How to Manage Type 1 Diabetes

In today's world, we have seen an increase of prevalence in many diseases and disorders. Type 1 Diabetes is no exception. Type 1 Diabetes results from the pancreas's inability to produce insulin, a hormone crucial for controlling blood glucose levels. Fortunately, with the technology we have today we can manage Type 1 Diabetes effectively, allowing someone with the diabetes to live a normal life. There are a few necessary steps that someone new to Type 1 Diabetes can follow to manage their Type 1 Diabetes properly. Proper daily management will allow you to lead a long healthy life.

WARNING: Taking Improper Amounts of Insulin Is Dangerous. Follow Doctor Prescribed Levels to Ensure Safety.

Important Items

You will need these items to manage your diabetes properly. Most of these can be obtained at a local pharmacy and are often covered by health insurance.

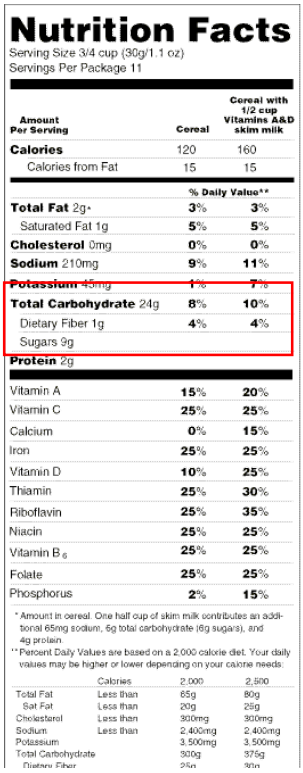
- Blood Glucose Meter
- Meter Test Strips
- Lancets
- Ketone Strips
- Glucagon Emergency Kit
- Fast Acting Carbs (juice box, fruit, fruit snacks)
- Sharps Container[1]

Figure 1. A common sharps container

Managing Your Diet

Diet management is a crucial part of ensuring you stay healthy. You will need to take insulin (use your doctor prescribed type and amount) every time you eat carbohydrates so it is important to be aware of what you're eating. Thus, you will need to count the carbohydrates to ensure that you are taking the proper amount of insulin each time. There are few steps you can take each time you plan a meal.

1. Plan a low carbohydrate meal.
2. Use the Nutrition labels to discover the amount of carbohydrates per serving (seen in Figure 2[2] in the Red Box).
    a. If no nutrition labels are available, the American Diabetes Association approves a few carb-counting books that provide you with nutrition information.
3. Add all the carbohydrates up that you will be eating.
4. Test you blood glucose using a blood glucose meter (instructions below).



Nutrition Facts

Serving Size 3/4 cup (30g/1.1 oz)
Servings Per Package 11

Amount Per Serving	Cereal	Cereal with 1/2 cup Vitamins A&D skim milk
Calories	120	160
Calories from Fat	15	15
	% Daily Value**	
Total Fat 2g*	3%	3%
Saturated Fat 1g	5%	5%
Cholesterol 0mg	0%	0%
Sodium 210mg	9%	11%
Potassium 45mg	1%	7%
Total Carbohydrate 24g	8%	10%
Dietary Fiber 1g	4%	4%
Sugars 9g		
Protein 2g		
Vitamin A	15%	20%
Vitamin C	25%	25%
Calcium	0%	15%
Iron	25%	25%
Vitamin D	10%	25%
Thiamin	25%	30%
Riboflavin	25%	35%
Niacin	25%	25%
Vitamin B_6	25%	25%
Folate	25%	25%
Phosphorus	2%	15%

* Amount in cereal. One half cup of skim milk contributes an additional 65mg sodium, 6g total carbohydrate (6g sugars), and 4g protein.
** Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Potassium		3,500mg	3,500mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Figure 2. A nutrition label with the carbs boxed in red.

[1] Image from http://www.insulincase.com/assets/icsimages/SHARPS3.JPG
[2] Image from http://www.health.gov/dietaryguidelines/dga95/images/CEREAL.GIF

5. Within five minutes before you eat, take your insulin based on the amount of carbs you will eat and you current blood glucose.
6. Enjoy your healthy meal.

NOTE: For snacks, it is also important to follow these steps to ensure proper insulin dosing.

Checking Blood Glucose Levels

Since blood glucose levels fluctuate throughout each day, it is important to check your blood glucose multiple times each day. It is recommended you check your levels using a blood glucose meter before you take insulin, if you feel symptoms of a high or low (these will be discussed later), if you are sick, or if you are having a hard time managing your levels. The desired range is 70-130 mg/dl (mg/dl stands for milligrams per deciliter and is the way most glucose meters measure blood glucose levels), however after a meal it may be higher. There are a few simple steps you can follow to check your blood glucose.

Figure 3. A Glucose Testing Meter with strip inserted.

1. Wash your hands or use an alcohol wipe to clean the area of your skin you plan to use.
2. Insert a testing strip into the meter. (as seen in Figure 3[3])
    a. The meter will turn activate upon proper insertion
3. Use a lancet to draw a drop of blood from the testing site.
    a. If necessary, squeeze finger to produce the required amount.
4. Touch the drop of blood to end of the testing strip.
    a. Most meters will beep or flash when enough blood has been collected for a reading.
5. Dab any excess blood from your finger on a clean paper towel, tissue, or cottons swab while awaiting test results.
6. If glucose levels are in the appropriate range do nothing, if not follow protocol for treating a high or a low.

CAUTION: All Lancets, Testing Strips, and Insulin Needles should be disposed of in the proper Sharps Container.

Treating Hyperglycemia (High Blood Glucose)

Hyperglycemia is related to many of the serious complications of diabetes and it is important to keep blood glucose levels in the proper range. Thus, if you are feeling symptoms of high blood glucose it is important to test. Symptoms of hyperglycemia include but are not limited to the following; frequent urination, thirst, nausea, dry mouth,

[3] Image from http://www.coding4fun.net/images/SweetSpotTheBeginningsofaGlucoseMeterDow_E586/freestyle_flash_gm4.jpg

shortness of breath, and vomiting. If you have any of these symptoms follow the next few steps to treat yourself.

1. Upon recognition of hyperglycemic symptoms, immediately test your glucose levels as directed above.
    a. If your level results in higher than 130 and it is not shortly after a meal you have high blood glucose.
2. Drink some water to ensure you stay hydrated.
3. If your glucose level is higher than 240 mg/dl check for ketones in your urine.
    a. This is done by urinating on a ketone strip (see Figure 4[4]). Each ketone checking system is different but commonly the strip changes color if you have ketones.
4. There are two main options for treating highs
    a. Exercise→especially if you are between 130 mg/dl and 240 mg/dl, exercise will help quickly bring you back into a healthy range
    b. Insulin→ particularly if your levels are elevated above 240 mg/dl and you have ketones it is important to quickly bring your levels back to the normal range.
5. Check your levels again 15 minutes after you have treated your high.
    a. Levels should be returning to normal within 15 minutes
    b. If you are exercising and your levels are still elevated after 15 minutes, insulin may be required to normalize your levels.

Figure 4. Ketone strips being compared to indicators on bottle

WARNING: If your levels stay elevated for an extended amount of time, show no signs of returning to a normal range, and you have ketones seek immediate professional medical attention.

NOTE: If you have constant hyperglycemia consult with your doctor and/or dietitian.

Treating Hypoglycemia (Low Blood Glucose)

WARNING: Hypoglycemia is very dangerous, as extreme lows can lead to unconsciousness, coma, or death, if not treated correctly and in a timely manner.

Low blood glucose can present in a few ways but there are common symptoms for most diabetics. However, you will learn over time how you experience a low. The most common symptoms are dizziness, sweating, shaking, hunger, headache, moodiness, pale skin, tingling mouth, difficulty paying attention, confusion. Some of the more serious symptoms include seizure and loss of consciousness.

NOTE: It is important that family and friends are aware of these symptoms and can treat you if you are unable to.

[4] Image from http://farm4.static.flickr.com/3179/2704481796_cc7d2e516f_o.jpg

The ways to treat a low are fairly simple to follow.

1. If you feel any of the symptoms listed above, test your sugar IMMEDIATELY.
    a. If your glucose is below 70 mg/dl begin treatment.
2. For less severe lows (45-70 mg/dl), eat fast acting carbs
    a. Fast acting carbs include glucose tablets, juice, candy, fruit snacks, fruit
3. For lows that are 45 mg/dl or lower IMMEDIATELY use glucose gel, juice, or icing.
    a. If they are unconscious icing or glucose gel should be rubbed on the gums for quick absorption and glucagon should be administered.
        i. Glucagon comes in an emergency kit (seen in Figure 5[5]) and must be drawn up into a needle and injected into a deep muscle (thighs or bottom).
4. Glucose levels should be checked every 5 minutes until levels are back above 70 mg/dl.

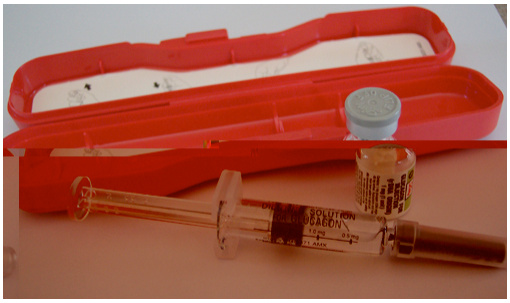


Figure 5. A Glucagon Emergency Kit before assembly.

Useful Terms:

Blood Glucose Meter- measures the amount of glucose in a drop of blood; common types include Freestyle, Accu-Check, and One Touch.

Carbohydrates- converted by the body into glucose and transported to tissues via blood; this process gives us energy to function

Glucagon- a hormone released by the pancreas that causes the liver to release glucose into the blood; when injected via a Glucagon Emergency Kit (seen in Figure 5) it elevates blood glucose

Hyperglycemia- high blood glucose levels (above 130 mg/dl)

Hypoglycemia- low blood glucose levels (below 70 mg/dl)

Ketone Strips- test for ketones in urine, ketones are symptomatic of high blood glucose levels (seen in Figure 4)

Lancets- used to draw a drop of blood, there are many different types but they all essentially involve a quick prick of the skin that feels like a pinch (seen in Figure 6[6]).

Figure 6. One-use lancets.

Sharps Container- used to dispose of used lancets and insulin needles. (seen in Figure 1) It is important to take a full sharps container to the proper medical facility for disposal

[5] Image from http://www.uptodate.com/online/content/images/prim_pix/Glucagon_kit.jpg
[6] Image from http://www.scalpel.cn/img/blood_lancets.jpg