



Liver Transplant Patient Manual

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Introduction

You have been told that you need or may need a liver transplant. Before you become eligible to receive a transplant you must learn about the procedure, understand the commitment involved, and realize that not everyone in need of a liver transplant will ultimately obtain one. The number of liver transplant procedures performed in the United States is limited by the number of donor organs available. There are many more people who need liver transplants than there are organs available (~17,000 patients on the waiting list with only ~ 4500 donors/yr). Living donor transplants may help make up the shortfall in liver donors but is only possible in a very small number of adult patients needing liver transplants. Selection of patients for transplantation is a complicated process that attempts to place organs in suitable recipients on the basis of need, medical urgency and likelihood for survival. Before you start your evaluation, we would like you to become more familiar with the evaluation process. This handout will provide you with additional information about the transplant evaluation process, the transplant procedure, and what to expect after the actual transplant.

Liver transplantation is not necessarily a cure. A transplant provides a chance to prolong your life and to improve your quality of life. Unfortunately, you may be exchanging new symptoms and problems for your old symptoms and problems. You must realize that you will be taking medications for the rest of your life. **This is probably the most important decision that you will make in your lifetime.** Try to learn as much as you can, review the information we give you, and **ask questions when you do not understand.**

Making sure that the patient is a suitable transplant candidate is crucial to the success of the transplant and a positive outcome. We know that the evaluation process can be extensive and extremely stressful for ill patients, and their families and friends who support them, so our goal is to make the process as smooth as possible.

Before Proceeding With The Liver Transplant Evaluation You Must Remember:

1. **No alcohol.** You may be asked to submit to random testing for alcohol. We may require that you attend AA or a similar alcohol treatment program. **If we detect that you are drinking, you will be taken off the list and not transplanted.**
2. **No smoking.** You may be asked to submit to random testing for nicotine use. It is important to know that the longer the time between smoking cessation and transplantation the better. Continued smoking leads to more complications after surgery and reduces your chances of surviving. **If we detect that you are smoking and you have been informed to stop, you will not be transplanted.**
3. **No illegal drugs.** You will be drug tested and if illegal or un-prescribed drugs are detected, **you will be taken off the list and not transplanted.**
4. **Compliance is critical.** You will be instructed on how to take your medications, and told when to return for appointments. It is expected that you will follow the instructions we give you. **If you do not follow our instructions, you will not be transplanted.**
5. **Social Support is necessary.** Immediately after the transplant you will need to rely on your family and friends for help. **If you do not have adequate support from your family or friends, you may not be transplanted.**

Normal Liver Function

The liver is the largest organ in the body. The liver is an active organ responsible for many vital life functions. The primary functions of the liver are:

- Bile production which aids in the digestion and absorption of fats
- It helps distribute the nutrients found in food
- Excretion of bilirubin, cholesterol, hormones, and drugs
- Metabolism of fats, proteins, and carbohydrates
- Enzyme activation
- Storage of proteins, vitamins, and minerals
- Synthesis of plasma proteins, such as albumin, and clotting factors
- It helps "clean" the blood by removing medications and toxins

Due to these important activities, the liver is exposed to a number of insults and is one of the body's organs most subject to injury.

Symptoms of Liver Disease

The symptoms of liver disease include:

- jaundice (yellowing of eyes and skin)
- severe itching
- dark urine
- mental confusion or coma
- vomiting of blood
- easy bruising and tendency to bleed
- gray or clay-colored stools
- abnormal buildup of fluid in the abdomen

Cirrhosis

When the liver is damaged it attempts to repair itself (regeneration). During the repair process, scar tissue (**fibrosis**) may develop. Over time, the scar tissue increases to the point where it surrounds entire areas of liver. When large portions of the liver are surrounded by scar tissue, **cirrhosis** is said to be present. Thus, cirrhosis is the end result of the liver attempting to repair itself. While some patients with cirrhosis have near normal liver function, most experience a variety of problems. Many of these problems (for example, esophageal varices, splenomegaly, ascites, encephalopathy), develop as a result of the way cirrhosis changes blood flow through the liver.

Complications of Cirrhosis

1) Esophageal Varices

Definition: **Esophageal varices** are the enlarged veins (varicose veins) located in the lower end of the esophagus (swallowing tube). These veins develop because cirrhosis blocks blood from flowing freely through the liver. Once the blood is blocked from flowing through the liver, it must find another way to return to the heart. The veins surrounding the esophagus and stomach provide a pathway for blood to return to the heart. Over time, these veins become larger and develop into varicose veins or varices. The enlarged veins surrounding the esophagus are **esophageal varices**, and the veins surrounding the stomach are **gastric varices**. If the pressure within these veins becomes high enough the veins can rupture, leading to life threatening bleeding.

Symptoms: Bleeding from varices is generally brisk and associated with symptoms. The most frequent symptoms include: weakness, light-headedness, nausea, vomiting of blood or coffee colored material, and passage of bowel movements that are bloody or black (like tar). Bleeding from varices represents a life-threatening medical emergency. **If you develop signs of bleeding, someone should take you to the nearest hospital immediately.**

Prevention: Variceal bleeding may be prevented by the administration of medications which reduce pressure within the portal vein and within the varices. Inderal is the drug most often used. When Inderal is given it slows the heart rate. A usual target heart rate for cirrhotic patients on Inderal is 55-60 beats per minute.

Treatment

Endoscopic Therapy: Bleeding from esophageal varices can usually be stopped with endoscopic therapy. The endoscope is a flexible lighted instrument that is inserted through the mouth in order to examine the esophagus, stomach, and small intestine. In patients with bleeding varices, the bleeding can usually be stopped with **sclerotherapy** or **rubber band ligation**.

2) Ascites

Definition: The fluid that accumulates in the abdominal cavity as a consequence of cirrhosis.

Symptoms: Pain in the abdomen, abdominal distention, loss of appetite, back pain, shortness of breath, fluid retention, and leg swelling.

Treatment: Salt restriction and diuretics are the primary treatment. When salt restriction alone is ineffective, patients are treated with diuretics

(water pills) such as spironolactone (Aldactone) and/or furosemide (Lasix) or torsemide (Demadex). When diuretics are ineffective, patients may need to have the fluid removed by placing a needle into the abdominal cavity (paracentesis).

3) Spontaneous Peritonitis

Definition: An infection within the ascites fluid.

Symptoms: Increased ascites, abdominal pain, fever, confusion (worsening encephalopathy).

Treatment: Intravenous antibiotics.

Prevention: Oral antibiotics may prevent episodes of spontaneous peritonitis. Preventive antibiotics are recommended for patients with severe ascites and for those who have experienced a previous bout of peritonitis.

4) Splenomegaly

Definition: Enlargement of the spleen. **Splenomegaly** occurs in patients with cirrhosis when blood backs up into the spleen as a result of the elevated pressure within the liver.

Symptoms: Enlargement of the spleen generally occurs without any pain or discomfort. Some patients will be able to feel the spleen in the left side of the abdomen. With splenomegaly, platelets and white blood cells can become trapped within the spleen leading to abnormally low platelet and white blood cell counts. Low platelet counts can lead to bleeding problems; low white blood cell counts may cause problems with infections.

Treatment: No treatment is required for splenomegaly due to cirrhosis. The problem is in the liver, not the spleen. Surgical removal of the spleen rarely helps and is not necessary.

5) Hepatic Encephalopathy

Definition: A brain dysfunction caused by the accumulation of toxic chemicals in the blood stream. The normal liver acts as a filter removing harmful substances from the blood. With cirrhosis the liver is not able to remove a variety of toxic chemicals. These chemical remain in the blood and eventually enter the brain, causing a variety of disturbances with brain function. The toxin most easily identified is ammonia.

Symptoms: Fatigue, sleepiness, confusion, depression, irritability, personality changes, forgetfulness, slurred speech, tremors (shakes), and problems with balance may occur. As the condition worsens, patients become drowsier and eventually lapse into a coma. Some patients with

encephalopathy develop a peculiar odor on their breath (fedor hepaticus) from the toxins.

Treatment: The toxins are produced in the intestine by bacterial metabolism of protein. The following therapies help reduce the levels of ammonia and other toxins.

- a) Laxatives. The longer material remains in the colon the more toxins that are produced; thus, constipation must be avoided. We recommend that people with encephalopathy have at least 1-2 bowel movements each day. Lactulose (Chronulac, Duphalac) is the preferred agent because it clears more ammonia from the intestines than other laxatives. Lactulose causes abdominal bloating and leads to increased intestinal gas. It is easier to take when mixed with juice.
- b) Avoidance of Medications. Certain medications may increase the brain's sensitivity to ammonia and other toxins. These medications include sedative drugs (Valium, Ativan, Xanax), pain medications (Darvocet, codeine, Vicodin, Percocet, Demerol), anti-nausea agents (Phenergan, Compazine), and antihistamines (Benadryl). These medications should not be taken unless you check with your physician.

6) Hepatocellular Carcinoma (Liver cancer)

Cancer of the liver (hepatocellular carcinoma, HCC, or hepatoma) can occur as a complication of cirrhosis from any cause. Some types of cirrhosis are more likely to be associated with hepatocellular carcinoma (HCC) than others. Patients with cirrhosis caused by hemochromatosis, alpha-1-antitrypsin deficiency, and those patients with cirrhosis caused by long-standing infection with hepatitis B and C viruses are at the greatest risk. In patients with cirrhosis due to hepatitis C, for instance, the risk of developing HCC ranges between 1.5-6% per year. Thus, 10 years after being diagnosed with cirrhosis a patient with chronic hepatitis C has somewhere between a 15-60% of developing HCC. Men are more likely to develop HCC than women, drinkers more likely than non-drinkers, and smokers more likely than non-smokers.

LIVER TRANSPLANT PROGRAM AGREEMENT DISCUSSION FORM

The information in this document, discussions with your physicians and other members of the transplant team, and written material from the program are all intended to give you the information necessary to assist you in making an informed decision regarding the risks of liver transplantation.

Please ask questions about anything that you do not understand. You are free to change your mind and withdraw your consent at any time prior to the transplant.

Evaluation:

Most evaluations are conducted on an outpatient basis over two or three days. You will be evaluated to determine the medical appropriateness of a transplant. The work-up is designed to: 1) determine whether you need a transplant, 2) detect problems which might complicate the transplant, 3) determine whether you have other conditions which make transplantation impossible. The *evaluation* consists of the following tests and procedures:

Blood tests will help determine the extent and/or cause of your liver disease. Other tests performed will be blood type for organ matching and screening for the immunity or presence of specific viruses, including HIV.

A *chest x-ray* helps your physician rule out pneumonia and identify any problems with your lungs. A chest x-ray (CXR) is a painless, three-minute procedure, which takes an internal picture of your chest including the lungs, ribs, heart, and the contours of the great vessels of your chest. A chest x-ray can aid in diagnosing infection, collapsed lung, hyperinflation, or tumors.

A *urine test* is used to screen for the presence of drugs and alcohol in your system.

An *echocardiogram and EKG* will show how well your heart is beating and the function of your heart valves. This will assist your physicians in deciding if your heart function is strong enough for transplant surgery. An echocardiogram is an ultrasound of the heart. It is performed to evaluate the impact of lung disease on the mechanics of your heart. It examines the chambers, valves, aorta, and the wall motion of your heart. This testing can also provide information concerning the pressure in the pulmonary arteries (PA pressure). This information is important in planning the exact approach during the transplant operation.

An *ultrasound* of your liver and abdomen helps assess the circulation to your liver. You may require frequent ultrasounds during your waiting period.

A *CT Scan or an MRI* determines the extent of disease, the presence of any tumors, and verifies the circulation to your liver.

The following tests are sometimes needed to complete your evaluation:

A *Liver Biopsy* is a procedure which may be requested by your transplant physician. During a liver biopsy a needle will be used to remove a tiny portion of your liver through a needle. This is an outpatient procedure. A microscope examination will provide information to your physicians regarding the nature and severity of your disease.

Pulmonary Function Tests may be required, especially if you are a smoker or have a history of lung disease. This is a breathing test to analyze your lung capacity. Pulmonary Function Tests measure lung volume and the rate of air flow through your lungs. Pulmonary function tests require that you perform a variety of breathing exercises by blowing into tube. The results of these exercises measure the progress of your lung disease. Please inform the respiratory technician before these tests if you are taking bronchodilators or other inhaled medication.

Arterial Blood Gases (ABG)-An arterial blood gas measures the amount of oxygen that your blood is able to carry to your body tissues. This is performed by placing a needle into an artery in your wrist. A small amount of blood is required. This procedure takes about 5 minutes. Any discomfort at the site where the needle was inserted will go away within a few minutes.

You will meet with members of the transplant team in the *Transplant Clinic* as part of the education and evaluation process.

The *Transplant Social Worker* will meet with you to evaluate your ability to cope with the stress of transplantation and assess your ability to follow a rigorous treatment plan.

You will meet with a *Transplant Psychologist/Psychiatrist* to screen patients for possible issues that may interfere with the transplant success.

Every patient meets with a *Registered Dietitian* who performs a nutritional assessment and provides education to patients.

All patients meet with the *Financial Counselor* who will discuss the costs associated with your transplant and the cost of the medications you will require. They will work with you to understand your insurance coverage. It is required that you arrange for payment of the costs that may not be covered

by insurance. You may not be able to undergo a transplant if you have not made acceptable financial arrangements for payment when a suitable liver becomes available.

The *Nurse Coordinator* will provide education regarding the transplant evaluation process, listing for transplant, and patient responsibilities before and after transplant. This meeting is intended to provide you with an opportunity to ask questions and to become fully informed about the liver transplant process.

A *Hepatologist* is a physician who specializes in liver disease. The hepatologist will conduct a full history and physical exam. He/she will also assist in the medical management of your liver disease and work with the transplant team to determine if you are medically suitable for a transplant.

Your *Transplant Surgeon* will conduct a physical exam. He will also meet with you and discuss the appropriateness of a transplant based on the information obtained during your evaluation. The surgeon will also discuss the significance of undertaking a liver transplant, along with the risks of the surgery and the possible complications after your transplant.

Transplant Selection Process

After the work-up has been completed and you have met with the key members of the transplant team, your case will be presented to the Transplant Selection Committee. Based on your test results and evaluations, the Committee will decide if you are an appropriate candidate for transplantation. The committee may make any of the following recommendations:

- 1) you don't need a transplant.
- 2) you are not a transplant candidate because of co-existing problems.
- 3) the committee needs more information.
- 4) the committee would like you to be followed for a period of time (generally 6-12 months) before being placed on the waiting list.
- 5) you are an acceptable candidate and can be placed on the transplant waiting list immediately.

You will not be placed on the waiting list until you hear from us telling you that you have been accepted. You will receive a written letter confirming your status on the waiting list.

Waiting List

The liver transplant waiting list is a computer list maintained by UNOS (United Network for Organ Sharing). Determining who gets a liver is based on a formula that takes into consideration lab values such as: creatinine, total bilirubin, and INR. UNOS will then assign a MELD score based upon these values. The higher the MELD score the sicker the patient, and the higher on the transplant waiting list. Livers are only matched for blood type (A, B, O, AB) and size. Unlike other organs, special tissue typing is not necessary to determine which liver donor makes the best match.

The MELD score assigned to each patient is re-assessed and re-certified by the transplant coordinator in accordance with the following UNOS schedule:

Adult Patient Reassessment and Re-certification Schedule

Status 1	Status re-certification Every 7 days.	Laboratory values must be no older than 48 hours.
MELD Score 25 or greater	Status re-certification Every 7 days.	Laboratory values must be no older than 48 hours.
Score <= 24 but > 18	Status re-certification Every 1 month.	Laboratory values must be no older than 7 days.
Score <= 18 but >=11	Status re-certification Every 3 months.	Laboratory values must be no older than 14 days.
Score <= 10 but > 0	Status re-certification Every 12 months.	Laboratory values must be no older than 30 days.

Once you are listed, we must be able to get in touch with you at all times. It is important to provide us with several contact numbers. If we can not find you then we can not transplant you. If we need to contact you, we will call your home first. **While on the waiting list you need to let us know if you have a problem or get admitted to the hospital.** Patients on the waiting list are seen in our clinic at least once every 6 months. When you are called in for your transplant we would like you here as soon as possible (if you live out of town, we usually have plenty of time for you to get here). **Plan your trip ahead of time. Don't wait for the phone call from the transplant center to find someone to drive you.**

Waiting Period

After you have been listed you will begin the waiting period. This time varies depending upon organ availability and the severity of your illness. During this time you will be seen in the transplant clinic and you will need to have regular lab work to maintain your position on the UNOS waiting list.

It is very important that you contact our office with any changes such as your phone number, address, and insurance coverage. If you are hospitalized or your disease worsens, you must contact your coordinator. Any medical changes may alter your position on the waiting list.

You will need to be available, by phone or pager, at all times so that when an organ becomes available you can be reached by your coordinator. You will be required to come to University Hospital, St. Paul immediately. The transplant will usually occur within 6 to 12 hours of initial contact.

A patient may wish to register at more than one transplant center. However, each center may have certain requirements for placement on the waiting list. Patients should inform the centers they contact of their multiple listing plans.

If a patient would like to change transplant centers, the patient may transfer his or her primary waiting time to the new center upon listing at that center. The patient would then contact their original center requesting removal from that list.

Liver Transplant Options

There are more people waiting for liver transplants than there are available livers. All patients accepted by a transplant program are registered on the national organ transplant waiting list managed by UNOS (United Network for Organ Sharing). UNOS is a non-profit charitable organization which operates the Organ Procurement and Transplantation Network (OPTN) under federal contract. UNOS maintains a centralized computer network and the UNOS organ placement specialists operate the network 24 hours a day, seven days a week. Patients are prioritized on the waiting list based on several factors. Adult liver transplant patients are prioritized using the MELD system. (MELD = Model for End Stage Liver Disease). A higher score means that you are sicker and you will be put higher on the list to get a liver. Additional information about the waiting list and UNOS can be obtained by logging on to www.unos.org.

The current organ options available in Texas are outlined below.

Option 1 is an organ by standard allocation: If it is determined that you are a candidate for transplant you will be listed on the UNOS waiting list. You will be given a MELD score based upon the results of your blood work. In order to maintain your UNOS listing, periodic blood tests will be required and your medicines may be changed as needed to keep you in the best possible shape for a transplant. It is very important that you keep all your appointments and keep your lab testing current.

When an organ becomes available, medical information is entered into the UNOS computer system and a list of potential recipients is generated. The transplant centers whose patients appear on the ranked list are contacted. Your surgeon will consider the organ based upon established medical criteria, organ condition, recipient condition, patient availability, and organ transportation. **By policy, the transplant team has only one hour to make its decision.** If an organ is declined it is offered to the next patient on the list until it is placed.

Option 2 is an extended criteria donor liver. There is a serious shortage of deceased donor livers. One way to increase the number of livers is to use extended criteria donors. The most common reasons that donor livers fall into the category of extended criteria are listed below:

The donor has a history of hepatitis C. When a donor has active hepatitis C, we will consider transplanting the organ into a recipient who also has hepatitis C. In all cases we will assess the donor liver prior to transplantation, sometimes with a liver biopsy, to ensure that there is no evidence of damage to the donor liver from hepatitis.

The donor is an inactive carrier of hepatitis B. Any transplant patient who receives an inactive carrier of hepatitis B organ will require additional treatment after the transplant. An initial three-dose treatment of hepatitis B immunoglobulin is administered and an oral anti-viral agent, Lamivudine, is used on an ongoing basis.

The donor liver contains some fat (steatosis). The presence of fat in the liver is very common in the general population and usually goes unnoticed with no ill effects. This may prolong the time it takes for the donor liver to function optimally after transplantation. For this reason these livers may not be suitable for some patients.

The donor is from an older age group. (greater than 65 years) The natural life span of the human liver is not completely understood. We do know that livers from older donors may experience a delayed function after transplant. Every liver offered from an older donor is carefully evaluated by the surgeon prior to implantation.

Donation after cardiac death. Cardiac death means that the donor heart has stopped beating prior to donation. (The standard donor has been declared brain dead but the heart still functions). A liver from this type of donor has an increased chance of delayed graft function and complications of the bile duct passages.

There are other reasons which would place a donated liver in the extended criteria category. Your surgeon will discuss the specific details of an extended criteria donor organ with you at the time the liver is offered.

All extended criteria donor organs are reviewed by the surgeon prior to implantation. The decision to accept a particular liver is based upon your specific needs at the time the liver is offered. The transplant surgeon may advise you to consider accepting a liver from one of the above groups depending upon your situation.

If you agree to be considered for an extended criteria donor liver you will remain on the UNOS waiting list. You will continue to be a candidate for a standard allocation donor liver; however, extended criteria donor organs will often become available sooner. The decision to accept an extended criteria organ must be balanced with the risk of dying or becoming sicker on the waiting list. You will always have the option to decline or to accept an extended criteria donor liver at the time it is offered. If you decline, it will in no way affect your status on the UNOS wait list.

Organ Offer

When a deceased organ donor is identified, an organ procurement coordinator from Southwest Transplant Alliance accesses the UNOS computer. The UNOS computer matches every patient on the liver transplant waiting list against the donor's characteristics. The computer then generates a ranked list of patients for each organ that is procured from that donor in ranked order according to organ allocation policies. Factors affecting ranking include blood type, size, length of time on the waiting list, distance between the potential recipient and the donor, and degree of medical urgency as set forth by the MELD allocation system. The organ is then offered to the transplant team of the first person on the list.

Day of Transplant

When you are selected as the recipient for an organ you will be called and you must come in to the hospital right away. If the organ is considered an extended criteria organ, your surgeon will review this with you and assist you in making your decision. You always have the option to decline an organ and it will not affect your UNOS status.

As soon as you arrive at the hospital you will be admitted to the Transplant floor. After hours you will enter the hospital through the Emergency Department. The coordinator contacting you will provide you with exact instructions. You will have a brief exam, blood and urine tests, x-rays and an EKG. You will receive your first doses of anti-rejection medication. In some cases the donor organ is not suitable for transplantation and the transplant will be called off. The actual operation takes between 4-8 hours. Afterwards you will be taken to the SICU.

Surgery

If everything goes as expected, you will spend 1-2 days in the ICU and 5-10 days in the hospital. During your hospital stay you will need to be monitored closely for signs of infection and rejection. If there are abnormalities in your blood tests we will do a liver biopsy to look for rejection. Most patients undergo several liver biopsies after their transplant. Mild episodes of rejection occur frequently and are usually easily treated with SoluMedrol (cortisone) or by adjusting your other anti-rejection medications. The medications you take to prevent rejection reduce your ability to fight infections.

Once you are discharged from the hospital you should plan to stay nearby for another 3-4 weeks, if you live more than 1 hour away. Since you will not be strong enough to stay alone, a family member or friend will need to stay with you. Arrangements with family and friends must be planned ahead of time.

During the transplant surgery you will be put under general anesthesia, which means you will be given drugs to put you to sleep, block pain, and paralyze parts of your body. You will also be placed on a machine to help you breathe. The Anesthesiologists will talk with you in more detail about the risks of anesthesia. The transplant surgeon will make an incision in your abdomen as large as necessary to remove your liver and implant the donated liver. Through this incision your liver and gall bladder will be removed and a donated liver (without a gallbladder) will be placed into your abdomen.

During the surgery you may require veno bypass. If required, your surgeon will place incisions in your underarm or neck and groin for the placement of tubes. These tubes will connect to a machine that will allow your blood to bypass your liver during surgery. The transplant surgeons will decide if this machine will be used based upon your condition.

Drains will be put into your body to allow fluids to be removed and to help you heal. A tube may be placed into the bile duct to keep it open while it heals. Special mechanical boots will be used to keep blood flowing through

your legs to try to prevent dangerous blood clots. You will be in the operating room for approximately four (4) to six (6) hours.

Immediately Post-Transplant

Once in the ICU, you will begin to wake up slowly as the anesthetic begins to work its way out of your system. Initially, a respirator helps you breathe. It is connected to a tube that is placed in your windpipe. After you are fully awake and are able to breathe on your own, this tube will be removed. During the time that the respirator is helping you breathe, your hands will be lightly restrained in order to prevent you from accidentally removing this tube.

You will not be able to talk during this time, since this tube is blocking your vocal cords. The nurses in the ICU will assist you in communicating. Also necessary during this initial recovery period is a nasogastric tube (NG tube). This is a small plastic tube that is inserted through your nose and then passed into your stomach. During surgery it keeps your stomach empty of any residual food you may have had prior to the operation, as well as intermittently removing the stomach juices that are normally produced. The surgery causes your stomach and intestines to be “asleep” temporarily; therefore, it may take one or more days before your stomach and intestines are ready to receive food again. You will receive liquid nutrition through a second tube called a feeding tube. You will be allowed small amounts of ice chips in order to keep your mouth from feeling too dry. Once you have passed gas or had a bowel movement, the NG tube will be removed. The feeding tube will be removed when you are able to eat enough.

In order to empty your bladder, you will have a catheter that will drain urine from your bladder into a bag on the outside of your body. This is usually removed as soon as you are able to use the restroom. While in use, it helps us monitor how well your kidneys are functioning.

Most transplant surgeons make an incision that is sometimes referred to as a “Mercedes” incision because it looks like an inverted “Y” or the Mercedes-Benz emblem. Occasionally, it may be necessary to place a drain in your incision, which will be connected to a “grenade-like” bulb. This will drain off any excess blood or fluid that may accumulate.

Several intravenous lines (IVs) will be needed to give you fluids and medications until you are able to drink and eat again. This IV line or “triple lumen” will often be placed in your neck or below your collarbone. This line may also be used to draw blood for the daily laboratory values.

Overall, those who have undergone liver transplantation say that there was not as much pain involved as they anticipated. We believe this is due, in part, to the type of incision that is made, plus the use of steroid medications.

The steroids are given both during and after the surgery and as a result significantly decrease the internal swelling. By doing so, pain is lessened.

Medical Risks of Transplant

There are inherent risks in all surgeries, especially surgeries conducted under general anesthesia. Most complications are minor and get better on their own. In some cases, the complications are serious enough to require another surgery or medical procedure.

One year after transplantation approximately 88.4% of liver transplant patients are living and approximately 81.03% are living after 3 years.

Immediately following the surgery, you will experience *pain*. Most transplant recipients have a significant reduction in pain three weeks after surgery. Some people continue to have pain for a longer time.

There may be a *delay in the function* of your transplanted liver. Such a delay may increase the length of your hospital stay and increase the risk of other complications.

There is a rare possibility that the transplanted *liver will not function*. When this occurs a second transplant is needed. You will be placed on the UNOS waitlist in the highest priority category allowed. If a second liver does not become available, death may occur.

Hepatic artery thrombosis (clotting)/*stenosis* (narrowing) occurs in a small percentage of liver transplants. A hepatic artery thrombosis is a clot that develops in the major blood vessel going to your liver. Hepatic artery thrombosis can cause two complications including liver abscess and/or biliary strictures. A hepatic artery stenosis is the narrowing of the artery that supplies blood to the liver. When this occurs, an angiogram is performed to assess the extent of the problem. Sometimes another surgery will be necessary to revise the area where the donor artery and the recipient artery are connected. In the worse scenario the liver may suffer irreversible damage from lack of blood flow requiring a second transplant.

Some transplant patients experience *bile leaks*. Bile is a secretion of the liver that aids in digestion. Most bile leaks get better without the need for surgery. Occasionally, tubes need to be placed through the skin to aid in the healing process. In some cases surgery is necessary to correct the bile leak.

Some transplant patients have a long term complication of *biliary strictures*. A biliary stricture is a narrowing of the ducts transporting bile. Some of the strictures can be repaired by non-surgical means such as the insertion of tubes, but some will require surgical repair.

As a result of not having a gallbladder, some patients have periods of diarrhea and cramping. In the vast majority of cases this goes away after two or three months.

Blood clots. These clots usually develop in the legs and can break free and move through the heart to the lungs. In the lungs, they can cause serious interference with breathing which can lead to death. Blood clots are treated with blood-thinning drugs that may need to be taken for an extended period of time.

Bleeding during or after surgery may require blood transfusions or blood products. The use of blood or blood products has the following general risks: itching, rash, fever, headache, or shock; respiratory distress (shortness of breath); kidney damage; systemic infection; exposure to blood borne viruses including hepatitis (an inflammatory disease affecting the liver), and Human Immunodeficiency Virus (HIV, the virus that causes AIDS); and death. The risk of getting the HIV virus and/or hepatitis C is approximately 1 in 2 million per unit transfused. The risk of getting hepatitis B is approximately 1 in 100,000 per unit transfused. In rare cases, blood transfusions (usually multiple transfusions) can adversely affect a person's ability to receive future organ or bone marrow transplants.

The risk of *infection* including urinary tract infection is higher for transplant recipients than other surgical patients because the treatments needed to prevent organ rejection make the body less capable of fighting infection. Also, liver disease itself decreases the body's ability to fight infection. The abdominal incision for the liver transplant and any incision needed for the liver bypass machine (neck, underarm, and groin) are potential sites for infection. Infections in the sites where tubes are placed in your body (tubes to help you breathe, tubes in your veins to provide fluids, nutrition, and to monitor important body functions) can cause pneumonia, blood infections, and local infections.

Damage to nerves may occur. This can happen from direct contact within the abdomen or from pressure or positioning of the arms, legs, or back during the surgery. Nerve damage can cause numbness, weakness, paralysis, and/or pain. In most cases these symptoms are temporary, but in rare cases they can last for extended periods or even become permanent.

Other possible complications include: injury to structures in the abdomen, pressure sores on the skin due to positioning, burns caused by the use of electrical equipment during surgery, damage to arteries and veins, pneumonia, heart attack, stroke, permanent scarring at the site of the abdominal incision.

Depression can be due to many factors such as an underlying disease (particularly hepatitis C), brain chemical imbalances requiring antidepressant drugs of one type or another, or hormonal imbalance. A serious procedure such as a transplant can create many personal and family stresses. It is not uncommon for transplant patients to experience anxiety and perhaps depression following their surgery, hospital confinement, and return home.

Disease recurrence after transplantation

Liver transplantation unfortunately does not cure the primary cause of liver disease in most cases. As a result of the many surgical and medical advances within the practice of liver transplantation, most liver transplant recipients can anticipate long-term survival and therefore recurrence of the original disease may become a threat to the long-term success of transplantation. The severity of recurrence varies among patients largely due to unknown reasons. In severe cases a second transplant is indicated; unfortunately, some patients may not be an appropriate candidate for a second transplant.

The most common cause of recurrent disease include viral hepatitis B and C. Medications to treat hepatitis B before liver transplantation and measures to prevent its recurrence after liver transplantation with oral and injectable medications may be necessary. As for hepatitis C, recurrence in the blood is universal and there are no effective measures to prevent that. Treatment for hepatitis C after liver transplantation is possible.

Liver tumors may recur after transplantation and the risk is higher in patients with larger tumors or those with involvement of the blood vessels. This has led to strict criteria for selecting liver cancer patients for liver transplantation.

Autoimmune liver diseases such as primary biliary cirrhosis, primary sclerosing cholangitis and autoimmune hepatitis may recur. In most cases, the immunosuppressive medications used to prevent rejection are sufficient to prevent significant autoimmune damage to the new liver.

For patients with alcoholic liver disease, recidivism (relapse) may occur after liver transplantation. This has been shown to lead to noncompliance with the transplant medications and a higher rate of medical problems, particularly infections.

Recovery

The Hospital Stay

The average length of stay in the ICU is variable and largely dependent on your body's tolerance of the surgical procedure as well as your preoperative medical condition. Once your condition warrants it, you will be transferred

to 3 North, the transplant nursing floor. You should expect to spend 7-10 days in the hospital post-transplantation. You will be given a private room and your family will have the freedom to come and go as they choose.

Soon after your transfer to the transplant floor, you will be instructed to begin getting out of bed. A physical therapist will come to work with you in rebuilding your strength. The individuals working with you are familiar with the needs of transplant patients and will work diligently to help you walk and begin functioning on your own.

You also will be encouraged to do coughing and deep breathing exercises in order to keep your lungs clear and expanded. You will be asked to use an incentive spirometer every hour while awake. This will help prevent pneumonia. The location of your liver is in the right upper portion of your abdomen and is directly below your right lung. This lung was pushed aside during the surgery, and may initially collect fluid (pleural effusion) or may not expand as well as it should. Frequent coughing and deep breathing will help return your lungs to normal: clear, expanded, and free of mucus.

Your diet will also be advanced during this time. You will begin with clear liquids and progress to solid food. Well-balanced, high protein meals are necessary because your body will need adequate calories and protein to heal and rebuild itself. Few dietary restrictions are necessary. To help with your individual needs, the transplant dietitian will discuss and instruct you on foods that will be beneficial in this rebuilding process. Before discharge, the transplant dietitian will counsel you individually on the long-term nutritional guidelines that you will need to follow.

Throughout your stay in the hospital, the transplant team will record your daily lab and test results on a flow chart. This chart remains in your records in our transplant office so that we can follow your progress over time. This chart will be kept in your room and provides an overall picture of your recovery. We feel that discussing your results and the intended plan of care while in your room provides an additional learning opportunity for you. Please do not hesitate to ask questions during this time. A separate section in this manual explains the meaning of each of the different lab tests.

Discharge/Rehabilitation

Medications for Life: You will be required to take medications for the rest of your life to prevent your body from rejecting the transplanted liver. The types and doses of medications will be determined and adjusted by your physicians based on your condition and health. Following transplantation you will receive further instructions and teaching regarding the medications specifically ordered for you. Listed below are examples of some, not all, of

these medications and potential side effects and risks. It is important to note that all anti-rejection medications can increase your risk for infections and malignancies.

Tacrolimus (Prograf): headache, tremors, insomnia, reduced kidney function, numbness and tingling of the extremities, elevated blood sugar (diabetes), decreased magnesium levels, increased potassium levels, and other serious side effects.

Cyclosporine (Neoral, Sandimmune): tremors, high blood pressure, reduced kidney function, changes in gums, increased hair growth, and other serious side effects.

Mycophenolate mofetil (CellCept): gastrointestinal disturbances, reduced white blood cell count, reduced platelet count, and other serious side effects.

Steroids: elevated blood sugar, weight gain, high blood pressure, osteoporosis, stomach ulcers, mental status changes, cataracts, muscle weakness, impairment of wound healing, and other serious side effects.

Sirolimus (Rapamune): elevated cholesterol and triglycerides, impairment of wound healing, lung problems, and other serious side effects.

The goal of various medications during and after transplantation is to help your body tolerate the donated organ. Other medications may be required for the rest of your life to treat or prevent various infections. Your potential need for these medications may be determined by the blood work obtained during the evaluation process.

Risks involving medical costs and insurance: After you have a liver transplant, health insurance companies may consider you to have a pre-existing condition and refuse pay for medical care, treatments, or procedures. After the surgery, your health insurance and life insurance premiums could be raised and remain higher. In the future, insurance companies could refuse to insure you.

Benefits: The benefit of liver transplantation to you is the hope of living longer than your liver disease would have likely permitted. This potential benefit cannot result from surgery alone; it is dependent upon your following the rigorous treatment plan prescribed by your physicians.

Alternatives: You have the choice NOT to undergo transplantation. If you choose not to have a transplant, treatment for your liver disease will continue. If you do not undergo the transplant surgery, your condition is likely to worsen and limit your life expectancy.

Protected Health Information: If you become a transplant candidate, federal regulations require that some personal health information about you be sent to the UNOS registry to allow you to be listed for an organ.

Teaching Facility: Your physicians are associated with the University of Texas Southwestern Medical Center which is a teaching facility. This means that residents, fellows, students, and others may assist with parts of procedures or other medical acts as deemed appropriate by, and under the supervision of, your physicians.

For the purpose of advancing medical education and research, you consent to the admittance of observers and discussion of your procedure with others who may not be directly responsible for your care. You also consent to the review of and use of your medical information and records. The use of your medical information and records will not result in your identity being published or revealed.

In *summary*, transplantation, including the risks and complications outlined in this document, can result in serious injuries, damage, and death. Your physicians cannot predict how your body will respond to a liver transplant. It is not known how the condition that caused your underlying liver disease will affect your transplanted liver.

Please initial the following statements and sign below to indicate that you have been fully informed about the liver transplant procedure and the potential risks and complications that accompany a transplant:

_____ I have read (or had read to me) Liver Transplant Program Agreement Discussion Form and I understand and agree to the statements set forth in this form.

_____ A member of the transplant team has explained to me all the information referred to in the discussion form.

_____ I have had an opportunity to ask questions and my questions have been answered to my satisfaction.

_____ I am signing this form voluntarily.

_____ I understand that I can withdraw my authorization at any time prior to the surgery.

_____ I consent to the release of my protected health information to UNOS (United Network for Organ Sharing) in order to be placed on the waiting list for a donor organ.

_____ I understand that in order to maintain my UNOS listing status, periodic tests will be required. If I fail to keep my appointments and if I fail to undergo required lab testing, my listing status may be affected.

_____ I understand that I will be required to take medications for life as a result of undergoing a liver transplant.

_____ I understand that I am responsible for arranging for payment for costs that are not covered by insurance. If I do not arrange for these costs my liver transplant procedure may be delayed.

_____ I understand that undergoing a liver transplant has significant risks and potential complications. I understand these risks and I remain interested in pursuing a transplant.

_____ I understand that there are no guarantees of a successful transplant.

_____ I understand that UT Southwestern Medical Center is a teaching facility and part of my care, under the guidance of my physicians, may be conducted by Residents, Fellows, Physician Assistants, Nurse Practitioners, and students.

_____ I understand that, without revealing my identity, my medical information, specimens, and procedures may be used for teaching and research activity.

_____ I hereby authorize the transplant team at UT Southwestern Medical Center to perform the procedures described in the discussion form.

_____ I authorize and request my physicians to perform any additional medical acts or procedures that they, in the exercise of their sole professional judgment, deem reasonable and necessary. I waive any obligation on their part to stop or delay the continuation of my surgery in order to obtain additional consent.

	Print Name	Date	Signature
Patient			
Witness			

I have explained to the prospective liver transplant recipient signing above all of the information contained in the discussion form. I have given no guarantee or assurance as to the results that may be obtained.

Date:

Name of staff obtaining discussion form:

TRANSPLANT RESOURCES

Education and Support

Transplant Support Group at UT Southwestern University Hospital, St. Paul The Kidney, Liver and Pancreas Transplant Program at UTSW understands the transplant process can be difficult for patients and their families. We understand that meeting the emotional needs of patients and families is equally important as meeting their medical needs. One of the ways we offer support is the opportunity for our patients to meet with each other and share their experiences. We have developed a support group facilitated by the program social worker for patients and their caregivers because we know the best people support comes from those who have been where you are going.

The group meets the second Tuesday of every month at 6:30pm in the DePaul Conference Room located on the first floor of University Hospital, St. Paul near the cafeteria. For more information contact the program social worker at (214) 645-1919.

Liver Disease Foundations and Groups

American Liver Foundation

American Liver Foundation (ALF) is the nation's leading nonprofit organization promoting liver disease prevention and liver wellness. ALF provides research, education and advocacy for those affected by liver-related diseases, including hepatitis.

www.liverfoundation.org

Alpha-1 Foundation

The Alpha-1 Foundation is dedicated to promoting leadership and resources that will result in increases research, improved health, worldwide detection, and a cure for Alpha-1 Antitrypsin Deficiency.

www.alphaone.org

HCV Advocate

The Hepatitis C Support Project (HCSP) is a registered non-profit organization founded in 1997 by Alan Franciscus and other HCV positive individuals to address the lack of education, support, and services available at that time for the HCV population. HCSP's mission is to provide unbiased information, support, and advocacy to all communities affected by HCV and HIV/HCV co-infection, including medical providers.

www.hcvadvocate.org

Hep C Connection

Hep C Connection is an education, support, and prevention network for those affected by, or at risk for, hepatitis C. Hep C Connection is one of the nation's premier hepatitis C-focused advocacy organizations and the only one of its kind in Colorado. We have a proven history of community education, patient support, and disease prevention strategies.

www.hepc-connection.org

National Institute of Diabetes, Digestion, and Kidney Disease

www.niddk.nih.gov

Division for Rehabilitation Services

214-339-1895

Transplant Organizations

Transplant Experience

The Transplant Experience program was created to meet your specific needs throughout the transplant process. It's information. It's tools and tips. It's real advice, from experts in transplantation and other transplant recipients.

www.transplantexperience.com

Transplant Living

No matter where you are in the transplant experience, Transplant Living can help you be prepared. You can now choose to personalize the site to help better manage your health information needs.

www.transplantliving.org

UNOS

Located in Richmond, Virginia, the United Network for Organ Sharing (UNOS) is a non-profit, scientific and educational organization* that administers the nation's only Organ Procurement and Transplantation Network ([OPTN](#)), established by the U.S. Congress in 1984. Through the OPTN, we:

- collect and manage data about every transplant event occurring in the United States
- facilitate the organ matching and placement process using UNOS-developed data technology and the [UNOS Organ Center](#)
- bring together medical professionals, transplant recipients and donor families to develop organ transplantation policy

Our mission is to advance organ availability and transplantation by uniting and supporting our communities for the benefit of patients through education, technology and policy development.

www.unos.org

Southwest Transplant Alliance

Southwest Transplant Alliance (STA) is a non-profit organ and tissue donor program serving hospitals & patients throughout much of Texas. Founded in 1974, STA is one of the largest of 59 federally designated organ procurement organizations in the U.S. In its service area, STA is the official link between those who need an organ to survive, and those who have the potential to save lives by becoming donors.

1-800-788-8058

www.organ.org

Fundraising and Financial Assistance Organizations

National Transplant Assistance Fund

NTAF is a private, non-profit 501 (c) (3) charitable organization. NTAF has more than 24 years experience empowering patients and communities to raise funds to cover uninsured medical expenses related to transplantation and catastrophic injury. NTAF staff will be by your side every step of the way - through the process of raising funds in the community, and also through the process of applying for financial assistance. NTAF is your partner in financing transplantation and recovery.

www.transplantfund.org

Transplant Foundation

Transplant Foundation, Inc (TF) is a privately funded organization thanks to unique individuals, such as yourself. Established in 1987 by thankful transplant recipients, Transplant Foundation has grown tremendously over the years to focus on providing both financial and emotional support to transplant patients. Organ donation and transplantation saves lives, so it is also within our mission to educate the community on the importance of organ donation and to fund transplant research.

www.transplantfoundation.org

Disability and Social Security

The [Social Security disability](#) insurance program pays benefits to you and certain family members if you worked long enough and paid Social Security taxes.

www.ssa.gov

National Foundation for Transplants

National non-profit organization that "Reaches Out to Help" those seeking a new life through transplantation. Limited emergency grants of not longer than 3 months duration are available for medications.

www.transplants.org

Pharmaceutical Research and Manufacturers Association of America (PHRMA)

Obtain free copy of the “Directory of Prescription Drugs Patient Assistance Programs”

www.PHRMA.org

Viatical Settlements

Enables seriously ill individuals to turn their life insurance policies into cash

www.vspi.com

Reverse Mortgages

Enable you to receive the proceeds from the sale of your house without having to move, contact local lending institutions

American Cancer Society

May provide limited medication grants to transplant recipients who have cancer

www.cancer.org

Financial/Insurance Information and Resources

Medicare Health Plan

1-800-633-4227

1-800-486-2048 (TTY/TDD)

www.medicare.gov

Social Security Administration

1-800-772-1213

Veterans Administration

If you have served in the military and received an honorable discharge, you may be eligible for VA benefits and immunosuppressant drugs.

800-606-2022

Medigap Plan

Medicare supplemental policies that can cover services that Medicare does not

Contact State Insurance Department for eligibility

www.medicareinfo.com

Texas Health Insurance Risk Pool

Also called Guaranteed Access Programs, created by state legislatures to provide insurance to the medically uninsurable population.

www.cainc.org

Dental Resources

Baylor College of Dentistry
214-828-8100

Alcoholics Anonymous Resources

Dallas Intergroup Association
6162 E. Mockingbird
Dallas, TX 75214
214-887-6699
<http://www.aadallas.org>

Oficina Intergrupala Hispania de A.A.
5415 Maple Ave Ste 318
Dallas, TX 75235-7441
214-905-0770

Central Office of Ft. Worth
316 Bailey Avenue #100
Ft. Worth, TX 76107
817-332-3533 TDD
<http://www.forthworthaa.org>

UNIVERSITY HOSPITAL, ST. PAUL
LIVER TRANSPLANTATION

Patient Responsibilities

Patient Name: _____

Date: _____

1. ALCOHOL/DRUGS

Alcohol damages the liver. Illicit drugs including marijuana increase the risk for returning to routine drug use. In addition, misuse of narcotics may be a sign of substitutive use of drugs. For these reasons:

- a) Liver transplant patients must abstain from alcohol and illicit drug use including marijuana.
- b) Patients must use narcotics only in the prescribed amounts with every effort put forth to minimize their use and discontinue them as soon as possible.
- c) Those identified by the team as problem drinkers or drug abusers in the past must:

- Attend the Liver Transplant Chemical Dependency Group Meeting time _____
Required: Six lectures (designated) and six groups

- d) Chemical Dependency treatment plan

2. SMOKING

Transplant recipients who smoke have higher risks of infection and lung cancer. Smoking also constricts blood vessels and is an independent risk factor in coronary artery disease.

Transplant recipients must stop smoking prior to transplant and maintain abstinence after transplant. Going through cigarette withdrawal at the time of surgery is an undue stress. All patients are

encouraged to stop smoking prior to transplant. Family members must support a smoke-free environment.

a) See your doctor about possible use of the nicotine patch, Zyban, or other aides.

b) Smoking cessation programs are available through many local hospitals. For the nearest stop smoking group, call

_____.

c) Stop smoking treatment plan:

3. **MEDICATION**

All patients must strictly adhere to a medication regimen with no alteration in the schedule unless prescribed by a physician. They must take all medications on time as directed. If they have side effects from the medication which are unpleasant, they must discuss this with the doctors, who will work with them to minimize negative effects. Patients must have a reliable system such as a medication box.

4. **DIET**

All transplant recipients must adhere to a prescribed diet. Dietary restrictions are an important part of the pre-transplant treatment, as well as post transplant, and strict adherence to the prescribed diet will be required. The liver transplant dietician is available to make suggestions and teach the patient and family members how these requirements can be met.

5. **CLINIC APPOINTMENTS**

Pre-transplant: There are many clinic appointments and evaluations. It is the patient's responsibility to attend all appointments, unless they are changed with the coordinator's approval.

All transplant recipients must be prepared to attend follow-up clinic visits at 8:00 a.m. up to three times a week and/or as needed at University Hospital/St. Paul, Dallas. In addition, patients may need to come to clinic if there is a change in their condition. Patients are responsible for arranging reliable transportation.

6. **FAMILY SUPPORT**

It is necessary to enlist the assistance of available family and friends to agree to support transplant patients emotionally and by way of rides to clinic, supervision of diet and medications, and encouragement of Chemical Dependency Treatment and treatment for smoking cessation. Family support can make a big difference in the long term success of the transplant. One person should be designated as the family spokesperson and coordinator of care.

Phase 1 - Pre Transplant

- Transportation to clinic visits, doctor appointments, and lab work
- Transportation to hospital as needed - could be at ANY TIME
- Provide care for patient for 24 hours a day - there may come a time where patient is NOT to be left alone
- May need to provide assistance with daily living activities including but not limited to cooking, cleaning, shopping, bathing

Phase 2 - Transplant Hospitalization

- Care Giver MUST be present during hospitalization for post transplant education (NO EXCEPTIONS).

Phase 3 - Post Transplant

- Care Giver must provide transportation to and attend doctor appointments 2-3 times a week
- Care Giver MUST learn patient's medications and post transplant education
- Care Giver MUST be prepared to transport patient to hospital or clinic at ANY GIVEN TIME

This person is:

Phone Number:

Support System

Name	Phone#	What they will do to help
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7. **BRAIN FUNCTION AND DECISION MAKING**

Hepatic encephalopathy is the effect of liver failure on the brain. It may include memory problems, difficulty concentrating, and confusion, irritability, and personality changes. The patient may need assistance with medications and other care. In extreme cases, families may need to apply for legal guardianship and be responsible for all care and decision making. There may be lasting effects on thinking, concentration, and memory. We expect that with a well functioning liver, brain function will improve. If the improvement is not sufficient for successful, independent living, the patient may need a supportive, structured environment long term.

8. **ADVANCED DIRECTIVES**

An Advanced Directive tells the team who the patient wants to make decisions for them if they are unable and specifies any limits they want on their care. An Advanced Directive or Durable Power of Attorney/Living Will is needed prior to transplantation. This must be discussed with the designated person.

Designated person:

9. Finally, it is important to understand that consent for the surgical procedure of liver transplantation includes consent for all diagnostic tests or treatments necessary to preserve life. This may include biopsies, medications, or other invasive tests that are necessary to make sure the liver is working efficiently.

10. Noncompliance with any of the above will be taken seriously by the Transplant Team. Compliance is essential for successful recovery from your operation and maintenance of a healthy liver. If noncompliance occurs either before or after transplant, your case will be reviewed by the Transplant Team

I have read this document and accept these responsibilities. I will do everything I can to help make the transplant successful and improve my quality of life.

Patient's Signature

Date

FAMILY SUPPORT: I understand the patient responsibilities and will assist _____ in helping make the transplant successful and improving his/her quality of life.

Support Person's Signature

Date

Support Person's Signature

Date

Support Person's Signature

Date

I have discussed this document, answered any questions he/she has and recognize the commitment to transplant.

Staff Signature

Date