

A Training Program for
Diabetes Management
in the School Setting:
The Role of Unlicensed School Staff

Virginia Department of Education

2015

Objectives

- To understand legal authorization and protection for unlicensed persons rendering care
- To provide an overview of diabetes
- To demonstrate specific daily and emergency management requirements
- To reinforce the importance of proper parent notification and documentation of care

Legislative Authorization

- *COV* § 54.1-2901(A)(13)(20)(26): allows trained unlicensed persons to give insulin and glucagon
- § 22.1-274 Requires schools to have employees trained in the administration of insulin and glucagon when a school nurse is not present
- Good Samaritan Act (§ 8.01-225.A.9) Protects persons rendering emergency care

Rights and Responsibilities

The rights and responsibilities of the student, physician, parent or guardian, administrator, and the trainee shall be consistent with relevant state and federal laws and local school board policy.

Levels of Care

- Level 1: All school personnel receive training
- Level 2: Classroom teachers and personnel caring for the student throughout the school day
- Level 3: Staff receiving in-depth training to manage diabetes and emergency care for student with diabetes

DIABETES

- Diabetes is a “disorder of metabolism” where glucose, the body’s energy source, is unable to be transported into cells because of a problem with a hormone called insulin.
- In people who have diabetes, the body does not make or use insulin properly. Glucose builds up unused. Because the body is not using the glucose, high levels of glucose build up in the blood.
- If the body no longer makes insulin, an alternate source of insulin must be provided by injection. If the body has, but does not use insulin properly, individuals may take insulin and/or other glucose lowering medications.
- Insulin and other diabetes medications are used to manage blood glucose levels; but they do not provide a cure for the disease.

Type 1 Diabetes

- In Type 1 diabetes, which is typically found in children and adolescents, the body does not make insulin
- Outside sources of insulin are needed to maintain normal glucose levels
- Poorly controlled Type 1 diabetes creates serious damage to many body systems

Type 2 Diabetes

- In Type 2 diabetes, which is typically found in overweight adults over 40, insulin is present but is not working properly
- The obesity epidemic in the US coincides with children developing Type 2 diabetes
- The same problems with body systems can occur with Type 2 as with Type 1

Symptoms of Diabetes

- Fatigue
- Increased thirst
- Increased urination
- Nausea
- Rapid weight loss
- Blurred vision
- Frequent infections
- Slow healing of wounds or sores

Authorization for Treatment

In order to treat a child or adolescent with diabetes in school, the following is needed:

- Documentation of the diagnosis with a written Diabetes Medical Management Plan (DMMP)
- Authorization for treatment by a prescriber licensed to practice medicine in the US
- Written parent permission

PRINCIPLES OF MEDICATION ADMINISTRATION

The “five rights” of giving medication are:

- Right student
- Right medication
- Right dose
- Right time
- Right route (by mouth, injection, etc.)

Documentation: The Sixth Right

Documentation includes:

- the name of person administering the medication
- the name of student receiving the medication
- the name of the medication
- the time it was given
- the dose given
- the route or manner in which it was delivered (e.g., oral, subcutaneous, intramuscular)
- any unusual observations or circumstances

Medication Storage

- All medications require proper storage in a secure cabinet, drawer, closet, or refrigerator
- All three U.S. insulin manufacturers recommend that insulin be stored in a refrigerator at approximately 36°F to 46°F
- Insulin products contained in vials or cartridges supplied by the manufacturers (opened or unopened) may be left unrefrigerated at a temperature between 59°F and 86°F for up to 28 days and continue to work

Individualized Care Plans

There are three types of care plans:

- Individualized Health Care Plan (IHP)
- Emergency Action Plan (EAP)
- Diabetes Medical Management Plan (DMMP)

Therapeutic Management of Diabetes

- The parent needs to provide essentials supplies, necessary to implement the DMMP and to sustain a student's needs for at least 72 hours
- Dependent students will house supplies in the school health office and replenished by the parent as they are used
- Independent students will carry some supplies in a diabetes kit and should keep back-up supplies in the health office

Monitoring the Student with Diabetes

Testing Blood Glucose

- Before eating snacks or lunch,
- Before physical activity,
- Before leaving school on the bus,
- As needed, such as when the student has symptoms of either a high or low BG,
- Anytime as written in the DMMP

Blood Glucose Testing

- Know the instructions to the type of meter the student is using
- If you are uncertain how to use or read the meter, seek guidance from your nurse supervisor or building administrator
- Learn how to ensure correct operation for accurate readings, proper cleaning, battery replacement and safe storage
- Never share meters between students

Procedure for Blood Glucose Testing

- Review directions on operation and use of meter
- Wash and dry hands and put on non-latex gloves
- Have student wash and dry hands
- Assemble supplies, turn on meter, place test strip in device per manufacturer instructions
- Select test site, such as side of fingertip. Hang arm down for 30 seconds.

Blood Glucose Testing Continued

- Put the device lancet on finger tip per manufacturer instructions, fire lancet and lift away, then gently milk finger down to obtain drop of blood to cover the test pad on the test strip and read per instructions
- Compress lanced area with tissue or cotton ball
- Record and compare reading to DMMP instructions

Procedures for Urine Testing

- Review directions for urine ketone testing, if not familiar with them. Wash hands. Don non-latex gloves
- Gather supplies:
 - bottle of ketone test strips (check expiration date)
 - urine cup
 - gloves, if caregiver performing the test
 - clock or watch with second hand
- Have student urinate into cup. Ideally student should handle urine and conduct testing if that is part of the DMMP.
- Dip the test strip into the urine and shake off excess urine, or observe the student doing same.

Urine Testing Continued

- Wait the specified amount of time in the directions on the bottle of test strips, usually 15 seconds.
- Read the results by comparing the color on the test strip to the chart on the bottle.
- Record the results on the student's log and take action per the DMMP.
- Dispose of test strip, remove gloves, wash hands

Diabetes and Nutrition

- According to the NDEP (2010, p. 50), the significant difference in meal planning for the student with diabetes is that the timing, amount, and content of the food eaten are carefully matched to the timing, dosing, and action of the insulin
- The nutritional component of diabetes management should be in the DMMP. Staff assisting students with tracking of food must become familiar with carbohydrate calculations

Carbohydrate Counting

- Adults assisting students with diabetes must remember it is important to read the labels on ALL foods to determine the number of servings in a container and the number of grams of carbs per serving

Sample Calculation of an Insulin to Carb Ratio

- The student's lunchtime insulin-to-carb ratio is 1:15
- The child ate 60 grams of carbs. The formula is:
- $60 \div 15 = 4$ units of insulin

Correction Factor

The correction factor is the amount of insulin the student needs to lower the BG into target range. The target BG is subtracted from the actual pre-meal BG. The prescriber will specify how much insulin is required for results that are over the target BG. This calculation is student-specific and may vary.

Sample Calculation of a Correction Dose

The student's pre-meal BG is 300. The student's target BG is 150. The correction dose is 1 unit of insulin for every 50 mg/dL over 150. The formula is:

$$300 - 150 = 150 \div 50 = 3 \text{ units of insulin}$$

Total Insulin Dose

- Insulin-to-carb dose plus correction dose = total units of insulin needed:
- The formula is:
 $4 + 3 = 7$ units of rapid-acting insulin

Exercise Affects Insulin Requirements

The student with diabetes should eat prior to exercising if it has been more than two hours since the student has eaten, or as directed in the DMMP.

Insulin Administration

Types of Insulin

- According to the FDA (2015), there are four basic types of insulin, each is classed by how it works:
 - Rapid-acting - Humalog[®], Novolog[®], Apidra
 - Short-acting – Regular (Humulin R, Novolin R)
 - Intermediate-acting – NPH (Humulin N, Novolin N)
 - Long-acting - Glargine (Lantus), Detemir (Levemir)

Vocabulary

Target Range: A range of numbers that represents an individual's ideal blood glucose level; determined by health care team with the individual (child with diabetes and parent/guardian)

Basal Insulin: Sometimes called "background" insulin, the insulin working steadily throughout the day

Bolus Insulin: a single dose of insulin, given for one of two reasons:

- **Carb or Meal/Snack Bolus:** Insulin dosed when food is eaten
- **Correction Bolus:** Insulin dosed when blood glucose level is too high and needs to be corrected (made lower)

Insulin Delivery Methods

- Insulin Syringe
- Insulin Pen
- Insulin Pump or Pod

Measuring Insulin Doses

- Insulin doses are measured in “units”
- One vial of insulin contains 10 ml of insulin
- 10 ml of insulin is equivalent to 1000 units
- Therefore 1 ml of insulin equals 100 units

DECIMALS AND ZEROS MATTER
IN MEASURING INSULIN!

Calculating and Measuring Total Insulin Dose-Quiz

- If the insulin-to-carb dose is 4
- And the correction dose is 3
- And we know this combination= total units of insulin needed
- How many units of rapid-acting insulin are needed as a correction factor?
- How many milliliters of insulin would you draw out of a 10 ml vial of insulin to get the correct number of units?

Question

- Insulin to carb dose is 4
- Plus correction dose of + 3
- Total correction dose is 7 units of insulin

You have 10 ml of insulin in an unopened vial.

You know 1 ml equals 100 units of insulin.

You only need 7 units.

How do you calculate the number of ml of insulin to draw up in your syringe?

Solution

$$\frac{\underline{1 \text{ ml}}}{100 \text{ units}} : \frac{\underline{X \text{ ml}}}{7 \text{ units}}$$

$$1 \times 7 = 7 = 100 \times X = 100X$$

$$\text{Therefore } \frac{\underline{7}}{100} = .07 \text{ ml}$$

Common Steps for All Types of Injections

- Wash hands and put on non-latex gloves. If student is assisting, have student wash hands.
- Assemble essential supplies specific to the method of delivery and insulin per DMMP.
- Warm cold insulin.

Common Steps for All Types of Injections

- Never recap or reuse a dirty needle and use extreme caution to avoid needle sticks to self or others.
- Discard used needles and syringes in a used sharps container. Remove and discard used gloves.
- Document appropriately.

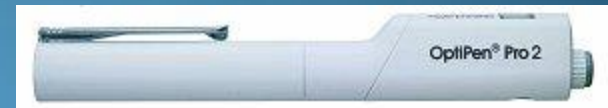
Insulin by vial, needle, and syringe

- Check (and double check) that insulin type and brand matches order
- Check expiration date
- Remove metal cover, and swipe rubber cap with alcohol wipe
- Fill syringe with air equal to the number of units of insulin needed
- Plunge into the vial and inject the air

Insulin by vial, needle, and syringe

- Fill syringe with appropriate dose of insulin and double check your numbers
- Prep site on skin with alcohol and let dry
- Inject insulin

Insulin by Insulin Pen



Insulin Pens

- Check the level of insulin remaining in the insulin cartridge.
- Attach new needle. Prime the needle. Dial in prescribed dose.
- Cleanse the skin with alcohol and allow the skin to dry before administering.
- Pinch up the skin at the site and dart the needle into the soft pocket at 90° angle.
- Push the plunger down and inject insulin at a steady rate.
- Release the pinched up skin. Count slowly to 5 and then remove the needle.
- Secure the pen.

Administering Insulin by Insulin Pump

- Decreases the risk of long-term complications
- Reduces symptoms of diabetes
- Promotes normal growth and development
- Promotes positive family adaptation
- Allows individual to lead a more normal life style



3:18 AM
5.1 mmol/L
Act Ins. 0.10 u
Basal

Bolus



Components of the Insulin Pump Therapy system

1. Insulin Pump
2. Reservoir
3. Infusion Set

Pump Operations

- Basal rate: This will not be changed at school.
- Bolus dose - delivered by child/nurse to cover carbohydrates eaten and/or to correct for hyperglycemia. This will be done in school multiple times per day:
 - Food doses are given whenever carbs are consumed
 - Correction doses cannot be given more often than every 2 hours



- The pump has a compartment to hold the reservoir.
- The reservoir is filled with insulin. (may be disposable)
- A thin tube attaches to the reservoir which is put into the pump and also attaches to the infusion set.
- The infusion set tube inserts into the body through a tiny needle or flexible tube (cannula) under the skin.
- The insulin is pumped from the reservoir through the infusion set to the body continuously through the day.

Blood Glucose Values

Result	Fasting Plasma Glucose (FPG)
Normal	less than 100 mg/dl
Pre-diabetes	100 mg/dl to 125 mg/dl
Diabetes	126 mg/dl or higher

Symptoms of Hyperglycemia

Mild	Moderate	Severe
<ul style="list-style-type: none"> • Increased thirst • Frequent urination • Fatigue/sleepiness • Increased hunger • Loss of concentration • Blurred vision • Urine ketones (0-small) 	<ul style="list-style-type: none"> • Sweet smelling breath • Dry mouth • Nausea • Stomach cramps • Vomiting • Urine Ketones (Moderate-Large) 	<ul style="list-style-type: none"> • Labored breathing • Very weak • Confused • Unconscious • Urine ketones (Moderate-Large)

Treating Hyperglycemia

Mild	Moderate	Severe
<ol style="list-style-type: none">1. Drink zero-calorie fluids (i.e. water)2. Check urine ketones3. Decrease activity if ketones present4. Notify parents	<ol style="list-style-type: none">1. Drink zero-calorie fluids (i.e. water)2. Check urine ketones3. If ketones are present, decrease activity, call the doctor, administer anti-nausea suppository if prescribed4. Notify parents	<ol style="list-style-type: none">1. Call 9112. Notify parents3. Notify health care provider if parent cannot be reached

Hypoglycemia

- Low blood sugar can develop within minutes and requires immediate attention. If “low blood sugar” is suspected, staff should not leave the child unattended at any time.
- **HYPOGLYCEMIA IS A MEDICAL EMERGENCY THAT REQUIRES IMMEDIATE ACTION WITH A SUGAR CONTAINING PRODUCT OR GLUCAGON FOLLOWING THE DMMP AND/OR EMERGENCY ACTION PLAN.**

Mild/Moderate

Symptoms of Hypoglycemia

- shakiness
- weakness
- dizziness
- cold, clammy skin
- hunger
- drowsiness
- sweating
- paleness
- rapid heart beat
- visual disturbances
- telling you “I feel low”
- complaining of “feeling funny”
- numbness or tingling of lips
- yawning
- headache
- confusion
- inability to concentrate
- changes in behavior (irritability, crying, combativeness)
- slurred speech
- nausea

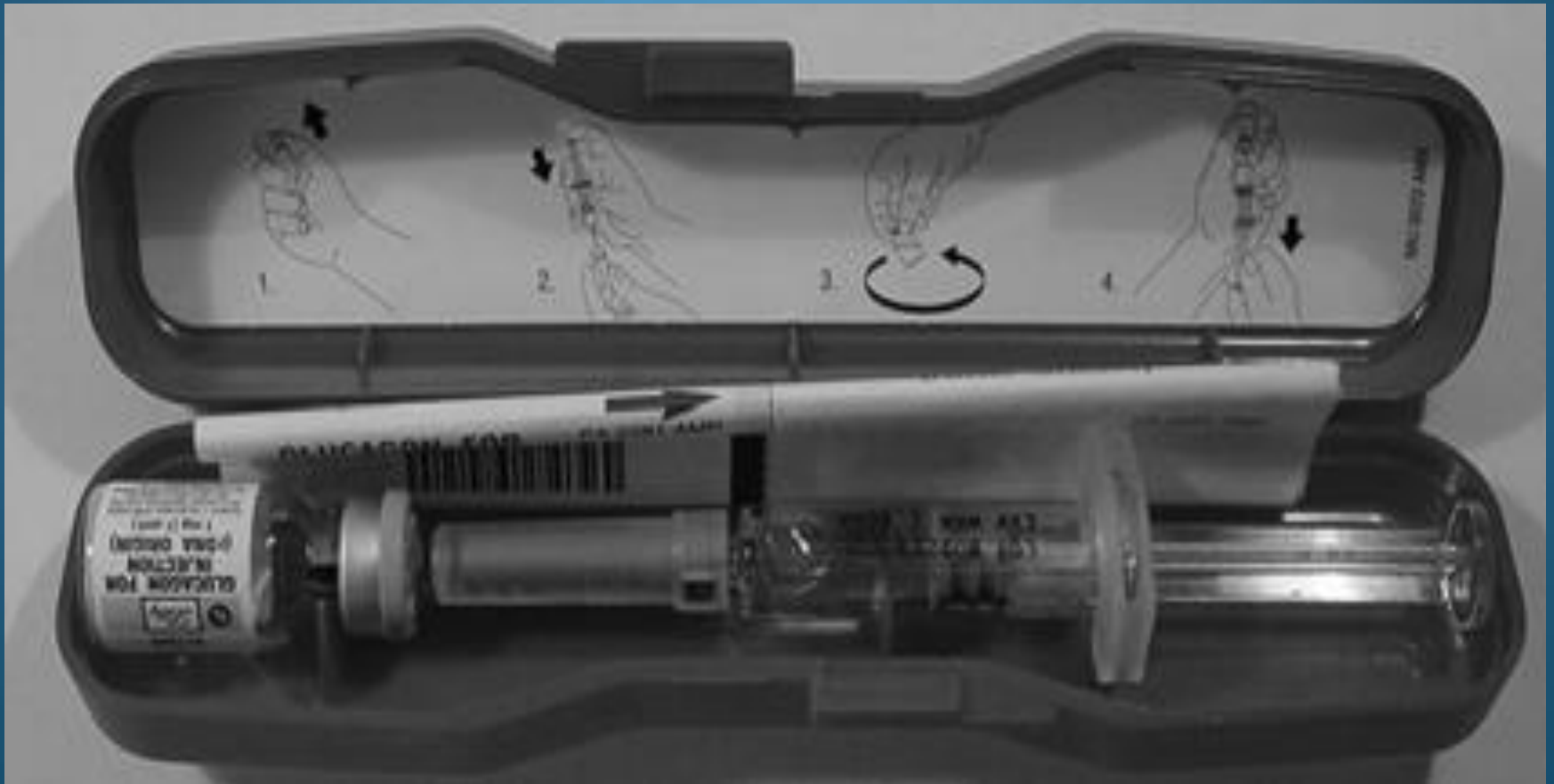
Severe Symptoms

- inability to swallow
- unconsciousness (extreme cases)
- seizures (extreme cases)

Treatment of Hypoglycemia

- For students who can swallow, follow the “Rule of 15”
- Treat with 15 grams of a fast-acting carbohydrate source
- Wait 15 minutes, then, recheck the blood sugar.
- If the blood sugar is less than the target range in the DMMP keep repeating the 15 grams of carbohydrate and rechecking blood sugar level 15 minutes later until the BG level is back in the desired range.
- Contact 911 and notify the parents immediately if blood glucose is not responding to your efforts or if the student worsens in symptoms OR
- If the blood sugar level is back in the target range per the DMMP, give a snack or meal as ordered in the DMMP.

Glucagon



Glucagon

- Verify signs of severe low blood glucose. Do not delay treatment pending BG testing if any of the signs or symptoms of hypoglycemia are noted:
 - unable to swallow
 - unconscious
 - combative
 - uncooperative
 - having seizures
- Call or ask someone to call 911. Do not leave individual unattended.
- Position child on his/her side in a safe area with head positioned to the side. Administer glucagon per Emergency Action Plan.
- After administration of glucagon, as the child regains consciousness, nausea and vomiting usually occurs and the student must be kept on his/her side to prevent choking.

If Glucagon is Not Available

If student is unconscious or seizing, and glucagon is not available, this is a

MEDICAL EMERGENCY

- Roll student on side
- Squirt glucose gel, frosting, honey, or other suitable glucose source onto gums taking care not to put hands in students mouth
- Call 911 and stay with student, repeating glucose squirts on gums until help arrives

DISPOSAL OF MEDICAL SUPPLIES

- Used needles, syringes, and lancets must be disposed of in a properly labeled biohazard sharps container as they are used.
- Know your local school division's policies and protocols regarding disposal of medications and syringes.

Documentation

- Documentation is commonly considered the “sixth right” of medication administration
- All care given to a student with diabetes must be recorded in the student’s cumulative medical record
- Documentation is the legal record the school staff has given the properly authorized medication and/or performed procedures or essential interventions

Emergency Action Plans

- Written by a school nurse
- Written for unlicensed persons to follow in case of an emergency
- Provides clear, simple and concise instructions, such as “If you see this..., then do this...”.

Blood Exposures or Accidental Sticks

- Use Standard (Universal) Precautions
- Use Judicious Avoidance
- Use scrupulous handwashing and non-latex gloves
- Report suspected or confirmed exposures immediately.

Medication Errors

- Insulin is a high hazard medicine
- Insulin errors are all emergencies
- Seek medical assistance immediately

Reference

- Manual for Training Public School Employees in the Administration of Insulin and Glucagon (Rev. July 2015)
- http://www.doe.virginia.gov/support/health_medical/medication/manual_training_insulin-glucagon.pdf.