

Medicines

For liver transplant patients

When you are planning to have a transplant, you also need to plan for your medicine needs after transplant. You will be taking medicines every day for the rest of your life. You will need to learn why you take them, how and when to take them, how they work, and what their side effects are. You will also need to plan how you will pay for them.

It will also be helpful to learn ways to remember to take each of your medicines at the right time, and in the right way.

What medicines will I take after transplant?

The medicines you take after transplant are vital to your recovery and the success of your transplant. They will include:

- **Immunosuppressive drugs** to help prevent or treat rejection of your new liver by your immune system. You will take these drugs for the rest of your life.
- **Antibiotics** to fight infection. Immunosuppressive drugs increase your risk of infection. You will take antibiotics for 3 to 6 months after your transplant surgery.
- **Antacids** to help prevent stomach upset or injury. You will take antacids for 2 to 3 months after transplant.
- **Laxatives and stool softeners** to help avoid constipation. You will take these for 2 to 3 months after transplant.

You may also need to take:

- **Aspirin**, in small doses, to prevent blood clotting
- **Antihypertensive drugs** for high blood pressure
- **Diuretics** (water pills) to help treat swelling



With the many medicines you will take after transplant, you will need to learn ways to remember how and when to take each medicine.

We may also advise that you take these supplements:

- **Iron** to help prevent anemia
- A **multivitamin**
- **Calcium** and **vitamin D** to help prevent osteoporosis

Getting Started

In the first few months after surgery, you will take many medicines. You will most likely deal with many side effects. **Keep all your appointments with your doctor and the transplant clinic** so that we can adjust your medicines and doses as needed.

What will these medicines cost?

Your medicines can cost \$1,000 or more a month. Your costs may go down over time, when some of the medicines are stopped or your doctor lowers the doses. Medicare, Medicaid, and private insurers may cover part of the cost of medicines.

Before your transplant, talk about transplant medicines with your health insurance agent or insurance company representative, your local pharmacist, and a social worker or financial counselor where you will receive your follow-up care. Be sure that you know:

- What transplant medicines are covered by your healthcare plan
- What your co-pays or deductibles will be

Be sure to keep your insurance coverage after transplant, since medicine costs can be \$12,000 to \$15,000 per year.

Where can I get my prescriptions filled?

You will need to have prescriptions filled while you are staying in the Seattle area for the required time after transplant. If your long-term (home) pharmacy is outside the Seattle area:

- Call your health insurance company to get a list of pharmacies near where you will be staying in the Seattle area after discharge.
- Make short-term arrangements to get your medicines from the pharmacy you choose in the Seattle area.

In the long term, you can fill your prescriptions at a local pharmacy or use a mail-order pharmacy. **Know where you will get your long-term prescriptions filled before your transplant surgery.** Tell your pharmacy that you will be a transplant patient so that they know your medicine needs and can set up billing arrangements.

We also advise you to:

- Always carry your prescription insurance card with you so you can show it to any pharmacy.
- Always carry a copy of your prescriptions with you, in case you need to get a refill at a new pharmacy.

What medical equipment will I need?

You will need to monitor the effects of your medicines. To do this, you may need to buy some equipment to help you do this. You may need:

- Blood pressure machine that also measures pulse
- Scale
- Thermometer
- Blood glucose meter

It is a good idea to buy a blood pressure machine and thermometer before your surgery and learn how to use them.

That way, you will be comfortable using them after surgery.

At the Hospital

What to Bring

When you are called in for transplant, bring with you:

- **Your current medicines** and a list of their names and dosages. Your Transplant Team needs to know about all of the medicines and supplements that you are taking.
- **Your transplant guide** (this manual).
- Any **equipment** you were asked to buy (see above).

Learning About Your New Medicines

After surgery, you and your caregiver will begin to learn your medicine schedule. You will need to know the names, strengths, doses, purpose, and side effects of each medicine you take. The hospital pharmacist will begin teaching you about your medicines within the first few days after surgery.

At first, the number of medicines may seem overwhelming. But, the amounts you take will get less over the next several months. Transplant patients tell us that the best way to learn all of this information is to start taking the medicines yourself while you are still in the hospital.

The pharmacist will give you a box (*mediset*) to help you organize your pills. It is a good idea for your family members and caregivers to learn about your medicines along with you, in case you need help managing the medicines.

Here are some tips to help you organize your medicines:

- Try to set up your routine so that you take medicines only 4 times a day (breakfast, lunch, dinner, and bedtime).
- Work with the pharmacist to set a schedule that will work for you.
- Use your mediset box. Store it at room temperature away from light.
- You may want to carry a small 1-day mediset with you during the day.
- You may want to get a watch with an alarm to help remind you when it is time to take your medicines. Or, use the alarm on your cell phone if you always carry it with you.

After Discharge

- **You will receive medicines to last 3 to 5 days when you leave the hospital.** You will also be given prescriptions to fill at the pharmacy you have chosen. Fill your prescriptions as soon as you can after discharge to make sure you do not run out of medicine.
- **Keep an up-to-date list of all of your medicines with you, along with the directions for taking them.** Update the list as needed and use it to refill your mediset. Ask your doctors to print out a current list at your clinic visits. You may want to keep your medicine list on your computer, tablet, or smart phone so that you can update it easily and have it with you at all times.
- **Refill your medicines early.** Do not let your supplies run out.
- **Most prescriptions can be refilled only a limited number of times.** When your refills run out, you will need to get your prescriptions renewed. This can be done by your primary care provider or *gastroenterologist* (a doctor who specializes in diagnosing and treating digestive system diseases).
- **When you come for clinic visits,** bring your mediset, the prescription bottles you have filled at your pharmacy, and your medicine list.
- **If you have problems or questions about your medicines** when you leave the hospital after your surgery, call your transplant nurse coordinator.
- **Keep your follow-up appointments** so your medicines can be checked and adjusted, if needed.

Taking Your Medicines

Here are basic guidelines about taking medicines:

- **Take ONLY the medicines your doctor prescribed for you.**

- **Take your medicines exactly as they were prescribed.** Do not increase or decrease your dose or stop taking a medicine without talking with your doctor or transplant nurse coordinator.
- **Do not take any new medicines** without talking with your doctor, transplant nurse coordinator, or pharmacist.
- **If you miss taking a dose:**
 - Wait until it is time to take your next dose and take your usual prescribed amount. Do **not** take more than a single dose at a time.
 - Call your transplant nurse coordinator or doctor for more instructions.
- Know the side effects of your medicines. Report them to your doctor or transplant nurse coordinator if they occur. If the side effects bother you too much, your doctor may be able to prescribe a different drug.
- Tell all of your healthcare providers that you are a transplant patient and are taking immunosuppressive drugs. This includes your dentist, optometrist, and all other providers.
- Keep all medicines out of reach of children and pets.
- Do not let anyone else take your medicines.
- **Do not take herbal, natural, or nutritional supplements** without talking with your transplant providers (doctors, nurses, pharmacist, and dietitian). This is because these products:
 - May have hidden ingredients that can cause side effects
 - Might interact with your transplant medicines and harm you
 - Can make managing your medicines even more complex
 - Can be costly
- **Avoid these (if possible) while taking immunosuppressants:**
 - Grapefruit, pomegranate, or star fruit
 - Non-steroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen (Advil, Motrin, and others) and naproxen (Aleve, Naprosyn, and others)
 - Aspirin (unless prescribed by your doctor)
 - Acetaminophen (Tylenol) – do not take more than 2,000 mg a day from all sources
 - Herbal or “natural” medicines
 - Nutritional supplements, other than those your Transplant Team prescribed

Immunosuppressant Medicines

Immunosuppressant medicines are also called *anti-rejection drugs*. They suppress your immune system by decreasing the effects of *lymphocytes*, a type of white blood cell. This is done so that your immune system does not see your new liver as a foreign object and reject it.

But, immunosuppressants may make it easier for you to get infections. This means you may get colds and the flu more easily. You can also get infections from germs that usually would not cause illness. These are called *opportunistic* infections. Immunosuppression also carries a small risk of developing tumors.

How many immunosuppressants will I take?

The transplant team will prescribe 2 to 4 immunosuppressant drugs for you to take. Each drug affects the immune system in a different way. When these drugs are taken together:

- They are more effective at stopping rejection.
- You can take smaller doses of each drug.
- You will have fewer side effects, and less severe side effects.

Your transplant surgeon will talk with you about the specific immunosuppressants you will need to take.

What should I do if I forget a dose?

It is important that you remember to take these medicines every day as prescribed by your doctor to prevent rejection. **If you forget whether you took your dose on a given day:**

- Do **not** double your dose.
- Call your doctor or transplant nurse coordinator for instructions.

How well do immunosuppressants work over time?

Even though you take your immunosuppressive medicines as prescribed, rejection may still occur. *Acute rejection* most often occurs within 1 year after transplant and may be reversed by using IV medicine.

Your blood test results will tell us whether your body is rejecting your new liver. Be sure to keep all appointments for blood tests.

Immunosuppressants Given by Induction

You will receive these immunosuppressants while you are in the hospital. They will be given through your IV line, by *induction*. Induction is a process that rapidly lowers your immune system right after the transplant surgery.

Antithymocyte globulin (Thymoglobulin)

Purpose: Antithymocyte globulin (ATG) is a strong anti-rejection drug. It destroys white blood cells. This drug is made from antibodies that come from animals. Some patients receive ATG to treat acute rejection episodes.

If you receive ATG:

- It will be given to you by IV over 12 hours starting right after your transplant surgery. This is called an *infusion*.
- You will then have infusions that last 4 to 6 hours every day or every other day, for at least 3 doses.

Possible side effects: Lymphocytes release chemicals as they are destroyed. These chemicals can cause allergic or flu-like symptoms. These side effects are more common after the first few doses. You will most likely be given acetaminophen (Tylenol), an antihistamine (Benadryl), and a corticosteroid (methylprednisolone) before your first 3 doses to prevent some of these side effects.

Side effects of ATG include:

- Flu-like symptoms, such as fever and chills
- Nausea
- Headache
- Shortness of breath
- Low or high blood pressure
- White blood cell count getting too low
- Low platelets and red blood cells
- Greater chance of infection

Basiliximab (Simulect)

Purpose: Basiliximab is an antibody. It blocks the action of *interleukin-2* (IL-2), a hormone-like substance in the body. IL-2 helps activate *T-lymphocytes*. Blocking T-lymphocytes will help keep your immune system from trying to destroy your transplanted liver.

An IV infusion of basiliximab is given right after transplant. A 2nd dose is given 4 days later. Some patients may receive this drug instead of ATG.

Possible side effects: This drug has a very low risk of side effects. Allergy or flu-like symptoms, such as fever and chills, are possible.

Methylprednisolone (Solumedrol)

Purpose: This drug, also known as a *steroid* or *corticosteroid*, blocks the response of many types of immune cells. You will receive a large IV dose of

methylprednisolone during your transplant surgery. You will receive another IV dose every day for up to 3 more days after surgery. This drug is also used to treat rejection episodes.

Possible side effects: High doses of steroid drugs can cause:

- Higher blood sugar
- Slower wound healing
- Blurred vision
- Muscle aches
- Mood swings
- Insomnia
- Swelling

Immunosuppressants Taken by Mouth

Medicines taken by mouth are called “oral” medicines. You will take these oral immunosuppressants for long-term maintenance (indefinitely):

Tacrolimus (Prograf, FK-506)

Purpose: Tacrolimus decreases activation, growth, and function of *lymphocytes* (white blood cells). Most transplant patients start taking tacrolimus about 1 to 3 days after surgery and keep taking it long-term.

Forms: Tacrolimus capsules come in 3 sizes: 0.5 mg, 1 mg, and 5 mg. You can combine sizes to make your dose. The brand name is Prograf, but there are also generic forms.

Usual maintenance dose: Your dose of tacrolimus will be between 1 to 10 mg taken every 12 hours, usually at 8 a.m. and 8 p.m. You may take it with meals. Your doctor may adjust your dose based on the result of a blood level test. **On clinic days, do not take your dose of tacrolimus until after your blood is drawn.**

Possible side effects: The most serious side effects of tacrolimus are injury to the kidney and nervous system reactions such as tremor and headache. These side effects may be lessened by adjusting your dose. Tacrolimus has many drug interactions and some food interactions (grapefruit, pomegranate, and star fruit) that can increase these side effects.

Some side effects include:

- Lower kidney function
- Higher blood sugar
- Higher blood pressure
- Higher blood potassium

- Lower blood magnesium
- Shakiness or tremor
- Headache
- Convulsions (seizures)
- Nausea or vomiting
- Hair loss
- Higher cholesterol
- Greater chance of infection

Cost: Tacrolimus costs \$300 to \$500 a month for generic forms. You will take it long-term. Most insurance plans, including Medicare Part B, cover the cost for eligible transplant recipients.

Mycophenolate (CellCept, Myfortic)

Purpose: Mycophenolate lowers the production of *lymphocytes* (white blood cells) in the body. Some patients take this drug while they are also taking tacrolimus.

Forms: Mycophenolate is available in 2 different forms:

- **Cellcept** comes as a 250 mg capsule and a 500 mg tablet. It also comes as an oral suspension (liquid).
- **Myfortic** is enteric-coated and comes in 180 mg and 360 mg tablets.

Usual maintenance dose:

- **Cellcept:** 1,000 mg (1 gm) taken by mouth twice a day.
- **Myfortic:** 720 mg taken by mouth twice a day. It is best taken on an empty stomach, but can be taken with food, if needed to avoid stomach upset. Do not take it with liquid antacids (Maalox, Mylanta), magnesium supplements, and iron, as they can affect how well your body absorbs the drug.

Take your doses at the same time every day. Your doctor may adjust your dose based on the result of a blood level test.

Possible side effects:

More common:

- *Leukopenia* (white blood cells getting too low)
- Nausea or vomiting
- Abdominal pain
- Diarrhea
- Greater chance of infection

Less common:

- *Anemia* (white blood cells getting too low)
- *Thrombocytopenia* (platelets getting too low)
- May cause birth defects, so **should not be taken by pregnant women**

Cost: Mycophenolate costs \$300 to \$500 a month for generic forms. You may need to take it long-term or only for several months after transplant. Most insurance plans, including Medicare Part B, cover the cost for eligible transplant recipients.

Prednisone (Deltasone)

Purpose: Prednisone (oral) and methylprednisolone (by IV) are also called *steroids* or *corticosteroid hormones*. They are used to prevent or treat rejection of the transplanted organ. They are related to a natural hormone in your body called *cortisol*. They lower the function and activity of *lymphocytes* (white blood cells).

You may receive methylprednisolone in large doses (*pulse therapy*) to treat acute rejection of your transplant. Some patients will take this drug while they are also taking tacrolimus.

If your doctors prescribe this immunosuppressant for you, you will be given methylprednisolone by IV injection for several days after your surgery. You will then start taking tablets of prednisone by mouth as needed.

Forms: Prednisone tablets come in 6 sizes: 1 mg, 2.5 mg, 5 mg, 10 mg, 20 mg, and 50 mg. The tablets are usually white and are scored, so that they break in half more easily.

Usual maintenance dose: 5 to 10 mg a day as a single dose every day. Always take prednisone with food or a snack to avoid stomach upset.

Possible side effects: Some of the side effects of prednisone and methylprednisolone are related to the dose. Higher doses cause more side effects. These lessen when the doses are reduced. Other side effects occur after many months or years of taking the drug at usual doses. It is important to get plenty of exercise and good nutrition to keep your body strong (especially bones and muscles) while you are taking prednisone.

Some patients may need to take insulin to control their blood sugar while taking prednisone. If you have diabetes, you might need higher doses of insulin at first, right after your surgery.

Short-term side effects (at high doses):

- Stomach upset, heartburn, stomach ulcers
- Emotional changes, mood swings, problems sleeping

- Night sweats
- Weight gain and swelling
- Slower wound healing
- Increased appetite, feeling hungry
- Higher blood sugar
- Face swelling (“moon face”)
- Acne
- Blurred vision
- Greater chance of infection
- Muscle aches

Long-term side effects:

- Muscle weakness
- Bone and joint weakness and pain
- *Osteoporosis* (bones become brittle and can break more easily)
- High blood sugar (*diabetes*)
- Stretch marks and weak, dry, thin skin
- Increased or unwanted hair growth
- Rounded shoulders (“buffalo hump”)
- Easy bruising
- Vision changes, cataracts
- Higher cholesterol
- Greater chance of getting certain cancers
- Greater chance of infection

Cost: Prednisone costs \$5 to \$10 a month. You may take it long-term or only for several months after the transplant. There are generic forms.

Other Immunosuppressants

Cyclosporine Modified (Neoral, Gengraf, Sandimmune)

Purpose: Cyclosporine decreases activation, growth, and function of *lymphocytes*. If your doctor prescribes cyclosporine for you, you will take it instead of tacrolimus. Both drugs work the same way on the immune system.

Forms: There are many forms of cyclosporine you can take by mouth, including a liquid. Capsules come in 3 sizes: 25 mg, 50 mg, and 100 mg. The strength of the liquid formula is 100 mg/ml. You may need to mix different sizes of capsules to make your dose.

Cyclosporine capsules are affected by air. Keep them sealed in their special package until you are ready to take your dose. The capsules are stable for 7 days outside the package.

Usual maintenance dose: 100 to 500 mg taken every 12 hours, usually at 8 a.m. and 8 p.m., with or without food. Take at the same times every day. Your doctor will adjust your dose based on the result of a blood level test.

Possible side effects: The most serious side effect of cyclosporine is toxicity or injury to the kidneys. This effect can be avoided by closely monitoring your kidneys, or reversed by proper adjustment of your dose.

Side effects include:

- Lower kidney function
- Higher blood pressure
- Higher blood potassium
- Lower blood magnesium
- Shakiness or tremor
- Burning or tingling in your hands or feet
- Increased or unwanted hair growth
- Increased gum growth
- Mood changes
- Acne
- Lower liver function
- Convulsions (seizures)
- Headache
- Higher cholesterol
- Greater chance of infection

Cost: Cyclosporine costs \$300 to \$500 a month. You will take it long-term. There are generic forms.

Sirolimus (Rapamune)

Purpose: Sirolimus blocks the function of immune cells (T-lymphocyte white blood cells) and stops them from destroying your new liver. It also has anti-cancer or anti-tumor effects. It may help prevent liver cancer from coming back. If your doctor prescribes sirolimus, you will usually take it while you are also taking tacrolimus or prednisone (or both).

Forms: Sirolimus tablets come in 0.5 mg, 1 mg, and 2 mg. It also comes as a liquid in a strength of 1 mg/ml.

Usual dose: Between 1 to 10 mg taken once a day, with or without food. Take your dose at the same time every day. Your doctor may adjust your doses based on the result of a blood level test.

Possible side effects:

- Higher blood cholesterol and triglyceride levels
- Decreased wound healing
- Lower blood platelets, red blood cells, and white blood cells
- Mouth ulcers or sores
- Acne
- Tingling in your hands or feet
- Joint pain
- Higher risk of infection
- May cause birth defects – **should not be taken by pregnant women**

Cost: Sirolimus costs \$500 to \$1,000 a month. You will take it long-term. There are no generic forms.

Azathioprine (Imuran)

Purpose: Azathioprine affects your bone marrow and helps reduce the number of white blood cells your body produces. You may take azathioprine instead of mycophenolate. You will take it long-term along with tacrolimus or cyclosporine and steroids.

Forms: Azathioprine comes as a 50 mg tablet. The tablets are scored so they can be broken in half more easily.

Usual maintenance dose: 25 mg to 175 mg taken every day in 1 dose, usually in the evening at bedtime.

Possible side effects: Azathioprine affects cells that grow rapidly such as white blood cells, red blood cells, platelets, and hair cells. The effects on blood cells usually can be reversed by lowering your dose.

Some side effects include:

- White blood cells getting too low
- *Anemia* (low red blood cells)
- Bleeding (low platelets)
- Some hair loss
- Nausea
- Jaundice (yellow skin caused by effects on the liver)

Cost: Azathioprine costs \$15 to \$100 a month. You will take it long-term. There are generic forms.

Antibiotics

When your body's immune system is suppressed, you can get infections more easily. Infections can be caused by germs that:

- Come from your environment
- Come from another person
- Live in or on you but usually do not cause infection (*opportunistic infections*)

For the first 3 months after your transplant surgery, it is very easy to get infections because of the large doses of immunosuppressants you are taking to prevent rejection. These infections can be more severe and harder to treat because you are immunosuppressed.

You will need to take several antibiotics during the first 3 months to prevent infection. The antibiotics you may take include:

Clotrimazole Troche (Mycelex) and Fluconazole (Diflucan)

Purpose: These *antifungal* (anti-yeast) drugs are given for 3 months after transplant to prevent yeast from growing in your mouth (*thrush*).

Usual dose:

- **Clotrimazole troche** (10 mg) is dissolved in the mouth. A troche is a lozenge. Avoid eating or drinking for at least 30 minutes after each dose.
- **Fluconazole** is taken by mouth and swallowed once a day or once a week. It may be taken with food.

Possible side effects of clotrimazole troche:

- Bad taste in your mouth
- Dry or chalky mouth
- Nausea

Possible side effects of fluconazole:

- Nausea
- Rash
- Diarrhea
- Abdominal pain

Cost: Clotrimazole troche costs \$50 a month. Fluconazole costs \$20 a month. There are generic forms of both.

Valganciclovir (Valcyte), Ganciclovir (Cytovene), and Acyclovir (Zovirax)

Purpose: These are antiviral medicines. Some viruses that cause infection, such as *herpes* viruses, do not leave the body once an infection has occurred. The viruses stay *dormant* (not active) until a weakened immune system “wakes them up.”

Viral infections can be severe and life-threatening for people who are immunosuppressed. Valganciclovir, ganciclovir, and acyclovir are antiviral drugs that are used to treat and prevent simple herpes virus infections (such as cold sores) and a more resistant herpes virus called *cytomegalovirus* (CMV).

You will take these drugs for 3 to 6 months after transplant. They do not treat other viruses like cold, flu, or some types of hepatitis.

Usual dose:

- **Valganciclovir** is taken by mouth. It is used to prevent or treat CMV infections. The usual dose to prevent CMV is 450 to 900 mg once a day. The usual dose to treat CMV is 900 mg twice a day. Valganciclovir can be taken with food.
- **Ganciclovir** is a form of valganciclovir. It is given by IV to treat CMV infections, either in the hospital or through home infusion.
- **Acyclovir** is used to prevent herpes infections such as cold sores. It is not used to prevent CMV. The usual dose is 400 mg twice a day. It can be taken with food.

Possible side effects:

- Nausea
- Lower kidney function
- Headache
- Low white blood cells

Cost:

- **Valganciclovir** can cost up to \$2,000 a month. There are no generic forms.
- **Acyclovir** usually costs less than \$20 a month. There is a generic form.

Trimethoprim/ Sulfamethoxazole (Bactrim/Septra, Cotrimoxazole, Trim/Sulfa, TMP/SMX), Dapsone, and Pentamidine

Purpose: These are anti-pneumocystis drugs. *Pneumocystis* is a fungus. It is usually found in the lungs of healthy people and does not cause illness. But, the fungus can cause a lung infection in someone who has a weak immune system.

Anti-pneumocystis drugs prevent this fungus from infecting the lungs. Most transplant patients take Bactrim/Septra, a sulfa-based drug. If you have a sulfa allergy, you may take Dapsone or Pentamidine instead.

These drugs are usually taken for 6 months after transplant.

Usual dose:

- **Bactrim/Septra** is a single-strength tablet (SS 80/400 mg). It is taken every day at bedtime with a full glass of water.
- The usual dose of **Dapsone** is 100 mg taken once a day by mouth.
- **Pentamidine** is usually taken once a month in an inhaled form (aerosol) at the hospital or clinic. The usual dose is 300 mg a month.

Possible side effects:

- Rash (report any rashes to your doctor)
- Nausea
- Lowered white blood cell count
- Lowered red blood cell count (with Dapsone)
- Sensitivity to the sun
- Cough, wheezing (with Pentamidine)

Cost: **Bactrim/Septra** and **Dapsone** cost \$5 to \$25 a month. There are generic forms. **Pentamidine** is taken at the hospital or clinic, and cost varies depending on your insurance coverage.

Antacids

Ranitidine (Zantac), Pantoprazole (Protonix), Omeprazole (Prilosec), and Lansoprazole (Prevacid)

Purpose: Antacids either neutralize stomach acid or stop acid from being secreted. They are taken for about 3 months after transplant to prevent the stomach upset or injury that drugs or stress can cause. If you have a history of ulcers, you will have a different plan to manage stomach acid.

Take antacids on an empty stomach for best effect.

Usual dose:

- **Ranitidine** is taken in a 150 mg dose at bedtime.
- **Pantoprazole** is taken in a 40 mg dose once a day.
- **Omeprazole** is taken in a 20 mg dose once a day.
- **Lansoprazole** is taken in a 30 mg dose once a day.

Possible side effects:

- Rash
- Headache
- Dizziness

Cost:

- **Ranitidine** costs \$10 a month. You will take it for 3 months after transplant to prevent ulcers. There are generic forms.
- **Omeprazole, pantoprazole, and lansoprazole** can cost from \$10 to \$100 a month. There are generic forms.

You do not need a prescription to buy these drugs.

Laxatives and Stool Softeners

Docusate (Colace), Senna (Senokot), Polyethylene Glycol (Miralax), and Bisacodyl (Dulcolax)

Purpose: Straining to have a bowel movement after surgery can keep your wound from healing. Avoid constipation and hard stools after transplant, and keep your stools soft for 3 months after your surgery.

To avoid constipation:

- Reduce your use of pain medicines as soon as you can after surgery. Pain medicines can cause constipation.
- Drink plenty of fluids.
- Increase your physical activity.
- Eat more foods with fiber.

Laxatives stimulate your intestines to help stool move through your bowel. **Stool softeners** make hard stool softer, so that it is easier to pass.

- **Docusate (Colace)** is a mild stool softener. It is prescribed most often after transplant.
- **Polyethylene glycol (PEG or Miralax)** helps your stool hold more water, which makes it softer.
- **Bisacodyl (Dulcolax)** is a stimulant laxative.

If you have diarrhea while you are taking these medicines, ask your doctor about taking less.

Cost: Laxatives and stool softeners cost \$5 to \$10 a month. You will take them for 3 months after transplant. There are generic forms. You can buy them without a prescription.

High Blood Pressure Medicines (Antihypertensives)

Amlodipine (Norvasc), Metoprolol (Lopressor, Toprol XL), and Doxazosin (Cardura)

Purpose: It is important to control your blood pressure to avoid damage to your new liver, and to prevent other problems such as stroke and heart disease. Some people have high blood pressure before transplant, but almost all transplant patients have high blood pressure after their surgery. Some of the immunosuppressant drugs can also cause high blood pressure.

To make sure your dose of blood pressure medicine is at the best level for you, we may adjust your dose over time. Please monitor and record your blood pressure and pulse at home, and bring your record with you to your follow-up clinic visits.

The Transplant Team often prescribes both a *calcium-channel blocker* drug such as amlodipine (Norvasc) and a *beta-blocker* drug such as metoprolol to control high blood pressure.

Special instructions:

- Do **not** stop taking your blood pressure medicines unless your doctor tells you it is OK to do so.
- Monitor and record your blood pressure and pulse twice a day. Do this before you take your morning dose and your bedtime dose of blood pressure medicine.
- Get up slowly after lying or sitting to keep from feeling dizzy or lightheaded.

Possible side effects:

- Dizziness
- Rapid lowering of blood pressure
- High or low heart rate
- Flushing
- Headache
- Feeling tired

Cost: Blood pressure medicines cost \$20 to \$50 a month. Many of these drugs have generic forms.

Clot Prevention

Aspirin

Purpose: Your doctor may advise you to take a small dose of aspirin to keep clots from forming in the blood vessels leading to your new liver. Aspirin may also prevent heart attacks and strokes. It will be prescribed for some patients, but not all.

Usual dose: 1 tablet (81 mg or baby aspirin) taken once a day.

Possible side effects:

- Bleeding in your *gastrointestinal* (digestive) tract
- Blood in your urine
- Ringing in your ears

Cost: Aspirin costs \$5 a month. You will take it long-term. There are generic forms. You can buy it without a prescription.

Diuretics

Furosemide (Lasix) and Torsemide (Demadex)

Purpose: Some of your transplant medicines can cause swelling (*edema*). Diuretics (water pills) help your body get rid of the excess water and sodium that cause the swelling. This fluid comes out in your urine.

Diuretics also lower blood pressure and remove potassium from your body. You may need potassium supplements if you lose too much potassium.

Special instructions:

- Measure and record your blood pressure, pulse, and weight every morning. Bring this record with you to your follow-up clinic visits.
- Get up slowly after lying or sitting to keep from feeling dizzy or lightheaded.

Possible side effects:

- Low blood potassium
- Too much water loss (*dehydration*)
- Dizziness
- The need to urinate more often
- Headache
- Not feeling hungry
- Leg cramps
- Higher heart rate

Drugs to Lower Cholesterol

Atorvastatin (Lipitor), Simvastatin (Zocor), Pravastatin (Pravachol), Rosuvastatin (Crestor), and Lovastatin (Mevacor)

Purpose: Most immunosuppressant drugs can raise cholesterol. High cholesterol is linked to heart disease, blood vessel disease, and damage to your new liver. Some transplant patients may need drugs to lower their cholesterol. If you were taking drugs to lower cholesterol before your transplant, you may need higher doses of them after transplant.

Special instructions: Tell your doctor if you have any muscle weakness or pain.

Possible side effects:

- Dizziness
- Headache
- Rash
- Nausea
- Abdominal cramps
- Muscle aches

Nutritional Supplements

Iron

Ferrous Sulfate

Purpose: After transplant, you may need extra iron to prevent *anemia*. Anemia occurs when there are not enough healthy red blood cells to carry oxygen to your tissues. Loss of blood is the most common cause of anemia.

Having anemia may make you feel tired and weak. Iron treats anemia by helping your body build new red blood cells.

Usual dose: The usual dose of ferrous sulfate is 324 mg, 1 to 3 times a day. You can buy most iron supplements without a prescription.

Multivitamins

Centrum, One a Day, Nature Made, Theragra, and Others

Purpose: We suggest transplant patients take a multivitamin with minerals every day to make sure their bodies have all the minerals and vitamins needed for healing and recovery. You can buy multivitamins without a prescription.

Calcium

Calcium Carbonate (Tums, Oscal), Calcium Citrate (Citracal), and Others

Purpose: Most transplant patients have a higher risk for *osteoporosis* (bone weakness) after surgery, especially if they already had bone disease before transplant. This risk is from taking immunosuppressant drugs, and from having low levels of vitamin D and sex hormones (estrogen and testosterone) before transplant.

Calcium helps build strong bones. Taking calcium after transplant can help prevent bone disease, bone loss, and fractures. Your body needs vitamin D to absorb calcium, so you will also need to take a vitamin D supplement (see “Vitamin D,” below).

Usual dose: We suggest you take between 600 to 1,200 mg of calcium as a supplement each day. The amount you need depends on how much calcium is in the foods you eat.

Dairy foods are a good source of calcium. See the “Nutrition” section of this transplant guide or talk with your transplant dietitian to learn more about calcium-rich foods.

You can buy calcium supplements without a prescription. Calcium in chewable tablets is often in a form that your body can absorb most easily.

Read labels carefully. A product with 500 mg calcium carbonate, such as Tums 500, may contain only 200 mg calcium that your body can use.

Vitamin D

Cholecalciferol (Vitamin D3), Ergocalciferol (Vitamin D2), and Calcitriol (Rocaltrol)

Purpose: Your body needs vitamin D to absorb calcium. Sunlight is the main source of vitamin D for most people. Transplant patients usually need to take a vitamin D supplement because they must avoid sun exposure to lessen their risk of skin cancer.

Usual dose: Most vitamin D found in supplements is *cholecalciferol* (vitamin D3). We advise taking about 1,000 units of cholecalciferol every day. This is in addition to the vitamin D that is in your multivitamin. You can buy cholecalciferol without a prescription.

Ergocalciferol and *calcitriol* are stronger forms of vitamin D. They must be prescribed by your doctor.

Magnesium

Magnesium Oxide (Max-Ox), Magnesium Amino Acid Chelate (Mag plus Protein), and Others

Purpose: Your body needs the mineral magnesium for healthy muscles and nerves. Magnesium also helps some enzymes work. Enzymes are proteins that help speed up important chemical reactions in your body.

Many transplant patients develop low magnesium levels. This may be caused by some of the anti-rejection drugs. Your magnesium levels can be measured with a blood test.

You may not be getting enough magnesium from the foods you eat. See the “Nutrition” section of this transplant guide or talk with your transplant dietitian for more information.

Usual dose: The usual dose of magnesium oxide is 400 to 800 mg twice a day. Magnesium comes in tablet and liquid forms.

Phosphate

Sodium Phosphate (K-Phos Neutral, Phospha 250 Neutral)

Purpose: Your body needs the mineral phosphate (phosphorous) for the growth and repair of body tissues, and for healthy bones. Transplant patients sometimes develop low blood phosphate levels. This may be because of a short-term change in how your body handles this mineral.

Dairy products can be a good source of phosphate. See the “Nutrition” section of this transplant guide or talk with your transplant dietitian for more information.

Usual dose: The usual dose of sodium phosphate is 250 to 500 mg twice a day. You can buy it without a prescription.

Ursodiol

Actigall, Urso

Purpose: Ursodiol is an acid that helps the body digest fats. It is naturally found in bile.

While the bile ducts heal after a liver transplant, the bile can become thick (*cholestasis*). If bile backs up into the liver and blood, it can cause *jaundice* (yellow skin). Your doctor may prescribe ursodiol to help keep your bile thin and prevent jaundice.

Usual dose: The dose of ursodiol is 300 to 600 mg twice a day. You will need a prescription for ursodiol.

Possible side effects: Tell your doctor if any of these symptoms are severe or do not go away:

- Diarrhea
- Constipation
- Upset stomach
- Indigestion
- Dizziness
- Vomiting
- Cough
- Sore throat
- Runny nose
- Back pain
- Muscle and joint pain
- Hair loss

Call your doctor **right away** if you have any of these symptoms while you are taking ursodiol:

- Having to urinate often
- Pain when you urinate
- Cough with fever

Cost: Ursodiol costs \$40 a month. There are generic forms.

