

Chemotherapy & CAR T-Cell Therapy

Side Effects and Management

Read this guide to learn:

- What are the most common Side Effects of Chemotherapy
- What are the most common Side Effects of CAR T-Cell Therapy
- Signs and Symptoms
- How to Manage the Side Effects

IMPORTANT PHONE NUMBERS

BMT Outpatient Daycare:

Leon Blackmore Pavilion, 6th Floor,
Vancouver General Hospital
Monday to Friday 7:00am – 7:00pm
Weekends & Holidays 8:00am – 6:00pm

P: 604-875-4073



BMT Afterhours (T15 Inpatient):

Jim Pattison Pavilion, 15th & 16th Floor,
Vancouver General Hospital
Monday to Friday 7:00 pm – 7:00 am
Weekends & Holidays 6:00pm – 8:00am

P: 604-875-4343

Call Us Immediately If You Have:

- Fever: a temperature of 38°C or higher
- Flu-like symptoms
- Rash, blisters, allergic reactions
- New bad bruising and/or bleeding
- Chills or shaking
- Difficulty taking your pills
- Yellow or green mucus when you cough
- New pain
- A bad headache
- A seizure
- Concerns with your IV line
- Diarrhea, nausea or vomiting that doesn't stop
- Unsteadiness when walking or have fallen down

The above numbers will allow your healthcare team to promptly triage your call and contact your doctor, but if any of the symptoms you are experiencing are more concerning/urgent, call **911** immediately for emergency services or go straight to the emergency department.

Chemotherapy

Side Effect	Signs and Symptoms	Management
<p>Low Blood Counts</p>	<p>The number of your white blood cells may decrease.</p> <ul style="list-style-type: none"> • White blood cells protect your body from illness and disease. • When they are low, you are at greater risk of having an infection. <p>The number of your platelets may decrease.</p> <ul style="list-style-type: none"> • Platelets help your blood to form clots after an injury (e.g., cut) thereby stopping or preventing bleeding. 	<p>To help prevent infection:</p> <ul style="list-style-type: none"> • Call your doctor immediately at the first sign of an infection such as fever (over 38°C by an oral thermometer), chills, cough, or burning when you pass urine. <ul style="list-style-type: none"> ○ Check your temperature twice per day: once in the morning and once in the evening. • Take your medications (Ex. antibiotics, antifungals, antivirals) as prescribed. These medications help protect you from infections while your white blood count is low. Continue taking these medications until instructed even if your symptoms have subsided. • Do not take Tylenol® unless instructed to by your healthcare team. Tylenol® can “hide” or “mask” your fever without treating the infection. • Wash your hands often and always after using the bathroom. • Take care of your skin and mouth. Brush your teeth with a soft toothbrush after eating and before bedtime. • Avoid crowds and people who are sick. • Do not go swimming or use hot tubs if you have a CVC line or low white blood cell counts. • See the “Food Safety Tips during Cancer Treatment” handout for tips on how to prepare food safely, and safer food choices. Some examples: <ul style="list-style-type: none"> ○ Always cook food to the safe internal temperature. Do not eat undercooked meat, eggs or seafood. ○ Do not eat deli meats, soft cheese and unpasteurized dairy or juice. <p>To help prevent bleeding problems:</p> <ul style="list-style-type: none"> • Try not to bruise, cut, or burn yourself. • Clean your nose by blowing gently. Do not pick your nose. • Avoid constipation. • Brush your teeth gently with a soft toothbrush as your gums may bleed more easily. Maintain good oral hygiene. • Only use an electric razor for shaving (no blade).

	<ul style="list-style-type: none"> • When the platelet count is low you may be more likely to bruise or bleed. <p>The number of your red blood cells may decrease. This can result in anemia and symptoms such as:</p> <ul style="list-style-type: none"> • Shortness of breath • Fast breathing rate • Fast heartbeat • Tiredness • Dizziness 	<ul style="list-style-type: none"> • Some medications such as Aspirin® or Advil® may increase your risk of bleeding. <ul style="list-style-type: none"> ○ Do not stop taking any medication that has been prescribed by your doctor (Ex. Aspirin for your heart). ○ Talk to your doctor before taking such medications for pain management. • Contact your healthcare team immediately if you have any of the following: <ul style="list-style-type: none"> ○ Vomit that looks like coffee grounds ○ Black, tarry poo ○ Bright red blood in your urine <p>To help manage the symptoms of anemia:</p> <ul style="list-style-type: none"> • Avoid strenuous or long periods of activity. Prioritize your most important activities, and take rest breaks. • Move slowly to avoid dizziness. • Eat a balanced diet, which includes food high in iron. • Tell your healthcare team if these symptoms have been affecting your ability to complete everyday tasks. • Immediately contact your doctor if you have symptoms such as chest pain and shortness of breath while at rest.
<p>Nausea and Vomiting</p>	<p>This can cause dehydration and prevent you from taking your prescribed medications</p> <ul style="list-style-type: none"> • Inform your healthcare team right away if these symptoms stop you from regularly drinking or taking your medications 	<p>To help with nausea/vomiting:</p> <ul style="list-style-type: none"> • Take prescribed anti-nausea pills as instructed and take more “as needed”. It is easier to prevent nausea than treat it once it has occurred. • Drink plenty of liquids. • Eat and drink often in small amounts. • Avoid foods that are very sweet, greasy, fried, spicy, or that have a strong smell. • Try bland foods such as soda crackers, congee, rice, applesauce, bananas etc. • Eat whatever you can manage. • If you are feeling nauseated, take deep slow breaths through your mouth or place a cool cloth over your eyes and forehead. • Distract yourself by listening to music, watching a movie, or talking to family or friends.

<p>Diarrhea (loose runny poo)</p>	<p>Inform your healthcare team right away if diarrhea symptoms include:</p> <ul style="list-style-type: none"> • Diarrhea greater than x4 per day • If it stops you from drinking or taking medications • If you have pain when you poo or see blood in your poo 	<p>To help with diarrhea:</p> <ul style="list-style-type: none"> • Drink plenty of liquids. Try to drink 8 to 10 large glasses a day. Try water, broth, Fruit juices, Jell-O and sports drinks. • Eat and drink often in small amounts. • Avoid high fibre foods. • Limit the use of irritants such as coffee, chocolate, and prune juice • Use soft toilet paper. Clean your bum with mild soap and water after each episode of diarrhea. Rinse well and pat dry. Cleaning will help lessen your risk of infection and skin irritation. • Consider buying a sitz bath (at a pharmacy). This allows you to soak your genitals and rectal area to help clean and relieve pain. • Ask your doctor before taking any over-the-counter medications for diarrhea
<p>Appetite Loss</p>	<p>Having enough nutritional intake is important to help you health and cope with the side effects of CAR T-cell therapy.</p> <ul style="list-style-type: none"> • Loss of appetite may also result in weight loss. 	<p>To help with appetite loss:</p> <ul style="list-style-type: none"> • Try eating smaller meals and snacks more often. • Eat when your energy is highest, and take your time while eating. • To add calories and protein to meals <ul style="list-style-type: none"> ○ Try adding: peanut butter, high fat milk, cream, eggs, cheese, yogurt, tofu, gravies, ice cream, nuts, beans etc. • Choose fluids that are higher in nutrients <ul style="list-style-type: none"> ○ Try: fuller fat milk, smoothies, meal replacement drinks, cream soups, and hot chocolate • Dieticians that work at the L/BMT program can meet with you and assist you.
<p>Fatigue and Malaise (Feeling Tired and Unwell)</p>	<p>Having a lack of energy, feeling weak and tired, and have trouble concentrating or finishing small tasks.</p>	<p>What you can do:</p> <ul style="list-style-type: none"> • Balance your rest and activity. Take opportunities to rest throughout the day. • Try to limit the length of visits with family and friends. • Light exercise such as walking around the block can help boost your energy. • Plan activities that need concentration or energy when you are more rested. • To save energy and time involved in meal preparations: <ul style="list-style-type: none"> ○ Keep easy to prepare food and snacks on hand. ○ Order your groceries online and for pick up ○ Try safe take-out food restaurants

CAR T-cell Therapy

Side Effect	Signs and Symptoms	Management
<p>Cytokine Release Syndrome (CRS)</p>	<p>Having high levels of cytokines may cause increased inflammation throughout the body. This can be harmful and interfere with a number of body functions.</p> <p>Typically looks like mild to moderate flu symptoms:</p> <ul style="list-style-type: none"> • Nausea • Fatigue • Headache • Chills • Fever <p>Other symptoms include:</p> <ul style="list-style-type: none"> • Feeling weak or feeling very tired • Shortness of breath • Fast or irregular heartbeat • Cough • Vomiting • Diarrhea • Muscle or joint pain • Dizziness • Fast or irregular heartbeat • Low blood pressure 	<p>You will need to:</p> <ul style="list-style-type: none"> • Immediately contact your doctor at the first signs of CRS such as fever (over 38°C by an oral thermometer), low blood pressure, shortness of breath etc. • Please call the number(s) given below listed under “important phone numbers” or if you are in need of more immediate emergency assistance call 911. • If you are experiencing flu-like symptoms, they could potentially be due to an infection, refer to that section for interventions. • Make sure you listen to your body. For example: If you are feeling dizzy or short of breath. Make sure you rest in a safe spot. • Your caregiver will play a vital role in your care. Make sure you ask for assistance, such as with walking to the washroom, cooking, or other daily tasks.
<p>Neurotoxicity</p>	<p>CAR-T therapy can affect your brain and nervous system.</p> <p>Symptoms:</p> <ul style="list-style-type: none"> • Impaired speech • Confusion • Delirium • Involuntary muscle twitching 	<p>You will need to:</p> <ul style="list-style-type: none"> • Immediately contact your healthcare team if you, or your caregiver, suspect neurotoxicity symptoms. • Due to the risk for altered or decreased consciousness or coordination in the weeks following CAR-T infusion, patients are not allowed to drive under any circumstances for 8 weeks post CAR T-cell infusion. • Such side effects are some of the reasons you are required to have a caregiver for at least 30 days after CAR-T therapy.

	<ul style="list-style-type: none"> • Loss of balance or coordination • Hallucinations • Unresponsiveness • Memory loss • Difficulty swallowing • Seizures have been reported <ul style="list-style-type: none"> ○ Sudden falls ○ Rigid body posture ○ Jerking movement of arms or legs ○ Shallow breathing ○ Loss of consciousness 	<p><i>For caregiver(s):</i></p> <ul style="list-style-type: none"> • On days you do not come into the daycare clinic, check for signs of disorientation or changes in your loved ones normal patterns. • Report to the doctor any changes over time that you have noticed. <ul style="list-style-type: none"> ○ Changes in their mobility and activities of everyday life. ○ For example: an increased difficulty walking, difficulty with eating meals, trouble recalling common facts etc. • Patients treated with certain CAR T-cell products will receive medications to prevent seizures for 30 days after CAR T-cell infusion. It is important you take this medication to prevent seizures. • If you witness seizure symptoms there are steps you can take to help reduce harm: <ul style="list-style-type: none"> ○ Make sure the patient is in a safe position. <ul style="list-style-type: none"> ▪ Remove anything around the person that could harm the patient, for example: furniture. ○ Do not put anything in their mouth. ○ Call your healthcare team and report the event ○ If you are able, keep track of how long the seizure lasts. ○ Once the seizure stops position the person on their side lying. • Avoid using marijuana. Marijuana can alter your mental state and mimic some symptoms of neurotoxicity. If you have questions about marijuana use, please talk to your doctor.
<p>Infection</p>	<p>CAR-T can cause you to have a weakened immune system, increasing the risk of getting an infection.</p> <ul style="list-style-type: none"> • Infections are illnesses you get from “germs” (bacteria, viruses, or fungi). <p>Symptoms:</p> <ul style="list-style-type: none"> • Fever (>38°C) • Chills or shakes • Cough up yellow or green mucus 	<p>To help prevent infections:</p> <ul style="list-style-type: none"> • Call your doctor immediately at the first sign of an infection such as fever (over 38°C by an oral thermometer), chills, cough, or burning when you pass urine. <ul style="list-style-type: none"> ○ Check your temperature in the morning and in the evening per day. You will be asked • Wash your hands often and always after using the bathroom. • Take care of your skin and mouth. • Avoid crowds and people who are sick.

	<ul style="list-style-type: none"> • Pain, burning, or blood in your pee or poo <p>*Symptoms can be similar to Cytokine Release Syndrome.</p>	<ul style="list-style-type: none"> • Do not go swimming or use hot tubs if you have a CVC line or low white blood cell counts. • Take your medications (Ex. antibiotics, antifungals, antivirals) as instructed. These medications help protect you from infections while your white blood count is low. Continue taking these medications until instructed even if your symptoms have subsided. • Do not take Tylenol® unless instructed to by your healthcare team. Tylenol® can “hide” or “mask” your fever without treating the infection. • See the “Food Safety Tips during Cancer Treatment” handout for tips on how to prepare food safely, and safer food choices.
<p>Low Blood Counts</p>	<p>Can increase the risk of infections, fatigue, and bruising or bleeding.</p> <p>The number of white blood cells may decrease.</p> <ul style="list-style-type: none"> • Normal white blood cells protect your body by fighting bacteria (germs) that cause infection. • When they are low, you are at greater risk of having an infection. <p>The number of your platelets may decrease.</p> <ul style="list-style-type: none"> • Normal platelets help your blood to clot normally after an injury (e.g., cut). • When the platelet count is low you may be more likely to bruise or bleed. <p>Contact your healthcare team immediately if you have any of the following:</p>	<p>*Please see above section, “Infection”, on how to prevent infections.</p> <p>*Call your healthcare team if you have any signs of spontaneous bleeding or bruising.</p> <p>To help prevent bleeding problems:</p> <ul style="list-style-type: none"> • Try not to bruise, cut, or burn yourself. • Clean your nose by blowing gently. Do not pick your nose. • Avoid constipation. • Brush your teeth gently with a soft toothbrush as your gums may bleed more easily. Maintain good oral hygiene.

	<ul style="list-style-type: none">• Vomit that looks like coffee grounds• Black, tarry poo• Bright red blood in your urine	<ul style="list-style-type: none">• Some medications such as Aspirin® or Advil® may increase your risk of bleeding. Talk to your doctor before stopping or starting use.
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References and Resources

Chemotherapy Side Effects:

If you go onto the BC Cancer website, and type “Patient Handout Search” into the search bar you will be brought to the following website. http://www.bccancer.bc.ca/our-services/patient-guide/patient-handout-search?q=* &identity=* &resource=* &. You can search these documents for a variety of patient handouts and information sheets.

Low Blood Counts:

American Cancer Society. (2023). *Low Red Blood Cell Counts (Anemia)*. <https://www.cancer.org/cancer/managing-cancer/side-effects/low-blood-counts/anemia.html>

BC Cancer. (2019, July). *Food Safety Tips During Cancer Treatment*. <http://www.bccancer.bc.ca/nutrition-site/Documents/Patient%20Education/Food-safety-tips-during-cancer-treatment.pdf>

- Chinese version: <http://www.bccancer.bc.ca/nutrition-site/Documents/Patient%20Education/Food-Safety-Tips-during-Cancer-Treatment-Simplified-Chinese.pdf>
- Punjabi version: <http://www.bccancer.bc.ca/nutrition-site/Documents/Patient%20Education/Food-Safety-Tips-during-Cancer-Treatment-Punjabi.pdf>

BC Cancer (2020, February). *Neutropenia: Low number of white blood cells in your blood*. <http://www.bccancer.bc.ca/managing-symptoms-site/Documents/Neutropenia.pdf>

- Chinese version: <http://www.bccancer.bc.ca/managing-symptoms-site/Documents/Neutropenia-traditional-chinese.pdf>
- Punjabi version: <http://www.bccancer.bc.ca/managing-symptoms-site/Documents/Neutropenia-Punjabi.pdf>

Canadian Cancer Society. (2023). *Low red blood cell count (anemia)*. <https://cancer.ca/en/treatments/side-effects/low-red-blood-cell-count>

Nausea:

BC Cancer. (2020, February). *Nausea and Vomiting*. <http://www.bccancer.bc.ca/managing-symptoms-site/Documents/Nausea-And-Vomiting.pdf>

- Chinese version: <http://www.bccancer.bc.ca/managing-symptoms-site/Documents/Nausea-And-Vomiting-traditional-chinese.pdf>
- French version: <http://www.bccancer.bc.ca/managing-symptoms-site/Documents/Nausea-and-Vomiting-French.pdf>
- Punjabi version: <http://www.bccancer.bc.ca/managing-symptoms-site/Documents/Nausea-and-Vomiting-Punjabi.pdf>

BC Cancer. (2023, August). *Practical Tips to Help Manage Nausea*. <http://www.bccancer.bc.ca/nutrition-site/Documents/Patient%20Education/Practical-tips-manage-nausea.pdf>

- Chinese version: BC Cancer. (2015, February). *Food Choices to Help Control Nausea – Chinese Translation*. [http://www.bccancer.bc.ca/nutrition-site/Documents/Patient%20Education/Food Choices to Help Control Nausea Chinese Translation.pdf](http://www.bccancer.bc.ca/nutrition-site/Documents/Patient%20Education/Food%20Choices%20to%20Help%20Control%20Nausea%20Chinese%20Translation.pdf)
- Punjabi version: <http://www.bccancer.bc.ca/nutrition-site/Documents/Patient%20Education/Practical-Tips-to-Help-Manage-Nausea-Punjabi.pdf>

Diarrhea:

BC Cancer Agency. (2021, November). *Food Choices to Help Manage Diarrhea caused by Cancer Treatment*.

[http://www.bccancer.bc.ca/nutrition-site/Documents/Patient%20Education/Food%20Choices%20to%20Help%20Manage%20Diarrhea%20Cause d%20by%20Cancer%20Treatment.pdf](http://www.bccancer.bc.ca/nutrition-site/Documents/Patient%20Education/Food%20Choices%20to%20Help%20Manage%20Diarrhea%20Caused%20by%20Cancer%20Treatment.pdf)

BC Cancer. (2020, February). *How to Treat Diarrhea Caused by Your Treatments and Medications*.

<http://www.bccancer.bc.ca/managing-symptoms-site/Documents/Diarrhea-Caused-By-Medications.pdf>

- Translations available for: Farsi, French, Korean, Punjabi, Chinese, and Vietnamese
<http://www.bccancer.bc.ca/health-info/coping-with-cancer/managing-symptoms-side-effects/diarrhea-caused-by-medications>

Decreased Appetite:

BC Cancer Agency. (2023, August). *Food Ideas to Help with Decreased Appetite*. <http://www.bccancer.bc.ca/nutrition-site/Documents/Patient%20Education/Food-ideas-to-help-with-decreased-appetite.pdf>

<http://www.bccancer.bc.ca/nutrition-site/Documents/Patient%20Education/Food-ideas-to-help-with-decreased-appetite.pdf>

Fatigue:

BC Cancer Agency. (2020, February). *Managing Fatigue (Tiredness)*. <http://www.bccancer.bc.ca/managing-symptoms-site/Documents/Fatigue.pdf>

<http://www.bccancer.bc.ca/managing-symptoms-site/Documents/Fatigue.pdf>

- Translations available for: Farsi, French, Korean, Punjabi, Chinese, and Vietnamese
<http://www.bccancer.bc.ca/health-info/coping-with-cancer/managing-symptoms-side-effects/fatigue-tiredness>

BC Cancer Agency. (2019, March). *High Protein High Energy Food Choices*. [http://www.bccancer.bc.ca/nutrition-site/Documents/Patient%20Education/high protein high energy food choices.pdf](http://www.bccancer.bc.ca/nutrition-site/Documents/Patient%20Education/high%20protein%20high%20energy%20food%20choices.pdf)

[http://www.bccancer.bc.ca/nutrition-site/Documents/Patient%20Education/high protein high energy food choices.pdf](http://www.bccancer.bc.ca/nutrition-site/Documents/Patient%20Education/high%20protein%20high%20energy%20food%20choices.pdf)

For chemotherapy drug specific side effects:

Fludarabine:

BC Cancer Agency. (2007, March). *Fludarabine IV Patient Handout*. BC Cancer Agency Cancer Drug Manual.

http://www.bccancer.bc.ca/drug-database-site/Drug%20Index/Fludarabineiv_handout_5Mar07.pdf

Cyclophosphamide:

BC Cancer Agency. (2007, February 20). *Cyclophosphamide IV Patient Handout*. BC Cancer Agency Cancer Drug Manual.

http://www.bccancer.bc.ca/drug-database-site/Drug%20Index/CyclophosphamideIV_handout_20Feb08.pdf

- Chinese version: http://www.bccancer.bc.ca/drug-database-site/Drug%20Index/CyclophosphamideIV_handout_Chinese_1May2014.pdf
- Punjabi version: http://www.bccancer.bc.ca/drug-database-site/Drug%20Index/CyclophosphamideIV_handout_Punjabi_1May2014.pdf

CAR T-cell therapy specific side effects:

American Cancer Society. (2023). *CAR T-cell Therapy and Its Side Effects*. <https://www.cancer.org/cancer/managing-cancer/treatment-types/immunotherapy/car-t-cell1.html>

BC Epilepsy Society. (2022). *First Aid for Seizures*. <https://bcepilepsy.com/information-sheets-brochures/>

Leukemia and Lymphoma Society of Canada. (n.d.). *Chimeric Antigen Receptor (CAR) T-cell Therapy*. <https://www.lls.org/treatment/types-treatment/immunotherapy/chimeric-antigen-receptor-car-t-cell-therapy>

The Princess Margaret Cancer Foundation. (n.d.). *CAR T-cell Therapy*. Princess Margaret Cancer Classes. <https://pmcancerclasses.ca>

Our program, The Leukemia/ Bone Marrow Transplant Program of British Columbia has free educational resource that you can access by visiting: <https://www.leukemiabmtprogram.org/general-resources/>