

## TRANSPLANT DIABETES ESSENTIALS

### Diabetes Overview

Over sixteen million people in the United States have diabetes. About 90 - 95% of people with diabetes develop it as an adult. We call this Type 2 diabetes. Less than 10% of people with diabetes have Type 1 or insulin-dependent diabetes. Diabetes is a chronic illness that will not go away. While we cannot cure diabetes, we can **control** diabetes. The best way to cope with diabetes is to learn as much as you can about taking care of yourself.



### What is Diabetes and what are high blood sugars?

Diabetes is a disease in which the body cannot properly use the energy it gets from food. Normally, most of the food we eat is broken down or digested into sugar (glucose). Glucose provides the body's cells with the energy they need. Insulin, a hormone produced in the pancreas, helps the glucose get into the cells where it is burned for energy. In diabetes the body cannot make enough insulin or is resistant to the insulin it makes. As a result, your blood glucose can become much higher than usual. A *normal fasting blood glucose* range is about **65 - 100 mg/dL**. When your blood sugar is **126 mg/dL** or higher after fasting for eight hours, a diagnosis of diabetes is made.

### Why is it important to control high blood sugars?

Often individuals awaiting a transplant will have blood glucose issues before their transplant. Others who did not have diabetes before their transplant may find that they have high blood sugars after transplant. For those with diabetes before transplant, it is important to optimize your blood sugar management before your transplant to prevent complications and impact on your health status. If you had pre-existing diabetes, your post-transplant blood glucose management can be challenging. The medications that are prescribed to prevent rejection may make blood sugars go up. As a result, some individuals will develop diabetes after transplant. To prevent dehydration, reduce the risk of infection, promote overall healing and post-transplant outcomes, it is important to keep blood sugars within the goal that you and your health care team make. This will help with recovery; and you will feel better!

### Types of Diabetes in the transplant population

- **Type 1 Diabetes:** Usually occurs before the age of 40. The pancreas has stopped making insulin. People with this Type 1 diabetes must take insulin injections to keep blood sugar levels normal.
- **Type 2 Diabetes:** Usually occurs after the age of 40. The pancreas still makes insulin, but it is not making enough and the body is resistant to the insulin it makes. This results in high blood glucose levels. The treatment for this Type 2 diabetes is diet, exercise, and sometimes, diabetes medication. People with Type 2 diabetes may take pills, injections of insulin or both to control their blood glucose. If you are overweight, weight loss can increase your body's sensitivity to insulin and decrease your need for medication.
- **New Onset Diabetes Post Transplant:** Diabetes that develops after transplant.
- **Impaired Glucose Tolerant:** Blood glucoses are elevated (100 - 125) but not high enough to be identified as diabetes.

### Signs of Diabetes and / or high blood sugar

These symptoms are the result of high blood sugar (glucose) levels:



**EXTREME THIRST**



**FREQUENT URINATION**



**DRY SKIN**



**HUNGER**



**BLURRED VISION**



**DROWSINESS**

## Signs of low blood sugar

After patients begin controlling their diabetes, they sometimes experience the symptoms of low blood sugar (glucose). If your finger stick test shows a glucose of 70 or below, you may feel the following symptoms:



## How to prevent complications

Research has demonstrated that good blood glucose control can delay and possibly prevent the long-term complications of diabetes. Work closely with your health care team to learn how to control your diabetes and reduce your risk of complications. Good control is usually a blood sugar of **90 - 130 mg/dL** in the morning or before meals, and **110 - 150 mg/dL** at bedtime with a plasma calibrated meter.

Be sure to discuss your specific glucose goals with your physician or diabetes team. They will help you set realistic goals that make sense for you. Long-term control is evaluated by the **Hemoglobin A1c** (A1c) test every 3-4 months. An A1c of **7% or lower** is the goal. Discuss the results of your A1c with your physician and create a plan for achieving and maintaining good control.

## Nutrition

If you haven't met with a registered dietitian in the last year, see one soon. Every person with diabetes should have a *personal meal plan*. The dietary guidelines for diabetes have changed, and now offer much more flexibility in food planning. The American Diabetes Association and the American Dietetic Association are both excellent resources for nutritional information.

### Essential Information about Food:

- **Carbohydrates (Starches):** Should make up about 40 - 50% of your diet. Examples include: breads, potatoes, fruit, fruit juice, rice, pasta and beans.
- **Protein:** Meat and dairy products: Should make up 10 - 20% of your diet.
- **Fat:** "Good fats" like olive oil, canola oil and nuts can make up to 25 - 35% of calories.



### General Ideas About Food to Remember:

- Remember, a "diabetes meal plan" is just a well-balanced diet!
- Eat a wide variety of foods everyday
- Eat high fiber foods, such as fruits, vegetables, grains and beans
- Use less added fat, sugar, and salt
- Limit how many carbohydrates you eat and spread the carbohydrates evenly throughout the day
- If you want to lose weight, cut down portion sizes. If you skip a meal, you may eat too much at your next meal.

Ask for a referral to meet with a **Registered Dietitian** for an *individualized meal plan*.  
Call **(650) 725-4005** to schedule an appointment.

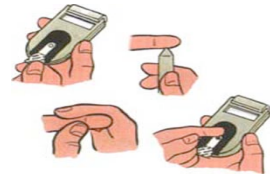
## Why is exercise important

Develop an exercise plan with your physician and diabetes educator. Walking is a perfect “getting started exercise”. Try walking 10 -15 minutes three days a week and gradually build up. Regular exercise helps control blood sugar and cholesterol, improves blood pressure and contributes to weight loss. If you have health problems that keep you from walking, consider stationary cycling, swimming or chair exercises. Exercise is an important part of diabetes control. Find an activity you like and get started. If you are already exercising regularly, keep up the good work!



## Blood glucose testing basics

We encourage everyone with diabetes to have a glucose meter at home. Meters are easy to use and give you immediate feedback on your blood glucose level. Depending on your glucose control, you may want to check your blood glucose one to four times a day, before meals and before bedtime. Try testing two hours after meals to see if your diabetes plan controls your glucose. If you’re taking diabetes medications, it’s a good idea to check your blood glucose before and after exercise in order to prevent low blood sugar. Knowing what your blood sugars are at any given moment will improve your feelings of *being in control* of your diabetes. If your blood glucose usually runs over 200, that’s too high. Most patients try to keep their blood glucose “near normal”, about **90 - 130** in the morning when fasting, and **less than 180** one to two hours after meals. Discuss what glucose goals would be right for you with your physician.



## Medications

Many people with diabetes take pills or insulin to control their blood glucose. In the last few years, several new oral medications (Glucophage, Avandia, Actos, Glucovance, and Prandin) have become available for patients with Type 2 diabetes. Diabetes pills can be taken alone, with other diabetes pills or with insulin. People with Type 1 diabetes need to take insulin injections since their body cannot make any insulin. The most effective treatments for Type 1 diabetes are multiple insulin injections (3 - 4 a day) or an insulin pump. Whatever your medication plan is, it is important for you to know the following information:

- **Name** of your medication
- **Dose** and **when** to take it





## Getting more information

Listed below are phone numbers and websites of organizations that provide resources and educational information that may be helpful to you and your family.

| Organization                                  | Phone        | Web Site  |
|---|--------------|---|
| American Diabetes Association                 | 800-232-3472 | <a href="http://www.diabetes.org">www.diabetes.org</a>  |
| American Association of Diabetes Educators    | 800-832-6874 | <a href="http://www.aadenet.org">www.aadenet.org</a>  |
| The American Dietetic Association Hotline     | 800-366-1655 | <a href="http://www.eatright.org">www.eatright.org</a>  |
| National Heart, Heart, Lung & Blood Institute | 301-951-3260 | <a href="http://www.nhlbi.nih.gov/nlbi.html">www.nhlbi.nih.gov/nlbi.html</a>                        |
| National Kidney Foundation                    | 800-747-5521 | <a href="http://www.kidney.org">www.kidney.org</a>  |
| American Liver Foundation                     | 800-223-0179 | <a href="http://www.liverfoundation.org">www.liverfoundation.org</a>                                |
| American Heart Association                    | 800-242-8721 | <a href="http://www.americanheartassociation.org">www.americanheartassociation.org</a>              |
| Diabetes Exercise & Sports Association        | 800-898-4322 | <a href="http://www.diabetes-exercise.org/index.asp">http://www.diabetes-exercise.org/index.asp</a> |

## The Transplant Diabetes Program at Stanford

Controlling blood glucoses is one of the most important things you can do to ensure the success of your transplant. The Transplant Diabetes Program has been developed specifically for transplant candidates and recipients. We understand that blood glucoses affect each person different. Because of this, individuals (pre- and post- transplant) and their families are welcome to attend the programs below. If elevated blood glucoses persist, your transplant team will refer you to the programs below so we can create an individualized treatment plan that will accommodate your needs.

| Program Resource   | Description of Program  | Program Information  |
|--|---|--|
| <b>Diabetes Update Class</b>  | Learn how good blood sugar control will better prepare you for transplant. This one-time class is for those with diabetes, pre- and post-transplant. Family and friends are encouraged to attend. | <b>Time:</b> Available twice per month. Call to enroll for class.<br><b>Call:</b> (650) 725-1988   |
| <b>Group Appointments</b>  | Group appointments provide a place for individuals to problem-solve diabetes related issues with a diabetes education team.   | <b>Time:</b> Available weekly by walk-in basis.<br><b>Location:</b> Boswell clinic 1 <sup>st</sup> floor Kidney / Liver Transplant clinic.<br><b>Time:</b> Monday 9am - 12 noon        |
| <b>In-Hospital Visits</b>  | While you are in the hospital, we are available to support the management of your diabetes.   | <b>Time:</b> 9-5 pm Monday through Friday.<br>To schedule an in-hospital visit.<br><b>Call:</b> (650) 498-4526   |
| <b>Individual Appointments</b>   | These appointments offer individually focused training.   | <b>Time:</b> Provided on an as-needed basis. Call to schedule an appointment.<br><b>Call:</b> (650) 498-4526   |
| <b>Transplant Diabetes Clinic</b>  | Meet with an Endocrinologist to help optimize your diabetes control, in a coordinated effort with your transplant physician.  | <b>Time:</b> Thursday afternoons<br><b>Location:</b> Boswell Clinic 1 <sup>st</sup> floor, Medical Specialties clinic. Call to schedule an appointment.<br><b>Call:</b> (650) 723-6961 |
| <b>Support Services</b>     | For people living outside the Stanford Medical Center area, we can provide out-of-area diabetes specialist referrals.   | <b>What:</b> To request an out-of-area diabetes doctor or other specialist referral coordinated with your Transplant team.<br><b>Call:</b> (650) 498-4526                              |
| <b>On-line Resources</b>   | The Transplant Diabetes Program website has more information about diabetes in the Transplant Process.  | To access the web site:<br><a href="http://www.stanfordhospital.org/transplantdiabetes">www.stanfordhospital.org/transplantdiabetes</a>  |

## How to live with Diabetes

**Team approach = long-term success!** Your diabetes care is primarily up to you, but your health care team is important. A successful transplant requires teamwork. The person with diabetes, and their family, are the most important members of the diabetes team. Here are some tips to make the most out of your visits with your healthcare team:

- Share information with your team
- Ask questions
- Make a plan for change
- Evaluate your progress compared to your plan

