Resource Guide to Insulin Pump Success

St. JOSEPH'S HEALTH CARE LONDON

Acknowledgements

The team at the Diabetes Education Centre of St. Joseph's Health Care London would like to thank Sanofi-Aventis for their generous contribution to sponsoring this educational initiative, thereby encouraging further development of resources and diabetes support for individuals with diabetes in southwestern Ontario.

We would also like to extend our appreciation to the Paediatric Diabetes Team at London Health Sciences Centre for sharing their resource manuals and for providing encouragement, guidance and support with the development of this teaching resource.

It is with great respect that we extend our appreciation to Dr. Irene Hramiak for her commitment to seeking opportunities to enhance the level of patient care and services in diabetes.

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Welcome to the exciting world of Insulin Pumping!

Choosing to manage your diabetes with an insulin pump is an important decision and long term commitment.

There are many possible benefits of using an insulin pump including better blood glucose control, convenience, flexibility, fewer instances of hypoglycemia, and ultimately, improved health and wellbeing!

Keep in mind, your success on the pump will be a direct result of the time and effort you invest in your diabetes management.

Some people feel it takes a full year on the pump to truly experience the range of situations and scenarios that arise with the changing seasons, outdoor activities and sports, work schedules, holidays and celebrations.

The healthcare team at the Diabetes Education Centre (DEC) of St. Joseph's Health Care London is here to help as you get started on the pump and will continue to support you in gaining experience, confidence and success along the way.

This resource contains a variety of resources to help you achieve that success, as well as information on how to get assistance when you need it.

The insulin pump is simply a different way to deliver insulin, and not a magic treatment. Although if used properly and to its full potential, with all the different features it has to offer, the pump can be magical!

Your Role

When you start the pump, you will need to:

- Keep a consistent schedule. This helps us adjust your insulin doses correctly.
- Check your blood glucose frequently (as advised by your certified pump trainer).
- Keep in regular contact with your diabetes care team. This can be done through phone, email and/or fax and includes uploading your pump to either CareLink or Diasend. If you are wearing a glucose sensor, please upload and provide this data as well.

Our Role

Our job is to:

- Make sure you are well-trained on the pump.
- Coach and encourage you to look at your day-to-day blood glucose and assist with problem solving.
- Ensure that you know what to do when you have a low or high blood glucose.
- Help you manage your diet when on the pump.

Contact Information

Name: _____

Phone number: _____

Pump Start Date: _____Renewal Date: _____

***Your Endocrinologist must sign your yearly renewal form. Ensure you have an appointment booked well in advance.**

Pump Make: _____Model: _____

Pump Serial Number: _____

Contact Names and Numbers

Endocrinologist: _____

Family Doctor: _____

Diabetes Education Centre: 519-661-1600

Nurse: _____

Dietitian: _____

Fax: 519-661-1634

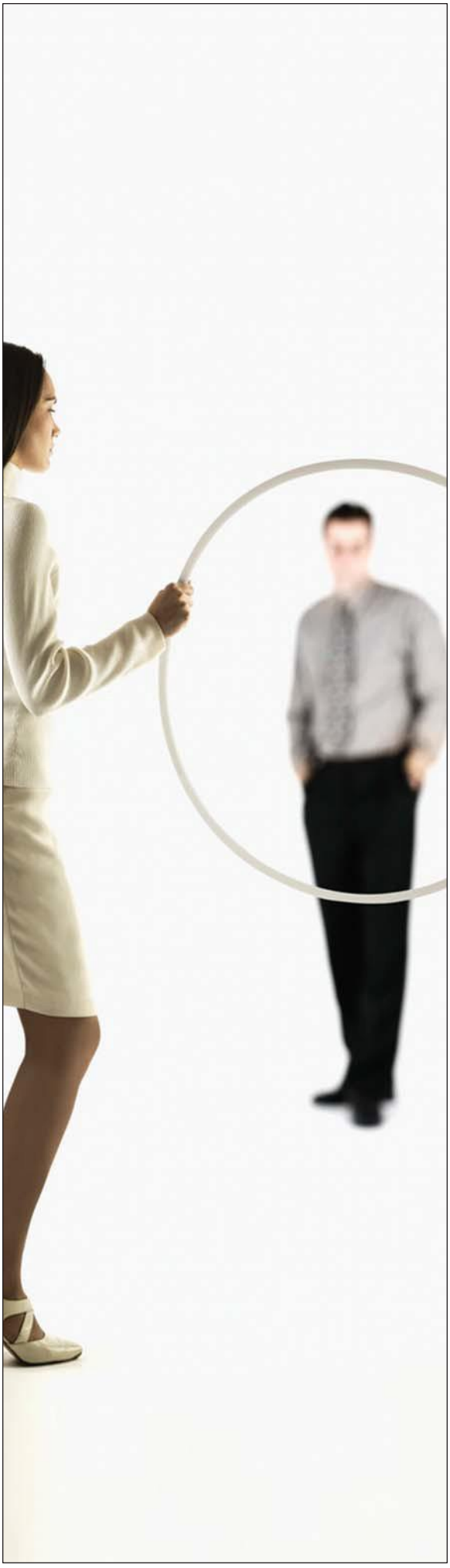
Tracking Your Success!

Date	A1c

Pump Start Date	

Graph Your Progress

11%								
10%								
9%								
8%								
7%								
6%								
5%								
Date								



1. ADP Criteria

Includes:

- Pump Start Information for Patients

Pump Start Information for Patients

Minimum Criteria for Pump Program (ADP)

You must have type 1 diabetes and be a patient of a Registered Adult Diabetes Team consisting of:

- Physician Specialist
- Registered Nurse
- Registered Dietitian

Pre-Assessment Phase

1. Attend the Pump Information Class and learn the potential advantages and disadvantages of pump therapy and decide if it is right for you. **If you are already on a pump you will not need to attend Pump Information Class.**

   At the Pump Information Class, you will have an opportunity to meet representatives from the various pump companies. In addition, we encourage you to arrange an appointment to meet individually with each company's representative for further information.

   If you decide to proceed, contact your physician specialist who will decide if they need to see you first. They will send a referral for ADP Pump Assessment to your **Diabetes Education Centre,** who will then schedule ADP Assessment appointments.

2. Attend your scheduled assessment and education appointments with the nurse and dietitian to meet minimum criteria as described below. The ADP form will be initiated at your Diabetes Education Centre.
   - Accurate insulin administration and dose adjustment within a basal/bolus regimen (multiple daily injections, minimum 1 year)
   - Minimum 4 blood glucose checks per day and effective use of logbooks or electronic records
   - Knowledge and application of carbohydrate counting, insulin to carbohydrate ratios, and correction factor
   - Recognition and proper treatment of hypoglycemia
   - Knowledge of sick day management/ketone testing/DKA prevention
   - Demonstrated commitment to long-term follow-up by at least 3 visits/year (physician, educators)
   - Ability to self-assess and problem solve effectively
   - Willingness to adhere to activities required for pump therapy
   - Financial means to pay for portion of costs not covered by ADP program (i.e. test strips, insulin, extra pump supplies)

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3. Once you have met minimum criteria, you will be provided with your Pump Start dates. Your ADP application form and Pump Start date will be sent to the Vendor by the Diabetes Education Centre. The pump company will then contact you and arrange to have your pump shipped to you closer to your start date so it does not affect your warranty.

Trial Period - 3 months

1. New Pump starts are done in groups - Two Classes: Pre-Pump Class (Fridays 0900-1200) and a Pump Start Class (Mondays 0900-1200). Upgrading your pump is also done in a group - One Class: Upgrade Pump Class (0900-1200).
2. If you are new to pump therapy, you will need to attend the Pump Management Class within 3 months of starting your pump to complete the trial period and to learn more about the advanced features of your pump.

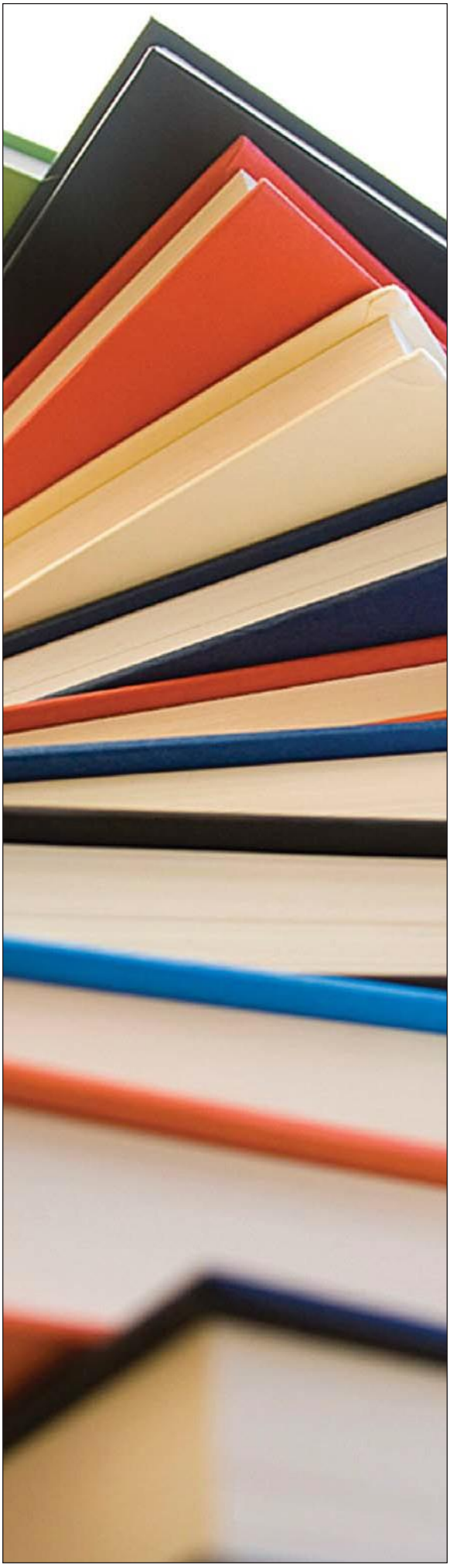
Completion of 3 month trial: (3 Possibilities)

1. You choose to continue with pump therapy and continue to meet criteria.
2. Criteria is not met and the pump must be returned to the manufacturer. A refund will be credited to the ADP program. This does not prevent you from reapplying at another time.
3. You decide that pump therapy does not meet your needs and return the pump to the manufacturer. ADP funding will stop at this time.

Once you have completed the 3 month trial successfully, sensor classes and other follow-up appointments may be booked.

Renewal of Funding Assistance for Insulin Supplies:

1. You will receive a Renewal Application form approximately 2-3 months prior to your pump start anniversary date. To maintain your funding, your physician specialist must complete the ADP renewal application. Please call their office for details. **It is your responsibility to ensure this form is completed.**



2. Before Starting on a Pump

Includes:

- Basal and Bolus Insulin Explained
- Introduction to Counting Carbohydrates
- Calculating Insulin Doses at Meals
- Insulin to Carbohydrate Ratio Sheet for Pumps

Pump Therapy:
Basal and Bolus Insulin Explained

Pump Therapy Overview

The goal for insulin delivery is to maintain blood glucose within target range. In a person without diabetes, cells in the pancreas called “beta cells” automatically and continuously deliver insulin to keep blood glucose in target. The healthy pancreas releases small amounts of insulin continuously throughout the day and night, and larger bursts of insulin “on demand” to handle sudden increases in insulin needs (when eating meals).

The insulin pump is a small computerized device that looks much like a cell phone or pager and delivers insulin into your body. The insulin pump contains a cartridge filled with rapid acting insulin. This may be NovoRapid, Humalog or Apidra.

Rapid-acting insulin:

- Starts working about 10-15 minutes after you inject
- Peaks (or works hardest) about 1-1.5 hours after you inject
- Stops working around 3.5-5 hours after you inject

The method of insulin delivery with the pump is different from your current multiple insulin injections, but the terms for the delivery of the insulin are the same. Your insulin pump delivers insulin two ways.

Basal

The amount of insulin delivered continually throughout the day and night is called your basal rate. Basal insulin takes the place of long-acting insulin. When set correctly, your basal rates should maintain fairly even blood glucose levels between meals and overnight. This is what a healthy pancreas does.

Initially your physician specialist will estimate how much basal insulin you need. Your basal rate(s) will most likely need to be adjusted once you start pumping. Most people need different amounts of insulin at different times of the day.

Once your basal rates are programmed into your pump, your pump will deliver the same amount of insulin day after day, unless you wish to change the rate(s).

Bolus

The extra insulin you deliver when you eat or correct a high blood glucose is called your bolus insulin. With input from your healthcare professional, you determine the amount of the bolus insulin and program this dose when you need it. You will need to bolus when you eat and when your blood glucose is higher than your target.

Bolus doses are based on the following:

- The amount (in grams) of carbohydrate you plan to eat
- Your insulin to carbohydrate ratio (I:C)
- Your blood glucose level
- Your correction factor (CF)
- The timing of your last bolus (insulin on board)
- Recent or planned activity

While you are waiting to start your pump, it is a good opportunity to practice counting carbohydrate and using insulin to carbohydrate ratios. Practice using correction boluses also if you have not already been doing so.

Sometimes erratic blood glucose occurs because you have too much basal insulin (Lantus, Levemir, Tresiba, Toujeo, or N/NPH) or too much bolus insulin (Novo Rapid, Humalog, Apidra, Fiasp, or Regular) at meals. Balancing your basal and bolus insulin proportions close to 50/50 or 40/60 may make the transition to the pump smoother.

Reference: Animas Canada, My Insulin Pump Workbook, Johnson & Johnson, 2013

Introduction to Counting Carbohydrates

Counting carbohydrates is an important tool for determining your insulin bolus when you eat. This gives you greater flexibility than having to match your food intake to a set dose of insulin. Let's take a look at why we count carbohydrates and review the basics.

The Basics

Food provides us with calories which come from three major nutrients: protein, fat and carbohydrate. Also provided are vitamins and minerals, but these micronutrients do not supply calories.

Carbohydrate is the nutrient that raises the blood glucose the most and the fastest. In fact, almost all of the carbohydrate that we eat will end up as glucose in our bloodstream within approximately 1 to 1½ hours. This is about the time the insulin from our food bolus will be working the hardest (peaking).

Of course some carbohydrates will enter the bloodstream faster than others. For example, fruit juice takes only minutes, whereas other foods like pizza may take much longer.

Balancing your carbohydrate intake with the appropriate amount of bolus insulin will help keep your blood glucose on track after eating. To accomplish this, you need to know which foods contain carbohydrates and be able to estimate how many grams of carbohydrate you are eating at each meal and snack.

How Much Carbohydrate?

It is important to consume enough carbohydrate in your diet to fuel your brain, liver and muscles with energy. Carbohydrate provides your body with energy and it is important to consume an adequate amount of this valuable nutrient. When your diet provides enough carbohydrate, your body's stores of carbohydrate or energy will be optimized, and this will help to decrease your risk of hypoglycemia. This is especially important when you are active.

You can be proactive and reduce your risk of hypoglycemia by consuming an adequate amount of carbohydrate through healthy food choices. This is better than having to treat a low blood glucose 'after the fact' with quick sugar.

The table below shows you the amounts of carbohydrate needed in different situations. Your dietitian will help you determine how much carbohydrate you require.

Daily Carbohydrate Needs		
Minimum RDA (Recommended Daily Intake)		130 grams per day minimum
Pregnancy		175 grams per day minimum
Average Woman		180-230 grams per day
Average Man		220-330 grams per day
Avg. Activity	1 hour/day 2 hours/day	4-5 g/kg body weight per day 5-6 g/kg body weight per day

Foods With Carbohydrate

Many foods contain carbohydrates. In general, carbohydrates are found in the following:

- Starches (bread, cereal, rice, beans/lentils and pasta) and starchy vegetables (corn, potatoes, winter squash and peas)
- Fruit and fruit juices
- Milk and yogurt
- Sugar and foods made with sugar (candy, baked goods, pop, syrups, etc.)

There are two approaches to counting carbohydrates:

1. Carbohydrate grams
2. Carbohydrate choices (one choice is approximately 15 grams of carbohydrate)

Using carbohydrate grams is the more accurate of the two methods and it fits easily with using an insulin to carbohydrate ratio. Many people, especially those already familiar with carbohydrate choices, use a combination of both methods.

There are several tools to assist with carbohydrate counting including:

- My Food Plan
- Carbohydrate choices with weights for use with a scale - pg 6.1
- Measuring cups, bowls and spoons
- Food scales: basic, digital, computerized with carbohydrate information
- Nutrient Value of Some Common Foods
- Recipe books, nutrition guides from restaurants, internet resources, phone apps

Protein And Fat

In general, foods with large amounts of protein and fat will slow your digestion so that the carbohydrates enter the blood stream more slowly.

Your insulin pump allows you to bolus in different ways to match the slower digestion of foods/meals that are higher in protein and fat. We will discuss alternative ways to deliver a bolus with your pump in the Pump Management Class that follows the Pump Start Class.

Reference: Animas Canada, My Insulin Pump Workbook, Johnson & Johnson, 2013.

Calculating Insulin Doses at Meals

MEAL INSULIN DOSE = CORRECTION DOSE + MEAL BOLUS

Accurately counting the carbohydrate content of your meal is important. A difference of even a few grams of carbohydrate can result in taking too much or too little insulin. This impacts your blood glucose control.

Insulin to Carbohydrate Ratio: estimates how many grams of carbohydrate **one unit** of rapid-acting insulin will cover.

**Check the accuracy of your ratio. When your blood glucose is in target before a meal, check two hours after eating and it should be 1-3 mmol/L higher.*

Correction Factor (Insulin Sensitivity): the drop in blood glucose made by **one unit** of insulin.

**Your correction factor should bring your blood glucose into target by 4-5 hours without going low.*

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Example

- Justin is having ½ cup of orange juice, 2 slices of toast and a banana at breakfast, a total of 75 g of carbohydrates.
- His insulin to carbohydrate ratio is 1 unit:12 g
- 1 unit of insulin drops his blood glucose 2mmol/L
- His blood glucose is 11.7mmol/L

How much insulin does he need for this meal?

- The total carbohydrate in this meal is 75 grams.

- Justin takes 1 unit of insulin for every 12 grams of carbohydrate he eats:
  75g ÷ 12g/unit = 6.25 units

- He uses the following information to calculate his correction dose:
  Blood glucose 11.7 mmol/L
  Target blood glucose 7.0 mmol/L
  Total needing correction 11.7 mmol/L – 7.0 mmol/L = 4.7
  Divided by his correction factor:
  4.7 mmol/L ÷ 2 mmol/L per unit = 2.35 units

MEAL INSULIN DOSE = CORRECTION DOSE + MEAL BOLUS

= 2.35 units + 6.25 units

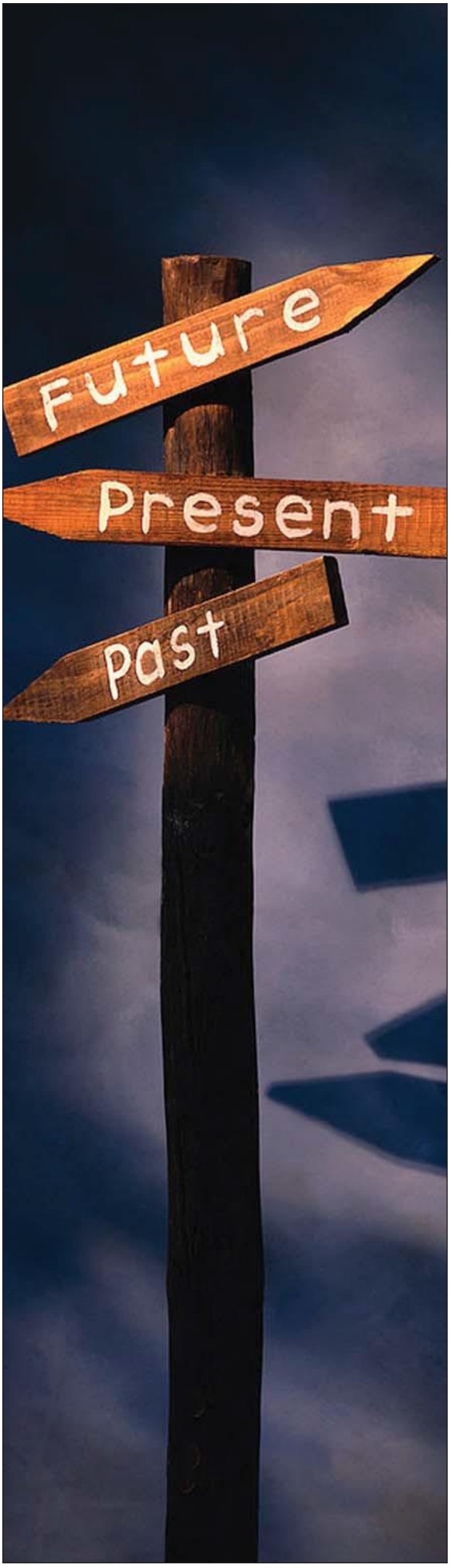
= 8.6 units

Insulin to Carbohydrate Ratio Sheet for Pumps

Grams of Carb	1:1.5	1:2	1:3	1:4	1:5	1:6	1:7	1:7.5	1:8	1:9	1:10	1:11	1:12	1:13	1:14	1:15	1:18	1:20	1:22	1:25
10 gms	6.7 u	5	3.3	2.5	2	1.7	1.4	1.3	1.3	1.1	1	0.9	0.8	0.8	0.7	0.7	0.6	0.5	0.5	0.4
15	10	7.5	5	3.8	3	2.5	2.1	2	1.9	1.7	1.5	1.4	1.3	1.2	1.1	1	0.8	0.8	0.7	0.6
20	13.3	10	6.7	5	4	3.3	2.9	2.7	2.5	2.2	2	1.8	1.7	1.5	1.4	1.3	1.1	1	0.9	0.8
25	16.7	12.5	8.3	6.3	5	4.2	3.6	3.3	3.1	2.8	2.5	2.3	2.1	1.9	1.8	1.7	1.4	1.3	1.1	1
30	20	15	10	7.5	6	5	4.3	4	3.8	3.3	3	2.7	2.5	2.3	2.1	2	1.7	1.5	1.4	1.2
35	23.3	17.5	11.7	8.8	7	5.8	5	4.7	4.4	3.9	3.5	3.2	2.9	2.7	2.5	2.3	1.9	1.8	1.6	1.4
40	26.7	20	13.3	10	8	6.7	5.7	5.3	5	4.4	4	3.6	3.3	3.1	2.9	2.7	2.2	2	1.8	1.6
45	30	22.5	15	11.3	9	7.5	6.4	6	5.6	5	4.5	4.1	3.8	3.5	3.2	3	2.5	2.3	2	1.8
50	33.3	25	16.7	12.5	10	8.3	7.1	6.7	6.3	5.6	5	4.5	4.2	3.8	3.6	3.3	2.8	2.5	2.3	2
55	36.7	27.5	18.3	13.8	11	9.2	7.9	7.3	6.9	6.1	5.5	5	4.6	4.2	3.9	3.7	3.1	2.8	2.5	2.2
60	40	30	20	15	12	10	8.6	8	7.5	6.7	6	5.5	5	4.6	4.3	4	3.3	3	2.7	2.4
65	43.3	32.5	21.7	16.3	13	10.8	9.3	8.7	8.1	7.2	6.5	5.9	5.4	5	4.6	4.3	3.6	3.3	3	2.6
70	46.7	35	23.3	17.5	14	11.7	10	9.3	8.8	7.5	7	6.4	5.8	5.4	5	4.7	3.9	3.5	3.2	2.8
75	50	37.5	25	18.8	15	12.5	10.7	10	9.4	8.3	7.5	6.8	6.3	5.8	5.4	5	4.2	3.8	3.4	3
80	53.3	40	26.7	20	16	13.3	11.4	10.7	10	8.9	8	7.3	6.7	6.2	5.7	5.3	4.4	4	3.6	3.2
85	56.7	42.5	28.3	21.3	17	14.2	12.1	11.3	10.6	9.4	8.5	7.7	7.1	6.5	6.1	5.7	4.7	4.3	3.9	3.4
90	60	45	30	22.5	18	15	12.9	12	11.3	10	9	8.2	7.5	6.9	6.4	6	5	4.5	4.1	3.6
95	63.3	47.5	31.7	23.8	19	15.9	13.6	12.7	11.9	10.6	9.5	8.6	7.9	7.3	6.8	6.3	5.3	4.8	4.3	3.8
100	66.7	50	33.3	25	20	16.7	14.3	13.3	12.5	11.1	10	9.1	8.3	7.7	7.1	6.7	5.6	5	4.5	4

← More Insulin Less insulin →

**Check the accuracy of your ratio: When your blood glucose is in target before a meal, check two hours after eating and it should be 1-3 mmol/L higher.*



3. Starting on a Pump

Includes:

- Being Prepared for your Pump Start Class
- Insulin Pump Tracking Record
- Take Home Messages
- Your Communication Plan for Insulin Pump Start
- The Importance of Site Rotation
- After Your Pump Start …
- Sample Blood Glucose Record Sheets (Example 1, Example 2)

Being Prepared for your Pump Start Class

1. Pump start classes begin at 9:00 a.m. and are held at the Diabetes Education Centre.

2. A family member or friend is welcome to join you.

3. Please bring:
    - your rapid insulin (10 ml vial)
    - all of your pump equipment
    - your blood glucose meter and supplies to check your glucose
    - supplies to treat a low blood glucose
    - emergency kit
    - morning snack and drink if you would like

4. Watch the available CD or online videos and review the user guide. Practice with the pump buttons over the weekend. Complete any online learning that may be available for your pump.

5. Be aware of any changes to your long-acting insulin on the day before your pump start or the morning of your pump start, if applicable.

Next week, “pumping” will be a new experience, so please accept that you will spend a lot of time thinking about diabetes. We need you to be prepared for the time commitment and the emotional commitment that is required when starting on a pump.

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Insulin Tracking Record

Name: _____ **Date:** _____

Current Management on Multiple Daily Injections:

Insulin to Carb Ratios	
Time	Insulin to Carb Ratio
Breakfast	
Lunch	
Supper	
Bedtime	

Correction Factor

Long Acting Insulin
_____units
*The night before your pump start, reduce long acting insulin (Lantus, Levemir, Tresiba, Toujeo, or NPH) to _____**or** leave the same.* *Do not take long acting insulin on the morning of the pump start (if applicable)*

Pump Start Settings:

Basal Program	
Time	Rate (units/hour)
12 am	

Bolus Settings		
Time	Insulin to Carb Ratio	Carb Targets (g)
12 am		

Blood Glucose Targets	
Time	Target (mmol/L)
12 am	

Correction Factor	
Time	Correction Factor
12 am	

Active Insulin Time
Duration: _____ hours
Total Daily Dose
_____ units

Temporary Basal
Allows a change to your basal insulin for a specific period of time. For activity, start one hour before (if planned) and run until two hours after the activity. Suggest trialing temporary basal feature with the below settings; check blood glucose frequently to assess if effective and make changes as needed.

Type of Activity	Percentage of basal
Low intensity	Try reducing by 10-20% (run at 80-90%)
Moderate intensity	Try reducing by 20-30% (run at 70-80%)
Illness or lower than usual activity	Try increasing by 10-20% (run at 110-120%)

Take Home Messages

- Monitoring Blood Glucose
  - Check blood glucose: before meals, bedtime, 3am, prior to driving, and when symptoms of hypoglycemia occur
  - Call your certified pump trainer if you are experiencing hypoglycemia frequently or have a severe low that may require the help of another person
  - Follow the hyperglycemia protocol; hyperglycemia can lead to diabetic ketoacidosis
  - Refer to the Resource Guide to Insulin Pump Success and your pump manual for additional troubleshooting of high or low blood glucose levels

- Safety Systems and Alarms
  - Review list of alerts and alarms in your pump manual

- Changing Infusion Set or Pod and Site Location
  - Change infusion set or pod every 2-3 days and preferably prior to a meal
  - Change infusion set sooner if experiencing redness, irritation, swelling, discharge, discomfort at the site, or if you suspect an occlusion (after appropriate troubleshooting)
  - **When in doubt, change it out!**
  - Clean skin prior to infusion set or pod insertion, rotate site location, and inspect your site
  - If applicable, remember to always disconnect when priming
  - Check blood glucose 1-2 hours after an infusion set or pod change

- Time off Pump/Back-up Plan
  - See Time off the Pump in the Resource Guide to Insulin Pump Success and/or speak to your certified pump trainer to get a plan in place for replacing basal and bolus insulin for time off the pump
  - ALWAYS keep a written copy of your most recent pump settings
  - May need to or decide to remove pump for contact sports, a day at the beach, a medical procedure, or a pump technical issue

- Contact Information
  - Medical Emergency: Contact the Diabetes Education Centre, endocrinologist, or 911
  - Technical Support: Call your pump company (the number is on the back of your pump or PDM)
  - Pump Supplies and Accessories: Contact your pump company or pharmacy

- Follow-up Care
  - Follow up regularly with your certified pump trainer for dose adjustment and continued care

Adapted from: Animas Canada, Take Home Instructions, Johnson & Johnson, 2011.

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Your Communication Plan for Insulin Pump Start

In order to make safe and effective adjustments to your pump settings, it is important to be in frequent contact with your diabetes team for at least the first 2 weeks.

1. Upload to either CareLink or Diasend and email details (type, length and time of exercise; results of ketone testing; any usual circumstances) to us by 9:00 a.m. on Mondays, Wednesdays and Fridays, unless otherwise specified. If wearing a glucose sensor, please upload and add these reports to your email as well.

2. Provide your certified pump trainer with a phone number where you can be reached during the day. We will try to contact you on Monday, Wednesday and Friday each week.

The Importance of Site Rotation

For your insulin to work best, it is important to use a different location for each new infusion set. This is called "site rotation", and involves following a regular pattern as you move from site to site. When you are on an insulin pump, it is recommended that you rotate your site every 3 days. Different people use different patterns, but the intent should always be to use all of the areas and the sites. When you do this, no one site will be used too often. Overusing a site can cause tissue changes that lower or change insulin absorption.

Areas to Avoid

- 2 inches around belly button
- High sensitivity areas
- Under a waistband
- Areas exposed to rubbing or bumping
- Over a bone
- Blood vessels
- Scar tissue/surgical scars
- Fatty tissue overgrowth
- Bruised areas
- Liposuction
- Body piercing
- Tattoos

Use the diagram on the other side of this page to plan a pattern. This will help you remember your last site used. The shaded areas are recommended when on an insulin pump.

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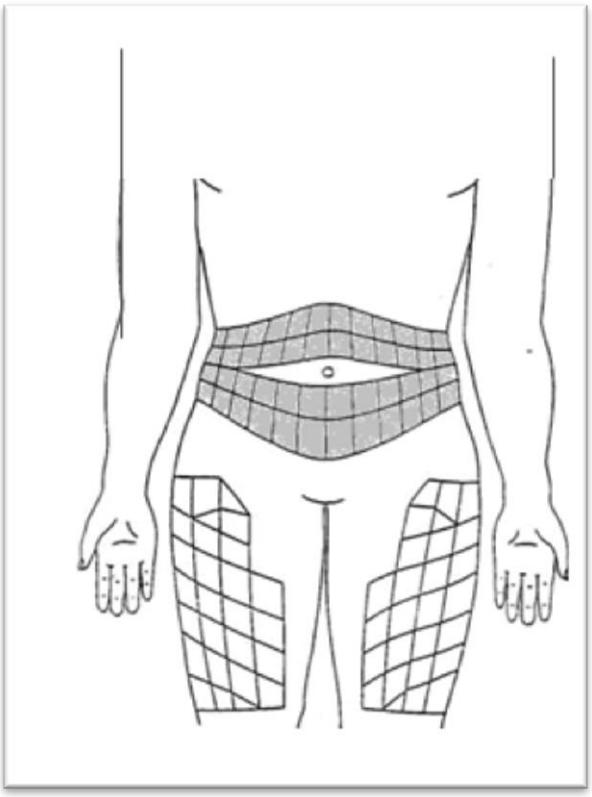
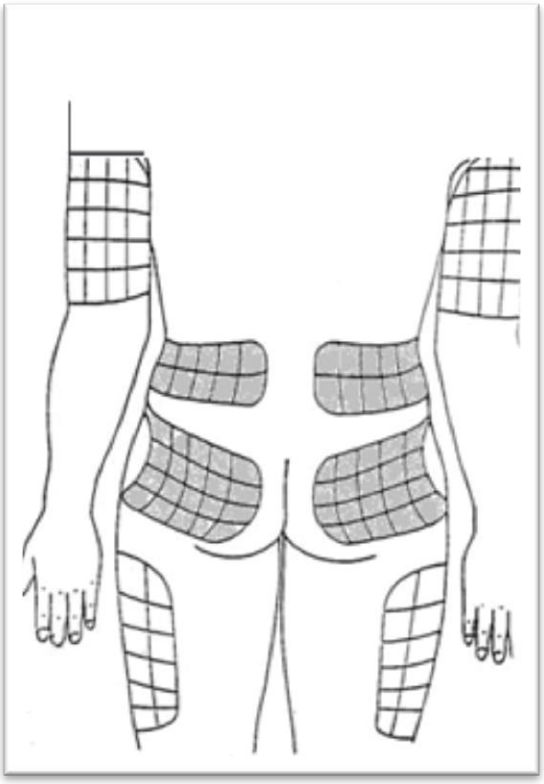
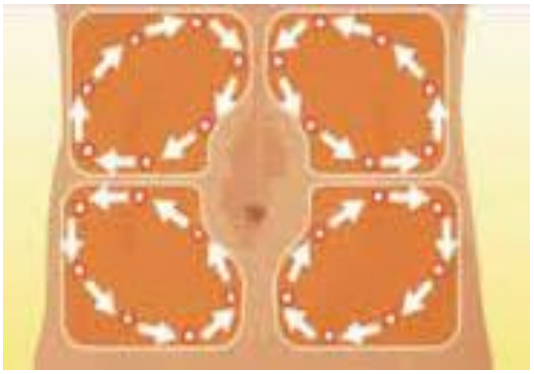
Site Selection





Site Rotation

Work your way across your body



Rotate within one area before moving on to the next one

After Your Pump Start…

In accordance with ADP Guidelines, it is important that you book a follow-up appointment with the Diabetes Education Centre within 90 days.

This 90 day follow-up appointment can include:

- Pump Management Class - Where advanced features of your pump are programmed, practiced and reviewed.
- Follow up appointment with a nurse, dietitian or both.

Attending appointments at the clinic, checking blood glucose regularly, and using your pump effectively are important for your safety and will help ensure that you continue to receive government funding for the pump and supplies. By reviewing your progress and assisting with troubleshooting, we will help you use your pump to its full potential.

Remember to bring the following when attending appointments at the Diabetes Education Centre:

1. Blood glucose records. This can include blood glucose results recorded in a logbook or printed using a web based program where the pump can be downloaded.
2. Blood glucose meter or sensor device.
3. 3 day food record.
4. Any questions or concerns you have concerning your pump experience.

"I think you're going overboard with this compliancy issue, Doc!"

Pump Blood Glucose Record (1-day)

Date Total Daily Dose _____ % Basal												
	12am	1am	2am	3am	4am	5am	6am	7am	8am	9am	10am	11am
Blood Glucose												
Carbohydrates												
Meal Bolus												
Correction Bolus												
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Pump Blood Glucose Record (7-day)

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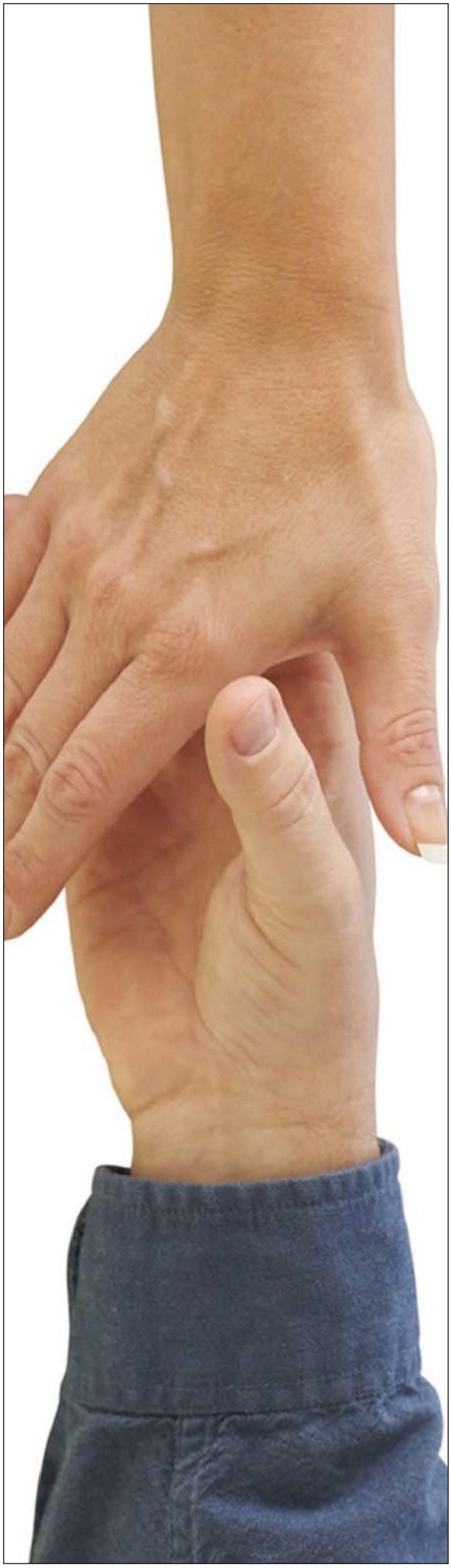

4. Managing Diabetes on a Pump

Includes:

- Emotional Wellness
- Pump Emergency Kit
- Guidelines for Managing Hyperglycemia
- Hyperglycemia Protocol for Insulin Pumps
- Guidelines for Managing Diabetic Ketoacidosis
- Sick Day Management
- Hypoglycemia/Severe Hypoglycemia
- Driving Guidelines
- Basal/Bolus Adjustments

Emotional wellness is a balancing act between self-care, productivity and leisure!

It is normal for people living with diabetes to experience feelings of anxiety and depression. It is challenging to live and cope with a condition that requires on-going attention and energy. People with diabetes often report that they experience peaks and valleys when it comes to the motivation required to continue to do the things that result in good diabetes management.

View wellness as a balance between self-care, productivity and leisure. The time and effort you spend on your self-care is a positive “side-effect” of having to manage your diabetes. **By eating well, incorporating regular physical activity into your routine and making your health a priority, you can be healthy with diabetes!**

It helps to understand what leads to lapses in doing the things that are required to be a good manager of your diabetes. Since it is normal to relapse, it is important to understand what triggers your relapses. **Having a plan for managing relapse allows you to get back on track faster and without the negative consequences of blaming yourself.**

It is important to see the value of the time you spend managing your diabetes and social work offers you opportunities to explore wellness from this perspective. Social work recognizes the impact that diabetes can have on your family, financial and social situations. Social work can help you to recognize and find solutions to issues you may be facing as well as connect you to programs and services that can assist. Ask your diabetes team for more information.

Pump Emergency Kit

Carry this kit with you at all times!

- Fast-acting glucose tablets or treatment of choice
- Blood glucose monitoring supplies
- Urine/blood ketone monitoring supplies
- Rapid acting insulin and insulin syringe/pen
- Extra infusion sets/pods, reservoirs/cartridges, inserter, skin prep/alcohol
- Extra batteries
- Quick Reference Card/Menu Map if available through company
- Glucagon emergency kit
- Emergency contact phone numbers/24 hr Help Line
- List of pre-pump insulin doses (MDI)
- List of current pump settings
    - Basal rates
    - Insulin to carbohydrate ratios, correction factors, blood glucose targets...

Inform family member, co-worker, and/or friend where this emergency kit is kept.

Guidelines for Managing Hyperglycemia

Signs and Symptoms of Hyperglycemia (High Blood Glucose)	
Onset	• Gradual (hours to days)
Usual Causes	• Illness, infection, surgery, injury • Stress: emotional or physical • Too little insulin • Increased food • Exercise (in type 1) with blood glucose over 14 mmol/L
Signs and Symptoms	• Thirst • Excessive urination • Fatigue • Abdominal pain, nausea, vomiting • Blurred vision • Change in appetite • Dry/itchy skin • Slow healing cuts • Hard to breathe / acetone breath
Troubleshooting	<u>Infusion Set:</u> • Is the tubing primed? • Is the cannula dislodged or kinked? • Has the set been in longer than 2-3 days? • Is the set connected to the cartridge? • Are there any leaks or can you smell insulin? • Is there discomfort, blood or redness at the site? • Is there air in the tubing? <u>Insulin Pump:</u> • Did you forget to bolus? Check Bolus History • Any recent alarms? • Is the cartridge empty? • Did you forget to stop your temporary basal rate? <u>Insulin</u> • Is the insulin cloudy or clumped? • Has the insulin expired? • Has the insulin been at room temperature for longer than one month? • Did you leave the insulin in a warm place? For technical problems with your pump, call the 24-hour Helpline

REMEMBER
• Insulin should always be taken! • Drink plenty of extra carbohydrate-free fluids. • Check blood glucose and urine ketones before every meal and/or every four hours.

Flow Chart: Hyperglycemia Protocol for Insulin Pumps

If your blood glucose reading is above 14 mmol/L, follow these steps:

High Blood Glucose Level
No Ketones

Take correction dose with pump.
Check if site and pump OK.
Recheck blood glucose in 1 hour.

Blood glucose is decreasing.

Recheck blood glucose before next meal. Take insulin as usual.

No change in blood glucose level.

Take insulin by syringe. *

Change infusion set site or active new pod.

Recheck blood glucose in 1 hour.

Contact doctor if no improvement in blood glucose.

High Blood Glucose Level
With Ketones

Use insulin from new vial and take by syringe using correction factor. *

Change infusion set and site or active new pod. Check pump.

Drink 1 cup of water or sugar free beverages every hour.

Recheck blood glucose and ketones every 2 hours.

Continue to take correction dose through the pump.

Contact doctor if no improvement in blood glucose and ketones.

Go to the hospital if blood glucose is >20mmol/L and you are experiencing abdominal pain, nausea, vomiting, or diarrhea.

* Your pump cannot track active insulin given via syringe. If you would like to track active insulin, disconnect pump or remove pod and use pump to calculate correction dose and deliver dose (discard in sink).

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Guidelines for Managing Diabetic Ketoacidosis (DKA)

What is DKA?

Diabetic ketoacidosis happens when you do not have enough insulin to help your body use glucose for energy. Your body starts burning fat for energy, which releases ketones in your blood. Ketones make your blood more acidic than normal. This can upset the chemical balance in your body and can quickly make you very sick.

What would cause DKA?

Diabetic ketoacidosis can occur in people with type I diabetes if you are not getting enough insulin or if your insulin isn't working well due to sickness, infection, pregnancy, stress and/or high blood glucose.

Check for Ketones:

- For any unexplained high blood glucose
- If your blood glucose is above 14 mmol/L
- If a fruity odor is detected on your breath
- If abdominal pain is present
- If nausea or vomiting occurs
- If you are breathing rapidly and short of breath

If a moderate or large amount of ketones register on the test strip, ketoacidosis is present and treatment is required immediately.

What should I do if I have DKA?

Follow the Hyperglycemia Protocol shown in the Flow Chart on the pervious page.

Sick Day Management

When you are sick, your body does not use insulin as well. This can cause problems with your blood glucose. To minimize these problems, it is very important to follow these guidelines whenever you are sick:

- Check your blood glucose if you are experiencing hyperglycemia every 2 hours while you are awake and every 4 hours overnight.
- Check your ketones using urine ketone strips or a blood ketone meter if your blood glucose is >14mmol/L or if you are experiencing abdominal pain, nausea, vomiting or diarrhea. When you have ketones it indicates you need more insulin and you need to drink water or carbohydrate-free fluids.
- If your blood glucose is above 14 mmol/L follow the Hyperglycemia Protocol shown in the Flow Chart.
- Check your temperature.
- Make sure you are drinking liquids if you are unable to keep down solid food. Drink one cup of liquid every hour while you are awake to prevent dehydration. If you are unable to hold down liquids, you may need to go to the emergency room or hospital.

Insulin Adjustments:

Depending on blood glucose results, you may need to make insulin pump adjustments while you are sick:

Basal adjustments to manage hyperglycemia (high blood glucose)

- Increase basal rate by 10% using temporary basal
- Check blood glucose in 2 hours
- If effective, continue at this temporary basal rate
- If not effective, increase the basal by 20% and reassess in 2 hours

Bolus adjustments to manage hyperglycemia

- Your usual correction factor may not be as effective when sick
- If hyperglycemia is not correcting, you may need more correction than usual. Consider an increase of 10%.
- Monitor blood glucose every 4 hours

Basal adjustments to manage frequent hypoglycemia (low blood glucose)

- Set a temporary basal with a 30% decrease
- Check blood glucose in 2 hours
- If effective, continue with this temporary rate
- If not effective, decease temporary basal rate to 50% and reassess in 2 hours

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When should I call my doctor?

- Your blood glucose stays higher than 14 mmol/L or lower than 4 mmol/L.
- If you have ketones and they don't go away after 4 hours
- You are unable to keep liquids or solids down.
- You have a fever (temperature over 101 degrees F or 38.3 degrees C).
- You have diarrhea or are vomiting.

What foods should I eat when I'm sick?

If you are sick, you should eat or drink 10-15 grams of carbohydrate every hour. Try to consume a minimum of 130 grams per day.

You may need to choose lighter foods such as those listed below. Each of these items equals approximately 15 grams of carbohydrate or 1 carbohydrate choice.

- ⅔ cup regular soft drink (not diet, avoid caffeinated drinks)
- ⅔ cup fruit juice
- 1 twin popsicle
- ½ cup prepared Jell-O™, flavoured gelatin or jelly powder(not diet)
- 1 cup sports drink
- 1 cup chicken noodle soup or cream soup*
- ½ cup cooked cereal
- ½ cup plain ice cream*, custard*, pudding*,apple sauce
- 1 slice toast
- 7 soda crackers
- ½ cup flavoured yogurt*
  *(consider limiting milk products if vomiting or diarrhea)

If blood glucose is more than 14mmol/L, drink at least 1 cup of carbohydrate-free fluids per hour and these can include:

- Water
- Any no sugar added liquid/powder water enhancer (ie. Crystal Light)
- Clear soup or broth
- Diet soft drink
- Tea

Hypoglycemia

What is Hypoglycemia?

Hypoglycemia means low blood glucose (blood glucose less than 4.0 mmol/L).

What are the symptoms of hypoglycemia?

You may experience one or more of the following:

- Shaky/trembling
- Sweating
- Dizziness
- Sudden hunger
- Confusion
- Irritability

When you have any of these symptoms **always** check your blood glucose. If you cannot check, assume your blood glucose is low.

What should I do if I have hypoglycemia?

1. Treat with one of these **quick sugars** (15 grams carbohydrate):
    - 15 grams glucose tablets (check label for number needed)
    - ⅔ cup regular pop or fruit juice
    - 15 "Skittles"
    - 1 tablespoon honey
    - 3 packets of sugar
    - 2 packages of "Rockets"
2. Wait 15 minutes and check your blood glucose again. If it remains low then treat again with one of the quick sugars listed above.
3. If it is more than 1 hour before your next meal have a small snack with 15 grams of carbohydrate plus protein (examples: ½ meat or cheese sandwich, 6 crackers with peanut butter)
    - Remember: Always have your meter, quick sugar and a carbohydrate containing snack with you.

Severe Hypoglycemia

What is severe hypoglycemia/low blood glucose?

Severe hypoglycemia meals a blood glucose level less than 2.8 mmol/L. In some cases, an individual may be unconscious or may require assistance to treat the low blood glucose.

What are the symptoms of severe hypoglycemia?

- Confusion
- Poor co-ordination
- Unusual behavior, i.e. stubborn, angry
- Unconsciousness

What is the treatment for severe hypoglycemia?

If the person is ***conscious***:

1. Treat with one of these **quick sugars** (20 grams of carbohydrates):
    - 20 grams of dextrose tablets (check label for amount needed)
    - 1 cup of regular pop or fruit juice
    - 4 teaspoons of honey
    - 4 packets of sugars
    - 3 packages of “Rockets”

2. Wait 15 minutes and check your blood glucose again. If blood glucose remains low then treat again with 15grams of quick sugar.

3. If it is more than 1 hour before your next meal have a small snack with 15 grams of carbohydrate plus protein (examples: ½ meat or cheese sandwich, 6 crackers with peanut butter).
    - Remember: Always have your meter, quick sugar and a carbohydrate containing snack with you.

If the person is *unconscious* call 911. Be sure to ask the doctor about glucagon for dealing with this situation in the future.

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Driving Guidelines for Diabetes

To keep you and others on the road safe, it is important that you follow these driving guidelines.

- Always check your blood sugar before driving and every 4 hours if you are driving long distances. If you are a commercial driver, you must check your blood sugar at least every 2 hours while driving.

Your blood sugar must be above 5.0mmol/L to drive.

If you are a commercial driver, your blood sugar must be above 6.0mmol/L.

- Before driving: if your blood sugar is between 4.0-5.0mmol/L, have a carbohydrate containing meal or snack.

- If you have experienced a low blood sugar, you must wait at least 40 minutes after treating your low before driving.

- If you think that your blood sugar is low while driving:
    1. Immediately pull off the road
    2. Turn off your vehicle and remove your keys from the ignition
    3. Check your blood sugar
    4. Treat your low blood sugar
    5. Wait at least 40 minutes before driving (judgments may be impaired for up to 40 minutes after hypoglycemia so you need to give your body time to recover)

- Remember to carry your glucometer, quick sugar and a carbohydrate containing snack.

For more information, please see:

- *Diabetes and Driving: 2015 Canadian Diabetes Association Updated Recommendations for Private and Commercial Drivers*
  http://www.diabetes.ca/getmedia/b960981b-a494-497e-ae5a-37c73d3261ab/2015-cda-recommendations-for-private-and-commercial-drivers.pdf.aspx
- Guidelines for Diabetes and Private and Commercial Driving
  http://www.diabetes.ca/diabetes-and-you/healthy-living-resources/general-tips/guidelines-for-diabetes-and-private-and-commercial
- Ministry of Transportation - Medical Review Section
  http://www.mto.gov.on.ca/english/dandv/driver/medical-review/process.shtml

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Basal Adjustments

General Principles:

- Look for patterns of 2 or more lows or highs at the same time of day
- Adjust for lows first by decreasing basal rate by 0.025-0.1 units/hour
- Determine what period of the day is the problem and adjust for only that period of time. You can break up your day into the following time blocks:
    - 3am to breakfast
    - breakfast to lunch
    - lunch to dinner
    - dinner to bed
    - bed to 3am
- Adjust for highs by increasing the basal rate by a maximum of 0.1 unit/hour, 2-3 hours before the problem period begins
- A high or low blood glucose 4-6 hours after a meal usually requires a basal adjustment
- Evaluate the changes for 2-3 days. If no improvements are seen after 2 or 3 adjustments, contact your diabetes team
- Be consistent with food and activity during the evaluation period
- Evaluate bolus/basal ratio (generally aim for 50/50 or 40/60 split)

These are only general guidelines for pump rate adjustments. Please contact your diabetes team for assistance.

Bolus Adjustments

General Principles:

- To evaluate the insulin to carbohydrate ratio, examine meals that have a pre-meal blood glucose that is in target
- If the blood glucose rises more than 3 mmol/L or less than 1 mmol/L at 2 hours after the meal, an adjustment in the insulin to carbohydrate ratio may be needed
- Insulin to carbohydrate ratio can be changed by 1-2 gram every 2-3 days (eg. 1u of insulin:10g carbohydrate may be adjusted to 1u of insulin:9g carbohydrate if blood glucose climbs more than 3mmol/L)
- Be sure to count carbohydrate grams accurately
- Choose low fat meals and normal amounts of protein
- Evaluate each meal separately
- Do not exercise around the time of the meal you are evaluating
- Do not correct 2 hour post meal while evaluating

These are only general guidelines for pump adjustments. Please contact your diabetes team for assistance.

5. Special Situations

Includes:

- A Guide for Exercise and Diabetes
- Carbohydrate and Insulin Adjustments for Exercise
- Alcohol
- Traveling with a Pump
- Time off the Pump
- Hospitalization and Your Pump

A Guide for Exercise and Diabetes

Benefits of Exercise

- Builds muscle and burns fat
- Maintains strong bones
- Improves blood lipid profile
- Increases insulin sensitivity
- Decreases blood glucose (short term and in longer term)
- Increases life expectancy
- Improves mood

Common Exercise Challenges in Type 1 diabetes

1. Too little carbohydrate or too much insulin leading to hypoglycemia
2. Too much carbohydrate or not enough insulin leading to hyperglycemia
3. Too little fluid and/or fuel leading to fatigue and poor performance

Before Exercise	
Check	✓ **Blood glucose levels should be between 5-14 mmol/L to begin exercise** ✓ If < 5 mmol/L, consume 15 g carbohydrate and check blood glucose 15 min later. ✓ If > 14 mmol/L with ketones, treat with insulin. Once ketones are not present exercise can begin cautiously, If > 14 mmol/L without ketones exercise can begin cautiously.
Hydrate	✓ Drink 1 cup (250 mL) of fluid 20-30 minutes before activity.
Insulin	✓ Inject insulin away from the exercising muscle. ✓ Insulin may need to be adjusted for moderate to high intensity over 30 minutes.
Snack	✓ A carbohydrate-electrolyte sports drink of 6-8% carbohydrate may be used to cover some or all of your carbohydrate needs (i.e. sports drinks such as Gatorade). ✓ Always plan ahead and carry your own fluids, snacks, and a fast acting carbohydrate for treatment of hypoglycemia. ✓ Snack before exercise according to your blood glucose level and type of activity.

During Exercise

Check
- ✓ Check blood glucose every 30 minutes during long periods of exercise.
- ✓ Blood glucose may rise with high intensity exercise.

Hydrate
- ✓ Maintain fluid intake of 1 cup (250 mL) for every 20-30 minutes of exercise.
- ✓ Dehydration can lead to hyperglycemia and fatigue.

Insulin
- ✓ Adjustments may be needed during long duration activities.

Snack
- ✓ Carry fluids and carbohydrate foods with you – always carry more than you think you may need (see Carbohydrate Adjustment on the following page).
- ✓ Higher glycemic index food choices are preferred just prior to or during exercise.

After Exercise

Check
- ✓ Check blood glucose levels after exercise. Check blood glucose overnight if activity was intense or long as hypoglycemia may occur up to 24-48 hours after exercise.

Hydrate
- ✓ Replace fluids with either water or sports drink.

Insulin
- ✓ Insulin may need to be adjusted for up to 12-24 hours after activity.
- ✓ Caution taking a correction after exercise. Use only ½ of the usual dose.

Snack
- ✓ Snack within 30 minutes after the activity (high glycemic index carbohydrate plus protein).
- ✓ Try low glycemic index snacks 1-2 hours after activity. This can protect against delayed hypoglycemia and help to replenish glucose stores.
- ✓ Avoid consuming alcohol as it may interfere with your ability to sense high or low blood glucose levels and with restoring glucose in the liver and muscle.

Common carbohydrate foods used for sports:

Choices	Serving	Approximate Net Carb	Glycemic Index
Banana	1 small	20 g	Low
Yogurt, low fat	¾-1cup	15-30 g	Low
Milk, low fat white	1 cup (250 ml)	12 g	Low
Milk, chocolate	1 cup (250 ml)	28 g	Low
Oatmeal cookie	1	10-20 g	Med
Granola Bar	1 bar (28g)	15-25 g	Med
Plain white bagel	¼ large	10-15 g	High
Sports gels	1 package	23-26 g	High
Sports Drinks	8 oz (250 ml)	15 g	High

Carbohydrate and Insulin Adjustments for Exercise

Guidelines for CHO Intake Before and During Exercise		
Exercise	**Blood Glucose**	**+ CHO/Time**
Low intensity/ short duration (30 minutes)	< 5.0 mmol/L	10-15 g
	> 5.0 mmol/L	Not required
Moderate intensity/ moderate duration (30-60 minutes)	< 5.0 mmol/L	15 g before + 15-30 g during
	5.0 -9.9 mmol/L	10-15 g
	10 - 13.9 mmol/L	Not required during but may need later
Moderate intensity/ long duration (ie football, hockey, basketball, strenuous cycling)(1 hour +)	< 5.0 mmol/L	30-45 g (part as mixed low fat snack before)
	5.0-10 mmol/L	30-45 g per hour divided into 10-15g every 20-30 min
	10-13.9 mmol/L	15 g per hour
High Intensity – short bursts of intense activity, usually can't be maintained more than 1 hour (i.e. competitive hockey, competitive rowing)	< 5.0 mmol/L	50 g (part as mixed low fat snack before)
	5.0-10 mmol/L	45 g per hour divided into 15g every 20-30 min
	10-13.9 mmol/L	15 g per hour

1. *Do not exercise if blood glucose is >14 mmol/L with ketones or over 16.7 mmol/L without
2. A "comfortable" starting blood glucose is approximately 6.5-8 mmol/L
3. For 1 hour mixed exercise at the gym, the recommended order is
    1. Warm up (10 minutes)
    2. Weights (~ 20-25 minutes)
    3. Cardio (~ 20-25 minutes)

*(Weight training before most of your cardio workout will help to give better stability in blood glucose.)

Hyperglycemia and Exercise

Hyperglycemia that follows high intensity exercise may be due to insulin deficiency or due to a stress response.

Hypoglycemia and Exercise

Too much insulin during activity may cause hypoglycemia. Delayed hypoglycemia following moderate or strenuous activity is common. This usually occurs 6-15 hours following the activity and can be responsible for hypoglycemia 24 or more hours later.

Guidelines for Insulin Adjustment During Exercise		
Adjust the insulin acting **during** exercise using these guidelines		
Percent to decrease peaking insulin	**Intensity of exercise**	**Duration of exercise**
0%	Low, moderate, or high	Short (30 minutes)
5%	Low	Intermediate to long
10%	Moderate	Intermediate (30-60 minutes)
20%	Moderate	Long (60 minutes or more)
20% - 30%	*High intensity	Intermediate
30% - 50%	*High intensity	Long

* In some cases high intensity exercise may cause blood glucose to increase, requiring an increase in insulin.

If your blood glucose is high following activity, only use ½ your normal correction dose. Later in the day or overnight, a reduction in basal of ~20% may be required.

Alcohol and Diabetes

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 glucose?	☐	☐

If you answered "no" to any of these questions, you should speak to your diabetes educator or healthcare 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 less than 3 standard drinks/ day or less than 15 drinks/ week for men.

This recommendation is the same for people without diabetes.

What is a "standard drink"?

1 standard drink (13.6 g of alcohol):

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

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

Wine
150 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 Canadian Diabetes Association Clinical Practice Guidelines recommend that:

- People using insulin or insulin secretagogues should be aware of delayed hypoglycemia (low blood glucose) that can occur up to 24 hours after drinking alcohol.
- People with type 1 diabetes should be aware of the risk of morning hypoglycemia if alcohol is consumed 2 to 3 hours after the previous evening's meal.
- Alcohol should be limited to 2 standard drinks/ day or less than 10 drinks/ week for women and less than 3 standard drinks/ day or less than 15 drinks/ week for men.
- People with diabetes should discuss alcohol use with their diabetes healthcare 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 glucose
- 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 glucose. To reduce this risk, take the following steps:

BEFORE drinking alcohol

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

- Always have a treatment for low blood glucose with you (such as 3 glucose tablets or ¾ cup regular pop or 6 Life Savers®).
- Wherever you are, make sure someone with you knows your signs and symptoms of low blood glucose and how to treat it so they can help you.
- Be aware that glucagon, a treatment for low blood glucose, 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 glucose symptoms.

(eg.)

- Check your blood glucose before going to bed. Eat a carbohydrate snack if your blood glucose 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 glucose 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 glucose, 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	5
non-alcoholic*	355 mL (~12 fl.oz)	50-80	11-17
low carb*	341 mL (12 fl.oz)	92	3
Spirits/Hard liquor	45 mL (1.5 fl.oz)	98	0
Liqueurs & Cordials	45 mL (1.5 fl.oz)	155-190	10-25
Wine:			
regular	150 mL (5 fl.oz)	123-127	1-4
dessert	150 mL (5 fl.oz)	232	23
non-alcoholic	150 mL (5 fl.oz)	9	1
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)	88-99	23-25
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	11
Tomato and clam juice†	250 mL (8 fl.oz)	123	28

Reference: Canadian Nutrient File, 2010; USDA, 2011; *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 glucose.
- Heavy alcohol drinkers (more than 3 drinks daily) are strongly advised to reduce the amount of alcohol they drink. Heavy alcohol use can make blood glucose control more difficult and increases other health risks.
- Talk to your diabetes educator or healthcare professional if you have questions.

Related article: *High blood pressure and diabetes*

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

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.

Travel with an Insulin Pump

Carry everything that you need on board the airplane.
See list on the next page. Additional items may also be packed in checked luggage, but all insulin and test strips should be carried with you as it may be exposed to extreme temperatures in transit.

Write down your current basal rates and carry this in a safe place. Also write down instructions for how much insulin to give if disconnected from the pump.

Your pump (and any loaner pump) should not be exposed to X-ray at customs. If questioned, ask if the screener wishes to visually inspect your insulin pump. Explain that you cannot remove it from your body. The walk through and wand are ok. Communication between meter and pump should be turned off while onboard the plane.

Be prepared for higher blood glucose while traveling. Check blood sugar often and stay hydrated.

Insulin may not last as long out of the fridge in a hot country. If crystals form in the bottle, throw it away.

In Canada, we use U100 insulin. Other countries may use U40 insulin. Your pump and syringes are meant to be used with U100 insulin only.

Crossing time zones is easy to manage with an insulin pump. Upon arrival at your destination, set the pump clock to local time.

Check your blood glucose often. Check blood glucose through the night until your blood glucose is stable.

Additional Tips

- Sign up for IAMAT (www.iamat.org). This organization provides English medical assistance in other countries.
- Know a few phrases in the language of the country you are visiting: “I have diabetes”. “I need juice.” “I need a hospital/doctor.”
- Carry a letter from your doctor confirming your need to carry glucometer/ pump/ needles/ insulin and other supplies with you.

Other considerations: travel health insurance, first aid kit, sunscreen, insect repellent, pain medication, anti-nausea and anti-diarrhea pills, comfortable walking shoes, bottled water or portable water filter, carbohydrate counting book.

Did you know….

Diabetes Canada partners with Ingle Insurance to offer travel insurance. Call 1-800-BANTING (226-8464) or contact your local Diabetes Canada branch for details.

St JOSEPH’s HEALTH CARE LONDON

Supply List

- ☐ Glucometer and strips
- ☐ Logbook
- ☐ Pump supplies (pack more than you usually use)
- ☐ Ketone strips
- ☐ Quick sugar
- ☐ Insulin (double usual supply) – carry this in a zip-lock bag for easy viewing
- ☐ Syringes
- ☐ Spare pump, pre-programmed with current settings, spare glucometer
- ☐ Extra batteries for meter and pump
- ☐ Extra food (crackers, granola bars, “fruit to go”,….)
- ☐ Glucagon kit
- ☐ ID card / medic alert bracelet
- ☐ Travel letter with medication list and contact numbers for health care team
- ☐ Travel letter from your physician, specialist or DEC team

For more information about diabetes and travel visit:
http://www.diabetes.ca/diabetes-and-you/healthy-living-resources/general-tips/travel-tips-for-people-with-diabetes

Amusement Park Rides

Remove your pump for “free-fall” types of rides to avoid electromagnet exposure. Disconnect (NOT suspend) your pump on roller-coaster rides to avoid effects of high gravity forces. If using OmniPod, it is not necessary to remove the pod for amusement park rides.

Time off the Pump

Time Off:	Try This:
Less than 1 hour	Do nothing if blood glucose is within acceptable range. Bolus or inject rapid insulin as per insulin to carbohydrate ratio if carbohydrates will be eaten or correction factor if your blood glucose is high before disconnecting.
1 to 5 hours	Cover 80% of the basal insulin during your time off the pump with a bolus prior to disconnecting or an injection of rapid insulin. Use your insulin to carbohydrate ratio if eating carbohydrate or correction factor if blood glucose is high during your time off by reconnecting and bolusing or with an injection.
More than 5 hours or overnight	Every 4 to 5 hours, replace 80% of the basal insulin with an injection of rapid insulin. Use your insulin to carbohydrate ratio for any carbohydrates eaten and use your correction factor as needed to lower your blood sugar to target. For overnight basal coverage, an alternative to injecting rapid insulin every 4 to 5 hours is to take long acting insulin equal to the next 12 hours of basal insulin at bedtime.
Longer than a day	Determine your average total daily dose (TDD) from your pump history. Give ½ of the average TDD in one or two injections of long acting insulin per day. Use injections of rapid insulin to cover carbohydrate and correction doses.

St JOSEPH's HEALTH CARE LONDON

Hospitalization and Your Pump

To Hospital Staff:

This patient uses an insulin pump. The pump delivers rapid–acting insulin in a way that mimics a normally functioning pancreas. Insulin delivery is programmed into the pump to match this patient's individual needs as determined by the patient's blood glucose levels, food intake, and lifestyle. This patient checks their blood glucose 4-8 times a day and adjusts their insulin based on these readings to maintain good glycemic control.

Insulin is delivered subcutaneously via the pump as a continuous basal rate and a bolus dose is given with food.

Basal Rate

This basal rate helps maintain a normal metabolic state when not eating (fasting). Generally the rate is approximately 50% of the total daily insulin dose over 24 hours.

Bolus Dose

The patient gives a bolus dose as needed for food or to correct high blood glucose and is taught to adjust this dose based on blood glucose readings, food intake, and activity.

Pump therapy during hospitalization or surgery provides the best means for normalizing the patient's blood glucose through these times of physiological stress. The best resource for pump management when in hospital is the patient.

Special warning for patients wearing the insulin pump:

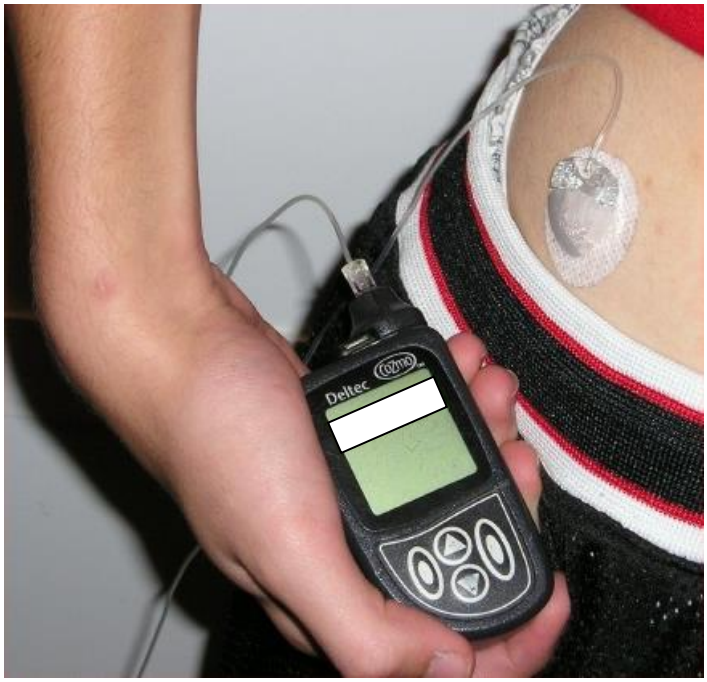
Do not remove the insulin pump unless insulin infusion is continued by IV or by injection. If insulin delivery is discontinued, diabetic ketoacidosis (DKA) may result. If DKA is not treated immediately, it may be life threatening. If the pump is discontinued, the wearer will need rapid acting insulin immediately.

For further information, please contact the Diabetes Education Centre of St. Joseph's Health Care London at (519) 661-1600.

STOP

Don’t Shut Off!

You wouldn’t shut off a pacemaker...



So why would you shut off an insulin pump?

St. JOSEPH’S HEALTH CARE LONDON

6. Carbohydrate Counting and Resources

Includes:

- Carbohydrate Choices with Weights
- Using Food Labels
- Beyond Carbohydrate Counting
- Glycemic Index of Some Common Foods
- Resources for Carbohydrate Counting
- Nutrient Values of Foods Commonly Used in Recipes
- Recipe Calculation Sheet (includes example)
- Recipe Analyzer
- Food Record Sheet (blank and completed example)

Carbohydrate Choices with Weights

A carbohydrate choice is the amount of a food that has about 15 grams of carbohydrate and varying amounts of protein and fat. Carbohydrate choices must be regulated to help blood glucose control.

Grains/Beans/Starchy Vegetables	Serving Size		Choices	Carbohydrate
Bagel	1 bagel	(120g)	4	60g
Baked beans	1/3 cup	(90g)	1	20g
Beans, (pinto, garbanzo, kidney), cooked or canned	½ cup	(90g)	1	15g
Bread	1 slice	(30g)	1	14g
Cereal, cooked (1/3 cup dry cereal)	3/4 cup	(180g)	1	15g
Cereal, unsweetened, ready-to-eat	3/4 cup	(20g)	1	15g
Corn	½ cup	(85g)	1	17g
Dinner roll	1 roll	(30g)	1	13g
English muffin	1 muffin	(55g)	1½	23g
# French Fries	10 pieces	(40g)	1	15g
Hamburger or hot dog bun	1 bun	(60g)	2	28g
Pancakes, 4" across	1 pancake	(38g)	1	15g
Pasta (macaroni, noodles, spaghetti), cooked	½ cup	(75g)	1	20g
Peas, green	1 cup	(170g)	1	16g
Potato, baked or boiled	1 medium	(165g)	2	30g
Potato, mashed	½ cup	(110g)	1	17g
Rice, long grain, white or brown, cooked	1/3 cup	(60g)	1	16g
Squash, acorn or butternut, cooked	1 cup	(200g)	1	18g
Tortilla, 6" across	1 tortilla	(50g)	1½	25g
# Waffle, 4" across	1 waffle	(35g)	1	12g
Fruits/Fruit Juices	**Serving Size**		**Choices**	**Carbohydrate**
Apple	1 small	(140g)	1	16g
Banana without peel	1 large	(135g)	2	30g
Blueberries	1 cup	(155g)	1	17g
Canned fruit in juice or water (ex: peaches in juice)	½ cup	(125g)	1	15g
Cantaloupe (cubed)	1 cup	(170g)	1	13g
Cherries	12-15	(100g)	1	15g
Fruit juice: orange, grapefruit, lemonade, apple	½ cup	(125g)	1	15g
Fruit juice: cranberry, grape	1/3 cup	(75 g)	1	15g
Grapefruit	½ medium	(125g)	1	11g
Grapes	12-15	(75g)	1	13g
Honeydew (cubed)	1 cup	(175g)	1	15g
Mango	½ medium	(104g)	1	16g
Orange, peeled	1 medium	(150g)	1	14g
Peach	1 large	(160g)	1	13g
Pear	1 small	(140g)	1	17g
Pineapple	¾ cup	(120g)	1	15g
Prunes (no pits)	3 prunes	(15g)	1	14g
Raisins	2 Tbsp	(18g)	1	14g
Raspberries	2 cups	(260g)	1	15g
Strawberries (whole), Blackberries	2 cups	(300g)	1	14g
Watermelon (cubed)	1 cup	(160g)	1	12g

Higher in fat

St. JOSEPH'S HEALTH CARE LONDON

Milk/Yogurt/Milk Substitutes	Serving Size		Choices	Carbohydrate
Milk, skim or low-fat (1%)	1 cup	(250ml)	1	13g
# Milk, reduced fat (2%) or whole	1 cup	(250ml)	1	12g
Rice beverage	1 cup	(250ml)	2	26g
Soy milk, low-fat or non-fat, original	1 cup	(250ml)	1	7g
Yogurt, low-fat, artificially sweetened or plain	3/4-1 cup	(200-250ml)	1	15g
Yogurt, low-fat, sweetened, with fruit	3/4-1 cup	(200-250ml)	2	30g
Combination Foods*	**Serving Size**		**Choices**	**Carbohydrate**
Asian entrée (no rice)	1 cup		1	15g
# Burrito with beans and cheese	1 burrito	(95g)	1½	23g
# Burrito with beef, cheese and chili	1 burrito	(152g)	2	30g
Chili con carne	1 cup	(270g)	1	18g
# Frozen dinner, 8-11oz	1 dinner	(220-300g)	2-3	30-45g
Frozen dinner, reduced calorie, “healthy”, 8-11oz	1 dinner	(220-300g)	2-3	30-45g
Hamburger with bun, regular size	1 burger	(140g)	2	30g
# Lasagna, with meat, 3” x 4” piece	1 piece	(230g)	2	35g
Lasagna, vegetarian, 3”x 4” piece	1 piece	(256g)	3	43g
# Macaroni and cheese-packaged	1 cup	(200g)	3	47g
# Pasta salad	½ cup	(95g)	1	16g
# Potato salad	½ cup	(130 g)	1	13g
# Pizza, thick –crust, medium	1 slice (1/8 pizza) (90g)		2	30g
# Pizza, thin-crust, medium	1 slice (1/8 pizza) (45g)		1	12g
Soup (bean, noodle, or vegetable)	1 cup	(250g)	1	15g
# Soup, cream	1 cup	(260g)	1	16g
# Spaghetti or pasta sauce, canned	½ cup	(125g)	1	15g
# Sub sandwich, 6” long	1 sub	(230g)	3	41g
# Taco prepared with beef, cheese, salsa, vegetables	1 taco	(80g)	1	12g
Combination Foods*	**Serving Size**		**Choices**	**Carbohydrate**
# Brownie or cake, 2” square, frosted	1 piece	(45g)	2	37g
# Chips, potato or tortilla	10-15 chips	(30g)	1	15g
# Chocolate candy bar, snack size	1 bar	(15g)	1	15g
# Cookie, oatmeal, without raisins, homemade	1 cookie	(30g)	1	19g
# Cookie, chocolate chip, commercial	1 cookie	(20g)	1	12g
# Crackers, soda	6 crackers	(20g)	1	14g
# Doughnut, glazed, 3” across	1 doughnut	(60g)	2	26g
Frozen yogurt, nonfat or low-fat, plain	½ cup	(76g)	1	18g
Gelatin, regular (not sugar free)	½ cup	(145g)	1	20g
Graham crackers, arrowroots	3	(21g)	1	15g
# Granola bar	1 bar	(25g)	1	15g
Hard candies	3 round	(18g)	1	15g
# Ice cream or light ice cream	½ cup	(75g)	1	18g
Jam or jelly, regular	1 Tbsp.	(20g)	1	15g
# Muffin, small, homemade	1 muffin	(60g)	2	28g
Popcorn, popped, no fat added	3 cups	(24g)	1	18g
Pretzel, hard, plain	38 sticks	(20g)	1	15g
Pudding, sugar free	½ cup	(100g)	1	14g
Syrup, honey, or table sugar	1 Tbsp.	(20g)	1	15g

Higher in fat

Free Foods

Free foods have less than 5 grams of carbohydrate and less than 20 calories per serving. They have no significant effect on blood glucose levels and are not counted in your food plan.

Unlimited	***Up to 3 servings per day is free (spread throughout the day)***
Coffee, tea	Condiments (Ketchup, taco sauce, mustard), 1 Tbsp.
Diet soft drinks, mineral water	Jams and jellies, low sugar or light, 1-2 tsp.
Seasonings	Salad dressings, fat-free, 1 Tbsp.
Sugar substitutes	Syrup, sugar free, 2 Tbsp.

* Some of these dishes can be modified to reduce fat and salt content.

Reference:

Health Canada. Canadian Nutrient File Database [updated 2012 Apr 26; cited 2014 Dec 31]. Available from: http://webprod3.hc-sc.gc.ca/cnf-fce/index-eng.jsp.

Using Food Labels

The best way to know how much carbohydrate, fat and sodium are in the foods you eat is to look at the label on the package.

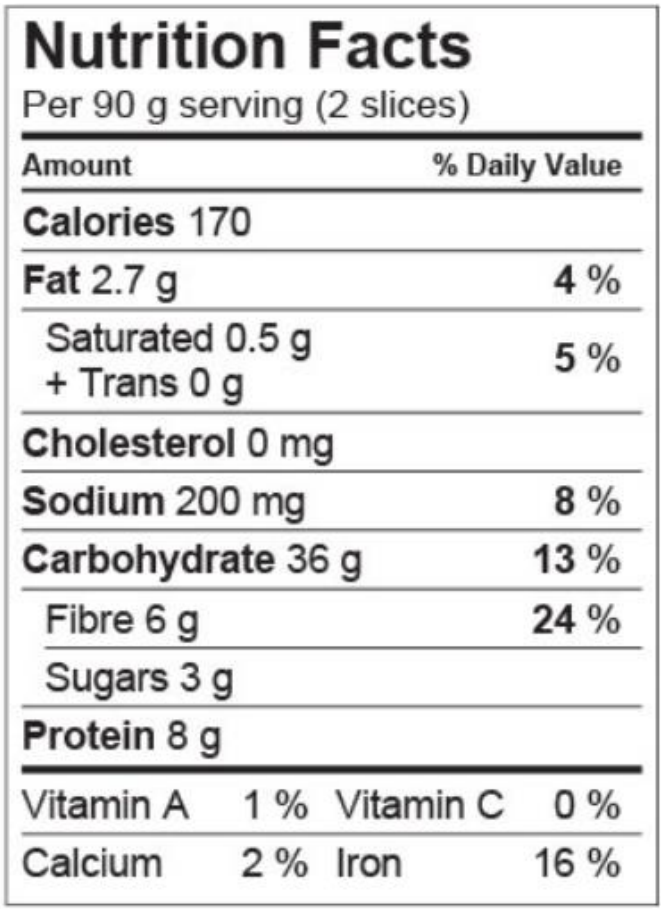
Serving Size

All of the information on the label is based on this serving size. If you eat double the serving size, the nutrients will be doubled as well.

Fat

This gives the total grams of fat in a serving of this food.

- Choose foods lower in fat
- Aim for ≤ 5% Daily Value (DV)
- Choose foods *low in saturated fat and with no trans fat*



Nutrition Facts

Per 90 g serving (2 slices)

Amount	% Daily Value
Calories 170	
Fat 2.7 g	**4** %
Saturated 0.5 g + Trans 0 g	**5** %
Cholesterol 0 mg	
Sodium 200 mg	**8** %
Carbohydrate 36 g	**13** %
Fibre 6 g	**24** %
Sugars 3 g	
Protein 8 g	

Vitamin A	1 %	Vitamin C	0 %
Calcium	2 %	Iron	16 %

Sodium

This shows the total milligrams of sodium in a serving of food. High sodium foods may increase your blood pressure.

- Choose lower sodium foods
- Consider that a Daily Value (DV) of 5% is a little and 15% is a lot

Carbohydrate

This shows the total grams of carbohydrate in one serving. Carbohydrate includes all starch, sugar, dietary fibre and sugar alcohol.

- Subtract the grams of **Fibre** and **Sugar Alcohol** from the grams of carbohydrate
- Aim for ≥ 15% Daily Value (DV) of fibre when comparing products

Beyond Carbohydrate Counting

Have you noticed that certain foods seem to impact your blood glucose differently than others even though they have the same amount of carbohydrate?

Listed below are some factors to consider in addition to the total amount of carbohydrate.

Glycemic Index

The Glycemic Index (GI) is a scale that ranks carbohydrate foods by how much they raise your blood glucose. High GI foods raise your blood glucose higher and faster compared to lower GI foods. Try to choose foods that have a lower GI more often.

See “Glycemic Index of Foods” for more information.

Glycemic Load

As the portion size of a food increases, so may the effect on your blood glucose. The Glycemic Load (GL) describes how high the carbohydrates in a *serving* of food will raise your blood glucose.

To calculate the GL, multiply the food’s GI by the grams of carbohydrate in the serving, and then divide that number by 100.

A low GL is under 10, medium 11-19, and 20 or over is high.

For example: pasta has a low GI yet as the portion size increases from 1 to 2 cups, the GL increases from 12 (medium) to 24 (high).

Accommodating meals with a high GL may require an adjustment in insulin.

More to consider…

The combination of foods in a meal can also affect how high and fast your blood glucose rises. Foods or meals with protein, fat, or fibre can slow digestion and result in a more gradual rise in blood glucose.

Glycemic Index of Some Common Foods

The Glycemic Index (G.I.) ranks foods from 0-100 based on how fast they are absorbed and how high they raise blood glucose.

Low G.I. (55 or less)		Intermediate G.I. (56 - 69)		High G.I. (70 or more)	
Breakfast Cereals					
All Bran	49	Cream of Wheat	66	Bran Flakes	74
Bran Buds with Psyllium	47	Oat Bran	60	Cheerios	74
Frosted Flakes	55	Puffed Wheat	67	Cornflakes	77
Muesli – natural	40	Raisin Bran	61	Corn Chex or Shredded Wheat	83
Oatmeal – steel-cut	52	Special K	69	Instant Oatmeal-made with water	82
Oatmeal – rolled oats	51			Rice Krispies	82
Breads and Baked Goods					
Corn Tortilla	53	Angel Food Cake	67	Bagel - plain	70
English Muffin - whole grain	45	Digestives - plain	62	Baguette - French	77
Oatmeal Cookies	54	Hamburger Bun	61	Dark Rye	80
Pizza – whole wheat/cheese	54	Muffin – Blueberry	59	Doughnut	76
Rye Bread – whole grain	55	Pita – whole grain	56	Gluten Free Bread - multigrain	79
Sourdough Bread	54	Pumpernickel	56	Rice Crackers - plain	91
Tea Biscuit - sweet	55	Rye Bread - light	68	Soda Crackers	74
100% Whole Grain Bread	54	Stoned Wheat Thins	67	Waffles	76
				White Bread / Bread Roll	71
				Whole Wheat bread	71
Grains / Pasta					
Barley – pearled, boiled	35	Basmati Rice	60	Brown Rice Pasta	92
Bulgur	46	Cornmeal	68	Instant Rice	87
Brown Rice	48	Couscous	65	Millet	71
Converted/White Rice	43	Macaroni & Cheese - Kraft	64	Short Grain White Rice (sushi)	85
Macaroni	47	Taco Shells	68	Jasmine Rice	109
Spaghetti	42	Vermicelli Rice- cooked	58		
Quinoa	53				

Low G.I. (55 or less)		Intermediate G.I. (56-69)		High G.I. (70 or more)	
Beans / Legumes					
Baked Beans	48	Broad Beans	63		
Black Beans	30				
Chickpeas	36				
Kidney Beans	36				
Lentils, Green – dried, boiled	30				
Lentils, Red – dried, boiled	26				
Lima Beans	32				
Soy Beans	20				
Fruits & Vegetables					
Apple	38	Beets – canned, drained	64	Potato – instant, mashed	88
Apricots – dried	30	Cantaloupe	65	Potato – russet, baked	76
Banana – ripe	52	Cherries – dark	63	Rutabaga	72
Carrots – peeled, boiled	39	Fruit cocktail – canned in juice	55	Watermelon	76
Dates	38	Kiwi	58		
Grapefruit	25	Mango – ripe	60		
Grapes – green	46	Papaya – ripe	60		
Orange	42	Pineapple- fresh	59		
Peach	47	Potato – average, boiled	58		
Pear – Bartlett	41	Pumpkin – peeled, cubed, boiled	66		
Peas - green	45	Raisins	64		
Plum	39	Sweet corn – boiled	60		
Prunes	29				
Squash - butternut	51				
Sweet potato - boiled/baked	46				
Parsnips – boiled	52				
Yam – peeled, boiled	54				

Low G.I. (55 or less)		Intermediate G.I. (56-69)		High G.I. (70 or more)	
Snacks					
Plain Chocolate – milk / dark	41	Arrowroot cookies	63	Fruit Roll-Up	99
Corn Chips	42	Mars bar	62	Jelly beans	78
Hummus	22	Pringles Original	57	Licorice - soft	78
Popcorn	55	Shortbread cookies	64	Life Savers - peppermint	70
Potato chips	51			Pretzels	83
Pudding, instant, vanilla	40			Rice Krispie treat	63
Nuts – plain	23			Vanilla wafers	77
Milk and Milk Alternative Products					
Chocolate milk	37	Condensed milk	61	Rice milk	79
Custard – low fat	38				
Frozen yogurt	50				
Ice cream – low fat, vanilla	35				
Milk – 1% skim	32				
Soy Milk	15-40				
Yogurt – non-fat, artificially sweetened	20				
Beverages – 8oz serving					
Apple juice – unsweetened	40	Beer – 4.6% alcohol	66	Gatorade	78
Cranberry Cocktail	56	Cola	63		
Orange juice – unsweetened	53	Fanta Orange	68		
Prune juice – unsweetened	43	Fruit Punch	67		
Tomato juice	38				

Adapted from:
1. University of Sydney. (2017). *Search for the Glycemic Index*. Retrieved from: www.glycemicindex.com
2. Brand-Miller J., Wolever T.M.S., Foster-Powell K , Colagiuri S. (2010). *The Low GI Handbook: Guide to the Long-term Health Benefits of Low GI Eating*. Philiadelphia, PA, Da Capro Press.

Resources for Carbohydrate Counting



1. Health Canada's publication of “Nutrient Value of Some Common Foods” is a comprehensive listing of food choices available for consumption in Canada. You can view a PDF version of the publication at: www.healthcanada.gc.ca/cnf
2. The USDA national nutrient database is available online at: http://www.nal.usda.gov/fnic/foodcomp/search
3. The Calorie King Calorie, Fat & Carbohydrate Counter at www.CalorieKing.com
4. Dietitians of Canada: http://www.dietitians.ca Recipe Analyzer
   EaTracker
5. Nutrition Software:
   - Diabetes Pilot
   - Nutrition Menu
6. Nutrition Scales:
   - Perfect Portions
   - Diascale
7. Books:
   - Walsh, J. and Roberts, R. Pumping Insulin. Everything You Need For Success On An Insulin Pump (Sixth Edition). 2016. Torrey Pines Press, San Diego, CA.
   - Netzer, C.. The Complete Book of Food Counts. 2011. Dell Publishing. New York.
   - Borushek, Allan. The Doctor's Pocket Calorie, Fat & Carbohydrate Counter. 2003. Family Health Publications. Costa Mesa, CA.

Nutrient Value of Foods Commonly Used In Recipes

FOOD	MEASURE	*AVAILABLE CARBOHYDRATE (g)	PROTIEN (g)	FAT (g)
Cereal and Grain Products				
Bran, natural, raw	250 ml (1 cup)	18	10	3
Bread crumbs	250 ml (1 cup)	76	14	6
Barley, uncooked	125 ml (½ cup)	55	12	2
Corn Meal	250 ml (1 cup)	103	12	2
Corn Starch	30 ml (2 tbsp.)	15	--	--
Flour, all purpose, sifted				
White	250 ml (1 cup)	96	14	2
Whole Wheat	250 ml (1 cup)	76	18	2
Oat Bran, dry	250 ml (1 cup)	56	18	6
Rice				
Brown, uncooked	125 ml (½ cup)	72	7.5	2
White, uncooked	125 ml (½ cup)	77	7	<1
Parboiled, cooked	250 ml (1 cup)	45	4	--
Rolled Oats, dry	250 ml (1 cup)	51	12	6.5
Wheat germ	45 ml (3 tbsp.)	9	6	3
Dairy Products				
Cheese				
Cheddar, shredded	250 ml (1 cup)	2	29	40
Cheese Whiz	30 ml (2 tbsp.)	3	5	7
Cottage, 2%	250 ml (1 cup)	6	30	2
Cream cheese, regular	30 ml (2 tbsp)	1	2	10
Milk /Yogurt				
Skim	250 ml (1 cup)	13	9	0
1%	250 ml (1 cup)	13	9	2.5
2%	250 ml (1 cup)	12	8.5	5
Buttermilk, 1%	250 ml (1 cup)	12.5	8.5	2
Yogurt, plain, 1%	175ml (¾ cup)	13	10	3
Cream, half and half	60 ml (¼ cup)	4	tr	8
Fats				
Butter/Margarine	60 ml (¼ cup)	--	--	45
Shortening	60 ml (¼ cup)	--	--	56
Vegetable oil	60ml (¼ cup)	--	--	52
Sour Cream, 14%	60 ml (¼ cup)	4	tr	8
Fruit				
Applesauce, unsweetened	250 ml (1 cup)	27	--	--
Banana	1 medium	25	1	--
Dates, dried, pitted	3	17	1	--
Raisins, dried, seedless	60 ml (¼ cup)	28	1	--

FOOD	MEASURE	*AVAILABLE CARBOHYDRATE	PROTIEN (g)	FAT (g)
Legumes				
Beans, baked, cooked	125 ml (½ cup)	21.5	6	0.5
Cow Peas				
Dry	125 ml (½ cup)	43	21	2
Cooked	125 ml (½ cup)	12	5.5	<1
Garbanzos				
Dry	125 ml (½ cup)	56	21.5	6.5
Cooked	125 ml (½ cup)	21	6	1
Kidney				
Dry	125 ml (½ cup)	34	23	2
Cooked	125 ml (½ cup)	12	6.5	--
Lentils				
Dry	125 ml (½ cup)	53.5	25	1
Cooked	125 ml (½ cup)	16.5	9.5	<1
Soybeans				
Dry	125 ml (½ cup)	15	36	18
Cooked	125 ml (½ cup)	3	14	7.5
Split Peas				
Dry	125 ml (½ cup)	59	25	1
Cooked	125 ml (½ cup)	18	8	<1
Miscellaneous				
Biscuit mix, dry	250 ml (1 cup)	83	11	21
Chocolate				
Baking, unsweetened	1 square (1 oz.)	3.5	4	15
Chips, semi-sweet	60 ml (¼ cup)	24.5	2	13
Cocoa	60 ml (¼ cup)	5	4.5	3
Whipped topping	60 ml (¼ cup)	2	0.5	3
Eggs				
White	1	--	3	--
Whole	1	1	6	5
Peanut Butter, smooth	60 ml (¼ cup)	8.5	16	32
Pumpkin, canned	250 ml (1 cup)	12.5	2	--
Tapioca, pearl, dry	15 ml (1 tbsp.)	8.5	--	--
Tomato				
Ketchup	60 ml (¼ cup)	16	--	--
Paste	125 ml (1/2 cup)	21.5	6	<1
Sauce	125 ml (½ cup)	8	2	--
Stewed	125 ml (½ cup)	6.5	1	--

FOOD	MEASURE	*AVAILABLE CARBOHYDRATE	PROTIEN (g)	FAT (g)
Nuts, Nut Products & Seeds				
Almonds	60 ml (¼ cup)	3	8	18
Coconut, dried, shredded, sweetened	60 ml (¼ cup)	10	0.5	8
Peanuts	60 ml (¼ cup)	3	10	19
Pecans, halves	60 ml (¼ cup)	0.5	2	18
Sesame seeds	125 ml (½ cup)	9	13	36.5
Sunflower seeds, plain	125 ml (½ cup)	8	15	36.5
Walnuts, chopped	60 ml (¼ cup)	1	4	17
Sugar & Syrups				
Corn Syrup	60 ml (¼ cup)	64	--	--
Honey	60 ml (¼ cup)	72	--	--
Molasses	60 ml (¼ cup)	64	--	--
Sugar				
Brown, packed	60 ml (¼ cup)	60	--	--
Icing	60 ml (¼ cup)	24	--	--
White	60 ml (¼ cup)	48	--	--

*Available Carbohydrate = (Total Carbohydrate – Dietary Fibre)

NOTE:

1 cup = 16 tablespoons (tbsp.) = 250 ml

½ cup = 8 tablespoons = 125 ml

¼ cup = 4 tablespoons = 60 ml

1 tbsp. = 3 teaspoons (tsp.) = 15 ml

Sources:

1. Health Canada. 2008. Nutrient Value of Some Common Foods. Ministry of Health. Ottawa, Ontario. IBSN 978-0-662-46512-6. Catalogue Number H164-49/2008E. Visit www.healthcanada.gc.ca/cnf

2. Canadian Nutrient File. Health Canada. https://food-nutrition.canada.ca/cnf-fce/index-eng.jsp

Recipe Calculation Sheet (Sample)

Recipe: Oatmeal Buttermilk Muffins

Number of Servings: 12 muffins

Ingredient	Amount of Ingredient	Available Carbohydrate (g)	Fat (g)
Oatmeal	1 cup	51	8
Buttermilk	1 ¼ cups	15	2
Baking Soda	1 tsp.	0	0
Egg	1	0	5
Brown Sugar	¾ cup	168	0
Oil	¼ cup	0	56
Vanilla	1 tsp.	0	0
Baking Powder	2 tsp.	0	0
Salt	¼ tsp.	0	0
White Flour	½ cup	48	1
Whole Wheat Flour	½ cup	38	2
Totals per recipe		320 g	74 g
Totals per serving		27 g	6 g

Recipe Calculation Sheet

Recipe: _____

Number of Servings: _____

Ingredient	Amount of Ingredient	Available Carbohydrate (g)	Fat (g)
Totals per recipe			
Totals per serving			

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Recipe Analyzer

Do you ever wonder how many carbohydrates, fat, protein, or calories are in your favourite recipe?

Visit the online recipe analyzer at www.eatracker.ca and click on the tab: Recipe Analyzer.

The Recipe Analyzer tool will give you information on the nutrients and number of Food Guide Servings your recipe provides. You will also find ingredient substitution tips that you can try to make your recipes healthier (e.g. lower in calories, fat, sugar or salt). You can also compare your new recipe to your original recipe to see the difference.

Register for free!

When done, you can:

- Print your recipe analysis
- Put it in your own recipe binder
- Store your recipe in your personal "recipe box" on the Dietitians of Canada – Recipe Analyzer website. How cool is that!

Note: You must "register" if you want to save your recipes.

You can use the recipe analyzer without registering, or register and take advantage of the following benefits:

- Save recipes to view later
- Compare two recipes
- Create an online recipe box

Food Record (Completed Example)

Date: _____ **Name:** _____

Meal	Food Eaten (include portion)	# Grams Carb	Insulin Taken
Basal Insulin			
Breakfast Time: *7:00 am* Blood Glucose (BG): *9.3*	*2 toast* *1 tbsp. peanut butter* *Coffee with 1 tsp sugar* *10 oz. 1% milk* *½ medium grapefruit*	32 0 5 15 15 67	Meal Insulin: *12* Correction: *1* Total Taken: *13*
Two hour BG: *6.4*			
Activity:*	3 (moved boxes and furniture in office)		
Snack Time: *10:00 am* Blood Glucose (BG): *4.2*	Coffee with 1 packet sweetener and 1 milkette	0	Meal Insulin: *0* Correction: *0* Total Taken: *0*
Lunch Time: *12:45 pm* Blood Glucose (BG): *4.5*	Ham and cheese sandwich on whole wheat bread 3 chocolate chip cookies 1 medium apple Diet pop	32 30 25 0 87	Meal Insulin: *12* Correction: *0* Total Taken: *12*
Two hour BG: *6.1*			
Activity	At work (sitting)		
Snack Time: *2:45 pm* Blood Glucose (BG): *5.1*	Diet pop	0	Meal Insulin: *0* Correction: *0* Total Taken: *0*
Supper Time: *6:30 pm* Blood Glucose (BG): *3.2* *Blood Glucose 4.8* *(15 min after treating)*	*¾ cup orange juice (for low BG)* *Steak* *1 cup rice pilaf (long grain brown)* *Caesar salad (no croutons)* *3 chocolate chip cookies*	 0 45 0 30 75	Meal Insulin: *12* Correction: *0* Total Taken: *12*
Two hour BG: *7.1*			
Activity			
Snack Time: *10:30 pm* Blood Glucose (BG): *10.5*	10 oz. of milk 1 toast with peanut butter	15 16 31	Meal Insulin: *3* Correction: *0* Total Taken: *3*
Basal Insulin			24 Lantus
Bedtime Glucose: *10* Time: *midnight*			
Comments	2 am BG 9.6		

* Write in activity or use 1: less than normal activity, 2: normal activity, 3: more than normal activity.

My Correction is: 1 unit drops blood glucose *2* mmol/L
My Insulin: Carbohydrate ratio is: *1* unit for *6* grams of carbohydrate (breakfast).
My Insulin: Carbohydrate ratio is: *1* unit for *7* grams of carbohydrate (lunch).
My Insulin: Carbohydrate ratio is: *1* unit for *6* grams of carbohydrate (supper).
My Insulin: Carbohydrate ratio is: *1* unit for *10* grams of carbohydrate (bedtime snack).

Adapted from CDA/CSEM Professional Conference October 2004 **Making Carbs Count**

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Food Record (MDI AND PUMP)

**** PLEASE ENSURE YOU BRING AT LEAST 7 DAYS OF BLOOD GLUCOSE READINGS (CHECKING AT LEAST 4 TIMES A DAY) TO YOUR APPOINTMENT ****

Date: _____ **Name:** _____

Meal	Food Eaten (include portion)	# Grams Carb	Insulin Taken
Basal Insulin			
Breakfast Time: Blood Glucose (BG):			Meal Insulin: _____ Correction: _____ Total Taken: _____
Two hour BG:			
Activity:			
Snack Time: Blood Glucose (BG):			Meal Insulin: _____ Correction: _____ Total Taken: _____
Lunch Time: Blood Glucose (BG):			Meal Insulin: _____ Correction: _____ Total Taken: _____
Two hour BG:			
Activity			
Snack Time: Blood Glucose (BG):			Meal Insulin: _____ Correction: _____ Total Taken: _____
Supper Time: Blood Glucose (BG):			Meal Insulin: _____ Correction: _____ Total Taken: _____
Two hour BG:			
Activity			
Snack Time: Blood Glucose (BG):			Meal Insulin: _____ Correction: _____ Total Taken: _____
Basal Insulin			
Bedtime Glucose: Time:			
Comments			

* Write in activity or use 1: less than normal activity, 2: normal activity, 3: more than normal activity.

My Correction is: 1 unit drops blood glucose _____ mmol/L
My Insulin: Carbohydrate ratio is: _____ unit for _____ grams of carbohydrate (breakfast).
My Insulin: Carbohydrate ratio is: _____ unit for _____ grams of carbohydrate (lunch).
My Insulin: Carbohydrate ratio is: _____ unit for _____ grams of carbohydrate (supper).
My Insulin: Carbohydrate ratio is: _____ unit for _____ grams of carbohydrate (bedtime snack).

Adapted from CDA/CSEM Professional Conference October 2004 **Making Carbs Count**

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7. Additional Resources

Includes:

- Additional Insulin Pump Resources
- Pump Class Information

Additional Insulin Pump Resources

The resources listed are provided as a starting point to help you access further information. We are not promoting any specific products.

Diabetes Association Websites

www.diabetes.ca – Diabetes Canada
www.diabetes.org – The American Diabetes Association
www.jdrf.ca –The Juvenile Diabetes Research Foundation

Pump Websites

www.medtronic.com – Information for Minimed products
www.myomnipod.ca – Information for OmniPod products
www.tandemdiabetes.com –Information for Tandem products

Nutrition Websites

www.dietitians.ca – Dietitians of Canada: wide variety of reliable nutrition information
www.unlockfood.ca – Nutrition, food, and healthy eating information as well as recipes
www.eatright.org – Academy of Nutrition and Dietetics: healthy eating resources
www.calorieking.com – Nutrition information of specific foods
www.glycemicindex.com – Up-to-date list of glycemic index of foods

General Diabetes Products

www.diabetesexpress.ca – Source of books, food scales, supplies etc.
www.diabetes.org – Carry many diabetes and pump supply products
www.spibelt.com – Waist belt for sports, can be used to hold pump

Reference Books

- Walsh, J. and Roberts, R. Pumping Insulin. Everything You Need For Success On An Insulin Pump (Sixth Edition) Torrey Pines Press, San Diego, CA, 2016. ISBN 1884804888.
- Colberg, Sheri R. Diabetic Athlete's Handbook. Your Guide to Peak Performance, Human Kinetics 2009.
- Riddell, M. Getting Pumped! An Insulin Pump Guide for Active Individuals with Type 1 Diabetes. 2016. Glue Inc. ISBN 9780994949608.

On An Insulin Pump?

Can you relate to any of these statements?

- ☐ My A1C is more than 7%
- ☐ I have trouble controlling my blood glucose when I exercise
- ☐ I am having many low blood glucoses
- ☐ My blood glucose levels are extremely unpredictable
- ☐ I'm not sure how to adjust my insulin for special situations

Would you like more information of ways to help improve blood glucose on a pump?

We invite you to call the Diabetes Education Centre (519) 661-1600 to schedule a follow up visit.

Also available: Lifestyle Aspects of Heart Health Class

To register for this class,

call the Diabetes Education Centre at (519) 661-1600

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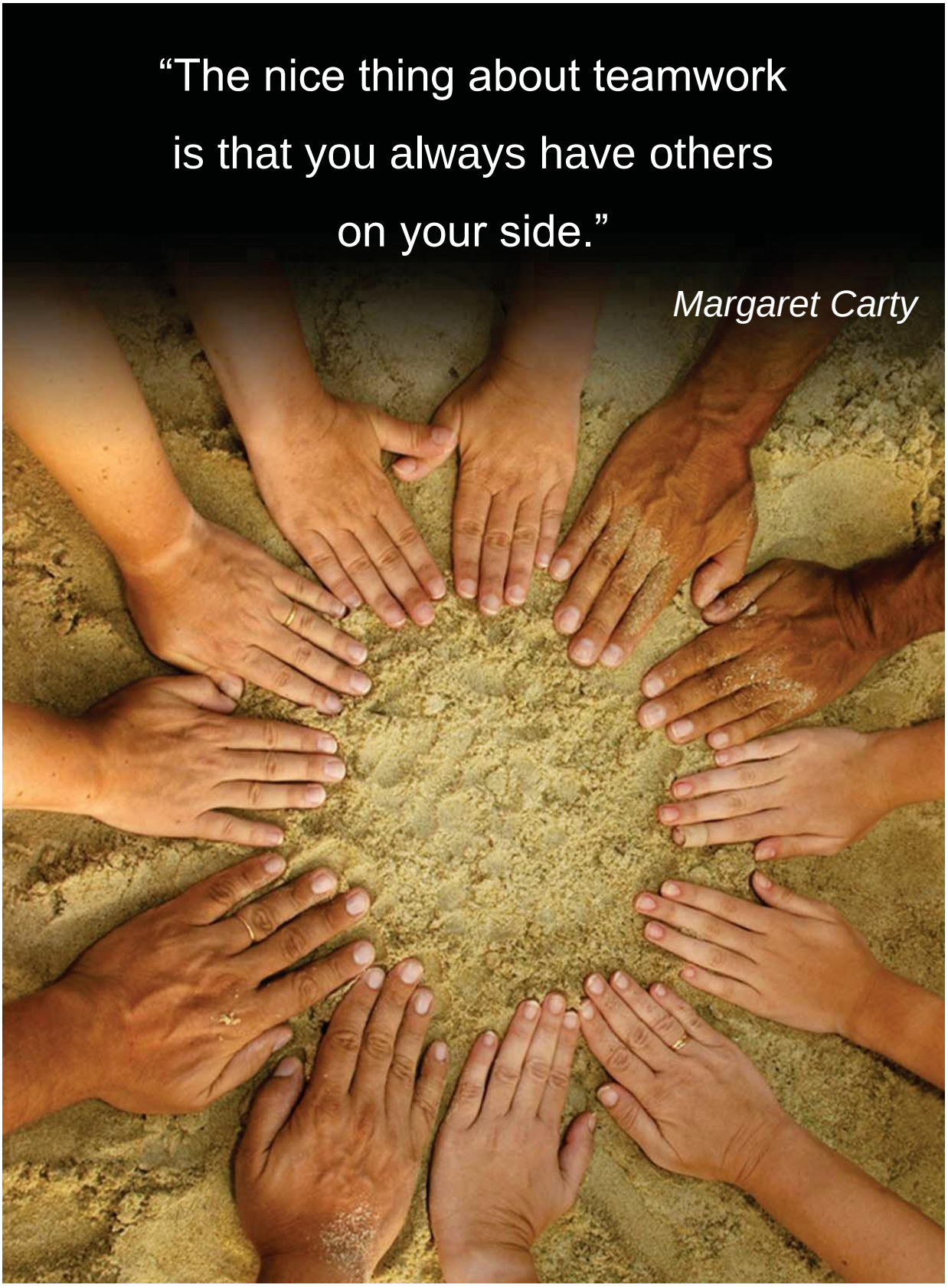
"The nice thing about teamwork
is that you always have others
on your side."
Margaret Carty