

PATIENT HEALTH GUIDE AFTER LIVER TRANSPLANTATION

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CONTACT INFORMATION

Solid Organ Transplant Clinic
Gordon and Leslie Diamond Health Care Centre
2775 Laurel Street – 5th Floor
Vancouver, British Columbia
V5Z 1M9

	Telephone number	Hours of Operation
Transplant Clinic	(604) 875-4439	
Transplant Nurses	Irene: 604-875-4111 Ext: 68752 Jo-Ann: 604-875-4111 Ext: 66630 Ali: 604-875-4111 Ext: 21482 Sophie: 604-875-4111 Ext: 23199	Monday-Friday 7:30AM - 3:00PM
Transplant Pharmacy	(604) 875-5692	
After Hours Emergency Number	(604) 877-2240	Monday – Friday 3:00PM - 7:30AM Any time on weekends and statutory holidays

LIST OF PHARMACIES IN BC

That Dispense Medications for BC Transplant Patients

Pharmacy	Address	Phone
Ambulatory Pharmacy Paul's Hospital	St. 1081 Burrard Street Vancouver BC V6Z 1Y6	604-806-8151
Kipp-Mallery Pharmacy	273 Victoria Street Kamloops BC V2C 2A1	250-372-2531
London Drugs Pharmacy	#196 - 1600 15th Avenue Prince George BC V2L 3X3	250-561-1118
Solid Organ Transplant Pharmacy Gordon & Leslie Diamond Centre Vancouver General Hospital	5 th Level, 2775 Laurel Street Vancouver BC V5Z 1M9	604-875-5692
Somerset Medical Centre Pharmacy	#7 - 13791 72nd Avenue Surrey BC V3W 9Y9	604-590-5587
Lakeside Clinical Pharmacy	112A - 2365 Gordon Avenue Kelowna BC V1W 3C2	250-860-3100
Royal Jubilee Prescriptions Royal Jubilee Hospital	DT1200-1952 Bay Street Victoria BC V8R 1J8	250-370-8153
Ambulatory Care Pharmacy BC Children's Hospital	4480 Oak Street Vancouver BC V6H 3V5	604-875-2205
Shoppers Drug Mart # 271	#271 - 1305 Cedar Street Trail BC V1R 4C3	250-368-3343
Central Drugs	Unit #16 2220 Bowen Road Nanaimo BC V9S 1H9	250-758-7711
Newgen PharmaChoice	100 – 1945 McCallum Road Abbotsford BC V2S 3N2	604-859-2351
Wellness Pharmacy #2	104 – 22314 Fraser Hwy Langley BC V3A 8M6	604-530-5300
City Centre Pharmacy	101 – 399 Main Street Penticton BC V2A 5B7	250-770-0047

CLINIC VISIT OVERVIEW

Before The Visit:

- Nothing to eat or drink (except water) after midnight until lab work completed on day of your visit. **Do not stop drinking water even when fasting!**
- **DO NOT** take your **morning** medications until your blood work is completed, but DO bring them with you to take after your lab work.
- Go to the Diamond Center laboratory for blood work at 7:30 AM.
- After blood work is done, come up to 5th Floor, SOT Clinic and sign in at Reception Desk.
- You will be seen by the nurse, physician, pharmacist and possibly the dietitian and social worker on your first visit.
- The doctor will tell you how often you need to do your lab work and when to return to the clinic for your next visit.
- Make a return appointment with our clerical staff at the front Reception Desk before leaving.

Bring the Following with You:

- Morning medications (to be taken after blood work is drawn).
- List of medications you are currently taking; if your medications are blister packed, bring your current pack.
- Records of your blood pressure and blood sugar (if you are diabetic).
- Something to eat and drink after your blood work is drawn.
- Bring any insulin and or pain medication that you may need to take while waiting. We do not stock these medications here.
- Something to read/watch while waiting to see the physicians.

STEP 1: Bloodwork

- Arrive at the **lab** on the main floor of the Diamond Centre at 7:00-7:30AM; identify yourself as a transplant patient to the receptionist, ask for “pre-clinic” blood work to be drawn. Also give a urine sample on your first lab visit – urine test is to be done ONCE every 3 months

STEP 2: Take Medications

- Take your **morning** medications **after** your blood work has been drawn.

STEP 3: Sign-In

- Proceed to the **5th floor** of the Diamond Centre to the **Solid Organ Transplant Clinic**; check in with the receptionist and wait to be seen by a clinic nurse.

STEP 4: Meet with the Nurse

- The clinic nurse will complete an assessment and medication review and then you will wait to be seen by a physician.

STEP 5: Meet with the Physician

- The physician will advise you when to return to the clinic and how often the blood work needs to be done.

STEP 6: Meet with Allied Healthcare Professionals

- You may also see other members of the transplant team during any of your clinic visits: pharmacist, social worker, dietitian, psychologist etc.

STEP 7: Pick Up Medications If Running Out

- Order medications that are supplied by the Transplant Pharmacy
- Wait to pick up your medications once filled

STEP 8: Book the Next Appointment

- Make an appointment with the receptionist on your way out.

- The transplant nurse will call you in the afternoon, after your clinic visit, if your anti-rejection medication dose needs to be changed (results for the tacrolimus level drawn in the morning are only available in the afternoon). Please confirm receiving the message even if off hours.

Home Monitoring

- It is important to check your temperature at least twice daily in the early post-transplant period. If your temperature is 37.5 C (99 F) or greater, wait one hour and check it again. If it remains elevated, call the SOT Clinic or the BC Transplant Society answering service.
- Wound Care – monitor your incision for redness, drainage and increased pain.

SIGNS OF INFECTION
Temperature > 37.5 C (99 F)
Redness, swelling, discharge, ↑ pain
Nausea, vomiting, diarrhea
Coughing up green/yellow sputum
Burning/stinging sensation on urinating

MEDICATION GUIDE

GENERAL INFORMATION

Before discharge from the hospital

Before discharge from the hospital a transplant pharmacist will discuss your medication regimen and provide you with:

- a medication calendar
- a supply of your anti-rejection medications
- a prescription for the rest of your medications

Your transplant and some antiviral medications will be refilled at the transplant clinic or a designated BC Transplant partner pharmacy (See *List of Pharmacies in BC*).

Ordering Medications

Please monitor home supply of transplant and antiviral medications. To assist the work flow efficiency in the transplant pharmacy please follow these instructions:

- Phone ahead to place your order **2 to 3 days** before your appointment or intended day of pick-up.
- Know the **name, directions** and **exact quantity** on hand for the medications you are ordering.
- Patients who place phone orders will be given priority over those who walk in to order. (See *Contact Information* for Pharmacy hours and telephone number).
- Patients residing outside of Vancouver may request pick up of transplant medications at one of the designated pharmacies (see the list above) or arrange delivery by courier by contacting LOOMIS (1-855-256-6647). Courier charges are not covered by BC Transplant. If medications are ordered to be picked up by a courier, we recommend that you place your medication order 2 weeks in advance.

Medication cost

Register with Fair PharmaCare to take advantage of government coverage. To apply visit: <http://www.health.gov.bc.ca/pharmacare/fpcreg.html>. To check if you have coverage call (604) 683-7151 (from Vancouver) or 1-800-663-7100 (toll-free anywhere else in B.C.)

The following medications are covered by BC Transplant and may be refilled at the transplant clinic or a designated BC Transplant partner pharmacy (See *List of Pharmacies in BC*):

Type	Name
Immunosuppressant/ Anti-Rejection	Tacrolimus
	Mycophenolate
	Prednisone
	Azathioprine
	Cyclosporine
	Sirolimus
Anti-Viral	Valganciclovir
	Lamivudine
	Entecavir
	Tenofovir

All other medications must be purchased at any pharmacy of your choice. You may request for your medications to be compliance packed (blister packed) free of charge. (NOTE: Not all medications can be blister packed (please consult a transplant pharmacist).

How to Take Your Medications

Take all and especially your anti-rejection medications at the **same time every day** to avoid missing doses and to keep consistent blood levels of the drug in your body.

Check with your transplant pharmacist before starting any new prescription and non-prescription medications as well as supplements and complementary alternative medicines.

Missed Doses

If you miss a dose take your medication as soon as you remember and then take your next dose at the regularly scheduled time. If it is almost time for your next dose, skip the missed dose and continue with your regular schedule. Do not double or take extra doses. If you **missed more than 1 day** of antirejection medications contact your transplant team immediately for further instructions (see *Contact Information*).

Storage

Store your medications in a cool, dry place away from sunlight. Do not store them in the bathroom or kitchen because moisture and heat may interfere with the effectiveness of some medications. Do not refrigerate your medications unless instructed to do so by your pharmacist. Keep medications in a safe place out of reach of children and pets.

Pregnancy

Before planning a pregnancy talk with your transplant physician. Use a safe method of contraception to avoid unplanned pregnancies.

Alcohol, Smoking, and Illegal Drugs

Do not drink alcoholic beverages including non-alcoholic beer and wines as they still contain small amount of alcohol. Alcohol is broken down by the liver and can cause liver damage as well as liver failure. Most medications are metabolized within the liver and the combination of these medications with alcohol could seriously harm your liver.

You must refrain from smoking. Studies have shown that transplant recipients who smoke are at increased risk of tobacco's adverse effects including heart disease, stroke and blood clot formation in the liver, which can lead to liver failure and death.

Do not take illegal drugs **including marijuana**. Smoking marijuana exposes your lungs to harmful fungal infections that can be life threatening. Cannabis is also known to worsen fat deposits and scar formation in the liver.

If you are having trouble living without alcohol or drugs, this can be a life-threatening situation. Please contact your doctor or transplant social worker.

ANTI-REJECTION MEDICATIONS

Anti-rejection medications, suppress your body's natural defence system (immune system) to prevent it from recognizing your transplant as a "foreign invader" and attacking it. The result of such an attack is **rejection**. By taking these medications your immune system is lowered enough for you to safely keep your organ. It is essential that you take anti-rejection medications at the **same time every day** and **12 hours apart** to avoid missing doses and to keep consistent blood levels of the medication in your body. You may take your anti-rejection medications with food. Make sure that you understand the directions. Never change your dose unless your physician tells you to do so.

Please ensure blood work and anti-rejection levels are done 30 min prior to your morning dose. For example, if you take your tacrolimus at 8am and 8pm, you need to do blood work at 7:30 am. Accurate timing of blood work is very important in interpreting your lab results.

Many prescription and non-prescription medications as well as naturopathic and homeopathic products (e.g. herbal medications) and vitamins don't mix safely with anti-rejection medications; please inform your healthcare providers (e.g. family doctor, dentist, community pharmacist) that you are taking anti-rejection medications so they can tailor your other therapies accordingly. Your healthcare providers should phone your Solid Organ Transplant clinic to check safety of starting any new therapy.

Avoid grapefruit or grapefruit juice while on this medication due to a serious interaction.

If you throw up within **30 minutes** of taking your anti-rejection medications or see any of your anti-rejections medications in the vomit repeat the dose again. If you throw up more than one hour after taking your medication do not repeat the dose, wait until your next dose.

Cytotoxic Safety Precautions at Home

This information is provided to advise you of safety precautions to be followed at home while taking any one of the following medications: ***tacrolimus, cyclosporine, mycophenolate, azathioprine or sirolimus.***

These medication(s) are beneficial for your treatment, but can be harmful to healthy cells in the body of those who are **not** taking them. These precautions are recommended for the safety of others around you.

After taking your medication(s), they remain in your body for several days and are gradually removed in your urine and stool. However, small amounts may also be present in other body fluids such as blood, saliva, sweat, vomit, semen, vaginal fluids and breast milk. While the risk is very low, it is important to follow the following recommendations:

- Family and friends can be near you, but they should avoid contact with your medications.
- After using the toilet put the lid down before flushing, flush twice and wash hands with soap and water.
- Family members should wear gloves and wash hands thoroughly when handling items or cleaning up anything that has become soiled with **significant** amount of your body fluids, vomit or anti-rejection medication spills.
- Clothing and bedding that is soiled with **significant** amount of body fluids should be handled with disposable gloves, placed in a separate laundry bag and washed in a separate load from other family member's laundry.
- Dishes and cutlery **do not** have to be washed separately.
- Casual contact such as hugging, touching and kissing are safe.
- Sexual activities are safe for you and your partner once your incision has healed.
- Because small amounts of medication may be present in semen and vaginal fluids, it is recommended that a condom or a female condom be used to prevent body fluids from coming in contact with your partner.
- Pregnancy and any family planning should be avoided until discussed with the transplant team.
- Ask your doctor or pharmacist for the most up to date information about breast-feeding.
- Unused and expired medications should be returned to the hospital or your drug store for disposal. Do not flush them down the toilet or discard in your garbage.

For more information about medications please contact your transplant clinic.

TACROLIMUS

BRAND NAMES: PROGRAF[®], ADVAGRAF[®]

[tak-row-lim-us]

Tacrolimus is available in the following formulations:

- Tacrolimus IMMEDIATE release (PROgraf[®]), a twice daily capsule
- Tacrolimus EXTENDED release (ADVAgRAF[®]), a once a day capsule
- Tacrolimus oral suspension (prepared by transplant pharmacy)

What is this medication for?

Tacrolimus is a medication used to lower your body's immune system to prevent your transplanted organ from being rejected. It makes your white blood cells weaker so they cannot damage the new organ.

How should I take this medication?

Tacrolimus should be taken **with food** to decrease stomach upset, but may be taken on an empty stomach if preferred. Be consistent, if you take it with food, always take it with food; if you take it on an empty stomach, always take it on an empty stomach.

Do not take calcium supplements or antacids (Diovol[®], Maalox[®], etc.) within 2 hours of tacrolimus as antacids may decrease the absorption of the medication by the body. You may take tacrolimus at the same time with stomach acid reducing medications (e.g. ranitidine (Zantac[®]), pantoprazole (Tecta[®]) etc.).

Tacrolimus blood levels should be drawn 30min prior to taking your morning dosage; that is, 11.5 hours after your evening dosage. For example, if you take your tacrolimus at 8am and 8pm, you need to do blood work at 7:30 am. Accurate timing of blood work is very important in interpreting your lab results. **Do not take the morning dose of tacrolimus until after your blood sample is taken.**

Avoid grapefruit or grapefruit juice while on this medication due to a serious interaction.

What are some possible side effects of this medication?

Side Effect	Management
Tremor, shakiness, headache, seizures	Presence of these side effects may be a sign of high tacrolimus levels. Report these symptoms to your doctor. These side effects will go away when your doctor adjusts the dose.
High blood pressure	Check your blood pressure regularly. Avoid foods high in salt or sodium.
High blood sugar	If you are diabetic, make sure you monitor your sugars regularly. Report any numbness or tingling in your hands or feet, increased thirst, dry mouth, fruity odour on your breath, or increased urinary frequency to your doctor.
Heartburn, nausea, vomiting	Check with your doctor if any of these are bothersome or persistent.
Mood changes, depression, confusion, difficulty sleeping, abnormal dreams	Check with your doctor if any of these are bothersome or persistent.
Thinning or loss of hair	Report these symptoms to your doctor.
Your body's ability to handle illness or injury is weakened by tacrolimus	Check with your doctor if you have an infection, illness or injury or are experiencing fever, chills, sore throat or other symptoms of a cold or flu.
Decrease in kidney function	High tacrolimus levels may decrease your kidney function. Notify your doctor if you notice any changes in your urine or the amount produced. Keep hydrated and drink at least 1.5 Liters of water per day; unless otherwise instructed by your physician.
Cancer	Taking this medication may increase your risk of skin and other cancers. Please inform your transplant team if you are diagnosed with cancer. For additional information please see section on "Cancer Risk".

MYCOPHENOLATE

BRAND NAMES: NOVO-MYCOPHENOLATE[®], MYFORTIC[®]

[my-ko-fen-o-late]

Mycophenolate is available in the following formulations:

- Mycophenolate Mofetil (Novo-Mycophenolate[®]) tablet and capsules
- Mycophenolate Sodium (Myfortic[®]) tablets
- Mycophenolate oral suspension (CellCept[®])

NOTE: Majority of transplant patients will receive Mycophenolate Mofetil (Novo-Mycophenolate[®]) after transplantation. Some may be switched to Mycophenolate Sodium (Myfortic[®]) if they did not tolerate the other formulation.

What is this medication for?

Mycophenolate lowers your immune system in order to prevent rejection of your transplanted organ. It prevents an increase in the number of white blood cells that could attack and damage your new organ.

How should I take this medication?

Mycophenolate should be taken **with food** to decrease stomach upset.

Do not take antacids (eg: Gaviscon[®], Tums[®], Maalox[®], Diovol[®], etc) within 2 hours of mycophenolate as antacids may decrease the absorption of the medication by the body. You may take mycophenolate at the same time with stomach acid reducing medications (e.g. ranitidine (Zantac[®]), pantoprazole (Tecta[®]) etc.).

What are some possible side effects of this medication?

Side Effect	Management
Heartburn, diarrhea, nausea, vomiting	Make sure you take mycophenolate with food. Diarrhea often starts after a few months of taking mycophenolate. Notify your doctor if diarrhea persists or if it is very bothersome.
Mycophenolate can lower the number of your white blood cells, red blood cells and platelets.	Regular blood work will be done to check your blood cell counts. Check with your doctor if you have any:
You may be at an increased risk for infection and bleeding.	<ul style="list-style-type: none">• Signs or symptoms of infection (fever or chills, cough, sore throat or pain or difficulty passing urine)• Signs of bleeding (bruising, tarry stools, vomiting of blood or blood in the urine)• Signs of decreased red blood cells (weakness or tiredness, fainting spells, light-headedness)
Cancer	Taking this medication may increase your risk of skin and other cancers. Please inform your transplant team if you are diagnosed with cancer. For additional information please see section on “Cancer Risk”.

AZATHIOPRINE

BRAND NAME: IMURAN®

Azathioprine is available as an oral tablet and suspension.

What is this medication for?

Azathioprine lowers your immune system in order to prevent rejection of your transplanted organ. It prevents an increase in the number of white blood cells that could attack and damage your new organ.

How should I take this medication?

Azathioprine may be taken with or without food. Taking it with food will decrease stomach upset. Be consistent, if you take it with food, always take it with food; if you take it on an empty stomach, always take it on an empty stomach.

Do NOT take medications for gout called allopurinol (Zyloprim®) and febuxostat (Uloric®) while on azathioprine; this may result in very severe side effects!

What are some possible side effects of this medication?

Side Effect	Management
Nausea, vomiting, diarrhea	Take azathioprine with food. These side effects usually resolve with continued use. Notify your doctor if symptoms persist or are very bothersome.
Azathioprine can lower the number of your white blood cells, red blood cells and platelets. You may be at an increased risk for infection and bleeding.	Regular blood work will be done to check your blood cell counts. Check with your doctor if you have any: <ul style="list-style-type: none">• Signs or symptoms of infection (fever or chills, cough, sore throat or pain or difficulty passing urine)• Signs of bleeding (bruising, tarry stools, vomiting of blood or blood in the urine)• Signs of decreased red blood cells (weakness or tiredness, fainting spells, light-headedness)
Elevated liver tests	This is an <u>uncommon</u> side effect. Notify your doctor if you experience yellow coloured skin or eyes or stomach or abdominal pain. You will have regular blood work done to monitor your liver function.
Hair thinning or loss	Check with your doctor if any of these are bothersome or persistent.
Cancer	Taking this medication may increase your risk of skin and other cancers. Please inform your transplant team if you are diagnosed with cancer. For additional information please see section on “Cancer Risk”.

CYCLOSPORINE

BRAND NAME: NEORAL®

Cyclosporine is available in the following formulations:

- Cyclosporine capsules
- Cyclosporine oral solution

What is this medication for?

Cyclosporine is a medication used to lower your body's immune (defense) system. It is used to prevent your transplanted organ from being rejected. It makes your white blood cells weaker so that your body will not reject the new organ.

How should I take this medication?

Cyclosporine should be taken with food to decrease stomach upset, but may be taken on an empty stomach. Be consistent, if you take it with food, always take it with food; if you take it on an empty stomach, always take it on an empty stomach.

If you are taking the oral liquid you may add the medication to a glass or ceramic container (**NOT plastic**) half full of apple or orange juice (**NOT grapefruit juice**) to improve the taste. Drink the liquid immediately after mixing. After drinking all of the liquid containing the medication, add some more liquid to the glass and drink it to be sure you get the full dose of your cyclosporine. After you have measured your dose, dry the outside of the dropper with a clean tissue. Do not rinse the dropper with water or any other liquid. Do not throw the dropper away, as you only get ONE dropper per bottle. This dropper is specifically designed to be used with the cyclosporine.

What are some possible side effects of this medication?

Side Effect	Management
Nausea, vomiting, stomach discomfort	Check with your doctor if any of these are bothersome or persistent.
High blood sugar	If you are diabetic, make sure you monitor your sugars regularly. Report any numbness or tingling in your hands or feet, increased thirst, dry mouth, fruity odour on your breath, or increased urinary frequency to your doctor.
Tremor, shakiness, headache	May be a sign of high cyclosporine levels. Report these symptoms to your doctor.
High cholesterol level	Eat healthy, well-balanced meals. Eat foods lower in fat and sugar content. Ask the dietitian to help you with an eating plan.
Your body's ability to handle illness or injury is weakened by cyclosporine	Check with your doctor if you have an infection, illness or injury or are experiencing fever, chills, sore throat or other symptoms of a cold or flu.
Cyclosporine can cause unusual growth of gum tissue and cause your gums to bleed	Brush and floss your teeth daily and visit your dentist regularly. Report these symptoms to your doctor.
Acne or other skin changes, excessive hair growth on face or body	Report these symptoms to your doctor.
Cancer	Taking this medication may increase your risk of skin and other cancers. Please inform your transplant team if you are diagnosed with cancer. For additional information please see section on "Cancer Risk".

PREDNISONE, PREDNISOLONE, METHYLPREDNISOLONE

Prednisone is available as an oral tablet.

PrednisolONE is available as an oral liquid.

Methylprednisone is available as an injection administered into the veins.

What is this medication for?

Prednisone, prednisolONE and methylprednisolone are also referred to as corticosteroids or “steroids”. These “steroids” are different from the type used by some athletes. They are used for their anti-inflammatory and immunosuppressive effects. They lower your immune system and prevent rejection. They can also treat mild acute rejection when given in high doses.

How should I take this medication?

Always take prednisone and prednisolONE with food or milk to prevent stomach upset.

If you take prednisone and prednisolONE just once a day, take your dose in the morning with breakfast. This mimics your body’s natural rhythm of steroid production.

Methylprednisolone is an injectable medication routinely given in large doses during your transplant operation and in the first few days following surgery to prevent rejection.

You may be started on high doses of prednisone, prednisolONE or methylprednisolone in case of acute rejection. The dose will be decreased gradually to the smallest effective dose, but you may need to continue this small dose indefinitely.

What are some possible side effects of this medication?

NOTE: Majority of the side effects only appear when prednisone, prednisolONE or methylprednisolone is taken at high doses for a long period of time. When taken for short periods of time or at really low doses, most side effects are rare.

Side Effect	Management
Heartburn or nausea, stomach ulcers	Take prednisone and prednisolone with food or milk. Your doctor may put you on a medication to protect your stomach (ranitidine (Zantac®) or pantoprazole (Tecta®)).
Swelling or high blood pressure	Avoid salty foods, elevate your feet when sitting, check your blood pressure regularly.
High blood sugars, especially in patients with diabetes	Check your blood sugar regularly if you are diabetic.
Increased appetite / weight gain	Eat healthy, well-balanced meals, eat foods that are lower in fat and avoid high calorie snacks like chips, chocolate bars and sugared drinks. Ask the dietitian to help you with an eating plan.
Bone loss (osteoporosis) can occur with long-term use	Taking calcium, vitamin D can help prevent osteoporosis.
Changes in behaviour including trouble sleeping, decreased mood, nightmares, nervousness	Other medications can be used to help with these symptoms if they are very bothersome.
Vision changes, cataracts, glaucoma	It is important to have regular eye examinations.
Changes in appearance (rounder face, more fat deposits around waist and the back of the neck, stretch marks, acne on face, back and chest)	These symptoms usually appear if you take high doses for a prolonged period of time. These changes do not last long and will start to improve after your steroid dose is reduced.
Slower wound healing	Inform your transplant doctor if this becomes an issue.

SIROLIMUS

BRAND NAME: RAPAMUNE®

Sirolimus is available as an oral tablet and an oral solution.

What is this medication for?

Sirolimus is a medication used to lower your body's immune (defense) system. It is used to prevent your transplanted organ from being rejected. It prevents an increase in the number of white blood cells that could attack and damage your new organ.

How should I take this medication?

Sirolimus may be taken with or without food. Taking it with food will decrease stomach upset. Be consistent, if you take it with food, always take it with food; if you take it on an empty stomach, always take it on an empty stomach.

When having sirolimus blood levels drawn, do not take the morning dose of medication until after your blood sample is taken.

Avoid grapefruit or grapefruit juice while on this medication due to a serious interaction.

What are some possible side effects of this medication?

Side Effect	Management
High cholesterol level	Eat healthy, well-balanced meals. Eat foods lower in fat and sugar content.
High blood pressure	Check your blood pressure regularly. Avoid foods high in salt or sodium.
<p>Sirolimus can lower the number of your white blood cells, red blood cells and platelets.</p> <p>You may be at an increased risk for infection and bleeding.</p>	<p>Regular blood work will be done to check your blood cell counts. Check with your doctor if you have any:</p> <ul style="list-style-type: none"> • Signs and symptoms of infection (fever or chills, cough, sore throat or pain or difficulty passing urine) • Signs of bleeding (bruising, tarry stools, vomiting of blood or blood in the urine) • Signs of decreased red blood cells (weakness or tiredness, fainting spells, light-headedness)
Swelling	Check with your doctor if you experience persistent weight gain or swelling around the ankles, hands, or eyes. Avoid foods high in salt or sodium.
Mouth ulcers	Practice good oral hygiene. Rinse mouth thoroughly after taking the medication. Contact your doctor if ulcers occur as your dose of sirolimus may need to be reduced. Anti-inflammatory mouth rinses/pastes can be prescribed to resolve mouth ulcers and reduce pain.
Skin rashes or acne	Contact doctor immediately if skin rash occurs.
Lung problems	Contact doctor immediately if any of the following occur: shortness of breath, chest pain, nagging cough, fever that is not related to another illness.
Cancer	Taking this medication may increase your risk of skin and other cancers. Please inform your transplant team if you are diagnosed with cancer. For additional information please see section on “Cancer Risk”.

REJECTION

What is rejection?

It is likely you will experience an episode of rejection. It is referred to as an episode of rejection because it is usually a temporary, reversible event. Your body's defense system – immune system – protects you from “foreign invaders” such as bacteria, viruses and fungi. When a new organ is introduced into your body your immune system may recognize it as a “foreign invader”. This triggers an immune response as a result of your body's immune cells attacking the cells of your new organ. This attack is called rejection.

One of the most common causes of rejection is skipping your doses of anti-rejection medications or taking them differently from how they were prescribed. This allows your immune system to become stronger and start rejecting your organ.

What are the signs of liver transplant rejection?

Most of the time the symptoms are very mild and may not be easily recognized. Inform your transplant team ***immediately*** if you have any of the following:

- Malaise or tiredness
- Low grade fever
- Loss of appetite
- Nausea and vomiting
- Abdominal pain or tenderness
- Dark yellow or orange urine
- Clay-coloured stools
- Jaundice (yellow colour of the skin and eyes)

How is rejection diagnosed?

A transplant biopsy may be performed. A local anesthetic will be administered over the area of transplant to numb it, then a doctor will insert a special needle into your transplanted liver under the guidance of an ultrasound to extract a very small piece of tissue to be examined under microscope.

How is rejection treated?

The dosage of one or more of your regular anti-rejection medications may be changed. You may also receive a short duration of intravenous anti-rejection medication(s) such as: Methylprednisolone (Solumedrol) or ATG (Antithymocyte Globulin).

**INFECTION
AND
ANTI-INFECTIVE MEDICATIONS**

GENERAL INFORMATION

Anti-rejection medications decrease the body's ability to fight infection.

What is infection?

An infection occurs when invisible to naked eye organisms (micro-organisms, also called "germs") enter your body causing damage to your body's tissues.

There are THREE types of organism:

- **Bacteria** – cause bacterial infection
- **Virus** – cause viral infection
- **Fungus**– cause fungal infection

As a transplant recipient you will require lifelong treatment with anti-rejection medications that lower your immune system and therefore decrease your body's natural ability to fight off invading micro-organisms.

What are the signs of infection?

Regardless of which type of organism has caused an infection you may experience some common symptoms:

- decreased, painful or frequent urination
- new onset of aches or pain
- fever, chills
- flu-like symptoms, cough, shortness of breath
- nausea, vomiting, diarrhea
- decreased blood pressure, racing pulse
- changes in wound appearance: increased redness, foul odor, increased pain and drainage.

Report these symptoms of a possible infection to your transplant team **immediately**.

How to decrease your risk of infection

Cuts and scrapes: The skin is a major defense against infection. If you have a cut or are injured, keep the area clean and dry. Watch for symptoms of a local infection (tenderness over the area, redness, pus, and pain). Notify your doctor if signs of infection are noted. Persistent sores, blisters, lumps, or growths in armpit, groin, or elsewhere should be examined by your family physician as soon as possible.

Hand washing: Wash your hands frequently using warm water and soap. Ask your healthcare team to demonstrate proper hand washing technique. Hand washing is recommended especially before eating and handling food, before caring for wounds, before and after handling a urinary catheter, after going to the bathroom, changing diapers, playing with pets. Encourage your visitor and family members to practice good hand washing techniques. Avoid putting your fingers or hands near your mouth, eyes or nose especially if you have not washed them.

Contacts: Avoid close contact with people who have obvious illness (cold, flu) especially in the first 6 months after transplantation. Avoid crowds during cold and flu season. Do not share utensils, cups, glasses or items for personal hygiene, like tooth brush or razor.

Pets: Ensure your pets are healthy and have all the required vaccinations. Do not handle animal waste; avoid cleaning bird cages, fish or turtle tanks or changing cat litter.

Gardening: Wear gloves when working in the garden and in soil. Wash your hands frequently.

Swimming: Six months after transplantation and after your incision and wounds have healed you may swim in chlorinated pools, large bodies of water (ocean, sea, large lake). Avoid public hot tubs if possible and take care not to swallow water during swimming.

Sexual activity: Practice safe sex, use condoms.

BACTERIAL INFECTION

What is bacterial infection?

An infection that occurs when bacteria take over and make you sick. This type of infection commonly occurs in the urinary tract. You will notice burning and/or pain when urinating and the urge to urinate frequently (Note: the urge to urinate frequently is common within the first few weeks after transplantation, but does not mean you have an infection).

Bacterial infections can also occur at the site of your surgery before it has completely healed. You will notice increased pain, swelling and unusual discharge from the site.

How is it treated?

Medications called “antibiotics” can be used to treat bacterial infections. Please let your doctor know if you have any medication allergies or if you have ever had side-effects to antibiotics.

Remember, many medications do NOT mix well with your transplant medicines. Be sure to tell your doctor and pharmacist to check the safety of any new medicine before you take it, even antibiotics.

FUNGAL INFECTION

What is fungal infection?

An infection caused by a fungus. There are many types of fungi; however, the three most common ones are:

- Pneumocystis Carinii (also known as Pneumocystis Jaroveci)
- Candida
- Aspergillus

PCP (Pneumocystis carinii pneumonia) or PJP (Pneumocystis jaroveci pneumonia)

Use of anti-rejection medications increases the risk of this type of fungal lung infection. The risk is highest one month after transplantation and up to a year after transplantation.

To prevent this infection you will be started on an anti-infective medication called sulfamethoxazole/trimethoprim (Septra®; Bactrim®, Sulfatrim®). If you have a history of allergy to this medication or a “sulfa” allergy, alternative medication will be prescribed.

Candida

Candida can affect different parts of your body; however, the most common type of infection is called **thrush**. Thrush is an infection of the mouth; it looks like a white coating over your tongue that can cause pain, dryness and difficulty swallowing. The treatment for thrush is an oral liquid anti-fungal called **nystatin**. If candida affects other parts of your body you may be given an oral tablet called **fluconazole**.

Aspergillus

This type of fungus usually affects the respiratory or digestive tract. It is treated with intravenous or oral anti-fungal medications (e.g. voriconazole, amphotericin B).

Remember, many medications do NOT mix well with your transplant medications. Be sure to tell your doctor and pharmacist to check the safety of any new medication before you take it, even anti-fungals.

SULFAMETHOXAZOLE / TRIMETHOPRIM

BRAND NAMES: SEPTRA[®], SULFATRIM[®], BACTRIM[®]

This medication is not funded by BC Transplant.

This medication is available as an oral tablet and liquid, and may look different depending on the brand.

What is this medication for?

This is a combination antibiotic used to prevent or treat a type of lung infection called PCP or PJP which is caused by a fungus. This type of infection is more common in patients who have a suppressed immune system.

How should I take this medication?

This medication may be taken with or without food. It can be taken at any time of the day and may be taken at the same time as any of your other medications. It is best to take it at the same time every day, to help develop a routine.

Drink a full glass of water with this medication. This helps prevent kidney stone formation.

This medication belongs to the class of sulfa medications and it is very important to inform your doctor if you have an allergy to sulfa.

What are some possible side effects of this medication?

Side Effect	Management
Nausea and vomiting	Take medication with food to minimize this side effect. Check with your doctor if bothersome or persistent.
Dizziness	Check with your doctor if this is bothersome or persistent.
Sun sensitivity	Wear a hat, long sleeves and long pants or skirt outside on sunny days. Apply a sun block lotion with a SPF (sun protection factor) of at least 30
Skin rash or itching	Notify your doctor right away.

PENTAMIDINE

This medication is not funded by BC Transplant.

This medication is available for inhalation via a nebulizer as well as intravenous injection.

What is this medication for?

Pentamidine is used to prevent and treat a particular type of pneumonia known as PCP or PJP. Patients with a suppressed immune system are more susceptible to this infection. Nebulized (vaporized) pentamidine is used when a person has a sulfa allergy or has experienced side effects to sulfamethoxazole/trimethoprim.

How should I take this medication?

Pentamidine is administered in the hospital setting, in a designated room within the Pulmonary Function Lab or another facility.

Pentamidine inhalation is administered once monthly. Treatment duration will be determined by your doctor.

What are some possible side effects of this medication?

Side Effect	Monitoring
Chest pain, coughing or wheezing	You will be given another inhaled medication (salbutamol) before the pentamidine to reduce this.
Decreased appetite	This is temporary, and wears off after a couple of days.
Dizziness/tiredness/fatigue	Breathe slowly; stop inhalation therapy if needed.
Cough and sore throat	Use throat lozenges or cough syrup if symptoms are very bothersome.
Bitter or metallic taste in the mouth	Rinse mouth immediately after the nebulized treatment. If it occurs during treatment, you may stop the inhalation and take a drink of water.

DAPSONE

This medication is not funded by BC Transplant.

This medication is available as an oral tablet and a specially made liquid if necessary.

What is this medication for?

Dapsone is used to prevent and treat a particular type of pneumonia known as PCP or PJP. Patients with a suppressed immune system are more susceptible to this infection. Dapsone is used when a person has a sulfa allergy or has experienced side effects to sulfamethoxazole/trimethoprim.

How should I take this medication?

This medication may be taken with or without food. It can be taken at any time of the day and may be taken at the same time as any of your other medications.

What are some possible side effects of this medication?

Side Effect	Monitoring
Sun sensitivity	Wear a hat, long sleeves and long pants or skirt outside on sunny days. Apply a sun block lotion with a SPF (sun protection factor) of at least 30.
Dapsone can lower the number of your white and red blood cells.	Regular blood work will be done to check your blood cell counts. Check with your doctor if you have any:
You may be at an increased risk for infection and bleeding.	<ul style="list-style-type: none">• Signs or symptoms of infection (fever or chills, cough, sore throat or pain or difficulty passing urine)• Signs of decreased red blood cells (weakness or tiredness, fainting spells, light-headedness)
Skin rash or itching	Notify your doctor right away.

FLUCONAZOLE

This medication is not funded by BC Transplant.

This medication is available as a tablet, oral liquid or in intravenous form.

What is this medication for?

Fluconazole is an antifungal medication, which is active against certain fungi.

How should I take this medication?

This medication may be taken with or without food.

Inform the transplant team if you receive a prescription for this medication from your other healthcare providers. It will interact with your anti-rejection medications.

What are some possible side effects of this medication?

Side Effect	Management
Upset stomach, nausea	Take with food or milk.
Diarrhea	May resolve, but inform your doctor if the symptoms are persistent.
Headache	May resolve; your doctor may suggest an over-the-counter painkiller.
Liver dysfunction	Inform your doctor immediately if you experience any of the following: yellow-colored skin or eye, stomach or abdominal pain, dark urine or pale stool.

VIRAL INFECTION

What is viral infection?

Use of anti-rejection medications lowers body's natural ability to fight off viruses. In the first year after transplantation the level of suppression of your immune system is the highest and you are at the highest risk of obtaining a new or re-activating a virus you have been exposed to. There are many types of viruses; however, the most common in transplant patients are:

- Cytomegalovirus (CMV)
- Hepatitis B and C

Cytomegalovirus (CMV)

The risk of CMV infection is highest in the first months after getting your new transplant. Signs of CMV infection can vary depending on which organ system is affected. Some of the symptoms may include: fatigue, aching joints, high temperature, headaches, diarrhea, heartburn, pneumonia.

Hepatitis B and C

Every transplant recipient is screened for active hepatitis infection or signs of previous exposure. If you have had Hepatitis B or C in the past the transplant team will conduct very in depth screening for presence of hepatitis.

Remember, many medications do NOT mix well with your transplant medications. Be sure to tell your doctor and pharmacist to check the safety of any new medication before you take it, even anti-viral medications.

VALGANCICLOVIR

BRAND NAMES: VALCYTE[®], APO-VALGANCYCLOVIR[®]

This medication comes as an oral tablet and liquid.

What is this medication for?

This is an anti-viral medication. In patients after transplantation it is most commonly used to prevent or treat a viral infection called CMV (Cytomegalovirus).

How should I take this medication?

This medication should be taken with food to improve absorption. It can be taken at any time of the day and may be taken at the same time as your other medications. Take it at the same time of the day every day with a full glass of water to prevent kidney stones.

What are some possible side effects of this medication?

<i>Side Effect</i>	<i>Management</i>
Drowsiness or sleepiness	Do not drive, operate machinery or do tasks that require you to be alert until you know how this medication affects you.
Nausea, vomiting, diarrhea	Take with food. Contact your doctor if this is persistent or bothersome.
Valganciclovir can lower the number of your white blood cells, red blood cells and platelets. You may be at increased risk for infection and bleeding.	Regular bloodwork will be done to check your blood cell counts. Check with you doctor if you have any of the following: <ul style="list-style-type: none">• Signs and symptoms of infection such as fever or chills, cough, sore throat, pain or difficulty passing urine• Signs of bleeding such as bruising, black, tarry stools, vomiting of blood or blood in the urine• Signs of decreased red blood cells such as unusual weakness or tiredness, fainting spells, or light-headedness.

VALACYCLOVIR

BRAND NAME: VALTREX®

This medication is not funded by BC Transplant.

This medication comes as an oral tablet.

What is this medication for?

This is an antiviral medication. You may get valacyclovir after your transplant if you develop viral infections such as herpes, chicken pox, shingles, and cold sores.

How should I take this medication?

This medication can be taken with or without food. It can be taken at any time of the day and may be taken at the same time as any of your other medications. Take it at the same time every day.

What are some possible side effects of this medication?

<i>Side Effect</i>	<i>Management</i>
Upset stomach, nausea	Take with food or milk.
Diarrhea	Take with food or milk.
Nausea, vomiting, diarrhea	May resolve, but inform your doctor if symptoms persist.
Headache	May resolve. Your doctor may suggest an over-the-counter painkiller.

LAMIVUDINE

BRAND NAMES: HEPTOVIR[®], APO-LAMIVUDINE[®]

Lamivudine is available as an oral tablet or solution.

What is this medication for?

Lamivudine reduces the amount of the hepatitis B virus in the blood, therefore preventing hepatitis B recurrence after liver transplantation.

How should I take this medication?

The tablet should be swallowed whole with water, with or without food.

What are some possible side effects of this medication?

Side Effect	Management
Fatigue	Inform your doctor if this becomes difficult to manage.
Headache	Your doctor may suggest acetaminophen (Tylenol or other brand) if the headache is very bothersome.
Stomach pain or discomfort, loss of appetite or weight loss	May resolve; but inform your doctor if it persists.
Diarrhea	May resolve; but inform your doctor if it persists.
Nausea, vomiting	Take with food or milk.
Burning/tingling in hands, feet	If does not resolve or worsens, inform your doctor.
Ear, nose or throat infection	Fever, pain in ear, jaw, pain when chewing food, nasal discharge that is not clear.

ENTECAVIR

BRAND NAMES: BARACLUDE®

Entecavir is available as an oral tablet or solution.

What is this medication for?

Entecavir reduces the amount of the hepatitis B virus in the blood, therefore preventing hepatitis B recurrence after liver transplantation.

How should I take this medication?

Take on an empty stomach. Take 2 hours before or 2 hours after meals.

What are some possible side effects of this medication?

Side Effect	Management
Fatigue	Inform your doctor if this becomes difficult to manage.
Headache	Your doctor may suggest acetaminophen (Tylenol or other brand) if the headache is very bothersome.
Dizziness	Inform your doctor if this becomes difficult to manage.
Upset stomach	May take with a light snack. Inform your doctor if this becomes difficult to manage.

TENOFOVIR

BRAND NAMES: VIREAD®

Tenofovir is available as an oral tablet.

What is this medication for?

Tenofovir reduces the amount of the hepatitis B virus in the blood, therefore preventing hepatitis B recurrence after liver transplantation.

How should I take this medication?

The tablet should be swallowed whole with water, with or without food.

What are some possible side effects of this medication?

Side Effect	Management
Fatigue	Inform your doctor if this becomes difficult to manage.
Headache	Your doctor may suggest acetaminophen (Tylenol or other brand) if the headache is very bothersome.
Dizziness	Inform your doctor if this becomes difficult to manage.
Upset stomach	Take with food or milk.
Kidney problems	Contact your doctor immediately if unable to pass urine, change in how much urine is passed, blood in the urine, or a big weight gain.
Bone pain	Contact your doctor if bone pain or pain in arms and legs develops.
Soft bones, thin bones, broken bones	Take calcium and Vitamin D supplements while taking this medication unless instructed otherwise by your physician. Check your bone density as instructed by your physician.

VITAMINS AND SUPPLEMENTS

Multivitamin

If you are consuming a healthy, well-balanced diet you may not require any additional supplementation or vitamins.

However, if you think you are not getting all the necessary vitamins through your diet, you may take any multivitamin of your choice. A multivitamin provides a moderate amount of the essential vitamins and minerals, but is not a substitute for healthy eating. If you are taking a multivitamin, remember to take it 2 hours before or after your antirejection medications.

Calcium and Vitamin D

Some patients will require chronic prednisone use after transplantation. This in combination with changes in bone health with age and onset of menopause in women can make your bones more fragile, a condition called **osteoporosis**. Your doctor may recommend that you take Calcium and Vitamin D to improve your bone strength. Before starting any calcium or vitamin D supplements consult your transplant team for a recommendation.

OVER-THE-COUNTER (OTC) MEDICATIONS

This list is not complete. You may take brands other than the ones listed as long as the ingredients are safe (as per table). Before you use any new medication please contact your transplant clinic to ensure this medication is safe for you.

Symptom	Examples of safe medications (active ingredient)	Not recommended
Cough	Benylin® DM (Dextromethorphan)	Avoid products with ORAL DECONGESTANTS (pseudoephedrine) if blood pressure is poorly controlled
	Benylin® DM-D (Dextromethorphan-Pseudoephedrine)	
	Benylin® DM-DE (Dextromethorphan-pseudoephedrine-guaifenesin)	
Allergies	Benadryl® (Diphenhydramine)	
	Chlortripolon® (Chlorpheniramine)	
	Claritin® (Loratidine)	
	Reactine® (Cetirizine)	
	Allegra® (Fexofenadine)	
	Aerius® (Desloratidine)	
Congestion	Otrivin® (Xylometazoline)	Avoid ORAL DECONGESTANTS (pseudoephedrine) if blood pressure is poorly controlled.
	Dristan® (Oxymetazoline)	

Symptom	Examples of safe medications (active ingredient)	Not recommended
Pain or headaches	Tylenol® (Acetaminophen)	Do not take pain relief medications known as NSAIDs (non-steroidal anti-inflammatory drugs). This includes ibuprofen (Advil® and Motrin®); naproxen (Aleve® and Naprosyn®); and also ASA or Aspirin®. If you are taking an 81mg 'baby' Aspirin® once daily to prevent heart attack and stroke, this is okay if it is on the advice of a doctor.
	Tylenol ES® (Acetaminophen extra strength)	
Back pain	Robaxin® (Methocarbamol)	
	Robaxacet® (Methocarbamol-acetaminophen)	
Diarrhea	Report ongoing symptoms to transplant clinic	IMODIUM – Unless directed by your doctor or the transplant team
Nausea	Gravol® (Dimenhydrinate)	
	Report ongoing symptoms to transplant clinic	

NATUROPATHIC, HERBAL, TRADITIONAL OR HOMEOPATHIC PRODUCTS

Very little research has been done on these products and the effect that they have on transplant medications. We recommend that you *do not take any* naturopathic, herbal, traditional or homeopathic products until you have discussed this with a transplant pharmacist.

Safety of these products may vary depending on how they mix with anti-rejection medications, side effects and the ability of some of these products to stimulate immune system, which can make you more likely to reject your transplant. Some of the most common products and their safety are as follows:

Product	Safety	Additional Information
Echinacea (Echinacea purpurea)	This supplement is an immune booster and is NOT safe for transplant patients because it will act against your transplant medications.	
Garlic (Allium sativum)	Taking concentrated garlic supplement may cause bleeding and should NOT be used by transplant patients. Supplemental form of garlic contains a super-concentrated version of garlic.	It is safe to continue eating garlic with food.
Ginger	Ginger boosts your immune system, which is NOT safe for transplant patients because it will act against your transplant medications.	Drinking ginger or other herbal teas in moderation or using ginger in food as part of a recipe is safe. Our concern is when you are taking a concentrated source in a pill or liquid form.

Product	Safety	Additional Information
Ginkgo (Ginkgo biloba)	This supplement may cause increased bleeding and should NOT be used by transplant patients.	
Probiotics	Taking a supplement (pill or capsule) with probiotics is NOT safe for transplant patients. Because your immune system is lowered you are more susceptible to infections and putting a potentially live bacteria into your body may cause an infection.	Eating foods with probiotics is safe. However, there are no standards in the food industry regarding probiotics and the food you eat may not actually contain the ingredients on the label.
St. John's Wort	Do NOT take this supplement. It interferes with your immunosuppressive medications TACROLIMUS and CYCLOSPORINE.	
Melatonin	This supplement is safe to take. However, advise your transplant team before starting to take this supplement.	

HIGH BLOOD PRESSURE (HYPERTENSION)

High blood pressure is common after transplantation, although in some patients having a healthy kidney improves blood pressure control. The risk is higher if you had high blood pressure, high cholesterol or diabetes before transplantation or if your kidney transplant is not working well. Antirejection medication tacrolimus can also cause high blood pressure. High blood pressure will damage your new kidney over time if it is not controlled and may lead to heart attacks and stroke. Some of your old blood pressure medications may be continued and new medications may be started after transplantation.

At the time of discharge from the hospital you will be asked to keep track of your blood pressure once you go home. Having extra salt in your diet will cause you to retain extra water and your blood pressure will rise. Monitor your salt intake, avoid salty pre-packaged foods, minimize intake of deli meats and canned food that is high in sodium. Please ask to see the dietician for more information

Blood pressure medications all work differently and have different side effects. Some of the most common side effects of blood pressure medications include:

Side Effects	Management
Dizziness or light-headedness	When rising from a sitting or lying position, do so slowly. This gives your body time to adjust to the change in position. Dizziness usually goes away after your body gets used to the medication; however, if it persists please let your doctor know, your dose may need to be adjusted.
Fatigue	If you feel unusual fatigue and it continues, inform your doctor
Swelling in your hands or feet	Discuss with your doctor if swelling persists
Persistent dry cough	Some of the blood pressure medications can cause a dry cough. Please inform your doctor if this side effect occurs.

Diuretics or “Water Pills”

These medications may be prescribed to control both your blood pressure and swelling by helping the kidney make more urine. Hydrochlorothiazide, Lasix® (furosemide) and Zaroxolyn® (metolazone) are common diuretics. Some side effects of diuretics are:

Side Effects	Management
Dizziness or lightheadedness	When rising from a sitting or lying position, do so slowly – this gives your body time to adjust to the change in position. Dizziness should go away in a few days. Notify your doctor if it persists.
Sun sensitivity	Hydrochlorothiazide and furosemide may cause your skin to sunburn easily. Use a sunscreen on all exposed skin when going outdoors.
Low potassium levels	Hydrochlorothiazide and furosemide may decrease your body’s potassium levels. Your doctor will tell you if you need to increase the amount of potassium in your diet.

HIGH CHOLESTEROL

Having high cholesterol increases the risk of heart disease and stroke. This risk is even higher if you had high cholesterol, high blood pressure, poor kidney function or diabetes before transplantation.

Anti-rejection medications such as tacrolimus and prednisone may contribute to increasing cholesterol levels in your blood. Other factors that can affect your cholesterol levels are: family history, diet, and other medical conditions such as diabetes. Your cholesterol levels will be monitored after transplant and you may be asked to see a dietician if your levels are high.

Regular exercise and weight loss can help decrease cholesterol. If dietary and lifestyles changes are not enough to lower your cholesterol, you may be prescribed a medication. The most common class of medications used to decrease cholesterol is known as “statins” (e.g. atorvastatin (Lipitor[®]), rosuvastatin (Crestor[®]), simvastatin (Zocor[®]), pravastatin (Pravachol[®])). These medications stop your liver from making more cholesterol. Common side effects of “statins” are as follows:

Side Effects	Monitoring
Unexplained muscle pain, weakness or discomfort	Report to your doctor immediately
Mild abdominal pain or cramps, heart burn	Check with your doctor if any of the above are bothersome or continue over time

DIABETES

Some transplant recipients are diabetics before transplantation and others may develop diabetes after surgery. Antirejection medications (tacrolimus and prednisone) increase the risk of developing diabetes, or can make diabetes more difficult to control. Diabetes is also more common in older recipients, if you have family members who are diabetic or if you are overweight.

There are complications of diabetes that can develop over time. Kidney damage, heart disease, changes in the circulation in your fingers and toes and changes to your vision can all happen with diabetes. Careful control of your blood sugars by whatever treatment is required is important to reducing the risk of these complications.

If you have diabetes it is essential that you monitor your sugars more rigorously within the first few months of transplantation to ensure good blood sugar control on new medications. Please bring your blood sugar records to clinic visits so that your transplant team can assess your diabetes control.

ACID REDUCING MEDICATIONS

Anti-rejection medications can be hard on your stomach and may cause symptoms of discomfort and heart burn. In the hospital you will be receiving an acid reducing medication to prevent these symptoms after your surgery. You may need to continue this medication at home. If you require chronic use of prednisone you may also be asked to take an acid reducing medication to reduce the risk of stomach ulcers.

Most commonly used acid reducing medications are ranitidine (Zantac) or pantoprazole (Tecta).

They both work by reduce the amount of acid produced in your stomach. These medications are usually well tolerated, some of the possible side effects include:

Side Effects	Management
Headache	Inform your doctor if this side effect persists or symptoms are sever.
Changes in bowel habits (diarrhea, constipation)	Check with your doctor if any of the above are bothersome or continue over time.

CANCER RISK

Use of anti-rejection medications increases the risk of developing certain types of cancers. The most common types of cancer seen are:

- Lymphoma (a cancer of the blood cells) called Post Transplant Lymphoproliferative Disease or PTLN
- Cancer of the cervix for women
- Digestive tract cancer
- Skin cancer

PTLN most often occurs in the first few months after transplantation, but may occur years after. PTLN is a serious complication and the treatment involves reduction or discontinuation of anti-rejection medications and chemotherapy or radiation in some cases.

Cancer of the cervix in female recipients can be detected on Pap smear; therefore, it is recommended at least once a year. This test helps detect abnormal cells so that they can be treated quickly. Early detection usually makes this type of cancer curable.

Digestive tract cancer is often difficult to detect just based on signs and symptoms. Report significant changes in bowel habits (e.g. alternating diarrhea and constipation, or the presence of blood in the stool) to family doctor or transplant team. Early detection and treatment is important. Individuals over age 50 need regular screening by colonoscopy. Ask your family doctor to refer you to a specialist.

Transplant recipients may develop **other cancers** at similar rates to people who do not have a transplant. Women should have annual breast examinations done through their family doctor and report any abnormalities immediately. Routine mammograms are usually started once a woman reaches age 50, or earlier in some cases. Men should do monthly testicular checks for any abnormal lumps, and should report these immediately. Men over the age of 40 should also discuss the need for prostate checks, including the PSA blood test and a physical examination with their family doctor.

Skin Cancer

Skin cancer is very common among transplant recipients. It is easily treated if detected early. Your family doctor should screen you for skin cancer and can refer you to a dermatologist if necessary.

What you can do to minimize your risk of skin cancer:

- Use sunscreen with sun protection factor (SPF) 30 or higher (remember commonly missed areas such as lips, behind the ears, along hairline, backs of the hands and tops of the feet). Reapply sunscreen after swimming or sweating heavily.
- Use sunscreen even in winter if you are outside for a prolonged period especially at higher elevations (e.g. skiing) and if it is sunny outside.
- Wear a hat, long sleeve shirts and pants when you are out in the sun. Remember though that regular clothing does not prevent UV rays from reaching you skin. Only specialized sun-protective (SPF) clothing reliably provides such protection.
- Avoid the sun especially in the summer between 11:00 a.m. and 3:00 p.m. Even on cool, cloudy or overcast days, 70-80% of the sun's ultraviolet (UV) rays still get through. Sitting in the shade or swimming underwater does not fully protect you.
- Examination of your skin and monthly checks for moles are a wise precaution. Look for any scaliness, changes in the color or shape of moles, or any persistent itching or oozing.
- Apply sunscreen 10 minutes before going outside and reapply every two hours. Refer to the following information to ensure that you receive the required protection.
 - Apply 1 teaspoon to face, head, and neck;
 - 2 teaspoons to front and back of torso;
 - 1 teaspoon for each of arms and forearms;
 - 2 teaspoons for each thighs, legs, and feet.

APPENDIX B

INFORMATION FOR HEALTH CARE PROFESSIONALS

DENTAL PROTOCOL

The following information can be provided to your dentist:

Prophylactic antibiotic coverage for dental procedures is recommended **ONLY** for the following transplant recipients:

- Prosthetic cardiac valve
- Previous infective endocarditis
- Congenital heart disease (CHD)
 - Unrepaired cyanotic CHD
 - 6 months following repair of CHD with any prosthetic material or device
 - Repaired CHD with residual defects
- Cardiac transplant recipients who develop cardiac valvulopathy
- For liver transplant patients, ensure no abdominal ascites present (call Transplant Clinic to review abdominal ultrasound results)

Recommended prophylactic antibiotics for **ADULTS** (to be given 30 to 60 min prior to procedure):

Situation	Antibiotic	Adults
Oral	Amoxicillin	2 grams
Unable to Take Oral Medication	Ampicillin OR Cefazolin or Ceftriaxone	2 grams IV or IM 1 gram IV or IM
True Allergy to Penicillin Allergic to Penicillin or Ampicillin – Oral	Cephalexin ^{1, 2} OR Clindamycin OR Azithromycin or Clarithromycin	2 grams 600 mg 500 mg
Allergic to Penicillin or Ampicillin and Unable to Take Oral Medication	Cefazolin or Ceftriaxone ² OR Clindamycin	1 gm IV or IM 600 mg IV or IM

¹ Or other first or second generation oral cephalosporin in equivalent dosage.

² Cephalosporins should not be used in an individual with a history of anaphylaxis, angioedema or urticaria with penicillin or ampicillin.

VACCINATION AFTER TRANSPLANT

General Principles

Generally, inactivated vaccines are safe and live vaccines are not. Consult your transplant pharmacist regarding any vaccination.

Use of anti-rejection medications may prevent transplant recipients from mounting an adequate response to vaccination.

Immunization of household contacts of immunosuppressed patients provides important protection; therefore vaccination opportunities for household contacts should not be missed (live vaccines or otherwise). With the exception of smallpox and oral-polio vaccines there is little to no risk to the transplant recipient if household contacts are provided live virus vaccines. Influenza vaccine should be offered to all household contacts of transplant recipient.

Vaccines to avoid (live vaccines)

- Intranasal Influenza Vaccine (FluMist[®])
- BCG Vaccine
- Cholera Vaccine “Mutacol[®]” (Oral Live)
- Japanese Encephalitis (Chinese source)
- Measles, Mumps, Rubella (MMR, Priorix[®])
- Oral Typhoid Vaccine (Vivotil[®], Vivotif L[®])
- Varicella Vaccine (Varivax[®], Varilrix[®])
- Yellow Fever Vaccine (YF-Vax[®])
- Oral Polio Virus Vaccine (OPV) – no longer marketed in Canada.

Vaccines Considered Safe

- Influenza Vaccine (including H1N1 vaccine)
NOTE: intranasal influenza vaccine (FluMist[®]) is a live vaccine and must **NOT** be given to transplant patients
- Cholera/ETEC Traveller’s Diarrhea Vaccine “Dukoral[®]”(Oral Inactive BS-WC)
 - safe, but may not obtain the expected response
- Diphtheria toxoid
- Haemophilus Vaccine
- Hepatitis A Vaccine, Hepatitis B Vaccine, Hepatitis Combined Vaccine
- Japanese Encephalitis (Canadian Vaccine)
 - poor response is expected in immunocompromised individual.
- Meningococcal Vaccine (Conjugate and Polysaccharide)
- Pertussis Vaccine

- Pneumococcal Vaccine (Conjugate and Polysaccharide)
- Injectable Inactivated Poliovirus Vaccine (IPV)
- Rabies Vaccine
 - should be followed by antibody determination to ensure adequate response.
- Tetanus Toxoid
- Injectable Typhoid Vaccine
- Human Papilloma virus vaccine (Gardasil®)

Vaccine booster protocol in solid organ transplant recipients

- Tetanus/diphtheria every 10 years for life
- Influenza every year for life
- Meningococcal conjugate (Menactra®) 5 years after last dose of polysaccharide vaccine (Menomune®)
- Pneumococcal – 5 years after transplantation (once only)

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