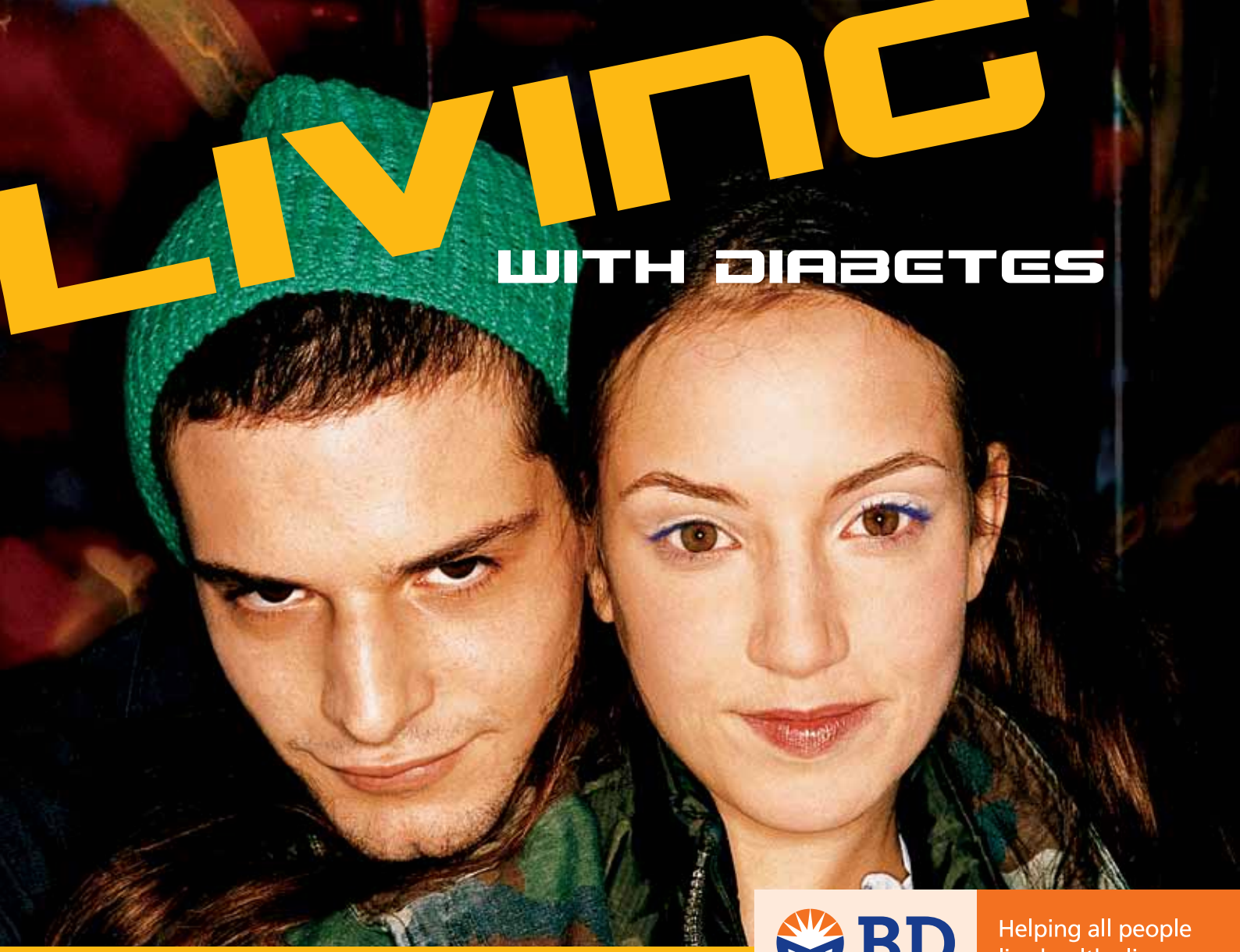
LIVING WITH DIABETES



BD

Helping all people live healthy lives

A ‘how to’ guide to injecting insulin

CHILL

together, we'll sort this out

You're reading this booklet because you need to start injecting insulin.

Sure: it's a bit of a pain. But, we'll sort this out together.

Around 650,000 people in Canada inject to manage their diabetes[1] including kids and teens at school and college. Guys and girls at university or work. People like you.

Injecting isn't difficult. It's easy to learn. It's quick and more comfortable than you would think.

It's about getting yourself in to a good, regular routine.

This simple guide explains how to get started.

Along with advice from your Doctor or Diabetes Educator, this booklet will help.

VIP

Very Important Points!
This booklet contains lots of important stuff about diabetes. Look out for the VIP button… we've used it to tell you something extra-important!

Contents

Diabetes. THE BASICS

Why do I need insulin?

You have diabetes because your pancreas, an organ close to your stomach, doesn't make enough of the hormone insulin.

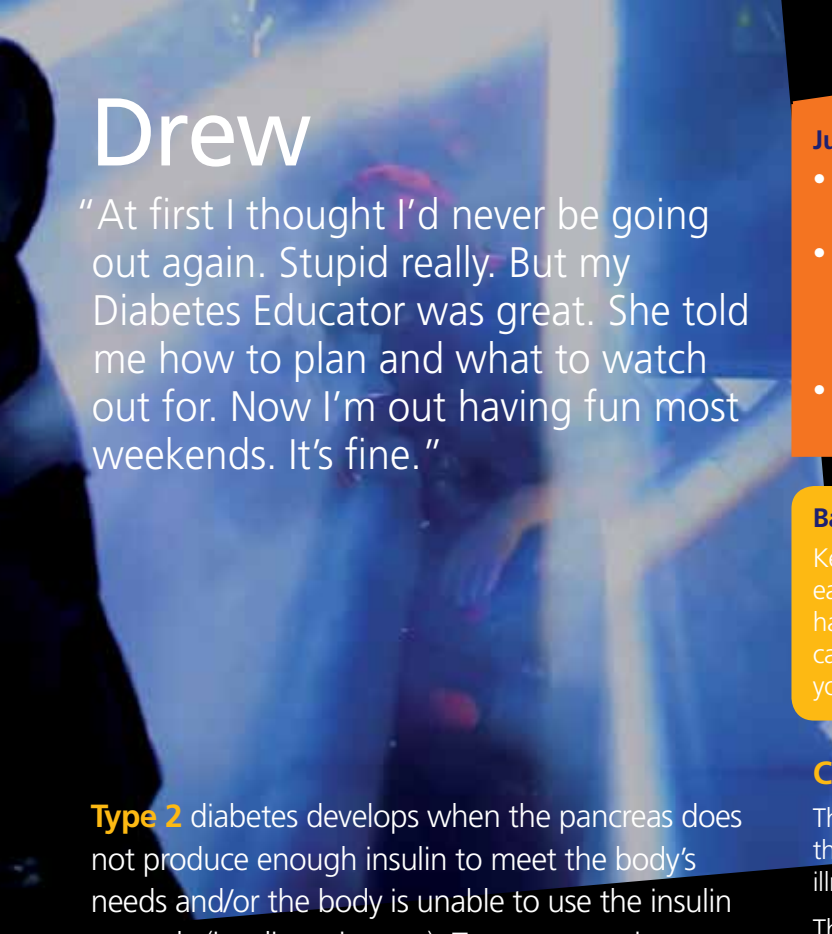
When carbohydrate containing food (e.g. bread, potato, rice, pasta, milk, fruit) is digested, it breaks down into sugar and enters your bloodstream. Insulin helps move the sugar out of the blood and into the cells where it is used to produce the energy your body needs to function properly. Insulin is really important. Without insulin, the sugar stays in the blood, building up and causing you to have hyperglycemia (too much sugar in the blood). By injecting insulin, you will let the sugar enter your body's cells again.

With the right amount of insulin, you will begin to feel much better.

Types of diabetes
There are two main types of diabetes

Type 1 diabetes develops when the pancreas stops making insulin. You will need insulin injections every day. Eating healthy and staying active are also recommended.

Although no one completely knows why, the body's own defence system attacks and destroys the cells making insulin. It generally develops before the age of 40 and especially in childhood. 10% of all people with diabetes have Type 1 diabetes[1].



Drew

"At first I thought I'd never be going out again. Stupid really. But my Diabetes Educator was great. She told me how to plan and what to watch out for. Now I'm out having fun most weekends. It's fine."

Type 2 diabetes develops when the pancreas does not produce enough insulin to meet the body's needs and/or the body is unable to use the insulin properly (insulin resistance). Treatment options include a combination of a healthier diet, increased physical activity and diabetes medication like oral medication and/or injectable drugs like insulin or GLP-1 receptor agonists.

Type 2 diabetes usually occurs later in life and is usually linked to family history. Lifestyle plays a big role. Certain ethnic groups are also more susceptible than others to developing diabetes.

It's the most common form of diabetes affecting 90-95% of all people with diabetes within the Canada[1].

Just so we're clear

- Injecting insulin helps to manage diabetes; it doesn't cure it.
- Diabetes is a lifelong condition that will likely change over time. Staying connected with your diabetes team will ensure that you are always on the best treatment for your condition.
- You're the best person to learn how to care for your diabetes on a day to day basis.

Balancing act

Keep in mind that healthy eating for diabetes is healthy eating! Just because you have to inject, doesn't mean you have to give up the foods you enjoy. A Diabetes Educator can give you tips on how you can make changes that match your diabetes treatment and your lifestyle.

Controlling diabetes

The sugar level in your bloodstream varies constantly throughout the day. Food, exercise, stress, medication and illness will each have an impact on your blood sugar.

That's why it's important to:

1. Eat healthy, well balanced meals spaced throughout the day.
2. Stay active.
3. Take your insulin, as prescribed.
4. Monitor your blood sugar to understand how you are doing.
5. Recognize when things don't feel quite right and know what to do.

Day-to-day. What does it all mean?

Your diabetes diagnosis means that there are some immediate changes you need to make. In addition to injecting insulin, you'll have to monitor your blood sugar and learn about new ways to count the food that you eat. You'll also have to be more aware of your level of physical activity and plan accordingly.

Driving and learning to drive

You will not have a problem obtaining or maintaining your license if you properly manage your diabetes and are able to recognize and treat the early symptoms of a low blood sugar. You do have to tell the motor vehicle licensing authority and your insurer that you have diabetes.

Going out, parties and clubbing

Want to go out and have a good time? What young person doesn't? Go right ahead.

You'll just need to plan ahead. Dancing, for instance, is great exercise – so it rapidly uses up sugar. You need to test your blood sugar level before you go out and, ideally, again half way through the night. That way you can keep it at the right level by eating something if it's too low, or using insulin if it's too high.

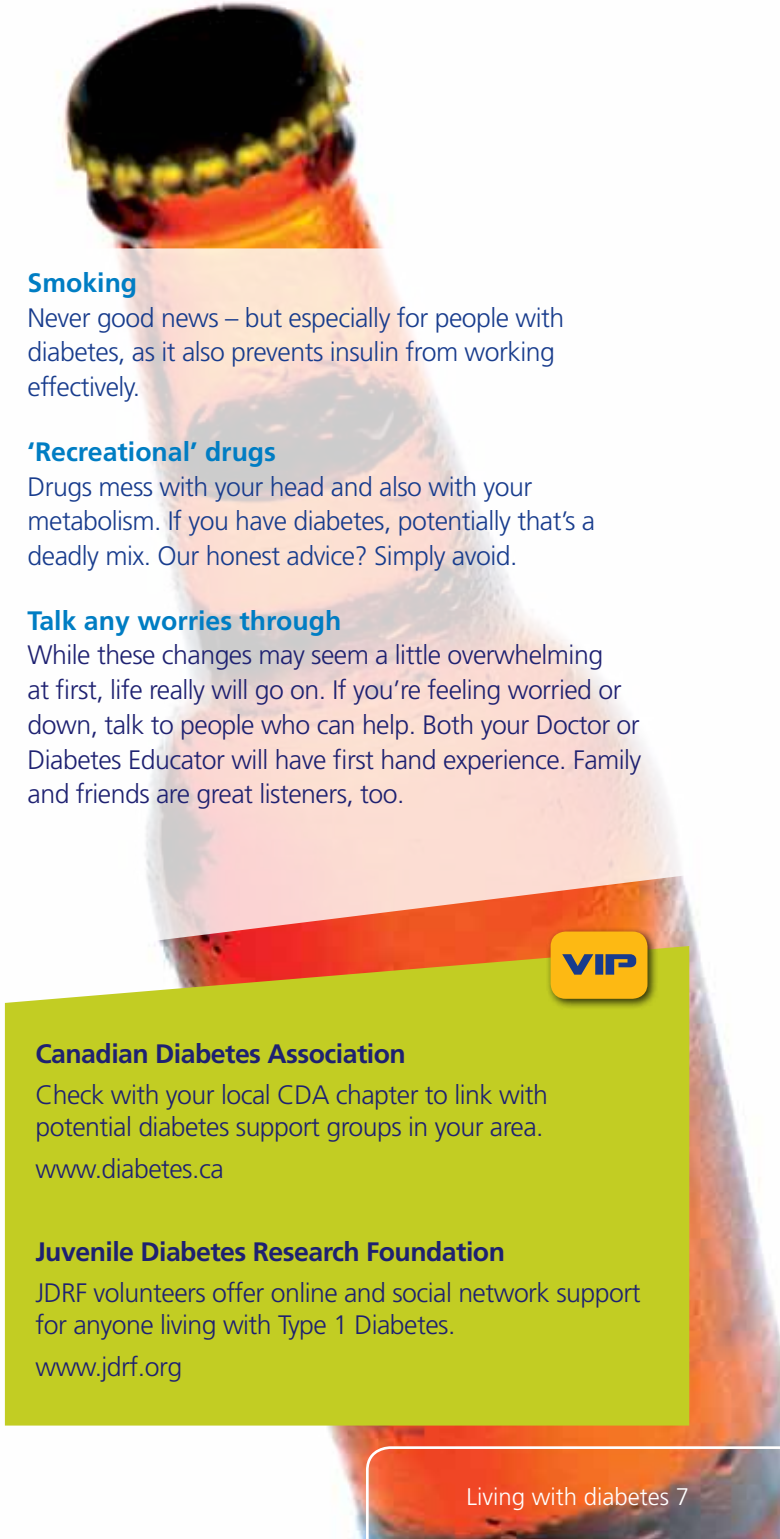
Sport and exercise

Physical activity is good for everyone, whether you have diabetes or not! Keep in mind that physical activity will affect your blood sugar and your insulin needs. Aim to test your blood sugar before and after your activity. You may notice trends that can help you and your Diabetes Educator develop a plan of action for (i.e. eating more carbohydrates or taking less insulin).

Drinking and alcohol

If you're legally old enough to drink, you're old enough to do it sensibly. People with diabetes can enjoy alcohol in moderation – just like everyone else! Keep in mind that the effects of alcohol can dramatically lower your blood sugar level. That's why it's important to:

- Eat normal meals. Don't drink on an empty stomach
- Consume coolers, liqueurs and beer wisely. They are high in sugar
- Take ID and be sure your friends know you have diabetes. Low blood glucose (a 'hypo' – see page 21) is serious and may be mistaken for drunken behaviour
- Test your blood sugar level and eat a snack before bed
- Just be safe, set your alarm clock to wake you for a quick blood sugar check in the morning.



Smoking

Never good news – but especially for people with diabetes, as it also prevents insulin from working effectively.

'Recreational' drugs

Drugs mess with your head and also with your metabolism. If you have diabetes, potentially that's a deadly mix. Our honest advice? Simply avoid.

Talk any worries through

While these changes may seem a little overwhelming at first, life really will go on. If you're feeling worried or down, talk to people who can help. Both your Doctor or Diabetes Educator will have first hand experience. Family and friends are great listeners, too.

VIP

Canadian Diabetes Association

Check with your local CDA chapter to link with potential diabetes support groups in your area.

www.diabetes.ca

Juvenile Diabetes Research Foundation

JDRF volunteers offer online and social network support for anyone living with Type 1 Diabetes.

www.jdrf.org

Monitoring blood sugar.

KNOWING WHERE YOU STAND.

The only way you will really understand how you are doing on a day to day basis is to monitor your blood sugar, as advised by your Doctor or Diabetes Educator. You may be told to test before meals, 2 hours after eating and/or before bed.

In order to stay healthy, your blood sugar should be within normal limits. The Canadian Diabetes Association's 2008 Clinical Practice Guidelines[2] recommends the following targets for most teens with Type 1 Diabetes:

How to test your blood sugar level*

1. Wash your hands with luke warm water and soap, rinse and dry them.
2. Insert a test strip into your meter.
3. Drop your arm to your side and shake it gently to get the blood flowing to your fingertips.
4. Using a lancing device, prick the side of your finger, it's less sensitive than the pad of your finger.
5. Test immediately after you have formed a small drop of blood.
6. Touch the tip of the test strip to the drop of blood. The blood is drawn into the test strip tip.
7. Hold the tip of the test strip in the blood drop until the meter beeps.
8. Depending on your meter, you may have options to select "before meal", "after meal" or set reminders.
9. Record your reading in a log book or plan to download the data from your meter to review with your Doctor or Diabetes Educator.

* Refer to the instructions of the meter manufacturer

	A1C (3 month average of your blood sugars)	**Fasting or "pre-meal" Blood Sugar**	**Blood Sugar** (2 hours after eating)
Type 1 Diabetes	**≤ 7.0%**	**4-7 mmol/L**	**5-10 mmol/L**

VIP

Your blood sugar level can fluctuate throughout the day – don't worry it's pretty normal. Your Doctor or Diabetes Educator will help you deal with this to make sure that your sugar levels remain balanced.

Injecting.
It's easier than you think.

Most people with diabetes use a pen device to inject. Pens offer an easy way to deliver an exact dose.

VIP! **BD pen needles offer universal fit with all insulin pens in Canada[1].**

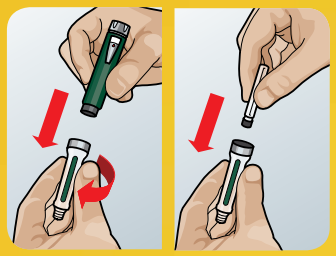
The pen can either be reusable, using a cartridge that needs to be replaced when empty, or disposable, pre-filled with insulin and then disposed of when empty. To use a pen, you need to attach a new sterile single-use needle every time you inject.

Using a pen

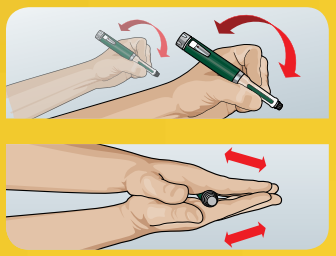
These are general guidelines common to all pen devices, but your Diabetes Educator will show you how to use your pen.

Take time to read your pen's instruction sheet too.

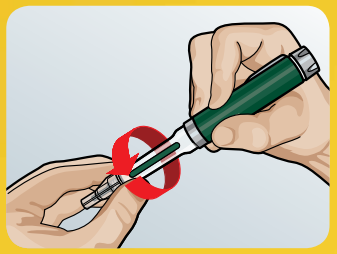
Before you begin, your Doctor or Diabetes Educator will recommend a pen needle. They come in a range of sizes. The 4mm pen needle is the shortest available. It offers a safe, one-handed injection experience for all people with diabetes[1].



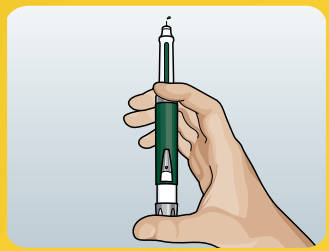
1. Pull off the cap of the pen. If your pen needs a cartridge, remove the cartridge holder from the pen. Put an insulin cartridge into the holder. Reattach the holder to the pen.



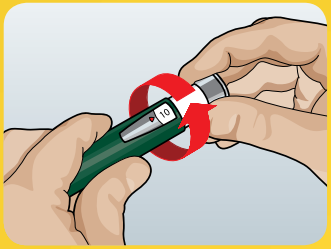
2. If the insulin is cloudy, gently rock the pen 10 times and roll it between the palms of your hands 10 times to mix it.



3. Screw on a **NEW** needle before each injection. Remove the outer cap of the needle, then the inner cap.



4. Before each injection, check to ensure that the pen is working. Set the dial to 2 units. With the pen pointing upwards slowly press the button. Drops should appear at the needle tip. If not, dial another 2 units, and press the button again until you see the drops.



5. Set the dose that has been prescribed for you.

Now, you are ready to inject.

Using a syringe
If you've been told to use a syringe, follow the instructions given by your Diabetes Educator.

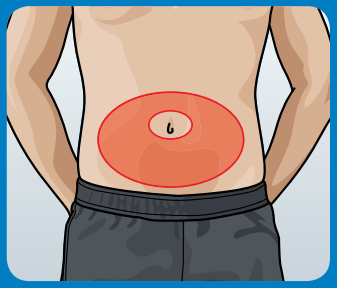
Injecting correctly.
The best sites, the best way.

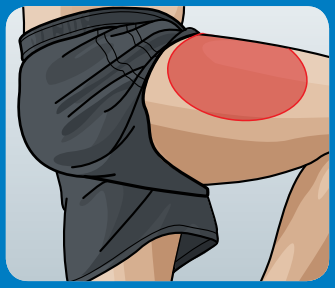
Choosing areas for injections

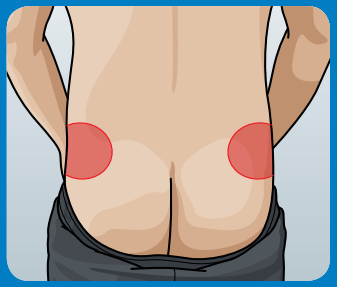
There are four areas on your body that are generally used for injecting: abdomen, thighs, buttocks and arms.

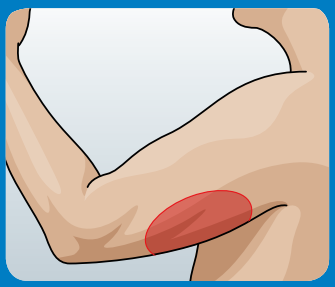
You need to be able to reach them easily, and be comfortable making your injection. Proper injection into the back of your own arm can be a challenge.

Talk to your Doctor or Diabetes Educator about the sites that are best for you.









Jack

"Most people at University are really good about it. My friends look out for me, and know what to do if I'm sick. My profs are cool too."

VIP

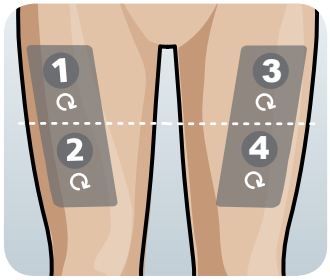
The speed of insulin absorption varies from site to site. So it's important to develop a pattern where you are injecting into the same area at the same time of day. Doing this also helps to control your blood sugar levels.

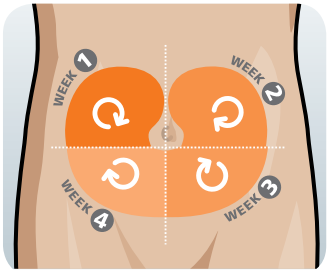
Rule 1:

Rotate between injection sites

For your insulin to be absorbed properly it is important to discuss a structured rotation plan with your Doctor or Diabetes Educator.

For example, divide the injection site into quadrants or halves (if using your thigh or buttocks). Use a different quadrant each week and then rotate clockwise.

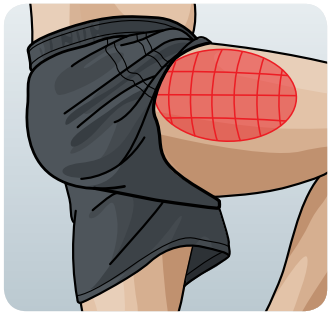




Rule 2:

Rotate within injection sites (i.e. don't inject in exactly the same point each time)

When it's time to inject again, choose a different spot within the site. If you imagine a grid drawn on the skin, you're aiming to move a finger's width from the last injection point.

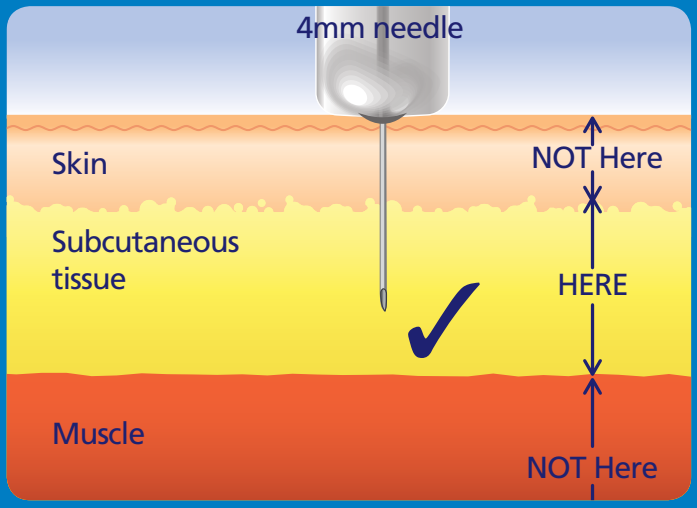


Rotation grids

Placing these grids over your injection sites will help you rotate your injections, making sure that you don't always inject in the same place each time.

INJECTING CORRECTLY

The science.



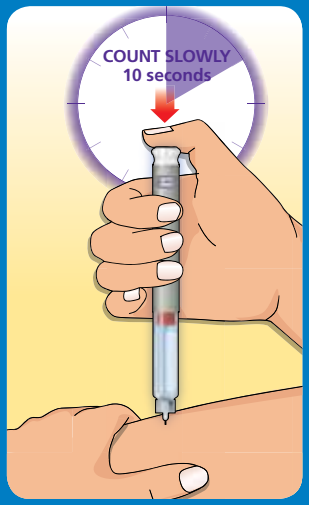
The body is covered with skin. Underneath the skin there's a layer of fat (subcutaneous tissue). Below that is a layer of muscle.

Average skin thickness ranges from 1.8 - 2.5mm within the four most common injection sites[1].

To be absorbed properly, the dose needs to be injected into the subcutaneous tissue just under the skin. If the needle goes deeper, the dose may go into the muscle.

An injection into your muscle will likely hurt and speed up your insulin absorption which can cause a low blood sugar.

One-handed technique for 4mm pen needle.



For a 4mm needle:

1. With your pen prepared, push the needle all the way into the skin at a 90° angle. Inject your insulin.
2. Keep the needle in for at least 10 seconds* after the dial has returned to zero to make sure that you get your full dose.
3. Take the needle out slowly.
4. Recap the needle and place it in a sharps collector for safe disposal.

*Or refer to the instructions of the pen manufacturer

VIP

Insulin storage†

Keep the insulin that you are using at room temperature for up to 28 days – injecting cold insulin may be painful.

Keep your remaining unopened cartridges in the refrigerator until you are ready to load it into your pen.

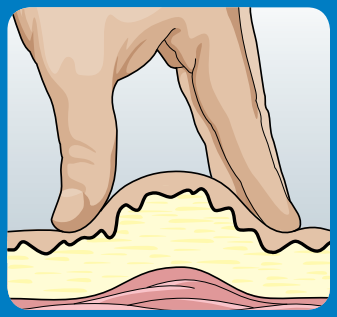
Always check the expiry date before using.

†Refer to the manufacturers instructions for specific storage details

Ensuring the right technique.

Skin lift technique for longer needles.

If you are using a needle longer than 4mm you may have to lift the skin, as advised by your Doctor or Diabetes Educator.



1. In a suitable area take a fold of skin between the thumb, index and middle finger. Only lift the skin NOT the muscle below it.

2. With your pen prepared, push the needle all the way into the skin at the peak of the fold at a 90° angle. Inject your insulin.
3. Keep the needle in for at least 10 seconds* after the dial has returned to zero to make sure that you get your full dose.

*Or refer to the instructions of the pen manufacturer

4. The grip on the skin should be maintained throughout the injection.
5. Take the needle out slowly, releasing the skin at the same time.
6. Recap the needle and place it in a sharps collector for safe disposal.

VIP!

Safe, secure needle disposal

You'll need to dispose of used needles responsibly.

A 'sharps collector' is a special clearly labelled container designed to keep discarded needles safe.

Follow local guidelines for safe disposal.

Preventing LIPOS

Using sites correctly.

It's very important to avoid re-injecting in the same place within a site. If you do, the tissue underneath may start to harden.

Over time, these can form unsightly lumps – a condition called lipohypertrophy.

You'll sometimes hear these lumps called 'lipos' for short.

Lipos prevent the injected insulin from working properly. Insulin gets absorbed erratically affecting your blood sugar control.

VIP

Avoid lipos!

No one wants to get lipos so make sure you inject properly, change sites and only use your needle once.

How are lipos treated?

Most importantly, to reduce in size, the lipo tissue needs to recover. Avoid injecting into the lipo area and remember to recognize, rotate and replace!

recognize

Talk to your Doctor or Diabetes Educator if you see or feel a lipo developing.

rotate

Rotate between injection sites and rotate within your injection sites.

replace

Use a new needle every time you inject.

Do these things and you greatly improve your chances of avoiding lipos. And not only will that make you feel great, but you will look great too!

Nat

"I don't really need to think about it… definitely don't want to end up with ugly lumps and bumps!!"

SHARP THINKING

Every time you inject, you should use a new needle. Don't leave the old one attached on your pen device to use it again. Take it off and dispose of it properly.

When it comes to needles, sharp thinking makes sense. Here's why...

New needle at x370 magnification*

Reused needle at x370 magnification*

*Photographs from Dieter Look and Kenneth Strauss: "Nadeln mehrfach verwenden?" Diabetes Journal 1998, 10:S.31-34

...blunt needles hurt!

A new needle is sharp and enters the skin easily. But if you use it more than once, the end becomes blunt. Injections will hurt.

...the drug can leak. Air bubbles can get in.

Leaving a needle attached to a pen device between injections means air bubbles can get in. The drug may also leak out. This can prevent you from delivering the correct dose or mixture.

...needles can clog between injections.

Insulin can form crystals in the needle. It may get blocked.

...blunt needles may cause lipos.

If the tip of the needle isn't sharp, there's an increased risk of lipos forming where you inject.

...new needles are sterile.

Each time a new needle is opened it's sterile. That means there is no bacteria present when you use it.

replace

Did you know: If you leave your needle attached to your pen, your body might only be getting 37% of the required dose of insulin[4].

VIP

Remember:
NEVER miss your insulin injection

FEELING ODD!

Too little or too much blood sugar.

It's tricky: your metabolism is constantly changing depending on your treatment, what you're doing (e.g. exercise), what you've eaten or drank – and how long ago.

Your blood sugar shouldn't get too high. If it does, you'll have hyperglycemia (high blood sugar). Equally though, it shouldn't fall too low. If it does you'll have hypoglycemia (low blood sugar).

When this happens, you need to be able to recognize what's wrong and know what to do.

Hypoglycemia – a 'hypo'.

Hypoglycemia, or having a "hypo", happens when the level of sugar in the blood is less than 4.0mmol/L.

Watch out for:

- Excessive sweating
- Faintness
- Paleness
- Headache
- Tingling lips
- Pounding of heart
- Anxiety
- Blurred vision
- Hunger
- Irritability/confusion
- Lack of concentration
- Personality change
- Difficulty awakening
- Shaking

What to do[2]:

- Test your blood sugar to confirm that you are low. If you do not have your meter with you, it is still safer to treat.
- Take 15 g of carbohydrate. Examples include: glucose tabs (3-4), 3 teaspoons or 3 packets of table sugar dissolved in water, 3/4 cup of juice or regular pop, 6 Life Savers (chew them up) or 1 tablespoon of honey.
- After 15 minutes, retest your blood sugar. If it is still low (<4.0mmol/L) you will need to treat with another 15 g of carbohydrate.
- When your blood sugar is >4.0mmol/L, you will need to have a meal or snack that includes at least 15g of carbohydrate and a source of protein (e.g. 1/2 sandwich or 1oz of cheese with 6 soda crackers).
- Record the event in your log book and consider why or how it happened so that you can prevent it from occurring again (see causes below).
- If unconscious:
  - someone should call 911
  - fluid should not be given to you
  - an injection of glucagon can be given by a support person
- For safety, you should wait at least 45 minutes following a low blood sugar event before driving.

Causes:

- Too much insulin
- Unusual amount of exercise
- Stress
- Not enough food
- Delayed meal
- Hot weather

Hyperglycemia – a 'hyper'.

Hyperglycemia happens when the level of sugar in the blood is too high. Levels may rise at times, this is normal. Severe hyperglycemia could be dangerous if left untreated.

Watch out for:

- Increased thirst
- Frequent urination
- Feeling drowsy or tired
- Loss of appetite
- Weakness
- General aches
- Heavy breathing
- Nausea and vomiting*
- Abdominal pain*
- Fruity smelling breath*

What to do[2]:

- Test your blood sugars more regularly.
- If you are able to swallow, drink sugar-free fluids or water to stay hydrated.
- Depending on your diabetes regimen, you may need a supplemental dose of fast acting insulin. Discuss this option with your Doctor or Diabetes Educator.
- If your blood sugar is >14.0mmol/L and you are feeling sick*, test for blood ketones[3].
  - If your blood ketones are greater than 0.6 mmol/L, follow the sick day advice that was provided by your Doctor or Diabetes Educator.
  - If your blood ketones are greater than 1.5 mmol/L, you are at risk of diabetic ketoacidosis (DKA). If left untreated, DKA can be life threatening. Immediately contact your Doctor or Diabetes Educator or go to the nearest emergency department.
  - If unconscious, someone should call 911.

Causes:

- Too little or no insulin
- Emotional stress
- Eating more carbohydrates than your diet allows for
- Infection, fever
- Less exercise than usual

If you fall unconscious…

Your friends and relatives need to be able to recognize the symptoms of hypoglycemia and know how to treat it in case of emergency. If need be, they should know how to give an injection of glucagon which releases stored body sugar into the blood.

Getting life SORT

Beyond the next 3 months.

The next couple of months will seem very different. A diabetes diagnosis means adjusting to new routines and learning to plan ahead.

It's only natural to feel anxious or worried.

But by taking each day at a time, as others will tell you, you'll find what works for you.

Trust us: soon, life will get back to normal.

"About a week after I got the diagnosis, I met a friend of my younger sister. She'd had diabetes for 2 years and had been injecting since she was 8 – but she just took it all in her stride. That's when I realized if she'd coped ok since 8, so could I at 18."

ED

"My friends kept asking if I'd still be fit enough to train. I think they thought I'd just flake out. Once they saw I could still hold my own, they were fine. Scoring my first goal this season felt really good."

"When they explained about lipos, I freaked. I was terrified I'd mess up my injections. It took a couple of weeks to get really confident, but now I'm ok. I always know where I'm injecting next."

Useful information.
Facts, resources, help.

BD Diabetes Care
Practical advice and resources.
www.BDDiabetes.ca

Canadian Diabetes Association
www.diabetes.ca
1.800.BANTING

Diabetes Québec
www.diabete.qc.ca
1.800.361.3504

Provides support and resources for people living with diabetes.

VIP!

MedicAlert

For your safety and peace of mind, consider MedicAlert. A MedicAlert ID instantly alerts emergency responders of your condition, which could help save your life.

www.medicalert.ca
1.800.668.1507

Remember! You're not alone.
One of the best ways of finding out more about diabetes is to talk to other teens that have diabetes. Your Diabetes Educator will be able to help your get in touch with others if you want to.

Juvenile Diabetes Research Foundation
JDRF staff and volunteers are committed to supporting all people living with Type 1 Diabetes.
www.jdrf.org
1.877.CURE.533

children with DIABETES®
An online community for kids and families living with diabetes.
www.childrenwithdiabetes.com

BD

Helping all people live healthy lives

[1] BD, data on file.
[2] Canadian Diabetes Association 2008 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada.
[3] Laffel L: Sick-Day Management in Type 1 Diabetes. Endocrinology and Metabolism Clinics of North America 2000 29: 707-723.
[4] B. Ginsberg, J. Parkes and C. Sparacino. The kinetics of insulin administration by insulin pens. Hormone and Metabolic Research. 2004;26:584-87.

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BD Medical - Diabetes Care
2100 Derry Road W. Suite 100
Mississauga, ON L5N 0B3

www.BDDiabetes.ca