Type 1 Diabetes Booklet

The resources in this booklet will be reviewed with you over the next several weeks. Make note of any questions you have, and ask your diabetes educator.

Many of these handouts and other resources can be found on the **Diabetes Canada website**: www.diabetes.ca or their resource page http://guidelines.diabetes.ca/patient-resources .

You may also access links to Alberta Health Services handouts on our website: **www.endometab.ca**

Diabetes Centre Calgary –Endocrinology & Metabolism Program
1820 Richmond Road, Calgary AB T2T 5C7 Tel: 403-955-8118 Fax: 402-955-8634
www.endometab.ca

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Section 1

Alberta Health Services

Type 1 Diabetes Education Schedule of Appointments

Date	Time	Educator
1.		
2.		
3.		
4.		
5.		

It is important to attend all sessions. Please call the booking office as soon as possible if you need to change appointment date(s) or time(s).

You will be contacted separately about an appointment with your diabetes specialist (Endocrinologist).

Important Phone Numbers

Diabetes Centre Calgary Main Desk: 403-955-8118

Booking Office: 403-955-8146

Endocrinologist's office: Dr. _____ Phone: _____

Endocrinologist on-call (for urgent, after hours calls): 403-944-1110

Your diabetes educators: _____

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Alberta Health Services

Date:_____

Endocrinology & Metabolism Program
Diabetes Centre Calgary
1820 Richmond Road SW
Calgary AB T2T 5C7
403-955-8118

To whom it may concern,

Re:_____

Date of birth:_____

_____ has recently been diagnosed with a chronic medical condition. This condition will not prevent the individual from performing his/her job. If correctly managed, time off due to illness will be minimized. However, it does require a great deal of learning and monitoring at the time of diagnosis and on an ongoing basis to ensure correct management and prevention of complications.

_____ has a series of appointments on the following dates:

1._____
2._____
3._____
4._____
5._____

Please be aware that upon completion of these appointments, additional visits will be required on a regular basis, approximately four to six times a year. Thank-you for understanding the importance of these appointments.

Sincerely,

Alberta Health Services

Alberta Health Services

Date: _____

Re: _____

To Whom It May Concern;

_____is a client of the Endocrinology & Metabolism Program, and was seen for a medical appointment today.

Sincerely,

Diabetes Centre Calgary
Endocrinology & Metabolism Program
403-955-8118

Diabetes Resources – Calgary Zone

Providers at the Diabetes Centre Calgary want to help you self-manage your diabetes. This handout lists resources to help. Please call Health Link at 811 to learn of more resources.

What you need to know:

Diabetes occurs when the body can't control blood sugar (glucose) levels. Blood sugar levels that are too high, for too long, can damage the small and big blood vessels they travel through. This can harm eyes, heart, brain (stroke), nerves, kidneys, and feet. There are steps you can take that may prevent or reduce these risks by up to 35-65% or more. For more information, read this handout and visit some of the resources.

Diabetes Centre Calgary can help you:

- Understand your glucose levels & options to control them.
- Understand how to manage or start insulin pump therapy.
- Understand how to keep babe and mom healthy through diabetes in pregnancy.
- Access help for diabetes specific stress (e.g. needle phobia)

Ask your doctor to refer you to our program or view our website: www.EndoMetab.ca

Resources to help you self-manage diabetes are listed in this handout:

Diabetes Canada Recommended Checks to stay healthy with diabetes	
A	A1c: Measures "average" blood glucose level over past 2-3 months • Ask for a standing-order A1c from your doctor so it is easier to get an A1c done every 3-4 months. You do not need to fast for this lab-work. • Target is usually 7% or less. Most people will aim for before-meal glucose checks of 4-7 mmol/L to reach an A1c of 7% or less. Check with your healthcare team for your targets. • **Why it's important:** A target A1c can lower the risk of diabetes complications. Each 1% drop in A1c (e.g. from 8% to 7%) may lower risk by up to 35% in type 2 diabetes. Dropping the A1c from 9% to 7% may lower the risk by up to 60% in type 1 diabetes.
B	Blood pressure (BP) • Aim for less than 130/80. Monitor at home, pharmacy, MD office. • **Why it's important:** Controlling blood pressure can reduce the risk of stroke, heart attack, dementia, erectile dysfunction and damage to eyes and kidneys.
C	Cholesterol • Ask your doctor to send you to lab yearly (you don't need to fast). • LDL target is less than 2.0 mmol/L for most with diabetes • **Why it's important:** High LDL and diabetes both raise the risk of heart attack & stroke.
D, D	Drugs to reduce glucose levels and to increase cardio-renal protection. • See your doctor to discuss possible medications. • **Why it's important:** Many medicines help reduce glucose levels, which can reduce complications. Some medications help reduce the risk of stroke, heart attack and kidney damage in different ways. Some medications help with both at the same time. Dental care: Perform daily dental care. Have regular dental appointments. • **Why it's important:** Diabetes increases the risk of gum disease; gums support teeth!
E	Exercise and Healthy Eating • **Why it's important:** Your healthy habits help increase overall wellness while lowering blood sugars, the risk of heart disease and other complications.
S, S, S	Self-Management Support • Set goals and identify barriers that keep you from reaching your goals • **Why it's important:** Goals focus your energy and help with next steps. Screening • Heart: Have BP, cholesterol and other tests done by doctor. • Feet: Examine feet daily. See doctor if you have open wounds or concerns. • Eyes: Get a diabetes eye exam with optometrist or ophthalmologist. • Kidney: Have urine and blood checks done yearly by your doctor. • **Why it's important:** The sooner complications are found, the sooner they can be managed and the less likely they'll affect your quality of life. Stop Smoking • When ready, see your doctor, pharmacist or visit https://www.albertaquits.ca/ • **Why it's important:** Quitting smoking reduces the risk of heart disease, stroke, many cancers, dying early and exposing loved-ones to smoke.

RESOURCES: EDUCATION & ANSWERS

1. Phone-line, Email
    a. Diabetes Canada's support services answers more than 20,000 questions a year: 1-800-226-8464 or visit their website to email them a question or to read FAQ https://www.diabetes.ca/campaigns/information---support--virtual-care .
    b. Diabetes Educator: If you already have a diabetes educator in your primary care network (doctor's office) or diabetes clinic, call him or her. Many pharmacists are also diabetes educators. Ask!

2. Diabetes Classes:
    a. Alberta Healthy Living Program Classes: To view and sign up online for virtual diabetes classes visit www.ahs.ca/ahlp Search classes by topic, i.e. diabetes.
    b. Diabetes Canada Virtual Classes https://www.diabetes.ca/get-involved/localprograms---events/virtual-diabetes-classes
    c. Primary Care Network (PCN) education: Find and visit your PCNs website at www.mypcn.ca to see what education classes they may offer. PCNs are groups of family doctors that offer extra services to their patients.

3. Online Education (handouts, webpages, videos)
    a. Diabetes Canada Education http://guidelines.diabetes.ca/patient-resources
    b. Diabetes Canada Home page www.diabetes.ca
    c. Additional diabetes resources (including Low Blood Sugar handout) listed by Diabetes Center Calgary: www.EndoMetab.ca > Patients and Family > type of diabetes
    d. MyHealth.Alberta: Visit https://myhealth.alberta.ca/ and search Diabetes

4. Glucose Monitoring (Purchases and "How To"):
    a. Pharmacies: Pharmacy staff can sell and train you on glucose measuring devices obtained through their pharmacy e.g. glucose meters, sensors.
    b. Diabetes educators: Educators at your Primary Care Network (doctor's office) or diabetes centre (if you are currently attending) may assist with trainings.

5. Insulin Pump Therapy
    a. Please view the following webpage to learn about Diabetes Centre Calgary's Insulin Pump Program and the Alberta Insulin Pump Therapy Program: www.EndoMetab.ca > Patients and Family > Insulin Pump Therapy

RESOURCES: SEEK INDIVIDUAL HELP FROM RESOURCES BELOW IF…

Seek help if …

- You are planning a pregnancy.
- You frequently have glucose readings less than 4.0 mmol/L each week
- You frequently have glucose readings above 10 mmol/L each week
- You are frequently peeing, thirsty, having infections
- You have an open wound on your leg or foot
- You are due for regular diabetes checks for A1c, heart, feet, eyes, kidneys
- You find it hard to take care of your health because of finances, disabilities, stress, and other mental health concerns.

Make an appointment to discuss with:

1. Your family doctor, nurse practitioner or the health educators in your Primary Care Network www.mypcn.ca. If you don't have a family doctor, find one at www.calgaryareadocs.com. Please note, the Mosaic PCN also has a Refugee Health Clinic http://mosaicpcn.ca/programs/refugee-health/
2. Your pharmacist. They may be a diabetes educator. Ask!
3. Your diabetes centre or diabetes doctor: If you don't see an educator at a diabetes centre, it may be that your diabetes doesn't need specialist care. Ask your doctor if you need a referral to a diabetes centre or to a diabetes doctor.
4. The people at these resources:
    a. **Alberta 211** (call or text 211) or https://ab.211.ca/ . This is Alberta's online directory to help you navigate to resources for mental health, finances, addiction, crisis, disability, employment, food, housing, indigenous peoples, legal & more.
    b. **Alberta Supports** 1-877-644-9992 province-wide (TTY: 1-800-232-7215) https://www.alberta.ca/alberta-supports.aspx Alberta Supports can help you access more than 30 programs and 120 services for seniors, people with disabilities, job seekers, parents and families, homelessness, financial assistance, abuse, and family violence prevention.
    c. **Access Mental Health** 403-943-1500 or The Distress Centre www.distresscentre.com to help you find the right resource.

RESOURCES: SEEK URGENT HELP FROM RESOURCES BELOW IF …

1. **You feel distressed and worry you may hurt yourself:**
    a. Call or Text 988 or visit https://988.ca/ for Canada's Suicide Crisis Helpline
    b. Call the Distress Centre Calgary 403-266-4357 (403-266-HELP)

2. **You have signs and symptoms of a heart attack or stroke**
   (www.heartandstroke.ca/heart or www.heartandstroke.ca/stroke)
    a. Call 9-1-1 or have someone drive you immediately to urgent care or an emergency department. You should be seen immediately. Do not drive yourself.

3. **You are on an insulin pump and it stops working. (Remember, you cannot be without insulin for more than 2 hours.)**
    a. Use the plan you have for coming off pump or
    b. Call your diabetes educator during daytime hours or
    c. Call your diabetes doctor or their after-hours physician.
    d. See general guidelines for Prevention of Diabetic Ketoacidosis (DKA) in Insulin Pump Therapy or Coming off Pump: www.EndoMetab.ca > Patients and Family > Insulin Pump Therapy > Handouts

4. **You have type 1 diabetes or take a pill called an SGLT-2 inhibitor and have nausea or vomiting, abdominal pain and/or trouble breathing you may be experiencing diabetic ketoacidosis (DKA).**
    a. Visit urgent care, an emergency department or if you feel too unwell to travel, call 91-1. Calgary emergency department wait times are listed here: http://www.albertahealthservices.ca/waittimes/waittimes.aspx
    b. You may also test ketones (see the DKA handout you were provided) and call your diabetes educator during daytime hours to help determine if it is DKA.

5. **You (or another person) with type 1 diabetes is having a severe low blood sugar. Glucose tablets or juice are not working or the person is unconscious, severely agitated or not responding to you.**
    a. Call 9-1-1 so EMS can respond to treat
    b. And administer glucagon if you've been trained on this

6. **You learn you are pregnant.**
    a. See your doctor now to make an urgent referral to a "Diabetes in Pregnancy Clinic".

7. **You made a big mistake with your insulin, like taking too much of the fast-acting insulin.**
    a. Call Poison and Drug Information Services (PADIS) for insulin dose errors Alberta & NWT 1-800-332-1414 available 24 hours a day.

b. Call your diabetes educator during daytime hours. Don't leave a message if unable to reach an educator. Call PADIS immediately.

IF YOU have an appointment at Diabetes Centre Calgary

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1. At your first appointment:
    a. We ask questions to get to know you better. This includes questions about how we can help you, your goals and your medical history.
    b. Together we decide on a plan for future visits to help you achieve your goals.

2. Please prepare for your appointment, so we can better help you.
    a. Bring a three-day record of what you eat and glucose readings.
    b. Plan to arrive at least 10 minutes early.
    c. Prepare to pay for parking if this is an in-person appointment. You may wish to download the AHS Parking app. (Parking at Sunridge Medical Gallery and South Calgary Health Centre is free.)
    d. Visit our webpage (listed on the first page of this handout) for any of the following:
        i. Forms for food records
        ii. How to link your glucose data to Diabetes Centre Calgary cloud accounts if you are using a sensor
        iii. Insulin pump program
        iv. Educational handouts

3. Tell us what you hope the visits with an educator will help you with. These may help you find answers before coming to your appointment.

    a. Nutrition to help with:
    b. Medications to help with:
    c. Help with concerns that impact your ability to self-manage diabetes (like accessing supplies and adjusting to diabetes).
    d. Other:

Tax Credits for people with Type 1 Diabetes

The federal disability tax credit (DTC) is available to help to support people with disabilities or their family members to reduce the amount of income tax they pay. Revenue Canada recognizes that Type 1 Diabetes is an expensive condition, requiring devices and suppies to aid in daily managment.

Canadians living with Type 1 Diabetes automatically qualify for this tax credit.

People can apply by submitting form T2201 to Revenue Canada. For more information, refer to our website **www.endometab.ca and go to Patients and Family > Type 1 Diabetes Resources.**

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www.endometab.ca

DIABETES CANADA

Managing your blood sugar

What is blood glucose (sugar)?

Blood glucose (sugar) is the amount of glucose in your blood at a given time.

Why should you check your blood sugar levels?

Checking your blood sugar levels will:

- provide a quick measurement of your blood sugar level at a given time;
- determine if you have a high or low blood sugar level at a given time;
- show you how your lifestyle and medication affect your blood sugar levels; and
- help you and your diabetes health-care team to make lifestyle and medication changes that will improve your blood sugar levels.

How often should you check your blood sugar levels?

How frequently you check your blood sugar levels should be decided according to your own treatment plan. You and your health-care provider can discuss when and how often you should check your blood sugar levels. Checking your blood sugar levels is also called Self-Monitoring of Blood Glucose (SMBG).

How do you test your blood sugar levels at home?

A *blood glucose meter* is a device used to check your blood sugar at home. You can get these meters at most pharmacies or from your diabetes educator. Talk with your diabetes educator or pharmacist about which one is right for you. Once you receive a meter, ensure you receive the proper training before you begin to use it.

Ask your health-care provider about:

- how and where to draw blood
- how to use and dispose of lancets (the device that punctures your skin)
- the size of the drop of blood needed
- the type of blood glucose strips to use
- how to clean the meter
- how to check if the meter is accurate
- how to code your meter *(if needed)*

A *flash glucose meter* (FGM) is a new generation device that uses sensor scans for blood sugar monitoring and doesn't require finger pricks.

A *continuous glucose monitor* (CGM) is a device that checks blood sugar level by a sensor inserted under your skin.

How do you keep your blood sugar levels within their target range?

If you have diabetes, you should try to keep your blood sugar as close to target range as possible. This will help to delay or prevent complications of diabetes. Maintaining healthy eating habits and an active lifestyle, and taking medication, if necessary, will help you keep your blood sugar levels within their target range. Target ranges for blood sugar can vary. It depends on a person's age, medical condition and other risk factors.

Targets for pregnant women, older adults and children 12 years of age and under are different. Ask your health-care provider what your levels should be.

Managing your blood sugar when you're ill

When you are sick, your blood sugar levels may fluctuate and be unpredictable. During these times, it is a good idea to check your blood sugar levels more often than usual (for example, every two to four hours). It is also very important that you continue to take your diabetes medication. If you have a cold or flu and are considering using a cold remedy or cough syrup, ask your pharmacist to help you make a good choice. Many cold remedies and cough syrups contain sugar, so try to pick sugar-free products.

When you are sick, it is VERY IMPORTANT that you:

- drink plenty of extra sugar-free fluids or water; try to avoid coffee, tea and colas, as they contain caffeine, which may cause you to lose more fluids.
- replace solid food with fluids that contain sugar if you can't eat according to your usual meal plan;
- try to consume 15 grams of carbo-hydrate every hour if you are not able to follow your usual meal plan;
- call your doctor or go to an emergency room if you vomit and/ or have had diarrhea two times or more in four hours; and
- if you are on insulin, be sure to continue taking it while you are sick. Check with your health-care team about guidelines for insulin adjustment or medication changes during an illness.

Recommended blood sugar targets for most people with diabetes*

Your target may not be the same as the examples in this blood sugar levels chart. Yours should be specific to you.

	A1C**	Fasting blood glucose (sugar) / blood sugar before meals (mmol/L)	Blood sugar two hours after eating (mmol/L)
Target for most people with diabetes	7.0% or less	4.0 to 7.0	5.0 to 10.0 (5.0 – 8.0 if A1C** targets not being met)

* This information is based on the Diabetes Canada 2018 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada and is a guide.

** A1C is a measurement of your average blood sugar control for the last 2 – 3 months and approximately 50% of the value comes from the last 30 days.

Talk to your health-care provider about YOUR blood sugar target ranges.

You should have your A1C measured every 3 months, when your blood sugar targets are not being met or when you are making changes to your diabetes management.

A1C, before meal and after meal blood sugar levels are all important measurements of your diabetes control.

Related article: *Lows and highs: blood sugar levels*

Interactive Self-monitoring of Blood Glucose Tool and Sick-day Management

DIABETES CANADA **diabetes.ca | 1-800 BANTING (226-8464) | info@diabetes.ca**

Diabetes Canada is making the invisible epidemic of diabetes visible and urgent. Eleven million Canadians have diabetes or prediabetes. Now is the time to End Diabetes - its health impacts as well as the blame, shame and misinformation associated with it. Diabetes Canada partners with Canadians to End Diabetes through education and support services, resources for health-care professionals, advocacy to governments, schools and workplaces, and, funding research to improve treatments and find a cure.

DIABETES CANADA

Type 1 diabetes: the basics

What is type 1 diabetes?

Type 1 diabetes is a disease in which the pancreas does not produce any insulin. Insulin is a hormone that helps your body to control the level of sugar (glucose) in your blood. Without insulin, sugar builds up in your blood instead of being used for energy. Your body produces sugar and also gets sugar from foods like bread, potatoes, rice, pasta, milk and fruit.

The cause of type 1 diabetes remains unknown. It is not caused by eating too much sugar, and is not preventable. The current thought is that type 1 diabetes occurs when the body's immune system destroys the cells that make insulin.

Insulin therapy

Insulin therapy is required for the treatment of type 1 diabetes. There are a variety of insulins available to help manage diabetes. Insulin is injected by pen, syringe or pump. Your doctor will work with you to determine:

- The number of insulin injections you need per day
- The timing of your insulin injections
- The dose of insulin you need with each injection

The insulin treatment your doctor prescribes will depend on your goals, age, lifestyle, meal plan, general health and motivation. Social and financial factors may also need to be considered.

The good news

You can live a long and healthy life by keeping your blood sugar levels in the target range set by you and your health-care provider:

You can do this by:

- Taking insulin as recommended (and other medications, if prescribed by your doctor)
- Monitoring your blood sugar levels regularly using a home blood glucose meter*
- Eating healthy meals and snacks
- Enjoying regular physical activity
- Aiming for a healthy body weight
- Managing stress effectively

*Discuss with your health-care provider how often you should measure your blood sugar level

Get the support you need

A positive and realistic attitude toward your diabetes can help you manage it. Talk to others who have type 1 diabetes or their caregivers. Ask your local Diabetes Canada branch about additional resources, joining a peer-support group or taking part in an information session.

Who can help you?

Your health-care team is there to help you. Depending on your needs and the resources available in your community, your team may include a family doctor, diabetes educator (nurse and/or dietitian), endocrinologist, pharmacist, social worker, exercise physiologist, psychologist, foot-care specialist, eye-care specialist. They can answer your questions about how to manage diabetes and work with you to adjust your food plan, activity and medications.

Remember, you are the most important member of your health-care team

Complications of diabetes

Over time, high blood sugar levels can cause complications such as blindness, heart disease, kidney problems, nerve damage and erectile dysfunction. Fortunately, good diabetes care and management can prevent or delay the onset of these complications.

You can reduce your chances of developing these complications if you:

- Keep your blood sugar within your target range*
- Avoid smoking
- Keep your cholesterol and other blood fats within your target range*
- Keep your blood pressure within your target range*
- Take care of your feet
- Have regular visits with your doctor, diabetes team, dentist and eye-care specialist

*Discuss your target ranges with your health-care provider

Related articles: *Managing your blood sugar, Physical activity and diabetes, Just the basics (tips for healthy eating), Cholesterol and diabetes, High blood pressure and diabetes, Smoking and diabetes, Foot care: a step toward good health, and Staying healthy with diabetes*

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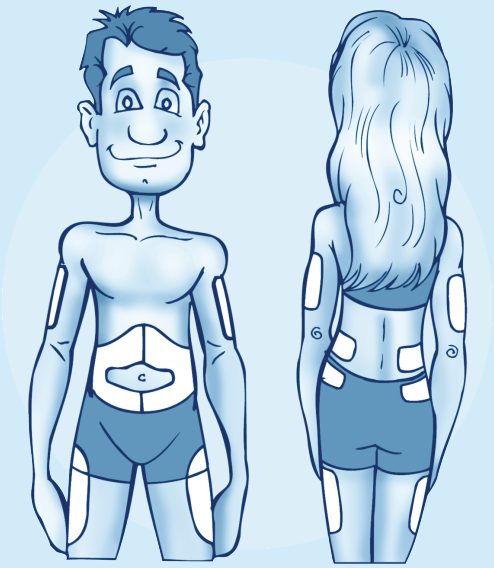
DIABETES CANADA

Getting started with insulin

Insulin Injection Sites



NOTE: It is really important to change (rotate) where you give yourself insulin to prevent fatty lumps from forming since these can affect how your body absorbs insulin. For example, you can move from one side of your abdomen to the other side, and you can also move your injection site to a different location within each side of your abdomen.

Avoid a 2-inch area around the belly button as well as scar tissue.

Insulin Pens:

Your pen comes with an instruction book. Please review it to understand how your pen works, how to load the cartridge, and how to prepare your pen for an insulin injection. There are different sizes and lengths of needle tips available. Most often the shortest needle is recommended. Talk with your health-care professional about which needle tip would be best for you.

Mixing Insulin:

Insulin that is cloudy (NPH, premixed) needs to be mixed before using. The pen should be rolled ten times, tipped ten times, and checked for a milky-white consistency.

Check Insulin Flow (Prime):

Attach pen needle. Dial up 2 or 3 units (whichever the manufacturers recommends) and, with pen tip facing upwards, push the dosing button. If no stream of insulin appears, repeat this step again.

Giving Your Injection:

After you have checked the insulin flow, dial up the dose of insulin to be taken. Insert pen tip into skin at a 90° angle. Push the dosing button until you see '0'. Count 10 seconds before removing the needle from your skin to ensure you receive the full dose. With longer needles (≥ 8mm), you may need to gently lift the skin before injection or inject on an angle.

Site	Things to think about
Abdomen (tummy) Stay 2 inches (5 cm) away from your belly button	Easy to reach. Insulin absorbs fast and consistently.
Buttock and thigh	Slower absorption rate than from abdomen and arm sites.
Outer arm	After abdomen, arm provides the next fastest absorption rate. This area is hard to reach when injecting yourself, so it is often not recommended.

Insulin Types:

Type	Onset (How quickly it starts working)	Peak (When it is most effective)	Duration (How long it works)	Timing of injection (When should it be given)
Bolus insulins				
Rapid acting analogues • Apidra / Humalog (U100, U200) / NovoRapid • Fiasp	10 – 15 min 4 min	1 – 2 hours 30 min – 1.5 hours	3 – 5 hours 3 – 5 hours	Given with one or more meals per day. Should be injected 0 – 15 minutes before or after meals. Fiasp is to be given two minutes before the start of your meal or within 20 minutes after.
Short-acting • Entuzity U500 • Humulin-R / Novolin ge Toronto	15 min 30 min	4 – 8 hours 2 – 3 hours	17 – 24 hours 6.5 hours	Given with one or more meals per day. Should be injected 30 – 45 minutes before the start of the meal.
Basal insulins				
Intermediate-acting • Humulin-N / Novolin ge NPH	1 – 3 hours	5 – 8 hours	up to 18 hours	Often started once daily at bedtime. May be given once or twice daily. Not given at any time specific to meals.
Long-acting analogues • Basaglar / Lantus U100 • Levemir • Toujeo U300 • Tresiba U100, U200	90 min	not applicable	up to 24 hours 16 – 24 hours > 30 hours 42 hours	Often started once daily at bedtime. Insulin detemir (Levemir) may be given once or twice daily. Not given at any time specific to meals.
Premixed insulins				
Premixed regular insulin • Humulin 30/70 • Novolin ge 30/70, 40/60, 50/50	The onset, peak, and duration of premixed insulins depend on the amounts of rapid-acting or short-acting insulin and intermediate-acting insulin. See above for more information based on the specific insulins contained in the premixed insulin.			Given with one or more meals per day. Should be injected 30 – 45 minutes before the start of the meal.
Premixed insulin analogues • Humalog Mix 25, Mix 50 / NovoMix 30				Given with one or more meals per day. Should be injected 0 – 15 minutes before or after meals.

Insulin Care and Storage:

Unopened insulin should be stored in the fridge between 2ºC and 8ºC. The insulin you are using can be stored at room temperature for up to 1 month. Both Levemir and Toujeo are the exception; they are safe at room temperature for 42 days. Discard insulin that has been frozen, exposed to temperatures greater than 30ºC, or expired.

Diabetes Identification:

You should always wear idenfication, such as a bracelet or necklace, to identify that you have diabetes. Identification bracelets, such as MedicAlert®, can be purchased at pharmacies and jewellery stores. Always carry identification in your wallet or purse that provides information about your diabetes.

Low Blood Sugar (Hypoglycemia):

Treatment of Low Blood Sugar (Hypoglycemia)

What is low blood sugar?

When the amount of sugar in your blood (blood glucose) has dropped below your target range (i.e. is generally less than 4.0 mmol/L), a condition called low blood sugar or hypoglycemia occurs.

When this happens, you may feel:

- Shaky, light-headed, nauseated
- Nervous, irritable, anxious
- Weak, drowsy, vision changes
- A faster heart rate
- Sweaty, headachy
- Hungry
- Confused, difficulty concentrating or speaking
- A numbness or tingling in your tongue or lips

How do I treat low blood sugar?

If you are experiencing the signs of a low blood sugar level, check your blood sugar immediately. If you do not have your meter with you, treat the symptoms anyway. It is better to be safe.

Eat or drink a fast-acting carbohydrate source (containing 15 grams). For example:

- 15 g of glucose in the form of glucose tablets (preferred choice)
- 15 mL (1 tablespoon) or 3 packets of table sugar dissolved in water
- 5 cubes of sugar
- 150 mL (2/3 cup) of juice or regular soft drink
- 6 LifeSavers® (1 = 2.5 g of carbohydrate)
- 15 mL (1 tablespoon) of honey (do not use for children less than 1 year)

Low blood sugar can happen quickly, so it is important to treat it right away. If your blood sugar drops very low, you may need help from another person.

Causes of low blood sugar:

- More physical activity than usual
- Not eating on time
- Drinking alcohol
- Eating less than usual
- Taking too much medication

If you are planning on fasting, consult your diabetes health-care team well in advance.

Checking Blood Sugars and Adjustment of Insulin:

Insulin: Starting Dose: units at

Blood sugar goals:

Contact for help with insulin adjustments:

What to do with your diabetes pills:

Please check blood sugar using the following schedule.

	Breakfast		Lunch		Supper		Bedtime	Night
	before	after	before	after	before	after		
Insulin								
Blood sugar								

Proper Use of Pen Tips (needles):

Use pen tips only once; they are thin and can become bent or broken if re-used. Reusing pen tips can make the injection more painful. Leaving pen tips on the cartridge may cause leaking or allow air into the cartridge which may affect the concentration of the insulin.

Safe Sharps Disposal:

Pen tips and lancets should be disposed of in a sharps container. Check with your local pharmacy. Many pharmacies supply safe, puncture-proof containers. When the container is full, it is returned to the pharmacy in exchange for a new container. Sharps otherwise should be disposed of in accordance with local regulations.

Diabetes Driving Guidelines

Prevention of low blood sugar for all insulin-treated drivers

- Measure your blood sugar level immediately before and at least every 4 hours during long drives.
- Always carry blood sugar monitoring equipment and an emergency supply of fast-acting carbohydrate within easy reach (e.g. attached to the visor).
- Do not start driving if your blood sugar is less than 4.0 mmol/L. If you feel symptoms of low blood sugar while you are driving, stop the vehicle in a safe location and remove the keys from the ignition.
- If your blood sugar is less than 4.0 mmol/L, you should have 15 grams of carbohydrate and not begin to drive until your blood sugar is at least 5.0 mmol/L. It is suggested to wait for 40 minutes to recover fully from low blood sugar.
- If your blood glucose is < 2.8 mmol/L while driving you must refrain from driving immediately, and notify a member of your health-care team as soon as possible.

Professional Drivers

- You should follow the above recommendations as well as perform any diabetes self care as required by your licensing province.

Each province has its own rules regarding sugar control and being able to drive.

I want to apply for a commercial licence. Can I drive in Canada? In the United States?

Canadians with diabetes who are using insulin can apply for a commercial licence. Motor vehicle licensing authorities require a greater level of medical fitness for drivers operating passenger vehicles (buses/commercial vans), trucks, and emergency vehicles. Commercial drivers spend more time driving and are often under more adverse conditions than private drivers.

Canadians with diabetes who are using insulin can be licensed to drive a commercial vehicle in Canada. The Canada/US Medical Reciprocity Agreement (effective March 1999) recognizes the similarity between Canadian and American medical standards and provides for reciprocal arrangements on medical fitness requirements for Canadian and American drivers of commercial vehicles.

However, Canadian commercial drivers who have diabetes requiring insulin, are not permitted to drive in the United States.

What is Diabetes Canada's position on diabetes and driving and licensing?

Diabetes Canada believes people with diabetes should be assessed for a driver's licence on an individual basis.

For more information, see http://www.diabetes.ca/about-cda/public-policy-position-statements/driving-licensing.

Related articles: *Lows and highs: blood sugar levels, Thinking of starting insulin, Managing your blood sugar*

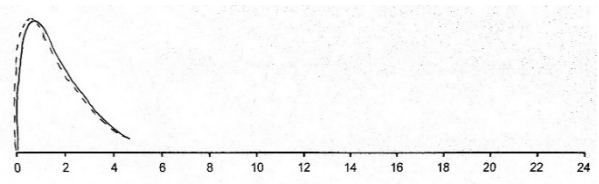
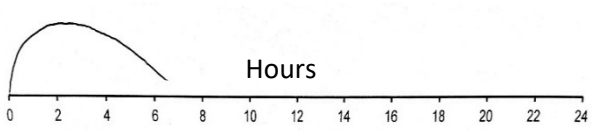
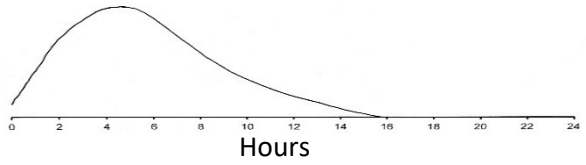
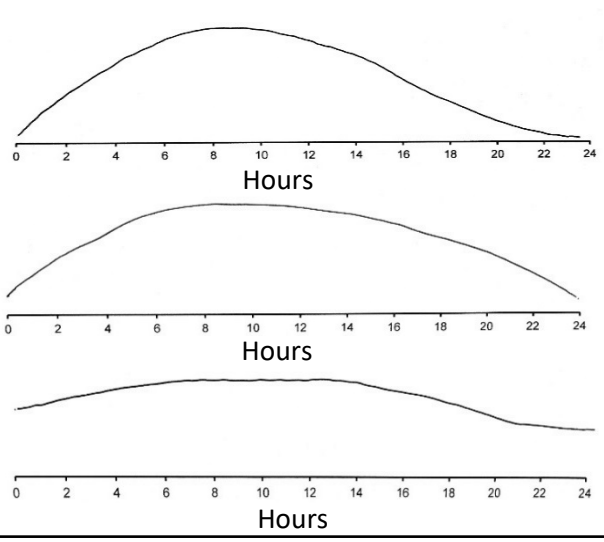
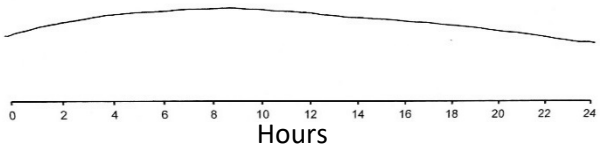
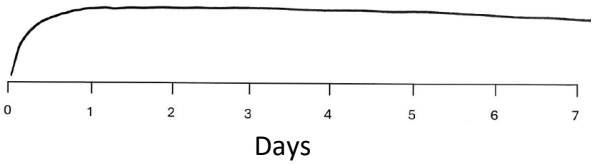
Interactive Self-monitoring of Blood Glucose Tool

See Diabetes Canada on YouTube for videos about using insulin.

DIABETES CANADA **diabetes.ca | 1-800 BANTING (226-8464) | info@diabetes.ca**

Diabetes Canada is making the invisible epidemic of diabetes visible and urgent. Eleven million Canadians have diabetes or prediabetes. Now is the time to End Diabetes - its health impacts as well as the blame, shame and misinformation associated with it. Diabetes Canada partners with Canadians to End Diabetes through education and support services, resources for health-care professionals, advocacy to governments, schools and workplaces, and, funding research to improve treatments and find a cure.

Average Insulin Action Time

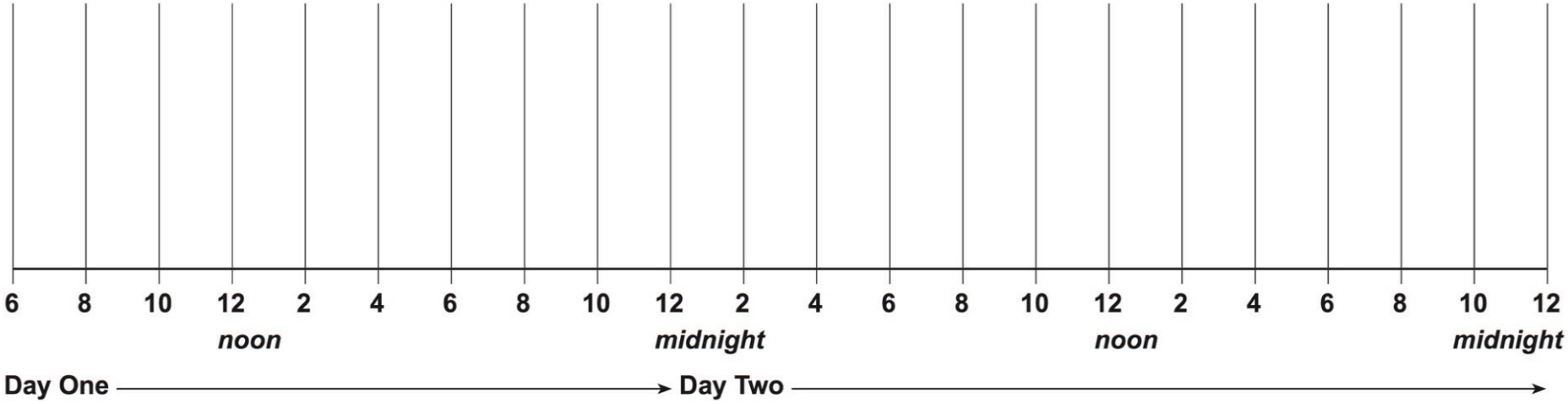
Insulin	Average insulin action (graphs show 24 h action – except Awiqli shows 1 week)
Rapid-acting Onset 10 to 20 min, Peak 1 to 3 h, Duration 3 to 5 h • Aspart: NovoRapid®, Trurapi® • Faster Aspart: Fiasp (slightly faster onset - dashed line) • Glulisine: Apidra® • Lispro: Admelog®, Humalog®	
Short-acting Onset 30 to 60 min, Peak 2 to 4 h, Duration 6 to 8 h • Regular: Humulin R®, Novolin Toronto®	
Intermediate-acting (cloudy) Onset 1 to 2 h, Peak 5 to 8 h, Duration 14 to 18 h • Humulin N®, Novolin NPH® • Concentrated short-acting: Entuzity®	
Long-acting Onset 1.5 h, No peak, Duration 16 to 24 h • Levemir® Onset 1.5h, No peak, Duration 24 h • Basaglar®, Lantus® No peak, Duration up to 36 h • Toujeo®	
Ultra-long-acting No peak, Duration 42 h • Degludec: Tresiba®	
Ultra-long-acting No peak, Duration: over 1 week • Icodec: Awiqli®	

Your Insulin Schedule

Date _____

Goals _____ **before meals**

_____ **after meals**



Time to test your blood sugar = ▼
Time to inject insulin = ▲

Diabetes Medicine

_____

_____

_____

_____

_____

_____

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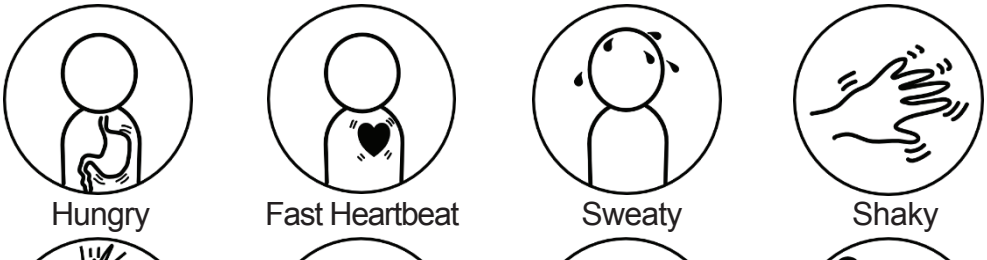
Low Blood Sugar (Hypoglycemia)

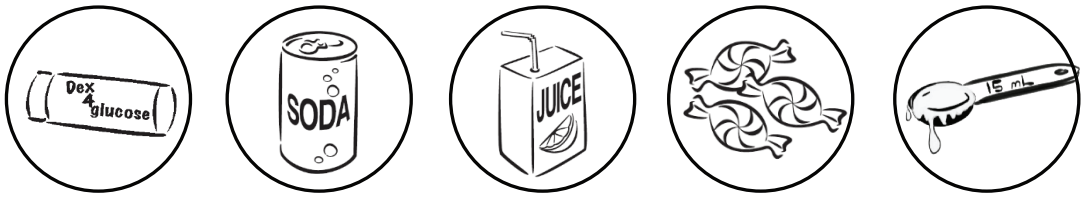
Low blood sugar is a reading of below **4.0 mmol/L** on a glucose meter or sensor. This can be unsafe if you're taking some diabetes medicines, especially insulin.

Know the signs of low blood sugar



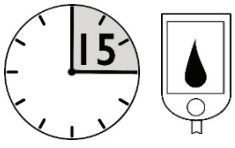
Treat low blood sugar quickly

1. Eat 15 grams of fast-acting sugar. Examples include 1 of the following:



Dex 4 Glucose	**Regular Pop**	**Juice**	**Candies**	**Sugar, jam, honey or syrup**
4 tablets	175 mL (3/4 cup)	175 mL (3/4 cup)	3 large	15 mL (1 tbsp.)

2. Wait 15 minutes. Check your blood sugar again. If it's below **4.0 mmol/L**, eat another 15 grams of fast-acting sugar.



3. Once your blood sugar is over **4.0 mmol/L**, eat one starchy food (7 crackers or one piece of bread) and one protein (cheese or peanut butter) if your next meal is over an hour away. Talk with your healthcare team about this step.

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Important things to know

1. If you have type 1 diabetes and can't treat a low blood sugar yourself, someone may need to give you a glucagon injection. Ask your healthcare team about this medicine.

2. If you plan to drive after treating a low blood sugar:
   - **Wait 40 minutes** before driving
   - Make sure your blood sugar is **5 mmol/L or more before you drive**
   - Know that driving skills are impaired after a low blood sugar. Ask your healthcare team for the Diabetes and Driving Handout.

Low blood sugar is unsafe

- Low blood sugar puts you at higher risk of accidents, falls, and unclear thinking. It slows down the reaction time of your body and your mind.
- Frequent low blood sugars can lead to losing early warning signs like sweating, fast heartbeat, etc. Low blood sugars that aren't noticed and aren't treated could lead to confusion, loss of consciousness, or seizures.

Prepare for and prevent low blood sugar

- Always carry fast-acting sugar and a glucose meter if you are at risk for low blood sugar.
- Learn how to prevent low blood sugar. Possible causes of low blood sugar are:
  - missed or late meals or snacks
  - less carbohydrate than usual
  - more physical activity than usual
  - alcohol on an empty stomach, or too much alcohol
  - too much diabetes medicine
- Talk with your healthcare team if you have low blood sugars. Your diabetes medicines might need to be adjusted.

AHS appreciates the assistance of the Mosaic PCN Refuge Health Clinic for translated versions.

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Glucagon and Diabetes

What is glucagon?

- Glucagon is a hormone that causes the liver to release stored glucose (sugar). The glucose then raises the blood sugar.
- It is used to treat severe low blood sugar.
- Glucagon must be either sprayed into the nose or injected under the skin.
- Glucagon begins to raise the blood sugar level within 2 to 10 minutes after it is given.

Who would use glucagon?

- Anyone who uses insulin, especially someone with type 1 diabetes, is at risk for a severe low blood sugar and should have glucagon nearby.
- Symptoms of severe low blood sugar include:
  - confusion
  - drowsiness
  - trouble thinking and remembering
  - loss of consciousness
  - convulsions, seizures
  - not able to treat the symptoms yourself

When is glucagon used?

- Glucagon is used when a person with diabetes is not able to swallow or take sugar by mouth to treat a low blood sugar.
- Glucagon spray should be given into one nostril.
- A glucagon injection should be injected by someone who knows how to draw up and give the injection.
  - Once mixed, injectable glucagon must be used or thrown out within 48 hours.

How do I treat a person with diabetes who is unconscious or convulsing?

- **Do not force food or liquid into the person's mouth.**

1. Lay the person on their side in a safe place.
2. If giving glucagon by a nasal spray, glucagon should be sprayed into one nostril.
3. If giving glucagon by injection, mix and draw up the glucagon as per the package instructions. Inject the full dose in the buttocks, thighs, or arms, like an insulin injection.
4. Call 911 if the person does not respond in 10 minutes, you feel that you need help, or the person has severe nausea and/or vomiting and can't eat.
5. Give the person 1 cup of juice or regular pop once awake. Wait 15 minutes and then offer a snack of starch and protein (for example, crackers and cheese).
6. Check the person's blood sugar every hour until it is stable.

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Tell your family doctor, diabetes specialist, or diabetes educators about the severe low blood sugar after the emergency is over. Insulin doses may need to be reduced after a severe low blood sugar.

Does glucagon have any side effects?

- The person may have nausea, vomiting, and/or a headache (these could also be from the severe low blood sugar).

What else do I need to know about glucagon?

- Family and friends should always know where the glucagon is kept. They should review how to give glucagon once in a while.
- Carry glucagon when away from home (for example, when on vacation), especially if you will not be close to a healthcare centre.
- Glucagon expires so be sure to check the expiry date. Check the expiry date before you leave the pharmacy as it should have at least 6 to 12 months before it expires.
- You do not need a prescription for glucagon. However, it costs a lot of money ($100.00 to $150.00). Ask your doctor for a prescription so your insurance plan can cover it.

How can I prevent low blood sugar?

- Adjust your food and/or insulin when you exercise.
- Check your blood sugar in the middle of the night after an active day or evening.
- Decrease insulin doses if you see a pattern of low blood sugars.
- Alcohol affects your blood sugar. Always eat food when having alcohol and test your blood sugar before bedtime.
- Try not to miss your usual meals or snacks.
- If you have any questions or concerns, please speak to your diabetes educator or doctor.

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How to Manage Illness in Type 1 Diabetes and Prevent Diabetic Ketoacidosis (DKA)

Being sick can make your blood sugar hard to control. Low blood sugar can happen if you are throwing up or not eating. Most of the time being sick will cause your blood sugar to go up. It also increases the risk of diabetic ketoacidosis (DKA).

DKA is a life threatening condition.

DKA happens when there is not enough insulin, which leads to a build-up of acids called ketones in the blood.

People on insulin pumps are at greater risk of DKA. Pump specific DKA prevention guidelines are in a separate handout.

Pregnant women with type 1 diabetes are at greater risk of DKA, as they become less sensitive to insulin due to hormones produced during pregnancy. DKA during pregnancy can result in the loss of the baby.

Steps for Preventing DKA

1. **Know when you are at risk for DKA:**
   - illness or emotional stress
   - nausea, vomiting, or diarrhea
   - infection
   - injury or day surgery
   - missing insulin dose(s)
   - insulin pump/infusion malfunction
   - pregnancy and type 1 diabetes
   - taking an SGLT2-inhibitor medicine
2. **Know the symptoms of DKA:**
   - nausea and/or vomiting
   - trouble breathing
   - fast heart beat
   - pain in your abdomen
   - “fruity” smelling breath
   - lightheadedness
3. **Take these actions when you are at risk for DKA:**
   - Check your blood sugars more often and always before bed.
   - Never stop your basal insulin even if you can’t eat. Basal insulins include: Humulin®N, Novolin®NPH, Insulin detemir (Levemir®), glargine (Lantus®), glargine 300 (Toujeo®), and degludec (Tresiba®) or the basal insulin delivered by the insulin pump.
   - Use the guidelines on the other side of this page to help you correct high blood sugars and prevent DKA. If you are on pump therapy, use the provincial handout for preventing DKA.
   - Test for ketones at home using items you can buy at the pharmacy. These items are urine ketone strips or a glucose meter that also measures blood ketones.
   - Contact your diabetes team if you need help. If your team has 24 hour phone service, phone them at _____
4. **Go to the emergency department for any of these reasons:**
   - You have ketones, you need help, and you cannot contact your diabetes team.
   - You have blood ketones 3 mmol/L or greater, or you have urine ketones reading moderate to large (40 mg/dL or more, 2+ or more).
   - You are throwing up and can’t keep fluids down for more than 4 hours.
   - You have symptoms of DKA or dehydration.

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NOTE: If you are on an SGLT-2 inhibitor pill and have symptoms of DKA or dehydration, test your ketones **even** if your blood sugar levels are normal. If you have moderate or large ketones, visit the emergency department. If you have small ketones, contact your doctor to see if you should stay on this pill.

Prevention of Diabetic Ketoacidosis (DKA) Guidelines

Test for ketones if you have type 1 diabetes and have any of these:

- blood sugar greater than 14.0 mmol/L
- symptoms of DKA **even if your blood sugar is normal** (nausea, vomiting, abdominal pain, lightheadedness, fruity smelling breath, or shortness of breath)
- illness
- symptoms of dehydration (dry mouth, dry tongue, or cracked lips)

Then follow the steps below:

Urine ketones Negative or Trace **Blood ketones 0.5 mmol/L or less**	**Urine ketones Above Trace (above 5 mg/dL)** **Blood ketones are 0.6 mmol/L or more****
1. Take your usual insulin correction bolus (if unsure see **Option 2**). 2. Drink 250 ml (1 cup) of calorie free fluids every hour. 3. Recheck blood sugar in 2 hours. If your blood sugar is: • less than 14 mmol/L, continue usual insulin dose • 14 mmol/L or more, retest ketones	1. Take 1.5 times the usual correction bolus by pen or syringe (if unsure see **Option 1 or 2**). 2. Drink 250 ml (1 cup) of calorie free fluids every hour. 3. Recheck blood sugar in 2 hours. If your blood sugar is: • less than 14 mmol/L, continue usual corrections • 14 mmol/L or more, retest ketones 4. If ketones are present for more than 6 hours go to emergency department.
****3 mmol/L or greater, go to the emergency department.** See the first side of this handout for other times to go to the emergency department.	

Option 1: Treating ketones **if** using an insulin sensitivity factor (ISF): If you use an ISF (correction factor), and you have positive ketones as described above, use one of the following formulas:

1.5 x Usual correction insulin dose = units to give to correct blood sugar

OR

$$1.5 \times \frac{\text{(blood sugar – target blood sugar)}}{\text{ISF}} = \text{units to give to correct blood sugar}$$

Example:

Susan's blood sugar was 19.0 mmol/L. She washed her hands and checked again. The second reading was 18.6 mmol/L. She checked for ketones, which were moderate. Her usual correction dose for this blood sugar without ketones would be 6 units.

- She gave 9 units (1.5 x 6 units) to correct the high blood sugar with ketones.
- She checked blood sugar in 2 hours. It was 18 mmol/L. Her ketones were moderate.
- She gave another correction since it had been 2 hours since her first correction. She used the same formula as above with actual blood sugar of 18 mmol/L.
- She checked again in 2 hours. Her blood sugar was 12.3 mmol/L and her ketones were trace. She did not give any more correction insulin.
- She checked again in 2 hours. Her blood sugar was 7.8 mmol/L.

Option 2: Treating ketones **if not** using an insulin sensitivity factor (ISF): Use this section **only** if you do not use an ISF (correction factor) **and** your healthcare provider has circled one of the following options:

1. Give extra insulin following the instructions your educator has circled below.
2. Talk with your healthcare provider to see if an ISF should be created for you.

If total daily dose of insulin is **less than** 50 units		
Blood sugar level	Rapid or short-acting insulin to give if **no or trace ketones**	Rapid or short-acting insulin to give if **ketones are positive**
14 to 17	2	3
17.1 to 20	3	4
Over 20	4	6

OR

If total daily dose of insulin is **more than** 50 units		
Blood sugar level	Rapid or short-acting insulin to give if **no or trace ketones**	Rapid or short-acting insulin to give if **ketones are positive**
14 to 16	3	4
16.1 to 18	4	6
18.1 to 20	5	7
Over 20	6	9

More Tips if You are Sick

- If you can't manage your diabetes on your own, you need to have someone stay with you. This person should know the signs of high and low blood sugars and DKA.
- Remember **never** stop taking your insulin. You may need less insulin if your blood sugars are under 6 mmol/L and you are throwing up. Take meal insulin only if you are eating or drinking fluids with sugar.
- Replace solid foods with liquid fluids if you are feeling sick to your stomach or can't eat. If your blood sugars are under 12 mmol/L, your fluids need to have sugar in them (see List 1).

List 1: Fluids **with sugar** in them
Options to drink when you are sick and your blood sugar is **under 12** mmol/L
• fruit drink or fruit juice • Gatorade® or other sports drinks • regular pop • regular powdered drinks (e.g. Kool-Aid® or Tang®) • popsicle • Jell-O®

- Drink fluids that are sugar-free if your blood sugars are over 12 mmol/L (see List 2).

List 2: Fluids **with no sugar** in them
Options to drink when you are sick and your blood sugar is **over 12** mmol/L
• water • clear bouillon or broth • diet pop • sugar free Kool-Aid® or Crystal Lite® • black coffee and tea • diet popsicle • diet Jell-O®

- Consider speaking to your doctor or pharmacist for treatment options for nausea and vomiting.

References*:*

1. Abbott Precision Xtra Blood Glucose and Ketone Monitoring System User Manual. https://www.abbottdiabetescare.com/dms/abbott-diabetes-care/document/Precision-Extra/Owners-Guide/ART21070-101_Rev-A_web.pdf Accessed 16/12/2013.
2. Correlation between urine ketones and capillary blood ketones (3 beta hydroxybutarate) in hyperglycemic patients. Diabetes and Metabolism. 33 (2):135-3, 2007

Section 2

Nutrition

Basic Nutrition Guidelines for Type 1 Diabetes

Here are some guidelines to help you control your blood sugars until you see a dietitian.

1. Limit foods that are concentrated in sugar (see next page).
2. Limit fruit juices to ½ cup (125 mL) per day because of their high natural sugar content. Try sugar-free beverages like water or sugar-free soft drinks when you are thirsty.
3. Foods with sugar substitutes in them can be used to replace sweets. Examples of sugar substitutes are Nutrasweet® (aspartame), Splenda® (sucralose), or acesulfame potassium.
4. Eat your meals and snacks 2–3 hours apart. Eat a variety of foods, except sweets
   - breakfast
   - mid-morning snack
   - lunch
   - mid-afternoon snack
   - supper
   - bedtime snack

   Be sure to include "starchy" foods at each meal and for your bedtime snack. Starchy foods include:
   - bread
   - buns
   - cereal
   - potatoes
   - rice
   - pasta
   - crackers
   - muffins
   - bagels

   Examples of good snack choices are:
   - 4–6 crackers with cheese
   - 2–3 plain cookies (examples: digestive, arrowroot, oatmeal)
   - 1 slice of toast with peanut butter
   - 1 small muffin
   - 1 medium fruit
   - 1 cup (250 mL) milk
   - ½ sandwich
   - ¾ cup (175 mL) of cereal with milk
   - 3 cups popcorn
   - ¾ cup yogurt

Note: You can have 1–3 of these choices as a snack, depending on how hungry you are.

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Foods Concentrated in Sugar

Beverages

- all fruit juices (unsweetened and sweetened)
- clamato juice
- chocolate drinks
- chocolate drink mixes
- iced tea
- fruit-flavoured crystals
- lemonade
- milkshakes
- soft drinks (pop)
- Slurpees®
- sweetened condensed milk
- tonic water
- sweetened mineral water beverages

Breads and Pastries

- cake with icing
- cereals with sugar coating
- commercial muffins
- cookies with icing, coating, or filling
- donuts with icing, coating, or filling
- pie, pastries, squares
- sweet rolls

Fruits

- fruit canned in syrup
- sweetened frozen fruit

Desserts

- frozen yogurt
- ice cream
- ice cream bars
- popsicles
- sherbet
- powdered gelatin dessert mixes such as Jell-O®
- pudding, custard
- sundaes with syrup
- tonic water
- sweetened condensed milk
- sweetened mineral water beverages

Sugars and Sweets

- candy
- chocolate and chocolate bars
- fudge
- honey
- jam, jelly, marmalade
- marshmallow
- sugars – all types (white, brown, icing)
- sweet sauces (sweet and sour, honey)
- syrups – all types (corn, maple, molasses)

Diabetes: Healthy Meal Planning

This handout will help you decide how much and what types of foods to eat throughout the day when you have diabetes.

Foods we eat and drink have carbohydrates, proteins, and fats.

About carbohydrates

Carbohydrates are found in grains, starchy vegetables, beans, lentils, fruit, milk, yogurt, and sugar (molasses, honey, table sugar, juice, pop, syrup).

Choose a variety of foods with carbohydrate every day to help you get the vitamins and minerals you need.

Foods with carbohydrates have a bigger effect on blood sugar than other foods. Since these foods raise your blood sugar, it's important to spread them over the day.

About proteins and fats

Proteins include foods like meat, fish, poultry, dairy products, and legumes (dried cooked beans, peas, lentils and soy products like tofu). They are mainly found in the Meat and Protein Alternatives food list (page 6) and the Milk and Alternatives food lists (page 4).

Protein foods don't directly raise blood sugars.

Fats are mainly found in higher fat meat and dairy products, oils, nuts and seeds, butter, margarines, fried foods, chocolate, and snack foods like chips, and store-bought baked products. Foods higher in fat are listed on page 7.

Fat doesn't raise blood sugar. However, too much fat in your diet may affect how well your insulin works.

Tips for healthy meals

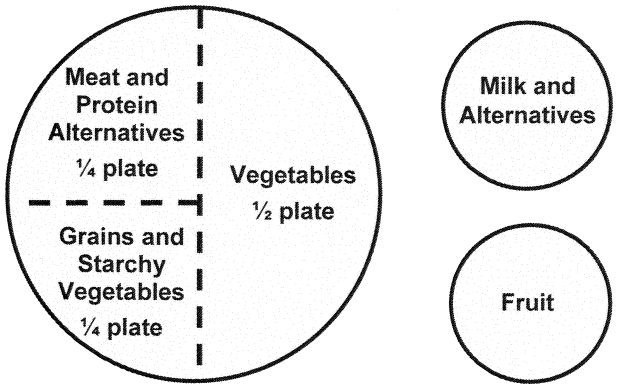
The tips below can help keep your blood sugars from rising too high after eating. They may also help you feel full longer after eating, which can help you manage portion sizes.

- Eat 3 meals each day.
- Include snacks if they help you eat smaller portions at your next meal.
- Choose higher fibre carbohydrate foods like whole grains, vegetables, fruit, beans, peas, and lentils. Try to eat 25–50 grams of fibre each day.
- Choose lean proteins and healthier fats.

The food lists on pages 3–7 can help you make healthy choices.

A meal that looks like the one below can help you to spread carbohydrate over the day.

- Put grains and starchy vegetables on ¼ of your plate. Some starchy vegetables are potatoes, yams, corn, squash, parsnips, and legumes.
- Put Meat and Protein Alternatives on ¼ of your plate.
- Cover ½ your plate with vegetables.
- Plan for fruit as part of some of your meals or snacks. See page 4 for suggested serving sizes.
- Have Milk and Alternatives with some of your meals or snacks. One serving is 1 cup (250 mL) of milk or ¾ cup (175 mL) of yogurt.
- Choose small amounts of healthy fats.



The next page shows how to count carbohydrates, which can also help you manage your diabetes.

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Developed by Registered Dietitians
Nutrition Services
607887-NFS

Available carbohydrate

Carbohydrates include sugar, starch, and fibre. Fibre does not raise your blood sugar. Sugar and starch are *available carbohydrates* because they do raise your blood sugar.

When you know the amount of available carbohydrate in your meal or snack, you can meet your carbohydrate goals (see the table in the next column). This will help you manage your blood sugars.

Steps to find the available carbohydrate in foods:

1. Measure the food you eat using measuring cups or a food scale.
2. Look at the Nutrition Facts table on packaged food.

Find the **serving size**. If you eat more or less than this, adjust the nutrient amounts.

Find the grams of **carbohydrate** in 1 serving.

Find the grams of **fibre** in 1 serving.

Nutrition Facts	
Per 3/4 cup (30 g)	
Amount	**% Daily Value**
Calories 110	
Fat 1 g	2 %
Saturated 0.2 g + Trans 0 g	1 %
Cholesterol 0 mg	
Sodium 261 mg	11 %
Carbohydrate 22 g	7 %
Fibre 5 g	20 %
Sugars 4 g	
Protein 3 g	
Vitamin A	0 %
Vitamin C	0 %
Calcium	2 %
Iron	30 %

If there's no Nutrition Facts table, use the food lists in this resource, cookbooks, or phone or tablet apps.

3. Find the available carbohydrate in your food.

Grams of carbohydrate – Grams of fibre = Grams available carbohydrate

For example, in the Nutrition Facts table above:

22 grams carbohydrate – 5 grams fibre
= 17 grams of available carbohydrate

If the table lists sugar alcohols, subtract the sugar alcohols *and* fibre from the carbohydrate.

Carbohydrate choices

A *carbohydrate choice* is the amount of a certain food that has about 15 grams of available carbohydrate.

For example, a ⅓ cup serving of cooked brown rice has about 15 grams of available carbohydrate. So, ⅓ cup of brown rice is 1 carbohydrate choice.

Using carbohydrate choices helps you:

- know how much carbohydrate you're eating
- know how much carbohydrate food to eat at your meals or snacks, according to your carbohydrate goals

The food lists on the next pages tell you what 1 carbohydrate choice is for many different foods.

How much carbohydrate do I need in a day?

Everyone needs a different amount of carbohydrate. A dietitian can help you find the amount that's right for you. Two examples are below.

	Grams of carbohydrate	Number of carbohydrate choices
Smaller carbohydrate goals		
At each meal	30–60 grams	2–4 choices
At each snack	0–15 grams	0–1 choice
Larger carbohydrate goals		
At each meal	60–90 grams	4–6 choices
At each snack	0–30 grams	0–2 choices

My carbohydrate goals:

At each meal: _____ grams or _____ choices

At each snack: _____ grams or _____ choices

Use the food lists on the next pages to create your meals and snacks.

Carbohydrate goals are different in pregnancy. If you are pregnant or planning to get pregnant, talk with your dietitian about your needs.

Carbohydrate choices

Note: Foods with a salt shaker are higher in salt (sodium). Choose these foods less often.

The food lists below tell you how much food is 1 carbohydrate choice.

Each carbohydrate choice has about 15 grams of available carbohydrate.

Your carbohydrate goals: _____ choices at each meal and _____ choices at each snack. Carbohydrate choices are listed on pages 3, 4, and 5.

Grains and Starchy Vegetables

Choose whole grain and higher fibre foods more often.

Choose more often

Grains:

bannock, whole grain, 1½ x 2½ inches (4 x 6 cm) baked
barley or bulgur, ½ cup (125 mL) cooked
bread, whole grain, 1 slice (30 grams weight)
bun, hamburger or hotdog, whole grain, ½
cereal, cold: bran cereals, ½ cup (125 mL)
cereal, cold: oat O's, ⅔ cup (150 mL)
cereal, cold: granola, ¼ cup (60 mL)
cereal, hot, ¾ cup (175 mL)
chapati, roti, whole grain, 1 (44 grams weight)
English muffin, whole grain, ½
millet, ⅓ cup (75 mL) cooked
pancake or waffle, whole grain, 1 (4 inch or 10 cm)
pasta, couscous, whole grain, ½ cup (125 mL) cooked
pita bread, whole grain, ½ (6 inch or 15 cm)
quinoa, ½ cup (125 mL) cooked
rice, brown, ⅓ cup (75 mL) cooked
rye crisps, 2–3 crackers (30 grams weight)
tortilla, whole grain, 1 (6 inches or 15 cm) or ½ (10 inches or 25 cm)

Starchy Vegetables:

beans, lentils, peas, ½ cup (125 mL) dried and cooked, or canned
corn, ½ cup (125 mL)
mushrooms, shitake, 1 cup (250 mL) cooked
parsnips, ¾ cup (175 mL)
peas, 1 cup (250 mL)
plantain, mashed, ⅓ cup (75 mL)
potatoes, ½ medium (84 grams weight) boiled or baked
potatoes, ½ cup (125 mL) mashed
squash: acorn, butternut, hubbard, ¾ cup (175 mL)
sweet potato or yam, ⅓ cup (75 mL) mashed
sweet potato or yam, ½ cup (125 mL) baked and cubed

Choose less often

bagel, ¼ large or ½ small
bread, white, 1 slice (30 grams weight)
bun, hamburger, or hotdog, white, ½
cereal, not whole grain, ½ cup (125 mL)
chapati, roti, white, 1 (44 grams weight)
French fries, 10
granola bar, oatmeal, 1 bar (28 grams weight)
muffin, plain, 1 small, 1½ inches (4 cm) high and 2½ inches (6 cm) diameter
naan, white, 1/6 (10 inches or 25 cm), 30 grams weight
pancake or waffle, 1 (4 inch or 10 cm)
pasta, couscous, white, ½ cup (125 mL) cooked
pita bread, white, ½ (6 inch or 15 cm)
pizza crust, 1/12 (12 inch or 30 cm)
rice, white, ⅓ cup (75 mL) cooked
rice, converted/parboiled, ⅓ cup (75 mL) cooked
soda crackers, 7
taco shells, 2 (5 inch or 13 cm)

Carbohydrate choices

The lists below tell you how much food is 1 carbohydrate choice.

Each carbohydrate choice has about 15 grams of available carbohydrate.

Your carbohydrate goals: _____ choices at each meal and _____ choices at each snack. Carbohydrate choices are listed on pages 3, 4, and 5.

Fruit

Choose fresh, frozen, or canned fruit with no added sugar.

Choose more often

- apple, 1 medium
- applesauce, unsweetened, ½ cup (125 mL)
- banana, ½ large
- blackberries, 2 cups (500 mL)
- blueberries, 1 cup (250 mL)
- cherries, 15
- fruit canned in juice, ½ cup (125 mL)
- fruit canned in water, ¾ cup (175 mL)
- grapefruit, 1 small
- grapes, 15
- kiwi, 2 medium
- mandarin orange (tangerine), 2 medium
- mango, ½ medium or ½ cup (125 mL)
- melon, 1 cup (250 mL)
- nectarine, 1 large
- orange, 1 medium
- peach, 1 large
- pear, 1 small
- pineapple, fresh, ¾ cup (175 mL)
- plum, 2 medium
- pomegranate, ½ medium
- raspberries, 2 cups (500 mL)
- strawberries, 2 cups (500 mL)

Choose less often

- dried fruit:
  - apricots, 8 halves
  - cranberries, sweetened, 3 Tbsp (45 mL)
  - date, 1
  - figs, 3
  - raisins, 2 Tbsp (30 mL)
- fruit leather, 1 small (14 grams weight)
- juice, unsweetened, ½ cup (125 mL)
- tomato juice, vegetable cocktail, 1½ cups (375 mL)

Milk and Alternatives

Make lower fat choices from this group more often.

M.F. = Milk Fat

Choose more often

- milk, skim or 1%, 1 cup (250 mL)
- evaporated milk, skim, canned, ½ cup (125 mL)
- fortified soy beverage, plain, 1 cup (250 mL)
- yogurt, less than 2% M.F., plain or no added sugar, ¾ cup (175 mL)

Choose less often

- milk, 2% or 3.25% (homogenized), 1 cup (250 mL)
- chocolate milk, 1%, ½ cup (125 mL)
- fortified soy beverage, flavoured, ½ cup (125 mL)
- milk pudding, low fat, no added sugar, ½ cup (125 mL)
- yogurt or soy yogurt, less than 2% M.F., flavoured, with added sugar, ⅓ cup (75 mL)

Carbohydrate choices

The list below tells you how much food is 1 carbohydrate choice.

Each carbohydrate choice has about 15 grams of available carbohydrate.

Your carbohydrate goals: _____ choices at each meal and _____ choices at each snack. Carbohydrate choices are listed on pages 3, 4, and 5.

Other Choices

Limit how many Other Choices you eat. These foods are higher in sugar and calories, and may be higher in fat and salt.

▽ Choose less often

brownie or cake, no icing, 2 inch (5 cm) square	ice cream, ½ cup (125 mL)
candies, hard, 5 small	jam, jelly, marmalade, 1 Tbsp (15 mL)
candies, jellybeans, 5 large	jam, syrup, no sugar added, 3 Tbsp (45 mL)
candies, licorice, 2 pieces	ketchup, 4 Tbsp (60 mL) 
cookies, arrowroot, digestive, and gingersnap, 3	popcorn, low fat, 3 cups (750 mL)
cookies, chocolate chip, 2	potato chips, baked, 10 chips 
cookies, cream type filling, 2	pretzels, low fat, 7 large or 30 sticks 
cranberry sauce, with added sugar, 2 Tbsp (30 mL)	sherbet, ⅓ cup (75 mL)
frozen yogurt, ⅓ cup (75 mL)	soft drink, regular (varies with flavor), ½ cup (125 mL)
honey, 1 Tbsp (15 mL)	sugar, syrup, molasses, 1 Tbsp (15 mL)

Foods with little or no carbohydrate

The foods listed on this page and the next page have little effect on blood sugars. Every day, including vegetables, meat and protein alternatives, and fats in your meals and snacks is important for health and for managing your diabetes. Check the healthy meal section on page 1 for ideas about portion sizes of vegetables and meat and protein alternatives.

Vegetables

Eat vegetables throughout the day. Cover ½ your plate with vegetables at most meals.

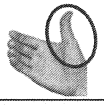
Choose more often

artichoke	celery	onions
asparagus	chard	peppers
bean sprouts	cucumber	radish
beans (yellow or green)	eggplant	spinach
beets	kale	squash (pumpkin, spaghetti)
bok choy	kohlrabi	tomato, canned/stewed
broccoli, rapini	leeks	tomato sauce
Brussels sprouts	lettuce	tomatoes, fresh
cabbage, Chinese cabbage	mixed vegetables	turnips
carrots	mushrooms	zucchini
cauliflower	okra	

Meat and Protein Alternatives

Proteins are found in meat, fish, poultry, dairy products, eggs, and legumes (dried cooked beans, peas, lentils, and soy products like tofu).These foods have little or no carbohydrate.

Meat and Protein Alternatives that are leaner and have healthy fats are in the *Choose more often* group. Put meats and meat alternatives on ¼ of your plate.

For hard cheeses, use your thumb as a guide to 1 serving. 

M.F. = Milk Fat

Choose more often

- beans, lentils, peas, dried and cooked, or canned (See the Starchy Vegetables list, page 3.)
- cheese, lower fat, less than 20% M.F.
- cottage cheese, fat free or 1% M.F.
- egg white
- eggs
- fish, fresh or canned
- meat, deli or processed, low fat
- meat or poultry, lean
- meatless soy protein products (such as vegetarian ground round)
- tofu, firm or soft
- yogurt, Greek, plain, less than 2 % M.F.

Choose less often

- cheese, regular, more than 20% M.F.
- meat, ground, medium or regular fat
- poultry or cheese strips, breaded or seasoned
- wieners, sausages, and deli or processed meat, regular fat

Foods with little or no carbohydrate

Fats

Choose small amounts of the fats from the *Choose more often* group.

All fats are high in calories. These foods have little or no carbohydrate.

For added fats like oils and margarine, use your thumb tip as a guide to 1 serving.

Choose more often

- avocado
- margarine, non-hydrogenated
- mayonnaise, light
- nuts and seeds
- oil: canola, olive, peanut
- olives, black or green
- peanut butter, and other nut butters
- salad dressing, low fat
- sour cream, light
- tahini

Choose less often

- bacon
- beef gravy
- butter
- cheese, spreadable, regular or light
- mayonnaise, regular
- salad dressing, regular
- sour cream, regular
- tropical oils such as palm or coconut oil
- whipped topping, regular

Avoid trans fats, if possible

Read the ingredient lists on packaged foods for:

- hydrogenated and partially hydrogenated oils
- shortening

Trans fats are also found in:

- hard or block margarines
- store-bought baked goods

Extras

Extras are foods that are lower in calories and carbohydrates.

The foods below are very low in carbohydrate, so they don't need to be measured.

- broth, bouillon, consommé
- club soda, mineral water
- coffee, tea
- herbs and spices, flavouring extracts
- horseradish, 1 Tbsp (15 mL)
- mustard
- pickle, dill
- rhubarb
- sauces: chili sauce, fish sauce, soy sauce, Worcestershire sauce
- sugar-free gelatin, gum, soft drinks, or crystal drinks
- sugar substitutes
- vinegar

The foods below are extras if you eat the small servings listed.

- barbecue sauce, 1 Tbsp (15 mL)
- fruit spread, no sugar added, 2 tsp (10 mL)
- ketchup, 1 Tbsp (15 mL)
- oyster sauce, 1 Tbsp (15 mL)
- relish, sweet, 1 Tbsp (15 mL)
- salsa, ¼ cup (60 mL)
- sour cream, fat free, 1 Tbsp (15 mL)
- steak sauce, 2 Tbsp (30 mL)
- syrup, no sugar added, 1 Tbsp (15 mL)
- tomato paste, 1 Tbsp (15 mL)
- vinaigrette salad dressing, fat free, 2 Tbsp (30 mL)
- whipped topping, low fat, 2 Tbsp (30 mL)

Counting carbohydrate choices

Counting available carbohydrate in meals and snacks and using carbohydrate choices can help you meet your carbohydrate goals on page 2. Meeting your carbohydrate goals can help you manage your blood sugars. Use the sample meal below to practice counting grams of available carbohydrate and carbohydrate choices.

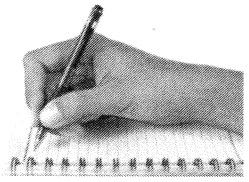
Food	Portion size	Grams of carbohydrate	Carbohydrate choices
Salmon	4 ounces (120 grams)	0	0
Brown rice	1 cup (250 mL)	45	3
Green beans	1 cup (250 mL)	0	0
Sliced tomatoes	½ cup (125 mL)	0	0
Pear	1 small	15	1
Milk, 1%	1 cup (250 mL)	15	1
	Total	**75 grams**	**5 choices**
In the spaces below you can write what you ate and drank for 1 meal. Then, count the grams of carbohydrate and carbohydrate choices in your meal.			
	Total	**_____ grams**	**____ choices**

Next steps

This resource includes healthy eating choices that can help you manage your diabetes. Change can be hard, especially if we try to make too many changes at once.

When you're ready to make a change, it can help to set a goal, and then break your goal into small steps. You're more likely to reach your smaller goals.

Ask your healthcare provider if you'd like support with goal setting.



Do you have more questions?

Even when you've been meal planning for a while, you may still have questions. Talk to your dietitian about healthy eating for diabetes.

DIABETES CANADA

Basic carbohydrate counting for diabetes management

Carbohydrate counting is a flexible way to plan your meals. It focuses on foods that contain carbohydrate as these raise your blood sugar the most. Follow these steps to count carbohydrates and help manage your blood sugar levels. Your registered dietitian will guide you along the way.

STEP 1 Make healthy food choices

- Enjoy a variety of vegetables, fruits, whole grains, low fat milk products, and meat and alternatives at your meals. A variety of foods will help to keep you healthy.
- Use added fats in small amounts. This helps to control your weight and blood cholesterol.
- Choose portion sizes to help you to reach or maintain a healthy weight.

STEP 2 Focus on carbohydrate

- Your body breaks down carbohydrate into sugar (glucose). This raises your blood sugar levels.
- Carbohydrate is found in many foods including grains and starches, fruits, some vegetables, legumes, milk and milk alternatives, sugary foods and many prepared foods.
- Meat and alternatives, most vegetables and fats contain little carbohydrate. Moderate servings will not have a big effect on blood sugar levels.

STEP 3 Set carbohydrate goals

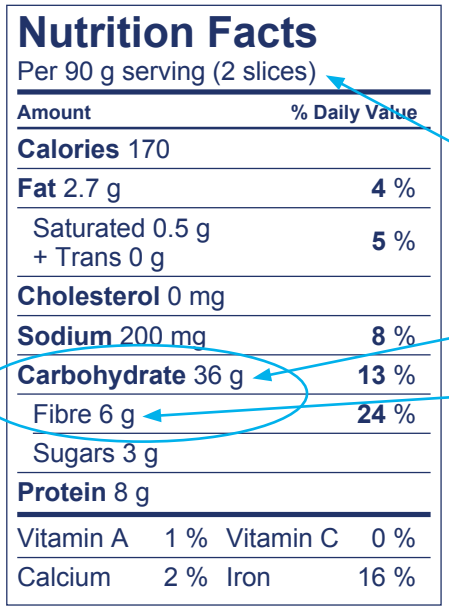
- Your dietitian will help you set a goal for grams of carbohydrate at each meal and snack. This may be the same from day to day or may be flexible, depending on your needs.
- Aim to meet your target within 5 grams per meal or snack.

STEP 4 Determine carbohydrate content

- Write down what you eat and drink throughout the day.
- Be sure to note the portion sizes. You may need to use measuring cups and food scales to be accurate.
- Record the grams of carbohydrate in these foods and drinks.
- For carbohydrate content of foods, check the *Beyond the Basics* resources, food packages, food composition books, restaurant fact sheets and websites.

STEP 5 Monitor effect on blood sugar level

- Work with your health-care team to correct blood sugar levels that are too high or too low.



Finding carbohydrate values using the Nutrition Facts table

The amount of carbohydrate in a food is listed on the Nutrition Facts table.

- The amount listed is for the serving size given. Are you eating more, less, or the same amount? Compare your serving size to figure out the amount of carbohydrate you are eating.
- The total amount of carbohydrate in grams is listed first. This number includes starch, sugars and fibre. (Starch is not listed separately.)
- Fibre does not raise blood sugar and should be subtracted from the total carbohydrate (i.e. 36 g carbohydrate – 6 g fibre = 30 g available carbohydrate).

Let's carb count! Sample carbohydrate counting

Food	Portion size	Grams of carbohydrate	Carbohydrate choices
Example – sandwich lunch			
Bread, whole wheat*	2 slices	30 g	2
Chicken breast	2 oz/60 g	0	0
Margarine	1 tsp/5 mL	0	0
Carrot sticks	½ cup/125 mL	0	0
Green grapes*	½ cup/125 mL	15 g	1
Milk*	1 cup/250 mL	15 g	1
Tea/coffee	1 cup/250 mL	0	0
	TOTAL	60 g	4 choices
What did you eat and drink? (write it below)			
	TOTAL		

*Carbohydrate containing food

Related articles: *Just the basics for healthy eating, Glycemic Index, and Sugars and sweeteners*

DIABETES CANADA **diabetes.ca | 1-800 BANTING (226-8464) | info@diabetes.ca**

Diabetes Canada is making the invisible epidemic of diabetes visible and urgent. Eleven million Canadians have diabetes or prediabetes. Now is the time to End Diabetes - its health impacts as well as the blame, shame and misinformation associated with it. Diabetes Canada partners with Canadians to End Diabetes through education and support services, resources for health-care professionals, advocacy to governments, schools and workplaces, and, funding research to improve treatments and find a cure.

Matching Insulin to Carbohydrate

Now that you have learned the basics of carbohydrate counting, you are ready to move on to matching your insulin to the amount of carbohydrate that you eat. If you do not understand carbohydrate counting basics, speak with your healthcare team before learning how to match insulin to carbohydrate. **At the beginning, it is important to have the same carbohydrate intake at breakfast, lunch, and supper from day to day. This will help you decide on the amount of insulin you need to cover the carbohydrate that you eat.** Knowing how to match your insulin doses to what you eat allows you more flexibility in the total amount of carbohydrate that you eat at a meal.

What is an insulin to carbohydrate ratio?

An insulin to carbohydrate ratio, or simply carbohydrate ratio, is the number of grams of carbohydrate that 1 unit of rapid acting insulin will cover. On average, 1 unit of rapid-acting insulin will cover 10–15 grams of carbohydrate. This average number is sometimes used as a starting point. However, since everyone is different, **it is important to decide how much carbohydrate is covered by 1 unit of insulin for you**. Your ratio could vary from meal to meal, with active or less active days, or because of illness or stress.

How do I decide what my insulin to carbohydrate ratio is?

You will need to monitor and keep track of the following:

- Your blood sugar levels before and 2 hours after the first bite of your meal. It is best to work out a ratio for one meal at a time.
- The food that you ate and number of grams of carbohydrate eaten at that meal. (Remember to subtract the fibre).
- The number of units of rapid-acting insulin you took at that meal.
- Any extra activity or exercise. It is best to keep exercise constant during the time that you are trying to decide your insulin to carbohydrate ratio.

It is best to work on this when your blood sugars are fairly stable and in the healthy ranges. Healthy blood sugar targets are 4–7 mmol/L before a meal and 5–10 mmol/L 2 hours after the first bite of a meal. If your pre-meal blood sugar is higher than 4–7 mmol/L, an acceptable rise in blood sugar 2 hours after the meal should be no more than 3 points.

Alberta Health Services

You will need to increase or decrease the dose of your rapid-acting insulin by 1–2 units every 3 days until your blood sugars are more often in your target ranges. You may also need to adjust the dose of your longer-acting insulin. Speak with your diabetes team about these adjustments.

Once you are getting blood sugar readings in your target ranges most of the time, you can calculate your insulin to carbohydrate ratio. Calculate your carbohydrate ratio once you have target blood sugar readings from 3 or more meals at the same time of day.

Remember the carbohydrate ratio is the number of grams of carbohydrate 1 unit of rapid-acting insulin will cover. Work out the grams of carbohydrate that you ate at that meal and divide by the number of units of rapid-acting insulin that you took.

$$\frac{\text{Grams of Carbohydrate}}{\text{Units of Rapid-Acting Insulin Taken}} = \text{Carbohydrate Ratio}$$

$$\text{Example: } \frac{\text{90 grams of carbohydrate}}{\text{9 units of rapid-acting insulin taken}} = 10$$

In this example, 1 unit of rapid-acting insulin will cover 10 grams of carbohydrate.

Use your information to figure out your carbohydrate ratios:
Your carbohydrate ratio for breakfast is: _____
Your carbohydrate ratio for lunch is: _____
Your carbohydrate ratio for supper is: _____

*If your answer is a decimal, always round **up** to the nearest whole number. For example, 9.3 would be rounded up to 10.

Now you can vary the amount of carbohydrate that you eat at a meal and take the amount of insulin you need to cover the carbohydrate. You will need to re-assess your ratio once in a while.

$$\frac{\text{Grams of Carbohydrate}}{\text{Carbohydrate Ratio}} = \text{Insulin Dose for Carbohydrate}$$

$$\text{Example: } \frac{\text{80 grams of carbohydrate}}{10} = 8 \text{ units of insulin}$$

*If your answer is a decimal, always round **down** to the nearest whole number. For example, 8.7 would be 8.

How do I decide what my correction factor is?

A correction factor is the number of points that your blood sugar is expected to drop with 1 unit of rapid-acting insulin. Your correction factor can also be written as a ratio. For example, a 1:2 ratio means that 1 unit of rapid-acting insulin will drop your blood sugar about 2 points. Knowing your correction factor can help you make insulin adjustments at meals when your blood sugar is higher than your target.

TDD stands for **T**otal **D**aily **D**ose of insulin. This includes both your rapid- and longer-acting insulin. If your total daily dose of insulin is always changing, use an average number.

Use the formula below to see what your correction factor is:

$$\frac{100}{\text{TDD}} = \text{Correction Factor}$$

Example: $\frac{100}{50} = 2$

Calculate your Correction Factor:
Your TDD is _____
100 divided by your TDD is _____

*If your answer is a decimal, always round **up** to the nearest whole number. For example 1.4 would be 2.

Once you know your correction factor, you can calculate how much insulin to take for a correction dose. A correction dose is used to correct for a pre-meal blood sugar that is above your target. The correction dose will help to bring your blood sugar into your target range before your next meal. You should know your insulin to carbohydrate ratio before adding a correction dose of insulin at your meals.

How do I use my correction factor to calculate my correction dose?

The formula below will help you calculate how much insulin you will have to take to correct for a pre-meal blood sugar that is above your target.

$$\frac{\text{Actual blood sugar} - \text{Target blood sugar}}{\text{Correction Factor}} = \text{Correction Dose}$$

For example, if your pre-meal blood sugar is 10 and your target is 6, then your correction dose is:

$$\frac{10 - 6}{4} = \frac{4}{4} = 1 \text{ unit}$$

*If your answer is a decimal, always round **down** to the nearest whole number. For example 1.6 would be 1.

The correction dose of insulin that you would need to take in this example would be 1 unit of rapid-acting insulin.

Putting the Carbohydrate Ratio and Correction Dose Together

Once you have calculated your carbohydrate ratio (the amount of insulin that you need for your meal) and your correction dose (the amount of insulin you will need to correct for a pre-meal blood sugar that is above your target), you add them together to get your dose of insulin for that meal.

Example: Following the examples given above, you need 8 units of insulin to cover your meal plus another 1 unit to correct for a pre-meal blood sugar above your target. Your dose of rapid-acting insulin at that meal will be 9 units.

Adapted from:

1. American Diabetes Association, Advanced Carbohydrate Counting (2003)
2. Walsh, John, Roberts, Ruth : Pumping Insulin (4th edition). Torry Pines Press. San Diego, CA. 2006
3. Pearson, Jan, Bergenstal, Richard: Fine-Tuning Control: Pattern Management Versus Supplementation. Diabetes Spectrum. 14:75-78, 2001
4. Building Competency in Diabetes Education: The Essentials. Diabetes Educator Section of the Canadian Diabetes Association. 2004.

Glycemic Index Food Guide

The glycemic index (GI) is a scale that ranks a carbohydrate-containing food or drink by how much it raises blood sugar levels after it is eaten or drank. Foods with a high GI increase blood sugar higher and faster than foods with a low GI.

There are three GI categories:

Green = Go
Low GI (55 or less) Choose Most Often

Yellow = Caution
Medium GI (56 to 69) Choose Less Often

Red = Stop and think
High GI (70 or more) Choose Least Often

Foods in the high GI category can be swapped with foods in the medium and/or low GI category to lower GI.

A low GI diet may help you:

- decrease risk of type 2 diabetes and its complications
- decrease risk of heart disease and stroke
- feel full longer
- maintain or lose weight

Try these meal planning ideas to lower meal GI:

- Cook your pasta al dente (firm). Check your pasta package instructions for cooking time.
- Make fruits and milk part of your meal plate (Figure 1). These foods often have a low GI and make a healthy dessert.
- Try lower GI grains, such as barley and bulgur.
- Pulses can be grains and starches or meat and alternatives. Swap half of your higher GI starch food serving with beans, lentils or chickpeas. For example, instead of having 1 cup of cooked short grain rice, have ½ cup of cooked rice mixed with ½ cup of black beans.

Diabetes Canada recommends choosing lower GI foods and drinks more often to help control blood sugar.

Work with your Registered Dietitian to add foods and drinks to your lists, create action plans that include choosing low**er** GI foods, adapt your favourite recipes, and find ways to swap/substitute low GI foods into your meal plan.

Checking your blood sugar before, and 2 hours after, a meal is the best way to know how your body handles certain foods and drinks.

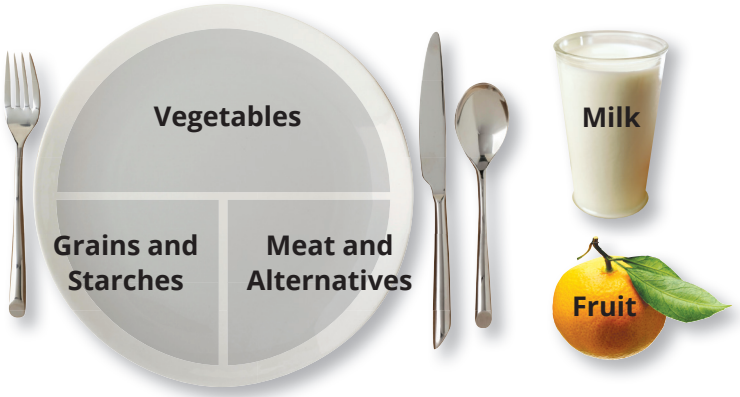


Figure 1: The Plate Method. Using a standard dinner plate, follow this model to control your portion sizes. www.diabetes.ca/mealplanning

Some carbohydrate-containing foods and drinks have so little carbohydrate that they do not have a GI value. This does not mean they cannot be included as part of a healthy diet. Examples include green vegetables, lemons, and some low-carbohydrate drinks. Diabetes Canada calls these foods and drinks "free" because they do not impact the blood sugar of people living with diabetes. You can put free foods in the green category, but they do not have a GI and have not been included in the food lists.

Items with this symbol are "sometimes foods"
(foods and drinks eaten only on occasion)

DIABETES CANADA

Grains and Starches

Low Glycemic Index (55 or less) Choose Most Often	Medium Glycemic Index (56 to 69) Choose Less Often	High Glycemic Index (70 or more) Choose Least Often
Breads:	**Breads:**	**Breads:**
Heavy Mixed Grain Breads	Chapati (White, Whole Wheat)	Bread (White, Whole Wheat)
Spelt Bread	Flaxseed/Linseed Bread	Naan (White, Whole Wheat)
Sourdough Bread	Pita Bread (White, Whole Wheat)	**Cereal:**
Tortilla (Whole Grain)	Pumpernickel Bread	All-Bran Flakes™ Cereal
Cereal:	Roti (White, Whole Wheat)	Corn Flakes™ Cereal
All-Bran™ Cereal	Rye Bread (Light, Dark, Whole Grain)	Cream of Wheat™ (Instant)
All-Bran Buds™ With Psyllium Cereal	Stone Ground Whole Wheat Bread	Puffed Wheat Cereal
Oat Bran	Whole Grain Wheat Bread	Rice Krispies™ Cereal
Oats (Steel Cut)	**Cereal:**	Special K™ Cereal
Grains:	Cream of Wheat™ (Regular)	**Grains:**
Barley	Oats (Instant)	Jasmine Rice
Bulgur	Oats (Large Flake)	Millet
Mung Bean Noodles	Oats (Quick)	Sticky Rice
Pasta (Al Dente, Firm)	**Grains:**	White Rice (Instant)
Pulse Flours	Basmati Rice	**Other:**
Quinoa	Brown Rice	Carrots*
Rice (Converted, Parboiled)	Cornmeal	Potato (Instant Mashed)
Other:	Couscous (Regular, Whole Wheat)	Potato (Red, White, Hot)
Peas	Rice Noodles	Pretzels
Popcorn	White Rice (Short, Long Grain)	Rice Cakes
Sweet Potato	Wild Rice	Soda Crackers
Winter Squash	**Other:**	
	Beets*	
	Corn	
	French Fries	
	Parsnip	
	Potato (Red, White, Cooled)	
	Rye Crisp Crackers (e.g. Ryvita Rye Crispbread™)	
	Stoned Wheat Thins™ Crackers	
Additional foods:	**Additional foods:**	**Additional foods:**
1.	1.	1.
2.	2.	2.
3.	3.	3.

* Most starchy/sweet vegetables (e.g. peas, parsnip, winter squash) provide 15 g or more carbohydrate per 1 cup serving. Beets and carrots often provide less than 15 g carbohydrate per serving (marked above with *). Most non-starchy (or free) vegetables (e.g. tomato and lettuce) have not been assigned a GI because they have very little carbohydrate and have very little effect on blood sugar.

Fruits

Low Glycemic Index (55 or less) Choose Most Often	Medium Glycemic Index (56 to 69) Choose Less Often	High Glycemic Index (70 or more) Choose Least Often
Apple	Banana (Ripe, Yellow)	Banana (Brown, Overripe)
Apricot (Fresh, Dried)	Cherries (Bottled)	Watermelon
Banana (Green, Unripe)	Cherries (Fresh)	
Berries	Cranberries (Dried)	
Cantaloupe	Figs (Fresh, Dried)	
Grapefruit	Grapes	
Honeydew Melon	Kiwi	
Mango	Lychee	
Orange	Pineapple	
Peach	Raisins	
Pear		
Plum		
Pomegranate		
Prunes		
Additional foods:	**Additional foods:**	**Additional foods:**
1.	1.	1.
2.	2.	2.
3.	3.	3.

Some fruits have not been assigned a GI because they contain less than 15 g of available carbohydrate per serving (e.g. lemon and lime).

Many fruits and vegetables fall in the low or medium GI categories.

Milk, Alternatives and Other Beverages

Low Glycemic Index (55 or less) Choose Most Often	Medium Glycemic Index (56 to 69) Choose Less Often	High Glycemic Index (70 or more) Choose Least Often
Almond Milk		Rice Milk
Cow Milk (Skim, 1%, 2%, Whole)		
Frozen Yogurt		
Greek Yogurt		
Soy Milk		
Yogurt (Skim, 1%, 2%, Whole)		
Additional foods:	**Additional foods:**	**Additional foods:**
1.	1.	1.
2.	2.	2.
3.	3.	3.

Milk, alternatives, and other beverages listed include flavoured (e.g. chocolate), sweetened and unsweetened varieties.

Meat and Alternatives

Low Glycemic Index (55 or less) Choose Most Often	Medium Glycemic Index (56 to 69) Choose Less Often	High Glycemic Index (70 or more) Choose Least Often
Baked Beans	Lentil Soup (ready-made)	
Chickpeas	Split Pea Soup (ready-made)	
Kidney Beans		
Lentils		
Mung Beans		
Romano Beans		
Soybeans/Edamame		
Split Peas		
Additional foods:	**Additional foods:**	**Additional foods:**
1.	1.	1.
2.	2.	2.
3.	3.	3.

Meat, poultry and fish do not have a GI because they do not contain carbohydrate. When ½ cup or more of pulses are eaten, they can be included in the Grains and Starches food group or the Meats and Alternatives group.

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DIABETES CANADA

Sugars and Sweeteners

Sweeteners that INCREASE blood sugar levels

Sweetener	Forms & uses	Other things you should know...
Sugars (Some examples)		
• Agave syrup • Barley malt • Brown rice syrup • Brown sugar • Corn syrup • Dextrose • Fructose • Fruit juice concentrates • Glucose • High fructose corn syrup • Honey • Icing sugar • Invert sugar • Lactose • Maltodextrins • Maltose • Maple syrup • Molasses • Sucrose • White sugar	• Used to sweeten foods and beverages • May be found in medications	• Sugars are carbohydrates that can affect your blood sugar (glucose), weight and blood fats. • There is no advantage to those with diabetes in using one type of sugar over another. • Sugars may be eaten in moderation by people with diabetes. Up to 10% of the days calories can come from added sugar. Their effect on blood sugar levels will vary. Talk to your dietitian about how to fit sugars into your meal plan.

Sweeteners that DON'T INCREASE blood sugar levels

Sweetener	Forms & uses	Other things you should know...
Sugar Alcohols		
• Hydrogenated starch hydrolysates (HSH) • Isomalt • Lactitol • Maltitol • Mannitol • Palatinit • Polydextrose • Polyol syrups • Polyols • Sorbitol • Xylitol	• Used to sweeten foods labelled "sugar free" or "no added sugar" • May be found in cough and cold syrups and other liquid medications (e.g. antacids)	• Sugar alcohols are neither sugars nor alcohols. Small amounts are found naturally in fruits and vegetables. They can also be manufactured. • They are only partly absorbed by your body, have fewer calories than sugar and have no major effect on blood sugar. • Check product labels for the number of grams of sugar alcohols per serving. If you eat more than 10 grams of sugar alcohols a day, you may experience side effects such as gas, bloating or diarrhea. • Talk to your dietitian if you are carbohydrate counting and want to use foods sweetened with sugar alcohols.

Health Canada has approved the following sweeteners as safe if taken in amounts up to the Acceptable Daily Intake (ADI). These sweeteners may also be used in medications. Please read the label. Ingredients may change. New products may be available.

Sweetener	Common/ Brand name	Forms & uses	Other things you should know...
Acesulfame Potassium (Ace-K)	Not available for purchase as a single ingredient	• Added to packaged foods and beverages only by food manufacturers	• Safe in pregnancy* • ADI=15 mg/kg body weight per day For example, a 50 kg (110 lb) person could have 750 mg of Ace-K per day. One can of diet pop contains about 42 mg of Ace-K.
Aspartame	• Equal® • NutraSweet® • Private label brand	• Available in packets, tablets or granulated form • Added to drinks, yogurts, cereals, low calorie desserts, chewing gum and many other foods • Flavour may change when heated	• Safe in pregnancy* • ADI=40 mg/kg body weight per day For example, a 50 kg (110 lb) person could safely have 2000 mg of aspartame per day. One can of diet pop may contain up to 200 mg of aspartame.
Cyclamate	• Sucaryl® • Sugar Twin® • Sweet'N Low® • Private label brand	• Available in packets, tablets, liquid and granulated form • Not allowed to be added to packaged foods and beverages • Flavour may change when heated	• Safe in pregnancy* (Be cautious of exceeding the ADI) • ADI=11 mg/kg body weight per day For example, a 50 kg (110 lb) person could have 550 mg of cyclamate per day. One packet of Sugar Twin® contains 264 mg of cyclamate.
Saccharin	• Hermesetas®	• Available as tablets • Not allowed to be added to packaged foods and beverages	• Safe in pregnancy* • ADI=5 mg/kg body weight per day For example, a 50 kg (110 lb) person could have 250 mg of saccharin per day. One tablet of Hermesetas® contains 12 mg of saccharin. • Available only in pharmacies
Sucralose	• Splenda®	• Available in packets or granulated form. Added to packaged foods and beverages • Can be used for cooking and baking	• Safe in pregnancy* • ADI=9 mg/kg body weight per day For example, a 50 kg (110 lb) person could have 450 mg of sucralose per day. One packet of Splenda® contains 12 mg of sucralose; one cup (250 mL) contains about 250 mg of sucralose.
Steviol glycosides	Stevia-based sweeteners such as: • Stevia • Truvia • Krisda • Pure Via	• Table top sweeteners • Added to drinks, breakfast cereals, yogurt, fillings, gum, spreads, baked products, snack foods	• Safe in pregnancy* • ADI= 4mg /kg body weight per day For example a 50kg (110 lb) person could have 200mg of Stevia per day. A 30g portion of breakfast cereal may contain 11mg of steviol glycosides

*For nutritional reasons, pregnant women should not consume excessive products containing artificial sweeteners, since such foods could replace more nutritious foods.

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DIABETES CANADA

Alcohol and diabetes

As a general rule, there is no need to avoid alcohol because you have diabetes.

You *should not* drink alcohol if you:

- are pregnant or trying to get pregnant
- are breastfeeding
- have a personal or family history of drinking problems
- are planning to drive or engage in other activities that require attention or skill
- are taking certain medications. Ask your pharmacist about your medications.

Consider the following questions when deciding what is best for you.

		Yes	No
1	Is my diabetes under control?	☐	☐
2	Am I free from health problems that alcohol can make worse such as disease of the pancreas, eye disease, high blood pressure, high triglycerides, liver problems, nerve damage or stroke?	☐	☐
3	Do I know how to prevent and treat low blood sugar?	☐	☐

If you answered "no" to any of these questions, you should speak to your diabetes educator or health-care professional before drinking alcohol.

If you answered "yes" to all of these questions, it is OK to drink alcohol in moderation.

Moderate alcohol intake is limited to 2 standard drinks/ day or less than 10 drinks/ week for women; and limited to 3 standard drinks/ day or less than 15 drinks/ week for men.

This recommendation is the same for people without diabetes. For people with high blood pressure, alcohol should be limited to 1 drink/day for women and 2 drinks/day for men.

What is a "standard drink"?

1 standard drink (10 g of alcohol):

Beer
341 mL (12 fl.oz)
of regular strength beer
(5% alcohol)

Spirits
43 mL (1.5 fl.oz) of spirits
(40% alcohol)

Wine
142 mL (5 fl.oz) of wine
(12% alcohol)

Note: If you are carbohydrate counting, do not take insulin for the carbohydrate content of alcoholic drinks.

Health risks of alcohol use

You may have heard that alcohol has certain health benefits. However, any pattern of drinking can be harmful. Proven ways of improving your health include: healthy eating, being active, and being a non-smoker.

The Diabetes Canada Clinical Practice Guidelines recommend that:

- People with type 1 diabetes should be aware that moderate consumption of alcohol with, or 2 to 3 hours after, an evening meal may result in delayed low blood sugar (hypoglycemia) the next morning after breakfast, or up to 24 hours after alcohol consumption. This also applies to people with type 2 diabetes who are using insulin or insulin secretagogues.
- Alcohol should be limited to 2 standard drinks/ day or less than 10 drinks/ week for women, and limited to 3 standard drinks/ day or less than 15 drinks/ week for men.
- People with diabetes should discuss alcohol use with their diabetes health-care team.

Risks for people with diabetes

Alcohol can:

- affect judgement
- provide empty calories that might lead to weight gain if taken in excess
- increase blood pressure and triglycerides
- cause damage to liver and nerves including brain and sexual organs
- contribute to inflammation of the pancreas
- dehydrate the body which is very dangerous in someone with high blood sugar
- worsen eye disease

For young people in particular, alcohol use:

- can lead to addiction
- is associated with a dramatic increase in injuries and death

For those on insulin or some diabetes medications

Drinking alcohol can increase your risk of having low blood sugar. To reduce this risk, take the following steps:

BEFORE drinking alcohol

Eat regular meals, take your medication(s), and check your blood sugar levels frequently (keep your blood glucose meter with you).

- Always have a treatment for low blood sugar with you (such as 3 glucose tablets or 150 mL regular pop or 6 Life Savers®).
- Wherever you are, make sure someone with you knows your signs and symptoms of low blood sugar and how to treat it so they can help you.
- Be aware that glucagon, a treatment for low blood sugar, will not work while alcohol is in the body. Because of this, make sure that someone knows to call an ambulance if you pass out.
- Wear diabetes identification such as a MedicAlert® bracelet.

WHILE drinking alcohol

- Eat carbohydrate-rich foods when drinking alcohol. Some ideas:

- Eat extra carbohydrate-rich foods if you are dancing, playing sports or doing other physical activity.
- Always pour your own drinks. Use less alcohol and stretch your drinks with sugar-free mixes.
- Drink slowly. Make your second drink without alcohol.

AFTER drinking alcohol

- Tell a responsible person that you have been drinking. They should look for low blood sugar symptoms.

(eg.)

- Check your blood sugar before going to bed. Eat a carbohydrate snack if your blood sugar is lower than usual.
- Set an alarm or have a responsible person wake you up through the night and early morning – a delayed low blood sugar can occur **anytime up to 24 hours** after drinking alcohol.
- You need to get up on time the next day for any food, medication or insulin you normally take. Missed medication or insulin can lead to high blood sugar, ketones and diabetic ketoacidosis (DKA).

Carbohydrate and calorie content in some common alcoholic beverages and mixes

(The amounts listed are a general guide only)

Beverage	Standard serving size	Energy (kcal)	Carbohydrate content (g)
Beer:			
regular	341 mL (12 fl.oz)	147	12
light	341 mL (12 fl.oz)	99	6
non-alcoholic*	355 mL (~12 fl.oz)	40-80	9-17
low carb*	341 mL (12 fl.oz)	96	3
Spirits/Hard liquor	43 mL (1.5 fl.oz)	98	0
Liqueurs & Cordials	43 mL (1.5 fl.oz)	155-190	10-25
Wine:			
regular	142 mL (5 fl.oz)	106-127	2-4
dessert	142 mL (5 fl.oz)	233-243	18-21
non-alcoholic	142 mL (5 fl.oz)	9	2
Cooler:			
regular	355 mL (12 fl.oz)	178-258	21-38
light*	330 mL (12 fl.oz)	100	1
Mixes:			
Sugar free pop	250 mL (8 fl.oz)	0	0
Regular pop	250 mL (8 fl.oz)	107	28
Club soda	250 mL (8 fl.oz)	0	0
Tonic water	250 mL (8 fl.oz)	88	23
Orange juice	250 mL (8 fl.oz)	118	27
Tomato juice	250 mL (8 fl.oz)	44	9
Tomato and clam juice	250 mL (8 fl.oz)	123	28

Reference: Canadian Nutrient File, 2018; USDA Food Composition Databases, 2018; *Actual Label
The caloric and carbohydrate content may vary by brand, be sure to check the labels

THE BOTTOM LINE

- If you do not drink alcohol, don't start.
- If you choose to drink alcohol, intake should be moderate (daily intake should be limited to 2-3 drinks for adult men and 1-2 drinks for adult women). When drinking alcohol, make sure you know how to prevent and treat low blood sugar.
- Heavy alcohol drinkers (more than 21 drinks/week for men and more than 14 drinks/week for women) are strongly advised to reduce the amount of alcohol they drink. Heavy alcohol use can make blood sugar control more difficult and increases other health risks.
- Talk to your diabetes educator or health-care professional if you have questions.

Related article: *High blood pressure and diabetes*

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Section 3

Special Considerations

DIABETES CANADA

Physical activity and diabetes

What kind of activity is best?

Both aerobic and resistance exercise are important for people living with diabetes.

Aerobic exercise

Aerobic exercise is continuous exercise such as walking, bicycling or jogging that elevates breathing and heart rate.

Resistance exercise

Resistance exercise involves brief repetitive exercises with weights, weight machines, resistance bands or one's own body weight to build muscle strength. If you decide to begin resistance exercise, you should first get some instruction from a qualified exercise specialist, a diabetes educator or exercise resource (such as a video or brochure) and start slowly.

Interval training

Interval training involves short periods of vigorous exercise such as running or cycling, alternating with 30 second to 3 minute recovery periods at low-to-moderate intensity or, rest.

Why is activity so important for people with diabetes?

Almost everyone, whether or not they have diabetes, benefits from regular exercise. Well-known health benefits include weight loss, stronger bones, improved blood pressure control, lower rates of heart disease and cancer as well as increased energy levels.

Regular exercise also has special advantages if you have type 2 diabetes. Regular physical activity improves your body's sensitivity to insulin and helps manage your blood sugar levels.

Safety first

- If you have been inactive for some time, talk to your doctor before starting any exercise program that is more strenuous than brisk walking.
- Make sure you wear comfortable, proper-fitting shoes.
- Wear your MedicAlert® bracelet or necklace.
- Listen to your body. Speak to your doctor if you are very short of breath or have chest pain.
- If you take insulin or medications that increase insulin levels, monitor your blood sugar before, during and many hours after your activity to see how it affects your blood sugar levels.
- Carry some form of fast-acting carbohydrate with you in case you need to treat low blood sugar (hypoglycemia), for example, glucose tablets or Life Savers®.
- If you live with type 1 diabetes, speak to your health-care provider about additional strategies to reduce the risk of hypoglycemia during and after exercise.

	Minutes	Times per week
My plan for aerobic exercise is :		
My plan for resistance exercise is :		

How much is enough?

Your goal should be to complete **at least 150 minutes of moderate- to vigorous-intensity aerobic exercise each week,** (e.g. 30 minutes, 5 days a week).

You may have to start slowly, with as little as 5 to 10 minutes of exercise per day, gradually building up to your goal. The good news, though, is that multiple, shorter exercise sessions of at least 10 minutes, adding up to 90-140 minutes per week, can have some benefits for people with diabetes. As you begin your exercise program and continue to build on it, be sure that you have no more than 2 consecutive days without exercise.

If you are able and when you are ready, try adding **resistance exercises like lifting weights 2-3 times a week.**

When you add resistance exercise, you should get some help from a qualified exercise specialist.

Note: You may consider **interval training** to increase improvements in fitness levels for type 2 diabetes, and to lower the risk of hypoglycemia in type 1 diabetes. Speak with your health-care provider or qualified exercise specialist if you plan to start interval training.

Keep going!

Habits can be hard to change, so be prepared with a plan in case your motivation starts to fade:

- Do something you like! It is hard to stick to an activity that is not fun. It may take you a few tries before you find the activity that is right for you.
- Have a support network. Ask your family, friends and co-workers to help you stay motivated by joining you for a walk or a workout at the gym.
- Set small, attainable goals and celebrate when you reach them. Reward yourself in healthy ways.
- Add physical activity to your daily routine. While you are working or watching TV, get up every 20-30 minutes.
- Seek professional help from a personal trainer, or someone knowledgeable who can help you find a fitness regimen that will work for you.
- Using a step monitor (pedometer or accelerometer) can be helpful to track your activity.

Physical activity and diabetes can be a complex issue. For more information, talk to your health-care team or visit diabetes.ca.

Regardless of your age, making the decision to become more physically active is one of the greatest gifts you can give yourself and the people who love you. Take that first step today!

Related articles: *Benefits of physical activity, Planning for regular physical activity, Introductory resistance program, Maintaining aerobic exercise, and Resistance exercise guidelines*

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Activity and Type 1 Diabetes

It is important to be active when you have diabetes. Activity includes things like exercising, shopping, doing housework or yard work, and sexual activity

How does physical activity affect diabetes?

Exercise makes the body more sensitive to insulin. This can cause your blood sugar to drop during or after the activity—sometimes for up to 24 hours.

Any type of activity can affect your blood sugar. Different activities can have different effects on your blood sugar even though you might have used the same effort.

Blood Sugar Tips:

- Don’t inject insulin into your arms or legs before doing an activity that uses those muscles.
- Reduce your insulin dose(s) when you know you will be active to prevent a low blood sugar (see *Adjusting Your Insulin for Activity* on the next page).
- Always carry a fast-acting sugar, like glucose tablets.
- Test your blood sugar:
  - before and after any activity
  - once in a while when you are doing longer activities
  - around 3 a.m. if you have a very active day or evening

Exercising Tips:

- Make sure you wear your medical alert identification.
- Wear shoes that fit well.
- Stay well hydrated. Drink water before you start your activity. Drink about 250 mL of water for every 20 minutes you are active.
- It’s a good idea to work out with someone else, especially if your activity is intense (like running a marathon).
- Don’t exercise:
  - if you don’t feel well
  - if you are showing ketones

Adjusting Your Insulin Dose for Activity

Follow the guidelines below for any activity that is going to last for at least 30 minutes.

- Cut your total meal dose of rapid-acting insulin (correction and meal dose) in half (by 50%) if you are going to be active within 2 hours of your meal insulin dose, even if your blood sugar is high.

  You may find you need to cut your rapid-acting insulin dose by more or less than half if your blood sugar is too low or too high during or after the activity. Your healthcare team can help you figure this out.

- If your activity wasn't planned and your insulin dose wasn't cut back in time, check your blood sugar. Have a snack that has at least 15 to 30 grams carbohydrate if:
  - your insulin dose was given within the last 2 hours
  - your blood sugar is under 7 mmol/L
  - you are worried that your blood sugar may drop too much with the activity, even if your blood sugar is over your target when you start
- Cut your bedtime long-acting insulin by 10% to 20% if you:
  - were active in the afternoon or evening
  - were active for a long time during the day (e.g., skiing, hiking, spring cleaning, painting a room)
  - did an intense activity for a short time (e.g., 30 minutes) but are usually not active
  - are planning to be active before noon the next day

Example 1:

Mary plans to go for a run after breakfast. Her pre-breakfast reading is 12.8 mmol/L. Her correction factor is 3 (1 unit drops her 3 mmol/L), and her insulin to carbohydrate ratio is 1:15.

She plans to eat 45 grams of carbohydrate at breakfast. Her usual dose at breakfast is 5 units: 2 units as correction, and 3 units to cover her meals. To prevent a low blood sugar, she cuts this dose in half and gives 2.5 units rapid-acting insulin before she eats her breakfast. Mary will test her blood glucose during and after her exercise to see how this dose worked.

Example 2:

John tests his blood sugar, gives his usual dose of rapid-acting insulin, and eats breakfast at 9:00 am. His friend calls and invites him to go for a bike ride at 10:30 a.m. John's blood sugar is 6.7 mmol/L before the ride. He eats 30 grams carbohydrate as he knows that he still has some insulin working from his breakfast dose.

Since this is the first time he has exercised at this time of the day, he's not sure what his blood sugar will do. He plans to cut his lunch dose of rapid-acting insulin in half to prevent a low blood sugar in the afternoon.

Example 3:

Mary plans to go for a long run right after supper. She has not run before at this time of day. She cuts her supper dose of rapid-acting insulin in half. At bedtime, her blood sugar is 8.2 mmol/L. She cuts her long-acting insulin by 10% and takes 9 units instead of 10 units. She tests her blood sugar at 3 a.m. to make sure her blood sugar isn't too low: Her blood sugar is 7.5 mmol/L. In the morning her blood sugar is 4.4 mmol/L. If she hadn't cut back on her evening insulin, she would have had a low blood sugar by the morning.

Example 4:

John is going skiing for the whole day. He decides to take half his morning basal insulin. He tests before each meal and reduces his meal dose by 50% at each meal. At bedtime, his blood sugar is 5.8 mmol/L. He eats an apple (about 20 grams carbohydrate) with cheese, and reduces his long-acting insulin by 20%.

At 3 a.m. his blood sugar is 5.6 mmol/L. He has 30 grams carbohydrate because he knows that activity can affect blood sugar for up to 24 hours. In the morning his blood sugar is 5.8 mmol/L.

Speak with your diabetes healthcare team if you have questions or concerns about exercise and activity.

Diabetes: Adjusting your medicine and diet for a barium enema or colonoscopy

The guidelines below will help you adjust your diabetes medicine and diet as you get ready for your test.
If you see a diabetes educator or diabetes specialist, contact them at least 1 week before your test to ask about adjusting your diabetes medicine or insulin.

Diet

- Follow the instructions the gastroenterology (GI) clinic gives you about what you can eat or drink before the test.
- Remember, do not eat or drink any of the following:
  - milk products or substitutes such as soy, almond or goats milk
  - meal replacements like Boost or Ensure
  - alcohol
- Treat the clear fluid days like a sick day. Use List 1 or 2 in the table below to choose what to eat and drink. Your diet can be changed to clear fluids in one of these ways:
  - If you count carbohydrates, try to drink the same amount of carbohydrates as you would eat at each meal and snack.
  - If you follow a meal pattern, any item from List 1 will replace 1 serving from the grains and starches, fruit, milk and alternatives, or other choices group.
  - If you don't follow a special diet or meal plan, eat or drink 1 item from List 1 every hour.
- If your blood glucose (sugar) drops below 4.0 mmol/L or if you have symptoms of low blood glucose, take 15 grams of a carbohydrate-containing fluid from List 1. Test your blood glucose again in 15 minutes. If your blood glucose is still low, take another 15 grams of carbohydrate-containing fluid from List 1.
- If you're worried your blood glucose will run too low, take extra fluid from List 1.

List 1 - Fluids that have sugar. Each has about 15 grams of carbohydrates. No fluids with red or purple dye.	**List 2 - Fluids that are sugar-free. Choose as desired. No fluids with red or purple dye.**
▪ black tea, coffee, or water with 1 rounded tablespoon (15 mL) sugar or honey ▪ ½ cup (125 mL) regular Jell-O ▪ ½ cup (125 mL) regular (sugar sweetened) Kool-Aid ▪ ¾ cup (175 mL) fruit drink or fruit juice without pulp (such as apple, white grape) ▪ ¾ cup (175 mL) regular pop (such as ginger ale) ▪ 1 cup (250 mL) sports drinks (e.g., Gatorade) ▪ 1 and 1/2 (50 mL) juice popsicle	▪ water ▪ clear bouillon, broth, or consommé ▪ diet pop (such as diet ginger ale) ▪ diet Kool-Aid or Crystal-Lite ▪ black coffee or tea ▪ diet popsicle ▪ diet Jell-O

Testing your blood glucose

Test your blood glucose anytime you feel your blood glucose is low or high.

- Test your blood glucose at least every 4 hours. Blood glucose in the range of 8.0 to 12.0 mmol/L are fine for these 2 days, even if it's higher than your usual target.
- If you have type 1 diabetes or you are on an SGLT2 inhibitor - canagliflozin (Invokana), dapagliflozin (Forxiga), empagliflozin (Jardiance) - and combination medicines that contain any of these medicines (such as with metformin) and your glucose is over 14.0 mmol/L, test your urine or blood for ketones.

    - If you have type 1 diabetes and are positive for ketones, you may need extra insulin.
    - Moderate to large ketones may mean that you're in DKA (diabetic ketoacidosis). Go to the emergency department right away.
- If you're worried about your blood glucose level, speak with your healthcare provider or diabetes educator.

Adjusting your diabetes medicine

If You Take Diabetes Medicine other than Insulin
2 Days before the Test

- If you are on an SGLT2 inhibitor - (canagliflozin (Invokana), dapagliflozin (Forxiga), empagliflozin (Jardiance) - or combination medicines that contain any of these medicines (such as with metformin), do not take.
- Take your other diabetes medicine as usual.

The Day Before the Test

- If you are on an SGLT2 inhibitor - (canagliflozin (Invokana), dapagliflozin (Forxiga), empagliflozin (Jardiance) - or combination medicines that contain any of these medicines (such as with metformin), do not take.
- Take your other diabetes medicine as usual or as your healthcare provider tells you.
- If you are on repaglinide (Gluconorm), gliclazide (Diamicron, Diamicron MR) or glyburide (Diabeta), speak to your healthcare provider as your dose(s) may need to be lowered.

Test Day

- Don't take any diabetes medicine until after your test is done and you're eating. Then take it as per your scheduled dose.

***Be sure to bring a source of fast-acting sugar and your blood glucose meter with you.**

If You Take Insulin
The day before the test

Morning

- **Basal Insulin:** Reduce your dose of basal insulin (Humulin N, Novolin NPH, Lantus, Basaglar, Toujeo, Levemir or Tresiba) by 20% or the amount your healthcare provider tells you. **Tresiba may need to be reduced for 2-3 days before the procedure.** Talk with your healthcare provider.
  Your dose will be _____ units.
- **Premix Insulin:** Reduce your dose of premix insulin (Humulin 30/70, Novolin 30/70, or Humalog 25/75) by 20% or the amount your healthcare provider tells you for your breakfast meal. Your dose will be _____ units.
- **Insulin Pump:** Keep the same basal rate.

Meals

- **Bolus (meal) Insulin:** Reduce your dose of bolus (meal) insulin (Admelog, Apidra, Fiasp, Humalog, Humulin R, NovoRapid, Novolin Toronto, or Trurapi) by 20% or the amount your healthcare provider tells you. You may need to reduce your dose of these meal insulins more if your blood glucose becomes low. Your dose will be _____ units.
- **Premix Insulin:** Reduce your dose of supper premix insulin (Humulin 30/70, Humalog 25/75, Humalog Mix 50, Novolin 30/70, Novolin 40/60, Novolin 50/50) by 20% or the amount your healthcare provider tells you. Your dose will be _____ units.

Evening/Bedtime

- **Basal Insulin:** Reduce your dose of basal insulin (Humulin N, Novolin NPH, Lantus, Basaglar, Toujeo, Levemir or Tresiba) by 20% or the amount your healthcare provider tells you. **Tresiba may need to be reduced for 2-3 days before the procedure.** Talk with your healthcare provider.
  Your dose will be _____ units.
- **Insulin Pump:** You may need to reduce your basal rate by 10% to 20% overnight if there are concerns about low blood glucose. If there are no concerns, keep the same basal rate.

Test day

Morning

- **Bolus (meal) Insulin: Don't take** your morning meal (bolus) insulin (Admelog, Apidra,Fiasp, Humalog, Humulin R, NovoRapid, Novolin Toronto, or Trurapi).
- **Premix Insulin: Don't take** your morning premix insulin (Humulin 30/70, Humalog 25/75, Humalog Mix 50, Novolin 30/70, Novolin 40/60, Novolin 50/50).
- **Basal Insulin:** Reduce your dose of basal insulin (Humulin N, Novolin NPH, Lantus, Basaglar, Toujeo, Levemir or Tresiba) by 20% or the amount your healthcare provider tells you. **Tresiba may need to be reduced for 2-3 days before the procedure.** Talk with your healthcare provider.
  Your dose will be _____ units.
- **Insulin Pump:** You may need to reduce your basal rate by 10% to 20% overnight if there are concerns about low blood glucose. If there are no concerns, keep the same basal rate.

***Be sure to bring a source of fast-acting sugar and your blood glucose meter with you.**

After the test

- **Premix Insulin:** Reduce your morning dose of premix insulin (Humulin 30/70, Humalog 25/75, Humalog Mix 50, Novolin 30/70, Novolin 40/60, Novolin 50/50) by 20% or the amount your healthcare provider tells you for your first meal after the test. Your dose will be _____ units.
- **All other insulin:** Take as prescribed.

***Be sure to bring a source of fast-acting sugar and your blood glucose meter with you.**

For 24/7 nurse advice and general health information call Health Link at 811.

Current as of: June 10, 2022

Author: Endocrinology and Metabolism Program, Alberta Health Services

Diabetes and Driving

- If you drive and have diabetes, it's important to know that a low blood sugar (hypoglycemia) can greatly affect your judgement and driving skills. Your ability to drive can be impaired for at least **45 minutes** after a low blood sugar has been treated and is back to normal.
- Talk to your doctor, diabetes educator, or pharmacist to see if the diabetes medicine you're taking puts you at risk for low blood sugars. If you're at risk, follow these guidelines to keep you and others safe.

Getting Ready to Drive

- Check with your licensing body about how often you need a medical exam to keep your license.
- Always have your blood sugar meter (glucometer) with you. Use a glucometer with an electronic memory or keep a record of your blood sugar levels.
- Wear your medical alert identification that says you have diabetes.
- Make sure you have quick-acting sugar (e.g., glucose tablets, juice) within easy reach of the driver's seat (e.g., attach it to the sun visor or the centre console).
- Keep snacks with carbohydrate and protein in your car (e.g., nuts and dried fruit, snack bar).

Before Driving

Test your blood sugar right before driving. Monitor your blood sugar at least every 4 hours when driving long distances. Your blood sugar must be **over 4.0 mmol/L** to drive.

If your blood sugar is **lower than 4.0 mmol/L**:

- Take 15 grams of quick-acting sugar (e.g., ½ cup juice/regular pop, 4-Dex 4 tablets®, or 6 LifeSavers®).
- Wait 15 minutes and re-check your blood sugar. If below 4.0 mmol/L, re-treat with 15 grams of quick-acting sugar.
- Once over 4.0 mmol/L, have a snack.
- Wait at least 45 minutes after eating a snack and your blood sugar level is at least 5.0 mmol/L before you drive.

While You're Driving

- If you think your blood sugar is low, pull off the road, test your blood sugar, and treat like above.

For more information about private and commercial driving with diabetes, go to diabetes.ca and search for driving and licensing.

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Travel and Diabetes

If travel is part of your lifestyle, it is important to continue even if you have diabetes. However, extra planning is needed to make sure you have a safe and enjoyable trip.

Getting Ready

- Make sure your diabetes is in good control.
- See your diabetes educators for help with planning for diet and time changes.
- Know your meal plan well and know what your usual serving sizes look like.
- Ask your doctor for a letter outlining your diabetes treatment plan and prescriptions for diabetes medications.

Tips for Travelling Out of the Country

- Buy health insurance for out-of-country travel.
- If you are travelling to a developing country, make sure your immunizations are up-to-date. For more information, contact the International Travel Clinic at 403-944-7100. If you are visiting an area where malaria is common, start anti-malarial tablets a week before you leave on your trip (you need a prescription for this). Keep taking them for at least 4 weeks after leaving the area.
- Find out what kind of medical facilities are available at your destination. Contact the International Association for Medical Assistance to Travelers by phone (1-519-836-0102) or e-mail (info@iamat.org) for information on English-speaking doctors in foreign countries.
- Bring a translation book with you and learn some key phrases of the country you are visiting (for example, “My blood sugar is low, and I need some sugar.”).

Packing Checklist

Here is a list of supplies you should bring on any trip:

- □ letter from your doctor and medical identification (for example, bracelet, necklace, wallet card)
- □ an extra supply of diabetes medications and blood testing equipment (bring double the amount you would normally use)
- □ medications to take if you feel or are sick to your stomach, have diarrhea, allergies, a fever, or pain
- □ sunscreen and insect repellent
- □ first aid kit
- □ supply of quick-acting sugar if on diabetes medications
- □ snacks (for example, juice boxes, granola bars, dried fruit, crackers, cookies)

Alberta Health Services

□ comfortable walking shoes and cotton socks
□ translation phrase book if you are visiting a country where you do not speak the language

Tips for Travelling by Car

- Stop once in a while for a break.
- Try to eat your meals on time (every 4–5 hours).
- In case of unexpected delays, carry some food such as cheese and crackers, fruit, and granola bars with you in the car.
- Follow your usual routine for testing your blood sugars. Test more often if you are concerned about hypoglycemia.
- If your blood sugar is low, stop driving right away and treat the low blood sugar. Check your blood sugar levels. **Do not drive** until your blood sugar is above 5 mmol/L. Even after your blood sugar returns to normal, your driving may be impaired for up to 60 minutes.

Tips for Travelling by Airplane

- Pack your diabetes supplies in your hand luggage and carry it on the plane with you. Do not pack them in your suitcase as it may be lost. If you are travelling with others, split up the supplies and ask them to carry some with them. **Make sure all your prescription medication is in the original prescription bottle and the label is readable.**
- Carry food on the plane with you.
- You can ask the airline or your travel agent to order a diabetic meal.

When You Get There

- If the water is not safe to drink, drink only bottled water or diet pop. Do not use ice cubes. Eat fruits and vegetables that can be peeled and/or cooked.
- Don’t drink milk or other dairy products that may not be pasteurized.
- Try to continue your usual exercise routine.
- Wear sensible walking shoes and check your feet every day. Do not go barefoot, even at the beach.
- You may need to check your blood sugar levels more often because of changes in food and activity.
- If you are vomiting and/or have diarrhea, take your usual medication and see the *Sick Day* guidelines
- If you need medical advice and don’t know where to find a doctor, check at a university hospital or with the Canadian Consulate or Embassy.

If you have any questions or concerns, ask your doctor or diabetes educator.

Alberta Health Services

Diabetes Centre Calgary
1820 Richmond Rd SW, Calgary, AB T2T 5C7
Tel: (403) 955-8118 Fax: (403) 955-8634

Date: _____

Re: Medical Supplies for _____

To Whom It May Concern:

This is to inform you that the above client has diabetes and is on insulin. They will need to carry on their person a medical kit to facilitate good glucose control while traveling. These supplies include some or all of the following:

- Medication (insulin)
- Insulin administration equipment (insulin pump, infusion sets, insulin pen and pen needles or syringes)
- Blood glucose monitoring equipment (continuous glucose monitor, blood glucose meter, strips, lancets, and lancet device) and ketone test strips
- Glucose tablets, glucagon kit and food for the prevention and treatment of low blood sugars.

Should you have any questions about these medical needs, please contact the number below.

Sincerely

Diabetes Centre Calgary
Endocrinology & Metabolism Program
Calgary, Alberta, Canada
Tel: (403) 955-8118

Section 4

Staying Healthy

DIABETES CANADA

Staying healthy with diabetes

Both type 1 and type 2 diabetes are serious conditions, and can lead to the same complications. But you can do many things to stay well. Talk to your doctor about all of the following points.They are important for basic diabetes care. Your doctor and your health-care team will work with you to ensure you get the best care.The important first steps are:

- Eat according to a healthy meal plan.
- Increase your physical activity.
- Learn as much as possible about diabetes.

Are you heading in a healthy direction?

Keeping your blood pressure and blood sugar at target will help you avoid diabetes complications such as heart attack, stroke, and damage to your eyes, nerves and kidneys.

Refer to the back page of this brochure to find your recommended target range and use this resource to help you prepare for regular diabetes-focused visits with your health-care provider.

Blood sugar

You and your health-care team should set goals for your blood sugar levels. It is important to recognize that you may need to add pills and/or insulin to your lifestyle changes (healthy eating and increased activity), to achieve your blood sugar targets. A blood glucose meter will help you track your blood sugar levels.

Blood pressure

High blood pressure can lead to eye disease, heart disease, stroke and kidney disease. You may need to change your eating and exercise habits and/or take pills to keep your blood pressure below 130/80 mm Hg.

Cholesterol

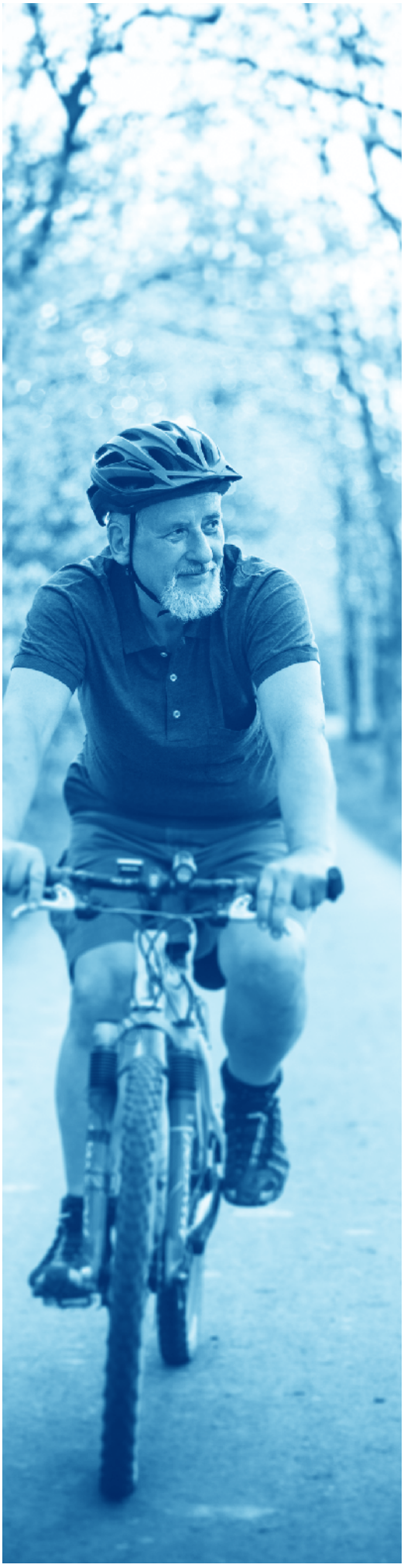
High cholesterol and other fats in the blood can lead to heart disease and stroke. You may need to change your eating and exercise habits and/or take pills to keep your blood fats at healthy levels.

Healthy eating

Ask your doctor to refer you to a registered dietitian to learn about healthy eating. You should follow diabetes-friendly diets (Mediterranean style) or diets emphasizing specific foods (low-glycemic-index foods).

Physical activity

Both aerobic and resistance exercise are important for people living with diabetes. If you have diabetes, you should do at least 150 minutes of moderate to vigorous intensity aerobic exercise per week. You may need to start with as little as 5 to 10 minutes per day of brisk walking. In addition, resistance exercise (such as weight training) should be performed 2-3 times per week. If you are just starting to be active, check with your doctor first.



Weight

Reaching and maintaining a healthy weight will help you control your blood sugar, blood pressure and blood fat levels.

Eye disease

You need to be seen by an eye-care specialist who will dilate your pupils and check for signs of eye disease. Your regular doctor cannot do this special test in his or her office. Ask for a referral to an eye-care specialist.

Foot care

Take off your shoes and socks at every visit (even if your doctor or health-care team forget to ask you). Ingrown toenails, cuts and sores on the feet can lead to serious infections. Learn about proper foot care.

Depression and anxiety

These are common feelings in people with diabetes and can negatively affect your diabetes control. Speak to your doctor or health-care team if you feel you might have depression or anxiety.

Smoking

Smoking and diabetes are a dangerous mix. If you are serious about quitting, your doctor or health-care team can help. If you do not succeed the first time, keep trying; your health is worth it.

Kidney disease

The earlier you catch signs of kidney disease the better. You must have your urine tested regularly for early signs of kidney disease. Your doctor may prescribe pills to delay more damage to your kidneys.

Nerve damage

Tell your doctor or health-care team if your hands or feet ever feel numb or feel the sensation of having “pins and needles”.

Problems with erection

Trouble getting and maintaining an erection is a common problem in men with diabetes. Do not be shy about talking to your doctor or health-care team about it. They may be able to suggest ways to solve the problem.

Stay healthy by asking the right questions. Be an informed patient. Know what tests you need to check for the complications of diabetes. Talk to your doctor and diabetes educators about these tests.

Tests for diabetes care

The following are important tests for basic diabetes care. Your doctor may recommend some tests more often than indicated. Target blood sugar and blood pressure levels may differ, depending on your health.

When	What test?
At diagnosis	**Type 2:** • ACR*/Kidney test: urine test performed at the lab • Eye examination: through dilated pupils by an eye-care specialist • Nerve damage test: using a 10-g monofilament or 128-Hz tuning fork • Cholesterol and other blood fat tests: a blood test
Approximately every 3 months	**Type 1 and 2:** • A1C blood test**(goal: 7.0% or below for most people with diabetes) • Blood pressure (goal: below 130/80 mm Hg) • Review of home blood sugar monitoring record
Every year	**Type 1 and 2:** • ACR*/Kidney test: urine test performed at the lab (at least once a year and for type 1: once a year if you have had diabetes for at least 5 years) • Foot exam at every visit and right away for an ingrown toenail or any cut or sore that doesn't heal • Meter check against the results of a blood test at the lab at least once a year • Cholesterol and other blood fat tests^
Every 1 to 2 years	**Eye examination by an eye specialist** **Type 2:** • every 1–2 years (if no eye disease present)† **Type 1:** • once a year† if you are over age 15 and have had diabetes for at least 5 years
Regularly/ Periodically	**Type 1 and 2:** • Questions about erection problems • Questions about depression and/or anxiety • Questions about healthy eating and physical activity

* Albumin/creatinine ratio (ACR)
** A1C targets for pregnant women, older adults and children 12 years of age and under are different.
^ More often if treatment is initiated.
† More often if eye disease is present.

For young children and pregnant women, the timing and type of test may be different.

Your diabetes-focused visit

It is important that certain visits with your health-care team focus specifically on your diabetes.

How to prepare

- Have laboratory tests done prior to your visit.
- Bring blood sugar records with you (written down or printed from meter).
- Bring a list of all medications including non-prescription drugs and let team know which need to be refilled.
- Write down any questions about your diabetes.
- Save any non-urgent, non-diabetes questions for another visit. This will ensure that your diabetes gets the full attention it deserves.

A

A1C (measure of blood sugar levels over time)

B

Blood pressure

C

Cholesterol

D

Drugs to protect your heart

E

Exercise goals and healthy eating

S

Self-management support

S

Screening or monitoring for complications

S

Smoking cessation

Do you know your ABCDES3?

If you have diabetes, you are at increased risk for heart disease and stroke, and other complications such as eye and kidney disease, nerve damage and foot problems. Keeping your blood sugar, blood pressure and cholesterol in a healthy range can reduce your risk of complications. Learn your diabetes ABCDES3. Talk to your doctor about Diabetes Canada's recommendations for diabetes management, what targets are healthy for you, and how to achieve and maintain them over time.

ABCDES3	Recommended targets	My goals
A1C*	7.0% or below (for most people with diabetes)	
Blood pressure	Below 130/80 mm Hg	
Cholesterol	LDL: below 2.0 mmol/L	
Drugs	Speak to your health-care team about medication to protect against heart attack and stroke	
Exercise goals and healthy eating	• Increase your physical activity • Eat according to a healthy plan	
Self-management support	• Set a personalized goal • Identify barriers to achieving goals (pain, stress, mental health, financial and/or other concerns)	
Screening or monitoring for complications	• Heart: ECG every 3-5 years if required • Foot: Yearly exam or more if required • Kidney: Yearly blood/urine tests or more if required • Eye: Yearly exam or more if required	
Smoking cessation	Stop smoking	

* A1C targets for pregnant women, older adults and children 12 years of age and under are different.

Related articles: *Managing your blood sugar, A prescription for maintaining healthy eyes, Smoking and diabetes, Cholesterol and diabetes, High blood pressure and diabetes, Managing weight and Diabetes*

DIABETES CANADA **diabetes.ca | 1-800 BANTING (226-8464) | info@diabetes.ca**

Diabetes Canada is making the invisible epidemic of diabetes visible and urgent. Eleven million Canadians have diabetes or prediabetes. Now is the time to End Diabetes - its health impacts as well as the blame, shame and misinformation associated with it. Diabetes Canada partners with Canadians to End Diabetes through education and support services, resources for health-care professionals, advocacy to governments, schools and workplaces, and, funding research to improve treatments and find a cure.

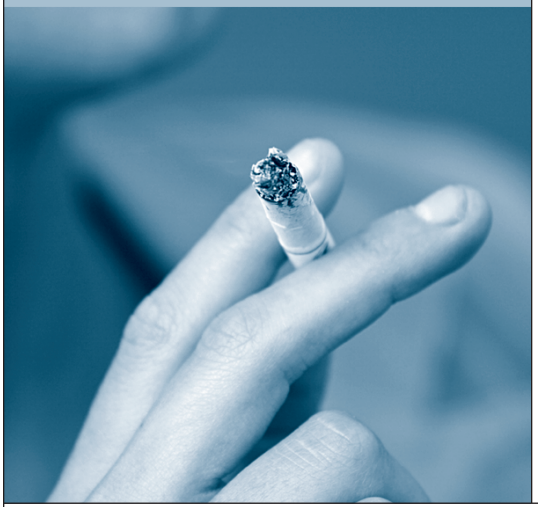
Smoking *and* diabetes

Canadian Diabetes Association

Why is it so hard to quit?

Simply put, nicotine is among the most addictive drugs. **Smoking is** not a habit or a lifestyle choice. It's **an addiction that over time, changes brain chemistry**. Nicotine has its effect by attaching to certain receptors in the brain, and when you become a smoker these receptors increase in number. If not regularly stimulated with nicotine, the increased receptors begin to make a person feel very unpleasant, a phenomenon known as withdrawal. Both withdrawal and the craving it causes are tied to changes in brain chemistry.

Quitting smoking is one of the most important things individuals living with diabetes can do to help prevent or delay the onset of complications.



Why is smoking so bad for people with diabetes?

Smoking is bad for everyone. It increases your risk for lung cancer, heart attack and stroke. Each year, more than 45,000 Canadians die of smoking-related illnesses. People with diabetes face an even greater risk from smoking: just like high blood glucose levels, the poisonous chemicals in cigarette smoke attack blood vessels.This contributes to hardening of the arteries (or what is known as atherosclerosis) which impairs the blood's ability to carry oxygen throughout the body.

Together, the deadly combination of high blood glucose and smoking dramatically increases damage to the blood vessels that feed the heart, brain, eyes, kidneys and peripheral nerves, speeding up the long-term complications of diabetes.

How can I quit?

The first critical step is to make the decision to quit. It may help to set a firm, short-term quit date. In the meantime, get as much information as you can from your doctor or pharmacist about options to help you quit, including medications that can increase your chances of success. Similar to the day-to-day process of managing your diabetes through diet, exercise and regular blood glucose testing, managing to quit smoking is something that is best approached by incorporating it into your daily routine.

What can help me quit smoking?

Nicotine replacement therapy

The first line of treatment is nicotine replacement therapy, whether in the form of a gum, patch or inhaler, to help ease withdrawal symptoms.

Nicotine replacement therapy is now available without a prescription in pharmacies. Talk to your healthcare provider about the potential benefit of nicotine replacement therapy.

Oral Medications

Your doctor can help prescribe a medication that can help reduce your smoking cravings. Speak to your doctor if these medications are suitable for you as they might interfere with other medications or health issues.

Lifestyle changes

Smoking often is associated with strong cues, so as you move toward a quit date, get a sense of where and when you smoke, and identify some strategies to bypass those situations. If you typically smoke after dinner, take a walk instead. Any setting where alcohol is involved, such as a wedding or a party, will probably be a hazard zone so just as you may plan to adjust your food intake or insulin dosage, consider in advance how you will handle these situations.

Enlist your family and friends in the effort. Make sure they understand how important it is for you to quit smoking and how hard it may be, and ask for their support. For some people, joining a support group along with others who are also trying to quit is helpful. Your doctor may have some information on groups in your community. For more information online go to www.gosmokefree.ca and www.smokershelpline.ca.

Never quit quitting!

Making the transition from smoker to nonsmoker is not easy, and you may have a lapse. If you do, give yourself a break. Don't focus on the one cigarette you just had, but remember the hundreds you haven't had since you quit. Manage your quitting plan much like you manage your diabetes – take it one day at a time.

The fact is, successful quitters generally make at least two or three unsuccessful attempts before they finally kick the habit, so never quit quitting!

Across the country, the Canadian Diabetes Association is leading the fight against diabetes by helping people with diabetes live healthy lives while we work to find a cure. Our community-based network of supporters help us provide education and services to people living with diabetes, advocate for our cause, break ground towards a cure and translate research into practical applications.

Canadian Diabetes Association

Related articles: *High blood pressure and diabetes, Staying healthy with diabetes*

diabetes.ca | 1-800 BANTING

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DIABETES CANADA

Foot care: A step toward good health

Diabetes and your feet

Diabetes can cause nerve damage (also known as diabetes peripheral neuropathy) and poor blood flow or circulation to the legs and feet (also known as peripheral arterial disease). As a result, people with diabetes are less likely to feel a foot injury, such as a blister or cut. Diabetes can make these injuries more difficult to heal. Unnoticed and untreated, even small foot injuries can quickly become infected, potentially leading to serious complications.

Foot problems are very common in people with diabetes and can lead to serious complications. This fact sheet provides basic information about how diabetes affects your feet and what you can do to keep your feet healthy.

Daily foot care

As always, prevention is the best medicine. A good daily foot-care routine and good blood sugar control will help keep your feet healthy.

Start by assembling a foot-care kit containing nail clippers, nail file, lotion, and a non-breakable hand mirror. Having everything you need in one place makes it easier to follow this foot-care routine every day:

- Wash your feet in warm (not hot) water, using a mild soap. Don't soak your feet, as this can dry your skin.
- Dry your feet carefully, especially between your toes.
- Thoroughly check your feet and between your toes to make sure there are no cuts, cracks, ingrown toenails, blisters, etc. Use a hand mirror to see the bottom of your feet, or ask someone else to check them for you.
- Clean cuts or scratches with mild soap and water, and cover with a dry dressing suitable for sensitive skin.
- Trim your toenails straight across and file any sharp edges. Don't cut the nails too short.
- Apply a good lotion to your heels and soles. Wipe off excess lotion that is not absorbed. Don't put lotion between your toes, as the excessive moisture can promote infection.
- Wear fresh clean socks and well-fitting shoes every day. Whenever possible, wear white socks – if you have a cut or sore, the drainage will be easy to see.

When to see your doctor

If you have any corns (thick or hard skin on toes), calluses (thick skin on bottom of feet), in-grown toenails, warts or slivers, have them treated by your doctor or a foot-care specialist (such as a podiatrist, chiropodist or experienced foot-care nurse). Do not try to treat them yourself.

If you have any swelling, warmth, redness or pain in your legs or feet, see your doctor or foot specialist right away.

Have your bare feet checked by your doctor at least once a year. In addition, ask your doctor to screen you for neuropathy and loss of circulation at least once a year.

Take your socks off at every diabetes-related visit to your doctor and ask him or her to inspect your feet.

Best advice

Do	Don't
Wear well-fitting shoes. They should be supportive, have low heels (less than 5 cm high) and should not rub or pinch. Shop at a reputable store with knowledgeable staff who can professionally fit your shoes.	Use over-the-counter medications to treat corns and warts. They are dangerous for people with diabetes.
Buy shoes in the late afternoon (since your feet swell slightly by then).	Wear anything tight around your legs, such as tight socks or knee-highs.
Wear socks at night if your feet get cold.	Ever go barefoot, even indoors. Consider buying a pair of well-fitting shoes that are just for indoors.
Elevate your feet when you are sitting.	Put hot water bottles or heating pads on your feet.
Wiggle your toes and move your ankles around for a few minutes several times a day to improve blood flow in your feet and legs.	Sit or cross your legs for long periods of time.
Exercise regularly to improve circulation.	Smoke. Smoking decreases circulation and healing, and significantly increases the risks of amputation.
Inspect your feet daily and in particular, feel for skin temperature differences between your feet.	Wear over -the- counter insoles - they can cause blisters if they are not right for your feet.

Contact Diabetes Canada for additional resources.

DIABETES CANADA

diabetes.ca | 1-800 BANTING (226-8464) | info@diabetes.ca

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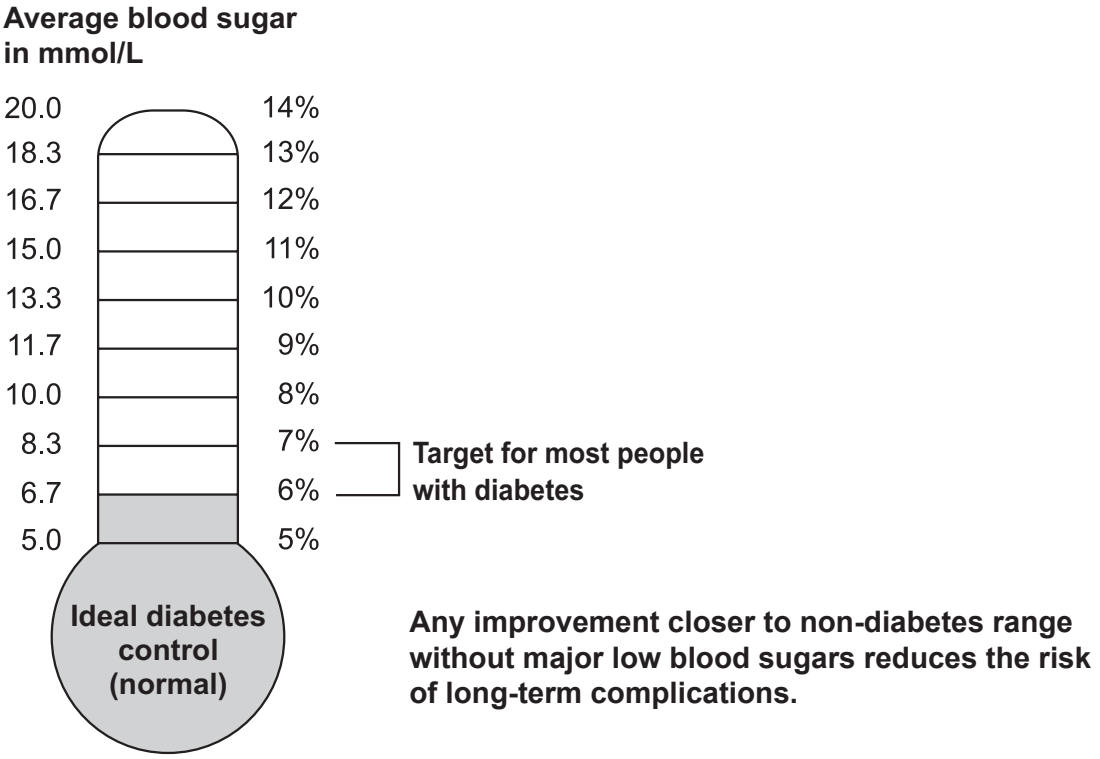
A_1C Testing (Adult)

- A_1C is a blood test that measures your average blood sugar level over the past 2–3 months. It gives you a picture of your overall diabetes control. It is also a predictor of long-term complications.
- A_1C testing should be done every 3–6 months. If you are on insulin or your blood sugars are not in target, it should be done every 3 months.



Recommended Blood Sugar Targets for People with Diabetes*

	A_1C (3 month blood sugar average)	Fasting blood sugar/ blood sugar before meals (at least 3 hours since eating)	Blood sugar 2 hours after eating
Target for most people with diabetes	Less than or equal to 7%	4.0 to 7.0 mmol/L	5.0 to 10.0 mmol/L (5.0 to 8.0 mmol/L if A_1C targets are not being met)

*These blood sugar targets are only a guide. Talk to your doctor about the best blood sugar targets for you.

Alberta Health Services

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