The Basics of Diabetes

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How are Diabetes and Pre-diabetes Diagnosed?

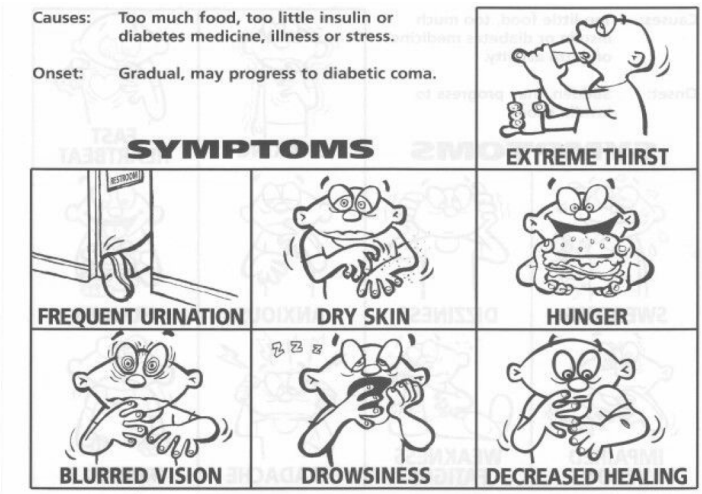
- Diabetes
  - ✓ A1c > 6.5%*
  - ✓ Fasting blood glucose ≥ 126 mg/dl *
  - ✓ Two hour blood glucose ≥ 200 mg/dl during an oral glucose tolerance test*
  - ✓ Random blood glucose ≥ 200 mg/dl plus clinical symptoms
- Pre-diabetes
  - ✓ Fasting blood glucose 100 to 125 mg/dl

* Should be repeated in absence of clinical symptoms

Common Types of Diabetes

- Type 1 diabetes
  - 5% to 10% of diagnosed cases of diabetes
- Type 2 diabetes
  - 90% to 95% of diagnosed cases of diabetes

Hyperglycemia: Signs & Symptoms



Target Blood Glucose Goals

- Before meals: 80-130 mg/dl
- After meals: Less than 180 mg/dl

(aim for no more than 50 mg/dl increase from meals)

Comparison Chart of A1C and Glucose

A1C %	Estimated Average Glucose
5	97
6	126
7	**154**
8	183
9	212
10	240
11	269
12	298

Each 1% Drop in A1c Lowers the Risk of Complications:

- 14% Reduction in Large Vessel Complications
- 37% Reduction in Small Vessel Complications

Why Does Blood Glucose Matter?

- To reduce the short-term symptoms of high blood glucose values.
- To reduce long-term complications.

Large Vessel Complications

- Heart disease (Cardiovascular disease)
- Stroke/TIA (Cerebrovascular disease)
- Poor circulation to legs and feet (Peripheral vascular disease)

Tests to Discuss with Your Health Care Provider

Test	ADA Recommended Value	Frequency
Blood pressure	Less than 140/90	At every visit
A1c	Less than 7%	2-4 times per year
Microalbuminuria (urine kidney test)	Less than 30 mg	Once per year
Cholesterol	Less than 200	Once per year
Triglycerides	Less than 150	Once per year
HDL	Men: 40 or higher Women: 50 or higher	Once per year
LDL	Less than 100 (low risk) Less than 70 (with CVD)	Once per year

Small Vessel Complications

- Eye disease
- Kidney disease
  - Microalbumin test
- Nerve disease
  - Autonomic neuropathy
    - Stomach
    - Intestines
    - Bladder and sexual function
    - Blood pressure
  - Peripheral neuropathy
    - Foot care is important!

Diabetes Medications

Two forms of medication available for persons with diabetes:

- *Oral pills (medication)*
  - Used in type 2 diabetes
  - Five drug classes of oral diabetes medications
- *Injectable medications*
  - *Insulin* – required for type 1 diabetes; may be necessary for type 2 diabetes as disease progresses
  - *Mimetics* – two drug classes; one class can be used by people with either type 1 diabetes or type 2 diabetes on insulin to improve glucose levels; the other class is just for type 2 diabetes

Oral Medication: *Sulfonylureas*

- **Glyburide (DiaBeta, Micronase, Glynase)**
- **Glipizide (Glucotrol/Glucotrol XL)**
- **Glimepiride (Amaryl)**

➢ *How they work:* they stimulate the pancreas to produce more insulin

➢ *Risk:* potential for low blood glucose – take before a meal, and do not skip meals!

Oral Medication: *Biguanides*

- **Metformin (Glucophage)**
- **Riomet (Glucophage)**
- **Metformin Extended Release (Glucophage XR)**
- **Fortamet (Glucophage XR)**
- **Glumetza (Glucophage XR)**

- *How they work:* they cause the liver to produce less glucose
- *Risk:* may cause GI distress (nausea, diarrhea); usually lasts for 7-10 days; start on low dose and advance slowly
- *Benefit:* may help with weight loss and reduced appetite; not likely to cause low blood glucose; cost-effective

Oral Medication: *Insulin Sensitizers*

- **Pioglitazone (Actos)**

- *How they work:* they help the body become more sensitive to insulin; may take 4-6 weeks to see positive effects on blood glucose
- *Risk:* may have some swelling (fluid retention) in legs and feet

Oral Medication:
DPP-4 Inhibitors

- **Sitagliptin (Januvia)**
  - **Janumet (sitagliptin + meformin)**
- **Saxagliptin (Onglyza)**
- **Linagliptin (Tradjenta)**
- **Alogliptin (Nesina)**

- *How they work:* increases secretion of insulin when blood glucose is elevated, so it helps to lower after-meal rises in blood glucose
- *Benefit:* they do not cause weight gain and may have a positive effect on cholesterol levels
- *Risk:* should not use with kidney or liver disease

Oral Medication
SGLT2 (sodium-dependent glucose transporter) Inhibitors

- **Canagliflozin (Invokana)**
- **Dapagliflozin (Farxiga)**
- **Empagliflozin (Jardiance)**

- *How they work:* transports glucose into kidney tubules; this results in improved glucose levels by excretion of glucose in urine; it creates a diuresis-like effect
- *Benefit:* decrease A1c levels; may help with weight loss; lowers systolic blood pressure levels
- *Risk:* Increase in urinary infections; increase in blood potassium levels

Combining Oral Medication

- The different classes of oral medications work in different ways to lower blood glucose levels; sometimes, they work better in combination to improve blood glucose control
- The most common combination of oral medications is a biguanide and a sulfonylurea
- Switching from one single pill to another is not as effective as adding another type of diabetes medicine (oral medication or insulin)

Injectable Medication: *Mimetic (Incretin) or GLP-1 Receptor Agonists*

- **Exenatide (Byetta)–** injection 2x daily; for persons with type 2 diabetes
- **Liraglutide (Victoza)-** injection 1x daily; for persons with type 2 diabetes
- **Exenatide extended release (Bydureon) -** injection once weekly; for persons with type 2 diabetes
- **Dulaglutide (Trulicity)-**injection once weekly; for persons with type 2 diabetes
- **Lixisenatide (Adlyxin)-**injection once daily, within 1 hour before first meal of the day; for persons with type 2 diabetes
- **Pramlintide (Symlin)-** injections before each meal; for persons with type 1 or 2 diabetes
- *How they work:* slows emptying from stomach; stimulates insulin release
- *Benefit:* decreases appetite; helps in weight loss
- *Risk:* transient nausea

Benefits of Physical Activity on Blood Glucose

- Increases sensitivity to insulin
- Lowers glucose by using it for fuel
  - for up to 36 hours, as liver replenishes its stores of glucose from the bloodstream *

**In Type 1 diabetes, exercising with blood glucose >250 mg/dl may increase blood glucose, due to insulin deficiency.*

Types of Physical Activity

- Aerobic
  - Make you breathe harder and make your heart beat faster
  - Moderate intensity activities
    - Walking briskly
    - Bicycling
    - General gardening
    - Dancing
    - Water aerobics or swimming
- Muscle-strengthening
  - Make muscles stronger
  - Resistance bands, lifting weights
- Balance and stretching
  - Enhance physical stability and flexibility
  - Gentle stretching, dancing, yoga, pilates, tai chi, martial arts

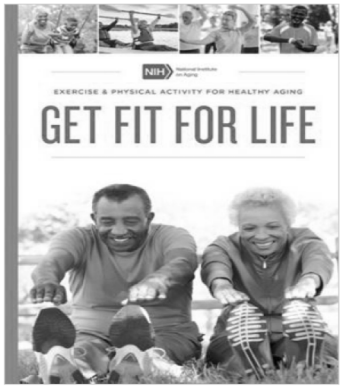
What are *YOUR* Goals for Physical Activity?

- Lowering Heart Disease Risk?
  - 2-3 times weekly for 15-30 minutes
- Overall Fitness?
  - 4 times weekly for 15-30 minutes
- Weight Maintenance?
  - 5 times weekly for 45-60 minutes

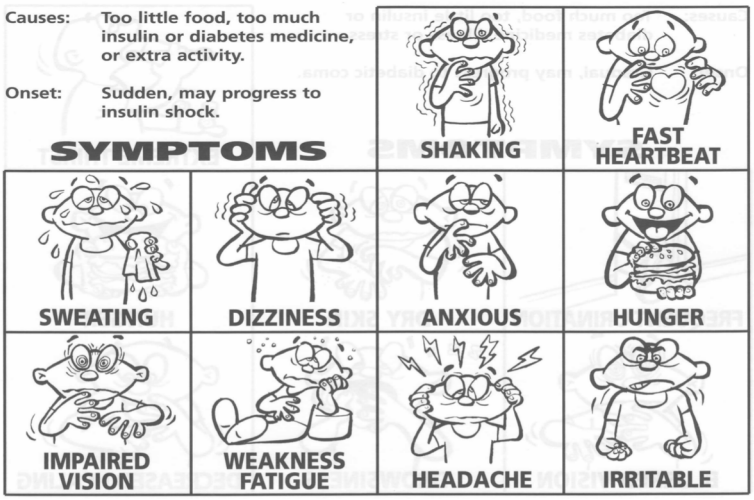
Other Considerations with Physical Activity

- FIND SOMETHING THAT YOU ENJOY!
- Upper body or armchair exercises can also be good to do if you have lower body (joint) problems and difficulty getting around
- Intermittent or small bouts of exercise (10-15 minutes at a time) can be just as beneficial as one- 30 minute exercise session; walking for 10-15 minutes after each meal can help to lower postprandial or after-meal blood glucose levels

To order call 1-800-222-2225 or visit



Hypoglycemia: Signs & Symptoms



Treatment of Hypoglycemia

Low blood sugar (hypoglycemia) – 70 mg/dl or less

- Treatment (15-15 Rule)
  - Take in 15 grams of carbohydrate:
    - 4 glucose tablets
    - ½ cup fruit juice
    - 1 cup of skim milk
    - 2 Tbsp. raisins
  - Wait 15 minutes and recheck blood glucose
  - If still below 100 mg/dl, repeat 15 grams carbohydrate
  - Follow treatment with a light snack of protein and carbohydrate
    - peanut butter and crackers OR ½ sandwich OR nuts & fruit

Talk to your doctor to see if you need a glucagon kit, if you experience severe hypoglycemia

Foot Care Tips

- **Check your feet every day**
- **Wash your feet every day**
- **Keep your skin soft and smooth**
- **If you can see and reach your toenails, trim them**
- **Wear shoes and socks at all times**
- **Protect your feet from hot and cold**
- **Keep the blood flowing to your feet**