

# THE BASICS

## DIABETES, INSULIN PUMP THERAPY & CARB COUNTING

MiniMed™ 670G System





## THE BASICS

### DIABETES, INSULIN PUMP THERAPY AND CARBOHYDRATE COUNTING MINIMED™ 670G SYSTEM

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## Introduction

When you have diabetes, and need to take insulin every day, an insulin pump is a great tool to help manage your insulin and blood sugar (glucose) levels.

This booklet will teach you the basics of:

1. Diabetes and How the Body Works
2. Insulin Pump Therapy
3. Carbohydrate Counting

Learning these concepts will help you better manage your glucose levels and be successful with insulin pump therapy.

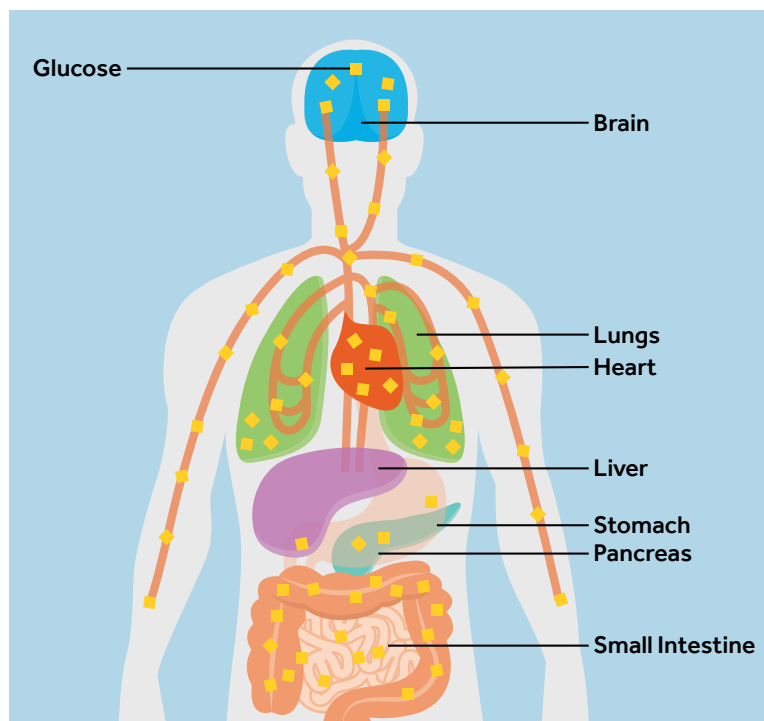
## Section 1: Diabetes and How the Body Works

### What is Diabetes?

Diabetes is a condition in the body where blood sugar levels are higher than normal. This can happen when the body either doesn't make any insulin (type 1 diabetes), or the insulin that the body makes doesn't work well (type 2 diabetes). To better understand what diabetes is and how to treat it, it helps to learn about how the body works.

### Glucose – The Body's Fuel

The body is made up of millions of cells, and every cell needs energy. Your body uses glucose, or sugar, for energy. You need some glucose in your body at all times to live, even while you sleep.



Every cell in the body uses glucose for energy



Glucose is the fuel your body uses for energy. Just like most cars need gas to run, the body needs glucose to work.

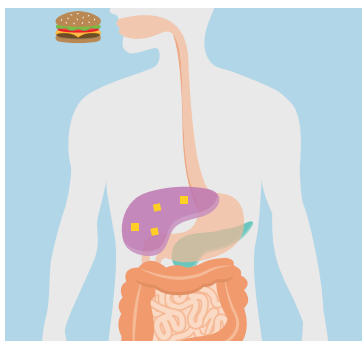
## How the Body Gets Glucose for Energy

When you eat, food travels into your stomach and digestive system. There, food is broken down into nutrients, one of which is glucose. Then glucose gets absorbed into the bloodstream.

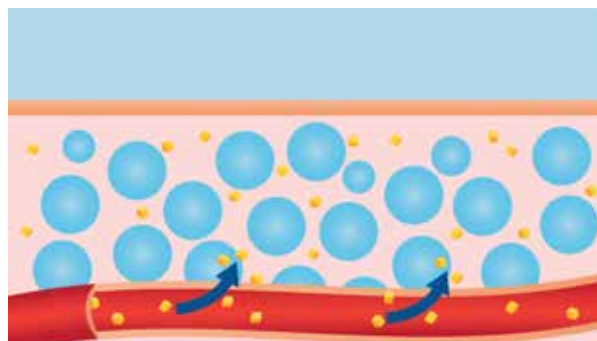
Once in the bloodstream, glucose moves into the fluid that surrounds all your tissues and cells. This fluid is called the interstitial fluid.



Food



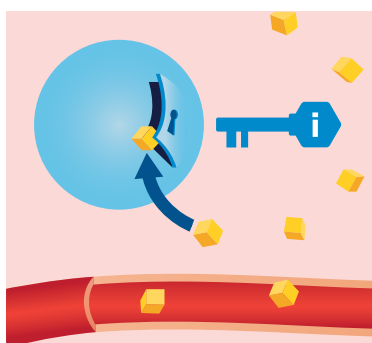
Digestive System



Glucose moving from bloodstream into the Interstitial Fluid

After glucose enters the interstitial fluid, it moves into your cells with the help of a hormone called insulin. Insulin is the 'key' that unlocks the cell and allows glucose to enter. This gives your body the fuel it needs.

### Insulin Acts as a Key



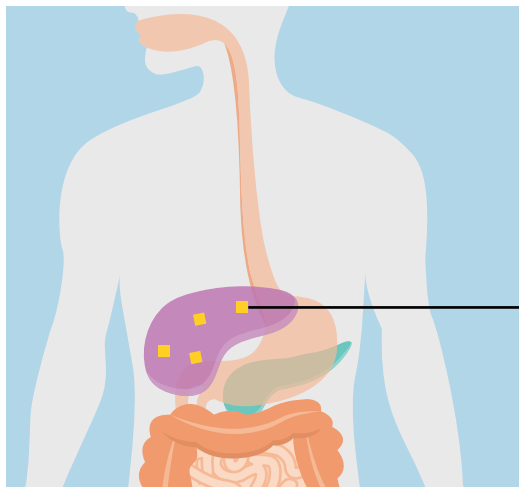
Glucose moves into your cells with the help of insulin



Insulin is the key that moves glucose inside your cells, so your body has energy to live.

# DIABETES

Extra glucose that is not needed for energy right away is stored in the liver.



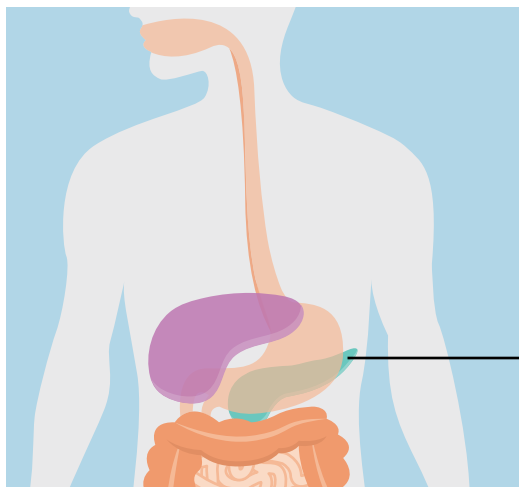
Just like a car stores extra gas in its tank, your body stores extra fuel in your liver.

Glucose  
stored in  
the liver

The liver releases glucose back into the blood stream when a person needs energy and has not eaten for a while. This happens during sleep and exercise.

## Insulin

Insulin is a hormone made by the pancreas. Insulin lowers blood glucose levels by allowing glucose to move out of the blood and into your body's cells.



Insulin lowers  
glucose levels

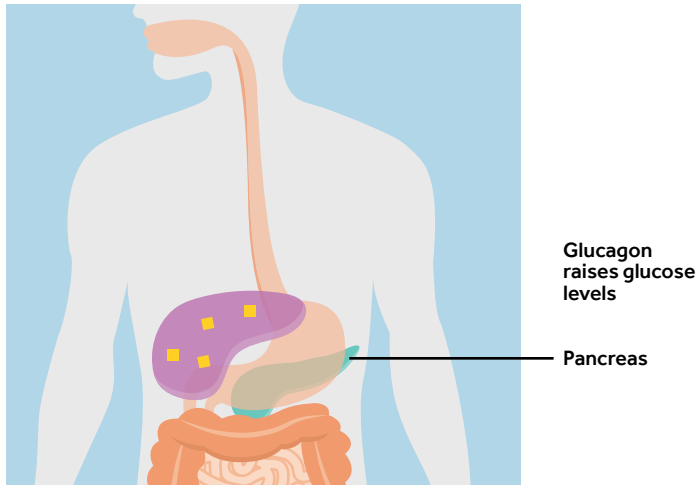
Pancreas

The pancreas releases insulin 24 hours a day. The insulin is released in two ways: A small amount (basal level) of insulin is released in between meals and while you sleep. A larger amount (a bolus) of insulin is released after eating.

When you have diabetes, you may not make any insulin or not make enough insulin. So, you rely on injectable insulin to lower your glucose levels.

## Glucagon

The pancreas makes another hormone called glucagon. You can think of glucagon as the opposite of insulin, because glucagon raises glucose levels.



When a healthy pancreas senses that glucose levels are dropping too low, it releases glucagon. Glucagon tells the liver to release some of the glucose it stored back into the blood stream. As the glucose enters the bloodstream, blood glucose (BG) levels start to rise.



The pancreas makes two hormones that help to keep glucose levels in balance – insulin and glucagon.



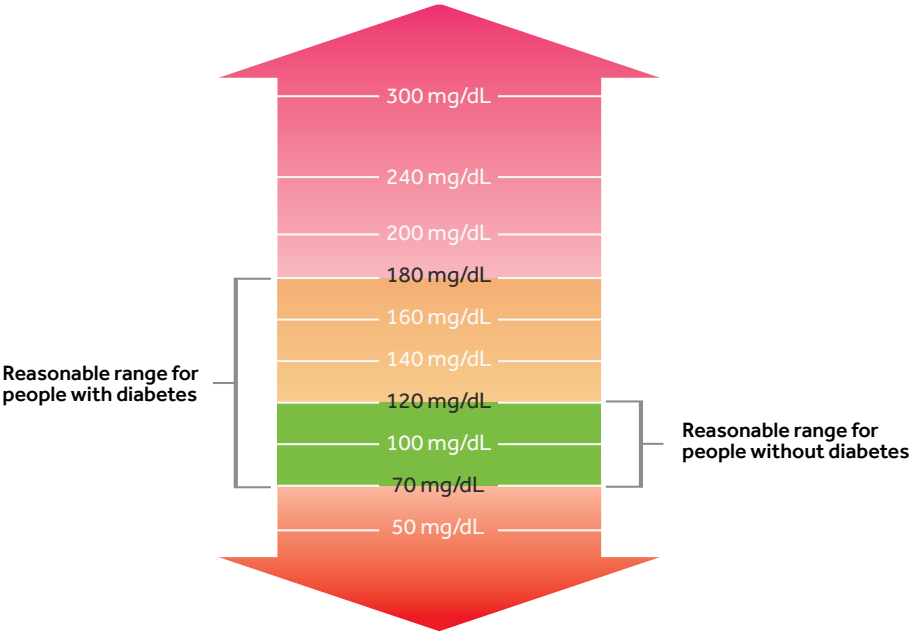
## Check Your Knowledge! (Choose the best answer)

1. The body's main source of fuel or energy is:
  - A. protein
  - B. fat
  - C. glucose
  
2. \_\_\_\_\_ is the 'key' that unlocks the cell and allows glucose to enter. This gives your body the fuel it needs.
  - A. carbs
  - B. insulin
  - C. water
  
3. Glucose your body does not use right away is stored in the \_\_\_\_\_.
  - A. liver
  - B. pancreas
  - C. heart

Answers: 1. C 2. B 3. A

Glucose Levels in the Blood

A person who does not have diabetes usually has glucose levels from 70 mg/dL to 120 mg/dL. When you have diabetes, it is very difficult to keep glucose levels within such a tight range. A more reasonable range for people with diabetes is from 70 mg/dL to 180 mg/dL. It is important to keep your glucose levels within your ideal range and try to avoid highs and lows. Your healthcare professional will help you decide the best glucose range for you.



When you use your insulin pump and glucose sensor, your pump can help you track how much of the time your glucose levels are within the target range of 70 mg/dL to 180 mg/dL. This is called Time in Range.

TIME IN RANGE

Now that Laura is on the pump and sensor, she tracks her Time in Range. Last month she increased her time spent between 70 mg/dL and 180 mg/dL from 60% to 70%. This means she spent 2.4 more hours a day in range.



|                      |              |              |             |            |
|----------------------|--------------|--------------|-------------|------------|
| ADA Recommendations  | Before Meals | 80-130 mg/dL | After Meals | <180 mg/dL |
| AACE Recommendations | Before Meals | <110 mg/dL   | After Meals | <140 mg/dL |

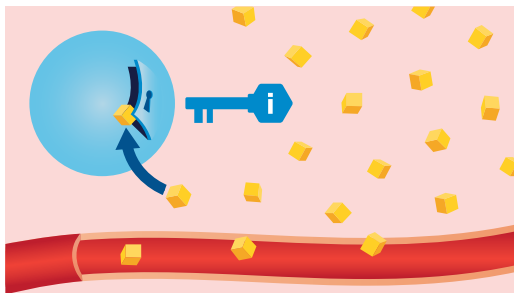
ADA: American Diabetes Association  
AACE: American Association of Clinical Endocrinologists

## Managing High and Low Glucose Levels with Diabetes

When you have diabetes, it's important to try to avoid high and low glucose levels. Highs and lows don't feel very good in the moment, and they can damage your body in the long run.

### High Glucose:

When you eat a meal, glucose levels start to rise. If there is not enough insulin in the body, glucose can't move into the cells. In this case, glucose will stay in the blood and interstitial fluid. More insulin is needed to lower blood glucose levels.



Too much glucose  
Not enough insulin



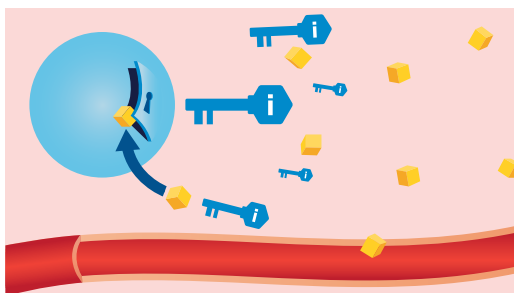
High blood glucose



More insulin needed

### Low Glucose:

When there is more insulin in the body than is needed, and there is not enough glucose, glucose levels will drop. It's important to drink or eat sugar to make blood glucose levels go back up to normal.



Too much insulin  
Not enough glucose



Low blood glucose



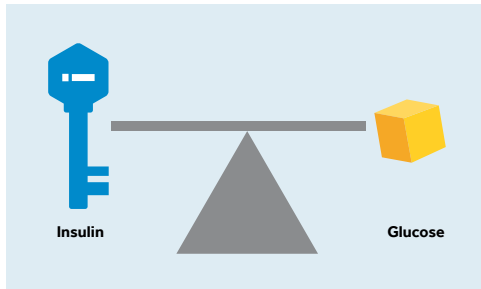
Must drink or eat sugar



If glucose is so low that you cannot eat or drink sugar, someone can give you an injection of glucagon. Remember glucagon makes the liver release glucose into the blood, and glucose levels will rise.

## Maintaining Glucose Levels in Range with Diabetes

The goal in managing diabetes is to take the right amount of insulin to balance the amount of glucose in your body. This can be difficult to do sometimes, but the insulin pump can help make it easier. Keeping your blood glucose in target range will help you feel your best.



Insulin and glucose in balance



Glucose levels in normal range

## Check Your Knowledge! (Choose the best answer)

1. Insulin helps to \_\_\_\_\_ blood glucose levels.
  - A. raise
  - B. lower
  
2. Glucagon helps to \_\_\_\_\_ blood glucose levels by telling the liver to release stored glucose into the blood.
  - A. raise
  - B. lower
  
3. When you have diabetes, you must always eat or drink something with sugar if your glucose gets low.
  - A. True
  - B. False

Answers: 1. B 2. A 3. A

## Section 2: Basics of Insulin Pump Therapy

### Insulin Delivery Using a Pump

A healthy pancreas releases insulin throughout the day and night -- a small amount between meals and during the night, and larger amounts when you eat food. An insulin pump mimics a healthy pancreas by coming close to delivering insulin the way a healthy pancreas does.

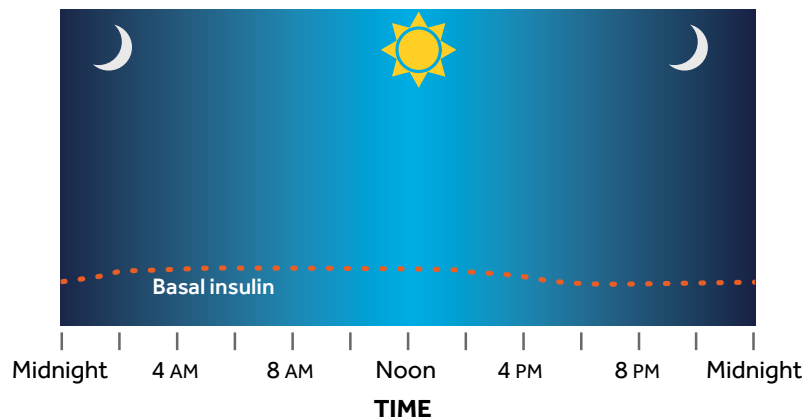


Insulin pumps are small computers that try to work like a pancreas. They hold several days' worth of insulin and only use rapid-acting insulin, like Humalog or NovoLog.

No long-acting insulin is needed when you use an insulin pump.

### Basal

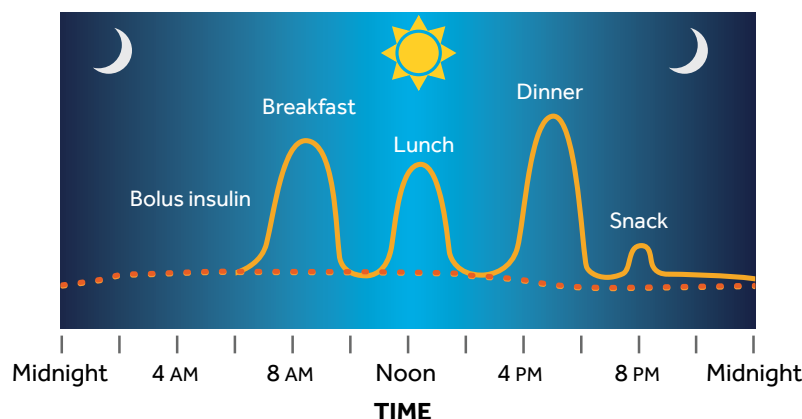
The pump automatically releases rapid-acting insulin every few minutes, 24 hours a day. This is the basal rate, which you can think of as 'background' insulin delivery. The pump's basal insulin delivery is meant to match the liver's steady release of glucose between meals and while you sleep.



Basal – matches the liver's steady release of glucose

## Bolus

A bolus is a larger dose of insulin given by you when you eat food, or any time you have a high blood glucose (BG) value. This extra insulin is meant to match the rise in blood glucose levels. This delivery allows the glucose to enter your cells.



**Bolus** – matches the rise in glucose levels, for example, after you eat

## Insulin Pump Therapy and Glucose Monitoring



When you use an insulin pump, it is important to check your blood sugar periodically.



Some people also use a continuous glucose monitor (CGM). This is a sensor that lets a person continuously know their interstitial glucose levels with a new value every 5 minutes. We call this the sensor glucose (SG) value.

## The MiniMed™ 670G System

The MiniMed™ 670G system has two modes -- Manual Mode and SmartGuard™ Auto Mode. In Manual Mode, it operates like a traditional pump. In Auto Mode, it can automatically adjust insulin.

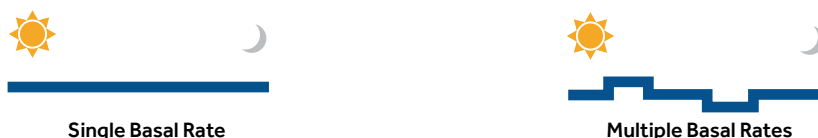
### Manual Mode

Your pump has basal and bolus settings that your healthcare professional will help you program. When you use your pump in this way, it is in Manual Mode.



#### Basal Rate

The pump automatically releases small amounts of insulin every few minutes, 24 hours a day. You can set different basal rates during the day and night to better match your body's needs.



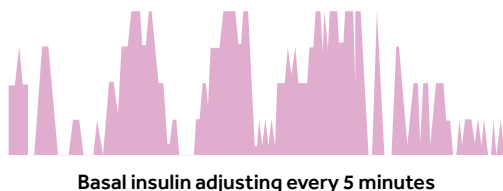
#### Bolus Delivery

You can give extra insulin (a bolus) when you want to eat a meal or correct a high blood sugar. In Manual Mode you can give yourself a bolus in two different ways:

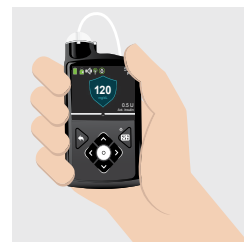
1. Use the pump's Bolus Wizard™ feature to help calculate how much insulin to take
2. Program the pump to deliver the units of insulin you would like to take

### SmartGuard™ Auto Mode

When your pump is not in Manual Mode, it is in Auto Mode. The pump automatically adjusts basal insulin delivery every 5 minutes based on your sensor glucose levels.



We call this technology Auto Mode, because it automatically adjusts insulin delivery. Since insulin is adjusted based on sensor glucose levels, a person must wear a glucose sensor. Some people call this a continuous glucose monitor, or CGM.





## In Auto Mode

- When you want to eat food:
  1. Enter the grams of carbs you are eating into the pump
  2. Tell the pump to deliver a bolus
- When you want to correct a high BG value
  1. Enter the BG value into the pump. Auto Mode will calculate how much insulin (it thinks) your body needs at that time.
  2. Tell the pump to deliver a bolus



Think of Auto Mode as your **co-pilot** when you are **awake**— assisting you with your basal rate adjustments while you decide how much insulin to take for meals.

Think of Auto Mode as your **auto-pilot** when you are **asleep**— gradually adjusting your insulin delivery to help keep your glucose levels in range.

## LAURA IN SMARTGUARD™ AUTO MODE

SmartGuard™ Auto Mode takes care of most of my glucose fluctuations without me having to even think about it. And if my pump needs me to check my BG to stay in Auto Mode, then my pump will let me know. Since using Auto Mode, I spend more time in range, have fewer lows, and worry less.\*

\*Some interaction required. Individual results may vary.

## How Pump Therapy Compares to Injections

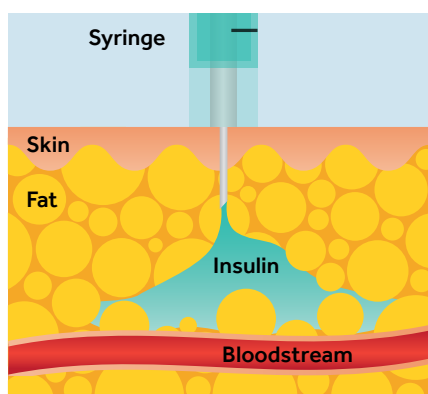
Here are a few ways that insulin pump therapy compares to injections:

### 1. Insulin Absorption

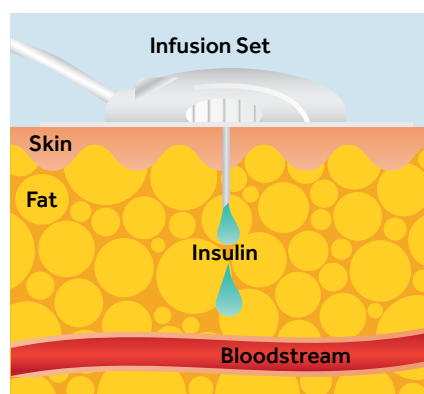
When taking multiple daily injections, a person needs both long-acting insulin and rapid-acting insulin. When using a pump, only rapid-acting insulin is needed.

The disadvantage of using long-acting insulin is that a large volume of insulin is injected at one time. This can lead to insulin “pooling” under the skin, and less consistent absorption day-to-day.

The advantage of using rapid-acting insulin is that smaller amounts of insulin are delivered, so the body has more consistent absorption day-to-day, which helps you manage your glucose levels.



Long-acting insulin can “pool” under the skin leading to inconsistent absorption



Rapid-acting insulin is delivered in tiny amounts, so it absorbs more consistently

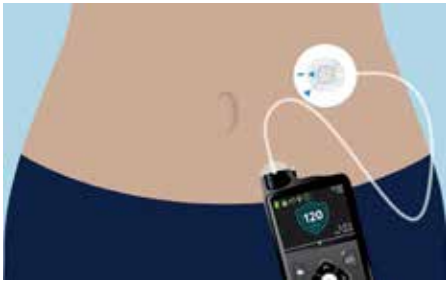
### 2. Stopping Insulin Delivery



With long-acting insulin, you cannot take back the insulin once you have injected it. It's there working in your body whether you want it to or not. This can sometimes cause lows during and after exercise.

With an insulin pump, you can change the amount of insulin you receive more often. In a pump system with Auto Mode, the pump will automatically deliver less insulin or stop your insulin delivery completely when it senses your glucose levels dropping. Lowering or stopping your basal insulin delivery may help avoid lows, especially during and after exercise.

### 3. Always Having Your Insulin With You



With multiple daily injections, it's easy to forget your insulin at home, and unfortunately if you do, you must skip a dose of insulin. This almost certainly leads to high glucose levels.

With an insulin pump, you always have your insulin with you to bolus for food or to correct a high BG. Always having your insulin there when you need it helps you avoid highs and better manage your glucose levels.

### Staying Safe with Insulin Pump Therapy



There are many advantages of using an insulin pump, but you need to stay safe while using one. The pump uses only rapid-acting insulin which doesn't stay in your body for long. Your glucose levels can rise quickly if basal insulin is stopped or if your pump becomes disconnected without you knowing it. It is important to monitor glucose levels when using or being disconnected from a pump. So never ignore a high glucose reading.

### Why Insulin Pump Therapy?

Insulin pump therapy may make managing your glucose levels easier, so you can spend time enjoying life and worrying less about diabetes.

#### LIFE WITH A PUMP

When Laura started using the MiniMed™ 670G system, her life changed. She eats when she wants to, not when she has to. Her pump can adjust the amount of insulin she gets every 5 minutes to better match what her body actually needs. With an insulin pump, managing her diabetes is a whole lot easier.

## Check Your Knowledge! (Choose the best answer)

1. What type of insulin is used for insulin pump therapy?
  - A. Long-acting insulin
  - B. Rapid-acting (U100) insulin
  - C. Basal insulin
  
2. A pump with **SmartGuard™ Auto Mode** can automatically adjust insulin levels every 5 minutes.
  - A. True
  - B. False
  
3. I still need to bolus for carbs if I use a pump with SmartGuard™ Auto Mode.
  - A. True
  - B. False

Answers: 1. B 2. A 3. A

## Section 3: Carbohydrate Counting

Food is made up of protein, fat and carbohydrate (carb). When carbs are digested, they get broken down into glucose, which makes blood glucose levels go up. Carb counting is adding up the grams of carbs you want to eat, so that you can give the right amount of insulin for the food you eat.

### Why Count Carbs?

- Match your insulin to the food you want to eat
- Better manage glucose levels to avoid highs and lows

### Counting carbs with an Insulin Pump

- Tell your pump how many carbs you are eating, and the pump will estimate how much insulin to take using its calculator
- When using a pump with Auto Mode, you must tell your pump how many grams of carbs you want to eat



Your healthcare professional will help you figure out your insulin dose based on how many carbs you are eating.

## Carb Counting Tools

One of the most important parts of carb counting is knowing how much of a certain food you are eating. You can use:

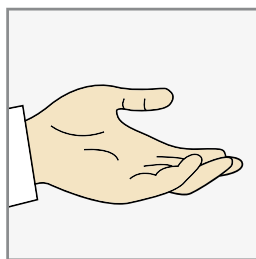
### Measuring Cups and Spoons

Measuring cups, spoons and a food scale are helpful tools for practice. Measuring helps give you a good visual idea of how different serving sizes look like on a plate, bowl or glass which helps you to better estimate when you are not at home.

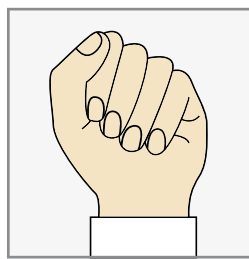


### Your Hands

Your hands can also help you estimate portion sizes, especially when you are away from home



Cupped hand = 1/2 cup



Fist = 1 cup

### Other Resources that you may find helpful:

- MyFitnessPal -- Calorie Counter & Diet Trackers
- CalorieKing Food Search app, or [www.calorieking.com](http://www.calorieking.com)
- Carb Counting with Lenny<sup>SM</sup> game and app for children, or [www.lenny-diabetes.com](http://www.lenny-diabetes.com)
- American Diabetes Association [www.diabetes.org](http://www.diabetes.org)

## Methods for Carbohydrate Counting

There are different ways to count carbohydrates. You may use one or a combination of the different methods.

### Estimating Carbohydrates – 15-gram servings

Estimating carbs is based on serving sizes that have about 15 grams of carbohydrate. This method can be helpful when you are, for example, eating at a restaurant and no food labels or nutrition information is available.

Here are food groups and serving sizes that contain approximately 15 grams of carbs:



#### Starches

|   |                                 |                     |
|---|---------------------------------|---------------------|
| 1 slice of bread  | 6 crackers                      | 6" tortilla         |
| $\frac{3}{4}$ cup cereal  | $\frac{1}{3}$ cup rice or pasta | $\frac{1}{4}$ bagel |
| $\frac{1}{2}$ cup starchy vegetables, like corn, peas, beans, lentils |                                 |                     |



#### Fruits and fruit juices

|                         |                                     |                      |
|-------------------------|-------------------------------------|----------------------|
| $\frac{1}{2}$ cup juice | 1 tennis ball-sized apple or orange | $\frac{1}{2}$ banana |
|-------------------------|-------------------------------------|----------------------|



#### Milk and yogurt

1 cup milk (skim, low-fat or whole)

6-8 oz of light yogurt



#### Sweets, desserts and other carbohydrates

|  |  |                              |
|--|--|------------------------------|
| 2" square of unfrosted cake                    | $\frac{1}{2}$ cup ice cream or pudding | 1 tbsp honey, syrup or jelly |
| 2 small cookies                                |  |                              |
| Don't forget sweetened sports drinks and candy |  |                              |

For a more complete list of foods and 15 gram servings, see page 26.

## Nutrition Labels

Reading Nutrition Facts labels is very helpful when counting carbs. Even though there are many items on a Nutrition Facts label, there are only two things that you should focus on:

### 1. **Serving Size:**

First check the serving size shown on the label. You may be eating more than the amount listed as the serving size. For example, if the serving size is ½ cup and you are eating 1 cup, then you are eating two servings.

### 2. **Total Carbohydrates grams (g):**

Check the total grams of carbohydrate to get the complete picture of the effect on your glucose levels.

For this food:

- 1/2 cup serving = 42 grams of carbs
- 1 cup serving = 84 grams of carbs

## Nutrition Facts

**Serving Size: 1/2 cup (56g) dry**  
**Servings per container: 8**

Amount Per Serving

**Calories 210** **Fat Cal. 10**

% Daily Value

**Total Fat 1g**

Saturated Fat 0g

Polyunsaturated Fat 0.5g

Monounsaturated Fat 0g

Trans Fat 0.5g

**Cholesterol 0mg**

**Sodium 0mg** **0%**

**Total Carbohydrate 42g** **14%**

Dietary Fiber 2g **8%**

Sugars 3g

Other carbohydrate 37g

**Protein 7g**

Vitamin A **0 %**

Vitamin C **0 %**

Calcium **0 %**

Iron **10 %**

An example and not a real item.



Sugar free does not mean carbohydrate free. Always check the label for **Total Carbohydrate**.

## CARB COUNTING WITH AN INSULIN PUMP

Because Laura counts carbs, she has more freedom when making food choices. She knows that when she adds up her carbs, her pump will estimate the amount of insulin she needs for the food she is eating. Carb counting and her insulin pump help keep her glucose levels in an ideal range.



## Carb Meal Size

Your healthcare provider may ask you to guess how many grams of carbs you are eating based on your meal's carb size.

When you examine your meal sizes and their carb content, you may be able to come close to knowing how many grams of carbs you are eating by guessing your "carb meal size."

For example, a healthcare professional may help one patient figure out that a typical small carb snack might be about 15 grams of carbs. A small carb meal might be 30 grams of carbs, a medium carb meal might be 60 grams of carbs, and a large carb meal might be about 90 grams of carbs. Another patient, for example, might have different carb meal sizes, where small is 30 grams of carbs, medium is 45 grams of carbs and large is 60 grams of carbs.



**15 grams of carbs**  
(1 small piece of fruit)



**30 grams of carbs**  
(2/3 cup rice + 1 cup lettuce)



**60 grams of carbs**  
(3 small tortillas, ½ cup beans, 1/3 cup rice)



**90 grams of carbs**  
(2 cups of pasta)



Whatever your method of estimating carbs is, work with your healthcare professional to pick the one that works for you and makes managing your glucose levels easier.

## Protein and Fat

Carbohydrates impact glucose levels the most, but protein and fat (especially in large quantities) can affect glucose levels too. Foods that contain mostly protein and fat: eggs, meat, seafood, cheese, oils, and nuts.

### Protein

There are increasing numbers of people eating more protein and limiting their carbohydrates in an effort to manage their glucose levels. For meals that are high in protein, and have little to no carbs, such as scrambled eggs, they may find they need insulin based on the amount of protein in their meal. For this group of people, the Chief Medical Officer at Medtronic suggests counting grams of protein, dividing grams of protein in half, then taking insulin per their carb ratio for half the protein grams. Additionally, this insulin may need to be spread out over time, which can be done using a Dual Wave™ bolus in Manual Mode. In Auto Mode, a patient can give multiple boluses to spread out their insulin over time.



Example:

2 eggs for breakfast

- 2 eggs = 12 grams of protein
- Enter 6g in bolus calculator



When bolusing for protein and fat, check glucose levels more often to see what works best. Be sure to discuss this with your healthcare team.

### Fat

Foods that are high in fat like cheese or meat, or 100% fat like oils, may impact glucose levels in two ways. Some people become more resistant to insulin when consuming foods high in fat, and therefore they require additional insulin. Fat also slows down digestion, which affects glucose levels. So, the carbohydrates eaten along with the fat move into the blood stream more slowly. For a person eating food with a high amount of fat and carbohydrates, for example a quesadilla, pizza, or fast food, they may need to spread out their insulin over time.



Example:

2 slices of pizza

- determine the total grams of carbs in the pizza
- One option in Auto Mode is to bolus for 50% or 75% of the carbs in advance of eating, and bolus for the remainder in an hour.
- Another option in Auto Mode is to bolus for 100% of the carbs in advance of eating, and check glucose levels after 1-2 hours and give a correction bolus if Auto Mode recommends one.

## Check Your Knowledge! (Choose the best answer)

1. Which of these foods contain carbohydrates?

|                    |                |        |           |
|--------------------|----------------|--------|-----------|
| Corn               | Potato         | Rice   | Crackers  |
| Sugar-free cookies | Honey          | Bread  | Diet soda |
| Skim milk          | Coffee (black) | Tuna   | Cheese    |
| Green beans        | Turkey         | Cereal | Popcorn   |
| Apple juice        | Pinto beans    | Orange | Lemonade  |
| French fries       | Margarine      | Yogurt | Broccoli  |

2. Write True or False next to each statement:

\_\_\_\_\_ You should always try to avoid eating carbohydrates.

\_\_\_\_\_ Selecting healthy carbohydrates and being careful about portion sizes will provide your body with valuable nutrients.

\_\_\_\_\_ The more carbs you eat, the more insulin you need.

3. Which two things should you focus on when using a nutrition label to count carbs?

- A. Fiber
- B. Sodium
- C. Serving Size
- D. Total Carbohydrates

# CARB COUNTING

4. Use the label to answer the following questions:

One serving equals:

- A. 1 package
- B. 2 bars
- C. 6 bars

2 bars = \_\_\_\_\_ grams of carb

1 bar = \_\_\_\_\_ grams of carb

3 bars = \_\_\_\_\_ grams of carb

## Nutrition Facts

Serving Size 2 bars (42g)

Servings Per Container 6

Amount Per Serving

Calories 160

Fat Cal. 50

% Daily Value\*

Total Fat 6g

9%

Saturated Fat 0.5g

3%

Trans Fat 0g

Cholesterol 0mg

0%

Sodium 400mg

6%

Total Carbohydrate 36g

9%

Dietary Fiber 2g

8%

Sugars 11g

Protein 3g

An example and not a real item.

Answers: 1. Corn, Potato, Rice, Crackers, Sugar-free cookies, Honey, Bread, Skim milk, Green beans, Cereal, Popcorn, Apple juice, Pinto beans, Orange, Lemonade, French fries, Yogurt, Broccoli

2. False, True, True 3. C, D 4. 36, 18, 54

## Estimating Carbohydrates – 15 gram servings

This list shows the serving sizes of various foods that contain 15 grams of carbohydrate. You can look for the foods you commonly eat and become familiar with the serving size that equals 15 grams.

### Starches

Each serving listed contains about 15 grams of carbohydrate

|                                |          |
|--------------------------------|----------|
| Bagel                          | ¼ (1 oz) |
| Biscuit, 2 ½" across           | 1        |
| Bread (white, wheat, rye)      | 1 slice  |
| Cornbread, 2" square           | 1        |
| Croutons                       | 1 cup    |
| English muffins                |          |
| Hamburger/ hot dog bun         | ½ bun    |
| Pancake, 4" across             | 1        |
| Pita, 6" across                | 1/2      |
| Popcorn                        | 3 cups   |
| Roll, plain, small             | 1        |
| Snack chips (potato, tortilla) | 9-13     |
| Stuffing, prepared             | ½ cup    |
| Tortilla, 6" across            | 1        |
| Waffle, 4" across              | 1        |

### Other Starches

Each serving listed contains about 15 grams of carbohydrate

|                            |        |
|----------------------------|--------|
| Brownie, 2" square         | 1      |
| Cake, unfrosted, 2" square | 1      |
| Cake, frosted, 2" square   | ½      |
| Cookie, small              | 2      |
| Gelatin, regular           | ½ cup  |
| Honey                      | 1 tbsp |
| Jam or Jello, regular      | 1 tbsp |
| Pudding, regular           | ¼ cup  |
| Salad dressing, fat free   | ¼ cup  |
| Sherbet, sorbet            | ¼ cup  |
| Syrup, light               | 1      |

### Starchy Vegetables

Each serving listed contains about 15 grams of carbohydrate

|                                       |       |
|---------------------------------------|-------|
| Baked beans                           | ½ cup |
| Beans (garbanzo, pinto, black, white) | ½ cup |
| Corn                                  | ½ cup |
| Corn on the cob, 6" ear               | 1     |
| Lentils                               | ½ cup |
| Lima beans                            | ⅔ cup |
| Mixed vegetables                      | 1 cup |
| Peas (green, split, black-eyed)       | ½ cup |
| Potato, 3 oz                          | 1     |
| Potato, mashed                        | ½ cup |
| Squash, winter                        | 1 cup |
| Yam/sweet potato                      | ½ cup |

### Combination Foods

Each serving listed contains about 15 grams of carbohydrate

|                           |         |
|---------------------------|---------|
| Chili with beans          | ½ cup   |
| Soup (cream, broth)       | 1 cup   |
| Split pea soup            | ½ cup   |
| Thin crust pizza ⅛ of 12" | 1 slice |
| Macaroni and cheese       | ½ cup   |
| Lasagna, 4" x 4"          | 1 cup   |

### Fruit Juice

Each serving listed contains about 15 grams of carbohydrate

|   |       |
|---|-------|
| Apple, grapefruit, orange and pineapple   | ½ cup |
| Cranberry, grape, and prune               | ⅓ cup |
| Cranberry juice cocktail, reduced calorie | 1 cup |

# CARB COUNTING

## Cereal and Grains

Each serving listed contains about 15 grams of carbohydrate

|                                    |           |
|------------------------------------|-----------|
| Bran cereals                       | 1/3 cup   |
| Cereals, cooked                    | 1/3 cup   |
| Cereals, unsweetened, ready-to-eat | 3/4 cup   |
| Granola, low fat                   | 1/4 cup   |
| Grits/oats, cooked                 | 1/2 cup   |
| Pasta                              | 1/3 cup   |
| Puffed cereal                      | 1 1/2 cup |
| Rice                               | 1/3 cup   |

## Fruit

Each serving listed contains about 15 grams of carbohydrate

|                           |              |
|---------------------------|--------------|
| Apple, small              | 1 (4 oz)     |
| Apricots, fresh           | 4 (5 1/2 oz) |
| Banana, small             | 1 (4 oz)     |
| Blackberries/blueberries  | 1/4 cup      |
| Cantaloupe/honeydew cubes | 1 cup        |
| Cherries                  | 12 (3 oz)    |
| Fruit, canned             | 1/2 cup      |
| Grapefruit, large         | 1/2 (11 oz)  |
| Grapes, small             | 17 (3 oz)    |
| Kiwi                      | 1 (3 1/2 oz) |
| Orange, small             | 1 (6 1/2 oz) |
| Peach, medium             | 1 (4 oz)     |
| Peach, large              | 1/2 (4 oz)   |
| Pineapple, fresh          | 3/4 cup      |
| Plums, small              | 2 (5 oz)     |
| Raisins                   | 2 tbsp       |
| Raspberries               | 1 cup        |
| Strawberries, whole       | 1 1/4 cups   |
| Watermelon                | 1 1/4 cups   |

## Milk

Each serving listed contains about 12 grams of carbohydrate

|                           |                |
|---------------------------|----------------|
| <b>Milk:</b>              |                |
| Fat free, 1%, 2% or whole | 1 cup          |
| Buttermilk                | 1 cup          |
| Evaporated Milk           | 1/2 cup        |
| <b>Yogurt:</b>            |                |
| Flavored, fat-free, light | 2/3 cup (6 oz) |
| Plain, fat-free           | 2/3 cup (6 oz) |
| Plain                     | 1 cup          |

## Non-starchy vegetables

One cup raw or 1/2 cup cooked serving of vegetables contains about 5 grams of carbohydrate

|                           |
|---------------------------|
| Artichoke                 |
| Asparagus                 |
| Beans (green, wax)        |
| Broccoli                  |
| Cabbage                   |
| Carrots                   |
| Cauliflower               |
| Celery                    |
| Cucumber                  |
| Greens (collard, mustard) |
| Mushroom                  |
| Okra                      |
| Onions                    |
| Pea pods                  |
| Peppers                   |
| Salad greens (lettuce)    |
| Spinach                   |
| Summer squash             |
| Tomato/tomato juice       |
| Tomato/vegetable juice    |
| Zucchini                  |

Adapted from: Basic Carbohydrate Counting [brochure], American Diabetes Association, Inc. and American Dietetic Association; 2003. Kulkarni K. Warshaw HS. Why count carbs? In: Landrum S, ed. Complete Guide to Carb Counting. 2nd ed. Alexandria, VA. American Diabetes Association; 2004: 211-255.

# IMPORTANT SAFETY INFORMATION

**WARNING:** (For MiniMed™ 670G System Users Ages 7-13): The low sensor glucose alert functionality is distinct from the automated insulin dosing function of the MiniMed™ 670G system. When used in Auto Mode, the MiniMed™ 670G system has been shown to be safe and effective for its intended use in this population. However, do not rely solely on the use of a low sensor glucose (SG) value for "Alert on Low" or "Alert before Low" for alerts set at 50 mg/dL and 60 mg/dL. A low sensor glucose alert may not reflect the user's true blood glucose at these levels or may not alert. Do not ignore symptoms of low glucose. Always confirm your sensor glucose readings with your blood glucose meter and treat according to the recommendations of your healthcare professional. Solely relying on these sensor glucose alerts and readings for treatment decisions could result in missing severe hypoglycemia (low blood glucose) events.

## IMPORTANT SAFETY INFORMATION

### MINIMED™ 670G SYSTEM

The Medtronic MiniMed™ 670G system is intended for continuous delivery of basal insulin (at user selectable rates) and administration of insulin boluses (in user selectable amounts) for the management of type 1 diabetes mellitus in persons, seven years of age and older, requiring insulin as well as for the continuous monitoring and trending of glucose levels in the fluid under the skin. The MiniMed™ 670G system includes SmartGuard technology, which can be programmed to automatically adjust delivery of basal insulin based on Continuous Glucose Monitor sensor glucose values, and can suspend delivery of insulin when the sensor glucose value falls below or is predicted to fall below predefined threshold values. The system requires a prescription. The Guardian™ Sensor 3 glucose values are not intended to be used directly for making therapy adjustments, but rather to provide an indication of when a fingerstick may be required. A confirmatory finger stick test via the CONTOUR®NEXT LINK 2.4 blood glucose meter is required prior to making adjustments to diabetes therapy. All therapy adjustments should be based on measurements obtained using the CONTOUR®NEXT LINK 2.4 blood glucose meter and not on values provided by the Guardian™ Sensor 3. Always check the pump display to ensure the glucose result shown agrees with the glucose results shown on the CONTOUR®NEXT LINK 2.4 blood glucose meter. Do not calibrate your CGM device or calculate a bolus using a blood glucose meter result taken from an Alternative Site (palm) or from a control solution test. It is not recommended to calibrate your CGM device when sensor or blood glucose values are changing rapidly, e.g., following a meal or physical exercise. If a control solution test is out of range, please note that the result may be transmitted to your pump when in the "Always" send mode.

**WARNING: Medtronic performed an evaluation of the MiniMed™ 670G system and determined that it may not be safe for use in children under the age of 7 because of the way that the system is designed and the daily insulin requirements. Therefore this device should not be used in anyone under the age of 7 years old. This device should also not be used in patients who require less than a total daily insulin dose of 8 units per day because the device requires a minimum of 8 units per day to operate safely.**

Pump therapy is not recommended for people whose vision or hearing does not allow recognition of pump signals and alarms. Pump therapy is not recommended for people who are unwilling or unable to maintain contact with their healthcare professional. The safety of the MiniMed™ 670G system has not been studied in pregnant women. For complete details of the system, including product and important safety information such as indications, contraindications, warnings and precautions associated with system and its components, please consult <http://www.medtronicdiabetes.com/important-safety-information#minimed-670g> and the appropriate user guide at <http://www.medtronicdiabetes.com/download-library>

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