Medicines

After your lung transplant

After your transplant, you will be taking medicines every day for the rest of your life.

Before you have your transplant, you will need to learn how to plan for your medicine needs after transplant. You will want to know as much as you can about your medicines – how they work, what their side effects are, how to pay for them, and tips for always remembering to take them at the right time and the right way.

Getting Started

Medicines and nutritional supplements are vital to your recovery and the success of your transplant operation. Your prescriptions will include:

- **Immunosuppressive drugs** to help prevent or treat rejection of your new organ. At first, the doses will be high and then will be tapered down slowly, based on your blood test results. You will take these drugs as long as you have your transplanted organ.

- **Antibiotics and antivirals**, some for the first 3 to 6 months after surgery, but others may be for your lifetime. Immunosuppressants increase your risk of getting infections. Antibiotics and antivirals will help you fight them.

- **Antacids** for the first 2 to 3 months after transplant (or longer if you have ever had reflux or GERD) to help prevent stomach upset and heartburn.

- **Laxatives** as needed for 2 to 3 months after transplant to help keep you from getting constipated.

- **Aspirin** in small doses to prevent blood clots.

- **Blood pressure medicines** as needed for high blood pressure.

- **A multivitamin** to supplement your diet.

- **Calcium** and **vitamin D3** to help prevent osteoporosis (thin, weak bones).

- **Magnesium** to make up for the loss of this mineral through urine after transplant.
• **Pain medicines**, usually for about 8 weeks after surgery.

In the first few months after surgery, you will be getting used to taking many medicines that may have many side effects. **Keep all of your appointments with your doctor and the Transplant Clinic** so that your medicines and medicine levels can be adjusted to help manage these side effects, when needed.

**Medicine Costs**

Medicines can cost as much as $3,000 or more each month. The costs may decrease over time as some of the medicines are stopped or your doctor lowers your doses. Medicare, Medicaid, and private insurers may cover part of the costs of medicines.

Before your transplant, be sure to check what transplant medicines your medical insurance covers. Call your insurance representative, social worker, local pharmacist, or financial counselor where you will receive your follow-up care. Know what your expected copays or deductibles will be. Keep your insurance coverage after transplant, since your medicine costs can be $12,000 to $36,000 a year or more.

**Deciding on a Pharmacy**

Before your transplant, decide where you will get your prescriptions filled. You can fill your prescriptions at a local pharmacy or use a mail-order pharmacy. It is a good idea to tell your pharmacy that you will be a transplant patient so that they may anticipate your medicine needs and set up billing arrangements.

You will need to stay in the Seattle area for about 3 months after your transplant. During this time, you will need to make a short-term plan for filling your prescriptions:

• For the first month, you will need to use a pharmacy in the Seattle area, near where you are staying.

• After the first month, you can use a mail order pharmacy or your usual pharmacy.

Call your insurance company for a list of participating pharmacies near where you plan to stay after discharge from the hospital. Always carry your prescription insurance card with you so you have it to show it at any pharmacy.

**Medical Equipment**

You may need to buy certain medical equipment to help monitor the effect of your treatment. Some things you will need are a blood pressure cuff, scale, and thermometer. It is a good idea to buy and learn how to use these items before your transplant. You may also need a blood glucose meter, but do not buy one before your transplant.
At the Hospital

When you are called in for transplant, bring a list of the medicines you already take. This will give your transplant team accurate information. By this time, you should have a pharmacy plan in place for getting your medicines after your transplant.

After surgery, you will begin to learn about your new medicine regimen. You will need to know the name, strength, dose, directions, purpose, and side effects of each medicine you take. The pharmacist will begin teaching you and your caregiver(s) about your medicines about 4 to 6 days after your surgery.

At first, the number of medicines may seem overwhelming, but they will be decreased over the next several months. Patients have told us that the best way to learn all of this information is to start taking the medicines yourself while still in the hospital.

Organizing Your Medicines

The pharmacist will give you a box called a mediset to help you organize your medicines. We require family members and others on your support team to also learn how to help you manage your medicines.

Tips

- Try to organize your dosing schedule so that you take medicines only 4 times a day – at breakfast, lunch, dinner, and bedtime.
- Work with your pharmacist to plan a good schedule for you.
- Use your mediset box. Store it at room temperature away from direct light and high humidity.
- You may want to carry a 1-day mediset box with you during the day.
- You may want to get a watch with an alarm to remind you when it is time to take your medicines.

After Discharge

- When you leave the hospital, you will be given prescriptions to fill at your chosen pharmacy. Have these prescriptions filled as soon as possible after discharge so that you do not run out.
- Keep an up-to-date list of all of your medicines – often called a medicine calendar – with you. Include the directions for taking each of your medicines. Update your medicine calendar as needed and use it to restock your mediset. There is a blank calendar page in the lung transplant information binder you can use for this.
• When you need prescription refills, contact your pharmacy. If your refills have run out and you need to renew your prescriptions, your primary care doctor or pulmonologist can write new prescriptions for you.

• When you come for clinic visits, bring your mediset, your medicine list, the medicines you have filled at your pharmacy, and your records. Always keep a written list of medicines with you. If you have problems or questions about your medicines after you are discharged, call your transplant nurse coordinator.

• Keep your appointments so that your medicines can be checked and adjusted if needed.

• Refill your prescriptions early, so you do not run out. If you are having trouble obtaining any of your medicines, call Post Lung Transplant Services at 206-598-5668 at least 48 hours before you will run out.

**Guidelines for Taking Medicines**

Here are some basic guidelines for taking medicines:

• Take **only** the medicines your doctor prescribed for you.

• Take your medicines only as prescribed. Do not increase or decrease your dose or stop taking a medicine without consulting your doctor or transplant coordinator.

• If you miss a dose of medicine, do **not** take 2 doses when it is time for your next dose. Call your transplant coordinator or doctor for more instructions if you miss a dose.

• Check with your doctor or pharmacist **before** you take any new medicines, including over-the-counter medicines, herbal or natural remedies or supplements, or vitamins.

• Know the side effects of your medicines. Tell your doctor or transplant nurse coordinator if you have any side effects.

• Tell your other health care providers (doctor, dentist, optometrist, etc.) about any new medicines that you are taking, including over-the-counter products, herbal or natural remedies, and vitamin or mineral supplements. Be sure to tell them you have had a transplant and that you are taking immunosuppressive drugs.

• Carry a list of your current medicines and doses with you.

• Keep all medicines out of reach of children and pets.

• Do not give your medicines to anyone else.

• Do not let your medicine supplies run out.
What to Avoid

Avoid these items when taking immunosuppressive drugs (unless your doctor says you may use them):

- Grapefruit and grapefruit juice
- Non-steroidal anti-inflammatories (NSAIDs), such as ibuprofen, (Advil, Nuprin, and others) and naproxen (Aleve, Naprosyn, and others)
- Aspirin in larger quantities than prescribed
- Erythromycin
- Clarithromycin
- Itraconazole
- Voriconazole
- Ketoconazole
- Diltaizem
- Verapamil
- Dilantin (phenytoin)
- Phenobarbital
- Rifampin
- St. John’s wort (*hypericum perforatum*)

**Herbal and Natural Medicines**

You will also need to avoid all other herbal and natural medicines or supplements. This is because:

- They may cause adverse drug interactions and toxicities.
- They are often costly.
- They make managing your transplant regimen more complex.

Always check with Post Lung Transplant Services at 206-598-5668 before taking any herbal medicines or supplements.

**Immunosuppressants**

*Immunosuppressants*, or anti-rejection drugs, suppress your body's immune system by decreasing the effects of *lymphocytes* (a type of white blood cell). These drugs are taken so that your body’s immune system does not see your new organ as “foreign” and then defend your body by attacking the organ with white blood cells.

Immunosuppressants may make your body more likely to get infections from organisms that normally do not cause infections (called “opportunistic” infections), as well as from organisms in your environment such as cold and flu viruses. Immunosuppressants may also increase your risk of developing some types of cancer or tumors.
You will use a combination of 2 to 4 immunosuppressants. Each drug works by blocking a different pathway in your immune system. Working together, they produce better immunosuppression and allow you to take smaller doses of each drug. Taking smaller doses also reduces the number and severity of side effects caused by the drugs. The specific immunosuppressants and protocol for your type of transplant will be explained by your transplant doctor and in the class.

You must remember to take your immunosuppressants every day as prescribed by your doctor to prevent rejection. **If you forget whether you took your dose on a given day**, call your doctor or transplant nurse coordinator for instructions. Do not double your dose if you think you missed a dose.

Even though you are taking your immunosuppressants, rejection may still occur. Acute rejection most often occurs within the first year after transplant. It may be successfully reversed by using medicine. It is important for you to recognize the signs and symptoms of rejection so that we can start treatment right away.

This is a list of the more common immunosuppressant (anti-rejection) drugs that you may take or receive:

- Basiliximab (Simulect)
- Tacrolimus (Prograf)
- Mycophenolate (Myfortic and Cellcept)
- Prednisone (Deltasone), Methylprednisolone (Solumedrol)

These immunosuppressant drugs are less common:

- Antithymocyte globulin (ATG, Thymoglobulin)
- Cyclosporine (Neoral, Gengraf, Sandimmune)
- Sirolimus (Rapamune)
- Azathioprine (Imuran)

**Basiliximab (Simulect)**

Basiliximab is an antibody that blocks the action of interleukin-2 (IL-2). IL-2 is a hormone-like substance (cytokine) in the body that helps activate T-lymphocytes, a type of white blood cell that is thought to attack the graft (transplanted organ) and destroy it. You will receive an IV infusion of this drug at the time of your transplant. You will receive a second dose 4 days after your transplant, before you leave the hospital.

**Potential Side Effects**

Basiliximab does not cause side effects in most patients. You may have allergy symptoms such as fever or chills.
Tacrolimus (Prograf, FK-506)

Tacrolimus is an immunosuppressant drug that helps prevent rejection. It decreases activation, growth, and function of lymphocytes (white blood cells). It is taken with mycophenolate and prednisone. It is usually started about 1 to 3 days after transplant surgery.

Dose

Tacrolimus capsules come in 3 sizes: 0.5 mg, 1 mg, and 5 mg. You can use a combination of different sizes to make your dose. Use the smallest number of capsules possible to make up your dose.

Example:

- For a 2.5 mg dose: take 2 of the 1 mg capsules and 1 of the 0.5 mg capsules.
- For an 8 mg dose: take 1 of the 5 mg capsules and 3 of the 1 mg capsules.

The usual maintenance dose is 1 mg to 10 mg taken every 12 hours, usually at 9 a.m. and 9 p.m. You may take it with or without food. Your doctor might adjust your dose based on the result of a blood test. Your blood test will be scheduled for 8:30 a.m. Do not take your morning dose of tacrolimus before your blood draw. Wait and take it after the blood has been drawn.

Potential Side Effects

The most serious side effects of tacrolimus are injury to the kidney (nephrotoxicity) and damage to the nerves (neurotoxicity). This type of nerve damage may cause tremor and headache. These side effects may be reduced by adjusting your dose based on results of a tacrolimus blood-level test.

Some side effects are:

- Decreased kidney function
- Increased blood glucose
- Increased blood pressure
- Increased blood potassium
- Decreased blood magnesium
- Shakiness or tremor
- Gingival (gum) growth
- Headache
- Nausea or vomiting
- Convulsions
- Hair loss
- Increased cholesterol
- Increased risk of infection
- Increased or unwanted hair growth

Cost

Tacrolimus usually costs $120 to $1,200 a month. You will take this drug indefinitely. Medicare Part B may cover 80% of the cost for eligible transplant recipients. Generic forms are available.
Mycophenolate (Myfortic, CellCept)

Mycophenolate is an immunosuppressant drug that helps prevent rejection. It decreases the production of lymphocytes (white blood cells) in the body. It is used with tacrolimus and prednisone. As part of your immunosuppressant regimen, you will take it by mouth 2 times a day. It is available in 2 different forms at most pharmacies.

You will take mycophenolate indefinitely.

Dose

- Myfortic is available in 2 sizes: 360 mg and 180 mg tablets. Myfortic has delayed absorption. Usual maintenance dose is 720 mg, taken by mouth 2 times a day.
- CellCept is available in 2 sizes: a 250 mg capsule and a 500 mg tablet. It is also available as a liquid with a strength of 1,000 mg/5 ml (teaspoonful). Usual maintenance dose is 1,000 mg (1 gm), taken by mouth 2 times a day.

It is best to take these drugs with food to prevent stomach upset. Do not take with liquid antacids such as Maalox and Mylanta, since they can affect how well your body absorbs mycophenolate.

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

Potential Side Effects

**More common:**
- Leukopenia (severe lowering of white blood cells)
- Nausea or vomiting
- Abdominal pain
- Diarrhea
- Increased risk of infections

**Less common:**
- Anemia (severe lowering of red blood cells)
- Thrombocytopenia (lower than normal platelets)

Cost

Mycophenolate usually costs $90 to $215 a month. Generic CellCept is available. There is no generic form of Myfortic available. Medicare Part B may cover 80% of the cost for eligible transplant recipients.

Prednisone (Deltasone), Methylprednisolone (Solumedrol)

Prednisone (oral) and methylprednisolone (intravenous) are also known as steroids or corticosteroid hormones. These immunosuppressant drugs are used to prevent or treat rejection of the transplanted lung.
These drugs are related to a natural hormone in your body called cortisol. They decrease the activity of white blood cells (lymphocytes). You will be given methylprednisolone by IV injection shortly before and for several days after your transplant surgery.

You will take prednisone by mouth shortly before your surgery and as part of your long-term immunosuppressant regimen.

Methylprednisolone in large IV doses (called “pulse therapy”) may be used later as needed to treat acute rejection. After pulse therapy, you will keep taking oral prednisone as part of your long-term immunosuppressant regimen.

You will take this drug indefinitely.

**Dose**

Prednisone tablets are available in 6 different sizes: 1 mg, 2.5 mg, 5 mg, 10 mg, 20 mg, and 50 mg. The tablets are usually white and have an indented line (called a “score”) in the middle. This makes it easy to break them in half.

After your transplant surgery, your dose will be decreased about every 2 weeks until it is down to the usual maintenance dose of about 10 mg, taken once a day. Always take prednisone with food.

**Potential Side Effects**

Some of the side effects of prednisone and methylprednisolone are linked with higher doses (“dose-related”). The side effects decrease when the doses are reduced. Other side effects occur after many months or years of taking the drug at usual doses.

Exercise and good nutrition help keep your body strong (especially bones and muscles) while you are taking prednisone. Some patients who did not have diabetes before transplant will need to take insulin to manage high blood glucose caused by prednisone. If you already have diabetes, you may need to take higher doses of insulin right after your surgery.
**Short-term side effects at high doses:**

- Stomach upset, heartburn, and ulcers
- Emotional changes, mood swings, sleep disturbances
- Night sweats
- Weight gain, swelling
- Slowed wound healing
- Increased appetite, feeling hungry
- Increased blood glucose
- Face swelling (“moon face”)
- Acne
- Blurred vision
- Increased risk of infection

**Long-term side effects (may be worse with higher doses):**

- Muscle weakness
- Bone and joint weakness or pain
- Osteoporosis (thinning bones)
- Weak, dry, thin skin; stretch marks
- Increased or unwanted hair growth
- Round shoulders (“buffalo hump”)
- Easy bruising
- Visual changes, cataracts
- Increased cholesterol
- Increased risk of getting certain cancers
- Increased risk of infection

**Cost**

Prednisone costs $5 to $10 a month. Generics are available. Medicare Part B may cover 80% of the cost for eligible transplant recipients.

**Antithymocyte globulin (ATG, Thymoglobulin)**

ATG is a strong anti-rejection drug. It is made from antibodies that are made in animals. ATG destroys white blood cells.

Some patients receive ATG to treat rejection episodes.

**Potential Side Effects**

As lymphocytes (white blood cells) are destroyed in your body, they release chemicals that can cause allergic or flu-like symptoms. These symptoms are more common after the first few doses.

Steroids, acetaminophen (Tylenol), and an antihistamine (Benadryl) are usually given before your doses to prevent some of the allergic side effects.

Some side effects include:

- Flu-like symptoms
- Fever
- Chills
- Nausea
- Headache, muscle aches, and backache
- Shortness of breath
- Lowered or elevated blood pressure
- Severe lowering of white blood cells
- Lowered platelets and red blood cells
- Increased risk of infection
Cyclosporine (Neoral, Gengraf, Sandimmune)

Cyclosporine is an immunosuppressant drug that helps prevent rejection. It decreases the activation, growth, and function of lymphocytes (white blood cells). It may replace tacrolimus in the immunosuppressant plan. It is used with mycophenolate and steroids. You will receive cyclosporine just before surgery (with prednisone). You may also receive it after surgery through an intravenous (IV) line, before switching to tacrolimus.

You may be switched to cyclosporine by your transplant pulmonologist if you do not tolerate tacrolimus after surgery. If you are switched to cyclosporine from tacrolimus, you will take this drug indefinitely.

Dose

There are several forms of oral cyclosporine available, including a liquid solution. Capsules may be available in 2 sizes: 25 mg and 100 mg. The strength of the liquid solution is 100 mg/ml. You will use a combination of sizes for your dose. Use the smallest number of capsules possible to make up your dose.

Example:

- For a 225 mg dose: take 2 of the 100 mg capsules plus 1 of the 25 mg capsules.
- For a 175 mg dose: take 1 of the 100 mg capsule plus 3 of the 25 mg capsules.

Cyclosporine capsules are sensitive to air and come in special blister-seal packaging. Keep them in the blisters until you are ready to take your dose. They are stable for 7 days outside the blister packaging.

Usual maintenance dose is 100 mg to 500 mg taken every 12 hours, usually at 9 a.m. and 9 p.m., with or without food. Take it at the same time every day. Your doctor will adjust your dose based on the result of a blood test. Blood for the test should be drawn right before your next dose of cyclosporine is due (12 hours after your last dose), so do not take your cyclosporine before your blood draw on clinic appointment days.

Different brands of cyclosporine are absorbed differently. If your cyclosporine refill looks different than usual, ask your pharmacist if you received the correct product. Tell Post Lung Transplant Services if your brand is changed.

Potential Side Effects

The most serious side effect of cyclosporine is toxicity or injury to the kidney. Often this effect can be avoided or reversed by close monitoring of your kidney function and proper adjustment of your dose.
Some side effects are:

- Mood changes
- Acne
- Decreased liver function
- Convulsions
- Headache
- Increased cholesterol
- Increased risk of infection

**Cost**

Cyclosporine usually costs about $100 to $300 a month. Generics are available. Medicare Part B may cover 80% of the cost for eligible transplant recipients.

**Sirolimus (Rapamune)**

Sirolimus is an immunosuppressant drug that is used to help prevent rejection. It blocks the function of immune cells (T-lymphocyte white blood cells) and prevents them from destroying the transplanted organ. It is usually taken with tacrolimus or cyclosporine, mycophenolate, and prednisone.

You will take this drug indefinitely.

**Dose**

Rapamune is available in 1 mg and 2 mg tablets, and as a liquid in a strength of 1 mg/ml.

The usual maintenance dose is 1 mg to 10 mg taken once a day, with or without food. Take your dose at the same time every day. Also take it the same way every day – with or without food. Your doctor might adjust your doses based on the result of a blood test.

If you take both cyclosporine and sirolimus, you **must** take the sirolimus 4 hours after the cyclosporine. This is because your body cannot fully absorb and use these medicines if you take them at the same time.

**Potential Side Effects**

- Increased blood cholesterol and triglyceride levels
- Decreased blood platelets and white blood cells
- Mouth ulcers or sores
- Acne
- Tingling feeling in hands or feet
- Joint pain
- Increased risk of infection
- Shortness of breath (rare)
- Decreased kidney function
Cost
Sirolimus usually costs $350 to $1,300 a month. No generic form is available. Medicare Part B may cover 80% of the cost for eligible transplant recipients.

Azathioprine (Imuran)
Azathioprine is an immunosuppressant drug that helps prevent rejection. It affects the bone marrow and decreases the number of white blood cells the body produces. It can replace mycophenolate in your immunosuppressant plan. It is used with cyclosporine or tacrolimus and steroids.

This drug is taken indefinitely.

Dose
Azathioprine is available as a 50 mg yellow tablet (Imuran brand) or as a generic. It has a score in the center that makes it easy to break in half. The usual maintenance dose is 25 mg to 175 mg taken 1 time a day, usually in the evening at bedtime.

Potential 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 can usually be reversed by lowering the dose.

Some side effects include:
- Severe lowering of white blood cells
- Bleeding (lowered platelets)
- Anemia (lowered red blood cells)
- Mild hair loss
- Nausea
- Jaundice (yellow skin caused by effects on the liver)
- Fever

Cost
Azathioprine usually costs about $15 a month. Generics are available. Medicare Part B may cover 80% of the cost for eligible transplant recipients.

Antibiotics and Antivirals
When your body’s immune system has been suppressed, you are at higher risk of getting infections. Infections can be caused by organisms (germs) that come from your environment or another person. They can also be caused by organisms that live in or on you but that normally do not cause infection.

During the first 3 months after your transplant surgery, you are at very high risk of infections because of the large doses of immunosuppressant
drugs you are taking to prevent rejection. These infections can be more severe and harder to treat in a person who is immunosuppressed. It is important that you take several antibiotics to prevent infection.

Antibiotics you may be prescribed include:

- Clotrimazole troche (Mycelex)
- Valganciclovir (Valcyte), ganciclovir (Cytovene), or acyclovir (Zovirax)
- Trimethoprim/sulfamethoxazole (Bactrim, Septra, cotrimoxazole, trim/sulfa, TMP/SMX)
- Dapsone
- Pentamidine (Pentam)

**Clotrimazole Troche (Mycelex)**

Lung transplant patients will take an antifungal (anti-yeast) drug to prevent too much yeast growth in the mouth (thrush).

You will usually take clotrimazole for 3 to 6 months after transplant.

**Dose**

The 10 mg clotrimazole troche (lozenge) should be dissolved in the mouth. Do not eat or drink for 15 to 30 minutes after each dose.

**Potential Side Effects**

- Unpleasant taste in mouth
- Chalky mouth
- Dry mouth
- Nausea

**Cost**

The cost is about $27 to $130 a month. Generics are available.

**Valganciclovir (Valcyte) or Acyclovir (Zovirax)**

Valganciclovir and acyclovir are antiviral drugs used to treat and prevent herpes infections. Valganciclovir is used to prevent cytomegalovirus (CMV) infections, a type of herpes infection. You will take 1 of these drugs for 3 months after transplant, then you will take acyclovir as prescribed, possibly for your lifetime. If you develop a CMV infection after transplant, you will restart valganciclovir or take an IV drug called ganciclovir to treat the CMV infection.

**Dose**

- The usual dose of valganciclovir is 900 mg once a day to prevent CMV infections.
- The usual dose of acyclovir to prevent herpes infections is 400 mg 2 times a day.

Both drugs can be taken with or without food.
Potential Side Effects

- Nausea
- Decreased kidney function
- Headache
- Decreased white blood cells

Cost

- Valganciclovir costs about $2,500 a month. Generics are available.
- Acyclovir costs about $10 a month. Generics are available.

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

Trimethoprim/sulfamethoxazole is an antibacterial sulfa drug used to treat or prevent lung infections that are caused by too much of a fungus called *pneumocystis*. This fungus occurs naturally in the environment. It does not cause illness in healthy people, but in people with a weakened immune system it can overgrow.

This drug is taken indefinitely after transplant.

Dose

Most patients will take a single strength (SS) tablet daily, usually at bedtime. Take with a full glass of water.

Potential Side Effects

- Rash (report any rashes to your doctor)
- Nausea
- Lowered white blood cell count
- More likely to sunburn (wear sunscreen if you are going to be in the sun for a long time)

Cost

This drug costs $10 a month. Generics are available.

Dapsone

Dapsone is used to prevent pneumocystis lung infections. It may be used instead of trimethoprim/sulfamethoxazole in patients who are allergic to sulfa drugs.

This drug is taken indefinitely after transplant.

Dose

Patients will take 1 tablet (100 mg) daily.

Potential Side Effect

- Lowered red blood cell count

Cost

This drug costs about $75 a month.
Pentamidine (Pentam)
Pentamidine is an antimicrobial drug that may be used instead of trimethoprim/sulfamethoxazole to prevent or treat pneumocystis infections.

Dose
Patients receive an inhaled treatment of 300 mg once a month.
This drug is taken indefinitely after transplant.

Potential Side Effects
• Unpleasant taste
• Cough

Medicines to Prevent Stomach Acid Secretion
Medicines called proton pump inhibitors and histamine blockers prevent acid secretion. They are needed to prevent stomach injury caused by stress or by high doses of your immunosuppressant drugs. Usually, these medicines are taken for 3 months after transplant unless you have had stomach ulcers, GERD (reflux), or severe heartburn in the past. Talk with your health care provider before suddenly stopping these medicines. You may need to taper the drug off slowly.

You will be prescribed one of these medicines:
• Ranitidine (Zantac)
• Pantoprazole (Protonix), Omeprazole (Prilosec), or Lansoprazole (Prevacid)

Ranitidine (Zantac)
Ranitidine decreases the output of stomach acid. This drug may be used alone or along with liquid antacids.

Dose
The usual dose for ulcer prevention is 150 mg 2 times a day.

Potential Side Effects
• Rash
• Headache
• Mental changes
• Dizziness

Cost
Ranitidine costs less than $10 a month. Generics are available. It is available over-the-counter (without a prescription).
Pantoprazole (Protonix), Omeprazole (Prilosec), or Lansoprazole (Prevacid)

Pantoprazole, omeprazole, and lansoprazole are strong drugs that stop the stomach from making acid. They are used to prevent and treat stomach ulcers and heartburn. They can be used instead of ranitidine.

**Dose**

These drugs should be taken on an empty stomach 30 minutes before a meal. They are usually taken once a day, in these doses:

- Protonix – 40 mg
- Prilosec – 20 mg
- Prevacid – 30 mg

**Potential Side Effects**

- Nausea
- Abdominal pain
- Constipation
- Headache
- Dizziness

**Cost**

These drugs cost about $20 to $50 a month. Generics and over-the-counter (without a prescription) choices are available.

**Laxatives and Stool Softeners**

These products make your stools softer or stimulate your bowel to help you have comfortable bowel movements. Constipation and hard stools should be avoided after surgery. Straining to have a bowel movement can lead to problems with your wound.

It is important to reduce your use of medicines that can cause constipation, such as pain medicines, as soon as possible after surgery. Drinking plenty of fluids, increasing your physical activity, and increasing the fiber in your diet can also help.

Docusate (Colace) is a mild stool softener that is used most often. Senna and bisacodyl (Dulcolax) are stimulant laxatives that may also be prescribed for some patients.

You will take these medicines for about 3 months after transplant. If you have diarrhea while taking them, you should decrease your dose or stop taking them.
Some common laxatives are:

- Bisacodyl (Dulcolax)
- Senna (Senokot)
- Milk of Magnesia (MOM)

Some common stool softeners are:

- Docusate (Colace, DOSS)
- Polyethylene glycol (Miralax)

**Cost**

These products cost about $5 to $10 a month. Generics are available. These are available over-the-counter (without a prescription).

**High Blood Pressure Medicines (Antihypertensives)**

Some transplant patients may need to take drugs to treat the high blood pressure they had before surgery. High blood pressure (*hypertension*) is common after transplant. High blood pressure can also be caused by some of the immunosuppressant drugs. Controlling blood pressure will prevent damage to your new organ(s) and will help prevent other problems, such as stroke, kidney damage, and heart disease.

We suggest you monitor and record your blood pressure and pulse at home so we can adjust the dose of your high blood pressure medicine, if needed. Some patients take these medicines indefinitely.

Some common antihypertensives used by the transplant team include:

- Amlodipine (Norvasc)
- Nifedipine (Procardia, Procardia-XL, Adalat)
- Felodipine (Plendil)
- Metoprolol (Lopressor, Toprol XL)
- Atenolol (Tenormin)
- Clonidine (Catapres)
- Valsartan (Diovan)
- Losartan (Cozaar)
- Enalapril (Vasotec)
- Lisinopril (Zestril, Prinivil)
- Hydrochlorothiazide
Special Instructions

• Do not stop taking blood pressure medicine before talking with your doctor and Post Lung Transplant Services. Some of these medicines may interact with your immunosuppressants, and your doses of immunosuppressants may need to be adjusted.

• Monitor and record your blood pressure and pulse before taking your morning and bedtime doses.

• Get up slowly from lying or sitting positions. This helps lessen dizziness or lightheadedness.

Potential Side Effects

• Dizziness
• Rapid lowering of blood pressure
• Increased or decreased heart rate
• Flushing
• Headache
• Feeling tired

Cost

Blood pressure medicines cost at least $20 to $50 a month. Many are available in generic form.

Aspirin for Clot Prevention

A small dose of aspirin can help prevent blood clots in blood vessels that lead to your new organ. It might also prevent heart attacks and strokes. Some patients will take it indefinitely.

Dose

The transplant team may prescribe a dose of 1 tablet (81 mg, or 1 baby aspirin) a day. Always take aspirin with food, even if it is enteric coated.

Potential Side Effects

• Bleeding of your soft tissues or gastrointestinal tract
• Blood in your urine
• Ringing in your ears

Cost

Aspirin costs $5 a month. Generic forms are available. It is an over-the-counter drug (no prescription needed).
Cholesterol-Lowering Drugs

Cholesterol-lowering medicines are used in lung transplant to decrease inflammation of the new lungs and prolong graft survival. Some patients may need medicines to lower cholesterol. Some common cholesterol-lowering drugs are:

- Simvastatin (Zocor)
- Pravastatin (Pravachol)
- Rosuvastatin (Crestor)
- Atorvastatin (Lipitor)

Special Instructions

Report any unexplained muscle weakness or pain to your doctor.

Potential Side Effects

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

Vitamin and Mineral Supplements

Multivitamins

We recommend taking 1 multivitamin every day to supplement your diet. If you have cystic fibrosis, we will adjust your vitamin regimen based on levels of vitamins in your blood.

Calcium

Most transplant patients need extra calcium to help prevent bone disease and osteoporosis (thinning of the bones). Some common calcium supplements are:

- Calcium carbonate (TUMS and Oscal)
- Calcium citrate (Citracal)

Dose

We recommend taking 600 mg to 1,200 mg of elemental (active) calcium a day, depending on how much calcium you get in your diet. Dairy foods are a good source of calcium. See the “Nutrition” section of this manual, or talk with your transplant dietitian for more information.

Vitamin D

Vitamin D is needed to help the body absorb the calcium from your diet or supplements. Some common vitamin D supplements are:

- Cholecalciferol (vitamin D3)
- Ergocalciferol (vitamin D2)
**Dose**

We recommend taking about 1,000 units of cholecalciferol every day, in addition to the vitamin D that is in your multivitamin. Ergocalciferol is a potent form of vitamin D that may be prescribed after your doctor has checked the vitamin D levels in your blood. If you have cystic fibrosis, we will adjust your vitamin D dose based on levels of vitamins in your blood.

**Magnesium**

Our bodies need magnesium to keep our muscles and nerves healthy. Magnesium also helps some enzymes work. (An enzyme is something that helps speed up a chemical reaction in your body.)

Many transplant patients have low magnesium levels. This may be caused by some of the antirejection drugs (tacrolimus, cyclosporine). It may be hard to get enough magnesium in your diet. Talk with your transplant dietitian for more information.

A common magnesium supplement is:

- Magnesium oxide (MagOx), available as a tablet or capsule

**Dose**

The usual dose of magnesium is 400 mg, twice a day.

**Potential Side Effects**

Magnesium may cause diarrhea.

**Will my insurance cover medicines I buy without a prescription?**

Most insurance companies do not pay for medicines you can buy “over the counter” (without a prescription). These include multivitamins, calcium, magnesium oxide, vitamin D, ranitidine, and aspirin.