GENERAL INFORMATION

DISCHARGE FROM THE HOSPITAL:
YOUR FOLLOW UP CARE

Please review the following guidelines. If you have any questions or concerns after you leave the hospital, please call the Liver Transplant Coordinator during office hours which are 8:00 a.m. to 4:30 p.m. Pacific Time. Leave a detailed message with your return phone number if the nurse is not immediately available to take your call.

Liver Transplant Office Phone Numbers

**OHSU, Local:** 503-494-8500

**OHSU Toll-free:** 1-800-452-1369, ext.4-8500

IN CASE OF EMERGENCY

For life threatening emergencies, Call 911.

Urgent issues after office hours: Call the OHSU operator 503-494-8311 and ask for the Liver Transplant Coordinator on call.

Lab Schedule

You will need to have labs drawn on a regular basis for the rest of your life. Remind your lab to fax the results directly to our office at 503-494-5292 the same day your lab work is drawn. Any change to your lab frequency will need to be discussed with your coordinator or physician.

For the first month following transplant you will have your labs drawn twice a week on Mondays and Thursdays.

The table below shows a normal lab schedule for a liver transplant patient.

<table>
<thead>
<tr>
<th>Months After Transplant</th>
<th>Lab Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Monday and Thursday</td>
</tr>
<tr>
<td>2-6</td>
<td>Every Monday</td>
</tr>
<tr>
<td>7-12</td>
<td>Every other Monday</td>
</tr>
<tr>
<td>After one year</td>
<td>First Monday of every month</td>
</tr>
</tbody>
</table>

The OHSU outpatient lab is located in the Physicians Pavilion on the third floor. Patients are to have their blood drawn each week on Monday and Thursday. After one month, or when your lab schedule changes, your labs should be drawn on Mondays to make sure that there is enough time for the results to be sent to our office and reviewed. If there are any medication changes, additional labs or other studies needed because of your lab results, a coordinator will call you. You will NOT be called if there are no changes to be made. If you wish, you can arrange with the laboratory for results to be sent to you so that you can monitor your test results directly. You can also sign up for OHSU’s “MyChart” while at an OHSU office visit. MyChart gives you easy online access to your lab test results, medical history and medical appointments. It also gives you the ability to send non-urgent messages to your health care providers.

Clinic Visits

After you are discharged from the hospital you will be closely followed at the Liver Transplant Clinic. At each clinic visit the provider will decide when you will need to return for your next office visit based on your rate of recovery.
Transplant Clinic is held in the mornings on Tuesdays and Fridays on the second floor of the Physician’s Pavilion.

When you have recovered sufficiently you will return to your Primary Care Physician for your routine health care. Please call to schedule a follow up visit with your doctor as soon as possible after your return home. Our office will be sending an informational packet regarding your transplant episode for your Primary Care Physician to review. The Liver Transplant Department will continue to follow you for life regarding your liver transplant issues. You should continue to see a doctor on a regular basis. You will need to be seen annually in the Liver Transplant Clinic.

One-Year Follow Up Evaluation
When you reach your first Transplant anniversary there will be several tests that will need to be ordered to help assess your overall health. The Liver Transplant office will work with you and your Primary Care Physician to get these studies completed. Some of the studies can be done locally in your community while other tests are preferred to be done at OHSU.

The following may be ordered for you:
1. Clinic visit
2. Labs: CBC with diff, Comprehensive metabolic panel and immunosuppressant level
3. Urinalysis
4. Ultrasound of the Abdomen
5. Chest X-Ray
6. Protocol testing if you are currently on any protocols
MEDICATIONS

GENERAL MEDICATION INFORMATION

This section is intended to be a general guide to each medication's function, proper use, dosage, precautions, and side effects. The information does not cover all aspects of each medication and is not intended as medical advice for individual problems. Its purpose is to give you a general overview. Always follow the instructions given to you by your transplant team.

You will not experience all of the side effects listed for each medication, and over time most side effects decrease.

After you have received your new liver you will be required to take a combination of medications each day for the rest of your life. These medications are essential to prevent liver rejection. You can never stop or miss these medications or you risk rejecting your liver.

Never change your dose of immunosuppressant's without discussing it with the Transplant Team.

The Transplant Team will always manage your immunosuppression medications. If your primary care physician wants to make any changes to your immunosuppression medications please have him or her contact the Liver Transplant Office first. The dose of your medications can change frequently. After you are home the medication changes will be called to you over the phone. Be sure to write down any changes you are requested to.

It is extremely important that you take your medications at the correct time each day. You may set your schedule around meals and bedtime. It is easy to forget whether you took your pills or not. You may find it helpful to set up a check system.

What you should know about your medications:

The brand name and generic name
Medications are known by two different names. The brand name is the name given to the medication by the pharmaceutical company that produces it. The generic name is the common, non-branded name of that medication. For example, tacrolimus and Prograf® are the same medication. Tacrolimus is the generic name and Prograf® is the brand name. In many cases there are multiple brand names. It is important to not switch between brand names and generic medications for your immunosuppressant's.

The purpose or reason for taking each medication
A medication often has more than one use and may be prescribed for different reasons. You should always know why you are taking each medication. For example, fluconazole is a medication used to treat fungus infections, but it can also be used to increase tacrolimus levels.

What each medication looks like
You must be able to recognize each medication by color, shape, and size. Many medications have a similar appearance with only slight differences. They must be looked at closely to be sure the correct medication is being taken. Magnesium oxide, sodium bicarbonate, and some generic forms of Bactrim® are all large, round, white pills. If you look closely, though, you will see some differences.

When to take each medication
Some medications, such as the anti-rejection medications tacrolimus and cyclosporine, must be taken on time twice a
day so that the appropriate level of that medication is maintained in your bloodstream. It is important to know what time you need to take each medication. Work with your coordinator and your pharmacist to arrange a medication schedule that is easy to follow with your daily routine.

**How to take each medication**
You will take most of your medications by swallowing a pill or capsule. Occasionally, a pill may be divided or crushed and mixed with food or liquids. Discuss how to take each of your medications with your coordinator and your pharmacist. Capsules and time release tablets should never be crushed or opened - as a large dose can be absorbed too quickly.

**The most common side effects**
Every medication has side effects, but these are not experienced by everyone. You should be aware of the most common side effects that each medication may cause.

**Any special instructions**
Some medications must be taken with food or on an empty stomach or separated from certain medications. Discuss any special instructions for your medications with your pharmacist, or coordinator.

**What to do if you are late, miss a dose, or forget to take a dose**
If you are very late taking a medication or have skipped a dose, take the next dose as soon as possible. Do not wait and double the next dose. If you have been vomiting or cannot swallow the pills, call your transplant coordinator. After asking you a few questions and considering your current health status, your coordinator will advise you on what to do.

**How to order your medications**
Your transplant coordinator or transplant pharmacist will help you find the most convenient way to order your medications.

**When to order your refills/repeat prescriptions**
Phone your pharmacy for refills. The number of refills you have for each medication depends on how long you will be taking the medication, as well as what your insurance coverage will allow. Once the prescription has been submitted to your pharmacy, you may call for refills/repeat prescriptions. It is very important to monitor the number of pills you have so you can order your refills in time so that you avoid missing any doses. You should always have at least a 10 day supply of medications.

**What is the cost for your medications?**
It is important that you know your financial responsibility for your medications so you can plan ahead. Some medications may be completely covered by insurance, while others have co-pays. Often, insurance companies have a deductible you must meet before their coverage begins. It may be helpful for you or a family member to call your insurance case manager or approved pharmacy provider before your medications are ordered. A toll-free number for “prescriptive authorization” is usually on the back of insurance cards. This contact person should be able to tell you what your cost is for each prescribed medication.
PRESCRIPTION DO’S AND DON’TS

**Do**

- Call your regular pharmacy for refills when you have 7 – 10 days of medication remaining.
- Give your local pharmacist our contact numbers for refills, phone 503-494-8500, fax 503-494-5292.
- Have your pharmacy contact our office for a new prescription on your anti-rejection medication.
- Call the Transplant Office during office hours (8:00 a.m. – 4:30 p.m.) if you have a problem with your immunosuppression prescriptions.
- Keep the name and phone number of your local pharmacy handy.
- Ask for pain medication refills when you are seen in the Transplant Clinic during the initial post op period.
- During the week, if your pharmacy calls, expect a 48-hour turnaround time for your medication to be refilled. If the office is closed such as on a weekend, holiday or after office hours it may take more than 48 hours.
- Remember to take a few extra days worth of medication with you when traveling.
- Carry a list of your medicines and dosages in your wallet or purse.
- Try to buy all your medicines from the same pharmacy. Many pharmacies keep a profile on their customers so they can track whether or not a new drug may cause problems if taken the patient’s other medications.

**Don’t**

- Run out of medication before getting refills.
- Wait until the weekend or after 4:00 p.m. to call for refills.
- Expect pain medication to be filled after hours and on the weekends.
# Medications You May Be Taking

## Immunosuppressants – Prevent rejection

<table>
<thead>
<tr>
<th>Medication Type</th>
<th>Medications</th>
<th>Trade Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcineurin Inhibitors</td>
<td>*Tacrolimus</td>
<td>Prograf®, FK506</td>
</tr>
<tr>
<td></td>
<td>Cyclosporine</td>
<td>Sandimmune®, Neoral®, Gengraf®</td>
</tr>
<tr>
<td>Purine Inhibitors</td>
<td>*Azathioprine</td>
<td>Imuran®</td>
</tr>
<tr>
<td></td>
<td>Mycophenolate mofetil</td>
<td>Cellcept®</td>
</tr>
<tr>
<td></td>
<td>Mycophenolic acid</td>
<td>Myfortic®</td>
</tr>
<tr>
<td>Steroids</td>
<td>*Prednisone</td>
<td>Deltasone®</td>
</tr>
</tbody>
</table>

## Anti-Infectives – Prevent bacterial, fungal, and viral infections

<table>
<thead>
<tr>
<th>Medication Type</th>
<th>Medications</th>
<th>Trade Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotics</td>
<td>*Sulfamethoxazole/trimethoprim (SMX/TMP)</td>
<td>Bactrim®, Septra®</td>
</tr>
<tr>
<td>Antifungals</td>
<td>*Fluconazole</td>
<td>Diflucan®</td>
</tr>
<tr>
<td>Antivirals</td>
<td>*Valganciclovir</td>
<td>Valcyte®</td>
</tr>
<tr>
<td></td>
<td>Acyclovir</td>
<td>Zovirax®</td>
</tr>
</tbody>
</table>

## Anti-Hypertensives – Lower blood pressure

<table>
<thead>
<tr>
<th>Medication Type</th>
<th>Medications</th>
<th>Trade Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Channel Blocker</td>
<td>*Amlodipine</td>
<td>Norvasc®</td>
</tr>
<tr>
<td>Beta Blocker</td>
<td>Metoprolol</td>
<td>Toprol-XL®, Lopressor®</td>
</tr>
</tbody>
</table>

## Gastric Acid Suppressants – Reduce “heart burn” symptoms and prevent stomach ulcers

<table>
<thead>
<tr>
<th>Medication Type</th>
<th>Medications</th>
<th>Trade Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proton Pump Inhibitor (PPI)</td>
<td>*Omeprazole</td>
<td>Prilosec®</td>
</tr>
<tr>
<td>Histamine Receptor Blockers</td>
<td>Famotidine</td>
<td>Pepcid®</td>
</tr>
<tr>
<td></td>
<td>Ranitidine</td>
<td>Zantac®</td>
</tr>
</tbody>
</table>

## Pain Medication

- Oxycodone (Roxicodone®)

## Stool Softeners

- Docusate (Colace®)
- Polyethylene glycol (Miralax®)

## Supplements

- Aspirin
- Calcium carbonate (Tums®)
- Vitamin D
- Magnesium oxide
- Multivitamin
- Potassium chloride (K-Dur®)
- Fludrocortisone (Florinef®)
TACROLIMUS (PROGRAF®, FK506)

What is it used for?
Tacrolimus is an immunosuppressive medication that is used to prevent or treat acute liver rejection. Tacrolimus may be the only immunosuppressant that is prescribed for you or it may be used with other anti-rejection medications to prevent rejection.

How is it given?
Tacrolimus is available in 0.5 mg, 1 mg, and 5 mg capsules. It is usually dosed twice daily, 12 hours apart. Your dose of tacrolimus will be adjusted based on the level of tacrolimus in your blood, which is measured in lab on a regular basis, as determined by your doctor.

When do I take it?
Take tacrolimus two times a day, 12 hours apart, for life or as determined by your doctor. It is important to take tacrolimus at the same time each day and consistently with or without food.

On a day when your tacrolimus level is to be measured in lab, do not take your morning dose until after your blood has been drawn. Make sure to bring your morning dose with you to the lab. Your blood should be drawn 12 hours (± 30 minutes) after your evening dose. For example if you take your tacrolimus at 9:00 p.m. have your blood drawn at 9:00 a.m. and then take your morning dose.

What side effects might I expect?
Side effects may vary and may depend on your tacrolimus levels. Side effects include but are not limited to tremors, muscle cramps, diarrhea, nausea, high blood pressure, headache, numbness and tingling of the hands and feet, insomnia (trouble sleeping), kidney problems, high blood sugar, and high potassium levels.

What else do I need to know?
Do not stop taking tacrolimus unless you are told to do so by your doctor. Take with food to prevent nausea. Store tacrolimus at room temperature (59 to 86 degrees F). Tacrolimus may interact with some commonly used medications and herbs. Please speak with your pharmacist if you have questions regarding interactions with medications and herbs.

Tacrolimus was given the name FK506 when it was a study drug. This name is still commonly used especially when blood is drawn for the drug level.

You should not eat grapefruit or drink grapefruit juice while taking tacrolimus. Chemicals in grapefruit can interfere with the enzymes that break down tacrolimus. Patients who are taking tacrolimus may develop a very high level of their medication if grapefruit is taken at any time of day. All forms of grapefruit and drinks containing a grapefruit juice should be avoided.

Some medications should not be taken with tacrolimus. Your coordinator or pharmacist will explain which medications should not be taken with tacrolimus.
CYCLOSPORINE, MODIFIED
(NEORAL®, GENGRAF®)

What is it for?
Cyclosporine is an immunosuppressive medication that is used to prevent or treat acute liver rejection. Cyclosporine may be the only immunosuppressant that is prescribed for you or it may be used with other anti-rejection medications to prevent rejection.

How is it given?
There are many different brands of cyclosporine and it is available in liquid and capsule forms. It is usually dosed twice daily, 12 hours apart. Your dose of cyclosporine will be adjusted based on the level of cyclosporine in your blood, which is measured in lab on a regular basis, as determined by your doctor.

When do I take it?
Take cyclosporine two times a day, 12 hours apart for life or as determined by your doctor. It is important to take cyclosporine at the same time each day and consistently with or without food.

On a day when your cyclosporine level is to be measured in lab, do not take your morning cyclosporine dose until after your blood has been drawn. Make sure to bring your morning dose with you to the lab. Your blood should be drawn 12 hours (+/- 30 minutes) after your evening dose. For example if you take your cyclosporine at 9:00 p.m. have your blood drawn at 9:00 a.m. and then take your morning dose.

What side effects might I experience?
Side effects may vary and may depend on your cyclosporine levels. Side effects include but are not limited to kidney problems, high blood pressure, leg cramps, gum tenderness or inflammation, tremors, headache, high potassium levels, and excess hair growth.

What else do I need to know?
Do not stop taking cyclosporine unless you are told to do so by your doctor. Take with food to prevent nausea. Cyclosporine may interact with some commonly used medications and herbs. Please speak with your pharmacist if you have questions regarding interactions with medications and herbs.

If you take the liquid solution, mix it with milk, chocolate milk, or orange juice to make it taste better. Stir it well and drink it at once. Only mix it in a glass container (not plastic), and rinse the container to make sure you get the full dose. When getting your cyclosporine refilled at the pharmacy make sure they do not switch between Neoral®, Gengraf®, and generic substitutes, they cannot be substituted.

You should not eat grapefruit or drink grapefruit juice while taking cyclosporine. Chemicals in grapefruit can interfere with the enzymes that break down cyclosporine. Patients who are taking cyclosporine may develop a very high level of their medication if grapefruit is taken at any time of day. All forms of grapefruit and drinks containing a significant amount of grapefruit juice should be avoided if you are prescribed cyclosporine.

Cyclosporine capsules and liquid should be stored at room temperature and away from direct sunlight. An opened bottle of cyclosporine liquid may be used for up to two months.
AZATHIOPRINE
(IMURAN®)

What is it for?
Azathioprine is an immunosuppressive medication that is used to prevent or treat acute liver rejection. Azathioprine is a “helper” immunosuppressant and may be given with tacrolimus, cyclosporine and prednisone.

How is it given?
Azathioprine is taken orally or intravenously depending on the condition of the patient being treated. Azathioprine is available in 50 mg tablets. It is usually prescribed once daily and should be given at the same time each day, with or without food.

When do I take it?
Take azathioprine every night. Most patients will take this medication for life.

What side effects might I expect?
Azathioprine may lower the number of white blood cells, which fight infection. It may also lower platelets, which help your blood clot. Other side effects may include nausea, vomiting, and rash. Azathioprine may also be harmful to the liver resulting in an increase in the liver functions tests. It can also cause an inflammation of the pancreas. When taken long-term, azathioprine may increase your risk for developing certain types of cancer such as skin cancer.

What else do I need to know?
If you develop gout and your doctor wants to treat you with allopurinol it is important to explain that you are taking azathioprine. These two drugs together can make your white blood cell count drop to critically low levels that may be result in death.

If you miss a dose of azathioprine, take it as soon as you remember. If it is near the time for the next dose, skip the missed dose and resume your regular dosing schedule. Call your transplant coordinator if you have missed a dose.
PREDNISONE (DELTASONE®)

What is it for?
Prednisone is a steroid used to prevent or treat acute liver rejection.

How is it given?
Prednisone is available as many different strength tablets as well as an oral solution. It is usually dosed once a day.

When do I take it?
Take prednisone once daily for life or as determined by your doctor. Prednisone should be taken in the morning. If taken at night, it can affect your sleep.

What side effects might I expect?
Prednisone can have many side effects, but these vary depending on the dose, frequency and duration of your treatment. The most common side effects include: an increased appetite, weight gain, high blood sugar, stomach irritation and/or stomach ulcers, mood changes, irritability, anxiety, and acne. You may also retain fluids which may make your face, hands, and ankles “puffy.” Side effects that can occur with higher dosages over a longer period of time include bruising, high blood pressure, high cholesterol levels in the blood, high blood sugar, muscle weakness, night sweats, bone weakening, delayed wound healing, cataracts, and glaucoma.

What else do I need to know?
Take with food or milk to prevent nausea. Do not abruptly stop taking Prednisone unless you are told to do so by your transplant doctor.

Prednisone may not work as well when taken at the same time as some other medications. Your coordinator or pharmacist will explain which medications should not be taken with prednisone.

Do not drive until your Prednisone dose is down to 10mg a day.
MYCOPHENOLATE MOFETIL
(CELLCEPT®)

**What is it for?**
Mycophenolate mofetil (Cellcept®, or MMF for short, is an immunosuppressant medication that is used to prevent or treat acute liver rejection. Mycophenolate may be the only immunosuppressant that is prescribed for you or it may be used with other anti-rejection medications to prevent rejection. Mycophenolate sodium (Myfortic®) is a slow release version of the same medication.

**How is it given?**
Mycophenolate is taken orally or intravenously depending on the condition of the patient being treated. Mycophenolate mofetil (Cellcept®) is available in 250 mg capsules and 500 mg tablets, as well as an oral suspension. Mycophenolate sodium (Myfortic®) is taken orally and is available in 180 mg and 360 mg tablets.

**When do I take it?**
Take Cellcept or Myfortic twice daily, 12 hours apart. Most patients will take one of these for life.

**What side effects might I expect?**
Mycophenolate may lower the number of white blood cells, which fight infection. It may also lower platelets, which help your blood clot. Other side effects include but are not limited to nausea, vomiting, loss of appetite, diarrhea, and stomach cramps. When taken long-term, mycophenolate may increase your risk for developing certain types of cancer such as skin cancer.

**What else do I need to know?**
It is important that you tell your doctor if you are taking any over the counter iron tablet supplements. Report excessive diarrhea to your doctor.

Mycophenolate capsules should be swallowed whole and should not be opened. The powder inside the capsule may be harmful if inhaled.

If you miss a dose, take it as soon as you remember. If it is near the time for the next dose, skip the missed dose and resume your regular dosing schedule. Call your transplant coordinator if you have missed a dose.

If you are planning to become pregnant, discuss the use of mycophenolate with your transplant physician and obstetrician/gynecologist. Women of childbearing age should use contraception while on this medication and for six weeks after discontinuing it.

You should avoid receiving live vaccines such as the nasal mist influenza vaccine (Flu-mist®), the live polio vaccine, the smallpox vaccine, the measles-mumps-rubella vaccine (MMR®), and the live varicella vaccine (Varivax®, Zostavax®).

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MYCOPHENOLIC ACID
(MYFORTIC®)
VALGANCICLOVIR (VALCYTE®)

What is it for?
Valganciclovir and acyclovir are antiviral medications that are used to prevent or treat certain viral infections that commonly occur in patients who have a suppressed immune system. Cytomegalovirus (CMV), herpes simplex infections (HSV), and Epstein Barr Virus (EBV) infections are usually treated with valganciclovir or acyclovir.

How is it given?
Valganciclovir is available in 450 mg tablets and as an oral solution. It is taken by mouth usually once or twice a day and should be taken with food. Acyclovir is available in 200 mg, 400 mg, and 800 mg tablets or capsules and as an oral suspension. It is taken by mouth twice a day and can be taken with or without food.

When do I take it?
Take valganciclovir or acyclovir once or twice daily. The amount of time you will need to take valganciclovir or acyclovir after your transplant will depend on your risk for developing a viral infection after transplant. Your pharmacist will instruct you on how long you should take valganciclovir after transplant, either 3, 4, or 6 months. You may be restarted on valganciclovir or acyclovir if you are treated for rejection.

What side effects might I expect?
Side effects may include: diarrhea, nausea, vomiting, headache, pancreatitis, confusion, and seizures. Valganciclovir and acyclovir can affect the white blood cell count and platelet count, but this usually resolves by decreasing the dose or by stopping the medication.

What else do I need to know?
Always take Valganciclovir with food. Drink plenty of fluids to avoid harm to your kidneys.

FLUCONAZOLE (DIFLUCAN®)

What is it for?
Fluconazole is an antifungal medication that is used to treat or prevent fungal infections, namely thrush. Thrush is a fungal infection in the mouth. It can also be in the esophagus.

How is it given?
Fluconazole is available intravenously or orally in 50 mg, 100 mg, 150 mg, and 200 mg tablets, as well as an oral solution and an oral suspension. For prevention, fluconazole is usually taken once a week. For treatment, fluconazole is usually taken once a day.

When do I take it?
Fluconazole is taken by mouth once a week, on Mondays for the first 4 months after your transplant surgery. You may be restarted on it if you are treated for rejection.

What side effects might I expect?
Side effects include but are not limited to rash, headache, dizziness, nausea, vomiting, abdominal pain, diarrhea, elevated liver enzymes and/or change in ability to taste food

What else do I need to know?
Fluconazole may increase the concentration of some drugs and enhance their effect, thus careful monitoring after completion of treatment is necessary:

- Warfarin (Coumadin®)
- Anti diabetic medication (Glyburide, Glipizide, Glimepiride)
- Phenytoin (Dilantin®)
- Theophylline
- Tacrolimus (Prograf®)
**SULFAMETHOXAZOLE / TRIMETHOPRIM [TMP/SMX] (BACTRIM®, SEPTRA®)**

**What is it for?**
Bactrim® is an antibiotic used to prevent or treat *Pneumocystis carinii* Pneumonia (PCP). Patients who have a suppressed immune system are at greater risk for this type of pneumonia.

**How is it given?**
Bactrim® is available as single strength or double strength tablets as well as an oral suspension. It is usually dosed once a day.

**When do I take it?**
Take Bactrim® once a day for 6 months after your transplant. You may be restarted on it if you are treated for rejection.

**What side effects might I expect?**
Side effects include but are not limited to photosensitivity or a sunburn-like reaction when exposed to the sunlight, rash, and diarrhea. Other side effects include nausea, vomiting, diarrhea, mouth ulcers, a low red blood cell count (anemia), a low white blood cell count, or a low platelet count. Bactrim® can cause an increase in liver and kidney function tests in some patients.

Patients who are allergic to sulfa drugs will have an allergic reaction to Bactrim® or Septra®. They usually develop a rash, itching, and/or hives. If you are allergic, your transplant doctor will prescribe another medication to prevent PCP.

**What else do I need to know?**
Bactrim® should be taken with a full glass of water. Drink plenty of fluids while taking Bactrim®.

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**OMEPRAZOLE (PRILOSEC®)**

**What is it for?**
Omeprazole is a proton pump inhibitor used to treat or prevent ulcers, esophagitis and other conditions caused by too much stomach acid, which can be the result of the use of high dose or a prolonged duration of steroids.

**How is it given?**
Omeprazole is available in 10 mg, 20, mg, and 40 mg capsules and tablets, and can be compounded into an oral suspension by your pharmacy. It is usually dosed once or twice a day.

**When do I take it?**
Take at night before going to bed or as directed by your doctor. You may be on this medication for 3 months after your liver transplant surgery. It may be restarted if you are treated for rejection. Some patients may stay on omeprazole for life.

**What side effects might I expect?**
Side effects are rare but can cause headache, nausea, and diarrhea.

**What else do I need to know?**
Capsules should be swallowed whole, not chewed, since these capsules contain time-released granules.
AMLODIPINE (NORVASC®)

What is it for?
Amlodipine is in a class of medications called calcium channel blockers that works to reduce blood pressure that may be caused by some immunosuppressant medications. It may be used alone or in addition to other blood pressure reducing medications.

How is it given?
Amlodipine is available in 2.5 mg, 5 mg, and 10 mg tablets. It is usually dosed once a day.

When do I take it?
Take amlodipine once a day. Some patients may stay on amlodipine for life.

What side effects might I expect?
Side effects may include but are not limited to dizziness, fatigue, headaches, abdominal pain, increased swelling in the legs or arms, or flushing. Amlodipine may increase your risk of developing chest pain or a heart attack; therefore you should contact your physician immediately if you are having chest pain while taking amlodipine.

What else do I need to know?
Amlodipine may affect the concentration of some drugs and either enhance or decrease their effect, thus careful monitoring is necessary:
- Cyclosporine (Sandimmune®, Neoral®, Gengraf®)
- Tacrolimus (Prograf®)
- Fluconazole (Diflucan®)
- Amiodarone (Cordarone®)
- Simvastatin (Zocor®)

METOPROLOL (TOPROL-XL®, LOPRESSOR®)

What is it for?
Metoprolol is in a class of medications called beta blockers that works to reduce blood pressure that may be caused by some immunosuppressant medications. Metoprolol also slows heart rate and may be used for other indications such as irregular heart beats. It may be used alone or in addition to other blood pressure reducing medications.

How is it given?
Metoprolol (Lopressor®) is available intravenously and in 25 mg, 50 mg, and 100 mg tablets and is usually dosed twice a day. Extended release metoprolol (Toprol-XL®) is available in 25 mg, 50 mg, 100 mg, and 200 mg tablets and is usually dosed once a day.

When do I take it?
Take metoprolol (Lopressor®) twice a day. Take extended-release metoprolol (Toprol-XL®) once a day with food. Some patients may stay on metoprolol for life.

What side effects might I expect?
Side effects may include but are not limited to dizziness, fatigue, shortness of breath, headache, or depression.

What else do I need to know?
Metoprolol may mask the symptoms associated with low blood sugar, so if you have diabetes, it is advised to monitor your blood sugars closely. Metoprolol may worsen symptoms associated with asthma. If you have asthma, discuss the use of metoprolol with your transplant physician prior to starting metoprolol.
OXYCODONE (ROVICODONE®)

What is it for?
Oxycodone is used to relieve moderate to severe pain. Oxycodone is in a class of medications called opiate (narcotic) analgesics. It works by changing the way the brain and nervous system respond to pain.

How is it given?
Oxycodone is generally prescribed in 5 mg tablets and is taken orally.

When do I take it?
Take oxycodone if needed every 4 to 6 hours or as directed by your doctor.

What side effects might I expect?
Side effects include but are not limited to drowsiness, dizziness, light-headedness, nausea, vomiting, headache, and constipation.

What else do I need to know?
Avoid alcohol, antihistamines or other drugs that may intensify the drowsiness caused by oxycodone. It can be taken with or without food. Avoid driving or operating heavy machinery while taking oxycodone.

This prescription is not refillable by phone. If you continue to experience pain request new prescriptions during your regular office visits.
# Medications for Electrolyte Imbalances

**Purpose:** Sometimes medications can cause imbalances in the body’s electrolytes. Electrolytes are substances your body needs to maintain fluid balance and to help with other functions of your body. Sodium, potassium, chloride, magnesium, calcium, and phosphorus are some of the electrolytes found in your body. Medications to treat or prevent electrolyte imbalances may be needed for several reasons. Sometimes these imbalances are due to side effects of other medications. For example, a high level of tacrolimus can cause magnesium levels in your blood to be lower than normal. Sometimes imbalances can occur if your kidneys are not working well. If you have a lot of diarrhea because of an infection or as a side effect of a medication, the bicarbonate level in your blood may be low.

<table>
<thead>
<tr>
<th>Medication</th>
<th>Use</th>
<th>Possible Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnesium oxide</td>
<td>To treat or prevent low magnesium levels</td>
<td>Diarrhea, abdominal cramping, muscle weakness, high magnesium level, low blood pressure</td>
</tr>
<tr>
<td>Magnesium gluconate (Magonate®)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fludrocortisone (Florinef®)</td>
<td>To treat or prevent high potassium levels</td>
<td>High blood pressure, edema, headache, rash, low potassium</td>
</tr>
<tr>
<td>Potassium chloride (K-Dur®)</td>
<td>To treat or prevent low potassium levels</td>
<td>High potassium, nausea, vomiting, diarrhea, abdominal pain, muscle weakness, heart</td>
</tr>
<tr>
<td>Calcium carbonate (Tums®)</td>
<td>To treat or prevent low calcium levels and support bone strength</td>
<td>Constipation, intestinal bloating and excess gas</td>
</tr>
</tbody>
</table>
APPROVED OVER-THE-COUNTER (OTC) MEDICATIONS

- Tylenol® (acetaminophen) 325 mg tablets, 2 tablets every 10 hours as needed for pain.

- Extra Strength Tylenol® (acetaminophen) 500 mg tablets, 1 tablet every 8 hours as needed for pain.

- Tylenol® (acetaminophen) can be toxic to your liver; do not take more than 1.5 grams (1500 mg) a day. You must be aware of combination drugs that contain Tylenol® (acetaminophen) and make sure you do not take more than 1.5 grams (1500 mg) a day.

- Chlor-Trimeton® (chlorpheniramine) and Benadryl® (diphenhydramine) antihistamines for cold symptoms (runny nose, itchy eyes), follow directions on the box.

- Claritin® (loratidine), Zyrtec® (cetirizine), and Allegra® (fexofenadine) for seasonal allergies, follow directions on the box.

- Robitussin® (dextromethorphan), Mucinex® (guifenesin), and Mucinex-DM® (guifenesin and dextromethorphan) for cough, follow the directions on the box.

- Sudafed PE® (phenylephrine), Astelin Nasal Spray® (azelastine), Ocean Nasal Spray® (saline), and Neti Pot for nasal congestion.

Check with your pharmacist before taking any other over the counter medications to see if they adversely interact with your current medications.

- **DO NOT TAKE** non-steroidal anti-inflammatory drugs (NSAIDs). These include but are not limited to Ibuprofen, Motrin®, Excedrin IB®, Advil®, Naproxen®, Feldene®, and Celebrex®. This kind of medication can injure your kidneys or cause kidney failure! If you are not sure whether you should take a medication that has been prescribed for you, ask your pharmacist.

- **DO NOT TAKE** aspirin unless it is prescribed by the transplant team.

- **DO NOT TAKE** Sudafed® (pseudoephedrine) unless it is prescribed by the transplant team. Sudafed® can increase blood pressure and cause irregular heart rhythms.

- **DO NOT TAKE** herbal medications after your liver transplant.

Please notify your coordinator if you are taking any of these medications on a regular basis.
HEALTH CARE

DENTAL CARE

You must have a dental check up every six months to one year. Inform your dentist that you had a liver transplant and are taking immunosuppressant medication. You may need to take an antibiotic before any dental work, cleaning, exam or procedure.

The mouth has a large amount of bacteria in it. The use of an antibiotic helps to decrease the chances of an infection if the mouth or gum tissue is disturbed during dental work.

OHSU transplant program follows the American Heart Association guidelines for pre-procedure antibiotics. Your dentist will decide if you need antibiotics and how long. They may call the Liver Transplant office with any questions.

ACTIVITY

There are few activity restrictions after transplant. We want you to resume your past level of activity in work or play. You should lead an active life. Restrictions in general include, but are not limited to:

1. No lifting of greater than five (5) pounds for three (3) months after transplant to prevent hernias. Remember, a gallon of milk weighs seven pounds!
2. No lifting of greater than 20 pounds for the next three (3) months.
3. No jogging or running for six (6) months after transplant. Do warm up and stretching exercises.
4. Avoid activities that cause you to bounce like horseback riding, snowmobiling and trail or cross country motorcycle riding for 6 months after transplant.
5. Avoid tub baths and swimming until your staples are out and your skin has healed, approximately 4 weeks after your surgery.

These weight restrictions are in place to lower your risk of developing hernias. The outside incision heals in approximately one month, the inside incisions need up to six months to heal.

You may notice your muscles, especially leg and abdominal muscles, have become weak. Excellent ways to improve the strength of these muscles include walking, bike riding, and swimming. For the first six months after transplant you are not to tighten or strengthen your abdominal core muscles. This time period gives your body time to heal from your surgery.

Use common sense as your guide for any activity after transplant. As you gain strength and endurance, your amount of physical activity will also increase. If you have any questions, please call the Transplant Office.

Try to do a little more physical activity every day. Make physical goals for yourself, for example walking so many steps in a day. Remember do not push yourself so hard that you cannot get up the next day and do it all over again.

After six (6) months, sit-ups and other abdominal exercises will improve the tone of your abdominal muscles.

SEXUAL ACTIVITY

As with any major surgery, waiting a period of six weeks before engaging in sexual intercourse is a good idea. This time will allow the incision and muscles to heal. If you are sexually active and do not have a steady sexual partner, it is essential to use condoms to reduce the risk of sexually transmitted diseases such as AIDS, syphilis, herpes, hepatitis, gonorrhea and chlamydia.

Women of child bearing potential should
use two forms of birth control. Some immunosuppressant's reduce blood levels of the hormones in the oral contraceptive pill and could reduce its effectiveness. Pregnancy must be discussed with your transplant team prior to conception. Some immunosuppressant’s have been associated with serious birth defects.

**PREGNANCY**

In women, ovulation may begin within 1-2 months after transplant for women with well functioning livers. All women of childbearing age should be advised about the possibility and risks of pregnancy after transplant. Pregnancy is not typically recommended within the first year after a transplant because the risk of rejection is the greatest and immunosuppressive therapy is the most aggressive. It should, however, be planned when organ function and immunosuppressive therapy are stabilized and there is no sign of rejection, hypertension or chronic infection.

If you are considering becoming pregnant, it is important to discuss potential risks with your transplant team.

For men, there are no known risks if your partner becomes pregnant while you are on immunosuppressive medications. Please discuss with your physician if you are planning on becoming pregnant or your partner is pregnant, while you are on immunosuppressive therapy.

**USE OF TOBACCO AND ALCOHOL**

Do not drink alcoholic beverages. Do not drink “non alcoholic” beverages including “near beers” and wine coolers. Alcohol is metabolized, or broken down, in the liver. Drinking any type of alcoholic beverages can harm your liver. Many of your medications are metabolized by the liver. Liver cells may be destroyed with the additional stress of breaking down alcohol as well as your medications.

Do not smoke or use tobacco products.

Smoking can cause cancer, heart disease, and lung disease. Additionally, smokers may have prolonged respiratory infections because of the effect of smoke on the lungs. Transplant recipients who smoked before transplant are strongly encouraged not to start smoking. Since nicotine is broken down or metabolized by the liver, there is a possibility that some medications, particularly tacrolimus and cyclosporine, may not be metabolized well. Levels of these medications may be lower in smokers. You should never risk losing your healthy liver for cigarettes. Chewing tobacco can lead to neck and mouth cancers. The use of marijuana can cause lung and brain infections from a fungus called Aspergillus.

**RETURNING TO WORK**

Some patients have returned to work as quickly as three weeks after their transplant surgery. Most patients are ready to return to work within three months after transplant. When possible, it can be helpful to return on a part-time basis. You can gradually increase your hours as your energy and endurance improves.
**SUN EXPOSURE**

Transplant recipients have an increased risk of developing skin cancer. This risk is up to 65 times greater than in people who have not had a transplant. The medications that transplant recipients take to suppress their immune system cause this increased risk.

Skin and lip cancers are the most common cancers of transplant patients. Since the risk increases with time, you must always protect your skin and lips from the ultraviolet rays of the sun. Apply lotion and lip balm that has sunscreen with an SPF of 30 or greater every day.

- Avoid midday (10 am to 3 pm) sun, when ultraviolet rays are strongest.
- Wear a hat, long sleeves and slacks when outdoors.
- Use a sunscreen lotion and lip balm (>30 SPF) every day (rain or shine) and apply often to exposed areas, especially face, neck and hands.

Remember that sunscreen lotions wash or wear off. Reapply the lotion as needed, especially after swimming.

**IMMUNIZATIONS**

**Avoid vaccines that consist of live viruses** such as Sabin oral polio, smallpox, measles, mumps, rubella (MMR), chickenpox, and yellow fever. Receiving a live vaccine may cause serious health complications because a transplant recipient could develop the virus that he/she is being immunized against.

You may receive injectable polio and a TB skin test. It is recommended that you receive the Influenza A & B or “flu” shot every year and pneumovax every five years. **You should not get live vaccines** such as the nasal mist influenza vaccine (Flumist®), the live polio vaccine, the smallpox vaccine, the measles-mumps-rubella vaccine (MMR®), and the live varicella vaccine (Varivax®, Zostavax®).

Do not change diapers of children that have received these immunizations, 3-5 days. It is best to avoid close contact with anyone who has had the oral polio vaccine for up to eight weeks since the virus may shed in their stool and saliva. Transplant recipients who have infants should be sure that their child receives the Salk polio injection. It is also recommended to avoid close contact with a child who has received the chickenpox vaccine. However you do not need to avoid a child who has recently received a MMR.

Get a tetanus booster every 10 years. If you are injured and have not had a tetanus booster within the last 5 years, please contact your primary care physician.

**AVOIDING INFECTION**

You need to consciously protect yourself from infection by taking the following pre-cautions:

- Wash your hands often. This is the number one way of protecting yourself from infection.
- Keep your hands away from your face and mouth.
- Stay away from people with colds or other infections.
- Avoid close contact with people who have obvious illnesses such as colds and flu.
- Avoid crowded places like stores, movies, restaurants and churches in the first few months, particularly during cold and flu season or when you are highly immune-suppressed.
✓ Do not share eating utensils, cups, or glasses with others since many viral illnesses are spread through saliva and mucous. Do not share razors or toothbrushes.

✓ Ask friends to visit only when they are well.

✓ If you have a wound that requires dressing changes, wash your hands before and after changing the dressing.

✓ Avoid working in the soil for three (3) months after your transplant. Thereafter, wear gloves. Avoid compost piles, wet leaves, and rotting organic matter. These materials can carry mold that can cause significant respiratory infections.

✓ Wear a surgical mask if you are near a construction site or in a large crowd until your prednisone dose is down to 10mg a day.

✓ Avoid handling animal waste and avoid contact with animals that roam outside. Do not clean birdcages, fish tanks, turtle tanks or cat litter boxes. The cat litter box should be covered and taken out of your home before it is changed. Some types of pets should be avoided such as reptiles, turtles, amphibians (frogs), hamsters, and guinea pigs. These animals can carry infections that could cause you to become ill.

**DIET AND EXERCISE**

A common problem with transplant patients is weight gain. It is not uncommon for patients that have had a transplant to gain up to 10-15% of their starting weight.

There are several reasons for this:
- You can eat your favorite foods again.
- You have a much-improved appetite.
- You feel better, so eating is once again a pleasure.

Achieving and maintaining a desirable weight is a major goal of your nutrition care plan. Obesity contributes to high blood pressure, diabetes, and may lead to heart attacks and strokes. It can also affect your self-image.

The bookends for weight management are: *exercise and diet.*

Some patients complain about a decreased appetite or that food tastes different. This is usually a temporary side effect of the medications. It is important for healing to eat frequent small meals.

Exercise should be a planned program that is done on a regular basis 3-5 times per week for at least 30 minutes. Walking is an excellent way to exercise, is inexpensive, and unless you have a physical problem is easy to do. Studies show that transplant patients who do aerobic exercise 3 times a week for 30 minutes live longer than patients who do not exercise.
Nutrition After Liver Transplant

A positive lifestyle, including well-balanced meals and moderate activity, is very important for your long-term health after a liver transplant. This section of your handbook will talk about food safety, eating well, and exercise.

Safe Foods and Food Hygiene
The medications used to prevent rejection also suppress your immune system. You are more at risk of picking up a food-borne illness after your transplant. The most important steps to protect yourself include:

1. Safe Food Handling and Preparation
   - Always wash hands well with soap and water and dry thoroughly after using the restroom, before and after handling foods, and before eating
   - Sanitize sinks and chopping boards with 1/2 teaspoon bleach in 2 cups water
   - Separate raw produce from uncooked meats. Use separate cutting boards if possible; and clean cutting utensils between use on fresh produce and animal products.
   - Remove outside leaves of leafy vegetables and rinse leaves individually
   - Rinse all produce under running water
   - Do not eat foods from damaged or broken containers
   - Ground meat must be thoroughly cooked—hamburgers should be well-done

2. AVOID High Risk Foods such as:
   - Raw and/or undercooked fish, other seafood, poultry, and meat
   - Foods containing raw eggs
   - Raw bean sprouts (very high risk for E. Coli)
   - Salad bars and buffet-style meals
   - Soft and semi-soft cheeses
   - Unpasteurized dairy products such as milk, cheese, and yogurt made from raw milk

3. Food storage
   - Store eggs in the refrigerator
   - Store raw meats below other foods in the refrigerator
   - Separate raw and cooked foods while purchasing, storing and preparing foods
   - Refrigerate or freeze perishable foods as soon as possible
   - Cover stored foods
   - Do not wait for cooked foods to cool; refrigerate immediately
   - Defrost foods in the refrigerator or microwave—not at room temperature.
   - Do not refreeze uncooked foods that have already been defrosted
   - Leftover foods should be consumed within 48 hours unless frozen

4. Eating out
   - Ask for food to be freshly prepared to your order
   - Avoid salad bars and buffet-style meals

“If in doubt, throw it out!”
Healthy Eating After Liver Transplant

General Nutrition
Heart healthy eating is very important for anyone living with an organ transplant. The Mediterranean diet is built around using olive oil (or canola or peanut oil) in food preparation. It also emphasizes fish and seafood, as well as poultry, with very lean red meat in smaller amounts. Whole grains, unsalted nuts and seeds, and fresh or frozen fruits and vegetables are stressed.

This is just one approach to enjoyable low fat, low cholesterol meals but it has been shown to protect some transplant recipients from heart disease later.

Protein
In the first 3 months after transplant you need extra protein. To tell you how many grams of protein you need each day: divide your weight in pounds by 2, and then add an additional 50% to that number.
- Meats, Fish, Poultry—about 7 grams of protein per ounce
- Dairy Products—8 grams of protein per cup of milk
- Eggs—about 7 grams of protein each
- Unsalted nuts—about 7 grams or protein per ¼ cup
- Dried beans, lentils, and peas—about 7 grams of protein per ¼ cup cooked
- Soybeans, soy milk, tofu—protein content varies, but is a high quality

Sodium
You should continue to limit your intake of sodium. One of your medications, prednisone, can cause fluid retention. Limiting the salt intake can help control bloating. Remember the words “NO ADDED SALT” and let them guide you when you are at the stove and at the table. The following foods are high in sodium and should be limited or avoided as much as possible:
- Salt (salt is sodium chloride)
- Crackers and snack foods with visible salt
- Cured meats (bacon, ham)
- Luncheon meats
- Canned or dried soups
- Ethnic foods: Chinese, Japanese, Mexican, Italian (it is best to cook these from scratch at home, using lower salt ingredients such as low-sodium soy sauce, or tomato products made with less salt)
- Sauces: Worcestershire, chile, soy, teriyaki
- Prepackaged casseroles
- Macaroni & cheese
Medical Problems

There is no way to predict which patients will have problems after surgery. Your transplant team will do their best to reduce your likelihood of complications and to treat them promptly if they occur. Following your instructions carefully and keeping your transplant team informed of any difficulties will help you return quickly to a normal, active life.

One way that you can help your transplant coordinator, is if you do not feel well go and get your liver transplant labs done, then call and talk to your transplant coordinator.

Problems that may occur

Fever
If you get a fever after liver transplant, it could be from a community-acquired cold or the flu. But fever after transplant can also be a symptom of rejection or a specific infection related to having a suppressed immune system. If you have a fever of 100.5 degrees (F) or greater, call the Liver Transplant Coordinator immediately.

Bile Leak
A bile leak occurs when bile collects outside the bile ducts. If you have a leak, you may experience pain over your liver, nausea, and/or fever. If this occurs, call your transplant office immediately.

Biliary Stenosis (narrowing of the bile duct)
Occasionally, the bile duct narrows and eventually may become blocked. This narrowing typically occurs where the surgeon sews the donor bile ducts to the recipient’s bile ducts. If this occurs you may become jaundiced or you may have no physical symptoms. This diagnosis can be detected through routine lab work and it most often occurs during the first 3-4 months post transplant.

INFECTIONS

Immunosuppressive medications interfere with your natural immunity; therefore, you will be more susceptible to infections after your transplant surgery. The following are some of the most common infections:

VIRAL INFECTIONS
The drug Valganciclovir is given to prevent Cytomegalovirus. It is also given to treat certain viral illnesses.

Cytomegalovirus (CMV)
CMV is one of the viral infections that occur most frequently in transplant patients. The risk of CMV is highest in the first months after transplantation. Signs include fatigue, high temperature, aching joints, headaches, visual disturbances, and pneumonia. Treatment may include hospitalization.

Herpes-Simplex Virus Type I and II
These viruses most often infect the skin, but can also occur in other areas such as the eyes and lungs. Type I typically causes cold sores and blisters around the mouth, and type II causes genital sores. Herpes is an infectious disease and can be transmitted sexually.

Most herpes-simplex infections are mild but occasionally they can be severe. Although there is no cure for herpes, it can be treated. Depending on the severity of the infection, the treatment is topical, oral, or intravenous (IV). Contact the transplant team immediately if you believe you have herpes.

Symptoms of herpes include feeling weak and having painful fluid-filled sores in your mouth or genital area. Women should also be aware of any unusual vaginal discharge.
Herpes Zoster (Shingles)
Shingles appear as a rash or small water blisters, usually on the chest, back, or hip. The rash may or may not be painful. Notify your transplant office if you have such a rash.

Hepatitis C
The hepatitis C virus is not eliminated with liver transplantation. When it recurs you may require treatment.

FUNGAL INFECTIONS
The drug Fluconazole or Diflucan® is given to prevent fungal infections.

Candida (Yeast)
Candida is a fungus that can cause a variety of infections in transplant patients. It usually appears in the mouth and throat but may also be in the surgical wound, eyes, or respiratory and urinary tracts. If infection occurs in the mouth or throat, it is called thrush. Thrush produces white, patchy lesions (raw areas), pain or tenderness, a white film on the tongue, and/or difficulty swallowing. Candida can also infect the esophagus (the tube from your mouth to your stomach) which can cause heart burn symptoms or difficulty swallowing. Women may experience infections in the vagina. Vaginal infections usually produce an abnormal discharge that may be yellow or white. Notify your transplant office if you think you have a candida infection.

BACTERIAL INFECTIONS
The drug Bactrim or Septra is given to prevent bacterial infections.

Wound Infections
Bacterial wound infections can occur at the surgical site. If you have a fever or notice redness, swelling, tenderness, or drainage at your incision, notify your transplant team. After a wound culture (a test for bacteria) is taken, an antibiotic will be prescribed if infection is present.

Other Infections
The drug Bactrim is given to prevent Pneumocystis carinii Pneumonia (PCP.)

Pneumocystis carinii is a germ similar to a fungus, and it is normally found in the lung. In people whose immune systems are suppressed, it may cause PCP. Early in the illness, a mild, dry cough and a fever may occur. If you suspect that you have a cold or flu like illness, contact your physician immediately.
REJECTION

Your body’s immune system protects you by recognizing certain foreign substances, such as bacteria and viruses, and destroying them. Unfortunately, the immune system also recognizes your new liver as a foreign substance.

Rejection is an attempt by your immune system to attack the transplanted liver and destroy it. To prevent rejection from occurring, you must take immunosuppressive medications as prescribed for the rest of your life.

In spite of all precautions, rejection episodes can occur. Even while taking immunosuppressant’s, up to 10 - 30% of all liver-transplant recipients will have at least one rejection episode. The first episode often occurs within 3 months of surgery. Changing the dosages of your immunosuppressive medications or adding a new one usually controls rejection.

If detected early, most rejection episodes can be treated successfully.

You should be alert to the signs and symptoms of rejection and inform your transplant team promptly if you have the following:
✓ fever greater than 100.5° F/38.4° C
✓ flu-like symptoms such as chills, nausea, vomiting, diarrhea, loss of appetite, headaches, dizziness, body aches, tiredness
✓ abdominal pain or tenderness

If you do not receive treatment, your symptoms will worsen over time. Later symptoms may be similar to problems you had before transplant and may include:
✓ dark, tea-colored urine
✓ confusion
✓ abdominal swelling with fluid (ascites)
✓ Jaundice (yellow skin or eyes)

✓ Dark yellow/orange urine
✓ Clay colored stools

Any injury to the liver can cause the release of liver enzymes into the bloodstream. An injury to the liver cells could be caused by rejection, infection, or side effects of medications. Measuring the liver function tests (LFTs) regularly and watching the pattern of the results can help your doctor decide what is happening to your liver.

Liver rejection is usually diagnosed by looking at the liver function tests. Your doctor may suspect that you have rejection if any of these numbers are increased from the normal range. This could be confirmed by a liver biopsy. Based on the results, your transplant team will decide the best treatment for you.

How is rejection treated?
Rejection does not mean that you will lose your liver, but early diagnosis and treatment are very important to avoid complications. Mild to moderate rejection is treated by increasing your immunosuppression and/or your prednisone dose. Sometimes the IV form of prednisone is given for several days. Another way to treat rejection is by adding or combining other anti-rejection medicines such as mycophenolate mofetil, sirolimus, or azathioprine.

Severe rejection requires admission to the hospital for IV administration of stronger agents.

The risk of rejection decreases over time but can occur at any time. Taking good care of yourself, taking your medications as prescribed, and having your blood tests done as requested will help decrease your risk of rejection.
Diagnostic Testing

MRCP (Magnetic resonance cholangiopancreatography)
An MRCP is a special type of Magnetic resonance imaging (MRI) that specifically images the biliary and pancreatic ducts in a non-invasive manner. This test is an excellent tool for visualizing blockages in the ducts and pancreatic cysts. It can also diagnose bile duct stones or tumors.

PTC (Percutaneous transhepatic cholangiography)
A procedure that x-ray’s the hepatic and common bile ducts. This procedure is done under local anesthesia by a radiologist. During the exam, a thin needle is inserted through the skin (percutaneous) and through the liver (transhepatic) into a bile duct. Then contrast media is injected, and the bile duct system is outlined. If necessary, a thin, flexible tube (catheter) may be inserted to allow the bile to drain into a collection bag outside the body, or into the small intestine. This procedure is called biliary drainage. Drainage catheters may be placed to divert bile. Stones can be removed, or balloon inserted to dilate strictures (narrowing of a duct or passage).

ERCP (Endoscopic, Retrograde Cholangio Pancreatography)
Endoscopic refers to the use of an instrument called an endoscope - a thin, flexible tube with a tiny video camera and light on the end. The endoscope is used by a highly trained gastroenterologist, to diagnose and treat various problems of the GI tract. The GI tract includes the stomach, intestine, and other parts of the body that are connected to the intestine, such as the liver, pancreas, and gallbladder. Retrograde refers to the direction in which the endoscope is used to inject a liquid enabling X-rays to be taken of the parts of the GI tract called the bile duct system and pancreas. The process of taking these X-rays is known as cholangiopancreatography. Cholangio refers to the bile duct system, pancreas to the pancreas.

Ultrasound with dopplers
Ultrasound is a safe and painless procedure that uses sound waves to "see" inside your body. The doppler allows the doctor to evaluate the blood flow through the arteries and veins of your abdomen. The scan can help diagnose obstructions in the blood flow to your liver as well as some problems in the liver.

CT (CAT) scan (Computed Tomography Scan)
CT scans use X-Ray technology and advanced computer analysis to create detailed pictures of your body. A CT can help diagnose problems in the liver, spleen, colon, pancreas, kidneys and other internal organs. Sometimes the exam includes a contrast dye. The dye improves the image quality by highlighting certain structures, such as arteries or the colon, making them more visible on the scan. The contrast is usually given by IV and in some cases may be given orally.

CTA (Computed Tomography Angiography)
CTA uses a Computed tomography (CT or CAT) scanner to create images of blood vessels. Special contrast dye is injected into an IV. The dye highlights the blood vessels and make them easier to see on the X-Ray images.
Health Concerns

What happens after transplantation depends on the organ transplanted and the recipient's specific medical situation. Most patients recover fully, return to work and resume a normal, active life after receiving a new organ. However, there is a possibility of developing unrelated health problems after transplantation. It is important to work closely with your doctor concerning your overall wellness.

ANXIETY AND DEPRESSION
Patients and their families face a new lifestyle after transplantation that may cause them to feel nervous, stressed or depressed. Anxiety and depression post transplant are considered normal. Because emotional and psychological support is a continuing process, ask your social worker about counseling services that can help you and your family deal with these changes. Professionals can help you work through concerns; mood swings; job planning; rehabilitation; family stresses, such as parent-child conflicts, marital conflict or financial concerns, such as questions about Medicare, disability or insurance.

HIGH BLOOD PRESSURE
High blood pressure (hypertension) is a common condition that is seen in the general population. After transplant, patients who have had high blood pressure may need to continue to be treated for this condition. Sometimes, high blood pressure occurs in patients who have never had any problem with their blood pressure. Hypertension after transplant can be a side effect of medications, particularly the anti-rejections medications. High blood pressure also may occur if the kidneys are not working well.

There are several medications that can be used to treat high blood pressure. They work in different ways to control hypertension. Sometimes patients are prescribed more than one blood pressure medication because the medications work together to control hypertension. Sometimes a diuretic (“water pill”) is needed to work with these medications. Your doctor will prescribe the blood pressure medications that are right for you to control high blood pressure and any complications you may have.

HIGH CHOLESTEROL
Many immunosuppressant drugs can contribute to high cholesterol. This condition therefore affects many transplant recipients. When a patient develops high cholesterol, blood vessels, including the ones attached to the transplanted organ, become clogged, which affects the flow of blood. This slowing of blood flow can affect the success of your transplant and may even lead to heart disease. It is important to talk to your doctor about how to reduce the risk factors of heart disease, including controlling your cholesterol.
DIABETES

Diabetes is an increased level of sugar in your blood. Some of the immune-suppressive medications that you take may cause diabetes.

If you develop diabetes, you will receive specialized teaching and ongoing follow up about how to deal with this problem.

Symptoms of diabetes may include:
- Increased frequency of urination
- Increased thirst
- Blurred vision
- Confusion
- Extreme hunger
- Constant itching
- Irritability

What can you do to lower your risk?
- Improve your overall health through diet and exercise.
- If you are overweight, it is important to lose weight to reduce your risk for diabetes.
- Improve your nutrition with a balanced diet. Talk to your dietician, transplant coordinator, and/or physician about the best diet for you.
- Exercise is an important treatment, particularly when combined with a weight loss program and stress reduction.
- Try to reduce stress. You may feel comfortable talking with your social worker, transplant coordinator, and/or physician about any increased stress you are experiencing after your transplant. They can help or refer you for additional counseling and advice.

If left untreated or uncontrolled, diabetes is related to heart disease, stroke, high blood pressure, blindness, kidney disease, and kidney failure. Severe problems with blood flow in small blood vessels also may lead to amputation.

RECURRENT HEPATITIS C

Unfortunately the hepatitis C virus is found in the blood and not just the liver, so a liver transplant is not a cure. Almost everyone transplanted because of Hepatitis C will have a recurrence of the virus in their blood.

The rate of progression is variable. It is unclear what all increases the rate of progression of the disease, but it is known that treatment of acute rejection has been associated with faster progression. About 25% of patients will develop significant recurrence of hepatitis C (seen on liver biopsy) in the new liver. Some patients will develop symptoms related to the hepatitis C shortly after transplantation. Two things lead to the quick recurrence; a high level of the virus in the blood at the time of transplantation, and the body’s inability to fight the virus because of the immunosuppression. Most people with recurrent hepatitis will develop cirrhosis within five years of their transplant, which is unfortunately much quicker than in non-immunosuppressed people. Luckily a person can live a long time, even with cirrhosis if they take good care of themselves.

Currently the only drug treatment for people with recurrent Hepatitis C disease is with interferon and ribavirin. How well a person responds to treatment is dependent on the type of hepatitis C (the genotype), the decreased rate of effectiveness with immunosuppression and the high rate of complications and side effects.
WRITING YOUR DONOR’S FAMILY

You no doubt are aware that sadness and loss have accompanied the gift of donation you received. And so you like many recipients, may be confused about what to say or do. You may want to express your gratitude, but may feel afraid that you will intrude or add to the donor family’s grief.

This guide is meant to address your concerns and provide you with instructions for corresponding with your donor family.

A Simple “Thank You” Means So Much…

“Thank You,” can say so much to donor families. It can say we deeply appreciate this precious gift. It can say this gift has been worthwhile. It can say someone’s life has been saved, and many people are grateful.

It can say we will always remember your generosity. It can say your loved one did not die without making a difference in this world.

Why Write to your Donor Family?
Experience shows that donor families want to know that their loved one’s gift has been received and it has made a difference in someone’s life. A letter from you can validate the gift of donation and may help them to bear the sorrow of their loss. A letter is not generally thought of as an intrusion as long as you communicate in a sensitive way.

There is no set timeline for corresponding. Some people want to communicate right away; some need time before they are ready.

The Family Resource Program of the Pacific Northwest Transplant Bank and your transplant social worker will facilitate correspondence with your donor family. It is our belief that donor families and recipients have the right to engage in mutually acceptable forms of communication, as they desire, with respect to confidentiality. There is no right or wrong way to approach this communication. And there is no timeline for your decision. The following are general guidelines for you to follow.

Guidelines for Communication
When writing to the donor family, you may:

- Acknowledge and express sympathy for the donor family’s loss.
- Thank the donor family.
- Use simple language.
- Share general information about your life, occupation, family and friends, hobbies and interests.
- Write about the transplant experience, and how it has affected your life.

Letters should remain anonymous. Don’t include last names, addresses, city names, phone numbers, or names of hospitals or physicians.

Place your completed letter in an unsealed envelope. Include a separate sheet of paper with your full name and your date of transplant. Mail the letter and separate sheet to your social worker. Your social worker will then mail your letter with the proper donor identification information to the Pacific Northwest Transplant Bank. They will then forward it to the donor family and send you a note indicating it was sent. The same process is true for any return correspondence from the donor family. The only way that you and your donor family could come to know each other’s identity is if you mutually agree to exchange that information.
Will the Donor Family Write Back?
Just as you had to make the decision to write to your donor family, the donor family also needs to decide whether they feel comfortable reading your correspondence and writing back. If you do not receive any return correspondence from the donor family, please remember that the donor family is coping with the loss of their loved one and that individuals handle grief in different ways. Even if they feel unable to communicate with you, they will always know that you cared.

If you need further information about writing to donor families, please call your transplant coordinator, social worker, or the Pacific Northwest Transplant Bank.

Letter From a Recipient

We could only imagine the pain that your family went through during your terrible loss. We are very sorry for the loss that you endured. It saddened us even more because our daughter was the same age.

My husband’s biggest goal was to see his only child married. Our daughter was married last Mother’s Day and my husband was in his glory walking her down the aisle. I don’t think there was a dry eye in the room when he danced with her.

Thank you doesn’t seem to say enough, but “Thank you” for raising a son who knew what his gift would mean to others.
From Donor Families

After saying yes to the question of donating my daughter’s organs, months afterwards I really had reservations. The pain of our loss was more than the joy of sharing. I wondered, was the gift of life given in vain? Until this past week, the question was still in our minds. A beautiful letter which meant so much was sent to us. Pains eased, the joy of sharing became very vivid in our minds. In death as in life, our daughter is helping others. If the same situation happens again, we would not hesitate to share.
WEB RESOURCES

American Heart Association (AHA)
National Center
7272 Greenville Avenue
Dallas, TX 75231-4596
(800) 242-8721
(Local and national AHA and the AHA cookbook are good sources of nutritional advice.)
www.americanheart.org

American Liver Foundation
1325 Pompton Avenue
Cedar Grove, NJ 07009
(201) 256-2550
(800) 223-0179
www.liverfoundation.org

International Transplant Nurses Society
Foster Plaza 5, Suite 300
651 Holiday Drive
Pittsburgh, PA 15220
www.itns.org

Transplant Recipients International Organization (TRIO)
1735 I Street NW, Suite 917
Washington, DC 20006
(202) 293-0980
(800) 874-6386
www.trioweb.org

United Liver Association
11646 West Pico Boulevard
Los Angeles, CA 90064
(310) 445-4202

United Network for Organ Sharing (UNOS)
The national organ procurement and transplantation network
700 North 4th St., P.O. Box 2484
Richmond, VA 23218
(804) 330-8500
www.unos.org
## Laboratory Tests that Monitor Liver Function

<table>
<thead>
<tr>
<th>Test</th>
<th>Normal Range*</th>
<th>Function</th>
<th>Indicates</th>
</tr>
</thead>
</table>
| **Total Bilirubin (T Bili)** | 0.1-1.2       | A substance made from the breakdown of hemoglobin; Red blood cells are trapped and destroyed in the spleen as they wear out. When these cells are destroyed, bilirubin is released into the blood. The liver then processes this bilirubin, combines it with another substance, and excretes the bilirubin through bile. Bile flows from the individual liver cells, through the bile ducts, and into the intestine where it leaves the body in the feces. The characteristic brown color of feces is due to bile. | ↑ Bile duct obstruction  
↑ May be a sign of rejection or infection |
| **Alkaline phosphatase**     | 45-129        | An enzyme produced by the liver (and other) cells; elevated blood levels of this substance may indicate abnormal function of the liver or other organs. | ↑ Bile duct obstruction  
↓ Malnutrition |
| **Alanine Transaminase**     | 9-57          | Enzyme which occurs in high concentration in the liver | ↑ Liver injury, rejection, biliary obstruction, mononucleosis, pancreatitis, myocardial infarction, severe burns, trauma |
| **Aspartate Transaminase**   | 14-44         | Enzyme present in tissues with high metabolic activity, including the heart, liver, muscles, kidney, brain, pancreas, lungs | ↑ Liver injury, rejection, myocardial infarction, pancreatitis, trauma |
| **Gamma Glutamyl Transferase (GGT)** | 9-59    | Enzyme present mainly in the liver, kidney, prostate and spleen | ↑ Liver injury, rejection, bile duct obstruction |
| **Albumin (Alb)**            | 3.5-5.0       | a protein made by the liver that helps maintain fluid balance in the body | ↓ Malnutrition |
| **Total Protein (TP)**       | 6-8.4         | Total of multiple types of proteins found in the blood. They are a source of nutrition and a buffer system. | ↓ Malnutrition, chronic liver dysfunction |
## Tests that Monitor Kidney Function & Electrolytes

<table>
<thead>
<tr>
<th>Test</th>
<th>Normal Range*</th>
<th>Function</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Urea Nitrogen (BUN)</td>
<td>7-23</td>
<td>BUN is a product of protein breakdown, or a waste product, normally excreted by the kidney.</td>
<td>↑ Kidney dysfunction, dehydration, high protein diet, side effect of some anti-rejection medications&lt;br&gt;↓ Liver disease, over-hydration</td>
</tr>
<tr>
<td>Creatinine (Cr)</td>
<td>0.6-1.1</td>
<td>Creatinine is a waste product produced by the muscles and released into the blood stream.</td>
<td>↑↓ Kidney dysfunction, side effect of some medications, dehydration&lt;br&gt;↓ Muscle wasting</td>
</tr>
<tr>
<td>Sodium (Na)</td>
<td>131-142</td>
<td>A mineral needed by the body to keep body fluids in balance</td>
<td>↓ Side effect of diuretics; kidney dysfunction</td>
</tr>
<tr>
<td>Potassium (K+)</td>
<td>3.5-5.0</td>
<td>A mineral required for normal body functioning; important in helping the heart, nerves, and muscles function properly; helps change carbohydrates into energy and in forming proteins</td>
<td>↑↓ Kidney dysfunction, side effect of some medications,&lt;br&gt;↓ Side effect of diuretics; decreased intake, vomiting</td>
</tr>
<tr>
<td>Magnesium (Mg++)</td>
<td>2-2.6</td>
<td>Mineral required for normal bodily function; involved in nerve, skeletal muscle, heart, and cell function; also involved in blood clotting and the metabolism of carbohydrates and proteins</td>
<td>↑↓ Kidney dysfunction,&lt;br&gt;↓ Diarrhea; side effect of medications</td>
</tr>
<tr>
<td>Glucose (Glu)</td>
<td>71-109</td>
<td>A type of sugar in the blood that supplies energy to the cell; glucose levels vary with diet, medications, stress, and organ dysfunction</td>
<td>↑↓ Diabetes, pancreas problem, side effect of some medications&lt;br&gt;↓ Occurs in liver disease or with thyroid problems</td>
</tr>
<tr>
<td>Calcium (Ca++)</td>
<td>8.4-10.4</td>
<td>A mineral measured in the blood that is required for bone growth and for blood clotting; also needed for the heart and nerves to function</td>
<td>↑↓ High intake of calcium; bone disorders, thyroid problem&lt;br&gt;↓ Kidney dysfunction, over hydration, problems with the pancreas, severe malnutrition</td>
</tr>
</tbody>
</table>
**Complete Blood Count (CBC)**

<table>
<thead>
<tr>
<th>Test</th>
<th>Normal Range*</th>
<th>Function</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Blood count (WBC)</td>
<td>4.4-10.8</td>
<td>Cells that fight infection; also involved in the rejection process</td>
<td>↑ May indicate infection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>↑ Side effect of some medications, stress</td>
</tr>
<tr>
<td>Hematocrit (hct)</td>
<td>Males 40-54%</td>
<td>Measures the percentage of oxygen-containing red blood cell (RBC)</td>
<td>↑ May cause blood clotting</td>
</tr>
<tr>
<td></td>
<td>Females 37-47%</td>
<td></td>
<td>↓ May be a sign of anemia</td>
</tr>
<tr>
<td>Hemoglobin (Hgb)</td>
<td>Males 12-18</td>
<td>The oxygen-containing part of the red blood cell (RBC)</td>
<td>↑ May indicate dehydration or a blood disorder</td>
</tr>
<tr>
<td></td>
<td>Females 12-16</td>
<td></td>
<td>↓ Can be a sign of anemia</td>
</tr>
<tr>
<td>Platelets (Plt)</td>
<td>150,000-350,000</td>
<td>Component of blood that helps stop bleeding</td>
<td>↑ Can make your blood “thick” and lead to clotting</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>↓ May be a sign of liver disease, bleeding, anemia</td>
</tr>
</tbody>
</table>
DEFINITIONS

**Albumin**
A protein made by the liver that helps maintain fluid balance in the body.

**Alkaline Phosphatase (Alk Phos)**
An enzyme produced by the liver (and other) cells; elevated blood levels of this substance may indicate abnormal function of the liver or other organs.

**Anemia**
Decreased capability of the red blood cells to deliver enough oxygen to the body tissues. It may be caused by a low number of red blood cells, decreased amount of hemoglobin or decreased volume of red blood cells.

**Antacid**
A drug that aids in protecting the digestive system and relieves heartburn and digestive discomfort.

**Antibody**
A protein produced by the body immune system to eliminate foreign substances, such as bacteria.

**B Cells**
A type of lymphocyte, or white blood cell that develops in the spleen that is responsible for the body’s immunity; B cells produce antibodies.

**Bacteria**
Small organism (germ) that can cause disease or infection.

**Bile**
A fluid produced by the liver, stored in the gallbladder, and released into the small intestine to help absorb dietary fats.

**Bile Ducts**
The tubes through which bile flows.

**Bile Leak**
A hole in the bile-duct system that causes bile to spill into the abdominal cavity.

**Biliary Stenosis**
Narrowing or constriction of a bile duct.

**Biliary Tree**
All passageways inside and outside the liver that carry bile to the intestines.

**Bilirubin**
An orange colored substance in bile produced by the breakdown of red blood cells.

**Blood Urea Nitrogen (BUN)**
A test that indicates kidney function. It is a product of protein breakdown normally excreted by the kidneys.

**Cadaveric Donor**
A recently deceased organ donor.

**Calcium**
A mineral measured in the blood that is required for bone growth and for blood clotting; also needed for the heart and nerves to function.

**Cholangiogram**
A test that examines the bile ducts in the liver for any leaks or blockages.

**Cholangitis**
A bacterial infection in the bile ducts.

**Cholestasis**
An accumulation of bile in the liver caused by medications, an injury to the liver, liver disease, total parenteral nutrition (TPN), or gallstones.

**Cholesterol**
A form of fat that performs necessary functions in the body, but can also cause heart disease. Cholesterol is found in animal foods such as meat, fish, poultry, eggs, and dairy products.

**Cirrhosis**
A disease causing irreversible scarring of the liver.

**CMV (Cytomegalovirus)**
A virus infection that is common in transplant recipients; it can affect the lungs and other organs as well; a member of the family of herpes viruses.
Coagulation
The process of blood clotting. The ability to clot is measured by the prothrombin time (PT), partial thromboplastin time (PTT) and platelet count.

Coagulopathy
Decreased ability to clot

Complete Blood Count (CBC)
A blood test that measures components of the blood including hemoglobin (Hgb), hematocrit (Hct), platelets (Plt), and the types of white blood cells (WBC)

Corticosteroids
A category of immunosuppressive medications that includes prednisone and prednisolone.

Creatinine
A substance found in blood and urine; it results from normal body chemical reactions; such as muscle metabolism. High blood creatinine levels are a sign of depressed kidney function.

Diabetes
A disease characterized by high levels of blood sugar.

Diabetic Nephropathy
Kidney disease or damage as a result of diabetes.

Dialysis
A process by which blood is cleaned to restore chemical balance.

Edema
Excess fluid in body tissues; swelling of the ankles, for example, is a sign of edema.

EGD (esophagogastroduodenoscopy)
A diagnostic endoscopic procedure that visualizes the upper part of the GI tract to the duodenum

Electrocardiogram (ECG or EKG)
A recording of the electrical activity of the heart.

Electrolyte
A dissolved mineral such as sodium, potassium, magnesium, etc that helps maintain bodily functions and fluid balance.

Endoscopy
A small telescope-like instrument that is used to examine the esophagus, stomach and small intestine.

Endotracheal Tube
A tube inserted through the mouth and into the windpipe to aid a person in breathing.

Enzyme
A protein made in the body and capable of changing a substance from one form to another.

ERCP
Endoscopic retrograde cholangio-pancreatogram; test that examines the drainage system or ducts of the gallbladder, pancreas, and liver (the biliary tree)

Fibrosis
The presence of fibrous tissue in the liver that causes scarring and liver dysfunction; fibrosis develops into cirrhosis.

Gallbladder
A muscular sac attached to the liver; stores bile. This is removed during transplant.

Gastroenterologist
A doctor who specializes in the diagnosis, treatment, and management of diseases of the digestive system, including the liver

Gastrointestinal (GI)
The tract between the mouth and the rectum, including the intestines and stomach.

Glomerular Filtration Rate (GFR)
A test that determines the level of kidney function.

Glucose
A type of sugar in the blood that supplies energy to the cell; levels vary with diet, medications, stress, and organ dysfunction

Graft
A transplanted tissue or organ, such as a liver or kidney. A graft between humans or the same species with different genetic material is called an allograft. A graft between different species, such as a baboon to human, is called a xenograft.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>Helper T-cell</td>
<td>The white blood cell that tells the immune system to fight infection or foreign substances, such as transplanted tissue.</td>
</tr>
<tr>
<td>Hematocrit</td>
<td>Measurement of the amount of red blood cells in the blood.</td>
</tr>
<tr>
<td>Hematoma</td>
<td>A bruise or swelling caused by the accumulation of blood in tissue.</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>A substance in red blood cells containing iron and protein that gives blood its characteristic red color; carries oxygen from the lungs to the tissues and carbon dioxide from the tissues to the lungs.</td>
</tr>
<tr>
<td>Hepatic</td>
<td>Relating to the liver.</td>
</tr>
<tr>
<td>Hepatitis</td>
<td>Liver inflammation that may be caused by a virus or chemical such as alcohol.</td>
</tr>
<tr>
<td>Hepatologist</td>
<td>A physician who studies the liver and treats liver disease.</td>
</tr>
<tr>
<td>Hepatomegaly</td>
<td>An enlarged liver.</td>
</tr>
<tr>
<td>Herpes</td>
<td>A family of viruses that infect humans: herpes simplex causes lip and genital sores; herpes zoster causes chickenpox and shingles.</td>
</tr>
<tr>
<td>Hirsutism</td>
<td>Excessive hair growth; a common side effect of cyclosporine seen in both male and female transplant recipients who receive cyclosporine.</td>
</tr>
<tr>
<td>Hypertension</td>
<td>High blood pressure.</td>
</tr>
<tr>
<td>Hypotension</td>
<td>Low blood pressure.</td>
</tr>
<tr>
<td>Immune System</td>
<td>The system that protects the body from invasion by foreign substances, such as bacteria and viruses, and from cancer cells.</td>
</tr>
<tr>
<td>Immunity</td>
<td>A condition of being able to resist a particular infectious disease.</td>
</tr>
<tr>
<td>Immunosuppression</td>
<td>Decrease of the body’s immune response, accomplished through the use of certain drugs in order to help prevent or control a rejection following a transplant.</td>
</tr>
<tr>
<td>Immunosuppressive Agents</td>
<td>Medications taken to prevent rejection of a transplanted organ.</td>
</tr>
<tr>
<td>Insulin</td>
<td>A hormone produced by the pancreas that regulates blood sugar levels.</td>
</tr>
<tr>
<td>Intravenous (IV)</td>
<td>Refers to fluids or medications administered to patients directly into a vein via a needle or catheter.</td>
</tr>
<tr>
<td>Jaundice</td>
<td>Yellowing of the skin and eyes caused by excess bile products in the blood.</td>
</tr>
<tr>
<td>Kidney Failure – Chronic</td>
<td>Diminished kidney function over time that is irreversible.</td>
</tr>
<tr>
<td>Leukocyte</td>
<td>A white blood cell that helps fight infection.</td>
</tr>
<tr>
<td>Liver Enzymes</td>
<td>Substances produced by the liver and released into the blood; these are measured to assess liver function.</td>
</tr>
<tr>
<td>Liver Function Tests (LFTs)</td>
<td>Blood tests used to determine how well the liver is functioning; includes the ALT, AST, GGT, bilirubin, and alkaline phosphatase.</td>
</tr>
<tr>
<td>Lymphocyte</td>
<td>Cells produced by the lymph glands that are responsible for immunity and defending the body against infection and foreign substances by producing antibodies and other substances.</td>
</tr>
<tr>
<td>MRCP (Magnetic resonance cholangio-</td>
<td></td>
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</tbody>
</table>
pancreatography
An alternative for Endoscopic retrograde cholangio-pancreatogram; test that examines the drainage system or ducts of the gallbladder, pancreas, and liver (the biliary tree) using an MRI

Nephrologist
A physician who specializes in diagnosing and treating kidney disease.

Neutrophil
A type of white blood cell.

Platelet
A small blood cell needed for normal blood clotting.

PTLD
Post-transplant lymphoproliferative disease; a wide spectrum of viral disorders associated with the Epstein Barr Virus (EBV) that may range from a self-limiting mononucleosis (“mono”) to a type of lymphoma, or cancer of the lymph nodes; a complication of a suppressed immune system; Treatment includes lowering immunosuppression and administering antiviral medications.

Pneumocystis Carinii Pneumonia (PCP)
A type of pneumonia seen primarily in patients whose immune systems are suppressed.

Potassium
A mineral essential for body function. High potassium levels can irritate the heart. Poor kidney function and side effects of immunosuppressive medication is often associated with high potassium levels.

Prophylactic Medication
Medication taken to help prevent disease.

Red Blood Cells
The part of the blood that transports oxygen to body tissues.

Renal
Refers to the kidney.

Rejection
When the immune system attacks the transplant organ (liver, kidney, etc.) to rid the body of it because it is recognized at a foreign object.

Sepsis
A severe infection that has spread to the bloodstream.

Shingles
A herpes virus infection (herpes zoster) causing painful blistering skin eruptions along a nerve track in one area of the body.

Signs
Things you or someone else can see that are determined by measurement, such as an increase in temperature or blood pressure.

Sodium
A mineral needed by the body to keep body fluids in balance.

Stricture or Stenosis
Narrowing of a passage in the body.

Systolic Blood Pressure
The top number when the blood pressure is measured. This is the pressure when the heart muscle contracts.

T Cells
White blood cells that play a major part in rejection.

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

Thrombosis
The development of a blood clot.

Thrush
A fungus infection in the mouth.

Tissue Typing
Identifying a person’s major antigens used to evaluate the match between a donated organ and a potential recipient via a blood test.

Toxins
Waste products in the blood that is poisonous to the body in high concentrations.

Turcotte Tube
A tube placed in the bile duct that allows bile to drain into a bag outside the body.

Ultrasound
A method of picturing internal organs using sound waves. It is often used to detect masses, abscesses, organ size, or blood flow to a transplanted organ.

**Urinary Catheter**
A soft rubber tube that is inserted into the bladder to drain urine.

**Urinary Tract**
The body system that produces, transport, stores and eliminates urine. The urinary tract includes the kidneys, ureter’s, bladder and urethra.

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**United Network for Organ Sharing (UNOS)**
The national body that sets policies for organ allocation in order to ensure fairness. UNOS also maintains statistics on different transplant programs and collects scientific data on transplant recipients and donors. Machine that helps a patient breathe.

**Virus**
A very small agent (germ) that causes infection.

**Wean**
To slowly withdraw or reduce; immunosuppression, particularly steroids, may be weaned slowly over time in patients who have stable function of the transplanted liver.

**White Blood Cells**
Cells in the blood that fight infection; part of the immune system.

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**Acknowledgements**
INTS International Transplant Nurses Society