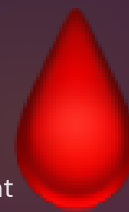


ENDOCRINE · ACUTE & CHRONIC CARE

Diabetes *Complications*



Acute emergencies, long-term vascular damage, prioritization, pharmacology, and patient teaching — every system, every red flag, every NCLEX trap in one reference.

◆ NGN NCLEX 2026 ◆ CLINICAL JUDGMENT ◆ TYPE 1 + TYPE 2

01 OVERVIEW

What goes wrong when blood sugar isn't controlled

Diabetes complications fall into two buckets — acute emergencies that kill in hours, and chronic vessel/nerve damage that disables over years. Both are largely preventable with glycemic control.

⚡ Acute Complications

- ▶ **Hypoglycemia** (BG <70) — most common; death from neuroglycopenia within minutes
- ▶ **DKA** — Type 1 driven; ketones + acidosis from absolute insulin lack
- ▶ **HHS** — Type 2 driven; profound dehydration, no acidosis, higher mortality than DKA
- ▶ **Trigger of all three:** infection, illness, missed insulin/meals, stress

💧 Chronic Complications

- ▶ **Macrovascular** — large vessel: CAD/MI, stroke, peripheral artery disease
- ▶ **Microvascular** — small vessel: retinopathy, nephropathy, neuropathy
- ▶ **#1 cause of:** blindness in adults (retinopathy), ESRD (nephropathy), non-traumatic amputation (neuropathy + PAD)
- ▶ **Driven by:** chronic hyperglycemia + HTN + dyslipidemia

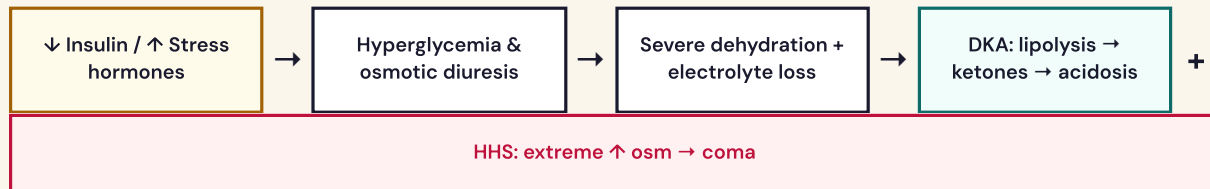
02 PATHOPHYSIOLOGY

From sugar to system damage

Hyperglycemia damages blood vessels and nerves through glycation, oxidative stress, and osmotic injury. Different complication paths emerge depending on which system bears the load.

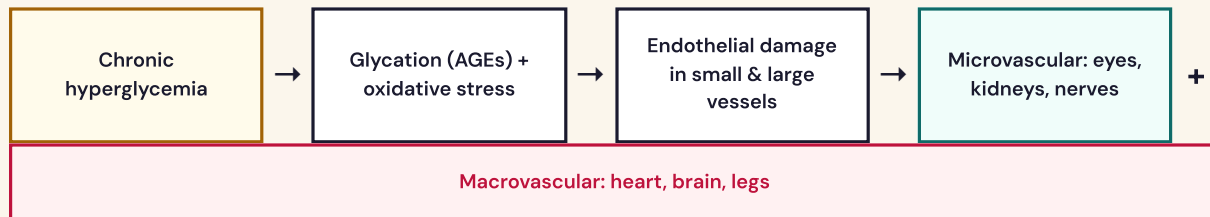
Acute Path → DKA / HHS

Insulin deficiency → cells starve despite high blood sugar → body breaks down fat (DKA) or osmotic crisis develops (HHS)



Chronic Path → Vessel & Nerve Damage

Glucose binds to proteins forming AGEs → blood vessels stiffen and leak → tissue ischemia and nerve injury



03 ACUTE EMERGENCIES

Three crises that demand immediate action

Hypoglycemia is the fast killer (minutes); DKA and HHS unfold over hours but are equally lethal. Differentiating them is a high-yield NCLEX skill.

ACUTE · MINUTES

Hypoglycemia

BG < 70 mg/dL · Type 1 & 2

TRIGGERS

- Too much insulin / oral agents
- Skipped or delayed meal
- Unplanned exercise
- Alcohol (suppresses gluconeogenesis)

SIGNS & SYMPTOMS

- **Cold, Clammy → give Candy**
- Shaky, sweaty, tachycardia
- Hunger, anxiety, irritability
- Confusion, slurred speech
- Late: seizure, coma

LABS

BG < 70

No ketones



Conscious: 15 g rapid carb · Unconscious: Glucagon IM/SQ or D50W IV push

ACUTE · HOURS

DKA

Diabetic Ketoacidosis · Type 1

TRIGGERS

- Missed insulin doses
- Infection (UTI, pneumonia)
- New-onset Type 1 diagnosis
- Severe stress, MI

SIGNS & SYMPTOMS

- **Kussmaul respirations** (deep, rapid)
- **Fruity / acetone breath**
- Polyuria, polydipsia, polyphagia
- Abdominal pain, N/V
- Dehydration, hypotension, AMS

LABS

BG > 250

pH < 7.3

HCO₃ < 18

⊕ Ketones



NS first → IV regular insulin drip → replace K+ before insulin if K < 3.3

ACUTE · DAYS

HHS

Hyperosmolar Hyperglycemic State · Type 2

TRIGGERS

- Infection (most common)
- Older adult, undx Type 2
- Inadequate fluid intake
- Steroids, diuretics

SIGNS & SYMPTOMS

- **Profound dehydration** (10+ L deficit)

- Severe AMS, lethargy, coma
- Seizures, focal neuro signs
- **NO Kussmaul, NO fruity breath**
- Hypotension, tachycardia

— LABS

BG > 600

Osm > 320

pH > 7.3

⊖ Ketones



Aggressive IV fluid replacement is #1 — even more than insulin. Higher mortality than DKA.

FEATURE	DKA	HHS
Typical patient	Type 1, younger	Type 2, older adult
Onset	Hours to 1–2 days	Days to weeks
Blood glucose	> 250 mg/dL	> 600 mg/dL
pH	< 7.3 (acidosis)	> 7.3 (normal)
Ketones	Positive (large)	Negative / minimal
Serum osmolality	< 320	> 320 mOsm/kg
Respirations	Kussmaul (deep, rapid)	Normal/shallow
Breath odor	Fruity (acetone)	None
Mental status	Alert → drowsy	Profound AMS, coma
Fluid deficit	~6 L	~9–12 L
Mortality	~1–5%	~10–20%

The Rule of 15 — Conscious Hypoglycemia

Memorize this exact sequence — it appears on the NCLEX as priority and as a select-all item.

1

Give 15 g carb

4 oz juice/regular soda · 3–4 glucose tablets · 1 tbsp honey ·
8 oz milk

2

Wait 15 min

Don't keep stacking carbs — overshoot causes rebound
hyperglycemia

3

Recheck BG

If still < 70 → repeat 15 g carb & recheck in another 15 min

4

Eat protein + carb

Once BG > 70, give a snack with protein (cheese &
crackers) to sustain

04 CHRONIC COMPLICATIONS

Long-term vessel and nerve damage

Macrovascular = big arteries (heart, brain, legs). Microvascular = tiny capillaries (eyes, kidneys, nerves). Tight glucose + BP control prevents or slows every one.

Macrovascular — Large Vessel

CARDIAC

CAD & MI



WHY IT MATTERS

- #1 cause of death in diabetes
- 2–4× higher MI risk
- **Silent MI** — autonomic neuropathy masks chest pain

MANAGEMENT

- BP < 130/80, LDL < 100 (or < 70 if known CAD)
- Statin, low-dose ASA per HCP
- HbA1c < 7%

TEACHING

- Don't wait for crushing chest pain
- Report SOB, fatigue, indigestion, jaw pain
- Mediterranean diet · 150 min/wk activity

CEREBROVASCULAR

Stroke (CVA)



WHY IT MATTERS

- 2–4× higher stroke risk
- Worse outcomes & recovery vs non-DM

MANAGEMENT

- BP < 130/80 — most important modifier
- Antiplatelets/anticoagulation per indication
- A-fib screening; smoking cessation

TEACHING · BE-FAST

- **B**alance · **E**yes · **F**ace
- **A**rms · **S**peech · **T**ime — call 911
- Note time of last known well

PERIPHERAL

PAD & Foot Ulcers



WHY IT MATTERS

- #1 cause of non-traumatic amputation
- Combined PAD + neuropathy = silent injury

SIGNS

- Intermittent claudication (calf pain w/ walking)
- Cool, pale, hairless extremities
- Weak/absent pedal pulses · slow cap refill
- Non-healing ulcers, gangrene

MANAGEMENT

- Walking program (build collateral flow)
- Antiplatelet · cilostazol if claudication
- Smoking cessation = #1 modifier

Microvascular — Small Vessel

EYES



Retinopathy

WHY IT MATTERS

- #1 cause of **blindness in working-age adults**
- Often asymptomatic until late

SIGNS

- Floaters, dark spots, blurred vision
- Sudden vision loss = retinal hemorrhage

MANAGEMENT

- Annual dilated eye exam (every 2 yrs if low risk)
- Tight BG & BP control
- Laser photocoagulation, anti-VEGF injections
- Vitrectomy for advanced disease

TEACHING

- Never skip annual exam — even with no symptoms
- Report floaters, vision changes immediately

KIDNEYS



Nephropathy

WHY IT MATTERS

- #1 cause of **ESRD** in U.S.
- Microalbumin → macroalbumin → ESRD

SIGNS & LABS

- Microalbuminuria (early warning)
- ↑ Cr, ↓ GFR · proteinuria, edema, HTN

MANAGEMENT

- **ACE inhibitor or ARB** — protects kidneys even if normotensive
- BP < 130/80 · A1C < 7%
- Annual urine albumin/Cr ratio
- **Avoid NSAIDs & nephrotoxic dyes**

TEACHING

- Limit dietary protein per HCP
- Hydrate, avoid OTC NSAIDs (ibuprofen, naproxen)

NERVES



Neuropathy

PERIPHERAL

- "Stocking-glove" numbness, tingling, burning
- Loss of protective sensation
- Foot ulcers from unfelt injury

AUTONOMIC

- **Gastroparesis** — N/V, early satiety, erratic BG
- Orthostatic hypotension · tachycardia
- Erectile dysfunction · neurogenic bladder
- **Silent MI** · hypoglycemia unawareness

MANAGEMENT

- Pregabalin, gabapentin, duloxetine, TCAs
- Metoclopramide for gastroparesis
- Tight BG control to slow progression

TEACHING

- Daily foot inspection (mirror under feet)
- Never walk barefoot · check water temp by hand

05

PRIORITY INTERVENTIONS

Action sequences when sugar goes wrong

ABCs always come first. For acute crises, the action depends entirely on whether BG is too low or too high.

Acute — Hypoglycemia / DKA / HHS

- 1 **ASSESS** ABCs, LOC, airway. Severe AMS = anticipate intubation in HHS.
- 2 **CHECK** capillary blood glucose immediately — direction of imbalance dictates everything.
- 3 **ESTABLISH** two large-bore IVs for DKA/HHS. Begin **0.9% NS first** (rehydrate before insulin).
- 4 **TREAT** hypoglycemia per Rule of 15 (conscious) or D50W IV push / glucagon (unconscious).
- 5 **REPLACE** potassium **before** starting insulin if $K^+ < 3.3$ mEq/L — insulin drives K into cells.
- 6 **MONITOR** BG every 1 hr on insulin drip; switch fluid to **D5½NS** when BG ≈ 250 to prevent cerebral edema.
- 7 **REASSESS** mental status, pH, anion gap, electrolytes q1–2h until resolution.

Chronic — Daily & Long-Term Management

- 1 **INSPECT** feet every visit — bilateral pulses, sensation (monofilament), skin breakdown.
- 2 **MONITOR** A1C every 3 mo (goal $< 7\%$ for most adults), BP every visit.
- 3 **SCREEN** annually: dilated eye exam, urine albumin/Cr, lipids, neuro/foot exam.
- 4 **ADMINISTER** ACE/ARB for nephropathy; statin per ASCVD risk; ASA per HCP.
- 5 **PROMOTE** sick-day rules: never stop insulin, check BG & ketones q4h, hydrate.
- 6 **COORDINATE** dietitian, podiatry, ophthalmology, social work — diabetes is a team sport.
- 7 **REINFORCE** smoking cessation — single biggest reversible vascular risk factor.

06 PHARMACOLOGY

Drugs that prevent and treat complications

Beyond insulin and metformin — these are the agents that protect the heart, kidneys, eyes, and nerves over decades.

Glucagon

HORMONE · SEVERE HYPOGLYCEMIA

MECHANISM	Stimulates liver glycogenolysis → ↑ BG within 10–15 min
ROUTE	IM, SQ, intranasal — for unconscious or NPO patient
SIDE EFFECTS	Nausea, vomiting (turn patient on side)
TEACHING	Family must know how to draw up & give. Follow with carbs once awake.

Regular Insulin (IV)

SHORT-ACTING · DKA/HHS

MECHANISM	Drives glucose & K ⁺ into cells, stops ketogenesis
ROUTE	ONLY regular insulin can be given IV
WATCH	Hypoglycemia, hypokalemia, hypophosphatemia, cerebral edema
TEACHING	Hourly BG checks · do not bolus until K ⁺ ≥ 3.3

ACE Inhibitors / ARBs

RENAL PROTECTION · LISINAPRIL, LOSARTAN

MECHANISM	↓ Angiotensin II → dilates efferent arteriole → ↓ glomerular pressure
INDICATION	Diabetic nephropathy — even with normal BP
SIDE EFFECTS	Dry cough (ACE), angioedema, hyperkalemia, ↑ Cr early
TEACHING	Avoid potassium salt substitutes; report swelling of face/lips

Statins

HMG-COA REDUCTASE INHIBITORS · ATORVASTATIN

MECHANISM	↓ LDL cholesterol synthesis in liver
INDICATION	All adults with diabetes age ≥ 40, or with ASCVD risk
SIDE EFFECTS	Myalgia, ↑ LFTs, rhabdomyolysis (rare)
TEACHING	Take in evening; report unexplained muscle pain or dark urine

Gabapentin / Pregabalin

ANTICONVULSANT · DIABETIC NEUROPATHY PAIN

MECHANISM	Modulates calcium channels → ↓ neuropathic firing
SIDE EFFECTS	Sedation, dizziness, peripheral edema, weight gain
TEACHING	Rise slowly · do not stop abruptly · avoid alcohol

SGLT2 inhibitors

"-FLOZINS" · EMPAGLIFLOZIN, DAPAGLIFLOZIN

MECHANISM	Block kidney glucose reabsorption → glycosuria · cardio & renal protection
SIDE EFFECTS	UTIs, genital yeast infection, dehydration, euglycemic DKA
TEACHING	Hydrate well, peri-care, hold for surgery/illness

GLP-1 agonists

"-TIDES" · SEMAGLUTIDE, LIRAGLUTIDE

MECHANISM	↑ Insulin, ↓ glucagon, slows gastric emptying, weight loss · cardioprotective
SIDE EFFECTS	N/V, pancreatitis, thyroid C-cell tumor (BBW), gallstones

Metoclopramide

PROKINETIC · DIABETIC GASTROPARESIS

MECHANISM	↑ Gastric motility · D2 antagonist
SIDE EFFECTS	EPS, tardive dyskinesia (BBW), drowsiness
TEACHING	Limit to 12 wks · report involuntary movements immediately

TEACHING

Inject SQ weekly (some daily) · report severe abdominal pain

07 TEST TRAPS

What students get wrong on the NCLEX

These are the high-yield distractors and priority traps that pull students off the right answer. Memorize the contrast.

TRAP 01

Cold & Clammy vs Hot & Dry

✗ "Patient with sweating and tachycardia → give insulin"

✓ **Cold & clammy → give candy** (low). **Hot & dry → sugar's high**. Sweating = HYPOglycemia.

TRAP 02

DKA First Action

✗ "Start the insulin drip immediately"

✓ **0.9% NS fluid resuscitation FIRST** — patient is severely dehydrated. Insulin without fluids causes circulatory collapse.

TRAP 03

Insulin Before Potassium

✗ "Give regular insulin IV when K+ is 3.0 mEq/L"

✓ **Hold insulin until K+ ≥ 3.3**. Insulin drives K+ into cells → fatal hypokalemia & arrhythmia.

TRAP 04

BG ≈ 250 on Insulin Drip

✗ "Stop the insulin drip when BG reaches 250"

✓ **Add D5 to the IV fluid & continue insulin**. Stopping insulin restarts ketogenesis. Goal is to clear ketones, not just drop BG.

TRAP 05

Kussmaul vs Cheyne-Stokes

✗ "Kussmaul = end-of-life breathing pattern"

✓ **Kussmaul = deep, rapid, regular** = body blowing off CO₂ to compensate for metabolic acidosis (DKA). Cheyne-Stokes is irregular w/ apnea.

TRAP 06

Silent MI Risk

✗ "No chest pain → no cardiac event"

✓ **Diabetics have silent MIs**. Report fatigue, SOB, indigestion, jaw pain, diaphoresis — even without classic chest pain.

TRAP 07

Foot Care Errors

✗ "Soak feet daily and trim corns at home"

✓ **Inspect daily, wash with mild soap & lukewarm water, pat dry, never soak**. Soaking macerates skin. Podiatrist trims callouses/corns.

TRAP 08

Sick Day Rules

✗ "Hold insulin when not eating due to illness"

✓ **Never stop insulin during illness**. Stress hormones ↑ BG. Check BG & ketones q4h, sip clear fluids, contact HCP if BG > 240 with ketones.

08

CLINICAL JUDGMENT · NCJMM

A 6-step walkthrough of a real scenario

Apply the Next-Generation Clinical Judgment Measurement Model to a typical NGN-style item.

Scenario

62-year-old male, Type 2 DM × 18 years, admitted from clinic with HR 124, BP 86/52, RR 16 shallow, T 99.8°F, BG 742 mg/dL, serum osm 348, pH 7.34, ⊖ ketones, K⁺ 3.1, mucous membranes dry, lethargic, oriented to self only. Wife reports a 2-week UTI and decreased fluid intake.

STEP 1 · RECOGNIZE CUES

What's relevant?

BG > 600, osm > 320, pH normal, ⊖ ketones, severe dehydration, AMS, hypokalemia, infection trigger (UTI). Type 2 + older + UTI + AMS.

STEP 2 · ANALYZE CUES

What's the pattern?

Profound hyperglycemia + hyperosmolarity without acidosis or ketones in a Type 2 with infection trigger = **HHS, not DKA**. Hypokalemia adds risk.

STEP 3 · PRIORITIZE HYPOTHESES

What's the top concern?

(1) Circulatory collapse from dehydration · (2) Cardiac arrhythmia from hypokalemia · (3) Cerebral edema risk if BG drops too fast · (4) Ongoing UTI sepsis.

STEP 4 · GENERATE SOLUTIONS

What actions are needed?

0.9% NS bolus → switch to ½NS · Replace K⁺ before insulin · Start IV regular insulin drip after K⁺ ≥ 3.3 · Treat UTI · Cardiac monitor · Q1h BG & neuro checks.

STEP 5 · TAKE ACTION

Implement the plan

Two large-bore IVs · NS 1 L over first hour · 40 mEq KCl IV piggyback · Foley for hourly UO · Insulin drip after K⁺ corrects · Cultures & antibiotics.

STEP 6 · EVALUATE OUTCOMES

Did it work?

↑ BP, ↓ HR, UO > 30 mL/h, BG drops 50–75 mg/dL/hr, K⁺ normalizes, neuro improves to baseline, no signs of cerebral edema (no headache, no ↓ LOC).

09 PATIENT EDUCATION

What every patient must know before discharge

Teach back is essential — have the patient demonstrate insulin administration, BG checks, hypoglycemia treatment, and foot inspection.

Hypoglycemia Self-Care

- ☐ Always carry 15 g rapid carbs (glucose tabs, juice box, hard candy)
- ☐ Recognize early signs: shaky, sweaty, hungry, anxious
- ☐ Apply Rule of 15 — 15 g, wait 15 min, recheck
- ☐ Wear a medical-alert ID at all times
- ☐ Teach household members to draw up & give glucagon
- ☐ Keep BG meter, strips, and glucagon in date
- ☐ Drive only if BG $\geq$ 100 mg/dL · recheck every 1–2 h on long drives

Sick Day Rules

- ☐ Never stop insulin — stress hormones raise BG
- ☐ Check BG every 4 hours · check ketones if BG > 240
- ☐ Sip 4–8 oz of fluid every hour (sugar-free if BG high)
- ☐ Replace meals with 15 g carb snacks if not eating solids
- ☐ Call HCP if vomiting > 4 h, BG > 240 with ketones, fever, AMS

Foot Care Daily

- ☐ Inspect feet head-to-toe with mirror — top, bottom, between toes
- ☐ Wash with mild soap & lukewarm water (test temp with elbow)
- ☐ Pat dry — especially between toes — never soak
- ☐ Apply lotion to tops/bottoms · NOT between toes
- ☐ Always wear shoes & cotton/wool socks; never go barefoot
- ☐ Trim toenails straight across · podiatrist trims corns/callouses
- ☐ Report any redness, blister, cut, or non-healing area same day

Annual Screenings

- ☐ Dilated eye exam every 1–2 years (ophthalmology)
- ☐ Urine albumin/creatinine ratio yearly
- ☐ Lipid panel yearly
- ☐ Comprehensive foot exam each visit; monofilament yearly
- ☐ HbA1c every 3 months (goal < 7%)
- ☐ BP each visit (goal < 130/80)
- ☐ Dental exam every 6 months — periodontal disease ↑ in DM
- ☐ Annual flu, COVID, pneumococcal vaccines

10

MEMORY BOOSTERS

Pattern recognition for the test

High-yield mnemonics that surface fast under exam pressure.

MNEMONIC

HOT & DRY = HIGH

Distinguishing hyper vs hypoglycemia in a glance

- H** Hot & dry skin = hyperglycemia ("sugar's high")
- C** Cold & clammy = need some candy ("sugar's low")
- F** Fruity breath + Kussmaul = DKA
- N** No ketones + extreme dehydration = HHS

MNEMONIC

3 P's of Hyper

Classic NCLEX cluster for hyperglycemia / DKA / new-onset

- P** Polyuria — osmotic diuresis
- P** Polydipsia — extreme thirst from fluid loss
- P** Polyphagia — cells starve despite high BG
- + Add **weight loss** in Type 1; **fatigue** in Type 2

MNEMONIC

3 D's — Long-Term Triad

Diabetes microvascular damage targets these three

- D** Dim vision — retinopathy → blindness
- D** Dialysis — nephropathy → ESRD
- D** Dead nerves — neuropathy → ulcers, gastroparesis, silent MI

MNEMONIC

BE-FAST

Stroke recognition (2–4× higher risk in diabetes)

- B** Balance — sudden loss of coordination
- E** Eyes — sudden vision change in one or both
- F** Face drooping on one side
- A** Arm weakness — can they hold up both?
- S** Speech slurred or strange
- T** Time — call 911, note last known well

Diane's NGN NCLEX 2026 Study Series

ENDOCRINE · DIABETES COMPLICATIONS · PRINT-READY REFERENCE