

Transplant Medications and Management

What this handout includes:

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Taking Your Medications

Importance of Adherence

- Adherence means taking medications exactly as the directions or health care provider say.
- Non-adherence may include:
 - Missing doses or stopping a medication without consulting a doctor
 - Taking the wrong dose
 - Taking medications at the wrong time or for the wrong length of time
 - Taking medications that are not prescribed
- Non-adherence leads to increased risk of organ rejection and loss.

Why do some people struggle with adherence?

- **Confusion**
 - There is often confusion about “the right way” to take medications.
- **Unable to Pay**
 - If you are concerned about paying for your medications, please let us know.
 - The discharge coordinator checks pricing with your insurance before you leave.
- **Lack of Supply**
 - Transplant medications are not common in the general population, so they may not be in stock at all pharmacies.
 - We will fill the first month of your medications in our outpatient pharmacy, as long as your insurance is accepted, to make sure you can take your medications right away.
 - If you choose to use your local pharmacy for further refills, let them know a week before you run out of pills so they can order the medications, transfer, and fill them.
 - When you are traveling (this includes traveling to clinic visits), bring a couple extra days supply of medications with you in case of delays or other travel complications.
- **Side-Effects**
 - If side-effects are serious or bothersome, call your transplant coordinator immediately to discuss ways to manage them.

- **Do not stop** taking your medications unless told to do so by your coordinator or doctor.

Tools and Resources

Important Phone Numbers:

- UW Mail Order Pharmacy (866) UWH-DRUG or (866) 894-3784
- UW Outpatient Pharmacy (608) 263-1280
- Transplant Pharmacy B4/6 (608) 263-7229
- Transplant Unit B4/6 (608) 263-8737
- Transplant Clinic (608) 263-1384



Adherence Tools & Resources

- **Medication List**
 - Every patient should have an **up-to-date** medication list that includes:
 - Names and doses of medications you take
 - How often you take them
 - Why you take them
 - Name of your doctor
 - Allergies and reactions you've had
 - Medical conditions you have
 - Bring this list to ALL appointments/hospital visits and keep it in your wallet/purse.
- **Medication Box**
 - Medication boxes organize your medications and make them easier to take.
- **UW Mail Service Pharmacy**
 - If you would like to participate in UW Hospital's prescription mail order program, you can obtain a pamphlet from the transplant unit or call their number above.
- **Local Pharmacy**
 - Some pharmacies fill medication boxes for you or offer automatic refill reminders.
 - Call your local pharmacy to see what services they offer.

Medication Resources

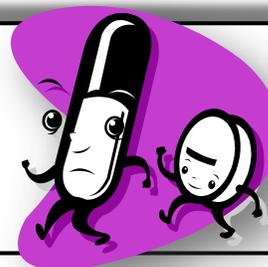
- **Transplant (B4/6) Pharmacists**
 - The transplant pharmacists are available by phone (see numbers above) from:
 - 7:00 AM - 10:00 PM (Monday – Friday)
 - 8:00 AM - 4:00 PM (Saturday – Sunday)
 - You may also call the B4/6 unit, and the unit coordinator will page a pharmacist.

- Pharmacists are also available in the transplant clinic for questions.
- **Physician Approval for Additional Refills**
 - If you are on your last refill of a medication or run out, call the transplant clinic
 - Refills cannot be given through your primary doctor
- **Refills at UW Hospital's Outpatient Pharmacy**
 - Call a day ahead to refill your prescriptions
 - If you wish to refill your prescriptions at your local pharmacy, have them call the outpatient pharmacy to transfer the prescriptions.

Transplant Medications & Supplements

Medication Table of Contents:

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The Typical Home Treatment

The majority of transplant patients will be sent home with these medications:

- **3 Anti-Rejection Medications**
 - Tacrolimus
 - Mycophenolate
 - Prednisone
- **3 Anti-Infective Medications**
 - Antibiotic
 - Anti-fungal
 - Anti-viral
- **Supplements & Medications for Other Conditions**

Why do I need these medications?

- **Anti-Rejection Medications**
 - Lower your body's natural defense (immune system) against illness and your new organ
 - When your body's immune system fights your organ, it is known as rejection
 - Thus, these medications stop your body from rejecting your new organ
- **Anti-Infective Medications**
 - Anti-rejection medications increase your risk of becoming sick from infections
 - Taking an antibiotic, anti-viral, and anti-fungal can help prevent this

- **Supplements & Other Medications**
 - These help to prevent complications from transplant medications and promote health

Who should know about my medications?

Tell **ALL** of your healthcare providers that you are on anti-rejection medications, including:

- Dentists
- Doctors or Surgeons
- Pharmacists: *Try to choose a single pharmacy to help prevent drug interactions*

****Tell your transplant coordinator if other doctors make medication changes before taking them.**

Anti-Rejection Medications - Three Most Common

- Each anti-rejection medication works differently to lower your immune system.
- The medications you receive depend on the type of new organ and your past medical history.
- Anti-rejection medications are never stopped unless directed to by your transplant doctor.

Prednisone

Side Effects	Increased blood pressure, cholesterol and blood sugar, thinning skin, easier bruising, holding fluid (edema), hyperactivity, mood changes, decreased bone mass, stomach upset, stomach ulcers, trouble sleeping, bigger appetite, and risk of cataracts
Food	Take with food to prevent upset stomach and ulcers
Special Tips	<ul style="list-style-type: none"> • If you have high blood sugar or diabetes, your dose may be split to twice daily. • If you take a single dose, you should take it in the morning so it is easier to sleep. • Have an eye exam once a year for cataract prevention.

Tacrolimus (Prograf/Hecoria)

Side Effects	Tremor, headache, kidney injury, hair loss, diarrhea, nausea/vomiting, trouble sleeping, and increased cholesterol, blood sugar and blood pressure
Food	Take with or without food, but be CONSISTENT in what you choose
Interactions	<ul style="list-style-type: none"> • Antacids (Tums, Rolaids, Mylanta) and certain supplements (calcium, aluminum, magnesium, iron) lower the absorption of tacrolimus. • Take tacrolimus one hour before or two hours after these products or dairy foods. • Avoid grapefruit or pomegranate juice, since they increase tacrolimus levels.
Monitoring	<ul style="list-style-type: none"> • Tacrolimus blood levels are drawn to make sure it is safe and effective (This is typically done on Mondays). • Blood is drawn right before your morning dose in order to measure the amount of drug in your body when it is lowest (a trough). • DO NOT take your morning dose until AFTER your blood is drawn. • Desired levels are typically 5-15 ng/mL initially and then decrease over time.
Special Tips	<ul style="list-style-type: none"> • Tell your transplant coordinator if tremor or headache worsen, or if you notice

	<p>burning in your fingers (this could mean blood levels are too high).</p> <ul style="list-style-type: none"> • Tell your transplant coordinator if the shape and/or color of your medication changes. • Different brands may lead to different blood levels.
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Mycophenolate Sodium ECT (Myfortic) or Mycophenolate Mofetil (Cellcept)

Side Effects	Diarrhea, nausea/vomiting, headache, and decreased cell counts (white blood cell and hemoglobin)
Food	Take with food to help prevent stomach upset and diarrhea
Interactions	<ul style="list-style-type: none"> • Antacids (Tums, Roloids, Mylanta) and certain supplements (calcium, aluminum, magnesium, iron, zinc) lower the absorption of mycophenolate. • Take your dose one hour before or two hours after these products or dairy foods.
Special Tips	<ul style="list-style-type: none"> • Do not crush, chew or cut mycophenolate tablets. • Pregnant women should not handle the tablets or capsules due to risk of fetal harm. • All female patients able to bear children who take mycophenolate must use an appropriate form of birth control.

Anti-Rejection Medications – Alternatives

Cyclosporine (Neoral) – ALTERNATIVE to Tacrolimus

Side Effects	Hair growth, diarrhea, nausea/vomiting, headache, tremor, gum enlargement, increased cholesterol, blood sugar and blood pressure.
Food	Take with or without food, but be CONSISTENT in what you choose
Interactions	Avoid grapefruit or pomegranate juice, since they increase cyclosporine levels.
Monitoring	<ul style="list-style-type: none"> • Blood levels of cyclosporine are drawn to make sure it is safe and effective. • Your blood is drawn right before your morning dose in order to measure the amount of drug in your body when it is lowest (a trough). • DO NOT take your morning dose until AFTER your blood is drawn. • Desired levels for cyclosporine are typically 100-200 ng/mL initially and then decrease over time.
Special Tips	<ul style="list-style-type: none"> • Tell your transplant coordinator if the shape and/or color of your medication changes. • Different brands may lead to different blood levels. • Capsules expire seven days after opening the foil package. • The oral solution is dispensed in a glass container and should not be refrigerated. • Have 6 month dental cleanings and brush twice daily to prevent gum enlargement.

Azathioprine (Imuran) – ALTERNATIVE to Mycophenolate

Side Effects	Nausea/vomiting, diarrhea, rash, low blood cell counts, fever
Food	Take with food to prevent stomach upset
Interactions	<ul style="list-style-type: none"> • Do not take mercaptopurine or allopurinol with azathioprine. • They increase risk of low blood cell counts.

Special Tips	<ul style="list-style-type: none"> • Women able to bear children should use a form of birth control with azathioprine • Azathioprine is toxic to unborn babies
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Sirolimus (Rapamune) – ALTERNATIVE to Mycophenolate OR Tacrolimus

****Kidney Transplant Only**

Side Effects	Constipation or diarrhea, nausea, headache, holding water (edema), slow wound healing, mouth ulcers, anemia, increased cholesterol, blood sugar, and blood pressure
Food	Take with or without food, but be CONSISTENT in what you choose
Interactions	Avoid grapefruit or pomegranate juice, since they increase sirolimus levels.
Monitoring	<ul style="list-style-type: none"> • Blood levels of sirolimus are drawn to make sure it is safe and effective. • Your blood is drawn right before your morning dose in order to measure the amount of drug in your body when it is lowest (a trough). • DO NOT take your morning dose until AFTER your blood is drawn. • Desired levels for sirolimus are different between patients
Special Tips	<ul style="list-style-type: none"> • Do not crush, split, or chew the tablets • Sirolimus should be taken four hours after cyclosporine to prevent toxicity

Everolimus (Zortress) – ALTERNATIVE to Mycophenolate OR Tacrolimus

****Kidney and Liver Transplant Only**

Side Effects	Diarrhea, nausea/vomiting, headache, rash/itching, fatigue, fever, holding water (edema), slow wound healing, anemia, increased cholesterol and blood pressure.
Food	Take with or without food, but be CONSISTENT in what you choose
Interactions	Avoid grapefruit or pomegranate juice, since they increase everolimus levels.
Monitoring	<ul style="list-style-type: none"> • Blood levels of everolimus are drawn to make sure it is safe and effective. • Your blood is drawn right before your morning dose in order to measure the amount of drug in your body when it is lowest (a trough). • DO NOT take your morning dose until AFTER your blood is drawn. • Desired levels for everolimus are usually between 3-8 ng/mL.
Special Tips	<ul style="list-style-type: none"> • Do not crush, split, or chew the tablets • If taken with cyclosporine or tacrolimus, take them at the same time as everolimus

Belatacept (Nulojix) – ALTERNATIVE to Tacrolimus

****Kidney Transplant Only**

Side Effects	Diarrhea or constipation, nausea/vomiting, anemia, fever, holding water (edema), increased cholesterol, blood sugar and blood pressure.
Food	This medication is given intravenously, so food does not affect it
Monitoring	Watch for side effects
Special Tips	<ul style="list-style-type: none"> • Patients must have tested Epstein-Barr Virus positive to receive Nulojix

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| <ul style="list-style-type: none"> This medication is IV and must be administered in clinic |
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Anti-Infective Medications & Prevention

Getting Your Shots (Immunizations)

- DO NOT receive immunizations within the first six months after transplant unless approved by your coordinator or transplant doctor.
- DO NOT receive any immunizations without your transplant coordinator's approval.
- Avoid live vaccines, including shingles, chicken pox, and the influenza nasal spray.
- People living with you should be vaccinated against influenza and can receive the live vaccine.
- Report any exposure to chicken pox to your transplant coordinator.
- The major vaccines to receive are:
 - Influenza** – yearly (shot only, not nasal spray)
 - Pneumonia** – 2 shots five years apart if less than 65 or 1 shot if you are over 65 years
 - Tetanus** – Every 5 to 10 years

Why do I need anti-infective medications?

- Because your immune system is suppressed, you are at a greater risk for becoming sick.
- Anti-infective medications help prevent infections for a period of time after your transplant.
- If you experience any signs of infection, call your coordinator:
 - Fever:** Report any temperature 100°F or greater to your coordinator
 - Bladder infection:** Cloudy or dark urine, painful urination, frequent urination
 - Pneumonia:** Severe cough, heavy slime production that may be colored
 - Wounds that won't heal:** Wounds that stay red and sore or continue to produce pus

Preventing General Infections and Pneumonia

Trimethoprim/sulfamethoxazole (Bactrim DS or Septra DS) or TMP/Sulfa

Common Directions	<ul style="list-style-type: none"> Take 1 tablet by mouth once daily Dose may be reduced based on kidney function (Every other day or Mon,Wed,Fri)
Duration	Taken for one year after transplant
Side Effects	Sun sensitivity, nausea/vomiting, diarrhea, rash, high potassium, low white blood cells

Pentamidine – ALTERNATIVE to TMP/Sulfa

Common Directions	<ul style="list-style-type: none"> Take 300 mg by inhalation once per month Pentamidine must be administered by a respiratory therapist Arrange with your coordinator to receive it at UW or a local hospital You will receive your first dose in the hospital prior to discharge
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Duration	Taken for six months after transplant
Side Effects	Cough, shortness of breath, nausea, loss of appetite, rash

Preventing Viral Infections (Cytomegalovirus – CMV)

- CMV is a virus that may hide out in the body and cause fatigue and “flu-like” symptoms.
- This virus is normally harmless, but is dangerous when your immune system is suppressed.
- The antiviral medication you receive depends on whether you or your donor have had CMV.

Valganciclovir (Valcyte)

Common Directions	<ul style="list-style-type: none"> • Taken by mouth once daily • The dose may be reduced based on kidney function
Duration	Taken for six months after transplant
Side Effects	Decreased white blood cell count

Acyclovir (Zovirax)

Common Directions	<ul style="list-style-type: none"> • Take by mouth 1 to 4 times daily based on kidney function • The dose may be reduced based on kidney function
Duration	Take for three months after transplant
Side Effects	Decreased white blood cell count

Preventing Oral Thrush – Yeast Infection

- Yeast may take advantage of a lowered immune system and start growing in the mouth.
- This can cause painful, white “splotches” in your mouth and throat.

Clotrimazole Troche (Mycelex) or “Suck Tab”

Common Directions	<ul style="list-style-type: none"> • Dissolve the tablet by mouth 2 times daily. • Do not eat or drink for 10-15 minutes after taking each dose.
Duration	Take for three months after transplant
Side Effects	Nausea, odd taste in the mouth

Nystatin (Swish and Swallow) – ALTERNATIVE to Clotrimazole

Common Directions	<ul style="list-style-type: none"> • Shake the bottle well • Swish 5 mL (one teaspoonful) in your mouth and swallow 2 times per day • Do not eat or drink for 10-15 minutes after taking your dose
Duration	Take for three months after transplant
Side Effects	Nausea, odd taste in the mouth

Supplements & Other Medications

- Most of these products are available without a prescription (over-the-counter or OTC)
- These products with doses will be listed on your discharge medication list.
- **You will need to buy these at a store or pharmacy after discharge:**

Supplement/Medication	Purpose	Side Effects	Tips & Comments
Calcium (carbonate or citrate)	Prevents bone loss from prednisone	Constipation or diarrhea	Look at the "Supplement Facts" on the back of the bottle to see how much elemental calcium is in each tablet.
Vitamin D (cholecalciferol)	Helps your body absorb calcium	None	You can purchase a combination of calcium + vitamin D.
Multivitamin	General health	Stomach upset	Choose any multivitamin appropriate for your age group.
Pantoprazole (Protonix) or Omeprazole (Prilosec) or Lansoprazole (Prevacid)	Prevents stomach ulcers due to prednisone	Headache	This may be given as a prescription depending on your insurance
Aspirin 81 mg	Prevents blood clots for heart health	Higher risk of bleeding	If you were on aspirin before transplant, you may need to resume your home dose

Other Possible Medications or Changes

- **Blood Pressure Medications (Usual goal – less than 130/80 mmHg)**
 - Many transplant patients have high blood pressure or develop high blood pressure as a result of long-term anti-rejection medication use.
 - Some patients resume their home blood pressure medications, some patients may need them added, or some patients may be able to stop taking them.
 - It is important to own a blood pressure cuff and monitor your blood pressure at home.
 - You should keep a log book of your numbers and bring it with you to appointments.
 - Blood pressure can also be controlled through:
 - Diet and exercise (lose excess weight)
 - Avoiding high-salt foods (DASH diet)
 - Quitting smoking
- **Medications for High Blood Sugar (Diabetes)**
 - Prednisone and tacrolimus can cause you to have high blood sugar (diabetes).
 - You may be started on insulin to lower your blood sugar.

- You may be asked to test your blood sugar up to four times a day.
- Ask your coordinator or diabetes manager what your blood sugar goals should be.
- **Antibiotics**
 - Transplant patients may need antibiotics to prevent infections prior to procedures.
 - They are not required for general teeth cleaning, unless you have a heart condition.

Medications and Foods to Watch

- **Medications Not in This Handout**
 - Avoid other prescription, over-the-counter, herbal, homeopathic, or dietary supplements unless recommended by your doctor and approved by your coordinator.
 - Please see the over-the-counter handout in this binder for medication options.
- **Pain Medications to Avoid and Limit**

Medication	Avoid or Limit?
Extra Aspirin	Do not take extra aspirin on top of your baby aspirin (81 mg) without discussing with your coordinator.
NSAIDs (ibuprofen (Advil/Motrin), naproxen (Aleve), Celebrex, diclofenac)	Do not take these without permission from your coordinator. Use Tylenol for pain or fever.
Acetaminophen (Tylenol)	<ul style="list-style-type: none"> ● Do not take more than 4,000 mg in 24 hours (no more than 12 regular strength or 8 extra strength tablets). ● Liver Transplant: Do not take more than 2,000 mg in 24 hours (no more than 6 regular strength or 4 extra strength tablets).

- **Foods & Drink**
 - Avoid grapefruit, grapefruit juice, pomegranate and pomegranate juice.
 - These foods can increase levels of certain anti-rejection medications.
 - If you can't live without these, you'll need to have the same amount every day in order to keep your medication levels the same.

Missed Medication Doses

- **Follow the "Half-Way" Rule**
 - If you are *less* than "half-way" to your next dose, take your missed dose.
 - If you are *more* than "half-way" to your next dose, skip it and continue with your next scheduled dose
 - NEVER use extra medicine to make up for a missed dose.
 - Notify your coordinator when you miss a dose of anti-rejection medication.

Medication Storage

- Store your medications in a cool, dry area out of reach of children.
- Bathrooms, kitchens and cars are *not* ideal places because of changes in heat and humidity.

Skin Cancer Risk

- Being on anti-rejection medications increases your risk of skin cancer.
- Apply sunscreen with SPF 30 or greater and cover up with protective clothes and a hat when in the sunshine.
- Tell your doctor if any skin spots/lesions have these:
 - **Asymmetry**: a melanoma is usually oddly shaped, not circular
 - **Border irregularity**: a melanoma usually has notched or faded borders
 - **Color variation**: a melanoma may have many colors within the lesion
 - **Diameter**: 6 millimeters (pencil eraser size) or larger may indicate a melanoma
 - **Elevation**: a melanoma may be raised above the skin surface or be uneven

Managing Side Effects

- Use the table below to help manage your medication side effects.
- If your side effects are serious or bothersome, call your transplant coordinator.

Side Effect	How to Manage
Acne	Anti-rejection medications may cause acne flairs: <ul style="list-style-type: none"> • Treat with prescription or over-the-counter medications, such as benzoyl peroxide • Keep your skin clean by washing your face two times per day • Avoiding moisturizing soaps and lotions with oils (try oil free) • Do not pick at pimples since it can increase your risk of infection
Alopecia (Hair Loss)	Hair loss from anti-rejection medications is usually temporary and will grow back. To help prevent it: <ul style="list-style-type: none"> • Use a conditioner after shampooing • Avoid perms, dyes, or bleaching • Limit your exposure to chlorine (swimming pools) and the sun
Edema (Holding Fluid)	Anti-rejection medications can cause edema: <ul style="list-style-type: none"> • Treated with diuretics (water pills) • Weighing yourself daily can help determine if you are holding water • Let your coordinator know if you gain more than 3 lbs/day or more than 5 lbs/week • Avoiding salt and increasing physical exercise can help prevent edema
Headaches	Notify your doctor or coordinator if you have a prolonged or severe headache: <ul style="list-style-type: none"> • Avoid caffeine, bright light, stress, and loud noises • Try 1 or 2 regular strength Tylenol tablets to relieve a mild headache
Hirsutism (Hair Growth)	Hair may be removed by bleaching, trimming, shaving or with hair removal products

Hyperlipidemia (High Cholesterol)	Transplant medications can cause high cholesterol: <ul style="list-style-type: none"> • Take your cholesterol medications as directed by your doctor • Exercise regularly • Eat a diet low in fat and cholesterol, and high in fiber
Infection	Besides taking your anti-infection medications and getting your shots: <ul style="list-style-type: none"> • Wash your hands often with antibacterial soap • Avoid contact with sick people (wear a face mask) • Use gloves if pet waste must be handled • Clean cuts with soap and water and apply a triple antibiotic (Neosporin) and cover
Osteoporosis (Bone Loss)	High doses of prednisone can cause bone loss: <ul style="list-style-type: none"> • Take calcium and vitamin D daily (prescriptions may be needed if this isn't enough) • Quit smoking, quit or reduce alcohol • Walking and weight lifting help keep bones strong
Tremors	Notify your physician or transplant coordinator if you are experiencing tremors: <ul style="list-style-type: none"> • It may be a sign that blood levels of your medications are too high • Stretching exercises may help relieve mild tremors

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