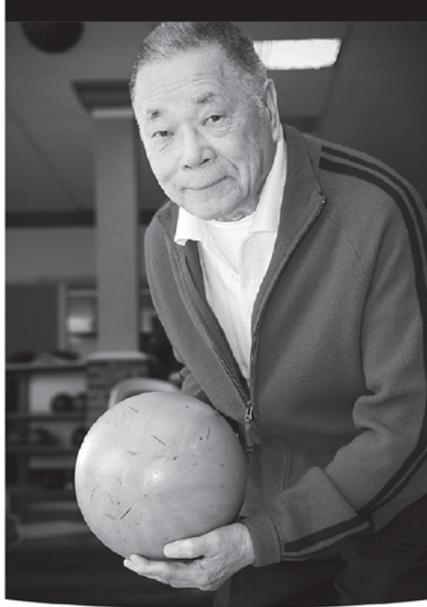


# Diabetes - The Basics



Information to help you  
understand and learn to live  
with diabetes



St. Joseph's  
Healthcare  Hamilton

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In this book we have used the term “health care provider”.

Your health care provider is the person who helps you manage your diabetes.



## What is Diabetes?

- Diabetes is when there is too much sugar in your blood.
- Sugar from food you eat and drink stays in your blood instead of going into the cells in your body.
- The cells in your body cannot use the energy from the food you eat. You may begin to feel run down or tired.



## How does sugar get into your cells?

- Your blood carries the sugar to all parts of your body and insulin helps it get into your cells.
- Insulin works like a key to open the cells to let sugar in. This allows the sugar to be used for energy.
- Insulin is a hormone made by the pancreas.



## Type 1 diabetes

- The pancreas does not make any insulin.
- People with Type 1 diabetes must inject insulin to survive.

## Type 2 diabetes

- The cells in your body cannot use the insulin. This is called insulin resistance.
- The liver sends out too much sugar.
- The pancreas does not make enough insulin.

### Why control Diabetes?

You may:

- have more energy
- feel better
- decrease the risks of complications



### What are my blood sugar targets?

Blood sugar before meals:	4.0 to 7.0 mmol/L
Blood sugar 2 hours after meals:	5.0 to 10.0 mmol/L

Reaching your blood sugar target helps reduce the risk of:

- heart attack
- stroke
- eye disease
- kidney disease
- nerve damage
- amputation



You may help delay or prevent these risks by having good control of your diabetes and seeing your health care provider regularly.

### **Why is testing your blood sugar important?**

- Tells you your blood sugar level.
- Helps you know how food or activity affects your blood sugar level.
- Helps you know if your diabetes medication is working.

### **How often should you test your blood sugar?**

How often you test depends on your treatment plan. There are different types of treatment plans:

- meal planning alone
- meal planning and pills
- meal planning and insulin
- meal planning, pills and insulin

Here are some testing guidelines:

- test at least once a day if you take pills and/or insulin
- vary the times you test such as:
  - when you wake up
  - before any meal
  - 2 hours after a meal
  - at bedtime
- keep a record of your blood sugar
- show and discuss your record with your health care provider

When you write your numbers in a record book, you will know if there are times of the day when your blood sugars go up or down.

## What is low blood sugar (hypoglycemia)?

Low blood sugar is when your blood sugar is less than 4.0 mmol/L. It is also called **hypoglycemia**.

### What causes low blood sugar?

Low blood sugar can be caused by:

- not eating at regular times or missing meals or snacks
- eating less carbohydrates than usual
- doing more exercise or activity than usual
- taking more diabetes medication or insulin than you need
- drinking alcohol

### What happens when your blood sugar is low?

You may have one or more of these symptoms:

- headache
- blurry eyesight
- hunger
- irritability
- sweating
- dizziness
- fast heartbeat
- shaking
- anxiety
- weakness, feeling tired

If you have one or more of these symptoms, test your blood sugar to see if it is **less than 4.0 mmol/L**.

If your blood sugar is **less than 4.0 mmol/L**, you need to treat it right away. If left untreated, your symptoms could get worse and you could pass out.

**If you are not able to test your blood sugar, treat your symptoms right away.**

## How to treat low blood sugar?

### Step 1

- Stop what you are doing.
- Eat or drink 15 grams of fast-acting carbohydrate. Choose one of these:
  - 3 to 6 glucose tablets (depending on brand)
  - 3 teaspoons, cubes or packets of table sugar (may be dissolved in water)
  - 3 teaspoons of honey
  - $\frac{3}{4}$  cup regular pop (not sugar free or diet)
  - $\frac{3}{4}$  cup fruit juice
  - 3 to 6 candies (depending on brand)

### Step 2

- Sit down and rest for 10 to 15 minutes. Check your blood sugar level again.
- If your blood sugar is still less than 4.0 mmol/L or if the symptoms of low blood sugar do not go away, repeat Step 1.



**If you have a low blood sugar just before a meal or snack, treat it as described in Steps 1 and 2 and then have your regularly planned meal or snack and medication.**

If your next meal is more than one hour away, have a snack with a starch and protein such as:

- $\frac{1}{2}$  cup of milk plus 2 plain cookies
- $\frac{1}{2}$  cup of milk with  $\frac{1}{2}$  cup cereal
- 6 crackers with 1 oz cheese
- 1 slice of bread with 1 tablespoon peanut butter or 1 oz meat or cheese

This will help maintain your blood sugar level until your next meal.

## Driving

When you take insulin or some types of pills for diabetes, you are at risk of having a **low blood sugar while driving**. These medications lower your blood sugar quickly.

If you have a low blood sugar while driving, you are a danger to yourself and others.



Your blood sugar should be **over 5.0 mmol/L to drive**.

Remember “Over 5 to Drive”.

If you drive a commercial vehicle, there are different guidelines for your blood sugar level. Please discuss with your health care provider and ask for a copy of “Diabetes and Commercial Driving”.

### What do I need to do before I drive?

**Always test your blood sugar just before driving.**

- If your blood sugar **is over 5.0 mmol/L**, you can drive. Test your blood sugar after every 4 hours of driving.
- If your blood sugar **is 4.0 to 5.0 mmol/L**, eat a snack with carbohydrate, such as cheese and crackers or ½ sandwich to raise your blood sugar over 5.0 mmol/L.
- If your blood sugar **is less than 4.0 mmol/L** or you have one or more of the symptoms of a low blood sugar, you need to raise your blood sugar quickly by doing **Steps 1 and 2** on the next page.

## How to treat a low blood sugar

### Step 1

Eat or drink 15 grams of fast-acting carbohydrate. Choose one of these:

- 4 to 7 glucose tablets (depending on the brand)
- 3 teaspoons, cubes or packets of table sugar (may be dissolved in water)
- 3 teaspoons of honey
- $\frac{3}{4}$  cup of regular pop (not sugar free or diet)
- $\frac{3}{4}$  cup of fruit juice
- 3 to 6 candies (depending on the brand)

### Step 2

Wait 15 minutes. Do not drive. Check your blood sugar again:

- If your blood sugar is still **5.0 mmol/L or less** or your symptoms have not gone away, repeat Step 1.
- If your blood sugar is **over 5.0 mmol/L**, have a snack such as a granola bar, cheese and crackers or  $\frac{1}{2}$  sandwich to keep your blood sugar above 5.0 mmol/L.



**When you treat a low blood sugar, always wait 45 to 60 minutes before you drive.**

**You need this time to fully recover and be able to drive safely.**

## What do I do if I feel a low blood sugar while I am driving?

If you feel that your blood sugar is low:

- pull to the side of the road and stop driving
- remove your keys from the ignition
- test your blood sugar
- treat a low blood sugar by doing Step 1 and Step 2 on page 7
- wait 45 to 60 minutes before driving



## Drive safely

Always wear your medical alert identification.

Keep an “emergency kit” in your vehicle to prevent or treat low blood sugars. This kit should contain:

- glucose tablets
- drinks with sugar such as juice or regular pop
- granola bars
- 2 or 3 plain cookies



Always travel with your blood glucose monitor and testing supplies.

Do not keep your monitor and supplies in the vehicle as they can be affected by hot or cold temperatures.

### **When is it unsafe to drive?**

A person who is likely to have a low blood sugar (hypoglycemia) may not be fit to drive. You may need to test your blood sugar more often if you:

- were recently diagnosed with diabetes and are learning how to use insulin
- are unable to recognize early signs of hypoglycemia
- are not testing your blood sugar regularly or keeping your blood sugar well controlled
- have moderate hypoglycemia (needing others' help) or severe hypoglycemia (needing emergency medical care)



By law, doctors must report anyone they consider to be unfit to drive.

It is important to follow up with your health care provider to review your blood sugar patterns.

## What is high blood sugar (hyperglycemia)?

A high blood sugar level is when the amount of sugar in your blood is higher than your target level.

High blood sugar is also called **hyperglycemia**.

### What causes high blood sugar?

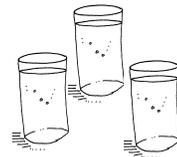
High blood sugar can be caused by:

- missing your diabetes medication
- taking too little diabetes medication
- eating too much, especially foods high in carbohydrates
- being sick or under stress
- side effects from other medications

### What are the signs of high blood sugar?

When your blood sugar level is high, you may:

- be thirsty, have a dry mouth and skin
- urinate more often
- feel tired or weak
- feel hungry or nauseous
- have stomach pains or cramps



People with Type 1 diabetes may also have fruity smelling breath. It may also smell like acetone or nail polish remover.

### **What do I do if I have high blood sugar?**

- Test your blood sugar level every 4 hours.
- Drink sugar free fluids such as water or diet pop.
- If you have Type 2 diabetes, an activity such as walking may help to lower your blood sugar.
- If you have Type 1 diabetes and your blood sugar is above 14.0 mmol/L, then do not do any activity. Check your blood for ketones. See page 12 for more information about ketones.



### **What do I do if my blood sugar remains high?**

- Test your blood sugar more often. Your health care provider will help you decide how often to test.
- Drink more water or other sugar free fluids – as long as you have not been told otherwise by your health care provider.

If your blood sugar remains high, you may need to call your health care provider to:

- adjust your diabetes pills, insulin or both
- adjust your meal plan

## What are ketones?

If you have Type 1 diabetes, ketones develop when your body does not have enough insulin to use sugar for energy. Instead, your body breaks down stored fat for energy and ketones are made as a result.

Ketones can make you very sick. If your blood sugar is high because you are sick, the build up of ketones can make your illness worse.

If you have Type 1 diabetes, you always need to take insulin. When you are sick, you may need to take more insulin and test for ketones more often.

If you have Type 1 diabetes, ask your health care provider about how to test for ketones.

## What do I do when I am sick?

- Take your diabetes medication.
- Eat your usual meals and snacks (if you have snacks), at your usual time if you can.
- Test your blood sugar level at least every 4 hours.
- Talk to your health care provider about how to deal with sick days.



### What if I am too sick to eat?

If you are unable to eat your usual meals and snack(s), have one of these every hour:

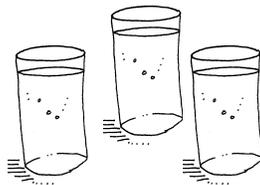
- ½ cup juice
- ½ cup regular pop
- ½ cup regular Jell-O
- 1 whole popsicle



You may need to test your blood sugar more often.

Drink lots of sugar free fluids such as:

- water
- clear broth
- tea
- diet pop



## Why be active?

### Activity:

- helps control your blood sugars
- helps control your weight
- improves your circulation
- strengthens your heart muscle
- helps to control stress



Activity can also help some people manage stress. Being active is important especially when you have diabetes.

### Suggestions for activity:

- walking
- swimming
- tai chi/yoga
- dancing
- exercise class
- gardening
- housework
- other \_\_\_\_\_



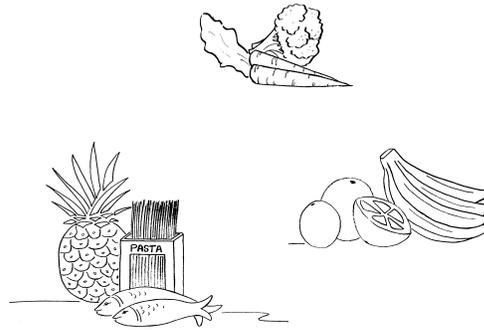
### How much activity?

- Check with your doctor before starting any activity.
- Start slowly.
- Aim for 30 minutes of activity a day, 5 times a week.

## Healthy eating

Healthy eating helps you:

- get better control of blood sugars
- use insulin better
- keep a healthy weight
- have more energy



The Canadian Diabetes Association recommends that all people with diabetes receive advice about nutrition from a Registered Dietitian.

Ask your health care provider to refer you to a Registered Dietitian.

When you eat food, it breaks down into:

- carbohydrates
- protein
- fat

Carbohydrates break down into sugar in your body.

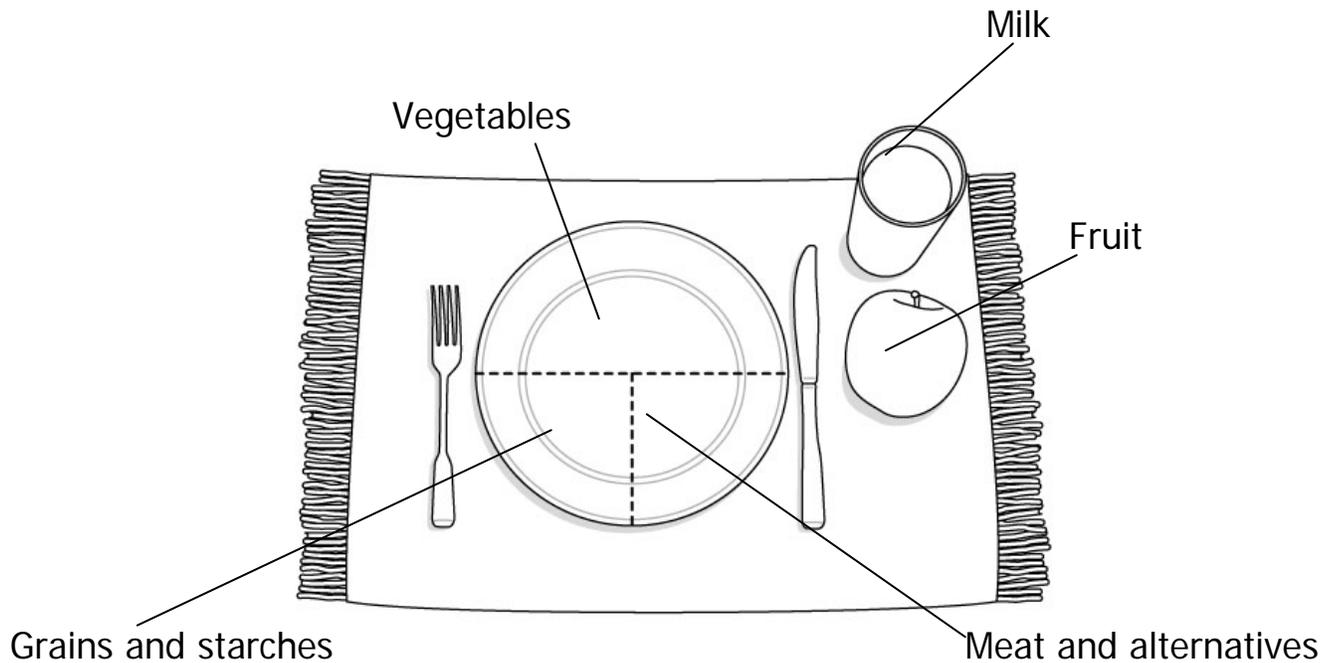
**When do I need to eat?**

- Eat at regular times to help control your blood sugar levels.
- Space meals 4 to 6 hours apart.
- Eat 3 meals a day. Some people may benefit from including a healthy snack.

### What do healthy servings look like?

Before you put food on your plate, in your mind divide your plate into 3 parts:

- Make  $\frac{1}{2}$  of your plate vegetables. Vegetables contain fibre, plenty of vitamins and minerals, and are low in calories.
- Make  $\frac{1}{4}$  of your plate grains and starches such as rice, noodles, potatoes, peas, beans or lentils.
- Make  $\frac{1}{4}$  of your plate meat and alternatives such as fish, lean meats, low fat cheeses, eggs or tofu.
- Have a glass of milk and a piece of fruit to complete your meal.



## What foods have carbohydrates?

Foods that have carbohydrates are:

- Grains and starches:
  - breads
  - cereals
  - potato
  - rice
  - corn
  - legumes, such as kidney beans, chick peas or lentils
- Fruit and some vegetables
- Milk and milk alternatives
- Sweets and sugars



Carbohydrates are also called “carbs”.

## How do I eat more fibre?

Choose high fibre foods such as:

- whole grain breads and cereals
- kidney beans and lentils
- brown rice
- fruit and vegetables



Foods high in fibre:

- help you feel full longer
- slow down how fast the food is digested or broken down
- slow down the rise of your blood sugar
- keep your bowels regular

**Foods without carbohydrate that will not affect your blood sugar**

Food Group	What is the size of one serving?
<p><b>Meat and Alternatives:</b>                      Cheese, part skim                      Chicken                      Eggs                      Fish                      Meat, lean                      Peanut butter                      Turkey</p> <ul style="list-style-type: none"> <li>• Make lower fat choices.</li> <li>• Prepare with no or small amounts of added fat.</li> <li>• Avoid fried foods.</li> <li>• Remove skin off of chicken or turkey.</li> <li>• Trim visible fat from meat.</li> </ul>	<p>Choose servings up to the size of the palm of your hand and the thickness of your little finger.</p>
<p><b>Fats and Oils:</b>                      Margarine, non-hydrogenated                      Nuts                      Oils                      Salad dressings, low fat</p>	<p>Choose servings equal to the size of the tip of your thumb.</p>
<p><b>Vegetables:</b>                      All</p>	<p>Choose as much as you can hold in both hands.</p>
<p><b>Extras:</b>                      Artificial sweeteners                      Coffee                      Diet pop                      Herbs and spices                      Soft drinks, sugar free (diet pop)                      Sugar free drinks (Crystal Light drink mix)                      Sugar free gelatin (Jello)                      Tea                      Vinegar                      Water</p>	<p>Have as desired.</p>

Pictures reprinted with permission from the Canadian Diabetes Association.

**Foods with carbohydrates that will affect your blood sugar**

Food Group	What is the size of one serving?
<p><b>Grains and Starches:</b>                      Beans, baked                      Bread, buns                      Cereal, hot and cold                      Corn                      Crackers                      English muffin                      Legumes (peas, beans and lentils)                      Pasta                      Pizza                      Popcorn                      Potato                      Rice                      Soup</p>	<p>Choose an amount up to the size of a small fist or a tennis ball.</p>
<p><b>Fruit:</b>                      Apple                      Banana                      Blueberries                      Cantaloupe                      Grapes                      Grapefruit                      Juice                      Orange                      Peach                      Pear                      Strawberries                      Watermelon</p>	<p>Choose an amount up to the size of a small fist or a tennis ball.</p>
<p><b>Milk and Alternatives:</b>                      Milk                      Soy beverage (unflavoured)                      Pudding, no sugar added                      Yogurt, fruit, plain or no sugar added</p>	<p style="text-align: center;">                       1 cup                 </p>
<p><b>Other Choices                      (have once in a while):</b>                      Chocolate bar (45 gram) .....½                      Cake or pie.....½ small slice                      Cookies .....2                      Granola bar .....1                      Ice cream .....1/2 cup                      Popsicle .....1                      Potato chips .....15                      Pretzel sticks.....30                      Sugar, honey, syrup .....1 tsp</p>	<p>Servings as listed.</p>

## Caring for yourself

Here is list of target levels for tests that are common for people with diabetes. Work with your health care team to find the best way to reach your target levels. Talk to your health care team if you have questions about your test results.

Test	Target Level	When to test
<b>A</b>		
A1C (blood test)	Less than 7%	Every 3 months
Albumin creatinine ratio (urine test)	Men: Less than 2.0 Women: Less than 2.8	Once a year
<b>B</b>		
Blood pressure	130/80 or under	Every visit
Blood sugar (glucose)	4.0 to 7.0	Before meals
	5.0 to 10.0	2 hours after meals
Blood and urine tests for kidneys	These tests are ordered by your health care team based on your needs.	
<b>C</b>		
Cholesterol: Total	Less than 4.2	Once a year
Cholesterol: LDL (Bad)	Less than 2.0	Once a year
Cholesterol: HDL (Good)	Greater than 1.3	Once a year
Cholesterol: Total to HDL ratio	Less than 4.0	Once a year
Cholesterol: Triglycerides	Less than 1.5	Once a year

## Other tests

Test	When to Test
<b>D</b> Dental	See your dentist once a year.
<b>E</b> Eyes	Have a dilated eye examination once a year, or more often if needed. This annual exam is covered by the Ontario Ministry of Health.
<b>F</b> Feet	Check your feet daily. Have your health care team check your feet at every visit.

## How can I take part in my care?

Keeping track of your progress is a good way to take part in your care:

1. Record your blood sugar results in a log book. Ask your health care provider or pharmacist for a log book. You can also call the phone number on the back of your meter to request a log book.
2. Record your lab results in the Diabetes Passport. Ask your health care provider or pharmacist for a copy of the Diabetes Passport. You can also print a copy at [www.serviceontario.ca](http://www.serviceontario.ca)
3. Bring your log book and Diabetes Passport to each visit with your health care provider.

## Smoking

### How does smoking affect my diabetes?

People who have diabetes **and** smoke are more likely to have a heart attack or stroke than people who have diabetes and do not smoke.

For support or help to stay smoke-free:

- talk to your health care provider
- contact Smokers' Helpline toll free at 1-877-513-5333 or [www.smokershelpline.ca](http://www.smokershelpline.ca)



## Alcohol

- Alcohol can cause a low blood sugar if taken with some medications. You may need to limit or avoid alcohol.
- Alcohol is high in calories and can increase your weight.
- Always have food when drinking alcohol.
- Drink in moderation. This means, no more than 1 or 2 drinks a day. One drink is 5 ounces (150 ml) dry wine or 1 ½ ounces (45 ml) liquor or 1 bottle of beer.
- Avoid sweetened mixes, liqueurs, coolers, sweet wine and tonic water.
- Choose sugar free pop, club soda or water for mixes.



Talk to your health care provider before drinking alcohol.

## Medical alert identification

Always wear medical alert identification.

Ask your health care provider or pharmacist for a medical alert identification form or you can pick up a form at your local pharmacy.



## Foot care



### Do:

- ✓ Check your feet every day:
  - Check for breaks in the skin, blisters, bruises, infections, dry skin and calluses.
  - Look at the top and bottom of each foot and between the toes.
  - Look for changes in colour.
  - Feel for changes in temperature.

If you have trouble seeing your feet, ask a family member or friend to check your feet for you.

- ✓ Wash your feet with mild soap and warm water. Before you wash, check the temperature of the water, so it does not burn your feet.
- ✓ Check the inside of your shoes for sharp or hidden objects before wearing.
- ✓ Buy shoes late in the day.

**Do not:**

- × Cut your own corns or calluses – this may cause an open area and lead to an infection.
- × Treat your own ingrown toenails.
- × Walk barefoot – you may step on something sharp or burn the soles of your feet on hot asphalt.
- × Apply heat to your feet – poor circulation may prevent you to from recognizing a dangerous temperature.

Contact your health care provider right away if you have:

- a blister, sore or crack in your skin
- swelling, pain or redness
- any concerns about your feet

## **How often should I see my health care providers?**

Regular follow up with your health care providers is important. With regular appointments any problems can be caught early and treated sooner. In general, try to see your health care providers every 3 to 4 months. If you are having problems you may need to see them more often.

Ask for more information about:

- coping with diabetes
- preventing complications
- foot care
- physical activity for Type 1 or Type 2 diabetes
- community resources

## Need more information?

- **Canadian Diabetes Association:** [www.diabetes.ca](http://www.diabetes.ca)  
Local office: 1685 Main St. West Hamilton  
Phone: 905-528-1263 or 1-866-429-3681
- **Bookstores and websites**  
Hamilton Health Sciences: [www.hhsc.ca](http://www.hhsc.ca)  
St. Joseph's Healthcare Hamilton: [www.stjosham.on.ca](http://www.stjosham.on.ca)  
Chapters: [www.chapters.indigo.ca](http://www.chapters.indigo.ca)  
The Diabetes Mall: [www.diabetesnet.com](http://www.diabetesnet.com)  
Diabetes Express: [www.diabetesexpress.ca](http://www.diabetesexpress.ca)  
American Diabetes Association: [www.diabetes.org](http://www.diabetes.org)
- **Public Library**
- **Your local pharmacy** – Ask if your pharmacy takes part in the Canadian Diabetes Program. This program offers diabetes information, cookbooks and supplies. It also ensures pharmacy staff are trained to help answer your questions about diabetes.

Metric and Imperial Sizes	
250 ml	= 1 cup
175 ml	= 3/4 cup
125 ml	= 1/2 cup
60 ml	= 1/4 cup
15 ml	= 1 tablespoon (tbsp.)
5 ml	= 1 teaspoon (tsp.)

