Te Whatu Ora
Health New Zealand

DIABETES, GLUCOSE MANAGEMENT & CANCER TREATMENT

Booklet for adults with cancer and diabetes,
Or cancer treatment may increase risk of develop high blood glucose levels.

Contacts

	Name	Phone
Oncologist		
Oncology nurse specialist		
Diabetes team		
Afterhours	Healthline	0800611116

If you are feeling stressed, overwhelmed, sad, angry, or anxious ask either your cancer or diabetes team for a referral to a psychologist

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This resource was adapted from original document to a generic document with authors permission.

Contents

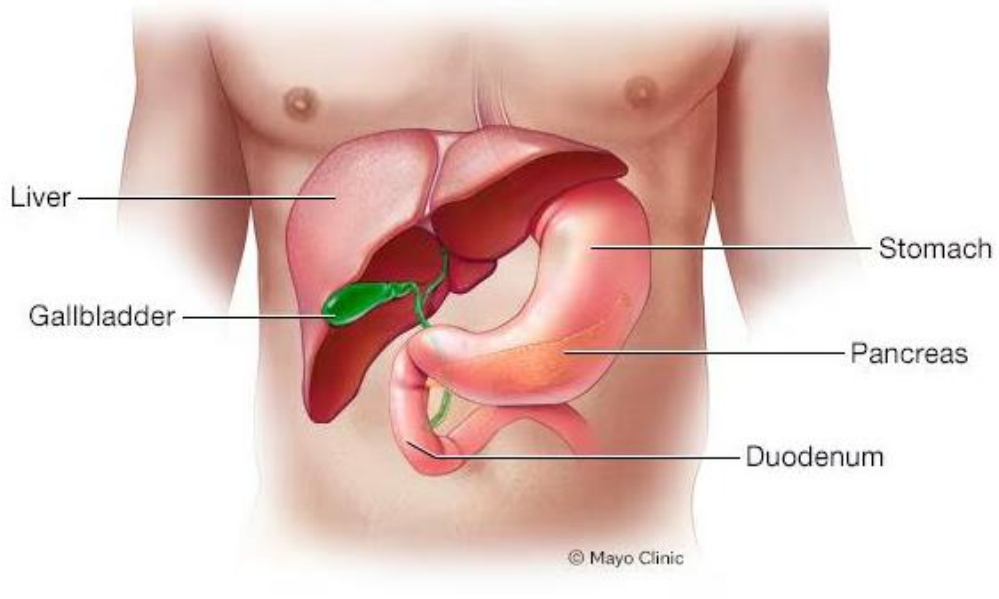
Summary

- Some cancers and cancer therapies, such as steroids, may increase blood glucose levels and/or cause diabetes in some people.
- Steroids are usually given on the first 3 to 5 days of each chemotherapy cycle and in some cases, can be continued daily as maintenance therapy. Steroids can cause an increase in blood glucose levels from around lunchtime through until the evening.
- If high blood glucose levels develop while on cancer treatment, diabetes medication will be used with an aim to keep levels within a target range of 5 – 15mmol/L.
- If blood glucose levels become too high (>20.0mmol/L) **and/or** feeling unwell with vomiting, stomach pain, deep/fast breathing or confusion, this may suggest a diabetes emergency – **seek medical advice/treatment immediately or call 111**
- If blood glucose levels become too low (<4.0mmol/L) while on diabetes medication and/or symptoms of shakiness, sweating or confusion occur – **refer to page 5 of this guide**
- Diabetes medication may need to be started, or existing diabetes medication may need to be adjusted if blood glucose levels remain high with cancer treatment.

About diabetes and cancer

What is diabetes?

Diabetes is a condition where a person develops high blood glucose levels. Blood glucose is regulated by a hormone called insulin, which is made in the pancreas. Insulin helps blood glucose move into cells, where it is converted to energy.



Diabetes is diagnosed when the pancreas stops making insulin, doesn't make enough or the insulin doesn't work properly. As a result, excess glucose stays in the bloodstream, leading to high blood glucose levels (hyperglycaemia).

The two most common types of diabetes are:

- **Type 1 diabetes:** an autoimmune condition where the pancreas is no longer making insulin
- **Type 2 diabetes:** the pancreas is not making enough insulin, or the insulin produced doesn't work well (insulin resistance). This is the most common type of diabetes

During cancer treatment, steroids may cause steroid induced diabetes, which is similar to, Type 2 diabetes. Steroids can cause insulin resistance, leading to high blood glucose levels.

Effects of cancer treatment on blood glucose levels/diabetes

Steroids

What Are Steroids?
Steroids are natural substances in the body that help control various functions, like using food, regulating the immune system, and balancing salt and water. They are effective at reducing inflammation and are often used in cancer treatment to:

- Enhance chemotherapy effectiveness
- Minimize allergic reactions to chemotherapy
- Reduce nausea and vomiting
- Boost appetite and energy levels
- Support overall cancer management

How to Take Steroids
Steroid tablets should be taken with food to avoid stomach irritation.

Common Steroids Include:

- Dexamethasone
- Hydrocortisone
- Methylprednisolone
- Prednisone

Effects on Blood Glucose Levels

- They increase glucose production in the liver.
- They make it harder for glucose to leave the bloodstream.
- They raise insulin resistance.

Factors Influencing Blood Glucose Levels While on Steroids:

- Existing diabetes before treatment
- High HbA1c levels before treatment
- Type and dosage of steroids used
- Duration of steroid use
- Timing of steroid doses (blood sugar levels rise about 8-12 hours after oral doses; quicker with intravenous)
- Overall response to steroids and chemotherapy, including changes in appetite and energy levels

Symptoms of High Blood Sugar

- Needing to urinate a lot
- Thirsty all the time
- Feeling very tired
- Blurry vision
- Losing weight without trying
- Itching in the genital area (might be thrush)
- Cuts and wounds that heal slowly

Over time, persistently high blood sugar levels can lead to damage of the small blood vessels in the eye, kidneys, and feet.

Hypoglycemia (Low Blood Glucose)

When treating diabetes with some types of medication, blood glucose levels can drop too low (less than 4 mmol/L).

Symptoms of Low Blood Sugar:

- Sweating
- Shakiness
- Hunger
- Anxiety or irritability
- Extreme tiredness
- Confusion or difficulty thinking

A low blood sugar episode can happen quickly and can be serious. It is important for family members to recognize the signs and know how to help.

Treatment for Hypoglycemia

1. **Eat or Drink Fast-Acting Carbohydrates (examples listed):**
    - 6 teaspoons of sugar dissolved in water
    - 350 ml of fruit juice or regular soft drink
    - 15 jellybeans
    - 2 tablespoons of honey
    - 3 tablespoons of jam
    - 10 dextrose or glucose tablets
    - 2 hypofit gels
2. **Wait 15 Minutes.**
3. **Retest Blood Glucose:**
    - If still less than 4 mmol/L, repeat step 1.
4. **Once Blood Glucose level is Above 4 mmol/L:**
    - Eat slow-acting carbohydrates, such as:
        - 1 slice of toast
        - 1 cup of milk
        - 3-4 crackers with cheese
        - 2 plain biscuits
        - A meal if it's time
5. **Check Blood Glucose Again After 30 Minutes** to ensure level is back to normal.
6. **Consult Your Diabetes Team** if you frequently experience low blood glucose your medication may need adjusting

Testing blood glucose levels while on steroids

- Regular blood glucose checking is needed:
    - In cases where there is pre-existing diabetes, or a high risk or developing diabetes, it is vital to check blood glucose levels during steroid treatment as this is used to guide medication management of high blood glucose levels.
    - Recommended checking times
        - Before breakfast (fasting)
        - Before lunch
        - 2 hours post lunch
        - Before evening meal
        - 2 hours post evening meal

Management of high blood glucose levels

- The Oncology team may change the dose or timing of the steroid or the type of steroid
- It may be necessary to make dietary/lifestyle modifications (less energy dense foods & increased physical activity)
- Addition of diabetes medication – Diabetes Team will assess, alter, or start medication best suited to individual requirements
    - Pre-existing diabetes – changes to medication used or increased doses of pre-existing diabetes treatment
    - A diabetes medication may be started to stop blood glucose levels rising too high
    - Common diabetes medication used (oral and injectable)
        - Metformin
        - Gliclazide/Glipizide
        - Empagliflozin (Jardiance®)
        - Vildagliptin (Galvus®)
        - Dulaglutide (Trulicity®)
        - Insulin (Protaphane, Humulin NPH, Lantus, NovoRapid, Apidra, Humalog, Actrapid, NovoMix 30, Humalog Mix 25 or Humalog Mix 50)

Oral Diabetes Medications used for Steroid-Induced High Blood Glucose

Metformin

- First-line treatment for Type 2 diabetes.
- Improves insulin response, reduces liver glucose production, and increases glucose use by muscles.
- Usually taken 2-3 times a day with food.
- Possible side effect: diarrhoea.
- Should be stopped if you are unwell or unable to eat.
- Does not cause low blood glucose levels (hypoglycemia).
- Available in 500 mg or 850 mg tablets; maximum daily dose is 3000 mg.

Gliclazide/Glipizide

- Increases insulin production in the pancreas.
- Typically taken 2-3 times daily with meals.
- Possible side effects: hypoglycemia and weight gain.
- Regular blood sugar monitoring is recommended due to hypoglycemia risk.
- **Gliclazide:** 80 mg tablets; usual dose is 40 mg (½ tablet), max 320 mg (4 tablets) per day.
- **Glipizide:** 5 mg tablets; usual dose is 2.5 mg (½ tablet), max 30 mg (6 tablets) per day.
- If a dose is missed, take it with food as soon as you remember. Do not double doses.
- Do not take if not eating, as this increases hypoglycemia risk. Restart once you are well and eating normally

Insulin therapy

If required, the Diabetes Team will provide information on the specific insulin therapy needed for individual situations

Diabetes Management on Steroid Days

On days when taking steroids, higher doses of diabetes medication are often needed.

Example: Days 1-4 of a Chemo Cycle with Dexamethasone

- Dexamethasone is given intravenously on Day 1, quickly raising blood sugar levels.
- On Days 2-4, Dexamethasone is usually taken as tablets, often causing blood sugar to rise, especially in the afternoons and evenings.

Diabetes management:

- Higher doses of insulin or Gliclazide/Glipizide are often required on Dexamethasone days, either once at breakfast or twice daily (breakfast and dinner).
- Regularly check blood sugar levels to allow your diabetes team to assess and fine tune insulin or Gliclazide/Glipizide doses.

On Non-Steroid Days (Days 5-6):

- Blood glucose levels gradually normalize after stopping Dexamethasone, reducing the need for diabetes medication.

Coping with Nausea and Vomiting

Cancer and its treatments can cause nausea and vomiting. Several anti-nausea medications include:

- **Dexamethasone:** For the first 3-5 days of chemotherapy.
- **Aprepitant:** 125 mg one hour before treatment on Day 1; 80 mg before breakfast on Days 2-3.
- **Domperidone:** 10 mg, 3-4 times daily.
- **Ondansetron:** 4-8 mg, up to 3 times daily.

Managing blood glucose levels with nausea

Nausea and vomiting can complicate diabetes management. If you cannot eat or drink, it may lead to dehydration and unstable blood glucose levels. If solid foods are difficult, a dietitian may recommend alternatives like fortified soups, smoothies, or supplement drinks (e.g., Ensure, Nutren, Diasip).

Sick Days

Sick Day Management for Patients with Diabetes

Acute illness usually causes high blood glucose in people but can cause low blood glucose in those on some oral medication or insulin with reduced food intake.

Sick Day Management:

- Notify someone if you are unwell and avoid strenuous activity.
- Monitor blood glucose levels at least 3-4 times daily, or more if you feel hypo- or hyperglycaemic.
- Stop SGLT2 inhibitors during illness and for at least 3 days before major procedures or any procedure requiring no food for over 12 hours. Restart only when well and eating normally.
- Those taking Empagliflozin (Jardiance/Jardiamet) should see a doctor if they have symptoms of diabetic ketoacidosis (DKA), such as nausea or abdominal pain.
- Stop metformin and acarbose during acute gastrointestinal illness and restart when well.
- Stay hydrated (aim for 1 glass of water per hour).
- Avoid non-steroidal medication (ibuprofen/Celecoxib/Diclofenac/Indomethacin) if you have diabetic kidney disease or are on blood pressure medication such as Quinapril, Lisinopril, Perindopril, Enalapril, Candesartan, Losartan
- Continue eating normally or have light meals if needed.
- If food intake decreases, reduce sulfonylurea and bolus insulin doses. Basal or premixed insulin doses may need to be cut by 20-30% based on blood glucose levels.
- Use correction insulin every 4 hours for high blood glucose levels.
- Contact your diabetes provider or emergency services if:
    - You feel very unwell (especially with fever, vomiting, or diarrhoea).
    - Blood glucose levels are consistently above 20 mmol/L or below 4 mmol/L.
- **High Dose Steroids:** High doses of steroids (e.g., prednisone over 20 mg/day) can cause significant high blood glucose levels, leading to possibly needing a 30% increase in insulin doses. Your diabetes team will guide you through this.

When to seek medical review:

- You are very unwell, regardless of glucose or ketone levels.
- Capillary ketones are over 1.5 mmol/L.
- Blood glucose level is consistently above 25 mmol/L or you have hyperglycaemic symptoms.
- You experience severe hypoglycemia or are at high risk for it.

Diarrhoea

Diarrhoea means needing to use the bathroom more often, with looser or watery stools. It can be caused by cancer treatments like chemotherapy, radiotherapy, immunotherapy, or surgery, and sometimes by antibiotics or infections. Most diarrhoea from treatment is mild, but severe cases can lead to dehydration.

Medication:
Take the anti-diarrhoea medication prescribed by your Oncology Team. Commonly prescribed is:

- **Loperamide:** 4 mg after the first loose stool, then 2 mg after each loose stool, up to a maximum of 16 mg per day.

If diarrhoea worsens, contact your nurse specialist or GP. Sometimes, you may need to stop certain medications if dehydration occurs.

Tips to Manage Diarrhoea:

- Drink plenty of fluids (at least 2 liters per day or 1 glass per hour), such as diluted fruit juice, milk, soup, and water.
- Avoid alcohol and caffeinated drinks.
- Eat small, plain meals with starchy foods (like potatoes, rice, and bread).
- Avoid greasy, fatty, and spicy foods.

If you cannot stay hydrated, you may need to go to the hospital for IV fluids. The Oncology Team can help with this.

Appetite Changes

Loss of appetite is common with cancer and its treatments. This can result in eating less, feeling no hunger, or feeling full quickly. Ongoing appetite loss may lead to weight loss, malnutrition, fatigue, and muscle weakness. For those on diabetes medication, reduced appetite can cause low blood sugar (hypoglycemia), which the Diabetes Team may address by adjusting medications.

Tips to Improve Appetite:

- Eat 4-6 small meals throughout the day instead of 3 large ones.
- Keep snacks handy and try ready-made meals.
- Drink high-calorie liquids (like soups, smoothies, or supplements).
- Share meals with family or friends.
- Have your biggest meal when you feel hungriest.
- Add calories to meals without increasing volume (using cheese, cream, butter, or milk powder).

Some medications, like steroids, may increase appetite. It is important to limit foods high in simple sugars and fats (like sugary drinks and fried foods) to better manage blood glucose levels.

Keeping Active

Staying physically active can help manage cancer treatment side effects, reduce anxiety and depression, and improve quality of life. It also aids in blood glucose control by enhancing insulin use, lowering blood glucose levels, and managing weight.

Infection Risk

Cancer and its treatments can weaken the immune system, increasing infection risk. People with diabetes or high blood glucose are especially vulnerable.

Symptoms of Infection

- High temperature (>38°C)
- Sudden feeling unwell, shaky, or cold
- Painful, swollen, or warm wound
- Sore throat, cough, or yellow/green phlegm
- Nausea, vomiting, or diarrhoea
- Increased urination or pain when urinating

If you experience any of these symptoms, seek medical attention promptly