Diabetes and insulin

Types, tests, insulin timing, lows and sick days

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1 AT A GLANCE

Diabetes means persistently high blood glucose, from too little insulin, resistance to it, or both. The nurse's most urgent job is spotting a low before it becomes a crisis.

Type 1 or type 2

	Type 1	Type 2
What happens	Immune system destroys the insulin-making cells: **no insulin**	Body **resists** insulin, or makes too little
Risks	Autoimmune; genetics; viruses	Age over 45, family history, obesity, metabolic syndrome, inactivity
Treatment	Always needs insulin	Lifestyle and drugs; some clients need insulin too

Gestational: Usually resolves after birth, but raises the later risk of type 2.

Diagnosis

Test	What it means
★ **Fasting glucose**	**126 mg/dL or more**, after an 8-hour fast and confirmed by a second abnormal test, is diabetes
Unequivocal hyperglycemia	One test is enough
A1C	Average glucose over the past 2 to 3 months
Random glucose	Over 200 mg/dL suggests diabetes
Tolerance test	Glucose checked after a fasting 75-gram drink
C-peptide	Marker of the body's own insulin; helps tell type 1 from type 2

Insulin timing (approximate: products differ, so check the label)

Insulin	When to give	Peak and length	Rules
★ **Rapid: lispro (Humalog), aspart**	Product-specific. Lispro: within 15 min before a meal, or right after. Aspart: 5 to 10 min before	Lispro peaks in about 1 to 3 h	The food must be there. No tray yet? Wait
Short: regular	About 30 min before a meal	Peaks about 3 h; lasts about 8 h	The usual IV infusion insulin
Intermediate: NPH	Once or twice a day	Peaks around 6 h; lasts up to a day	Cloudy: roll gently to mix. Never IV
★ **Long: glargine**	Once a day, same time	No real peak; lasts about 24 h	Never mix or dilute. Never IV
Premixed (like 70/30)	Usually twice a day, before meals	NPH plus a faster insulin	Only under the skin

Watch: Lows are most likely near an insulin's peak. All insulin moves potassium into the cells, so watch for low potassium. IV use is product-specific (regular, certain lispro products) and closely monitored.

Hypoglycemia: the numbers and the signs

- ★ **Below 70 mg/dL** is hypoglycemia. **Level 2** is below 54 mg/dL.
- **Level 3 (severe)** means the client needs another person's help, at any glucose.
- Early: shaky, sweaty, hungry, fast heart rate, anxious. Then confused, weak, dizzy, blurred vision.
- Untreated, it can cause seizures, coma and death.
- Causes: too much insulin or a sulfonylurea, extra exercise, late or missed meals, alcohol.
- Hidden lows: older adults and clients on beta blockers. Some clients get no warning signs at all.

Treating a low

Client	Do this
★ **Awake, can swallow**	**15-15 rule:** 15 g fast carbohydrate (half a cup of juice or regular soda, or 3 to 4 glucose tablets). Recheck in 15 min; repeat until at least 70 mg/dL
Back in range	Meal or snack with complex carbohydrate and protein; notify the provider. No chocolate: fat slows the sugar
★ **Can't swallow, unconscious or seizing**	Urgent: call for help, check the airway, **nothing by mouth**. Glucagon (nasal or injection) or IV dextrose, concentration per protocol
No response after 15 min	A second glucagon dose from a new device may be given; food once able to swallow
After any low	Recheck repeatedly; monitor by risk, longer on sulfonylureas; report it so the plan is reassessed

Educational use only. Not a substitute for clinical judgment, your facility's policy or the provider's orders. Where practice varies, follow facility policy and state law. No patient information.

Diabetes and insulin

1 AT A GLANCE, CONTINUED

Sick days

- Illness can raise glucose, even when the client eats less.
- ★ Check glucose at least every 4 h. Adjust insulin as the provider instructs.
- ★ Call if glucose is **over 240 mg/dL**.
- Fluids: sip every 15 min if needed. Simple carbohydrates if eating is hard.
- Clients at risk check ketones every 4 to 6 hours, or as their plan directs. Call right away if ketones are present.
- Seek emergency care for trouble breathing, vomiting or severe diarrhea over 6 hours, or not keeping liquids down for 4 hours. Also seek care for a fever over 101°F for a day.

Other diabetes drugs

Drug	Key points
★ **Metformin**	Usual first drug for type 2; with meals; alone, doesn't cause lows. Boxed warning: lactic acidosis. May be stopped before contrast imaging; not used with severe kidney disease
Sulfonylureas	Pancreas releases more insulin, so they can cause lows. Timing varies by drug: glimepiride with breakfast
Empagliflozin	Sugar leaves in the urine: watch for genital and urinary infections, dehydration, ketoacidosis. Held at least 3 days before surgery, when possible
Semaglutide	A GLP-1 agonist: slows stomach emptying and curbs appetite. Weekly injection or daily tablet. Boxed warning: thyroid tumors, so report a neck lump, trouble swallowing or hoarseness

2 PRIORITY AND SAFETY CALLS

★ Sudden change in mood or behavior in a client with diabetes: **check the glucose now**.

★ Can't swallow safely? **No juice, nothing by mouth.** Glucagon or IV dextrose per protocol, and activate the emergency response.

Before every insulin dose: confirm why it's ordered, check the latest glucose, assess for signs of a low.

Don't dose from a glucose someone tells you out loud: check the record. Time mealtime insulin with the tray.

One pen, one client, even with a new needle. Hold the needle in for that pen's count: 5 for Humalog KwikPen, 10 for Lantus SoloStar.

IV insulin runs under close supervision, with frequent glucose and potassium checks; the rate follows the protocol.

Feet: inspect every day, between the toes too; proper footwear, never barefoot. In facilities, only podiatrists or trained staff trim toenails.

Teach with a **return demonstration**: have the client show you their injection technique.

3 EXAM ANCHORS

1. Hypoglycemia is a glucose **below 70 mg/dL**; level 2 is below 54 mg/dL.
2. 15-15 rule: 15 g fast sugar, recheck in 15 min, **only if awake and able to swallow**.
3. Diabetes: fasting glucose 126 mg/dL or more after an 8-hour fast, confirmed by a second abnormal test; one test is enough if hyperglycemia is unequivocal.
4. Beta blockers and older age can hide the warning signs of a low.
5. Sick days: check glucose every 4 h, call if over 240 mg/dL, and don't stop insulin without guidance.
6. Glargine has no real peak and is never mixed; regular insulin is the usual IV insulin.
7. Metformin: lactic acidosis is the boxed warning; it may be stopped before contrast imaging.

4 SELF-QUIZ

1. Hypoglycemia is a blood glucose below _____ mg/dL.
2. An awake client who can swallow gets _____ grams of fast carbohydrate, then a recheck in 15 minutes.
3. Regular insulin is given about _____ minutes before a meal.
4. The long-acting insulin with no real peak that is never mixed is _____.
5. On a sick day, the client calls if glucose is over _____ mg/dL.
6. A client who can't swallow needs glucagon or IV _____, per protocol.
7. At school, a Section _____ plan describes how the student gets the care they need.

ANSWER KEY 1. 70 · 2. 15 · 3. 30 · 4. glargine · 5. 240 · 6. dextrose · 7. 504

5 SOURCES

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7. NIDDK, Helping the Student with Diabetes Succeed: A Guide for School Personnel (reviewed May 2020). niddk.nih.gov/health-information/professionals/cl…

Built from RN PocketPal course lessons: Diabetes mellitus and hypoglycemia (c11-l01); Endocrine drugs (c05-l10). Every line on this sheet comes from those lesson scripts.

ENDOCRINE

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