


**The Basics of Diabetes Part 1**

  
*University of Virginia*  
*VA Center for Diabetes Prevention & Education*

1

---

---

---

---

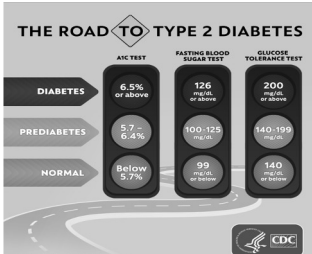
---

---


---

What is a normal Blood Glucose Level?

**THE ROAD TO TYPE 2 DIABETES**



Category	A1C TEST	FASTING BLOOD SUGAR TEST	GLUCOSE TOLERANCE TEST
DIABETES	6.5% or above	126 mg/dL or above	200 mg/dL or above
PREDIABETES	5.7% - 6.4%	100-125 mg/dL	140-199 mg/dL
NORMAL	Below 5.7%	99 mg/dL or below	140 mg/dL or below



2

---

---

---

---

---

---

---

**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
- Gestational diabetes
  - During pregnancy

3

---

---

---

---

---

---

---

**CHANGING LIFE WITH DIABETES**

### Hyperglycemia (High Blood Glucose)

**CAUSES:** Too much food, too little insulin or diabetes pills, illness, or stress.  
**ONSET:** Often starts slowly.

**Some Symptoms:**

- EXTREME THIRST
- NEED TO URINATE OFTEN
- DRY SKIN
- BLINDNESS
- ITCHY
- HEALING WOUNDS

[HIGH BLOOD GLUCOSE MAY LEAD TO A MEDICAL EMERGENCY IF NOT TREATED]

**What Can You Do?**

- CHECK BLOOD GLUCOSE
- IF your blood glucose levels are higher than your goal for three days, and you don't know why, CALL YOUR HEALTHCARE PROVIDER

---

---

---

---

---

---

---

---

4

### 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 pre-meal glucose)*

---

---

---

---

---

---

---

---

5

### Comparison Chart of A1C and Glucose

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

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

---

---

---

---

---

---

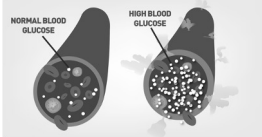
---

---

6

### Why Does Blood Glucose Matter?

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



7

---

---

---

---

---


---

---

---

### Why its Important to Manage Diabetes?

HOW UNCONTROLLED DIABETES DAMAGES YOUR



8

---

---

---

---

---

---

---

---

### Large Vessel Complications

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

9

---

---

---

---

---

---

---

---

**Tips to reduce your risk for heart disease.**



**Maintain a Healthy Weight**    **Make Healthy Food Choices**    **Stay Active**    **Stop Smoking**

**Diabetes ABCs**    **Know Your Diabetes ABCs** Talk to your health care team about how to manage your A1C, blood pressure, and cholesterol. This will help lower your chances of having a heart attack, a stroke, or other diabetes problems.

NCDP.nih.gov

---

---

---

---

---

---

---


---

10

**Stroke Prevention**

**What are my risk factors?**

**HIGH BLOOD PRESSURE**    **DIABETES**    **SMOKING**    **HIGH CHOLESTEROL**    **EXCESSIVE ALCOHOL CONSUMPTION**



**Ways to reduce my risks**

**LOWER BLOOD PRESSURE** Keep blood pressure below 120/80

**DIABETES** Tips to control diabetes: exercise, weight loss, medications

**STOP SMOKING** Your risk decreases 5 years after you quit

**LOWER CHOLESTEROL** Tips to lower cholesterol: diet, exercise, medications

**REDUCE ALCOHOL CONSUMPTION** 1 drink/day for women and 2 drinks/day for men

UNMC NEBRASKA MEDICINE

---

---

---

---

---

---

---

---

11

**ABOUT 8 MILLION PEOPLE IN THE UNITED STATES HAVE PAD**

**PAD FACTS**    **1 in 20** Americans over the age of 50 has PAD

Peripheral Artery Disease    Untreated PAD can increase a person's risk for heart attack or stroke.

**RISK FACTORS**

Smoke or used to smoke    High blood pressure    **>50** Over the age of 50    Have diabetes    High cholesterol

**SIGNS and SYMPTOMS**

Poor wound healing    Cold legs    Pain during exercise, which is relieved during rest    Constant leg pain, tingling, burning or loss of sensation

Talk with your health care provider to find out if you should be screened.    [froedtert.com/pad](http://froedtert.com/pad)    1-800-DOCTORS

Froedter & the Medical College of Wisconsin    ©2011 Froedter & the Medical College of Wisconsin

---

---

---

---

---

---

---

---

12

### Small Vessel Complications

- Eye disease
  - ❖ Eye exam yearly
- Kidney disease
  - ❖ Microalbumin test
- Nerve disease
  - ❖ Autonomic neuropathy
    - Stomach, intestines, bladder, and sexual function, blood pressure, heart
  - ❖ Peripheral neuropathy
    - Foot pain and numbness.

13

---

---

---

---

---

---

---

---

**DIABETES & YOUR EYES**  
Protect your vision with regular, dilated eye exams from your doctor of optometry.

**Diabetic Retinopathy**

**FACT #1:** In 2016, doctors of optometry diagnosed more than 301,000 cases of diabetic retinopathy in patients who did not even know they had diabetes.

**FACT #2:** People with diabetes are at higher risk for eye diseases, such as glaucoma, cataracts, and diabetic retinopathy.

**FACT #3:** Unfortunately, only 14 percent of people with diabetes regularly visit their doctor of optometry, according to American Optometric Association's American Eye-Q® survey.

Early detection and treatment can save your vision. No online app can do that.

AMERICAN OPTOMETRIC ASSOCIATION

14

---

---

---

---

---

---

---

---

**HOW TO CARE FOR YOUR KIDNEYS**

SEE YOUR DOCTOR FOR REGULAR CHECK UPS

MANAGE YOUR DIABETES

HAVE A HEALTHY BLOOD PRESSURE

KNOW YOUR FAMILY'S KIDNEY HEALTH HISTORY

TAKE MEDICATION AS PRESCRIBED

STOP SMOKING

EAT HEALTHY

LIMIT ALCOHOL

AIM FOR A HEALTHY WEIGHT

BE ACTIVE

LEARN MORE: [kidneyhealth.ca](http://kidneyhealth.ca)

15

---

---

---

---

---

---

---

---

**Keep your blood glucose level under control**

The best way to prevent nerve damage or to relieve symptoms is to keep your blood glucose level under good control. Maintaining safe blood glucose levels protects nerves throughout the body.

**PREVENT DIABETIC NEUROPATHY BY**

- Eating a healthy diet
- Exercising regularly
- Reaching a healthy weight
- Avoiding smoking
- Limiting alcoholic beverages
- Managing your stress level

*Neuropathy* www.neuropathyprogram.com

---

---

---

---

---

---

---

---

16

**Tests to Discuss with Your Health Care Provider**

Test	ADA Recommended Value	Frequency
Blood pressure	Less than 120/80	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 (Good)	↑ Men: 40 or higher Women: 50 or higher	Once per year
LDL (Bad)	↓ Less than 100 (low risk) Less than 70 (with )	Once per year

---

---

---

---

---

---

---

---

17

- Diabetes Management Self-Care Behaviors**
- ❖ Manage Stress
  - ❖ Being physically active
  - ❖ Follow a healthy meal plan
  - ❖ Take medications as prescribed
  - ❖ Monitor glucose

---

---

---

---

---

---

---

---

18

### Diabetes Medications

Two forms of medication available for persons with diabetes:

- **Oral medication (Pills)**
  - Used in type 2 diabetes
  - Several drug classes of oral diabetes medications
- **Injectable medications**
  - Insulin – required for type 1 diabetes; may be necessary for type 2 diabetes as disease progresses
  - GLP1 Receptor Agonists for people with type 2 diabetes

---

---

---

---

---

---

---

---

19

### Combining Oral Medication

- We now know that diabetes is a multisystem disorder.
- 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

---

---

---

---


---

---

---

---

20



Oral Medication:  
*Biguanides*

- **Glucophage (Metformin)**
- **Glucophage (Riomet)**
- **Glucophage XR (Metformin ER, Fortamet, Glumetza )**
- **Action:** These reduce how much glucose the liver produces. It also improves how insulin works in the body.
- **Benefit:** May help with weight loss and reduce appetite; does not cause low blood glucose; cost-effective, lowers cholesterol.
- **Side Effects:** May cause GI distress (nausea, diarrhea) - self-limited; can cause a metallic taste; can decrease Vit B12 levels.

---

---

---

---


---

---

---

---

21



Oral Medication:  
*Biguanides*

- **Glucophage (Metformin)**

*Cautions:*

- Avoid in severe kidney or liver disease
- May need to hold for radiology procedures with IV contrast
- May need to hold with any severe dehydration (i.e., gastroenteritis)
- May need to hold with any severe illness (i.e., heart attack, heart failure)

---

---

---

---


---

---

---

---

22



Oral Medication:  
*Sulfonylureas*

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

- *Action:* These lower glucose by causing the pancreas to release more insulin.
- *Benefits:* Low cost.
- *Risk:* **Potential for low blood glucose** – take before a meal, and do not skip meals! Can cause weight gain.

---

---

---

---


---

---

---

---

23



Oral Medication:  
*Insulin Sensitizers*

- **Pioglitazone (Actos)**

- *Action:* These improve the way that insulin works in the body increasing the body's sensitivity to insulin. Decreases the glucose made in the liver.
- *Benefit:* These do not cause low blood sugar
- *Risk:* May cause some swelling (fluid retention) in the legs and feet; avoid with heart failure

---

---

---

---

---


---

---

---

24





**Oral Medication:**  
*DPP-4 Inhibitors*

- **Sitagliptin (Januvia).** (Janumet = sitagliptin + metformin)
- **Saxagliptin (Onglyza)**
- **Linagliptin (Tradjenta)**
- **Alogliptin (Nesina)**

➤ *Action:* These block an enzyme that destroys the hormone GLP<sub>1</sub>. GLP<sub>1</sub> helps the body produce more insulin only when it is needed; reduces the amount of glucose being produced by the liver and slows the absorption of food.

➤ *Benefit:* Weight neutral and may have a positive effect on cholesterol levels (Triglycerides). Does not cause low blood sugar.

➤ *Risk:* Not for use with significant kidney or liver disease. Cautious use if history of pancreatitis. High cost.

---

---

---

---


---

---

---

---

25



**Oral Medication**  
*SGLT2 (sodium-dependent glucose transport Inhibitors)*

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

➤ *Action:* These block reabsorption of glucose in the kidneys to carry it out of the body; it creates a diuretic-like effect: "Glucretic"

➤ *Benefit:* May help with weight loss; lowers blood pressure; protects against kidney disease and heart disease. Does not cause low blood sugar.

➤ *Risk:* Increase in urinary and genital infections; increase in potassium levels; can cause dehydration, avoid with a low-carb diet and excess alcohol.

---

---

---

---


---

---

---

---

26



**Injectable Medication:**  
*GLP-1 Receptor Agonists*

- **Exenatide (Byetta)**– injection 2x daily;
- **Liraglutide (Victoza)**- injection 1x daily
- **Lixisenatide (Adlyxin)**-injection once daily, within 1 hour before the first meal of the day;
- **Rybelsus – (Semaglutide)** pill form - taken daily.
- **Dulaglutide (Trulicity)**-injection once weekly
- **Semaglutide (Ozempic )** - injection once weekly.
- **Exenatide extended-release (Bydureon)** - injection once weekly

---

---

---

---

---

---

---

---

27

Injectable Medication:  
GLP-1 Receptor Agonists

- **Action:** Slows emptying of food from the stomach; stimulates insulin release only in response to food, decreases the amount of glucose released by the liver, and helps you feel full sooner so that you eat less.
- **Benefit:** Decreases appetite; helps in weight loss; reduces serious heart attacks and strokes; does not cause low blood sugar.
- **Risk:** Transient nausea. Avoid if FH of medullary thyroid cancer. Expensive.

---

---

---

---

---

---


---

---

28

Benefits of Physical Activity on Blood Glucose

- Increases sensitivity to insulin
- Lowers glucose by using it for fuel
- For up to 36 hours, as the 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.*

---

---

---

---

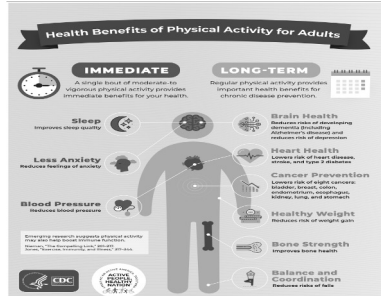
---

---

---

---

29



**Health Benefits of Physical Activity for Adults**

**IMMEDIATE** (within 1 hour): A single bout of moderate-to-vigorous physical activity provides immediate benefits for your health.

**LONG-TERM** (over 12 weeks): Regular physical activity provides important health benefits for chronic disease prevention.

- Sleep:** Improves sleep quality.
- Less Anxiety:** Reduces feelings of anxiety.
- Blood Pressure:** Reduces blood pressure.
- Brain Health:** Reduces risk of Alzheimer's disease, Parkinson's disease, and reduces risk of depression.
- Heart Health:** Lowers risk of heart disease.
- Cancer Prevention:** Lowers risk of eight cancers: breast, colon, esophagus, endometrium, kidney, lung, and stomach.
- Healthy Weight:** Reduces risk of weight gain.
- Bone Strength:** Improves bone health.
- Balance and Coordination:** Reduces risk of falls.

Source: American College of Sports Medicine, 2016. © 2016 American College of Sports Medicine. All rights reserved.

---

---

---

---

---

---

---

---

30

### Types of Physical Activity

- **Aerobic**
  - Make you breathe harder and make your heartbeat 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

---

---

---

---

---

---


---

---

31

### 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




---

---

---

---

---

---

---

---

32

### 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.

---

---

---

---

---

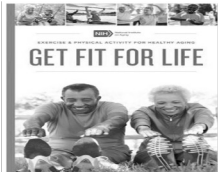
---

---

---

33

To order call 1-800-222-2225 or visit <http://www.nia.nih.gov/HealthInformation/Publications/>



Easy and Fun Physical Activity – *Let's try it!*

Video: <https://www.youtube.com/watch?v=Ev6vE55kyGw>

34

---

---

---

---

---

---

---

---

CHANGING THE FACE OF DIABETES

### Hypoglycemia (Low Blood Glucose)

**Caution:** Too little food or skipping a meal, too much insulin or diabetes pills, more activity than usual.

**Onset:** Often sudden.

**Some Symptoms:**

- SHAKY
- FEELING HEADACHE
- SWEATING
- DIZZY
- ANXIOUS
- HUNGRY
- BLURRY VISION
- WEAKNESS OR FATIGUE
- HEADACHE
- IRRITABLE

**What Can You Do?**

**CHECK your blood glucose, right away. If you can't check, have a snack.**

**TREAT** by eating 2 to 4 glucose tablets or a 1/2 to 1 hard candy, or you can choose quickly carbs (e.g. jellybeans) or fast-acting glucose of fruit juice, or 1/2 cup of regular soda pop.

**CHECK** your blood glucose again after 15 minutes. If it is still low, treat again. If symptoms don't stop, call your healthcare provider.

35

---

---

---

---

---

---

---

---

### Hypoglycemia: Signs & Symptoms

**Level 1:** A glucose alert value of 70mg/dL or less.

**Level 2:** A glucose level of 54mg/dL is sufficiently low to indicate serious hypoglycemia.

**Level 3:** Severe hypoglycemia denotes any level that impairs mental status requiring external assistance for recovery.

International Hypoglycemia Study Group. Diabetes Care. 2010;63(10):2337-2341-2215.

36

---

---

---

---

---

---

---

---

### Rule of 15 - Treating Hypoglycemia

- 1) Consume 15 grams of carbohydrate:
    - 4 glucose tablets (15 g)
    - ½ cup fruit juice/soda (15 g)
    - 1 cup of skim milk (15 g)
  - 2) Recheck blood glucose level in 15 minutes
  - 3) Repeat if still < 70
  - 4) 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

---

---

---

---

---

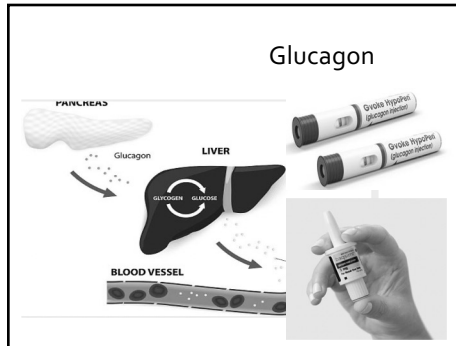
---

---

---

37

### Glucagon




---

---

---

---

---

---

---

---

38

### 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

---

---

---

---

---

---

---

---

39

**This program is for informational purposes only. Publisher disclaims all guarantees regarding the accuracy, completeness, or suitability of this video for medical decision making.**

**For all health related issues please contact your healthcare provider.**

---

---

---

---

---

---

---