


Diabetes Self-Management Skills – Part 1



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

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Class Topics:

- I. Testing blood glucose
- II. Understanding blood glucose patterns
- III. Insulin therapy, delivery devices, & CGMs
- IV. Reducing stress and practice in relaxation

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Diabetes Treatment Components

- Healthy eating
- Weight reduction (primarily in type 2 diabetes)
- Medications; Insulin
- Glucose Pattern Management
- Exercise
- Stress management; healthy coping

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Target Blood Glucose Goals

- Before meals: 80-130 mg/dl
- After meals: Less than 180 mg/dl
- Before bedtime: 110-150 mg/dl



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What Makes Blood Glucose Go Up or Down?

UP <ul style="list-style-type: none">•Eating carbohydrate-containing foods•Not taking or not taking enough needed diabetes medicines•Taking certain non-diabetes-related medicines, such as steroids, some oral contraceptives, or diuretics•Eating meals or snacks too close together•Inactivity•Infection, dehydration, or other illness•Changes in hormone levels (for example, during menstrual cycles)•Stress	DOWN TOO LOW <ul style="list-style-type: none">•Not eating enough carbohydrate•Taking too high a dose of diabetes medicine•Taking certain non-diabetes-related medicines, such as warfarin and some antibiotics•Eating meals or snacks too far apart from each other•Drinking alcohol, especially on an empty stomach•Being more physically active than usual (without adjusting your diabetes regimen to compensate)
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Common Glucose Patterns in Type 2 Diabetes

- High fasting blood glucose levels
- High blood glucose levels after meals
- High blood glucose levels after dinner

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ACTIVITY

Understanding Your Glucose Pattern

- *What is the pattern?*
 - High, low, or at goal glucose levels?
 - When are they high, low, and at goal?
- *What's causing this pattern?*
 - Too much food?
 - Not enough medication?
- *What can I do about it?*

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Case Study # 1

- John has type 2 diabetes and works as a full-time factory worker during the week. On the weekends, he stays busy doing activities around the house. His diabetes is currently controlled with oral medication, metformin, which he takes twice a day – 1,000 mg. before breakfast and 1,000 mg before dinner.
- He has been advised to test his blood glucose levels at least once/day at different times (either before or after meals or at bedtime) and when possible, to test twice/day in pairs (either pre/post-meal or at bedtime and before breakfast).

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Case Study # 1

	Pre-Bkfst.	Post-Bkfst.	Pre-Lunch	Post-Lunch	Pre-Dinner	Post-Dinner	Bedtime
Monday	180						
Tuesday						129	116
Wednesday	192						
Thursday	203						128
Friday					86	159	
Saturday	219				118		
Sunday			90				132

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Case Study # 2

- Sarah is a 57-year-old who has had type 2 diabetes for 1 year. At the time of her diagnosis, her primary care physician told her to lose weight, or she would need to start on medications.
- Her A1c is now 7.9%, she has not lost any weight, and has been referred for diabetes education. The diabetes educator has asked her to begin glucose testing and to test her blood glucose at least twice/day (in pairs or at bedtime and before breakfast) for the next month.
- Sarah loves to eat and frequently eats out with friends for lunch and with family for dinner on the weekends.

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Case Study # 2

	Pre-Bkfst.	Post-Bkfst.	Pre-Lunch	Post-Lunch	Pre-Dinner	Post-Dinner	Bedtime
Monday	146	270					
Tuesday			109	193			251
Wednesday	160						
Thursday					112	229	
Friday	79					206	
Saturday	151						311
Sunday					87	280	

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Case Study # 3

- Sean was diagnosed with type 2 diabetes approximately 6 months ago – at which time he began to eat healthier and joined a gym. He was recently promoted to a manager position at the company where he works. His hours have increased, and he frequently has early morning and lunchtime meetings. He picks up carry-out on his way home (often after 7 pm) and frequently eats and falls asleep
- At his recent appointment with the diabetes educator, he was asked to test his blood glucose more frequently to better understand his glucose patterns and begin to problem solve.

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Case Study # 3							
	Pre-Bkfst.	Post-Bkfst.	Pre-Lunch	Post-Lunch	Pre-Dinner	Post-Dinner	Bedtime
Monday	156	141					
Tuesday			130	102			
Wednesday					74	225	
Thursday	169						300
Friday	180	156					
Saturday					80	282	
Sunday						210	285

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Frequently Asked Questions About Insulin
<ul style="list-style-type: none"> ▪ Will I have to be on insulin forever once I start it? ▪ Does taking insulin mean my diabetes has gotten "worse"? ▪ Will insulin injections hurt? ▪ Is this a sign that I'm a failure at diabetes self-management? ▪ Do I have to carry a cooler with my insulin supplies?

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Summary
<ul style="list-style-type: none"> ▪ Blood glucose testing is important to help you understand glucose patterns and to make lifestyle and medication adjustments. ▪ Diabetes SELF-MANAGEMENT is a goal for all people with diabetes – the smarter you are about glucose testing, the more you will benefit towards a healthy lifestyle!

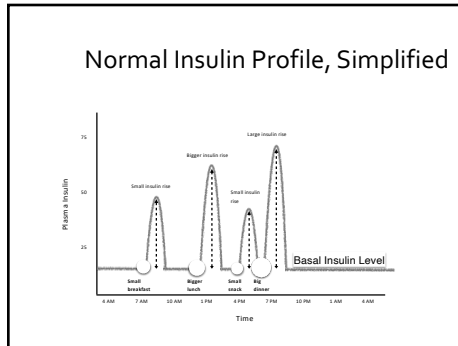
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Insulin Therapy

Purpose:

- To allow glucose from the blood stream to move into the cells of the body
- To provide fuel and energy
- Administered by injection only
- *Type 1* - requires insulin injections; ideally, given 4 times daily before meals and bedtime or via insulin pump
- *Type 2* - may need insulin as disease progresses and the body's insulin becomes deficient; diet, exercise, and oral medication become ineffective for blood glucose control; initially, given once daily at bedtime.

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Effective Insulin Therapy

- **Basal Dose** (NPH, Lantus, Toujeo, Levemir, Tresiba, U500)
 - Background insulin for blood glucose control when not eating
- **Bolus/Meal Dose** (Regular, Humalog, Novolog, Apidra, Fiasp)
 - To cover glucose rise from food (mainly carbohydrates)
 - Give before or after meals
- **Correction Dose** (Regular, Humalog, Novolog, Apidra, Fiasp)
 - To correct hyperglycemia pre-meal, if needed
 - Give before meals

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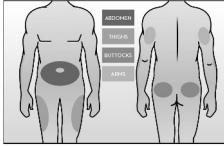
Types of Insulin & Action

Insulin	Onset	Peak	Duration
Rapid-acting • aspart (Novolog) • lispro (Humalog) • glulisine (Apidra) • aspart (Fiasp)	5 minutes	1-2 hours	4-6 hours
	2-5 minutes	1 hour	5-7 hours
Short-acting (Regular)	30 minutes	2 to 4 hours	6 to 10 hours
Intermediate-acting (NPH)	1 to 2 hours	4 to 8 hours	10 to 20 hours
Long-acting • glargine (Lantus) • detemir (Levemir) • Glargine (Toujeo) • degludec (Tresiba)	1 to 2 hours	flat	24 hours 8-24 hours
	6 hours		Up to 48 hours

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Insulin Injection Sites

- Abdomen (avoid area 2 inches around navel)
 - Preferred site
 - Fastest rate of absorption
 - More subcutaneous tissue
- Arms
- Thighs
- Buttocks



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Insulin Storage

- 36° to 86° F (do not store near extreme heat or cold)
- Room temperature if discarded after 28 days of being opened
- Glargine must be discarded after 28 days of use (refrigerated or not)
- Levemir – good for 42 days after opened at room temperature
- Pre-filled syringes (30 days)

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Needle Lengths of Insulin Syringes

Micro 4mm x 32 G	Mini 6mm x 31 G	Short 8mm x 31 G	Original 12.7mm x 29 G
4mm	6mm	8mm	12.7mm

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Barrel Capacity of Insulin Syringes

	30 units
	50 units
	100 units

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Advantages of Insulin Pens

- Easy, accurate dosing
- Compact
- Fewer supplies required
- Less errors
- Smaller amount of insulin in cartridge (300 versus 1000 units)
- More cost effective for some

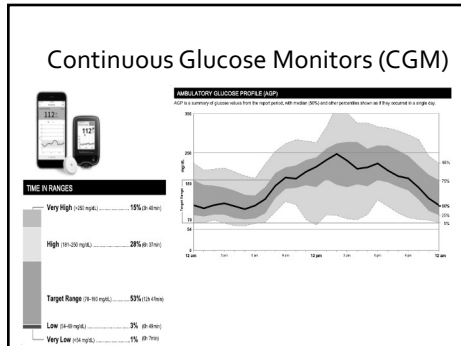
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Continuous Glucose Monitors (CGM)

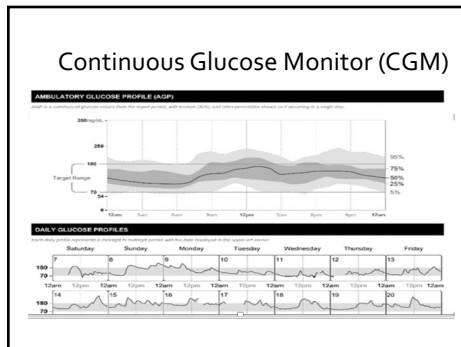
- CGM is a way to measure glucose levels in real-time throughout the day and night.
- A tiny electrode is inserted under the skin to measure glucose levels. It is connected to a transmitter that sends the information via wireless radio frequency to a monitoring and display device.
- CGMs measure glucose in interstitial fluid. Readings are comparable to checking blood glucose via meter but may be 5-10 min behind the blood glucose
- There are several brands of CGMs



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Insulin Pumps

- Devices that deliver rapid or short-acting insulin 24 hours a day through catheter placed under the skin
- Doses are separated into basal, bolus, and corrections
- Brands of insulin pumps include Medtronic, Tandem T-Slim, Insulet Omnipod
- Prescribed to those with type 1 and type 2 diabetes



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Insulin Caps/ Insulin Smart Pens



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Improving Quality of Life

- Diabetes technologies can improve the decision-making process to better manage your diabetes.
- Continuous glucose monitoring shows glucose readings every few minutes vs the glucose meter shows one point in time.
- Insulin delivery technology can optimize insulin management and help prevent insulin stacking.
- Insulin pumps provide an alternative to multiple daily injections and improve glucose control, especially pumps with automated insulin dosing used in conjunction with CGMs.

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Sick Day Guidance

- Never omit insulin or your diabetes pills even if you can't eat
- Test your blood glucose every 3-4 hours; call your doctor if your blood glucose stays below 80 mg/dl or above 300 mg/dl x 2
- If you have type 1 diabetes, test urine for ketones every 4 hours
- Drink sips of juice or sweetened liquid (such as ginger ale) at least ½ cup every hour if you are UNABLE to eat; if you are ABLE to eat, choose light foods (soup, yogurt, ice cream, pudding, cooked cereal, jello, or crackers)
- You should also drink unsweetened liquids (water, tea, diet soda, or broth) – staying hydrated is important

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Stress

- 60-70% of people with diabetes have some sort of depression, anxiety, or stress related to their disease
- Physical
 - Sickness, Surgery
- Emotional
 - Stress
 - Family challenges
 - Burnout



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Stress Management

- Work on things you CAN control, let go of things you CAN'T!
- Do something enjoyable
- Nurture relationships
- Keep things in perspective
- Give to and help others
- Exercise
- Eat healthy



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Deep Breathing and Relaxation



<https://www.youtube.com/watch?v=8Yn21zG7UY8&t=260>

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Summary

- Recent technologies have made BG monitoring easier and provide more information for better self-management.
- Insulin therapy is necessary in type 1 diabetes and may be needed as type 2 diabetes progresses.
- Managing stress also helps in controlling your blood glucose

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