MANAGING TYPE 1 DIABETES IN THE SCHOOL SETTING:

A Guide for Non-Medical Personnel in Schools

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.

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JDRF IMPROVING LIVES. CURING TYPE 1 DIABETES.
Children's Miracle Network Hospitals
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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: 60 ÷ 10 = 6 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 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 units of rapid-acting insulin for the total mealtime dose

ADMINISTERING INSULIN

WITH SYRINGE

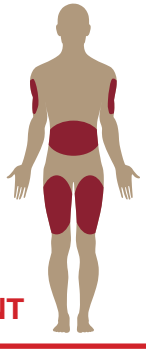
PREPPING INSULIN

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.

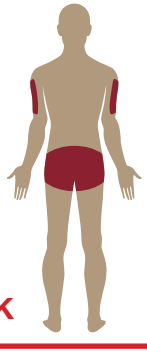
INJECTING INSULIN

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

ADMINISTERING INSULIN

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.

CHECK FOR URINE KETONES

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 MILD HYPOGLYCEMIA | "The Rule of 15"

1. **PROVIDE** 15g of fast-acting carbohydrates, 4 oz. of juice or 4 glucose tablets.
2. **WAIT** 15 minutes.
3. **RECHECK** blood glucose.
4. **REPEAT** treatment if blood glucose level is still less than 80 with symptoms.
5. **NOTIFY** parent if treating a third time.
6. **GIVE** a 15g carbohydrate snack with protein if the student's next meal is more than 2 hours away.

FOR SEVERE HYPOGLYCEMIA | Loss of consciousness, seizure and/or inability to swallow

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.

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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

ACTION PLAN

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

SEVERE

- 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

ACTION PLAN

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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