Introduction

This booklet is for whom is about to receive or is now receiving chemotherapy for cancer. This is a guide you can refer to throughout your chemotherapy treatment. This includes facts about chemotherapy, its side effects, and highlights ways you can take care of yourself before, during, and after treatments.

If you have any questions regarding chemotherapy and its side effects, talk with your physician or advanced practice nurse.

Samsung Comprehensive Cancer Center
Contacts:
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What is chemotherapy?

Chemotherapy is a type of cancer treatment that uses drugs to destroy cancer cells.

What does chemotherapy do?

Depending on your type of cancer and how advanced it is, chemotherapy can:

- **Cure cancer** — when chemotherapy destroys cancer cells to the point that your doctor can no longer detect them in your body and they will not grow back.
- **Control cancer** — when chemotherapy keeps cancer from spreading, slows its growth, or destroys cancer cells that have spread through the other parts of your body.
- **Ease cancer symptoms** (also called **palliative care**) — when chemotherapy shrinks tumors that are causing pain or pressure

Sometimes, chemotherapy is used as the only cancer treatment. However, chemotherapy is also used along with surgery, radiation therapy or biological therapy. Chemotherapy can:

- Make a tumor smaller before surgery or radiation therapy. This is called **neo–adjuvant chemotherapy**.
- Destroy cancer cells that may remain after surgery or radiation therapy. This is called **adjuvant chemotherapy**.
- Help radiation therapy and biological therapy work more efficiently.
How will the Chemotherapy be given to me?

A type of chemotherapy is determined after consideration of various facts such as the type of cancer, treatment purpose, and overall health condition.

Chemotherapy is often administered by an intravenous injection, an intramuscular injection, a hypodermic injection, or oral medication. Also, an intra-thecal or an intra-peritoneal injection is given on special cases.

Intra-arterial injection or special drug injection device may be used depending on the type of drug, condition of blood vessel, and method of injection. Chemotherapy is administered and repeated at regular intervals, you may be hospitalized or be required to regularly visit the outpatient clinic.
What are the side effects of chemotherapy?

Side effects are problems caused by cancer treatment. Most of the chemotherapy drugs are designed to kill fast-growing cancer cells, but that can also affect healthy cells that grow quickly and cause side effects. Such cells are gastrointestinal mucous membrane cells, bone marrow (makes blood cells), hair pouch cells, and etc. Therefore, side effects such as mouth sores, diarrhea, lower blood cell counts, hair loss may occur. Also, it can adversely affect heart, kidneys, lungs, liver and etc.

Side effects vary depending on the type and dose of drug, duration of treatment and patient’s individual conditions. In most cases, it can be controlled by appropriate preventative measures and treatment for natural recovery. If severe, however, the dose of drug may be reduced or the drug may be replaced according to the medical team’s discretion.

In order to control side effects and proceed with chemotherapy safely, it is important to understand the side effects,
What can be done about side effects?

Nausea / Vomiting

Some types of chemotherapy can cause nausea/vomiting. Nausea is when you feel sick to your stomach, like you are going to throw up. Vomiting is when you throw up.

Nausea and vomiting can occur while you are getting chemotherapy, right after, or many hours or a few days later. Also, if you have experienced severe nausea/vomiting before, symptom may occur before chemotherapy.

Antiemetic drugs can help you prevent and control nausea/vomiting. There are many types of antiemetic drugs and one or more drugs will be given depending on the seriousness of symptoms. When one antiemetic drug does not work well, different drug can be prescribed. If symptoms cannot be controlled, it is important to consult your medical professionals.
Ways to manage symptoms

▶ To do

· Eat lightly on the first day of treatment.
· Have foods that are soft and easy to digest.
· Eat small meals and snacks. Eat 5 or 6 small meals a day.
· Have foods and drinks that are warm or cool instead of very hot or cold.
· Try small bites of popsicles or fruit ices.
· Have sugar-free mints or candies
· Relax before treatment.
  · Meditate, do deep breathing exercise, imagine scenes or experiences that make you feel peaceful.
  · You can also do quiet hobbies such as reading, listening to music, or knitting.
· When you feel like vomiting, breathe deeply and slowly or get fresh air.

▶ Not to do

· Do not drink a lot before or during meals.
· Do not lie down right after you eat.
· Stay away from food and drinks with strong smells (food, perfume…).

⚠️ Let your doctor or nurse know if your medicine for nausea is not working.
Mouth and Throat Changes

If mucous membrane in the mouth is damaged by chemotherapy, it may cause soreness and infection inside the mouth or throat. If germs invade through damaged membrane, it may cause secondary infection. Therefore, constant management of your mouth is needed in order to keep it clean.

Generally, mouth and throat changes occur within one or two weeks after treatment.

 удал Ways to prevent mouth and throat changes

- Keep your mouth clean.
  - Brush your teeth after meals and before bedtime (4 times a day).
- Check the condition of mucous membranes inside your mouth daily
  - Inspect any sores, red areas or white patches.
- If you wear dentures, check it fit well and keep it clean.
- Use prescribed mouthwash after brushing your teeth as needed.
If your mouth becomes red in color, and becomes irritated with prickling sensation, rinse your mouth with mouthwash to prevent secondary infection.

Using mouthwash

- Mouthwash: chlorhexidine solution or one of the following, saline solution / baking soda solution
- Keep mouthful amount of the mouthwash inside your mouth for about one minute.
- Gargle until solution reaches down to the throat and spit out.
- Do not rinse with plain water after mouthwash.
- Do not eat within 30 minutes after mouthwash
- Use your mouthwash after tooth brushing.
- Use it 4 times daily. If symptoms worsen, rinse every 1 to 2 hours.

Other ways to manage

- Choose foods that are moist, soft and easy to chew or swallow.
  - Cooked cereals, mashed potatoes, and scrambled eggs.
- Take small bites of food, chew slowly, and sip liquids while you eat.
- Soften food with gravy, sauces, broth, yogurt, or other liquids.
- Eat foods that are cool or at room temperature.
- Suck on ice chips or popsicles. These can relieve mouth pain
- Eat foods with protein and vitamins
  - beans, eggs, meat, dairy products (milk, cheese etc.), fruit, vegetables etc.

*If it is too painful to eat any food because of sore mouth or throat, talk to your doctor or nurse.*
Diarrhea

Diarrhea is a frequent bowel movement that may be soft, loose, or watery. Chemotherapy can cause diarrhea because it harms healthy cells that line your large and small bowel. It happens within 1–2 weeks but it may become acute depending on the type of drug used. If diarrhea persists, abdominal cramping, dehydration and electrolyte imbalance may occur. Therefore, proper dietary control and drug control (anti-diarrheal drug, pain reliever, fluid supplement) may be needed.

Ways to manage

- Drink 8 to 12 cups of clear liquids each day.
  - Water, clear broth, ginger ale, or sports drinks such as Gatorade
- Drink slowly, and choose drinks that are at room temperature.
- Eat 5 or 6 small meals and snacks each day.
- Foods you should stay away from and foods you need are listed in the following.

<table>
<thead>
<tr>
<th>Helpful foods</th>
<th>Foods to stay away</th>
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<tr>
<td>Low-fiber foods</td>
<td>Alcohol, milk or milk products, such as ice cream, milkshakes, sour cream, and cheese.</td>
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<tr>
<td>: Banana</td>
<td>Spicy foods, such as hot sauce, salsa, chili and curry dishes.</td>
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<td>: White rice</td>
<td>Greasy and fried foods, such as french fries and hamburgers.</td>
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<td>: White toast</td>
<td>Foods or drinks with caffeine, such as regular coffee, black tea, cola, and chocolate.</td>
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<tr>
<td>: Chicken or turkey(skinless)</td>
<td>Foods or drinks that cause gas, such as cooked dried beans, cabbage, broccoli, and soy milk and other soy products.</td>
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<tr>
<td>: Cooled refined cereals</td>
<td>High-fiber foods, such as cooked dried beans, raw fruits and vegetables, nuts, and whole-wheat breads and cereals.</td>
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<tr>
<td>: Potatoes (baked or mashed without the skin)</td>
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</tbody>
</table>
If diarrhea persists longer than 24 hours and causes abdominal cramping, tell your doctor or nurse.

**Constipation**

Constipation is when the bowel movements become less frequent and stools are hard, dry, and difficult to pass. You may have painful bowel movements and feel bloated or nauseous. You may belch, pass a lot of gas, and have stomach cramps or pressure in the rectum. Treatments such as chemotherapy and pain medicine can cause constipation. Constipation can also happen when you are not active and spend a lot of time sitting or lying down. Constipation can also be due to eating foods that are low in fiber or not drinking fluids, but constipation may be prevented or controlled by dietary control, exercise, and medicine.

👀 Ways to manage

- Drink at least 8 cups of water a day or more.
- Eat lots of high-fiber foods.
  - Whole-grain breads, cereal, dried beans and peas, raw vegetables, fresh and dried fruit, nuts, seeds, and popcorn etc.
- Be active every day.
  - You can be active by walking, riding a bike, or doing yoga.
  - If you can’t walk, do simple exercise on the bed or on the chair.
- Let your doctor or nurse know if you have not had a bowel movement in 3 days & if you feel bloated, nauseated or have vomited
  - Your doctor may suggest a fiber supplement, laxative, stool softner, or enema.

If you feel bloated and nausea or vomiting occurs, it may suggest ileus (the bowel movement has stopped), consult your medical team.
Bone Marrow Change

Bone marrow is a sponge like tissue filling the cavities of bones and produces new blood cells such as white blood cells, red blood cells and platelets.

Chemotherapy can lower the number of blood cells because it affects bone marrow’s ability to make blood cells. Generally, blood cells decrease within 1 to 2 weeks after chemotherapy and recover within 3 to 4 weeks on average.

Your doctor will identify if your bone marrow function has recovered through blood tests before chemotherapy. If not enough number of blood cells have been recovered, either treatment schedule is delayed or adjusted to reduce the amount of drugs. If the number of blood cells is decreased, side effects such as infection, bleeding, and anemia may occur.
Low White Blood Cell Count & Infection

White blood cells help your body fight infections. There are many types of white blood cells, one type is called neutrophil. When your neutrophil count is low, it is called neutropenia and the risk of catching an infection increases. Therefore, it is important to avoid the chances of exposure to infections during neutropenia period.

Infection may occur anywhere on the body and symptoms of infection may vary depending on the area.

Symptoms of an Infection

- High fever: fever above 38°C or 100.4°F
  → Most typical symptoms
- Chills
- Painful or frequent need to urinate
- Severe cough, difficulty breathing, sore throat or pain
- Redness, swelling, pain or tenderness on the intravenous injection area or wound

If you have a fever of 38°C (100.5°F), visit the emergency room immediately. If the infection is progressing towards blood poisoning (septicemia), it is very dangerous. Therefore, your condition must be checked by your doctor or nurse. Do not take drugs that reduce fever without talking with your doctor or nurse first.
Ways to manage in order to preventing infection

• Wash your hands often with soap and water.
  : Be sure to wash your hands before cooking and eating, and after you use the bathroom, blow your nose, cough, sneeze, or touch animals

• Keep up personal hygiene
  : Wash your face, take a shower or bath to keep your skin clean.
  Use lotion to soften and heal dry, cracked skin.

• Maintain good mouth care.

• Be careful not to get scratches on your skin.
  : Be cautious with knives, scissors, needles etc.
  Use an electric shaver instead of razor.

• Stay away from people who are sick (cold, the flu, measles, chicken pox etc.)

• Do not get a flu shot or any other type of vaccine without asking your doctor or nurse first.
Low Platelet Count and Bleeding

Platelets are cells that make your blood clot when you bleed. A low platelet count is called thrombocytopenia. This condition increases risk of bleeding.

 Symptoms of bleeding

- Bruise (even when you have not been hit or have not bumped into anything)
- Small, red spots on your skin
- Bleeding from your nose or in your mouth
- Red or pink colored urine
- Black or bloody bowel movements
- Bleeding when vomiting
- Heavy bleeding during your menstrual period or a prolonged period
- Vaginal bleeding not caused by your period

 Ways to manage

- Check your doctor or nurse before taking aspirin that may interfere blood clotting.
- Blow your nose gently.
- Be careful not to get cuts when using knives, scissors or other sharp objects.
- Avoid strenuous exercise or other activities which you could get hurt.
- Use an electric shaver instead of a razor.

If bleeding or expecting decline of platelet count, blood test and platelets transfusion is administered as needed.
Low Red Blood Cell Count & Anemia

Red blood cell carries oxygen into various places of the body. Fewer red blood cells may cause anemia.

Red blood cells carry oxygen throughout your body. Anemia is when you have too few red blood cells to carry the oxygen your body needs. Your heart works harder when your body does not get enough oxygen. This can make it feel like your heart is pounding or beating very fast. Anemia can also make you feel short of breath, weak, dizzy or very tired.

If symptoms with anemia are severe, you may be administrated a drug that stimulates the production of red blood cells. Otherwise, red blood cells transfusion is administered.

Ways to manage

- **Get plenty of rest.** Try to sleep at least 8 hours each night. You might also want to take 1 to 2 short naps (1 hour or less) during the day.
- **Limit your activities.** This means doing only the activities that are most important to you. For example, you might go to work but not clean the house or you might order takeout food instead of cooking dinner.
- **Accept help.** When your family or friends offer to help, let them. They can help care for your children, pick up groceries, run errands, drive you to your doctor’s visits, or do other chores you feel too tired to do.
· **Eat a well-balanced diet.** Choose a diet that contains all the calories and protein your body needs. Calories will help keep your weight up, and extra protein can help repair tissues that have been harmed by cancer treatment. Talk to your doctor, nurse, or dietitian about the diet that is right for you. (To learn more, see Appetite Changes on page 18.)

· **Stand up slowly.** You may feel dizzy if you stand up too fast. When you get up from lying down, sit for a minute before you stand.

### Hair Loss

Hair loss is when some or all of your hair falls out. The extent of hair loss varies depending on the type of chemotherapy drugs.

Generally, hair loss starts within 2 to 3 weeks after chemotherapy begins. Aside from hair loss, irritation on scalp, thinning and dryness of hair may occur.
Ways to manage

- Avoid scalp irritating perms and hair dyes for at least 6 months.
- Use a mild shampoo, such as a baby shampoo.
- Use less irritating and soft hair brushes.
- Avoid applying too much heat when using hair drier.
- If you cut your hair short, it looks thicker and richer and is easy to manage.
- After hair loss, wear a hat, put on sun block, or a scarf to protect scalp from the sun.
- Use wigs if you please your taste.

Almost always, your hair will grow back 2 to 3 months after chemotherapy is over. Therefore, it is important to accept the condition and try to get used to changes in appearance.

Skin and Nail Changes

Chemotherapy may cause various changes on skin and nails

- Skin rashes and itching
- Hand–foot syndrome
- Nail changes
- Skin discoloration and increased sensitivity to the sun light.
- Skin damage caused by drug infiltration (Leakage out of blood vessels)
Skin Rashes & Itching

Some types of chemotherapy can cause skin rashes, hives, acne like rashes with dryness and itching.

Ways to manage

- Keep your skin clean if rashes occur.
- Keep indoor temperature not too hot or dry.
- If dry, apply moisturizer frequently.
- Do not irritate your skin and avoid tight clothing.
  - Wear cotton clothing in relaxed fit.
- Avoid using deodorant, perfume, powder and use electric shaver.
- Do not use Band-Aid or tape on the irritated skin.

If you have severe symptoms, tell your doctor or nurse. You may be given drugs such as antihistamine, steroid, and your chemotherapy plan may be changed.
Hand-Foot Syndrome

Hand-foot syndrome causes symptoms such as skin change and dysesthesia (insensitivity on palm and sole). It depends on the type of drug, dosage, and treatment duration. There are no special ways to prevent such symptoms but it is important to prevent further deterioration with appropriate management.

Initial symptoms of hand-foot syndrome are redness, swelling, numbness of hand and feet. If severe, blisters, infections and pain may occur as well. You may also have difficulty grabbing things, walking around, wearing shoes.

Ways to manage

- Wear gloves to prevent cuts and scratches on your hand when doing chores.
- Avoid taking baths with hot water and touching hot objects.
- Avoid doing chores that add pressure on the palm of your hand such as twisting laundry clothes.
- Avoid popping blisters. If popped, be careful not to get infections.
- Apply moisturizers frequently.
- Do not clip your nails too short.

If symptoms occur, tell your doctor or nurse. If severe, stop taking drugs temporarily or change dosage as needed.
Nail Changes

Nails may become dark, turn yellow, become brittle, hardened and cracked. Sometimes your nails will loosen, get infected and fall off. It is recommended to wear gloves when you do chores.

These changes will be recovered naturally few months after treatment.

If infection arises around nails, keep it clean to prevent further infections and tell your doctor or nurse. Antibiotics may be given to prevent secondary infection.

Skin Discoloration and Sensitivity to the Sun

Some type of Chemotherapy may cause discoloration to your skin. Such changes will recover naturally few months after the completion of treatment.

Skin discoloration occurs in the blood vessel where injected or occurs on the skin area exposed to the sun such as face, arms and etc.

- Avoid direct sunlight. This means not being in the sun from 10 a.m. until 4 p.m. These are times when the sun is strongest.
- Use sunscreen lotion with SPF (skin protection factor) of 15 or higher. Use ointments that block the sun’s rays, such as those with zinc oxide.
- Keep your lips moist with a lip balm that has an SPF of 15 or higher.
- Wear light-colored pants, long-sleeve cotton shirts, and hats with wide brims.

▶ Skin Damage Caused by Chemotherapy Drug Leakage

In case of chemotherapy leaking from an intravenous injection, some drug may cause inflammation or severe tissue damage the skin around. In most cases, it can be reversed with an appropriate treatment, but skin graft may be needed in severe cases.

Let your doctor or nurse know right away if you have burning sensation or pain when you get IV chemotherapy.

A special venous access devices as below may be inserted before chemotherapy for more safe administration.

- Hickman Catheter
- Peripherally Inserted Central Catheter (PICC)
- Implanted Port
Heart Changes

Some chemotherapy drugs may affect heart function and it may cause arrhythmia (irregular pulse), weakening of heart functions, and heart failure. If you are administered that drugs, you may have test for heart function before and during the chemotherapy. Protective drug may be used to prevent cardiotoxicity (heart poisoning) depending on the type of chemotherapy drug.

Urinary, Kidney, and Bladder Changes

Some type of chemotherapy damage cells in the kidneys and bladder. It may cause decrease kidney function, electrolyte imbalance and bladder infection (cystitis). However, actual chance of occurrence is very rare because supplementary treatment is administered for prevention. In order to prevent kidney malfunction, large volumes of infusion solution and diuretic is administered and changes in kidney function are checked through regular blood test. Infusion solution or protective drug may be administered to prevent hemorrhagic cystitis.

Symptoms of cystitis

- Burning or pain when you begin to urinate or after you empty your bladder
- Frequent, more urgent need to urinate
- Not being able to urinate
- Not able to control the flow of urine from the bladder (incontinence)
- Blood in the urine
- Fever/chills
If you get chemotherapy that can damage the bladder and kidney, it is good to drink plenty of fluids. If symptoms of kidney malfunction or cystitis occurs, talk with your doctor or nurse because the cause of disease must be identified for attentive treatment.

▶ Nervous System Changes

Chemotherapy can cause damage to your nervous system. Side effects on the nervous system may appear temporarily or continue for several months or years after the treatment depending on the type of drug and duration.

🔍 Symptoms caused by nervous system changes

- Tingling, burning, weakness, or numbness in your hands or feet
- Increase of pain or numbness on your hands and feet when exposed to cold objects
- Pain when walking
- Weak, sore, tired, or achy muscles
- Trouble picking up objects or buttoning your clothes
- Being clumsy and losing your balance
- Shaking or trembling
- Confusion and memory problems
- Hearing impairment
- Hearing disturbance
- Let your doctor or nurse know right away if you notice any nervous system changes. It is important to treat these problems as soon as possible.
Ways to manage

- Be cautious when using sharp tools such as knives, scissors.
- Be careful not to trip when walking.
- Wear comfortable shoes, never walk on bare foot or wear slippers.
- Wear gloves to protect your hands when working in the garden, cooking, or washing dishes.
- If numbness of hands and feet becomes worse by contacting cold objects, avoid exposure to them.

Changes in nervous system cannot be prevented, but in case of tingling sensation and numbness of hand and feet or severe pain may be treated with pain reliever or drugs to relieve symptoms, please tell your doctor or nurse.

Liver Changes

Liver changes must be verified through periodic blood tests because some chemotherapy drugs may impair liver functions.

Herbal medication and dietary supplement may affect liver function, so it is better to not take any of these without counseling your doctor or nurse.

Lung Changes

Some chemotherapy drugs may cause decreased lung capacity, pulmonary fibrosis (fibroid lung), pneumonia, and other lung related complications. Periodic lung checkups and chest x-ray are conducted to monitor changes.

If breathing difficulties, dry cough and fever appear or become severe, you must tell your doctor or nurse.
Sexual Changes & Infertility

Chemotherapy may cause sexual changes or infertility. These changes vary depending on the type of chemotherapy you get, your age, and whether you have other health problems. Before treatment starts, tell your doctor or nurse if you want to have children in the future.

- For men
Temporary or permanent infertility may occur because the number of sperm is reduced and its mobility is weakened. You may experience temporary loss of sexual desire or erectile dysfunction from fatigue, mental stress. If drugs injected cause high rate of infertility, sperms can be collected and be kept in a freezer before the treatment.

- For women
Chemotherapy may damage the ovaries, which can cause changes in hormone levels. Hormone changes can lead to problems like irregular period of menstruation, early menopause, and infertility. You may also experience facial flushing, depression, and dryness of vagina. It may be helpful to use lubricants if you feel pain during sexual intercourse.

You may experience sexual changes during the treatment but sexual intercourse itself is not harmful nor spreads cancer to the spouse. However, chemotherapy can cause birth defects. Do not get pregnant while you are getting treatment.
Hypersensitivity Reaction

Hypersensitivity reaction is a sort of allergic reaction which your immune system responds to some of chemotherapy.

Most of hypersensitivity reactions occur in few minutes after drug injection but they may occur after treatment. A small amount of drug is injected or skin test is performed to check for possible hypersensitive reactions before treatment. In some cases, infusion rate is increased gradually with monitoring of hypersensitivity reaction.

Severe hypersensitive reaction rarely occurs and it can lead you to shock and require you emergency treatment.

_symptoms_of_hypersensitivity_reaction

- Chills or febrile sense
- Breathing difficulty, tightness or pain of chest, dry cough
- Rashes, urticaria, itchiness
- Flushing of face, swelling of lips and eyes
- Dizziness, restlessness, consciousness change

If preventative drugs are prescribed beforehand, follow the direction with care and tell your doctor or nurse immediately if hypersensitive reaction symptoms occur.
**Fluid Retention**

Fluid retention is a buildup of fluid caused by chemotherapy, hormone change caused by treatment, or your cancer. It can cause your face, hands, feet, or stomach to feel swollen and puffy. Sometimes fluid builds up around your lungs and heart, causing coughs, shortness of breath, or irregular heart beat. Fluid can also build up in the lower part of your belly, which can cause bloating.

**Ways to manage**

- Avoid overly salty food.
- If hands and feet experience edema (swelling), use cushions and pillows to hold them up and position your body when you take a rest or sleep.
- Check body weight regularly to verify the changes if necessary.
- Use diuretic depending on the symptoms after counseling with your doctor.

Let your doctor or nurse know if you gain weight quickly or symptoms are severe.
Flu–like Symptoms

Some types of chemotherapy can make you feel like you have the flu. This is more likely to happen if you get chemotherapy along with biological therapy. Flu–like symptoms may include muscle and joint aches, fever, headache, chills, fatigue, appetite loss and nausea. These symptoms may last from 1 to 3 days.

Let your doctor or nurse know if you have any of these symptoms, you may take pain and fever reliever.

Fatigue

Fatigue is one of the common symptoms experienced by chemotherapy patients. Fatigue may be experienced by various causes such as cancer itself, treatment, psychological cause, anemia and etc.

Intensity of fatigue may vary individually, daily, and depends on activities to alleviate symptoms.

Ways to manage

✓ If possible, avoid physical labor or activity that need long hours of concentration.
✓ Ask family members and relatives to help you with chores.
✓ Get enough rest but take a light walk or accompany physical activity because long hours of sleep or lying down may increase fatigue.
✓ Take a short nap during the day.
  : It relieves you from fatigue in the afternoon.
### My Chemotherapy Plan (Name of Drug / Schedule)

#### Drug Names & Administration Method

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Administration</th>
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1 Week Cycle Start 2 Week Cycle Scheduled
## Drug Names & Administration Method

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