ACP BOARD REVIEW: DIABETES MANAGEMENT
7/17/2026

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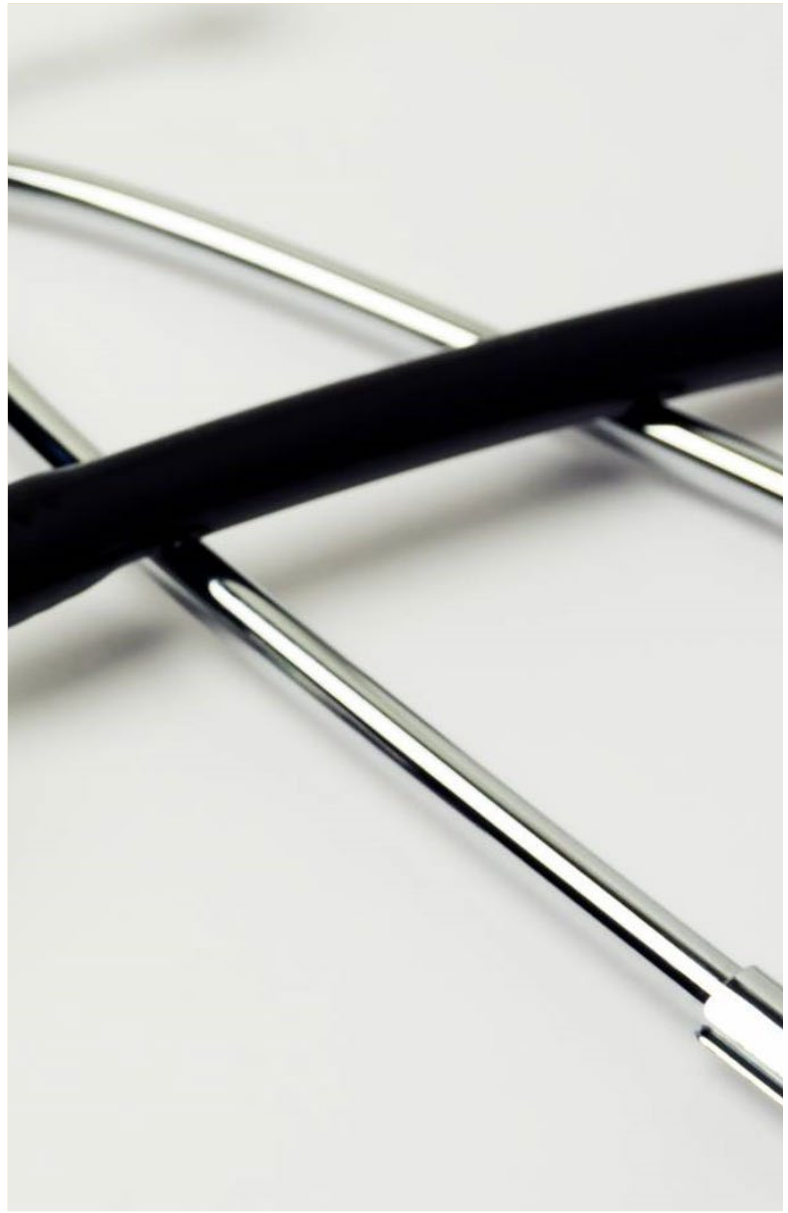
OBJECTIVES

- Utilize case-based format to
  - Understand blood glucose targets with a focus on patient co-morbidities
  - Initiate insulin using weight-based and A1C targets based on patient co-morbidities
  - Discuss non-insulin anti-diabetic medications



CASE #1

- A 52-year-old female presents to the emergency department with chest pain. She is obese (BM 32), and has a history of hypothyroidism, HTN, and dyslipidemia and takes levothyroxine, amlodipine and atorvastatin. She last went to her PCP 18 months ago and labs were normal at that time. Upon presentation, she is hypertensive to 160/95. Her labs are significant for a creatinine of 1.5, BUN 24, troponins are elevated but flat at 75, 72, and 65, respectively. CXR is normal. EKG is normal sinus rhythm with no ST-T changes. Glucose on BMP is 175. She is admitted to you as a "chest pain rule out".

CASE #1

- Would you work up the glucose level further and what would you do?
- With regards to inpatient glucose control, what are appropriate targets?
- How would you manage her blood sugar during her hospitalization?

ADMISSION OF NON-ICU HOSPITALIZED PATIENTS:

- Hyperglycemia is defined as any **BG > 140 mg/dL**
- Perform an A1C test on all people with diabetes or hyperglycemia (random blood glucose >140 mg/dL) at the time of admission if no A1C test is available from the prior 3 months.
- **Initiate insulin if BS > 180 mg/dL** (confirmed on two occasions within 24 h) for most noncritically ill individuals; conversely, treat hypoglycemia as BS < 70 mg/dL
- Target: BS 100-180 mg/dL in non-critically ill patients (avoiding hypoglycemia)
- For patients with terminal illness, limited life expectancy, or at high risk for hypoglycemia, a higher target range < 200 mg/dl is ok
- Fasting glucose levels <100 mg/dL (<5.6 mmol/L) are predictors of hypoglycemia within the next 24 h (make insulin adjustments)

DOSING INSULIN: IT'S EASY!
SOCIETY OF HOSPITAL MEDICINE

- **All DM1 & most DM2 = scheduled basal insulin**
- Estimate total daily dose (TDD) insulin*:
- Malnourished, elderly (>65)**, CKD, ESRD, ESLD
  - 0.2-0.3 units/kg
  - 0.1 units/kg or DDP-4 inhibitor alone or DPP-4 + basal can be safe alternative in elderly pts
- Normal-weight patients, incl. Type I DM
  - 0.4 units/kg
- Overweight
  - 0.5 units/kg
- Obese, high-dose steroids, insulin resistance
  - 0.6 units/kg

DOSING INSULIN: IT'S EASY!

- **NPO or clear liquids**
  - Basal: 50% TDD, nutritional: none, SSI if needed
- **Eating meals**
  - Basal: 50% TDD, nutritional: 50% TDD / 3 meals, SSI if needed
- **Continuous TFs**
  - Basal: continue prior, if none, use 5 units NPH/detemir q12h or 10 units glargine q24h
  - Nutritional: 1 unit/10 grams carbs in TF formula
  - Correctional: q6h regular insulin or q4h with rapid-acting insulin
- **Bolus TFs**
  - Basal: continue prior or 50% TDD; nutritional: 1 unit/10-15 grams carbs prior to feeding
- **Parenteral nutrition (add to bag if requiring > 20 units/day)**
  - Regular insulin to TPN – 1 unit/10 g carbs, continue SSI

Adjust q1-2 days based on glucose trends; decrease by 20% if hypoglycemia

UPDATED 2026 ADA GUIDELINES FOR DOSING INSULIN

Type 2 Diabetes — Basal Insulin Initiation

Starting doses are based on body weight and HbA1c:

- **A1C <8%**: Start at **0.1–0.2 units/kg/day**
- **A1C ≥8%**: Consider **0.2–0.3 units/kg/day**
- **Severe hyperglycemia with catabolism**: Up to **0.3–0.4 units/kg/day**

An alternative fixed-dose approach is to start at **10 units/day** regardless of weight, then titrate.

Titrate every 2–3 days (glargine) or every 3–5 days (deludec) targeting fasting glucose, typically <110–130 mg/dL without hypoglycemia.

Over-basalization should be suspected if the basal dose exceeds **0.5 units/kg/day** without achieving fasting glucose targets, prompting consideration of prandial insulin.

When adding **prandial insulin** in type 2 diabetes, a common approach is to start with **4 units** (or ~10% of the basal dose) at the largest meal, titrating by 1–2 units (10–15%)

INSULIN DOSING – ADA

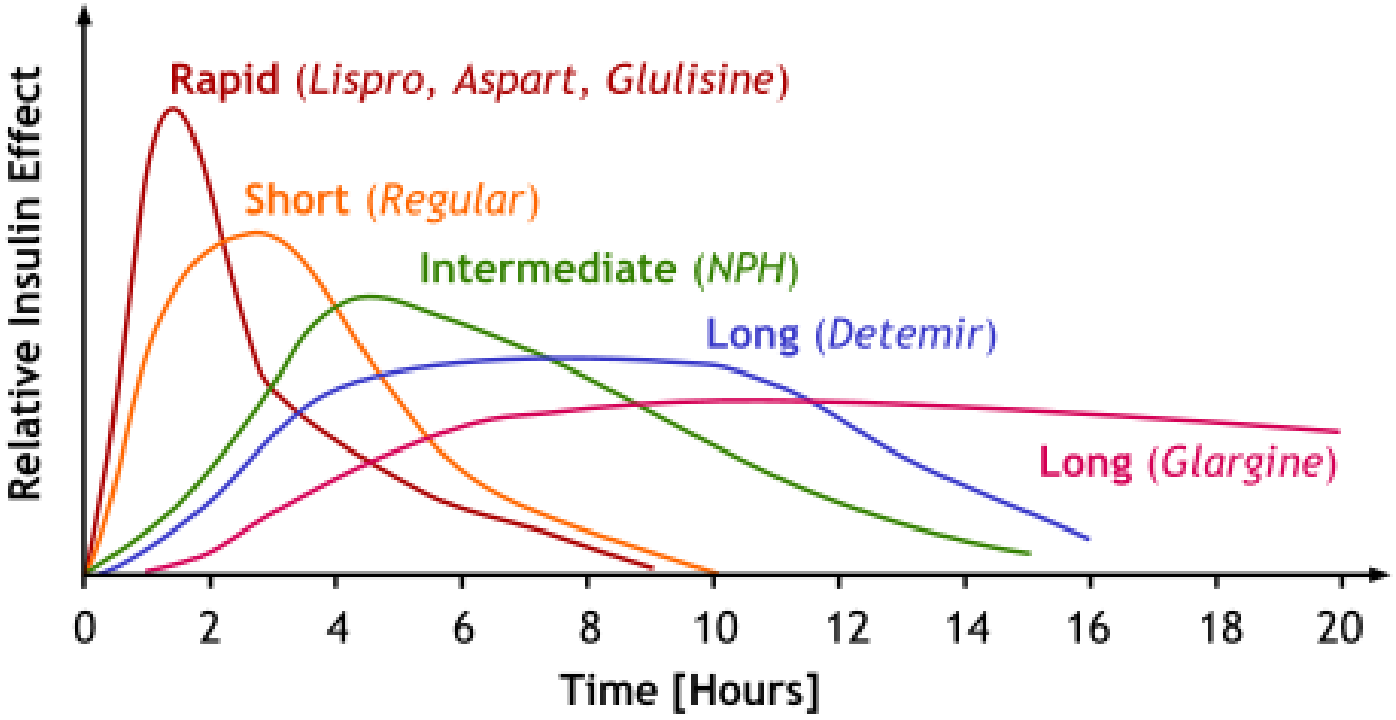
- **Type 1 Diabetes — Total Daily Dose**
  - Typical starting total daily dose (TDD): **0.4–0.5 units/kg/day**, with **0.5 units/kg/day** commonly cited
  - Higher doses may be needed in obesity, puberty, pregnancy, sedentary lifestyle, or acute illness
  - Lower doses (**0.2–0.3 units/kg/day**) are recommended for older adults, renal failure, malnutrition, low BMI
  - Basal insulin typically accounts for **40–50% of TDD**, with the remainder as prandial insulin
- **Hospitalized Patients (Non-Critical Care)**
  - Per the Endocrine Society, weight-based dosing for inpatients includes:
    - **Basal insulin**: 0.2–0.4 units/kg/day
    - **Prandial insulin**: 0.2–0.4 units/kg/day divided into 3 premeal doses, with correctional insulin for above-target glucose
    - If NPO, hold prandial insulin and continue correctional dosing

CASE #2

- A 75-year-old male Veteran with a past medical history of diabetes mellitus and chronic kidney disease (CKD) presents to the clinic for a diabetes follow up visit. Prior to arrival, he had fasting labs done which show blood sugar of 200 and creatinine of 2.5 from 1.8. His home insulin regimen is 15 units "70/30" Novolin BID and regular insulin sliding scale as needed for blood sugars > 180 which he usually uses at lunch and dinner. For the past week, he has been feeling shaky, diaphoretic and weak, especially after lunch and dinner, such that he's needed to eat a high carbohydrate snack. He checked his blood sugar around 3 pm yesterday and it was 55. He tells you that lately he's been taking his BID insulin doses close together because he sleeps in until 10 AM.

CASE #2

- What factor(s) contributed to the patient's hypoglycemia?
- What are pre-mixed insulins and how do they work?
- You want to switch him to basal-bolus insulin. The patient's weight is 75 kg. Calculate his dose keeping in mind his acute kidney injury.



SPECIAL POPULATIONS WHEN IT COMES TO INSULIN

Steroid-induced hyperglycemia

- Monitor with bedside POC for at least 24-48 h after initiation of steroids; if BG > 140 mg/dl, continue POC testing
- Initiate insulin if persistent hyperglycemia (BG > 180)
- Prednisone (peak action 4-8 hours) – can use intermediate acting insulin (NPH), or if dexamethasone or multi-dose (longer acting) – use basal/prandial/correctional
- Post-prandial hyperglycemia is common

CKD

- High risk for hypoglycemia
- A1C values are often unreliable
- Many patients stop needing insulin as CKD progresses
- Dose insulin at 0.2-0.3 units/kg

Perioperative

- Target glucose in perioperative period: 80-180 mg/dL
- Withhold oral hypoglycemic agents the morning of surgery and give half of NPH dose or 60–80% doses of a long-acting analog or pump basal insulin.
- Moderate peri-op target of BG < 180 mg/dL is associated with lower risk of stroke & mortality

CASE #3

- A 65-year-old morbidly obese female with type II diabetes mellitus, COPD, systolic heart failure and CKD stage 3a presents with the Emergency Department with an acute COPD exacerbation. She takes U-500 insulin as an outpatient but is not always compliant. Her last A1C was 10.5%. Other medications are metoprolol, aspirin, spironolactone, Lasix, sacubitril-valsartan, and tiotropium. Her blood glucose on presentation is 325 mg/dl. She received 125 mg IV Solumedrol in the Emergency Department and is sent home with prednisone 40 mg daily. Her other labs are within normal limits except for her blood glucose and creatinine at baseline of 1.6. When she gets home, she calls the clinic because blood sugars have been consistently > 500.

CASE #3

- What would you do for this patient?
- What is U-500 insulin?
- Calculate her basal-bolus insulin dosing regimen based on a weight of 112 kg keeping in mind her medical co-morbidities.
- Two days into the patient's hospital admission, her blood glucose levels have been consistently > 200 mg/dL. Re-calculate her insulin dosing.
- She is improved and ready for discharge home. What additional medications should be considered?

MEDICATION ESCALATION IN DIABETES

PRINCIPLES OF THE AACE ALGORITHM FOR MANAGEMENT OF ADULTS WITH TYPE 2 DIABETES

1.	Lifestyle modification is the foundation for all therapy.
2.	Use a comprehensive approach for weight loss to achieve clinical goals.
3.	Choice of pharmacologic therapy is guided by glycemic targets and comorbidities (overweight/obesity, ASCVD CHF, CKD, MASLD, OSA).
4.	Choice of therapy considers ease of use and access.
5.	Individualize glycemic targets (A1C, GMI, TIR, FBG, PPG).
6.	Optimal A1C (or GMI) is ≤6.5% (48 mmol/mol) or as close to normal as is safe and achievable.
7.	Avoid therapeutic inertia and get to goal as soon as possible (adjust ≤3 months).
8.	Avoid hypoglycemia.
9.	CGM is highly recommended to reach glycemic goals in adults with diabetes.
10.	Comorbidities and complications must be managed for comprehensive care.

Abbreviations: **A1C**, hemoglobin A1c; **ASCVD**, atherosclerotic cardiovascular disease; **CGM**, continuous glucose monitoring; **CHF**, congestive heart failure; **CKD**, chronic disease; **FBG**, fasting blood glucose; **GMI**, glucose management indicator; **MASLD**, metabolic dysfunction-associated steatotic liver disease; **OSA**, obstructive sleep apn postprandial glucose; **TIR**, time in range

Algorithm Figure 1 - Guiding Principles

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GLUCOSE-CENTRIC GLYCEMIC CONTROL ALGORITHM

LIFESTYLE INTERVENTION
Start or continue metformin as appropriate

ASSESS FOR COMORBIDITIES AND COMPLICATIONS: CHF | CKD | CVD | STROKE/TIA | MASLD
If Yes, see ALGORITHM 6: COMORBIDITIES- AND COMPLICATIONS-CENTRIC ALGORITHM for pharmacotherapy recommendations

PERSON-CENTERED SELECTION OF THERAPY

Patients may present with >1 scenario	Severe Hyperglycemia [a]	↑ Hypoglycemia Risk	Overweight/Obesity [b]	↓ Access Need for ↓ Cost
Preferred	Basal Insulin + Prandial Insulin or + GLP-1 RA or + GIP/GLP-1 RA	Metformin | SGLT2i GLP-1 RA or GIP/GLP-1 RA DPP-4i [c] | TZD	GLP-1 RA or GIP/GLP-1 RA SGLT2i | Metformin	Metformin TZD | GLN | SU [d] | AGI
Less Preferred or Caution/Avoid	Basal Insulin + Other Agents	SU | GLN	TZD [e] | SU | GLN	DPP-4i [c] | SGLT2i GLP-1 RA or GIP/GLP-1 RA

Order of medications suggests hierarchy for use

A1C >7.5% (58 mmol/mol) Start 2 agents

A1C >9% (75 mmol/mol) or >1.5% (>16 mmol/mol) above goal Start ≥2 agents

INDIVIDUALIZE GLYCEMIC TARGETS
A1C <6.5% (48 mmol/mol) for most people
A1C 7% to 8% (53-64 mmol/mol) if high risk for adverse consequences of hypoglycemia and/or limited life expectancy
Avoid Therapeutic Inertia | Monitor and Adjust Every ≤3 Months | Titrate to Maximum Tolerated Dose for Additional Glucose Lowering
Add Beneficial Agent Not in Use for Additional Glucose Lowering | Periodic Diabetes Self-Management Education | Implement CGM as Early as Feasible

NEED FOR ADDITIONAL GLUCOSE LOWERING? [f]

→ Go to PROFILES OF PHARMACOTHERAPY FOR T2D

→ Go to ALGORITHM 8: INITIATING AND TITRATING INSULIN

[a]For SEVERE HYPERGLYCEMIA (A1C >10% [>86 mmol/mol] and/or glucose >300 mg/dL [16.7 mmol/L] with symptoms), strongly consider basal insulin (Go to ALGORITHM 8: INITATING AND TITRATING INSULIN). Avoid use of GLP-1 RA or GIP/GLP-1 RA alone in severe hyperglycemia. These agents require titration over weeks which can delay glycemic control. After glucose toxicity is resolved, reassess medical therapy and consider other agents. [b]See **AACE Algorithm for the Treatment of Obesity/Adiposity-Based Chronic Disease-2025 Update**. [c]DPP-4i and GLP-1 RA or GIP/GLP-1 RA should not be combined. [d]SUs may be inappropriate in older adults due to risk of hypoglycemia. [e]TZDs can cause increased weight partially attributable to fluid retention. [f] If despite appropriate therapy and adherence, glucose levels remain above target, also reconsider ALGORITHM 3: DIABETES CLASSIFICATION.

Abbreviations: **A1C**, hemoglobin A1C; **AGI**, alpha-glucosidase inhibitor; **CGM**, continuous glucose monitoring; **CHF**, congestive heart failure; **CKD**, chronic kidney disease; **CVD**, cardiovascular disease; **DPP-4i**, dipeptidyl peptidase 4 inhibitor; **GIP**, glucose-dependent insulinotropic polypeptide; **GLN**, glinide; **GLP-1 RA**, glucagon-like peptide 1 receptor agonist; **MASLD**, metabolic dysfunction-associated steatotic liver disease; **SGLT2i**, sodium glucose transporter 2 inhibitor; **SU**, sulfonylurea; **TIA**, transient ischemic attack; **T2D**, type 2 diabetes; **TZD**, thiazoladinedione

Algorithm Figure 7 - Glucose-Centric Glycemic Control

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WHAT ABOUT THE NON-INSULIN MEDICATIONS?

- Sodium–glucose cotransporter 2 inhibitor (empagliflozin – Jardiance) should be started/continued during hospitalization if indicated for heart failure, providing there are no contraindications.
  - SGLT2 inhibitors are not recommended for glycemic management in the hospital setting
  - FDA recommends that SGLT2 inhibitors should be stopped 3 days before scheduled surgeries (4 days in the case of ertugliflozin - Steglatro) and ensuring risk factors for ketoacidosis are resolved prior to reinitiating therapy.
- Data on the inpatient use of glucagon-like peptide 1 receptor agonists (GLP-1 RAs) are in research phase
  - Therefore, GLP-1 RA drugs should be held for acutely ill individuals in the hospital setting.
- Individuals taking a GLP-1 RA medication have higher chances of increased residual gastric content despite fasting.
  - Based on these reports, FDA added a warning label to all GLP-1 RA or dual glucose-dependent insulinotropic polypeptide (GIP) and GLP-1 RA medications about the risk of pulmonary aspiration during surgery/procedures
  - More recently, multiple societies and expert groups have advised a personalized approach, allowing individuals at low risk for delayed stomach emptying who undergo elective surgery to continue taking their GLP-1 RA medications and suggesting a liquid nutrition protocol for 24 h before the procedure

WHAT ABOUT THE GLP-1 MEDICATIONS?

SURMOUNT-1 Trial (3 years):

- In ~1,000 adults with prediabetes + obesity:
  - 94% reduction in progression to T2D vs placebo
  - Up to 22–23% body weight loss over 3 years
  - Nearly **99% remained diabetes-free** at 3 years **Other indications:**

1. Tirzepatide (Mounjaro) was approved by for moderate-to-severe obstructive sleep apnea in adults with obesity. This expands its role beyond glycemic control and weight loss (This indication can be used if the patient has both prediabetes and sleep apnea as prediabetes alone would not be covered). (SURMOUNT-OSA)
2. Semaglutide (Ozempic) received U.S. FDA approval on January 28, 2025, for reducing progression of chronic kidney disease and cardiovascular death in type 2 diabetes—based on the Phase 3 FLOW trial (these indications can be used to get Ozempic covered if the patient has elevated sugars but not in the diabetes range)
3. Semaglutide – low-dose semaglutide can reduce craving and some drinking outcomes, justifying larger clinical trials to evaluate GLP-1RAs for alcohol use disorder.

STATIN THERAPY IN DIABETICS

- Ages 40-75: Moderate intensity statin for primary prevention regardless of LDL level
- Ages 40-75: High intensity statin for primary prevention regardless of LDL level with co-morbidities: HTN, smoking, obesity
- Agres 40-75: Existing ASCVD: High intensity statin to target > 50% reduction and LDL < 55 mg/dl
- Age < 40 and > 75: case-by-case basis

CASE #4

- A 47-year-old diabetic male presents with fever, nausea, vomiting and right leg pain. He is found to have right lower extremity cellulitis and is admitted to the hospital. Admission labs are as follows: blood glucose 200, sodium 134, bicarbonate 15, chloride 95, K 3.5, albumin 3.5, UA shows ketones. He has type 2 DM and is on 20 units of Lantus QHS and Jardiance was recently started about 1 month ago.

CASE #4

- What is this patient's anion gap?
- What additional testing might you want to order?
- What is the most likely diagnosis?
- How do you treat the above condition?

EUGLYCEMIC DKA

- Euglycemic DKA develops in the presence of low insulin levels and can be associated with a variety of factors including reduced food intake, pregnancy, alcohol use, liver failure, and/or SGLT2 inhibitor therapy
- Approximately 10% of people experiencing DKA present with euglycemic DKA (plasma glucose <200 mg/dL [<11.1 mmol/L], in the presence of ketosis and metabolic acidosis); therefore, DKA diagnosis requires either the presence of hyperglycemia or prior history of diabetes.

CASE #4 CONTINUED

- Upon discharge, you are assuming care. He was diagnosed with type 2 diabetes mellitus 5 years ago and his A1C has been increasing over the last year. He is on 20 units of Lantus QHS and Jardiance. His last A1C was 9.5%. He hands you his glucometer, and all his blood glucose levels have been between 100 and 150 mg/dl. He checks his blood sugars fasting and before meals. BMI = 22.

CASE #4

- What hemoglobin A1C level should correlate with glucose level between 100 and 150?
- What could explain the discrepancy between his A1C and blood sugar levels?
- What tool could you recommend to monitor his blood sugars more closely?

ALTERATIONS IN HEMOGLOBIN A1C

- Hemoglobin variants (hemoglobinopathies)
- Increased RBC turnover
  - Pregnancy
  - G6PD, sickle cell
  - Recent blood loss or transfusion
  - Hemodialysis and EPO therapy
- Decreased RBC life span

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THANK YOU

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