

# DIABETES TYPE 1

*What is it? How do  
you treat it?*

## **Introduction to diabetes Type 1:**

Here are a list of questions to ask a diabetic to understand how well they are taking care of their condition and why to ask them.

1. What was your last A1C? The A1C is a test that measures the level of glucose stored in the blood cells. It gives a measure of what your average blood sugar level has been over the past 3 months. (See chart in this handout of what an A1C translates into)
  - a. A normal non-diabetic blood sugar level is between 90 – 120 mg/dl.
  - b. A1C is a measure of the percent of glucose on a blood cell and is usually between 6% and 12% and is translated into an average blood sugar. (eg. 6% = 126 mg/dl and 12% = 298 mg/dl)

The goal of diabetics is to take insulin in the right amounts whenever they eat to keep the level of blood sugar in their blood as close to normal as they can. Everyone is different and will take different amounts and types of insulin to manage their blood sugars

2. What is your target blood sugar? Some people will target 120 mg/dl while others will have a target of being below 150 mg/dl. It is an individual setting between the diabetic and their doctor.

There are two conditions that diabetics experience due to taking insulin they are Hypo-glycaemia and Hyper-glycaemia. Hypo = Low and Hyper = High. If a diabetic is not taking enough insulin they will have high blood sugar. Hyper-glycaemia damages the body slowly over time and many diabetics will allow their blood sugars to run high in an effort to avoid the risks of Hypo-glycaemia or low blood sugar. The symptoms of hyper-glycaemia are feeling lethargic, muscle aches, bad breath, and blurred vision. If a diabetic is averaging a blood sugar over 180 mg/dl it is like having maple syrup in their blood stream. The heart has to work harder and over time it damages their circulatory system. Diabetics should monitor their feet and vision regularly. The areas where your veins are the smallest are damaged first due to poor circulation because of high blood sugars. Diabetics with continual high blood sugars don't feel good and after a long period of high blood sugars it can lead to a coma as the body starts to shut down. This takes place over a period of months of poor blood sugar management.

Hypo-glycaemia (Low blood sugar) is what diabetics fear the most. It typically happens quickly, within minutes. This happens when diabetics take too much insulin for the food they have eaten. The symptoms of Hypo-glycaemia are different for everyone and can be severe.

3. What symptoms do you have when you are experiencing Hypo-glycaemia (Low blood sugar)? Typical symptoms are cold sweats, slurred speech, seizures, and personality changes. People with low blood sugar are often thought to be drunk. Most people have "tells" that low blood sugar is coming and they are aware of them. This is good information to share with companions.

Most Type 1 diabetics today have an insulin pump to manage their diabetes. This isn't true for everyone but it is typical. This question is for diabetics that wear a pump but can be modified for any diabetic without one.

4. What is your backup plan if your pump or main insulin delivery tool fails? A pump is an electronic device and it can break, get lost and pump supplies have been recalled from time to time. Insulin can go bad over time; it should be always be stored in the fridge.

They should always have a second bottle of insulin and as a rule they should always have at least a one month supply of drugs and pump supplies. Typically if a pump fails they should be comfortable giving themselves insulin injections using a syringe and they should have a supply of them. (Like a box of 100 disposable syringes). Diabetic supplies can be hard to get at night and on the weekends when a pharmacy is closed. It is important that they never get even close to running out of their supplies.

5. How much of a drug and pump supplies do they have? One months' worth, three months' worth? How do they plan to get the supplies they need when they are down to a one month supply?

If the answer to the question is that their parents are going to ship them supplies when they need them you will need to give them some extra attention. They need to be able to get their own supplies. Many will have mail order pharmacy accounts and can just call when they need more supplies and they are delivered to their door the next day. It is illegal for parents to send medications through the mail besides insulin needs to be kept cold and not frozen.

It is probably not a good idea to have insulin supplies shipped to the mission home because it can result in an emergency run out to their area for special delivery and the contents of the package should be put in the fridge when it arrives. Diabetic supplies should be ordered the week before transfers or the week after transfers. It will avoid the emergency road trip.

6. Do they know what pharmacies are covered by their insurance? Not all pharmacies get paid by all insurance companies. When they get to their assigned area they need to find a pharmacy that takes their insurance.
7. Do they have an insurance card for their supplies? Do they have a copy of all of the prescriptions they have? Do they have the phone number of their doctor and the pharmacy that last filled their prescriptions?

All of this information is critical to being able to refill their prescriptions. Tell them not to wait until they need to refill them to figure out where to go and what they need to get them refilled. The last thing they want is to go to a pharmacy to refill a prescription and get told they need to pay hundreds of dollars to get their supplies, usually because the pharmacy does not work with their insurance. Have them ask about what their co-pays will be when they transfer their prescriptions to the new pharmacy. Have them write down the phone number and location of the new pharmacy because they will need it when they move to a new area and need to transfer their prescriptions again.

8. Ask them to tell you what they plan to tell their new companion about being a diabetic. Ask them if they want you to be a part of that discussion. Some people are embarrassed about the potential risks of low blood sugar and will avoid talking about it. Give them a chance to practice.

Some details about the terms diabetics use;

Basal rate: This is a baseline rate of insulin that a diabetic has programmed into their pump it is measured in units per hour and is typically a small amount that is delivered continually by their pump. If they don't have a pump it is longer lasting insulin that they take once a day.

Bolus: A diabetic will give themselves a bolus of insulin before they eat. They will estimate how much insulin they need based on what they plan to eat. Taking insulin before you eat is important because it allows the insulin to be in your system before your blood sugar starts going up. If they wait until after they finish eating it won't be until their blood sugar is really high before the insulin is in their system and results in poor control of diabetes.

Insulin Active period: Each type of insulin has a different active period. If they use a pump they probably use Novolog, Humalog or Apidra as the insulin in their pump. This is fast acting insulin that starts taking effect quickly and is completely used in 2 hours. People that don't use an insulin pump will use different insulin's that have different active periods that could last 8 hours or up to 24 hours and they use them in combination to control their blood sugars.

Carb ratio: Diabetics today estimate how much insulin they need by counting the carbohydrates in the foods they eat. Carbohydrates are turned into blood sugar quickly and have the greatest impact on blood sugar level. Things like proteins, fats and healthy vegetables are also turned into blood sugar but at a much slower rate and it is taken care of by the Basal insulin they are taking. The Bolus they take when they eat is to take care of the blood sugar that comes from the carbohydrates in their diet. It will be a value like 7 grams of carbs to 1 unit of insulin.

9. What is the Carb ratio that you use when you give yourself insulin before you eat? They should be able to answer this question quickly and clearly. If it doesn't make sense to you it probably doesn't make sense to them and they will need some extra attention.

Some typical values of Carbs are: each type of item is different based on size and sweetness, this is not an absolute, this is an estimate. (For a full list of carbs in meals, local book stores sell calorie and carb counting books. They are small and easy to pack and are a great resource. )

- 2 pieces of white bread (20 grams)
- An apple (30 grams)
- Big Mac (47 grams)
- Large Fry (66 grams)

As a recommendation they should be testing their blood sugar several times every day. Depending on the individual they could test as few as 2 or as many as 6 times a day. If their A1C is in the 7's or below

they are testing enough if they are above 8% on their A1C they need to be testing more. The best times to test are;

- First thing when they get up in the morning
- Before they eat a meal
- 2 hours after they have taken an insulin bolus
- Before they go to bed

Fast acting insulin has an active period of 2 hours. If they test 2 hours after they take it they will know if the estimate they made before they started eating was accurate. If they didn't give enough they can take an additional bolus as a correction.

If you have a diabetic that is having trouble managing their blood sugars you should ask them to start keeping a journal or to share the one they are keeping with you. A diabetic journal/log should contain;

- Date/time and blood sugar levels every time they test their blood sugar.
- Date/time and what they eat including their estimate of grams of Carbs.
- Date/time of when and how much of a bolus of insulin they take.

The journal or log can be used to identify if they are estimating their carbohydrates correctly. It will also identify if they are testing their blood sugar enough and at times that will best help them manage their blood sugar levels.

10. What should the companion of a diabetic carry with them to help if a hypo-glycemic attack occurs?

- Glucose tablets
- Juice boxes or Capri Suns
- Hard Candies (5 or 6)
- GU (you can find this at most stores. It is a specialty sports item that contains 25 g of complex carbohydrates and something I highly recommend)
- Honey
- Glucagon Shot (only to be used if un-responsive or un-conscious)

Items to have at home. Let your companion know that these foods are to help treat your diabetes and they should not help themselves to them without proper communication between the two of you.

- Orange juice
- Grape Juice
- Non-Diet soda
- Chocolate milk
- Candy bars

11. When should the companion administer a glucagon shot?

The **last** step in treating a hypo-glycemic attack would be administering a glucagon injection. This would be administered if the diabetic Elder is either unresponsive or won't eat for you. Once administered, if the diabetic is unconscious, they will usually regain consciousness in 5-20 minutes. Check blood sugar to make sure that the diabetic's blood sugar is coming up to a normal range.

- Continue to monitor blood glucose levels.

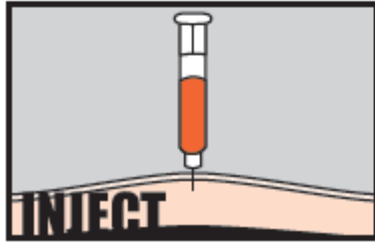
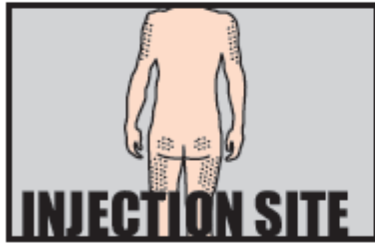
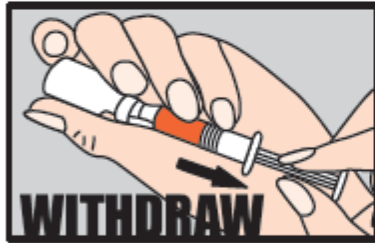
If blood sugar stays low and the diabetic remains unconscious, call 911 for help. Make sure to tell them that you have administered glucagon.

<p><b>When low blood sugar begins to occur, have your companion check your blood glucose with a glucometer. Know how to operate the glucometer just in case your companion is unable to. The symptoms of low blood sugar include some or all:</b></p> <ul style="list-style-type: none"> <li>- Weakness</li> <li>- Shaking (Looks jittery)</li> <li>- Headache</li> <li>- Feeling nervous and anxious</li> <li>- Trouble thinking clearly</li> <li>- Double or blurry vision</li> <li>- Fast or pounding heart beat</li> <li>- Feeling tired</li> <li>- Sweating (very noticeable)</li> <li>- Hunger</li> <li>- Feeling cranky or can be very giddy and try to act funny</li> <li>- Feeling uneasy</li> </ul> <p><b>When blood sugar gets extremely low, the following symptoms may occur: Weakness Seizure Coma Fainting</b></p>	<p><b>When low blood sugar begins to occur, have your companion check your blood glucose with a glucometer. Know how to operate the glucometer just in case your companion is unable to. The symptoms of low blood sugar include some or all:</b></p> <ul style="list-style-type: none"> <li>- Weakness</li> <li>- Shaking (Looks jittery)</li> <li>- Headache</li> <li>- Feeling nervous and anxious</li> <li>- Trouble thinking clearly</li> <li>- Double or blurry vision</li> <li>- Fast or pounding heart beat</li> <li>- Feeling tired</li> <li>- Sweating (very noticeable)</li> <li>- Hunger</li> <li>- Feeling cranky or can be very giddy and try to act funny</li> <li>- Feeling uneasy</li> </ul> <p><b>When blood sugar gets extremely low, the following symptoms may occur: Weakness Seizure Coma Fainting</b></p>
<p><b>What you should give your companion that has low blood sugar: (Choose from)</b></p> <ul style="list-style-type: none"> <li>- 3 glucose tablets</li> <li>- ½ cup (4 ounces) fruit juice or regular, NON-DIET soda</li> <li>- 5 or 6 hard candies</li> <li>- 1 Tablespoon sugar – can be put in water</li> <li>- 1 Tablespoon honey or syrup – if they are unable to hold the spoon with the honey on it, you may put the honey between their bottom lip and their teeth and let the sugar dissolve through the mucous membranes there.</li> </ul> <p>Your last step would be administering a glucagon injection. You would administer this if your companion is either unresponsive or won't eat for you. Once administered, if your companion is unconsciousness, they will usually regain consciousness in 5-20 minutes. Check your companion's blood sugar to make sure it is coming up to a normal range. Between 90-120 mg/dl</p> <p>Continue to monitor blood glucose levels.</p>	<p><b>What you should give your companion that has low blood sugar: (Choose from)</b></p> <ul style="list-style-type: none"> <li>- 3 glucose tablets</li> <li>- ½ cup (4 ounces) fruit juice or regular, NON-DIET soda</li> <li>- 5 or 6 hard candies</li> <li>- 1 Tablespoon sugar – can be put in water</li> <li>- 1 Tablespoon honey or syrup – if they are unable to hold the spoon with the honey on it, you may put the honey between their bottom lip and their teeth and let the sugar dissolve through the mucous membranes there.</li> </ul> <p>Your last step would be administering a glucagon injection. You would administer this if your companion is either unresponsive or won't eat for you. Once administered, if your companion is unconsciousness, they will usually regain consciousness in 5-20 minutes. Check your companion's blood sugar to make sure it is coming up to a normal range. Between 90 – 120 mg/dl</p> <p>Continue to monitor blood glucose levels.</p>

Above are two cards that can be cut out and kept in the missionary's wallets. One for the diabetic and one for their companion.

# Administering Glucagon

Treat, then follow district policy for emergency medical care.



1. Position the student on his or her side.
2. Remove the cap from the glass vial.
3. Pull the needle cover off the syringe.
4. Insert the needle into vial and inject the liquid.
5. Shake to dissolve.
6. Withdraw the glucagon solution back into the syringe and remove the needle from vial.
7. Check for air bubbles in the syringe. Tap any visible air to the top of the syringe and gently push on the plunger until the air is removed.
8. Insert the needle at a 90 degree angle and inject the glucagon into a large muscle (upper arm, thigh, or upper outer area of buttock).
9. Withdraw the needle and apply slight pressure to the injection site.
10. Keep the student positioned on his or her side.
11. Remain with the student until Emergency Medical Services (EMS) assumes control.



Optimal A1C level			Good A1C level			Nominal A1C level		
Hba1c	mg/dl	mmol/l	Hba1c	mg/dl	mmol/l	Hba1c	mg/dl	mmol/l
4.0	65	3.6	5.0	101	5.6	6.0	136	7.6
4.1	69	3.8	5.1	104	5.8	6.1	140	7.8
4.2	72	4.0	5.2	108	6.0	6.2	143	8.0
4.3	76	4.2	5.3	111	6.2	6.3	147	8.2
4.4	79	4.4	5.4	115	6.4	6.4	151	8.4
4.5	83	4.6	5.5	118	6.6	6.5	154	8.6
4.6	86	4.8	5.6	122	6.8	6.6	158	8.8
4.7	90	5.0	5.7	126	7.0	6.7	161	9.0
4.8	93	5.2	5.8	129	7.2	6.8	165	9.2
4.9	97	5.4	5.9	133	7.4	6.9	168	9.4

Slightly high A1C			High A1C level			Very High A1C		
Hba1c	mg/dl	mmol/l	Hba1c	mg/dl	mmol/l	Hba1c	mg/dl	mmol/l
7.0	172	9.6	8.0	207	11.6	9.0	243	13.6
7.1	176	9.8	8.1	211	11.8	9.5	261	14.6
7.2	180	10.0	8.2	215	12.0	10.0	279	15.6
7.3	183	10.2	8.3	218	12.2	10.5	297	16.6
7.4	186	10.4	8.4	222	12.4	11.0	314	17.5
7.5	190	10.6	8.5	225	12.6	11.5	332	18.5
7.6	193	10.8	8.6	229	12.8	12.0	350	19.5
7.7	197	11.0	8.7	232	13.0	12.5	368	20.4
7.8	200	11.2	8.8	236	13.2	13.0	386	21.4
7.9	204	11.4	8.9	240	13.4	13.5	403	22.4

Here is a copy of the A1C's and what they translate into. You can see that an A1C of 8.0 or greater is considered high, is in the red zone and that is why we don't want our missionaries there. The second column is the average blood sugar that the diabetic has had over the last three months. Cut this chart out and keep it for future reference. Remember that the American Diabetic Association recommends an A1C of 7.5 or less for those aged 13-20.

<b>NORMAL BLOOD SUGAR</b>	70-130	No adjustment needed
<b>1-2 Hours after meal</b>	Less than 180	Insulin should be taken before eating. Insulin taken before meals will not reach their peak for 2 hours, so waiting until after you eat will cause unnecessary high blood sugars and uncontrolled management.
<b>High Blood Sugar</b>	180 and greater	If your blood sugar is more than 180 for more than a week, or if you have two consecutive readings greater than 300, call your health care provider.
<b>Low Blood Sugar</b>	Under 70	<p>Check your blood sugar whenever you have symptoms of low blood sugar. If your blood sugar is below 70 mg/dL, treat yourself right away. Eat something that has about 15 grams of carbohydrates. Examples are:</p> <ul style="list-style-type: none"> <li>• 3 glucose tablets</li> <li>• A 1/2 cup (4 ounces) fruit juice or regular, non-diet soda</li> <li>• 5 or 6 hard candies</li> <li>• 1 tablespoon sugar, plain or dissolved in water</li> <li>• 1 tablespoon honey or syrup</li> </ul> <p>Wait about 15 minutes before eating any more. Be careful not to eat too much. This can cause high blood sugar and weight gain.</p> <p>Check your blood sugar.</p> <p>If you don't feel better in 15 minutes, and your blood sugar is still low (less than 70 mg/dL), eat something with 15 grams of carbohydrate again.</p> <p>You may need to eat a snack with carbohydrates and protein if:</p> <ul style="list-style-type: none"> <li>• Your blood sugar is in a safer range (over 70 mg/dL), and</li> <li>• Your next meal is more than an hour away</li> </ul> <p>If these steps for raising your blood sugar do not work, call your doctor right away</p>

# **SHOPPING TIPS**

# Shopping Tips

- When going to the store, choose lean meats.
- If there is fat on the meat when you open it, cut off the excess.
- Ground turkey has fewer calories than hamburger and can be just as good with the right kind of spices. If you just can't eat ground turkey, get the leanest type of hamburger available (85/15 or better).
- Easy and convenient foods are always more calorie rich than homemade food, plus you are burning calories while you cook.
- You can do the majority of your shopping on the outer perimeter of the grocery store. Go with a list in mind and stick to it. This will help you avoid those "extra's" that are sure to sabotage your efforts both monetary and diet.
- Baking and grilling are the two best ways to prepare your foods. Frying is never a good option. Avoid vegetable oils and use Extra Virgin Olive Oil instead.
- Cinnamon and nutmeg are some favorite holiday seasonings. What's great about these two spices are that they not only add amazing flavor but are also super beneficial. Cinnamon helps improve your body's ability to respond to insulin (great for type 2 diabetics) and nutmeg helps remove toxins from the body.
- You can't go wrong with most vegetables and fruits. They are loaded with natural sugars and nutrients. Mangos pack the most sugar. Apples, bananas, oranges, blueberries, raspberries, strawberries and grapes are good for you. Green vegetables are freebie foods, meaning they are essentially calorie free.
- Avoid drinking sugary beverages. Always try to avoid drinking your calories. Stay away from energy drinks and Gatorades as they are empty calories. Water is your best friend. Remember to take a drink of water ATLEAST every hour or drink at least 8 (8 oz.) glasses of water every day.
- If you enjoy Coca-Cola, imagine eating 32 sugar cubes when drinking your beverage since that is how much sugar is in your drink. No nutritional value whatsoever.

# The American Diabetes Association has put out the following Shopping List

## **Refrigerator**

- Fruit (a few of your favorites)
- Vegetables (a few of your favorites – focus on non-starchy vegetables)
- Skim, 1% low-fat milk
- Non-fat or low fat yogurt
- Eggs
- Low-fat cottage cheese
- Reduced fat cheese
- Lean low sodium sandwich meats such as turkey, ham, roast beef

## **Freezer**

- Frozen fruit
- Frozen vegetables
- Fish fillets or shellfish
- Frozen chicken breast (boneless, skinless)
- Frozen meals (lower sodium, lean options for days when time is tight)

## **Spice Cabinet**

- Pepper
- Spices (your favorites)
- Salt-free dried herb or spice blends
- Mrs. Dash
- Cooking sprays
- Vegetable Oil (used sparingly)
- Olive oil

## **Pantry**

- Canned Vegetables
- Canned fruit (canned in juice)
- Canned beans (low sodium if available)
- Fat free refried beans
- Canned tuna or salmon
- Instant oatmeal or quick oats
- Whole grain cereal (unsweetened)
- Brown rice
- Pasta (try whole wheat)
- 100% whole wheat bread or pita bread
- Dried Fruit
- Unsalted Nuts
- Natural peanut butter or another nut butter
- Seeds
- Popcorn (light, microwave)
- Potatoes (white or sweet)
- Spaghetti Sauce