

Glycemic Index and Glycemic Load

- Diets composed mainly of high glycemic index and high glycemic load foods have been associated with a greater risk of type 2 diabetes in men and women
- Low GI and GL diets release glucose into the blood stream more slowly and steadily than high GI and GL foods, making blood sugar levels easier to regulate
- GI and GL indexes are simple tools for controlling blood sugar levels and measuring the carbohydrate content of foods, but do not account for calories, fats, or sodium content, or other nutrients and portion sizes

Bottom Line

- Eat Less: refined starches like white bread, white rice, white pasta, white potatoes
- Eat Less: sugary foods like cookies, cake, pastry, sugary beverages
- Eat More: vegetables, fruit, whole grains and legumes
- Add lean protein and good fats to slow release of glucose

Combine Carbohydrate with Protein/Fat

- Foods comprised of protein and fat take longer to digest than carbohydrates
- Proteins and fat slow down digestion
- Protein and fat along WITH carbohydrates break down to glucose much slower and raise blood sugar more slowly than carbohydrates alone
- Example: Apple with 10 almonds
Whole grain crackers with low-fat cheese

The Diabetic Diet: Debunking the Myths

- **Myth I**
- Simple vs. Complex Carbs: Table Sugar
 - For many years people believed that diabetics have to avoid simple carbohydrates like table sugar and opt for complex carbs such as potatoes instead.
 - Healthy eating still focuses on minimizing highly processed foods, which are often full of refined flour and sugar, but 15 grams of carbohydrates is the same whether it comes from fruit or fudge



Myth II

■ The Diabetic Diet



- Eating with diabetes is not a life sentence to a rigid, deprived meal plan.
- All foods can fit into the diabetic diet, and will have different responses for each individual.
- The best diet is the same kind of healthy eating that is best for everyone.



Dietary Exchanges and Carb Counting

- Other approaches to meal planning with diabetes include using dietary exchanges or carbohydrate counting.
- **Dietary Exchanges:**
 - The dietary exchange system includes a series of exchange lists that group foods with similar nutrition profiles.
 - The system is based on 3 major categories of food: the carbohydrate group, the meat and meat substitutes group, and the fat group.

Dietary Exchanges

- Each food selection on a given exchange list has a similar nutrient profile
- Any food choice on the list may be exchanged for another  = 
- The system is easy to learn and can help build a meal plan that outlines a certain number of exchanges from each list based on caloric and other nutritional requirements.

Dietary Exchanges

- **Carbohydrate Group: One Exchange equals:**
 - Starch: 15 g carb; 3 g protein, 0-1 g fat; 80 calories
 - Fruit: 15 g carb; 0 g protein and fat 60 calories
 - Milk: 12 g carb; 8 g protein; 0-8 g fat 90-150 calories
 - Vegetable list (non-starchy): 5 g carb; 2 g protein, 0 g fat; 25 calories
 - Other carbs (e.g. sweets) 15 g carb; other nutrients vary
 - See Booklet

Meat and meat substitute group

One exchange equals:

- **Very lean** list; 0 g carb; 7 g protein; 0-1 g fat; 35 calories (1 oz poultry/fish)
- **Lean** list; 0 g carb; 7 g protein; 3 g fat; 55 calories (1 oz lean pork/dark turkey)
- **Medium-fat** list; 0 g carb; 7 g protein; 5 g fat; 75 calories (1 oz beef/1 egg)
- **High-fat** list; 0 g carb; 7 g protein; 8 g fat; 100 calories (1 oz cheese/salami)

Fat Group – One exchange equals

- 0 g carbs, 0 g protein, 5 grams fat; 45 calories
- 2 Tbs avocado
- ½ Tbsp peanut butter
- 1 tsp margarine or mayonnaise
- 1 Tbsp regular salad dressing

Carb Counting (Cont...)

- Every 15 grams of carbs are counted as 1 carbohydrate choice.
- Carb counting allows diabetics who use fast-acting insulin to calculate the right amount of insulin to counteract the corresponding blood glucose rise from their meals.

Diabetes and Alcohol



- The enjoyment of social drinking makes eliminating alcohol from the diabetic diet difficult. Using proper precautions, diabetics can still take pleasure in drinking in moderation.
- When you drink alcohol, your liver stops producing glucose and switches over all its resources to the job of clearing the booze from your bloodstream. Without any food delivering glucose to your blood and no supplemental glucose coming from the liver, you are at very high risk for hypoglycemia, especially if you drink on an empty stomach or after taking insulin or glucose-lowering oral medications.
- It takes 2 hours for 1 ounce of alcohol to be broken down and leave the body's system, so the risk continues long after you finish a drink.

Alcohol

- For individuals with well-controlled diabetes, alcohol intake should follow the same guidelines established for the general population by the United States Department of Agriculture (USDA):
 - A maximum of two drinks per day for men and one drink for women (women have a lower body water content and metabolize alcohol more slowly than men)
 - A maximum of one drink for anyone over the age of 65.
- One drink is defined as:
 - 12 ounces of regular beer (150 calories)
 - 5 ounces of wine (100 calories)
 - 1.5 ounces of 80-proof distilled spirits (100 calories)
 - One drink = 2 fat exchanges; regular beer is an additional starch exchange



Alcohol

- Alcohol is a unique substance. The body processes alcohol before it metabolizes fat, protein, or carbs.
- A 5-ounce glass of wine typically contains 110 calories, 5 grams of carbs, and about 13 grams of alcohol (which accounts for 91 of the calories).
- These numbers are roughly the same as you will find in a 12-ounce light beer or 1.5 ounces of 80-proof liquor.
- Most people experience a dip in their blood sugar after consuming alcohol; the glycemic index of beer, wine, and hard liquor is zero.

Blood Sugar Management: Hypo- and Hyperglycemia

- Hypoglycemia: Low blood sugar
 - Sometimes referred to as an “insulin reaction”, hypoglycemia occurs more frequently in people with diabetes who take insulin
 - Typical hypoglycemic threshold: 70 mg/dl (3.9 mmol/l)
 - Commonly caused by certain oral medications, missed meals, and exercise without proper precautions

Hypoglycemia (Cont...)

- Symptoms may include erratic heartbeat, sweating, dizziness, confusion, unexplained fatigue, shakiness, hunger, and potential loss of consciousness
- Once recognized, treat immediately with a fast-acting carbohydrate, such as glucose tablets or juice



Hyperglycemia

- **Hyperglycemia: High blood sugar**
 - May lead to 1 of 2 conditions:
 - **Diabetic ketoacidosis (DKA)**
 - More common in Type 1 diabetes
 - **Hyperglycemic hyperosmolar nonketotic syndrom** (HHNS or hyperglycemic hyperosmolar nonketotic coma)
 - Known as a **Diabetic coma**
 - More common in Type 2 diabetes

Prevention of Hyperglycemic Conditions

- Check blood glucose levels regularly
- Eat regular meals at consistent times
- Take extra care of yourself particularly when you are sick, and check blood glucose levels every 4 hours



Blood Sugar Management

- Maintaining blood glucose levels through proper dietary changes, exercise and/or medication and insulin therapy is essential for effective diabetes control.
- Avoiding fluctuations of high and low blood sugar levels will reduce the risk of diabetes complications and improve the way you feel.
- It is important to test blood glucose levels frequently each day and get regular A1c tests from your health care provider to make sure that your blood glucose levels are in target range.

What Numbers Should You Be Looking For?

- **The American Association of Clinical Endocrinologists (AACE) recommends the following general blood glucose testing goals for adults with type 1 and type 2 diabetes:**
 - Preprandial (fasting, or before a meal): <110 mg/dl (6.1 mmol/l)
 - Two hours postprandial (after the start of a meal): <140 mg/dl (7.8 mmol/l)
 - A1c (three month blood glucose average): 6.5% or lower
- **The American Diabetes Association (ADA) suggests:**
 - Preprandial: 70-130 mg.dl (3.9-7.2 mmol/l)
 - Postprandial (1-2 hours): <180 mg/dl (<10.0 mmol/l)
 - A1c (three month blood glucose average): 7.0% or lower
- Self-testing blood glucose levels will be determined by your physician according to your individual medical history and lifestyle requirements

Weight Management

- Excess weight is an issue for many people living with type 2 diabetes.
- Being overweight or obese promotes insulin resistance and fat makes it harder for the body to use insulin to process blood glucose.
- Excess glucose is stored by the body as fat, making weight problems worse for people with uncontrolled diabetes.

Body Mass Index (BMI)

- BMI measures weight in relationship to height as an indicator of body fat.
- Adult BMI Range:
 - Normal: ≤ 24.9
 - Overweight: 25-29.9
 - Obese: 30-39.9
 - Extreme: ≥ 40
(or morbid) Obesity

BMI – Body Mass Index

- Location of pounds also make a difference.
- People who have an apple-shaped body, that carry extra weight around the waist, are at a higher risk for developing type 2 diabetes and heart disease.
- <http://www.bmi-calculator.net>



Effective Weight Management

- The same things that are good for controlling diabetes are also key to weight control: healthy dietary habits and regular exercise.



Diabetes and Exercise

- Regular physical activity helps control blood sugar levels, reduces the risk of complications, increases energy, improves heart health, and promotes emotional well-being.
- Many diabetic complications occur as a result of poor circulation. Damage to blood vessels caused by high blood glucose levels decreases circulation throughout the body.
- Regular exercise promotes circulation, decreasing the risk of developing complications, and may help reduce the amount of medications needed.

Exercise

- Exercise also reduces stress, enhances your mood, improves body image, and promotes a sense of well-being.
- Diabetics can benefit from participating in at least 30 to 60 minutes of physical activity on most days of the week.
- Always consult your health care practitioner before starting a new exercise or fitness routine to determine which activities are safe and compatible with your individual health profile.



Rules to Ensure a Safe Exercise Session

✓ **Check your levels**

- ✓ Self-test blood glucose levels before and after a workout. The ADA recommends using caution with exercise if fasting glucose levels are >300 mg/dl (16.67 mmol/l) and no ketosis is present, and avoid exercise if ketosis is present and fasting glucose levels are >250 mg/dl (13.89 mmol/l). If levels are below 100 mg/dl (5.56 mmol/l) before exercise, have a snack and retest in 15 minutes.

✓ **Keep a Log**

- ✓ Track your blood sugar response to different activities and environments (e.g., hot versus cold) and your food intake to be able to recognize patterns and make treatment adjustments.

✓ **Sweets for Safety**

- ✓ Keep a source of fast acting carbohydrates (e.g., glucose gel or tablets; juice) available for hypoglycemic emergencies.

✓ **No insulin before exercise**

- ✓ Exercise has a blood sugar lowering effect and muscles in action metabolize insulin injections faster, increasing the risk for hypoglycemia.

✓ **Stay hydrated**

- ✓ Drink plenty of water. Staying well-hydrated before, during, and after exercise is important for preventing erratic blood sugar levels and heat stroke.

✓ **Identify yourself**

- ✓ When exercising, always wear a medical identification tag or bracelet in a noticeable place on your body, so others will know how to help you if you lose consciousness.

✓ **Warm up and cool down**

- ✓ The ADA recommends a warm-up of 5-10 minutes of aerobic activity (walking, cycling, etc.) at a low intensity level and an additional 5-10 minutes of gentle stretching. The cool-down should also last 5-10 minutes, until heart rate has returned to pre-exercise levels.

✓ **Dress appropriately**

- ✓ Well-fitting shoes and socks and breathable, weather appropriate clothing are essential for preventing foot problems and heat stroke.



Supplements

- Very important not to replace conventional medical therapy for diabetes without communicating with health care professional
- Diet and exercise are key, but supplements can help.
- Work with a health care professional if you'd like to try supplements
- Start with one supplement at a time and see how blood sugar improves

Recommendations

- **Multi-vitamin/mineral for diabetics**
- **GTF (glucose tolerance factor) chromium:** This trace element plays a role in blood sugar regulation by working with insulin to help transport glucose into cells. Can take 1,000 mcg daily.
- **Alpha-lipoic acid:** An antioxidant that can enhance glucose uptake, inhibit glycosylation (the abnormal attachment of sugar to protein), and helps promote and maintain eye and nerve health. Start with 100 milligrams a day. Higher doses (600 milligrams a day) help treat and prevent diabetic neuropathy (nerve damage from impaired circulation).
- **Magnesium:** 1 in 4 people with diabetes may have low blood levels of magnesium (Archives of Internal Medicine). To help promote healthy insulin production, take 350 mg daily. (Magnesium glycinate is a good form with less of a laxative effect.) Magnesium citrate is good to help move bowels.

Recommendations

- Vitamin D – at least 1,000 IU daily with food
- Large study showed a strong inverse association between blood levels of Vitamin D and diabetes
- Lower a person's Vitamin D level, higher chance they had diabetes – check your levels!
- Vitamin D in infancy helps prevent type 1 diabetes
- Vitamin D deficiency may also play a role in development of type 2

Supplements

- Coenzyme Q10: A powerful antioxidant that may help maintain a healthy heart. Take 60-100 milligrams of a softgel form with your largest meal.
- Cinnamon: 1 tsp in food or 500 mg cassia cinnamon in capsule form twice daily.
- Bitter melon (*Momordica charantia*)
- Gurmar (*Gymnema sylvestre*) “sugar destroyer”
- Fenugreek: available as tea and in capsule form, a typical dose is 5 to 100 g/day. Can interact with Coumadin.
- Glucomannan - fiber

Vinegar/Sour Dough Bread

- When lactic acid is added to sourdough bread, it does two things: changes the flavor so that you get that tangy, delicious bite of sourdough and mediates the glycemic impact of all that white wheat flour.
- Lactic acid isn't the only one that helps keep blood sugar in check. The acetic acid in vinegar and the citric acid in lemons and limes has the same effect.)

Summary

- Good nutrition is one of the keys to managing Type 2 Diabetes
- Nutrition guidelines for Type 2 Diabetes focus on controlling carbohydrate and fat intake
- Weight management and exercise are also key
- Seek help to set and reach your nutrition and exercise goals

Summary

- Talk to your doctor, dietitian, diabetes educator about which changes are most important for you
- Start slowly by changing your habits one at a time for a lifestyle program you can live with
- Seek support from your dietitian and/or diabetes support team

Resources

- American Diabetes Association
www.diabetes.org
- Joslin Diabetes Center www.joslin.org
- National Diabetes Information Clearinghouse
www.diabetes.niddk.nih.gov
- Calorieking.com
- Dwlz.com (Restaurants)
- <http://www.changingdiabetes-us.com/>

Resource Books

- *American Diabetes Association Complete Guide to Diabetes*
- *Diabetes for Dummies*
- *The All-Natural Diabetes Cookbook* by Jackie Newgent, RD
- *The Mediterranean Diabetes Cookbook* by Amy Riolo
- *Magic Menus* – American Diabetes Assoc.
- *The New Glucose Revolution* by Jeannie Brand-Miller, PhD

Remember

- Type 2 Diabetes is mainly a disease of “lifestyle.”
- You can prevent many of the complications of diabetes through diet, exercise and stress reduction
- Take care of yourself – you’re worth it!!!

