DIABETES CONTROL AND MANAGEMENT | A student’s diabetes treatment plan starts with:

- **EATING** consistently on a schedule
- **TESTING** blood sugar levels regularly
- **ADJUSTING** insulin based on blood sugar levels and activities
- **EXERCISING** regularly

HOW TO CHECK BLOOD GLUCOSE LEVELS WITH A GLUCOSE METER*

1. **LOAD** sterile lancet into lancing device.
2. **INSERT** test strip into test strip port with the three contact bars facing up. This turns on the glucose meter.
3. **HOLD** lancing device firmly against student’s clean finger and push release button.
4. **LOOK** at display screen. When it says “APPLY BLOOD” apply the blood sample to test strip.
5. **READ** the blood glucose level on the display screen.

[ A TYPICAL SCHOOL-AGED CHILD’S RANGE IS 80–180.]

*These instructions are for the commonly used One Touch Ultra meter. Instructions for other glucose meters may vary. Talk to the parent(s) about the student’s specific meter. This is not a product endorsement from Beaumont Children's Hospital.
Hyperglycemia
If Over 150 (High Blood Sugar)

SIGNS & SYMPTOMS
Blood glucose level is above student's target range. Symptoms to look for:

- THIRST (DEHYDRATION)
- FREQUENT URINATION
- BLURRY VISION
- STOMACH PAIN
- INCREASED HUNGER
- NAUSEA
- DROWSINESS/LETHARGY/EXHAUSTION
- CONFUSION
- SWEATING
- FRUITY, SWEET OR WINE-LIKE ODOR ON BREATH
- VOMITING
- INABILITY TO CONCENTRATE
- WEIGHT LOSS (A LONG-TERM SYMPTOM)
CALCULATING AN INSULIN DOSE

CALCULATING THE FOOD DOSE OF INSULIN | This equation calculates how much insulin will be required to cover the carbohydrates that are consumed at mealtime. It also helps determine a student’s total mealtime insulin dose. To figure out the “food dose,” use this math equation:

TOTAL GRAMS OF CARBOHYDRATES OF MEAL ÷ INSULIN TO CARBOHYDRATE RATIO = FOOD DOSE

The insulin to carbohydrate ratio should be in the student’s school management plan. The ratio is the amount of carbohydrates that will require 1 unit of insulin. For this example, we will use 1 (unit of insulin) : 10 (grams of carbohydrates).

FOOD DOSE EXAMPLE: If the student is having 60 grams of carbohydrates for lunch, then:

\[ \frac{60}{10} = 6 \text{ units of rapid-acting insulin for the food dose.} \]

IF LEVEL HIGHER THAN 150 | The child may need additional insulin. This is called a correction dose. This dose “corrects” high blood sugar levels.

CALCULATE THE CORRECTION DOSE OF INSULIN | Follow this sequence of math equations*

*Remember a correction dose is only needed if blood glucose level is more than 150.

1. ACTUAL BLOOD GLUCOSE LEVEL – TARGET BLOOD GLUCOSE LEVEL = X
2. X ÷ CORRECTION FACTOR = CORRECTION DOSE

The correction factor should be in the student’s school management plan. If his/her exact target blood glucose level is unknown, confirm with the child’s parent.

CORRECTION DOSE EXAMPLE: If the student’s blood glucose level is 250, the target level is 150 and the correction factor is 100:

1. \[ 250 – 150 = 100 \]
2. \[ 100 ÷ 100 = 1 \text{ unit of rapid-acting insulin for the correction dose} \]

CALCULATING THE TOTAL MEALTIME INSULIN DOSE | This is a calculation to determine the total dose of insulin given at a child’s scheduled mealtime.

CORRECTION DOSE + FOOD DOSE = TOTAL MEALTIME INSULIN DOSE

TOTAL MEALTIME INSULIN DOSE EXAMPLE: If the student’s food dose is 6 and the correction dose is 1:

\[ 6 + 1 = 7 \text{ units of rapid-acting insulin for the total mealtime dose} \]
ADMINISTERING INSULIN

WITH SYRINGE

PREPPING INSULIN

1. WASH your hands and put on gloves.
2. GATHER supplies: insulin, syringe and alcohol wipes.
3. WIPE top of insulin bottle with alcohol wipe.
4. REMOVE cap from syringe needle.
5. PULL syringe plunger out to the number of units to be injected.
6. PUT bottle of insulin on table and insert needle into bottle.
7. PUSH plunger in to push air into bottle.
8. TURN bottle upside down.
9. PULL plunger out to number of units you plan to inject.
10. CHECK for air bubbles. If you see some, push insulin back into bottle and repeat Steps 9 and 10.

INJECTING INSULIN

1. CHOOSE injection site on student. Make sure the site is clean. (See diagram below)
2. RELAX the chosen area.
3. LIFT up skin with a “gentle pinch.”
4. TOUCH needle to skin and push it through skin. Use a 90° angle if using a 5/16 inch or short needle (the most common types used for children).
5. PUSH in insulin slowly and steadily.
6. RELEASE the pinch.
7. COUNT to ten seconds to let insulin absorb. Needle should still be in skin.
8. PUT pressure on site if bruising or bleeding are common.
9. LOOK for any drops of insulin (i.e. leak back). Enter in student’s medical record if leak back was noted.
10. DISCARD used syringe and needle into a sharps container.

INJECTION SITES

FRONT  BACK  SIDE
WITH INSULIN PEN | Pen types vary. For demonstration purposes only, these are instructions for the NovoPen Echo & Novolog Flex pens*.

HALF-UNIT DOSING INSULIN PENS

Note: Steps 3-5 are only when using a new cartridge.

1. WASH hands and put on gloves.
2. PULL off pen cap. Twist off cartridge holder. If the piston rod sticks out of pen, push it in until it stops.
3. TAKE a new insulin cartridge and check that it contains the right insulin and has no cracks or damages.
4. SLIDE cartridge into cartridge holder with the threaded end first.
5. SCREW cartridge holder back into pen until you hear or feel a click.
6. GET a new needle and tear off the paper tab. Push needle straight into pen. Turn needle until tight.
7. PULL off outer-needle cap and save it.
8. PULL off inner-needle cap and throw away (never share pens and needles).
9. TEST the insulin flow by giving an “air shot” before you inject.
10. SELECT 2 units and press the dose button until dose counter shows “0”. Hold pen upright until insulin squirts from needle tip.
11. CHECK the insulin window and make sure there is no gap between the black piston rod head and the orange piston.
12. PULL out dose button. The dose counter should show “0”. Turn the dose button to select the dose you need (the button can be turned forward or backward).
13. INSERT needle into student’s skin (see “Injecting Insulin” directions) and press dose button until the dose counter reads “0”.
14. COUNT to ten before removing needle from skin.
15. DISCARD used pen needle into a sharps container.

TO CHECK LAST DOSE

Make sure dose counter shows “0”. Pull out dose button. Push button back in to check the last dose. You will first see the startup display followed by details of the last dose.

1 UNIT DOSING INSULIN PEN

FOLLOW same instructions as the half-unit dosing insulin pen except that no cartridge insertion is required. The pen is already pre-filled with insulin.

• FlexPen administers insulin in full-unit increments, not half-units.
• FlexPen does not record amount and time of last dose given.

*This is not a product endorsement from Beaumont Children's Hospital.
IF LEVEL HIGHER THAN 300

Check student’s urine for ketones. Use a Keto-Diastix* strip for Ketones testing.

1. WASH hands and put on gloves.
2. COLLECT fresh urine in a dry, clean cup.
3. DIP the test area of the strip in the urine and remove immediately.
4. WAIT 15 seconds.

IF KETONES ARE “NEGATIVE” OR “TRACE”

1. GIVE at least 8 oz. of water per hour.
2. RECHECK ketones at each urination until negative.
3. CALL student’s parent if ketones are present.

IF KETONES ARE “MODERATE” OR “LARGE”

1. CONTACT student’s parent.
2. ENCOURAGE student to drink water until parent is reached.
3. STOP student from any exercise.
4. CALL 911 for medical assistance (if a parent can’t be reached) if student is experiencing abdominal pain, nausea/vomiting or is lethargic.

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Hypoglycemia
If Under 65 or
Under 80 with Symptoms (Low Blood Sugar)

SIGNS & SYMPTOMS
Blood glucose level is less than 65. Or if less than 80 with any of the following symptoms:

- DIZZINESS
- NERVOUSNESS
- PERSONALITY CHANGE/IRRATIONAL BEHAVIOR
- BLURRY VISION
- SHAKINESS
- NAUSEA
- CRYING
- SLUGGISHNESS
- SWEATING
- POOR COORDINATION
- HUNGER
- LIGHTHEADEDNESS
- IRRITABILITY
- DROWSINESS
- ERRATIC RESPONSE TO QUESTIONS
- INABILITY TO CONCENTRATE
FOR SEVERE HYPOGLYCEMIA

1. CALL 911.
2. CONTACT trained personnel.
3. DO NOT give student anything by mouth.
4. ADMINISTER glucagon.*

PREPPING THE GLUCAGON VIAL

1. WASH hands and put on gloves.
2. REMOVE plastic cap off the vial.
3. TAKE needle cover off of syringe.
4. INSERT syringe needle through vial’s rubber stopper and inject all liquid from syringe.
5. KEEP needle in vial and gently shake vial until powder completely dissolves and solution is clear.
6. TURN vial upside down with needle still inside.
7. PULL on syringe plunger, withdrawing liquid from vial.
8. STOP at syringe’s 1mg mark for someone 50 pounds or more. Stop at 0.5mg mark for someone less than 50 pounds.

BEFORE INJECTING

1. TURN student on his/her side.
2. KEEP needle in vial and flick the syringe with your finger.
3. SQUIRT any air bubbles out of syringe into the vial by gently pushing on syringe plunger.
   • If you are above the required dose, push plunger in until you get the right amount.
   • If you are below the required dose, pull plunger out until you get the right amount.
4. PULL OUT syringe from the vial.

INJECTING

1. INSERT needle and into the muscle located on outside thigh midway between the knee and hip.
2. INJECT glucagon.
3. WITHDRAW needle and press on injection site.
4. DISCARD used syringe with needles into a sharps container.

AFTER INJECTING

1. FEED student when he/she awakens and can swallow. Give the student a fast-acting source of sugar (e.g. regular soft drink or fruit juice) and long-acting source of sugar (e.g. cheese and crackers or a meat sandwich).
2. GIVE another dose of glucagon if student isn’t awake within 15 minutes.
3. NOTIFY a doctor even if glucagon awakens student.
4. STAY with student and contact parents.

*This is not a product endorsement from Beaumont Children’s Hospital.
Quick Reference Guide

HYPOGLYCEMIA | Low Blood Sugar

**COMMON CAUSES**
- Too much insulin
- Missed or delayed food
- Too much or too intense exercise
- Unscheduled exercise

**SYMPTOMS**
- MILD
  - Hunger
  - Dizziness
  - Shakiness
  - Sweating
  - Lack of concentration
  - Poor coordination
  - Personality/behavior change
- SEVERE
  - Loss of consciousness
  - Seizure
  - Inability to swallow

**BLOOD GLUCOSE <65 OR 65-80 WITH SYMPTOMS**
- Provide 15g of carbohydrates, 4 oz juice or 4 glucose tablets
- Wait 15 minutes
- Recheck blood glucose
- Repeat treatment if blood glucose is <80
- If >2 hours before a meal, give a 15g snack of carbohydrates and protein

**ACTION PLAN**
- MILD
  - Call 911
  - DO NOT give anything by mouth
  - Contact trained medical personnel
  - Roll child on his/her side
  - Administer Glucagon as prescribed
  - Stay with child
  - Contact parents

**HYPERGLYCEMIA | High Blood Sugar**

**COMMON CAUSES**
- Too little insulin
- Too much food
- Decreased activity
- Illness/infection or stress

**SYMPTOMS**
- MILD
  - Increased hunger/thirst
  - Frequent urination
  - Fatigue/sleepiness
  - Blurred vision
  - Stomach pains
  - Lack of concentration
- SEVERE
  - Nausea/vomiting
  - Moderate or large ketones
  - Sweet, fruity breath
  - Labored breathing
  - Confused
  - Unconscious

**CHECK URINE KETONES IF BS >300 OR SYMPTOMS OF SEVERE HYPERGLYCEMIA**
- NEGATIVE OR TRACE KETONES
  - Give extra water
  - Allow use of bathroom as needed
  - Inform parents of frequent high readings
- SMALL KETONES
  - Give at least 8 oz. water every hour
  - Recheck ketones at next urination
  - Child cannot exercise if ketones present
  - Call parent

**MODERATE TO LARGE KETONES**
- Call parent
- Encourage drinking water until parent is contacted
- If child has abdominal pain or is nauseous, vomiting or lethargic, call for medical assistance if parent can't be reached
- Child cannot exercise if ketones present

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