DIABETES MELLITUS: AN OVERVIEW

Diabetes in USA
About 30 million children and adults have diabetes in the United States. Another 86 million have pre-diabetes, and about 1.4 million are diagnosed each year.

Racial Disparities
The risk of diagnosed DM is 1.2 times higher among Asian Americans, 1.7 times higher among Hispanics and 1.7 times higher in non Hispanic Blacks.

Death from Diabetes
- Diabetes is the main cause of death in 70,000 Americans yearly
- Contributes to death in almost 250,000 Americans each year

Cost
- Diabetes costs $250 billion
- Total cost is 2.3 times higher for those diagnosed with DM

Complications
- Hospitalization rates for heart attack were 18 times higher in diabetic
- Hospitalization rates were 1.5 times higher for stroke
- Almost 300,000 emergency room visits are from hypoglycemia
- Almost 200,000 emergency room visits for hyperglycemia
- About 30% of diabetics in USA over 40 years have retinopathy
- Almost 45% of all new kidney failure cases is from diabetes
- Each year, 50,000 Americans begin treatment for kidney failure due to diabetes
- About 80 - 70% of people with diabetes have mild or severe forms of neuropathy
- Hearing loss is 2 times as common
- 60% of non-traumatic limb loss is due to diabetes with about 74,000 amputations performed yearly
Diabetes occurs when too much glucose fills up in the bloodstream. This is called hyperglycemia or high blood glucose. The diagnosis is made by testing: non-fasting or fasting blood glucose level. A fasting glucose test is taken after you have not eaten for at least eight hours.

Symptoms
There are many symptoms and signs that can occur when the blood glucose levels remain high. These include:

- Blurred vision
- Increased urination
- Feeling more tired than usual
- Increased thirst or hunger
- Slow wound healing
- Yeast infections

Complications
Long-term complications may arise from high blood glucose levels as a result of damage to large blood vessels, nerves, small blood vessels. This can lead to long-term problems which include:

- Stroke
- Heart attack
- Circulation problems
- Kidney disease
- Blindness
- Nerve disease
- Loss of foot or leg caused by circulation problems and nerve disease

### Glucose and Hemoglobin Targets

<table>
<thead>
<tr>
<th></th>
<th>Normal</th>
<th>Pre-diabetes</th>
<th>Diabetes</th>
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<tbody>
<tr>
<td>Fasting Blood Glucose (mg/dL)</td>
<td>Less than 100</td>
<td>101 to 125</td>
<td>126 or greater</td>
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<tr>
<td>Glucose 2 hrs after 75g glucose drink (mg/dL)</td>
<td>Less than 140</td>
<td>141 to 199</td>
<td>200 or greater</td>
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<td>Random Glucose</td>
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<tr>
<td>Hemoglobin A1c (%)</td>
<td>Less than 5.7%</td>
<td>5.8 to 6.4</td>
<td>6.5 or greater</td>
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### Types of Diabetes

**Type 1 Diabetes**

1.25 million Americans have it and 40,000 people will be diagnosed with it this year. Type 1 diabetes occurs at all ages, in people of different races. In type 1 diabetes, the body does not produce insulin. Insulin helps glucose enter from the blood stream into different cells of the body. The glucose is then utilized to produce energy.

**Pre-diabetes**

There are no clear symptoms—so you may have it and not know it. Here’s why that’s important: before people develop type 2 diabetes, they almost always have pre-diabetes—blood sugar levels that are higher than normal but not yet high enough to be diagnosed as diabetes. You may have some of the symptoms of diabetes or even some of the complications.

**Type 2 Diabetes**

Type 2 diabetes is the most common form of diabetes—here, the body doesn’t use insulin properly. And while some people can control their blood sugar levels with healthy eating and exercise, others may need medication or insulin to help manage it. A key part of managing type 2 diabetes is maintaining a healthy diet.
Do You Have Type 1 Diabetes?
You are not alone! Success lies in balancing your medications, sticking to your daily exercise routine and having a sound nutrition plan.

Manage Your Medication
Everyone manages their diabetes in different ways. But the key to finding the right way to manage Type 1 Diabetes lies in working with your healthcare providers to discover what works best for you.

Learn the Genetics of Diabetes
Unlike some traits, diabetes does not seem to be inherited in a simple pattern. Yet clearly, some people are born more likely to develop diabetes than others.

WHAT LEADS TO DIABETES?
Type 1 and type 2 diabetes have different causes. Yet two factors are important in both. Certain genes are passed on to a family, then something in your environment triggers it. Genes alone are not enough.
- 5 - 10% of people living with diabetes have type 1 diabetes
- Most are older than 25 years
- People usually inherit the gene that leads to type 1 diabetes.

Risk factors for disease onset include:
1. Race: Whites have the highest rate of type 1 diabetes.
2. Environmental triggers: Type 1 diabetes develops more often in winter than summer and is more common in places with cold climates.
3. Viruses: Maybe a virus that has only mild effects on most people triggers type 1 diabetes in others.
4. Early diet may also play a role. Type 1 diabetes is less common in people who were breastfed and in those who first ate solid foods at later ages.

The body destroys its own pancreas gland that make insulin. Insulin is the hormone that allows the cells of the body to take glucose from the blood to use for energy now or later. In type 1 diabetes, no insulin is produced and the cells cannot get glucose from their bloodstream. Because of this the blood glucose levels rise known as hyperglycemia. Without insulin, the body cannot get enough energy and in the process produces ketones bodies, a condition called diabetic ketoacidosis. Untreated, this can lead to coma or death.

Uncontrolled type 1 diabetes with long periods of high glucose (hyperglycemia) can result in dangerous consequences including:
- Blindness
- Heart attack
- Stroke
- Kidney disease
- Nerve disease
- Circulating problems and loss of foot or leg (from circulatory and nerve problems)

COMBAT HYPERGLYCEMIA WITH:
Medication:
Insulin injections to replace the insulin the body can no longer produce

Food Choices:
Making healthy choices for growth and health

Physical Activity:
Improves the utilization of the insulin

Monitor Glucose:
To see how the treatment is working to meet your goals
Do You Have Type 2 Diabetes?
You are not alone! Success lies in balancing your medications, sticking to your daily exercise routine and having a sound nutrition plan.

Manage Your Medication
Everyone manages their diabetes in different ways. But the key to finding the right way to manage Type 2 Diabetes lies in working with your healthcare providers to discover what works best for you.

Learn the Genetics of Diabetes
Unlike some traits, diabetes does not seem to be inherited in a simple pattern. Yet clearly, some people are born more likely to develop diabetes than others.

WHAT LEADS TO DIABETES?
90% of people with Diabetes have Type 2. Most are older than 40 years old. Risk factors include:
- a family history of diabetes
- elevated weight
- not being physically active
- developing diabetes during pregnancy
- giving birth to baby heavier than 9 lbs
- race: African American, Pacific Island, Hispanic or Native American

Type 2 Diabetes Occurs When Any of the Following Occur:
1. Your cells do not take in enough glucose from bloodstream because they have trouble using insulin. Your liver releases more stored glucose into the bloodstream than your body needs.
2. Your pancreas may not make enough insulin.
3. Your pancreas may not supply insulin soon enough after you eat.

With these factors, glucose builds up in the blood resulting in elevated glucose levels - hyperglycemia.

Uncontrolled type 2 diabetes with long periods of high glucose (hyperglycemia) can result in dangerous consequences including:
- blindness
- heart attack
- stroke
- kidney disease
- nerve disease
- circulating problems and loss of foot or leg (from circulatory and nerve problems)

COMBAT HYPERGLYCEMIA WITH:

Medication:
Insulin injections to replace the insulin the body can no longer produce

Food Choices:
Making healthy choices for growth and health

Physical Activity:
Improves heart health and decreases insulin resistance

Monitor Glucose:
To see how the treatment is working to meet your goals
What is Hypoglycemia (low blood sugar)?
Hypoglycemia occurs when the blood glucose level drops below 70mg/dL. At this level, the body does not get enough glucose it needs.

Causes
- **Medication** - taking too much insulin or oral medication
- **Food Choices** - taking too much insulin or oral medication skipping meal , eating at different times, eating fat rich meals that can delay the rise of your blood glucose levels, weight loss
- **Increased Physical Activity**

Symptoms
- Shaking
- Pounding heart
- Fast pulse
- Cold sweat
- Headache
- Dizziness
- Blurred vision
- Blurred speech
- Nausea
- Hunger
- Giddiness
- Trouble Thinking
- Fatigue
- Numbness
- Irritability
- Unusual Anger
- Arguing
- Crying
- Nervousness
- Clammy feeling
- Sweating
- Chills
- Confusion

How to Avoid Low Blood Sugar
1. Understand how and when the medication works
2. Understand when to eat
3. Understand how to exercise

Treating Low Blood Sugar
Treatment for low blood sugar involves both raising your blood sugar and treating the cause of your low blood sugar.

- Increase your blood sugar by eating 15-20 grams of carbohydrates. This includes drinking 8 oz juice, milk or regular soda, taking 3 glucose tablets or glucose gel, a spoonful of sugar or grape jelly. Recheck your sugar in 15-20 minutes. If it is still less than 70, retreat with 15-20 grams of carbs. If after two attempts, your sugar remains low, treat again and call 911.
- If your blood sugar is so low that you are confused or passing out, and you are not able to eat anything, you will need to be treated with glucagon. Glucagon is a hormone that can quickly raise blood sugar levels and stop severe symptoms. It comes as a shot or a nose spray.
- If a medicine is causing your low blood sugar, your doctor can change or stop your medicine.

Source: Created by Quality And Patient Safety Department, Hackensack Meridian Health, 2020
WHAT YOU NEED TO KNOW

Vision loss can be caused by different problems in the eye:

- **Presbyopia**
  Makes it hard for the lens to focus

- **Cataract**
  Makes the lens cloudy

- **Glaucoma**
  Build up of pressure in the eye that damages the Optic Nerve and lead to blindness

- **Macula Degeneration**
  Damages the macula, the part of the eye that allows you to see fine detail

- **Diabetic Retinopathy**
  Damages the blood vessels in the retina, the part of the eye that receives visual images and sends these images to the brain

Checking for Eye Disease

- Dilated Eye Exam
- Digital Retinal Imaging

**Foot Complications**

- Loss of feeling
- Infection
- Ulcers
- Loss of Limb

**How to Reduce the Risk**

- Work with the care team to evaluate risk and screen for loss of feeling in the feet
- Ensure the blood glucose is in the target range
- Engage in daily foot care
- Avoid going barefoot, check for objects in the shoes and choose shoes that support your feet
- Change socks/stockings daily

**Diabetic Retinopathy**

Damages the blood vessels in the retina, the part of the eye that receives visual images and sends these images to the brain.

Symptoms can include:

- Blurry vision, dark or floating spots
- Trouble seeing things that are at the center of your focus when reading or driving and telling colors apart
CHECKING YOUR GLUCOSE: IT’S IMPORTANT

It is important to check your glucose to see how well your treatment plan is working. Remember to write down the medication information - date, dose and time taken.

Materials needed: glucose meter, lancet, lancing device, alcohol swab and test strips

1. Gather Your Supplies
   Monitor + test strips + lancets (tiny needle), sharps container

2. Wash and Dry Hands
   Ensure Sterility

3. Site to Lance
   Ensure enough blood in the area to be lanced - may help by squeezing the blood into that spot

4. Set Up Meter
   Turn the meter on, insert the test strip, match the code on the meter

5. Lance Finger and Collect Blood
   Finally write down your result

DIABETIC MEDICATION

What are the goals of type 2 diabetes treatment?
The goals of treatment for type 2 diabetes are:
1. To keep your blood sugar at your goal level
2. To prevent future health problems
3. Making these lifestyle changes can be as important as taking your medicines.

How is type 2 diabetes treated?
Type 2 diabetes can be treated with:
- Diet changes
- Lifestyle changes
- Medicines

What diet and lifestyle changes might be part of my treatment?
Recommendations include that you:
- Lose weight
- Eat healthy foods
- Get regular exercise
- Sleep
- Not smoke
- Avoid excessive alcohol use

TODAY’S HIGHLIGHT
You may need a second medication. The choice will depend on different things, including your weight, other health problems, and if you are comfortable giving yourself a shot. Some of these medicines can cause low blood sugar as a side effect. Symptoms of low blood sugar can include:
- Sweating and shaking, fast heart beat, dizziness
- Feeling hungry
- Feeling worried

Glucose less than 70mg/dL is low blood sugar. If you feel symptoms, check your sugar. If low, treat with foods that have sugar (about 15 -20 grams of carbs), for example, 1 glass (8 oz) orange juice, milk or regular soy, 3 glucose tablets (available at any pharmacy), hard candy (not chocolate), 2 spoonful of raisin, grape jelly, or 1 tablespoon of plain sugar. Check finger-stick in 15mins. If fingers tick is still low, recheck. If glucose remains low treat and call 911.

If you get low sugar levels, call your doctor to adjust your medications.

If you have been diagnosed with diabetes and require continuous glucose monitoring systems, please consult your health care provider for instructions on how to use the device.
YOUR MEDICATIONS AND YOU

What is insulin?
Insulin is a medicine that lowers a person’s blood sugar level. It is produced by the pancreas (an organ in the belly). Insulin allows the cells of the body to take glucose from the blood stream to use energy or store for later use. People with Type 1 Diabetes do not produce insulin and need to replace it. Some people with type 2 diabetes do not produce enough insulin or their cells have difficulty using it, so they need insulin to manage their glucose. It usually comes in the form of a shot that people give themselves. If your clinician prescribes insulin, he or she will tell you which form to use and show you how to use it. He or she will also tell you:

Which type of insulin to use
- There are different types of insulin that come in a shot. It might be in the form of an insulin pen, an insulin pump, or with a needle free injector.
- Some types work faster or last longer than others.

There are 4 types of insulin:
1. Rapid acting
2. Short acting
3. Intermediate acting
4. Long acting

Discuss with your clinician:
- How much insulin to use
- When to use it
- When to check your blood sugar level
- Interactions with other medications

An insulin dose often needs to change when a person gets sick, has surgery, travels, or eats out. Ask your doctor or nurse how to change your dose during these times. Also beware of insulin injection before you exercise - especially if you inject in your legs and then run, the insulin gets used up much faster and may lead to low blood glucose levels.

What other treatments might I need?
Sometimes, people with type 2 diabetes need medicines to treat health problems that often affect people with diabetes. For example, people who have high blood pressure might take medicines to lower their blood pressure. This can reduce their chances of having a heart attack or stroke. Many people may also need medications to lower their cholesterol.

When should I see my doctor or nurse?
Most people with diabetes see their clinician every three months where you should discuss your medications, any side effects, glucose control and if changes need to be made. Some people feel sad as well and if you do, you are not alone - speak to your health care provider about this too.

TIPS TO HELP WITH MEDICATIONS COMPLIANCE
1. Make your medication a part of your routine
2. Log your use
3. Organize in a pill box
4. Place your medication in clear view

Injection Areas:
It is best to inject insulin in abdomen, upper arm, thighs and buttocks. Try to inject the same time of the day. Change the point where you inject or the injection site - this helps keep your skin and tissue healthy.

NUTRITION BASICS FOR BLOOD SUGAR BALANCE

Eat Breakfast Everyday!

Eat within 2 hours of rising and make sure your breakfast contains protein.

Things to Include:
- Eggs cooked in butter, avocado, or olive oil
- Vegetable omelettes: add tomatoes, mushrooms, spinach, peppers
- Whole fruit
- Full fat Greek yogurt
- Smoothie with kefir, coconut or almond milk and fruit and/or vegetables (e.g. spinach)
- Leftovers from dinner
- Tofu scrambled with vegetables

ENERGY TIP: Regular activity helps your body use the energy you eat rather than storing it in fat cells. Move more, especially after eating to help your metabolism.

Eat Regularly & Drink More Water

- Eat 3 meals every day with an evening snack.
- Avoid large meals within 3 hours of bedtime.
- Don’t go too long between eating meals.
- Pay attention to what you are eating and how you feel during and after you eat it. Take time to chew your food, and eat in a relaxed atmosphere as often as you can.
- Drink more water. Don’t drink beverages with sugar added. A slice of lemon, orange or a berry added to water can make it pretty and add flavor.

SNACK IDEAS
- Banana or apple with nut butter
- Full fat Greek yogurt with berries
- Hardboiled egg with a piece of fruit
- Vegetables with hummus
- One handful of nuts with a piece of fruit or vegetables
- Any meat with cheese or a vegetable
- 1 oz dark chocolate (70% cacao or more)
**NUTRITION BASICS FOR BLOOD SUGAR BALANCE**

**PROTEINS**
- Eggs, chicken, turkey, lean meats
- Salmon (canned or wild caught)
- Tuna, sardines, wild caught fish
- Beans (also count as carbohydrates)
- Tofu or tempeh

**HEALTHY FATS**
- Nuts, nut butters, peanut butter
- Flax, chia, pumpkin or other seeds
- Avocados
- Butter
- Coconut oil, olives, olive oil
- Vegetable oils (preferably organic)

**CARBOHYDRATES**
- All vegetables
- All fruits
- Rice, wild rice, pasta, quinoa
- Hummus, beans
- Millet, buckwheat
- Whole grain breads

**Balance Your Meals and Snacks**
- Include a healthy protein, fat and carbohydrate with every meal and snack.
- Make at least half your plate non-starchy vegetables.
- Eat smaller portions. Try using a smaller plate. Don’t eat directly from the container or bag.
- Eat real food, not processed or packaged food. The more a manufacturer has done to a food, the fewer nutrients it has.
- Food should look close to the way it is found in nature.

**TIP:** Make sure your breakfast contains protein.

**TIP:** Eat more healthy fats. They help you feel satisfied and add important nutrients.

**TIP:** Read labels for carbohydrate content, especially for added sugars. Eat less sugar and carbohydrates.

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**THE HEALTHY PLATE**

- **Proteins**
  - 4 oz. wild caught salmon or sardines
  - 4 oz. pasture-raised organic chicken, turkey breast, or organ meats
  - 2 pasture-raised organic eggs
  - 12 oz. homemade bone broth

- **Lean Proteins**
  - 1 tsp maple syrup
  - 1/8 tsp blackstrap molasses
  - yacon syrup

- **Carbohydrates**
  - 1/4 avocado
  - 8-10 olives
  - 1/4 cup nuts & seeds
  - 1 tablespoon olive oil, coconut oil, ghee butter, avocado oil
  - 1 oz. goat or sheep cheese
  - 1/8 oz. 85% dark chocolate

- **Healthy Fats**
  - 1/4 avocado
  - 8-10 olives
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- **Non-Starchy Vegetables**
  - Romaine
  - Spinach
  - Arugula
  - Broccoli
  - Beets
  - Brussel sprouts
  - Celery
  - Endive
  - Kale
  - Okra
  - Leeks
  - Sprouts
  - Cauliflower
  - Cabbage
  - Mushrooms
  - Tomatoes
  - Zucchini
  - Cucumbers
  - Green beans
  - Carrots
  - Beets
  - Brussel sprouts
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  - Cabbage
  - Mushrooms
  - Tomatoes
  - Zucchini
  - Cucumbers
  - Green beans
  - Carrots

- **Herbs & Spices**
  - Turmeric
  - Ginger
  - Cayenne
  - Garlic

- **Sweeteners**
  - 1 tsp maple syrup
  - 1/8 tsp blackstrap molasses
  - Yacon syrup

- **Whole Grains & Complex Carbohydrates**
  - 1/4 cup portions:
    - Pumpkin
    - Winter squash
    - Sweet potato
    - Parsnip
    - Beans
    - Lentils
    - Snap peas
    - Okra
    - Parsnip
    - Quinoa
    - Buckwheat
    - Wild red rice
    - Amaranth
    - 1 medium piece of fruit
    - 1 cup berries or melon
    - 1/4 cup pomegranate seeds or dried fruit

- **Water**
  - Half your body weight in ounces of pure water throughout the day

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9 IDEAS FOR A HEALTHY, HAPPIER YOU

1. Work out regularly
   - Home Gym
     - Walking
     - Running
     - Swimming

2. Eat healthier
   - Blend up a snack
     - Fruits - proper portion
     - Veggie snacks

3. Reduce stress
   - Coloring Book
   - Gardening
   - Socialize

4. Sleep better
   - Smart lightbulbs
   - Sleep Hygiene

5. Spend time with loved ones
   - Great games

6. Celebrate
   - Create special moments around wins in your life

7. Quit smoking
   - Tools to help

8. Get organized
   - A guide to tyding
     - Make a check list/To do list

9. Get moving
   - Fitness trackers

Source: Created by Quality And Patient Safety Department, Hackensack Meridian Health, 2020

MY FOOD LOG

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<th>BREAKFAST</th>
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