

Cyclophosphamide Oral Formulation (Cytoxan®, Neosar®, Endoxan®)

Pronounced: SYE-kloe-FOS-fa-mide

Classification: Alkylating Agent

About Cyclophosphamide

Cyclophosphamide exerts its anti-cancer effect by a process called alkylation. Alkylation damages the DNA of cells, which prevents them from dividing, and causes them to die. Since cancer cells, in general, divide faster and with less error correcting than healthy cells, cancer cells are more sensitive to this damage.

How to Take Cyclophosphamide

Cyclophosphamide can be given by intravenous (IV, into a vein) infusion or taken orally (by mouth) in a pill form. This information is about the oral (by mouth) formulation.

Oral doses should be taken whole (not crushed, chewed, or broken) and with food in order to decrease nausea. The dosage and schedule are determined by the person's size and type of cancer.

Storage and Handling of Oral Cyclophosphamide

Store your medication in the original, labeled container, at room temperature, and in a dry location (unless otherwise directed by your healthcare provider or pharmacist). This medication should not be stored in a pillbox. Keep containers out of reach of children and pets.

If a caregiver prepares your dose for you, they should wear gloves or pour the pills directly from their container into the cap, a small cup, or directly into your hand. They should not touch the pills. They should always wash their hands before and after giving you the medication. Pregnant or nursing women should not prepare the dose for you. Ask your oncology team where to return any unused medication for disposal. Do not flush down the toilet or throw in the trash.

Where do I get this medication?

Depending on your insurance coverage, oral cyclophosphamide is available through retail/mail order and some specialty pharmacies. Your oncology team will work with your prescription drug plan to identify an in-network retail/mail order pharmacy or specialty pharmacy for medication distribution.

Insurance Information for Oral Formulation

Oral cyclophosphamide may be covered under your prescription drug plan. Co-pay assistance from third party independent foundations may be available depending on your income and diagnosis. Your care team can help you find these resources, if they are available.

If you have Medicare, the oral formulation of this medication is covered under Medicare part B for Medicare recipients. Make sure your pharmacist knows to process this prescription through your Medicare part B and NOT part D.

Possible Side Effects

There are a number of things you can do to manage the side effect of cyclophosphamide. Talk to your doctor or nurse about these recommendations. They can help you decide what will work best for you. There are some of the most common side effects:

Nausea and/or Vomiting

Talk to your doctor or nurse so they can prescribe medications to help you manage [nausea and vomiting](#). In addition, dietary changes may help. Avoid things that may worsen the symptoms, such as heavy or greasy/fatty, spicy or acidic foods (lemons, tomatoes, oranges). Try antacids, (e.g. milk of magnesia, calcium tablets such as Tums), saltines, or ginger ale to lessen symptoms.

Call your doctor or nurse if you are unable to keep fluids down for more than 12 hours or if you feel lightheaded or dizzy at any time.

Diarrhea

Your oncology team can recommend medications to relieve [diarrhea](#). Also, try eating [low-fiber](#), bland foods, such as white rice and boiled or baked chicken. Avoid raw fruits, vegetables, whole grain breads, cereals and seeds. Soluble fiber is found in some foods and absorbs fluid, which can help relieve diarrhea. Foods high in soluble fiber include: applesauce, bananas (ripe), canned fruit, orange sections, boiled potatoes, white rice, products made with white flour, oatmeal, cream of rice, cream of wheat, and farina. Drink 8-10 glasses of non-alcoholic, un-caffeinated fluid a day to prevent dehydration.

Low White Blood Cell Count (Leukopenia or Neutropenia)



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White blood cells (WBC) are important for fighting infection. While receiving treatment, your [WBC count can drop](#), putting you at a higher risk of getting an infection. You should let your doctor or nurse know right away if you have a fever (temperature greater than 100.4), sore throat or cold, shortness of breath, cough, burning with urination, or a sore that doesn't heal.

Tips to preventing infection:

- [Washing hands](#), both yours and your visitors, is the best way to prevent the spread of infection.
- Avoid large crowds and people who are sick (i.e.: those who have a cold, fever or cough or live with someone with these symptoms).
- When working in your yard, wear protective clothing including long pants and gloves.
- Do not handle pet waste.
- Keep all cuts or scratches clean.
- Shower or bath daily and perform frequent [mouth care](#).
- Do not cut cuticles or ingrown nails. You may wear nail polish, but not fake nails.
- Ask your doctor or nurse before scheduling dental appointments or procedures.
- Ask your doctor or nurse before you, or someone you live with, has any vaccinations.

Loss or Thinning of Scalp and Body Hair (Alopecia)

Your hair may become [thin, brittle, or may fall out](#). This typically begins two to three weeks after treatment starts. This hair loss can be all body hair, including pubic, underarm, legs/arms, eyelashes, and nose hairs. The use of scarves, wigs, hats and hairpieces may help. Hair generally starts to regrow soon after treatment is completed. Remember your hair helps keep you warm in cold weather, so a hat is particularly important in cold weather or to protect you from the sun.

Decrease in Appetite

[Nutrition](#) is an important part of your care. Cancer treatment can affect your appetite and, in some cases, the side effects of treatment can make eating difficult. Ask your nurse about nutritional counseling services at your treatment center to help with food choices.

- Try to eat five or six small meals or snacks throughout the day, instead of 3 larger meals.
- If you are not eating enough, nutritional supplements may help.
- You may experience a metallic taste or find that food has no taste at all. You may dislike foods or beverages that you liked before receiving cancer treatment. These symptoms can last for several months or longer after treatment ends.
- Avoid any food that you think smells or tastes bad. If red meat is a problem, eat chicken, turkey, eggs, dairy products and fish without a strong smell. Sometimes cold food has less of an odor.



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- Add extra flavor to meat or fish by marinating it in sweet juices, sweet and sour sauce or dressings. Use seasonings like basil, oregano or rosemary to add flavor. Bacon, ham and onion can add flavor to vegetables.

Bladder Irritation

Cyclophosphamide may irritate your bladder, cause blood in your urine, or pain with urination. Drink at least 6 to 8 glasses of fluid/day to flush out your bladder. Let your doctor or nurse know if you have difficulty urinating, pain, notice pink or red urine, or bleeding during urination. When given in high doses, your doctor may give you a medication to protect your bladder.

Nail and Skin Changes

Your fingernails/toenails may become dark, brittle or fall off. You may notice dry skin or changes in the color or tone of your skin. Your skin may be more sensitive to the sun, which can result in severe sunburn or rash. Sun sensitivity can last even after chemotherapy is completed. Avoid the sun between 10-2pm, when it is strongest. Wear sunscreen (at least SPF 15) everyday, wear sunglasses and long sleeves/pants to protect your skin. Keep your fingernails and toenails clean and dry. You may use nail polish, but do not wear fake nails. If any nails fall off, clean the nail bed well with soap and water and cover with a band aid.

Secondary Malignancies

There is a very low risk of developing leukemia or other type of cancer due to treatment with this medication, which can occur many years after treatment. This is most often associated with repeated treatments or high doses.

Lung Changes

In rare cases, this medication may cause lung changes, including pneumonitis (irritation of the lung tissue) and pulmonary fibrosis (a scarring and stiffening of the lung tissue). These problems can develop during treatment, or months to years after treatment is completed. Call your physician right away if you have new or worsening shortness of breath, cough, wheezing or difficulty breathing.

Heart Problems

In rare cases, this medication can affect your heart function, cause abnormal heartbeats (afib or aflutter), or an abnormal heart rhythm called QT prolongation. Notify your healthcare provider right away if you develop swelling of the feet or ankles, shortness of breath, have a rapid weight gain, feel abnormal heartbeats or if you feel dizzy or faint.

Wound Healing



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This medication can lead to slower or incomplete wound healing, such as a surgical wound not healing or staying closed. Therefore, it is recommended that the medication be discontinued prior to any surgery. In addition, any surgical incision should be fully healed prior to starting or restarting the medication. If you have a surgical wound that has not healed or begins to have signs of infection (redness, swelling, warmth), report this to your healthcare team.

Reproductive Concerns

Exposure of an unborn child to this medication could cause birth defects, so you should not become pregnant or father a child while on this medication. Effective birth control is necessary during treatment and for women for at least 1 year after treatment, and for 4 months after treatment for men. Even if your menstrual cycle stops or you believe you are not producing sperm, you could still be fertile and conceive. You should consult with your healthcare team before breastfeeding while receiving this medication.

Vincristine (Oncovin®, Vincasar PFS®, VCR)

Pronounced: vin-KRIS-teen

Classification: Antimicrotubule Agent

About Vincristine

Vincristine is a member of the vinca alkaloids family of chemotherapy agents. These medications work by interfering with cell division, which leaves the tumor unable to grow and spread. Vinorelbine was developed from the periwinkle plant.

How to Take Vincristine

This medication is administered intravenously (IV, into a vein) by a trained professional. Specific dosage and dosing schedule depends on the person's size and the type of cancer being treated.

This medication is a vesicant. Even when carefully and correctly administered by trained personnel, this drug may cause a feeling of burning and pain. There is a risk that this medication may leak out of the vein at the injection site, resulting in tissue damage that can be severe. If the area of injection becomes red, swollen, or painful at anytime during or after the injection, notify your doctor or nurse immediately. Do not apply anything to the site unless instructed by your doctor or nurse.



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Possible Side Effects of Vincristine

There are a number of things you can do to manage the side effects of vincristine. Talk to your doctor or nurse about these recommendations. They can help you decide what will work best for you. These are some of the most common side effects:

Constipation

Vincristine can cause serious constipation, abdominal pain and can even lead to a blockage or stoppage of the bowel (called paralytic ileus) if not treated promptly. There are several things you can do to prevent or relieve constipation. Include fiber in your diet (fruits and vegetables), drink 8-10 glasses of non-alcoholic fluids a day, and keep active. A stool softener once or twice a day may prevent constipation. If you do not have a bowel movement for 2-3 days, you should contact your healthcare team for [suggestions to relieve the constipation](#).

Nausea and/or Vomiting

Talk to your doctor or nurse so they can prescribe medications to help you manage [nausea and vomiting](#). In addition, dietary changes may help. Avoid things that may worsen the symptoms, such as heavy or greasy/fatty, spicy or acidic foods (lemons, tomatoes, oranges). Try antacids, (e.g. milk of magnesia, calcium tablets such as Tums), saltines, or ginger ale to lessen symptoms.

Call your doctor or nurse if you are unable to keep fluids down for more than 12 hours or if you feel lightheaded or dizzy at any time.

Low White Blood Cell Count (Leukopenia or Neutropenia)

White blood cells (WBC) are important for fighting infection. While receiving treatment, your [WBC count can drop](#), putting you at a higher risk of getting an infection. You should let your doctor or nurse know right away if you have a fever (temperature greater than 100.4), sore throat or cold, shortness of breath, cough, burning with urination, or a sore that doesn't heal.

Tips to preventing infection:

- [Washing hands](#), both yours and your visitors, is the best way to prevent the spread of infection.
- Avoid large crowds and people who are sick (i.e.: those who have a cold, fever or cough or live with someone with these symptoms).
- When working in your yard, wear protective clothing including long pants and gloves.
- Do not handle pet waste.
- Keep all cuts or scratches clean.
- Shower or bath daily and perform frequent [mouth care](#).



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- Do not cut cuticles or ingrown nails. You may wear nail polish, but not fake nails.
- Ask your doctor or nurse before scheduling dental appointments or procedures.
- Ask your doctor or nurse before you, or someone you live with, has any vaccinations.

Low Red Blood Cell Count (Anemia)

Your red blood cells are responsible for carrying oxygen to the tissues in your body. When the [red cell count is low](#), you may feel tired or weak. You should let your doctor or nurse know if you experience any shortness of breath, difficulty breathing or pain in your chest. If the count gets too low, you may receive a blood transfusion.

Low Platelet Count (Thrombocytopenia)

Platelets help your blood clot, so when the [count is low](#) you are at a higher risk of bleeding. Let your doctor or nurse know if you have any excess bruising or bleeding, including nose bleeds, bleeding gums or blood in your urine or stool. If the platelet count becomes too low, you may receive a transfusion of platelets.

- Do not use a razor (an electric razor is fine).
- Avoid contact sports and activities that can result in injury or bleeding.
- Do not take aspirin (salicylic acid), non-steroidal, anti-inflammatory medications (NSAIDs) such as Motrin®, Aleve®, Advil®, etc. as these can all increase the risk of bleeding. Unless your healthcare team tells you otherwise, you may take acetaminophen (Tylenol).
- Do not floss or use toothpicks and use a soft-bristle toothbrush to brush your teeth.

Fatigue

[Fatigue](#) is very common during cancer treatment and is an overwhelming feeling of exhaustion that is not usually relieved by rest. While on cancer treatment, and for a period after, you may need to adjust your schedule to manage fatigue. Plan times to rest during the day and conserve energy for more important activities. Exercise can help combat fatigue; a simple daily walk with a friend can help. Talk to your healthcare team for helpful tips on dealing with this side effect.

Mouth Ulcers (Sores)

Certain cancer treatments can cause [sores or soreness in your mouth](#) and/or throat. Notify your doctor or nurse if your mouth, tongue, inside of your cheek or throat becomes white, ulcerated or painful. Performing [regular mouth care](#) can help prevent or manage mouth sores. If mouth sores become painful, your doctor or nurse can recommend a pain reliever.

- Brush with a soft-bristle toothbrush or cotton swab twice a day.
- Avoid mouthwashes that contain alcohol. A baking soda and/or salt warm water



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mouth rinse (2 level teaspoons of baking soda or 1 level teaspoon salt in an eight ounce glass of warm water) is recommended 4 times daily.

- If your mouth becomes dry, eat moist foods, drink plenty of fluids (6-8 glasses), and suck on sugarless hard candy.
- Avoid smoking and chewing tobacco, drinking alcoholic beverages and citrus juices.

Loss or Thinning of Scalp and Body Hair (Alopecia)

Your hair may become **thin, brittle, or may fall out**. This typically begins two to three weeks after treatment starts. This hair loss can be all body hair, including pubic, underarm, legs/arms, eyelashes, and nose hairs. The use of scarves, wigs, hats and hairpieces may help. Hair generally starts to regrow soon after treatment is completed. Remember your hair helps keep you warm in cold weather, so a hat is particularly important in cold weather or to protect you from the sun.

Neurotoxicity

This is a toxicity that affects the nerves. The most common affect is called peripheral neuropathy, which affects the nerves in the hands and feet, causing causes a numbness or tingling, often in the pattern of a stocking or glove. This can get progressively worse with additional doses of the medication and can lead to difficulty with balance or walking. In some people, the symptoms slowly resolve after the medication is stopped, but for some it never goes away completely. You should let your healthcare provider know if you experience numbness or tingling in the hands and feet, as they may need to adjust the doses of your medication.

The vinca alkaloid class of chemotherapies are known to cause neuropathy, but vincristine can also cause neurologic toxicity that presents as mental depression, headache, malaise, dizziness and seizures. It can also cause toxicity of the cranial nerves, which affects the vocal cords (changes in voice), eyes (visual changes) or facial nerves (drooping of the face or mouth). Patients can develop severe pain in the jaw soon after the first treatment with vincristine, which is caused by the medication affecting the nerves. If you notice any of these problems, notify your healthcare team right away.

Other Side Effects

Urinary retention (being unable to urinate even when you feel that you need to) can develop. If you notice you are unable to urinate, you should call your healthcare team right away or go to the emergency room to be evaluated.

Some patients will have an allergic reaction to the medication during the infusion or shortly after. Let your nurse know right away if you have any shortness of breath or difficulty breathing, rash or swelling of the face.

Sexual & Reproductive Concerns



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This drug may affect your reproductive system, resulting in the menstrual cycle or sperm production becoming irregular or stopping permanently. Women may experience menopausal effects including hot flashes and [vaginal dryness](#). In addition, the desire for sex may decrease during treatment.

Exposure of an unborn child to this medication could cause birth defects, so you should not become pregnant or father a child while on this medication. Effective birth control is necessary during treatment, even if your menstrual cycle stops or you believe you are not producing sperm. You may want to consider sperm banking or egg harvesting if you may wish to have a child in the future. Discuss these options with your oncology team. You should consult with your healthcare team before breastfeeding while receiving this medication.

Prednisone (Sterapred®, Prednisone Intensol™)

Pronounced: PRED-ni-sone

Classification: Glucocorticoid

About Prednisone

Prednisone is a corticosteroid, similar to a hormone that is made naturally in your body. Corticosteroids (sometimes abbreviated as "steroids") are used to decrease inflammation, (swelling and/or redness) and thus are involved in the management of a number of diseases, including asthma, autoimmune disorders, reactions to medications, and gastrointestinal disorders (colitis), among others. Prednisone may be given to prevent a reaction to a medication, prevent or decrease nausea or be used in high doses to treat certain cancers.

How to Take Prednisone

Prednisone comes as a tablet to take by mouth. Prednisone is best taken with food, as it can irritate your stomach. Your doctor will probably tell you to take your dose(s) of prednisone at certain time(s) of day every day. Your personal dosing schedule will depend on what the medication is being used for. If you miss a dose, take it as soon as possible. If it is too close to your next dose skip the missed dose and resume your schedule.

Storage and Handling



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Store your medication in the original, labeled container at room temperature and in a dry location (unless otherwise directed by your healthcare provider or pharmacist). Keep containers out of reach of children and pets.

Where do I get this medication?

Prednisone is available through most pharmacies. Your oncology team will work with your prescription drug plan to identify an in-network pharmacy for distribution of this medication.

Insurance Information

This medication may be covered under your prescription drug plan. Patient assistance may be available to qualifying individuals without prescription drug coverage. Your care team can help you find these resources, if they are available.

Possible Side Effects of Prednisone

There are a number of things you can do to manage the side effects of prednisone. Talk to your healthcare provider about these recommendations. They can help you decide what will work best for you. These are some of the most common side effects:

Increase in Appetite

Prednisone can cause people to be more hungry or thirsty than usual. Drink plenty of fluids and try to make your snacks healthy ones.

Increase in Energy

Prednisone can give people an increase in energy. They may also develop insomnia, or difficulty sleeping. Taking the medication in the morning may help to prevent this.

Irritability or Change in Mood

Some patients report feeling irritable or noticing a change in their mood while taking prednisone. If this becomes difficult to handle or if the patient expresses a desire to hurt him or herself, notify a healthcare provider right away.

Swelling

Patients may notice swelling in their hands and/or feet. Elevating the feet may help to lessen swelling in the feet and ankles. Avoid restrictive or tight clothing that may make it harder for the fluid to drain from the hands, feet, and ankles.

Nausea and Heartburn

Taking prednisone with food or milk is generally enough to prevent nausea and heartburn. If possible, take the medication when you can be upright (not lying down) for a few hours after the dose. Avoid things that worsen the symptoms, and try antacids (milk of magnesia



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and calcium tablets, like Tums), saltines, or ginger ale to lessen symptoms.

Increased Blood Sugar

Prednisone can increase your blood sugar. Diabetics should monitor their blood sugar closely and may require higher doses of insulin while taking prednisone. Patients who are not diabetics but are having increased blood sugar levels may be instructed to check their blood sugar and administer insulin while taking prednisone. Your provider will determine if this is necessary.

Weakening of the Bones (Osteoporosis)

Long-term use can lead to early osteoporosis. Your doctor may have you get a bone density scan (dexa scan) to assess your bone health if you are on long-term therapy.

Other Side Effects

Prednisone can cause delayed wound healing, headaches, muscle weakness, and cataracts (after long-term use).



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