avoid pulling or straining your abdominal muscles - no heavy lifting or sit-ups. Avoid all contact sports as well as any activities that are jarring, such as horseback riding, snowmobiling, etc.

After six weeks, you may increase your activities and include such things as swimming and bicycling. You will be able to participate in most activities after three months. However, please discuss specific activities with your transplant physician beforehand.

Returning to work will depend on the type of job you have. You may be able to return to work as quickly as four to six weeks after surgery or you may have to wait three months if your job requires strenuous activity or heavy lifting.

Since Prednisone can cause an increase in your appetite and weight gain, it is very important that you incorporate exercise as a means of controlling your weight. A good exercise program should be part of your daily routine. Only regular exercise will help you build muscle mass and keep your weight at the desired level. You should exercise at least three nonconsecutive days per week, i.e. Monday, Wednesday, and Friday. If exercise is difficult to fit into your schedule, a simple activity such as daily walking is sufficient.

If you experience bone or joint pain at any time, report it to your transplant physician. This may indicate a medication side effect and may need further investigation.

SEXUAL ACTIVITY AND BIRTH CONTROL:

It is a good idea to wait four to six weeks after surgery before you have sexual relations. However, you will probably find that once you are feeling well that you are more interested in relations than when you were sick. Also, do not worry about hurting the new liver; you may be more comfortable, however, in using positions that do not place pressure on the liver.

Women should visit their gynecologist soon after leaving the hospital and be placed on the most appropriate regimen of birth control. Menstrual periods usually begin two to twelve months after surgery; however, it is possible to become pregnant before your period starts.

While all types of birth control have risks, the best type for transplant patients are barrier methods such as condoms, and diaphragms. Birth control pills with estrogen should not be used, as well as the intrauterine device (IUD).

Keep in mind that because of the immunosuppressive drugs you are taking, you will be at greater risk for infection from sexually transmitted diseases such as AIDS, gonorrhea, syphilis, herpes, etc.

Women age 40 and younger need to have a Pap smear and a breast examination once a year.

Men should be better able to have an erection after transplant. If you are having problems with impotence, it may be because of your blood pressure medication. If this is the case, your transplant physician may order a different medication to remedy the problem. Never stop taking blood pressure medication as high blood pressure places you at risk for stroke.

PREGNANCY:

If your liver is functioning well and you do not have problems with high blood pressure, you may try to conceive two years after surgery. However, you need to discuss any plans with your transplant team before trying to become pregnant. CellCept and Myfortic are rated as a pregnancy category D which means that there is positive evidence of human fetal risk, but the benefits from use in pregnant women may be acceptable despite the risk (e.g., if the drug is needed in a life-threatening situation or for a serious disease for which safer drugs cannot be used or are ineffective). It is recommended that two forms of birth control be utilized while taking cellcept or myfortic if you are of child-bearing age as cellcept and myfortic interact with oral contraceptives making them less effective)

NUTRITIONAL COUNSELING:

Nutrition plays a crucial role for patients with chronic liver disease, both in pre-transplantation and post-transplantation. Pre-transplantation, many patients with end stage liver disease develop anorexia, nausea, vomiting, steatorrhea, malabsorption, energy and protein metabolism alterations, and severe fluid retention. Malnutrition is often a result. Therefore, the nutrition evaluation and counseling is an invaluable component in the work-up of a liver transplant patient.

Many transplant candidates wait years to receive an organ so ongoing nutrition assessment and support help to minimize the malnourished state and disease symptoms. Nutritional education also helps to minimize hospital admits secondary to encephalopathy, ascites/edema, and malnutrition with the goal of keeping the patient as well-nourished as possible to maximize quality of life pre-transplantation and improve post-transplantation outcomes.

Before and after transplant, nutrition plays an important role in your care. Before transplant, some patients can develop nausea, vomiting, early fullness, constipation, or decreased appetite. These can affect your food intake. It is important to receive the appropriate amount of calories and protein from your diet. If you don't eat enough protein, you may begin to lose some muscle mass including loss of muscle from vital organs such as the heart and lungs. Too much protein can also be harmful. You will be placed on a controlled protein diet. Your dietitian will specify what your protein goal is and how to achieve it.

Calories are also important. If you are of normal weight or underweight and do not eat enough calories, you will begin to use muscle for energy. You may experience both weight loss and breakdown in muscle mass. If you have a loss of appetite or early fullness, try eating smaller, more frequent meals.

Fluid retention is also common with liver disease. Carrying additional fluid can put a strain on the body to perform everyday functions. To minimize fluid retention, a low sodium diet will be recommended by your dietitian.

After your transplant, a dietitian will review in detail with you types of dietary changes you will have to make in order to stay as healthy as possible. In general, diet restrictions will depend upon the ability of your new liver to function properly. In addition, some restrictions will be necessary due to the anti-rejection medications you are taking.

During the first few weeks after transplant surgery, you need to eat additional protein. This is needed to maintain muscle mass, and replace protein losses from steroid medications. You will need 50 percent more protein than you were allowed prior to your transplant surgery for about the first two months. Extra calories are also needed for those who lost a significant amount of weight prior to surgery and are now under their ideal body weight. The body needs these calories and proteins to heal, fight infection, and maintain your nutritional status.

Dietitians are an important part of the transplant team, and your dietitian will work with you closely to ensure that you understand and follow instructions regarding your diet.

YOUR DIET:

After your transplant, a nutritionist will review in detail with you the types of dietary changes you will have to make in order to stay as healthy as possible. In general, diet restrictions will depend upon the ability of your new liver to function properly. In addition, some restrictions will be necessary due to the anti-rejection medications you are taking.

1. Maintain an ideal or acceptable body weight. **AVOID TOO MUCH WEIGHT GAIN!**
2. Reduce your risk of cardiovascular disease by following a low-fat, low cholesterol diet.
3. Control blood sugar levels by reducing the amounts of high sugar foods to avoid steroid induced diabetes.
4. Control fluid retention and blood pressure by minimizing the amount of sodium consumed in your diet.
5. Increase calcium intake to help prevent bone loss or osteoporosis. In addition, your dietitian will discuss food safety to help prevent food borne illness.

Prednisone, an important anti-rejection medication, has many side effects, which can be controlled through proper choices in your diet. It causes sodium and water retention, which can lead to an increase in blood pressure. A sodium (salt) restricted diet may be used to control your blood pressure.

Another side effect of Prednisone is an over stimulation of your appetite. Use exercise, hobbies, or fat-free foods or beverages to help compensate for your hunger.

Although most patients will initially need to gain weight after surgery, they should do so slowly and stop when their ideal body weight is reached. It is recommended that you gain a maximum of one pound per week so that you can build back the muscle that was lost during your illness and convalescence. If you are presently at your ideal body weight, you will need to discipline yourself to maintain this weight.

Prednisone also causes a breakdown of the muscle tissues. You should eat adequate quantities of high quality protein to assist the body in counteracting the effects of Prednisone and regaining lost muscle mass. Eat plenty of non-fat/low-fat milk and cheeses, eggs, and meat.

Another side effect of Prednisone is an increase in fat deposits, especially in the face and abdominal area. To prevent this problem, you should eat only moderate amounts of carbohydrates, sweets and fats. Use skim milk, low-calorie desserts, fresh fruits, and vegetables. Reduce use of margarine, butter, oil, bread, potatoes, and pasta.

Prednisone can also affect your blood sugar level. It can cause your body to be resistant to insulin and blood sugars can increase. For people with diabetes mellitus, this can result in the need for larger doses of insulin. A no concentrated sweets diet is recommended.

Calcium is a mineral that makes your bones and teeth strong. Steroid medications make it difficult for your body to absorb and maintain calcium. You will need to choose at least four high calcium foods every day.

Nutritionists are an important part of the transplant team, and the transplant nutritionist will work with you to ensure that you understand and follow instructions regarding your diet.

HIGH-POTASSIUM FOODS

Fruits

Apricot , raw (2 medium)
dried (5 halves)
Avocado (¼ whole)
Banana (½ whole)
Cantaloupe
Dates (5 whole)
Dried fruits
Figs, dried
Grapefruit Juice
Honeydew
Kiwi (1 medium)
Mango(1 medium)
Nectarine(1 medium)
Orange(1 medium)
Orange Juice
Papaya (½ whole)
Pomegranate (1 whole)
Pomegranate Juice
Prunes
Prune Juice
Raisins

Vegetables

Acorn Squash
Artichoke
Bamboo Shoots
Baked Beans
Butternut Squash
Refried Beans
Beets, fresh then boiled
Black Beans
Broccoli, cooked
Brussels Sprouts
Chinese Cabbage
Carrots, raw
Dried Beans and Peas
Greens, except Kale
Hubbard Squash
Kohlrabi
Lentils
Legumes
Mushrooms, canned
Parsnips
Potatoes, white and sweet
Pumpkin
Rutabagas
Spinach, cooked
Tomatoes/Tomato products
Vegetable Juices

Other Foods

Bran/Bran products
Chocolate (1.5-2 ounces)
Granola
Milk, all types (1 cup)
Molasses (1 Tablespoon)
Nutritional Supplements:
Use only under the
direction of your doctor
or dietitian. Nuts/seeds
Nuts and Seeds (1 ounce)
Peanut Butter (2 tbs.)
Salt Substitutes/Lite Salt
Salt Free Broth
Snuff/Chewing Tobacco
Yogurt

What foods are low in potassium?

The following table list foods which are low in potassium. *A portion is ½ cup unless otherwise noted. Eating more than 1 portion can make a lower potassium food into a higher potassium food.*

LOW-POTASSIUM FOODS

| <u>Fruits</u> | <u>Vegetables</u> | <u>Other Foods</u> |
|---|--|--|
| Apple (1 medium) | Alfalfa sprouts | Rice |
| Apple Juice | Asparagus (6 spears) | Noodles |
| Applesauce | Beans, green or wax | Pasta |
| Apricots, canned in juice | Cabbage, green and red Carrots, cooked | Bread and bread products: (Not Whole Grains) |
| Blackberries | Cauliflower | Cake: angel, yellow |
| Blueberries | Celery (1 stalk) | Coffee: limit to 8 ounces |
| Cherries | Corn, fresh (½ ear) frozen (½ cup) | Pies without chocolate or high potassium fruit |
| Cranberries | Cucumber | Cookies without nuts or chocolate |
| Fruit Cocktail | Eggplant | Tea: limit to 16 ounces |
| Grapes | Kale | |
| Grape Juice | Lettuce | |
| Grapefruit (½ whole) | Mixed Vegetables | |
| Mandarin Oranges | Mushrooms, fresh | |
| Peaches, fresh (1 small) canned (½ cup) | Okra | |
| Pears, fresh (1 small) canned (½ cup) | Onions | |
| Pineapple | Parsley | |
| Pineapple Juice | Peas | |
| Plums (1 whole) | Green Peppers | |
| Raspberries | Radish | |
| Strawberries | Rhubarb | |
| Tangerine (1 whole) | Water Chestnuts, canned | |
| | Watercress | |
| | Yellow Squash | |

How do I get some of the potassium out of my favorite high-potassium vegetables ?

The process of leaching will help pull potassium out of some high-potassium vegetables. It is important to remember that leaching will not pull all of the potassium out of the vegetable. You must still limit the amount of leached high-potassium vegetables you eat. Ask your dietitian about the amount of leached vegetables that you can safely have in your diet.

How to leach vegetables:

For Potatoes, Sweet Potatoes, Carrots, Beets, and Rutabagas:

1. Peel and place the vegetable in cold water so they won't darken.
2. Slice vegetable 1/8 inch thick.
3. Rinse in warm water for a few seconds.
4. Soak for a minimum of two hours in warm water. Use ten times the amount of water to the amount of vegetables. If soaking longer, change the water every four hours.
5. Rinse under warm water again for a few seconds.
6. Cook vegetable with five times the amount of water to the amount of vegetable.

For Squash, Mushrooms, Cauliflower, and Frozen Greens:

1. Allow frozen vegetable to thaw to room temperature and drain.
2. Rinse fresh or frozen vegetables in warm water for a few seconds.
3. Soak for a minimum of two hours in warm water. Use ten times the amount of water to the amount of vegetables. If soaking longer, change the water every four hours.
4. Rinse under warm water again for a few seconds.
5. Cook the usual way, but with five times the amount of water to the amount of vegetable.

Very High Magnesium Foods

Cocoa
Bitter chocolate

High Magnesium Foods

Nuts:

Cashews
Almonds
Brazil nuts
Peanuts
Pecans
Hazel nuts
Walnuts
Fresh/Dried coconuts

Seafood:

Cockles
Crab
Clams
Shrimp
Conch
Winkles
Whelks

Vegetables:

Soybeans(Edamame
Butter beans
Soy flour
Chard
Seaweed
Beet greens
Spinach
Collards

Grains:

All bran
Raw oats
Whole barley
Corn meal
Rye flour
Brown rice
Whole wheat bread

Fruits:

Dried figs
Dried apricots
Dates

Medium Magnesium Foods

Nuts & Fruits:

Chestnuts
Dried peaches
Dried prunes
Avocado
Bananas
Raisins
Blackberries

Grains:

Corn meal
White flour
White rice
Pearled barley
Macaroni, raw

Dairy:

Hard cheese

Vegetables:

Parsley
Sweet corn
Okra
Kale
Potatoes & skin
Cabbage, raw
Brussels sprouts
Horseradish
Dandelion
Artichokes
Kohlrabi

Seafood:

Herring
Haddock
Salmon
Bluefish
Flounder
Prawns
Oysters
Mackerel
Canned Sardines
Boiled Lobster

Meats:

Liver
Heart
Bacon
Corned beef
Veal
Steak
Chicken
Turkey
Lean roast beef

Low Magnesium Foods**Fruits:**

Plums
Pears
Apples
Grapes
Cranberries
Cherries
Cantaloupes
Peaches
Pineapple
Grapefruit
Oranges
Apricots
Strawberries
Raspberries

Vegetables:

Boiled peas
Boiled potatoes
Boiled broccoli
Beets
Onions
Eggplant
Carrots
Cucumber
Mushrooms
Tomatoes
Lettuce
Asparagus
Boiled cauliflower

Grains:

Boiled macaroni
Boiled white rice
Pastries
White flour products

Dairy:

Eggs
Milk
Butter
Cream

Meat & Fish:

Lean roast port
Ham
Grilled lamb
Kidney/ brain
Beef tongue
Roast beef with fat
Cod
Halibut

Extras:

Sugar

POST-DISCHARGE HOSPITAL VISITS:

After you have been discharged from the hospital, you will be monitored very closely by the transplant team for both medical and surgical complications and problems. You must visit the Transplant Surgery outpatient clinic weekly for approximately one month, and then every other week for an additional two months.

The frequency of follow-up visits to the Transplant Office will depend upon your progress. You should plan on frequent visits for a period of eight months to one year after your transplant as that is the time period in which most common transplant complications occur. You will require life-time monitoring at scheduled intervals by your family physician and the transplant team. If you move out of the area, arrangements will be made with another transplant center for your ongoing care.

The Outpatient Transplant Surgery Office

Outpatient care for transplant patients is provided in a dedicated suite in the University Physicians Center (UPC II), Suite 3100, Surgical Specialties Clinic. Parking is available in a lot adjacent to the UPC building. The clinic is open on Monday.

You will have blood drawn for tests to evaluate your blood count, liver function, kidney function, and Prograf level. You should bring your medicines to the transplant clinic but you should not take your Prograf until the blood samples have been obtained.

Outpatient visits are short, and will involve a brief examination of the wound sites, a discussion of how you are adapting to your new life-style, and a review of your medications and your diary. Bring your liver transplant manual to these appointments. During the visit, please ask questions you may have and report anything that you are concerned about including fever, headache, cough, weight gain, wound drainage, and weakness. We will review your labs at this visit.

If all is well, you will return home. If any changes are needed in your medications, you will be contacted. If the laboratory tests suggest a rejection reaction, you may be readmitted. This may only require a one-day stay. A significant problem will require a repeat of your liver ultrasound and/or biopsy of the liver, or a cholangiogram if a *T-tube* is present.

It is important to remember that rejection may occur with or without symptoms. That is why blood is drawn and tested on a frequent basis, and why it is crucial that you keep your outpatient appointments. It is not unusual for patients to be readmitted at least once or twice following transplant.

LONG-TERM FOLLOW-UP CARE:

Follow-up with the Transplant Program:

- First month: weekly visits on Monday
- Then every two weeks for the second month
- Once in the third month
- Clinic visits at 6 months, 9 months, 1 year, 1.5 years, and 2 years.
- Then yearly clinic visits.

Lab work:

- Mondays and Thursdays for the first 3 months.
- Weekly for the fourth month (Mondays)
- Every other week for month 5 and 6 (Mondays)
- After six months, labs once a month.

Follow-up with the referring physician:

- Please arrange to see your primary care doctor after your discharge from the hospital.
- Please **DO NOT** let anyone remove stitches or staples from your incision.

WHEN TO CALL THE TRANSPLANT TEAM

Your transplant surgeons and coordinators are available by calling the Transplant Office at 1-800-525-5395, Monday through Friday from 8:00 a.m. to 4:00 p.m. No question or concern is trivial, and it is important that you call whenever you have a question, concern, or symptom. Once you have been transplanted, **if you have an emergency after hours**, you may call the Hospital operator at (717) 531-8521 and have the Transplant Coordinator on call paged.

Signs of Rejection:

- fever above 100°F
- swelling or tenderness over the new liver
- flu-like feelings
- itching
- back or abdominal pain
- gray-colored stools
- dark, tea-colored urine
- yellow skin or eyes (late sign). This is also called jaundice

Signs of Infection:

- Nausea, vomiting, or diarrhea
- Sneezing, ear ache, or cough that does not go away over a 24-hour period
- Burning sensation while urinating or frequent urination
- Redness, swelling, or drainage from your incision

MEDICAL DISABILITY

After a recuperative period of approximately three to six months is completed, it is important that you view yourself and encourage others to view you as a “normal” person. The transplant team encourages patients to return to a fully productive life, the ultimate goal of organ transplantation. Of course, if you happen to have a problem after transplant that prevents or delays resumption of normal activities, every effort will be made to lessen or resolve those problems.

Certification of medical disability will not be automatically given after a recovery period of six months, unless there are compelling reasons to do so.

YOUR NEW LIVER

The liver transplant process will not be easy. You will certainly experience your share of stress and anxiety during this difficult period. You will be concerned and have many questions about your own health and future, as well as the impact the process will have on your family.

The Liver Transplant Program at the Hershey Medical Center is committed to providing you with the finest in medical services. The entire team, including *transplant surgeons* and *hepatologists* from Hershey Medical Center, are equally concerned about providing you with the emotional and practical support that is necessary to get through the transplant process successfully. Because of our academic and research expertise, our program can offer the latest breakthroughs in transplant science. Those resources, coupled with your firm commitment to faithfully follow the instructions necessary for your recovery, offer you an excellent chance of returning to a normal life.

Again, if you have any questions at all at any point in the process, do not hesitate to contact the transplant team.

WRITING TO YOUR DONOR FAMILY

Once you have received your new liver, you will have the opportunity to write a letter to the family of your donor. Donor families often express their gratitude in hearing from the recipient of their loved one's liver. While writing a letter is optional, we encourage all transplant recipients to do so. Everyone recovers at a different rate and is not always up to writing a letter immediately. You can write a letter to your donor family at any time after transplantation. Please see the brochure "Writing to Your Donor" that was given to you with your teaching manual. If you do not have one of these brochures, please request one from either your social worker or transplant coordinator.

The transplant team can forward your letter to the local procurement agency, the Gift of Life Donor Program, who will then forward this letter to the appropriate family. If you decide to write to your donor family, please leave out your name or any other "identifying" information. The letter must remain anonymous in an effort to protect the privacy of both you and the donor family. Your letter will be screened prior to sending it to the donor family. If the family chooses to respond to your letter, they will follow the same process, submitting a letter to the Gift of Life Donor Program, who will then forward the letter to you after screening it.

Tips for Writing to Your Family

When writing about yourself:

- Include your first name only (and the first names of the family if you choose to include them).
- Acknowledge the donor's family's loss and thank them for their gift.
- Discuss your family situation such as marital status, children, or grandchildren. Describe the type of transplant that you received. (One donor may have benefited many people).
- Use simple language. Avoid complex medical terms and giving too much detail about your medical history.
- Describe how long you have waited for a transplant. What was the wait like for you and your family?
- Explain how the transplant has improved your health and changed your life. Did you return to work, school, or accept a new job? Did you celebrate another birthday? Did your son or daughter marry? Did you become a parent or grandparent?
- Share your hobbies or interests
- Consider omitting any religious comments, since the religion of the donor family is unknown.

When closing you card or letter, please sign your first name only. Do not reveal your address, city, phone number, physician's name, or the name of your hospital.

You may or may not hear from them. Some donor families have said that writing about their loved one and their decision to donate helps them in their grieving process. Other donor families, even though they are comfortable with their decision to donate, may prefer privacy and chose not to write.

We thank you for your thoughtfulness. We know the donor families appreciate hearing from recipients. Remember the donor family may still be coping with the loss of their loved one, and individuals manage grief in different ways. While you may be celebrating the anniversary of receiving your transplant, someone else is remembering a loss. Help the family understand the importance of the decision to donate. Let them know that their loved ones will never be forgotten.

Mail to:

Family Support Services

Gift of Life Donor Program

401 N. 3rd Street

Philadelphia, PA. 19123

LIVER TRANSPLANT RESOURCES

**www.pennstatehershey.org/transplants - PENN STATE HERSHEY
MEDICAL CENTER TRANSPLANT**

**WWW.DONORS1.ORG - GIFT OF LIFE, THE ORGAN
PROCUREMENT CENTER (OPO) FOR THE DELAWARE VALLEY**

WWW.TRANSPLANTSQUARE.COM

WWW.ROCHEUSA.COM

WWW.TRANSPLANTLIFE.COM

<http://www.healthytransplant.com>

OTHER RESOURCES AT THE HOSPITAL

Cafeteria

The cafeteria is located on the first floor by the rotunda. It is open from 6:30 a.m. to 2:00 a.m., and closes briefly from 9:15 p.m. to 10:00 p.m., and midnight to 12:30 a.m. At “common” meal times, you will find the largest selection of hot foods to choose from. Also located on the first floor near the east entrance (main lobby) are the Information Desk, Gift Shop, MAC machine, and Chapel.

Chapel

Many chaplains are available at the hospital to offer you spiritual support, and can be reached by dialing x8177 from any hospital phone. The chaplains offer a variety of services:

- Catholic mass (chapel): 12 Noon on Monday, Tuesday, Thursday and Friday
- Catholic mass (hospital auditorium): 6:00 p.m. on Sunday
- Ecumenical service: 12 Noon on Wednesday

Walking Path

For visiting family members who wish to exercise, there is a walking path which is located in the front of the hospital outside the North Lobby entrance. The path, which circles around the water retaining pond, is approximately one-half mile in length.

A hotel which consistently offers some of the best rates is:

Simmon's Motel
355 West Chocolate Avenue
(717) 533-9177

HOTELS IN THE AREA ARE:

| | | |
|--|---|--|
| Hilton Garden Inn 550 E. Main Street (717) 566-9292 | Milton Motel Hershey 1733 E. Chocolate Ave (717)533-4533 | Econo Lodge Hershey 115 Lucy Ave. (717)533-2515 |
|--|---|--|

| | | |
|---|---|---|
| Hampton Inn 749 E. Chocolate Ave (717)533-8400 | Holiday Inn Express 610 Walton Ave (717)220-4085 | Best Western Rt 422 & Sipe Ave (717)533-5665 |
|---|---|---|

| | | |
|--|--|--|
| Cocoa Motel 914 Cocoa Ave (717)534-1243 | Comfort Inn 1200 Mae Street (717)566-2050 | Days Inn 350 W. Chocolate Ave (717)534-2162 |
|--|--|--|

| | | |
|---|---|--|
| Fairway Motel 1043 E Chocolate (717)533-5179 | Hershey Lodge 400 E. Hershey Park Dr (717)533-3311 | Howard Johnson (717)533-9157 |
|---|---|--|

| | | |
|--|---|---|
| Motel 6 1518 E. Chocolate Ave (717)533-2384 | Red Carpet Inn 210 Hockersville Rd (717)534-1600 | Rio Motel 60 Washington Ave. (717)534-1065 |
|--|---|---|

| | | |
|---|--|---|
| Roadway Inn 43 W. Areba Ave. (717)533-7054 | The Warwick Hotel 12 W. Main Street (717)566-9124 | White Rose Motel 1060 E Chocolate Ave. (717)533-9876 |
|---|--|---|

America' Best Value Inn
(717)838-4761

Hershey Ronald McDonald House
(717)533-4001
(888)829-3545

If financial constraints make it difficult to obtain accommodations at an affordable rate, please contact your social worker for assistance.

NEARBY RESTAURANTS AND ATTRACTIONS

Restaurants

There are a multitude of restaurants in the area; however, we suggest the following because they have family-type atmospheres. For more information on local restaurants, please refer to the Yellow Pages in the Hershey telephone book.

- **Applebee's** located off of Hershey Park Drive, 1 mile north of the Hospital.
- **Bob Evans** located off of Hershey Park Drive, 1 mile north of the Hospital.
- **Friendly's Family Restaurant**, located on Route 322, directly across from the hospital, off of University Drive.
- **Fuddruckers** - located on Route 322 across from the hospital.
- **Isaac's** (deli sandwiches), located on Route 322.
- **McDonald's** located just off of Hershey Park Drive, 1 mile north of the Hospital.
- **Pizza Hut**, located just off of Hershey Park Drive, 1 mile north of the Hospital.
- **Wendy's** located just off of Hershey Park Drive, 1 mile north of the Hospital.
- **Your Place Restaurant** (pizza), located just across from the hospital on route 422.

Shopping

- **Briarcrest Square** (unique specialty shops, located across from the hospital.)
- **Hershey Outlets** - located on Hershey Park Drive, past Hershey Park, near Route 743
- **K-Mart** located just off of Hershey Park Drive, 1 mile north of the Hospital
- In addition, the city of Harrisburg is within 15 miles of the Hospital. Please refer to the Yellow Pages for information regarding shopping malls in the Harrisburg area.

Attractions

- **Chocolate World** - free tour of Hershey's chocolate-making process. Located on Hershey Park Drive, adjacent to Hershey Park
- **Hershey Park** - amusement park with rides and entertainment. Located on Hershey Park Drive.

GLOSSARY

| | |
|---------------------------|---|
| Antibody: | part of the immune system that helps the body fights infection and foreign substances. |
| Antigen: | the “marker” that stimulates antibody production. |
| Ascites: | excess fluid in the abdomen. |
| Bile: | a fluid produced by the liver, stored in the gallbladder, and released into the small intestine to help absorb dietary fats. |
| Compliant: | the act or process of conform, submit, or adapt to a demand, proposal, or regimen, being able to fulfill official requirements |
| Contraindication: | any condition which renders some particular line of treatment undesirable. |
| Diastolic: | the bottom of two blood pressure numbers, which measures the force of the heart muscle at rest, when it expands and fills with blood. |
| Edema: | excess fluid in body tissues; swelling of the ankles, for example, is a sign of edema. |
| Endotracheal tube: | an airway tube inserted through the mouth leading to your windpipe to help you breathe during surgery. |
| Foley catheter: | a tube inserted into the bladder to drain urine. |
| Fulminant: | sudden and severe. |
| Hepatologist: | a physician who studies the liver and treats liver disease. |
| Hypertension: | high blood pressure. |
| Immune system: | the system that protects the body from the invasion of foreign |

substances, such as bacteria, viruses, and from cancer cells.

Immunosuppressant: an agent given to prevent rejection of the transplanted organ.

Jaundice: a yellowish discoloration of the skin resulting from high levels of bilirubin in the blood.

Moon face: puffiness of cheeks as a result of high dose steroids.

Occult: difficult to observe, concealed.

Systolic: the top blood pressure number which measures the force of contraction of the heart muscle as blood is pumped out of the heart chambers.

T-Tube: a tube placed in the bile duct that allows bile to drain into a bag outside the body.

Varices: abnormally dilated and enlarged blood vessels