ENDOCRINE | HIGH-YIELD NCLEX | EMERGENCY

Hypoglycemia

Low blood glucose < 70 mg/dL — a medical emergency that can rapidly progress from mild adrenergic symptoms to seizure, coma, and brain damage if not corrected swiftly.

1 Definition / Overview

FOUNDATION

- **Hypoglycemia = Blood glucose < 70 mg/dL.** Severe hypoglycemia is < 54 mg/dL with neurologic impairment.
- **Why it matters:** The brain depends on glucose. Sustained low glucose causes seizures, brain injury, and death within minutes.
- **Most common causes:** Too much insulin or oral hypoglycemic, missed/delayed meal, increased exercise, alcohol, kidney failure, and beta-blockers (mask symptoms).

Glucose Cut-Offs: Normal fasting 70–99 mg/dL · Hypoglycemia < 70 · Severe < 54 · Treat any patient with symptoms even if BG is borderline. Never delay treatment to draw labs.

2 Pathophysiology (Simplified)

MECHANISM

STEP 1 Insulin (or sulfonylurea) effect > glucose intake → blood glucose falls below 70 mg/dL.

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STEP 2 Body releases counter-regulatory hormones: *epinephrine, glucagon, cortisol, growth hormone* to push glucose up.

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STEP 3 *Sympathetic nervous system* activation → adrenergic / "shaky-sweaty-hungry" early warning symptoms.

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STEP 4 Glucose continues to fall → brain is starved of glucose → *neuroglycopenic* symptoms (confusion, slurred speech, vision changes).

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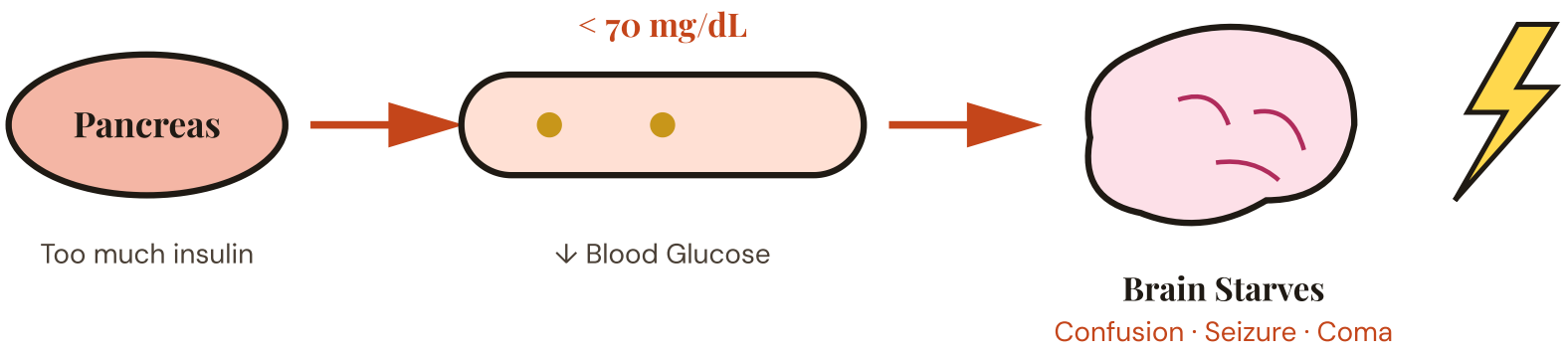
STEP 5 Without correction → seizures → loss of consciousness → coma → permanent brain injury or death.



PATHWAY: EXCESS INSULIN → LOW GLUCOSE → BRAIN ENERGY CRISIS

3 Signs & Symptoms

EARLY VS LATE

EARLY · ADRENERGIC

"Cold & Clammy"

BG ~ 60–70 MG/DL · SYMPATHETIC SURGE

- 😵 **Shakiness** / tremors
- 💦 **Diaphoresis** (cool, clammy skin)
- ❤️ **Tachycardia** & palpitations
- 😟 Anxiety, irritability, nervousness
- 🍕 **Hunger**
- 👅 Tingling lips/tongue, pale skin

LATE · NEUROGLYCOPENIC 🚨

"Brain Starving"

BG < 54 MG/DL · CNS DYSFUNCTION

- 🤯 **Confusion**, difficulty concentrating
- 🗣️ Slurred speech
- 👀 Blurred or double vision
- 🚶 Unsteady gait, weakness
- 🧠 Behavior changes (looks "drunk")
- ⚡ **Seizures** · 🛑 **Loss of consciousness** · ☠️ Coma

🚨 **RED FLAG:** A patient on a *beta-blocker* (e.g., metoprolol) may NOT show tachycardia, palpitations, or tremors — they lose adrenergic warning signs and present directly with confusion or coma. Always check BG in any diabetic with altered mentation.

4 Priority Nursing Interventions

ABCS · SAFETY · ACTION

▶ Conscious & Able to Swallow — "Rule of 15"

1. **Check blood glucose**
   Confirm hypoglycemia with a fingerstick when symptoms appear — but never withhold treatment if symptomatic and meter unavailable.

2. **Give 15 g of fast-acting carbohydrate**
   4 oz (½ cup) juice or regular soda · 3–4 glucose tabs · 1 tbsp honey/sugar · 8 oz milk · 6–7 hard candies. NO chocolate (fat slows absorption).

3. **Wait 15 minutes, then recheck BG**
   If still < 70 mg/dL → repeat 15 g carbs and recheck again in 15 minutes. Repeat the cycle until BG > 70.

4. **Once BG > 70: give a complex carb + protein snack**
   Cheese & crackers, peanut butter on toast, half sandwich — prevents rebound hypoglycemia, especially if next meal is > 1 hour away.

5. **Document & identify the trigger**
   Was a meal missed? Insulin double-dosed? Activity increased? Notify HCP if recurrent or severe.

▶ Unconscious / Unable to Swallow — Emergency

1. **Protect the airway · turn to side**
   Aspiration risk! NEVER place food, juice, or glucose gel in the mouth of an unconscious patient.

2. **If IV access:**
   Administer *D50W 25 mL (½ amp) IV push* per protocol or order.*Rapid onset within minutes. Flush line after.*

3 **If NO IV access:**

Administer *Glucagon 1 mg IM, SubQ, or intranasal.* *Onset 5–15 minutes. Patient may vomit on awakening — turn on side to prevent aspiration.*

4 **Recheck BG q 15 minutes; once awake/safe to swallow → complex carb + protein meal.**

Glucagon stores are limited — patient WILL relapse without follow-up food.

5 Pharmacology

TREATMENT DRUGS

Drug / Class	Mechanism	Key Side Effects / Cautions	Nursing Considerations
Oral Glucose PO · 1ST LINE	15 g of rapid-absorbing simple sugar raises BG within minutes.	Conscious patients only. Choking risk if swallowing impaired.	Only for ALERT patients. Recheck BG in 15 min. Avoid fat-containing foods (chocolate, ice cream) — fat delays absorption.
Dextrose 50% (D50W) IV PUSH	Concentrated glucose given directly into the bloodstream — onset within 1–3 minutes.	Vesicant — causes tissue necrosis if extravasates. Hyperglycemia rebound.	Only via patent *large-bore IV*. Push slowly, flush line. Monitor IV site closely. NEVER give SubQ/IM. 25 mL = ½ amp = 12.5 g dextrose.
Glucagon IM / SUBQ / IN	Hormone that stimulates the liver to release stored glycogen → glucose.	Nausea/vomiting on awakening. Ineffective if liver glycogen depleted (alcoholics, malnourished, prolonged starvation).	Use when no IV access OR patient unconscious. Onset 5–15 min. Position on side. Give a meal once alert. Family member education on home injection kit.
Dextrose 10% (D10W) IV DRIP	Continuous lower-concentration dextrose for sustained correction.	Risk of fluid overload; rebound hyperglycemia.	Used for sulfonylurea-induced or recurrent hypoglycemia — long-acting agents may cause prolonged lows requiring continuous infusion.

Insulin Reminder: The most common *cause* of hypoglycemia is insulin overdose. Know your insulin onsets — Rapid (Lispro, Aspart) peaks 1 hr · Regular peaks 2–4 hr · NPH peaks 4–12 hr · Glargine has no peak. Hypoglycemia most often occurs at the peak.

6 NCLEX Test Traps

COMMON PITFALLS

⚠ "Trick" — Hot & Dry vs Cold & Clammy

If the patient is **cold and clammy** → they need some **candy** (HYPOglycemia). If **hot and dry** → sugar's **high** (HYPERglycemia). Reading "diaphoretic" should immediately point to LOW glucose.

⚠ "Trick" — Don't give food to an unconscious patient

Even glucose gel rubbed inside the cheek of an **unconscious** patient is the WRONG answer. The right answer is **glucagon IM** or **D50 IV push**. Aspiration kills.

⚠ "Trick" — Chocolate is NOT the right snack

Fat in chocolate, ice cream, and milk-based candies **delays glucose absorption**. Pick juice, regular soda, or glucose tabs instead.

⚠ "Trick" — Beta-blockers mask the warning

A diabetic on metoprolol or propranolol may have NO tachycardia, NO tremors, NO palpitations. **Confusion may be the first and only sign**. Always check BG in any diabetic with altered LOC.

⚠ "Trick" — Treat the patient, not the number

If a patient is **symptomatic** with shakiness/sweating/confusion and BG is borderline (e.g., 72), treat first, lab second. Don't waste time with another fingerstick if the symptoms are clear.

⚠ "Trick" — Sulfonylurea hypoglycemia is LONG

Glipizide and glyburide cause hypoglycemia that can last 12–24+ hours. One dose of D50 is NOT enough — these patients need **admission and a D10 drip**. Don't be fooled by initial improvement.

⚠ "Trick" — Somogyi vs Dawn Phenomenon

Both cause AM hyperglycemia, but: **Somogyi** = nighttime hypoglycemia rebound (DECREASE evening insulin). **Dawn** = early-morning hormone surge (INCREASE evening insulin). Test 3 AM glucose to tell them apart.

7 Patient & Family Education

SELF-MANAGEMENT

Recognize Early Symptoms

Teach: shakiness, sweating, hunger, confusion, irritability. Carry a glucometer and check whenever symptoms appear.

Always Carry Fast Carbs

Glucose tabs, juice box, hard candies, or glucose gel. Keep them in purse, car, bedside table, gym bag.

Apply the Rule of 15

15 g of carbs → wait 15 min → recheck BG. Repeat until > 70 mg/dL, then eat a complex carb + protein.

Family Knows Glucagon

Teach a family member to give the glucagon kit IM/SubQ or intranasal if patient becomes unconscious. Roll them on their side.

Wear Medical ID

Bracelet or necklace stating "Type 1/Type 2 Diabetic." Critical so first responders treat unconsciousness correctly.

Don't Skip Meals

Eat consistently around insulin/medication doses. Adjust insulin for exercise. Eat before alcohol — alcohol blocks the liver from releasing glucose.

Call HCP When...

Frequent lows, severe lows requiring help, hypoglycemia unawareness, or pattern shifts (e.g., new lows at the same time daily).

Driving Safety

Always check BG before driving. If < 70: treat & wait 15 min before getting behind the wheel.

8 Memory Boosters & Mnemonics

QUICK RECALL

"Cold & Clammy"

Cold & Clammy → need some Candy

vs.

Hot & Dry → Sugar High

(Hyperglycemia: warm flushed skin, dehydrated)

TIRED

- **T** Tachycardia
- **I** Irritability
- **R** Restlessness
- **E** Excessive hunger
- **D** Diaphoresis · Depression

"15-15 Rule"

- **15** grams of fast carb
- **15** minutes wait
- **15** recheck BG
- Repeat ↻ until BG > 70
- Then complex carb + protein

"D50 vs Glucagon"

If they have an **IV** → push **D**extrose

If they don't have IV → poke a **G**lucagon shot

Either way → roll them **on their side** + recheck.

Feature	Hypoglycemia (LOW)	Hyperglycemia (HIGH)
Onset	Sudden (minutes)	Gradual (hours-days)
Skin	Cold, clammy, pale, diaphoretic	Hot, dry, flushed
Mental status	Anxiety → confusion → coma	Lethargy, drowsy → coma (DKA/HHS)

Feature	Hypoglycemia (LOW)	Hyperglycemia (HIGH)
Breathing	Shallow, normal	Kussmaul (deep, rapid) in DKA
Breath odor	Normal	Fruity/acetone (DKA)
Hunger / thirst	Hungry	Thirsty (polydipsia) + polyuria
Treatment	15 g fast carbs / D50 / glucagon	Insulin + IV fluids + electrolyte correction

★ NCJMM Clinical Judgment Framework

NGN 2026

1 Recognize Cues

Diabetic + tremors, sweating, confusion. BG 58 mg/dL. On insulin glargine + lispro, missed lunch, beta-blocker on med list.

2 Analyze Cues

Adrenergic + early neuroglycopenic symptoms = symptomatic hypoglycemia. Beta-blocker may mask further warning. Trigger: missed meal + insulin.

3 Prioritize Hypotheses

#1 Hypoglycemia (most acute, life-threatening). Rule out stroke / sepsis only after BG corrected. Brain injury risk is highest priority.

4 Generate Solutions

Conscious + alert → 15 g oral carbs · Recheck in 15 min. Unconscious → D50 IV push (if access) or glucagon IM. Position safely. Notify HCP.

5 Take Action

Give 4 oz juice. Stay with patient. Recheck BG in 15 min. If still <70, repeat. Once >70 + symptom-free, give peanut butter crackers.

6 Evaluate Outcomes

BG > 70 mg/dL. Patient alert, oriented x3, symptoms resolved. No recurrence in 30–60 min. Reviews insulin/meal-timing teaching with nurse.