
Diabetes Foundation
Diabetes & Heart Health:
Reducing Your Risk
Diabetes Foundation
ADCES
Accredited Program

1


PRESENTER
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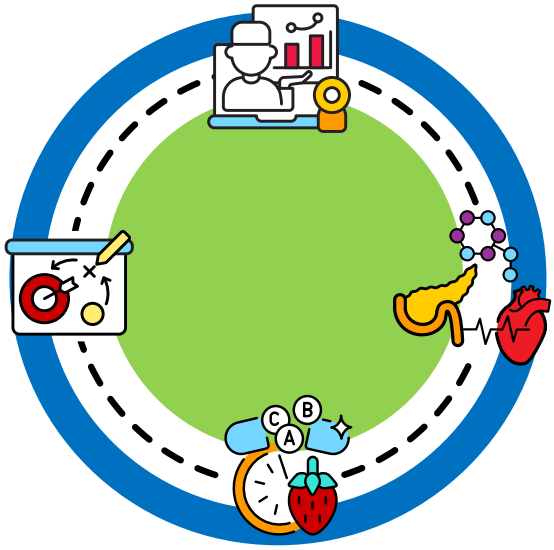
2

Objectives

01 Identify signs of diabetes, treatment and monitoring methods

02 Learn the ABCs of diabetes & the importance of managing your numbers to prevent long-term complications.

03 Understand how managing your diabetes can reduce your risk for heart disease.



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3

The Facts

1 in 10 people have diabetes

Diabetes is a lifelong condition

The Power Is You!

- Diabetes is a chronic health condition.
- Diabetes effects how your body turns food into energy.
- It is manageable!

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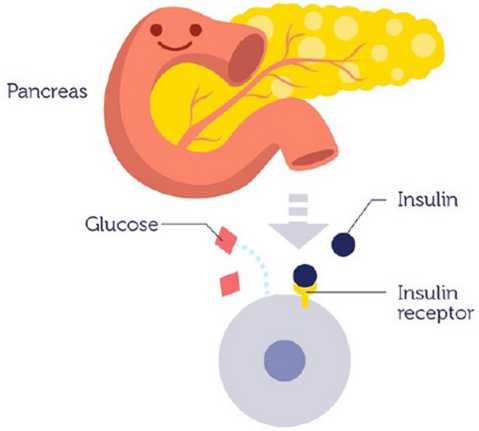
4

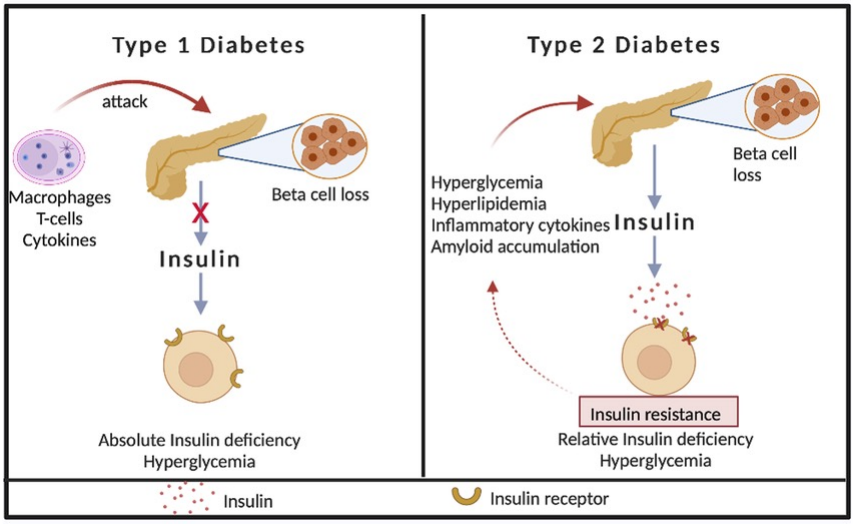
Normal Metabolism in People without Diabetes

- When food is eaten, it breaks down to sugar in the blood, raising blood sugar (blood glucose).
- The pancreas produces insulin in response to the sugar in the blood.
- Insulin carries the sugar from the bloodstream into cells providing the cells with energy.
- Energy is needed for the brain and muscles to work.



6

Diabetes Metabolism: type 1 and type 2 diabetes



7

Diabetes by Type

P

- Pre-diabetes: A1c is between 5.7%-6.4%
- Signs of insulin resistance begin developing. The pancreas is still producing insulin, but it is inefficient.

T2

- A1c is ≥ 6.5%
- Insulin resistance. Pancreas may still produce insulin.
- Common risk factors include family history, overweight/obese, history of gestational diabetes, inactivity, race/ethnicity.
- It is a progressive condition.

T1

- Autoimmune disease where there is beta cells destruction within the pancreas
- Genetics increase risk
- Insulin must be taken to live

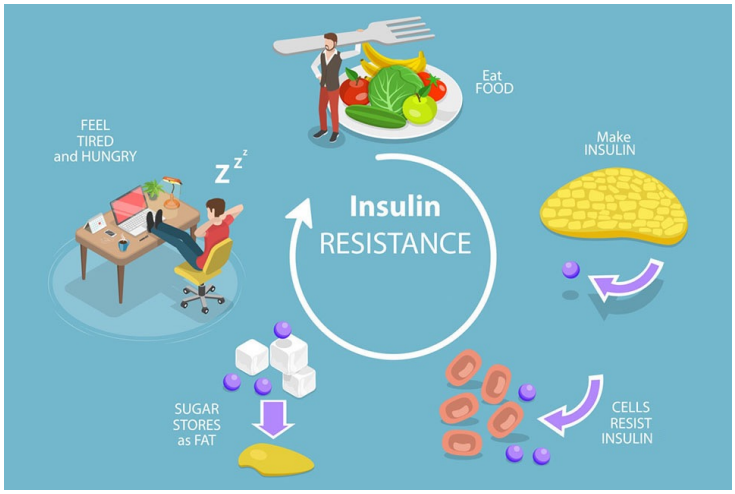
G

- Hormones of pregnancy cause insulin resistance
- Women with GDM are likely to develop t2d within 5-10 years

8

What is Insulin Resistance?

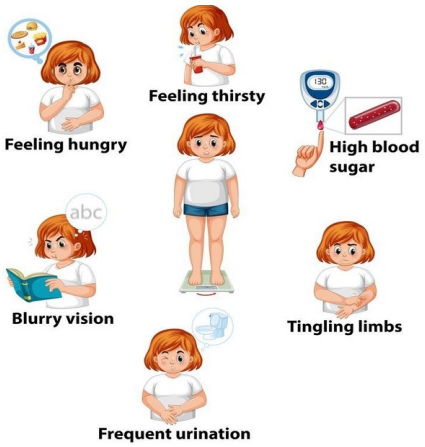
- Insulin resistance causes your cells to be "resistant" to the insulin your body makes.
- The goal is to reduce insulin resistance, so that your own insulin becomes more efficient.
- Insulin resistance can be reduced by:
  - Medication
  - Increased exercise/activity
  - Weight loss



9

Hyperglycemia and its Symptoms

- Insulin resistance or the absence of adequate insulin result in hyperglycemia
- High blood glucose also known as hyperglycemia is defined as blood glucose levels >180-200 mg/dl. Or when your blood sugars are abnormally higher than usual.
- The signs & symptoms shown here are similar to the acute symptoms you may experience when your blood sugars are high
- Once you have been diagnosed with diabetes, it's important to explore the reason you may be experiencing these symptoms. Here are some common causes of hyperglycemia:
  - Not enough insulin
  - Missing a dose of diabetes medication
  - Eating more than planned
  - Exercising less than usual
  - Stress: from illness or an outside source



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11

The Goals of Diabetes Therapy can by achieved by Following the 7 Areas of Diabetes Self-Care

- Feel better: Increase energy and sense of well-being.
- Reduce risk for diabetes complications.
- Maintain blood glucose levels as close to normal as possible.

12

Diabetes Management is a Balancing Act

- Requires:
  - Medication Management
  - Balancing food intake with medication management and activity.
  - Monitoring to validate that the Diabetes Management Plan is working.
- Problem-solving: Learning how to problem-solve unexpected situations.
- Coping mechanisms for a chronic disease.
- Reducing risks.

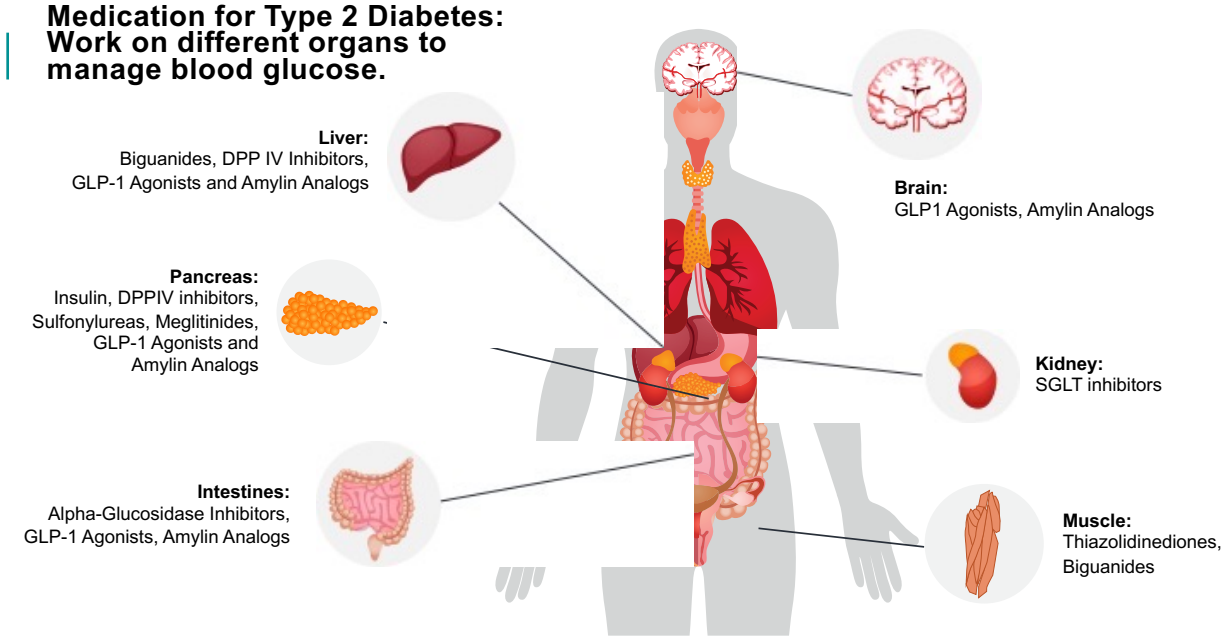
13

Medication Management & Diabetes

- Type 1: Insulin is always needed
- Type 2:
  - Oral Medication
  - Non-Insulin Injectables
  - Insulin

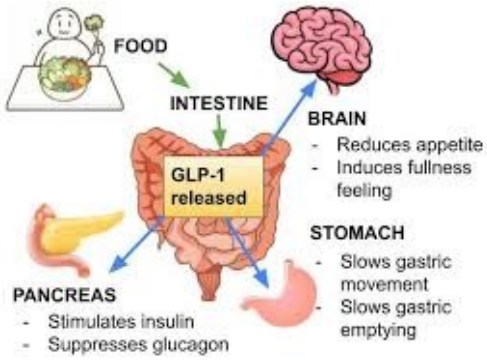
14

Medication for Type 2 Diabetes: Work on different organs to manage blood glucose.



15

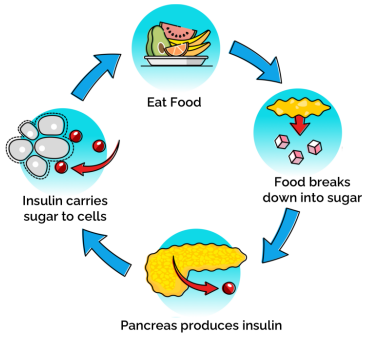
How GLP-1's Work: Ozempic (Wegovy), Mounjaro (Zepbound)



16

Insulin Role in Diabetes Treatment

Insulin's Role in the Body



17

Normal BG trends in Non-Diabetes Person

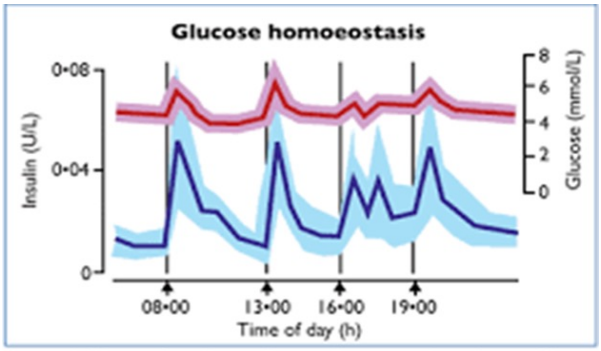


Figure 1. Twenty-four-hour plasma glucose and insulin profiles in healthy subjects. Mean values with 95% confidence interval. Red line: plasma glucose; blue line: insulin. Source: Reference 1. Reprinted with permission from Owens, with permission from Elsevier.

18

Types of Insulin Injectables

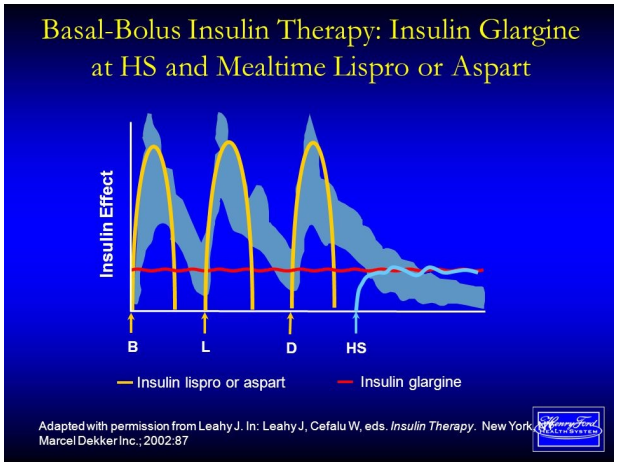
- **Ultra Rapid Acting**
  - Lyumjev - Lispro
  - Fiasp – Aspart
  - Afrezza (insulin human) – inhaled
- **Rapid Acting**
  - Novolog – Aspart
  - Humalog – Lispro
  - Apidra – Glulisine
- **Short Acting**
  - Humulin-R, Novolin-R – Regular, Human
- **Intermediate-acting insulin**
  - Humulin-N, Novolin-N – NPH, Human
- **Long Acting**
  - Basaglar, Lantus, Toujeo, Semglee - Glargine
  - Levemir - Detemir
  - Tresiba - Degludec

for s.c. administration

Insulin type	Onset of action (h)	Peak of action (h)	Duration of action (h)
Ultra-rapid acting analog (faster aspart)[a,c]	0.1-0.2	1-3	3-5
Rapid-acting analogs (aspart, glulisine, and lispro)	0.15-0.35	1-3	3-5
Regular/soluble (short acting)	0.5-1	2-4	5-8
NPH*	2-4	4-12	12-24[a]
Basal long-acting analogs			
Glargine[b]	2-4	8-12	22-24[a]
Detemir	1-2	4-7	20-24[a]
Glargine U300*+*	2-6	Minimal peak	30-36
Degludec[c]	0.5-1.5	Minimal peak	>42

19

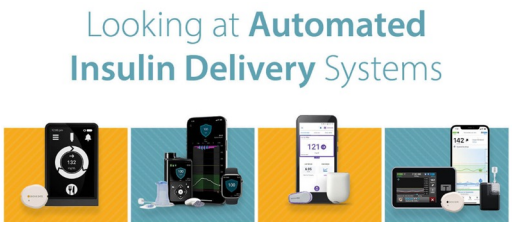
Example of Insulin used to Replicate Physiological Insulin Action



20

Insulin Delivery Devices

- Vial and Syringe
- Insulin pens
- Insulin Pumps
- Inhaled Insulin

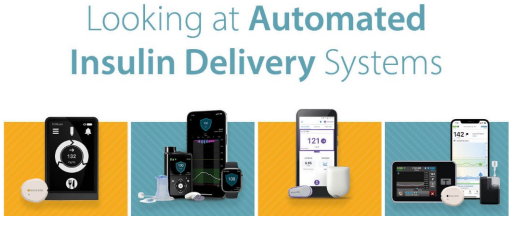


21

AID Insulin Pumps

Pros:
- Delivers multiple basal rates of insulin throughout the day and night.
- Bolus doses delivered with a touch of a button.
- Can help users achieve blood sugar levels close to normal.
- Paired to CGM (Continuous Glucose Monitoring) automatically alters basal or bolus doses and/or makes suggestions for adjustments.
- Can respond quickly to changes in blood sugar levels reducing risk of hypoglycemia.

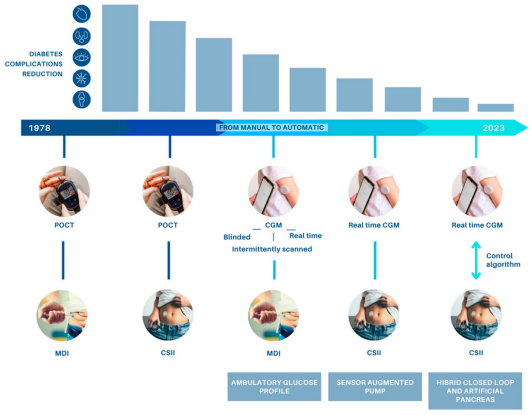
Cons:
- Initial training is time consuming
- Expensive $6,000
- Has to be worn 24 hours a day, constant reminder of diabetes.
- Skin irritation at insertion sites possible
- Technology failure



22

Glucose Monitoring: Indicates if Therapy is Effective

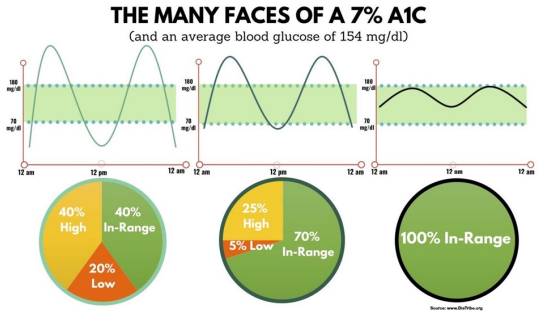
- A1C: Indicates level of Overall Management of Diabetes
- SBGM: Self-Blood Glucose Monitoring
- CGM: Continuous Glucose Monitor



23

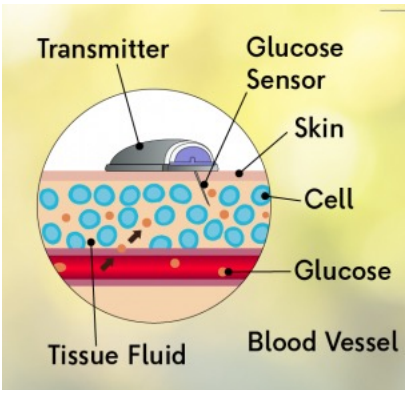
Monitoring: Limitations of A1C

- Extreme readings cancel each other out and are not reflected in the A1C reading.
- One could be "out of range" 40% of the time, experience hypoglycemia and still reach an A1C of 7%.
- The Goal is to be "Time in Range"(TIR) 70% of the time.



24

Continuous Blood Glucose Monitoring

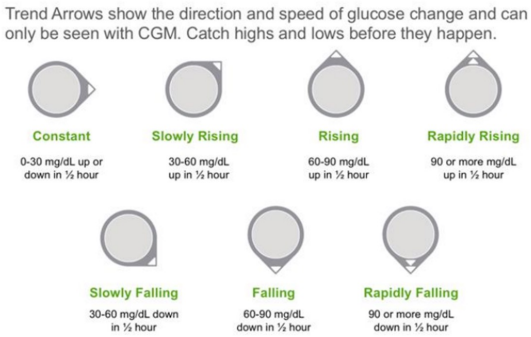


- Measures interstitial glucose is measured continuously
  - This may lag 5-15 minutes behind the blood glucose leading to some differences between CGM and fingerstick readings, especially if the glucose is changing rapidly.
    - If glucose is changing rapidly, may need to double check with a BGM fingerstick
  - Current CGMs on the market have a high degree of accuracy.
- A tiny sensor is inserted under the skin, and a transmitter sends the information via radio waves from sensor to a wireless device: phone, receiver insulin pump and/or the cloud.
- Includes directional arrows and a graph indicating if the glucose is trending up or down.

25

Advantages of CGM

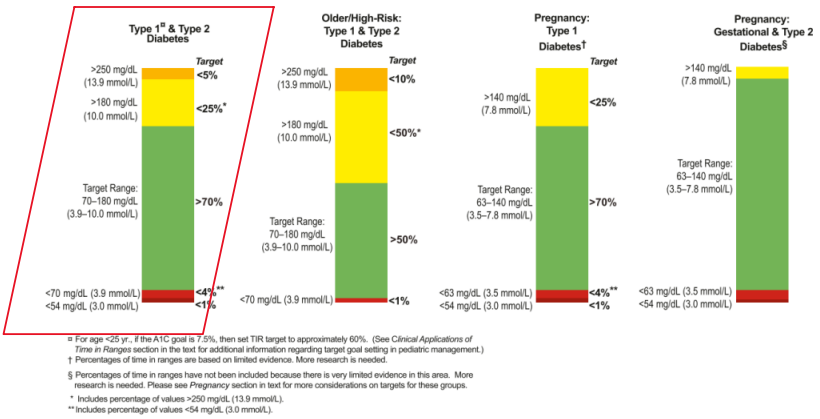
- Provides real time glucose information every 5 minutes
  - Up to 288 readings in a 24-hour period
- Shows current glucose
- Shows where glucose was
  - Trend graph
- *Predicts where glucose is going*
  - Rate of change arrows
- Remote monitoring
  - Multiple alarm settings
- *Eliminates finger-sticks*



26

Time in Range

Diabetes: CGM Targets



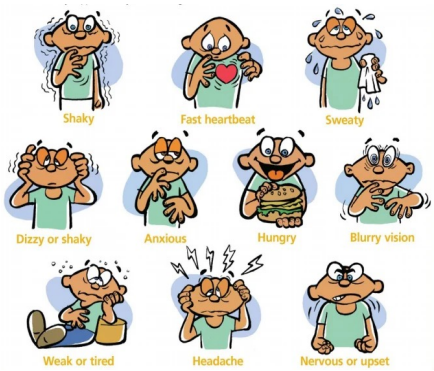
= For age <25 yr., if the A1C goal is 7.5%, then set TIR target to approximately 60%. (See *Clinical Applications of Time in Ranges* section in the text for additional information regarding target goal setting in pediatric management.)
† Percentages of time in ranges are based on limited evidence. More research is needed.
§ Percentages of time in ranges have not been included because there is very limited evidence in this area. More research is needed. Please see *Pregnancy* section in text for more considerations on targets for these groups.
* Includes percentage of values >250 mg/dL (13.9 mmol/L).
** Includes percentage of values <54 mg/dL (3.0 mmol/L).

Battelino et al. Diabetes Care 2019, PMID: 31177185

27

Hypoglycemia Signs and Symptoms

AKA Low Blood Glucose (Sugar) - < 70 mg/dl when checked via SMBG or CGM



Common Causes of Hypoglycemia	Preventive Strategies
Delaying or skipping meals or snacks	Eat meals and snacks on time. During your waking hours, don't go more than 5 hours without some nutrition. If you take insulin that peaks during your sleeping hours, be sure to eat a bedtime snack; otherwise no bedtime snack is required
Taking too much diabetes medication, or taking it at the wrong time with regard to meals	Take your diabetes medication as prescribed. If you take rapid-acting insulin, be sure to eat within 15 minutes of the injection. If hypoglycemia persists, even if you are taking your medication as prescribed, inform your provider
Increased physical activity	Balance increase activity with increased carbohydrate food intake
Drinking too much alcohol, especially without eating	If you drink alcoholic beverages use in moderation. Don't drink on an empty stomach

28

Hypoglycemia Treatment

The "15-15" Rule
- Take **15 grams** of simple carbohydrates to raise blood sugar and check again in **15 minutes.**
- Repeat this until blood sugar is > 70 mg/dl.
- Eat a meal or snack once blood sugar is normal (>70 mg/dl) to ensure it doesn't drop again

Examples of 15 grams of simple Carbs:
- Glucose tablets (3-4)
- ½ cup of juice or REGULAR soda
- 1 tablespoon of honey or sugar
- Hard candies (read label for serving and keep that exact serving in small zip lock baggies)

29

Hyperglycemia

AKA high blood glucose (sugar) – when blood glucose levels are >180-200 mg/dl. (or abnormally higher than usual)

Causes:
- Not enough insulin
- Eating more than usual
- Exercising less than usual
- Stress from illness or other

Signs:
- Frequent urination
- Increased thirst
- Excessive hunger
- Blurred vision

30

Connecting Diabetes & Heart Disease

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31

Tracking your

A	B	C
A1c	Blood Pressure	Cholesterol

will reduce risk of diabetes complications

https://www.youtube.com/watch?v=U2gh6i1Q8iU&t=61s

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32

Heart: Macrovascular Complication

NORMAL ARTERY

ARTERY NARROWED BY PLAQUE

People with diabetes are at greater risk of heart disease and stroke.

Recommendations:

A1C – target is 7% (or per MD recs)

Blood Pressure targets:

- Normal BP level: less than 120/80

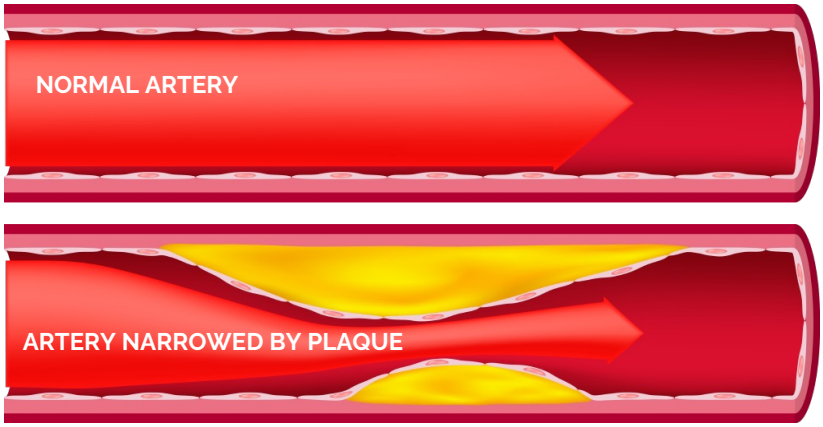
Chol/Lipid panel target range below (or per MD recs based on history):

- Total Chol - < 200 mg/dl
- LDL - < 70 mg/dl
- Triglycerides - < 150 mg/dl
- HDL - > 40 for men; > 50 for women

Regular MD visits to include A1C & lipid panel. Ask healthcare professional about your BP.

33

Vascular Changes accelerated by Diabetes



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34

Lifestyle Interventions for Management & Prevention

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35

Healthy Eating: The HOW & WHY?

- **Individualized to meet YOUR needs. Look at this as a lifestyle, not a diet.**
- **What are the important considerations when it comes to diabetes and healthy eating?**
  - **Blood Glucose:** Choose the right type and amount of *carbohydrates* at each meal and snack.
  - **Blood pressure:** Decrease the amount of sodium in your diet to reduce blood pressure.
  - **Cholesterol:** Losing weight, reducing carbohydrate intake, and choosing healthy fats over unhealthy fats have a positive effect on lipid levels.

36

Carbohydrates

- Carbohydrates have the biggest effect on your Blood Sugar.
- Best choices include carbohydrates from vegetables, fruits, whole grains, legumes and dairy.
- Choices & portions matter: It is important to choose the right type and the correct amount of carbohydrates at each meal and snack to help prevent blood sugar spikes after meals & snacks.
- Never eliminate carbohydrates from your meals & snacks.

37

Carbohydrates with Fiber

"A type of carbohydrate that the body cannot digest"

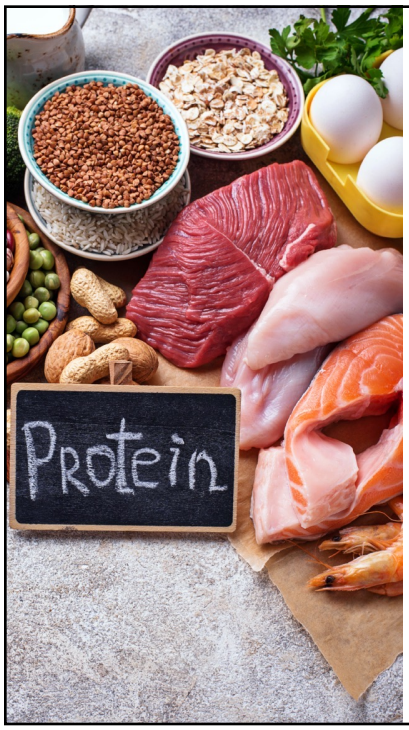
Why include more fiber?
- Helps keep you full
- Decreases blood sugar spikes after eating
- Supports Heart Health

Sources of fiber include:

- Whole grains, Whole fruit, Vegetables, Legumes, Nuts

Adding 1-2 servings of whole foods in place of processed foods each day may help to reach the goal of 30 gm per day.

38



Macronutrient: Protein

An essential macronutrient that is responsible for carrying the oxygen in your blood.

Animal Sources:
- Poultry, Seafood, Eggs, Cheese/yogurt, Red meat

Plant Sources:
- Lentils, Beans, Peas, Edamame, Nuts and seeds, Whole grains
- Optimally people benefit from mixture of lean animal sources and plant sources
- Ideally include with every meal and snack

39

Macronutrient: Fat

Essential macronutrient which helps the body to absorb fat soluble vitamins (A,D,K, & E) and it helps you feel full

Unsaturated Fat Sources:

- Olive, peanut & canola oils, Avocados, Nuts, Seeds, Fish

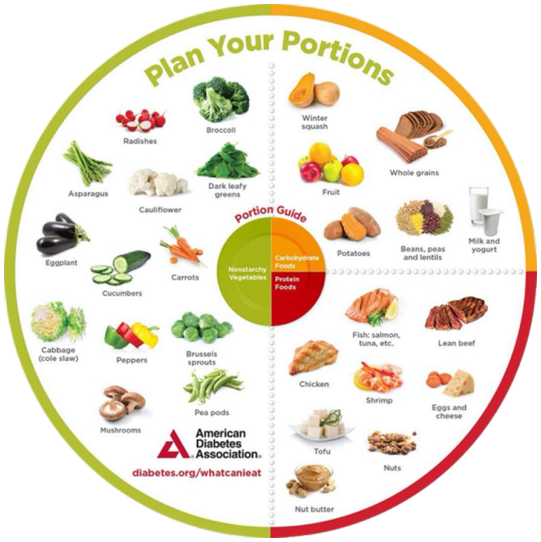
Saturated Fat Sources:

- Palm & coconut oils, Cheese, Whole fat milk/dairy, Butter, Red meat/processed meat, Desserts

- Goal is to get more unsaturated fats throughout the day and limit saturated fats to 10% of your fat intake throughout the day

40

American Diabetes Association: Diabetes Plate



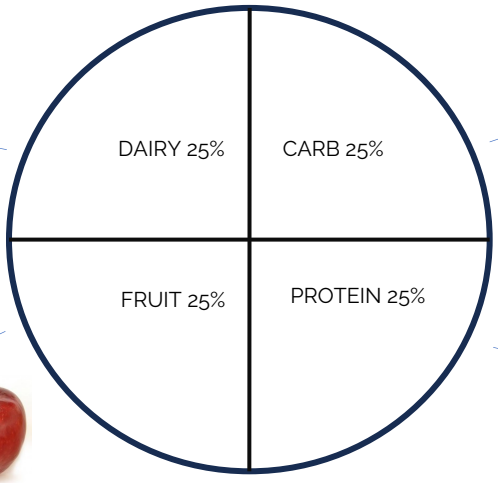
41

Breakfast Plate

Egg Sandwich & Fruit Smoothie

6 oz low fat plain yogurt

Smoothie



1-2 oz corn tortilla or whole grain bread

Small peach or apple

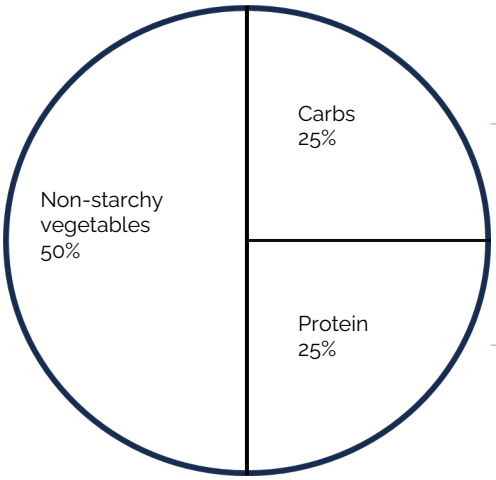
1-2 eggs

42

Dinner Plate

Rice and Beans, Salad & Cooked Vegetables

1 cup cucumber salad
+
1 cup cooked green beans



1 cup rice

1 cup stewed beans

43

Snacking

Carbohydrate (with fiber) + protein or fat = satiating snack

- Dried fruit/fresh fruit & nuts (1 handful)
- Rice cake with peanut butter/almond butter
- Seeds & 1 piece of fruit
- Hummus & vegetables & 3-4 small crackers

44

Nutrition Tips

Focus on healthy food choices and balanced diet

***Choose whole grains or complex carbohydrates.**
Aim for at least 3 grams of fiber per serving
Decrease processed carb intake, i.e. chips, crackers, pretzels, white rice, white bread, white pasta

***Fill up on Fiber**
Including up to ½ plate of vegetables will help you stay full in between meals without adding too many calories. BONUS: they have lots of vitamins & minerals

***Include "healthy" fats & protein sources**
These will keep blood sugar from spiking quickly
Some examples: beans & peas, nuts & seeds, eggs, fish, lean meats, yogurt & cottage cheese, tofu, tempeh.

Choose unsweetened over sweetened beverages.

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45

Types of Physical Activity

Aerobic (cardio)

Walking
Jogging / Running
Cycling
Swimming
Dancing
**

Anaerobic (strength/resistance)

Weight lifting
Weight resistance training
High Intensity Interval Training (HIIT)
**

Balance

Walking along a line (tight rope walking)
Standing up & sitting down from a chair without using hands
Standing with weight on one foot

Flexibility

Stretching
Yoga
tai- chi
pilates

** Indicates that these exercises impact BG directly

46

Ways to Be Active

Aerobic Exercise

- Provides cardiovascular conditioning through exercise that uses oxygen to burn fuel and move
- Directly Impacts BG by lowering it
- Examples: Swimming, cycling, walking, rowing, jogging, elliptical training
- Goal: 3-5 days/week, 30 minutes per day

47

Ways to Be Active

Strength – Anerobic Exercise

- Also known as resistance training
- May improve insulin response by increasing the body's sensitivity to insulin, prevent bone loss & decrease body weight
- Examples: free weights, weight machines, resistance bands, own body weight
- Goal: 2 times/week (non-consecutive days)
- Impacts BG varies person to person

48

Diabetes Self-Management

- Maintain a personal care record
- Utilize the 7 areas of diabetes self-care behaviors in your diabetes plan
- Know your **ABC**s: **A**1c level, **B**lood pressure and **C**holesterol levels
- Work with a specialized healthcare team for YOUR individual needs
- Seek education to create a personalized plan

49

Education Resources

- Ask your doctor for a referral to an education program
- DSMES: https://www.adces.org/program-finder
- DPP: https://dprp.cdc.gov/Registry
- DF's no-cost Diabetes Self-Management Education Support program is available in English and Spanish.
- DF's 1-hour workshops include: Healthy Eating, Healthy Coping, Being Active, Medication Management, Monitoring, Reducing Risk, Problem Solving.
- DF's Diabetes Prevention Program is online
- Link to Classes: https://diabetesfoundationinc.org/events/

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53

The Diabetes Foundation Difference

Creating Access to Improve Health for Nearly Four Decades

Our high-quality accessible services provide awareness, prevention, diabetes management, and health professional tools across the state of New Jersey and beyond

Services free insulin, diabetes supplies, A1C screenings, self-management education, social support groups, and navigation to services such as health insurance and providers.

We are funded entirely through philanthropic gifts. Please become a donor today at any level if you can. Every contribution counts.

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54