

# Glucagon Emergency Administration Training Tool

## A Resource for School Nurses and School Personnel

**This training was developed by the NYS Department of Health in collaboration with the New York State Board of Nursing and the New York Statewide School Health Services Center. Modifications for use in Rhode Island were made by the Rhode Island Department of Health and the American Diabetes Association**

## Safety and Reassurance

- My daughter felt a little low at tennis practice and checked her blood sugar. It was dangerously low. She was able to treat herself with glucose tablets, but what if she had waited to check herself? Luckily, she had glucagon in her gym bag, and her coach knew how to give it to her. It is reassuring to know there is a trained volunteer on hand so that she can safely participate in a sport she loves.

## Full Participation

➤ My daughter wants to attend a field trip to Washington, D.C. It was suggested that I go on the trip to ensure my daughter's safety. I am a single mother and have another child to care for. Thankfully, a teacher who will be going along volunteered to be trained to inject glucagon in anticipation of an emergency. My daughter can now enjoy the much anticipated trip.

## Overall Goal of Federal Laws: Optimal Student Safety at School and School-Sponsored Events

- Americans with Disabilities Act (ADA) of 1992
- Individuals with Disabilities Education Act (IDEA) of 1991
- Section 504 of the Rehabilitation Act of 1973

# Immunity from Liability Provision

NO school teacher  
school administrator  
school health care personnel  
person employed on behalf of the school  
any other school personnel, nor  
any local educational authority

shall be liable for civil damages which may result from acts or omissions in use of glucagon which may constitute ordinary negligence. This immunity does not apply to acts or omissions constituting gross negligence or willful or wanton conduct.

# Learning Objectives

## Participants will learn:

- Diabetes basic care
- Symptoms and treatment of hypoglycemia (low blood glucose)
- Procedure for the emergency administration of glucagon

# Diabetes Basics

**Diabetes is a disease where the body does not produce insulin or does not use insulin properly.**

**Insulin** is a hormone normally made by the body. It helps glucose (sugar) enter cells where it can be used for energy.

**Without insulin**, glucose remains in the blood stream and cannot be used for energy by cells.



# Two Main Types of Diabetes

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## Type 1 Diabetes

▶ Pancreas makes too little or no insulin

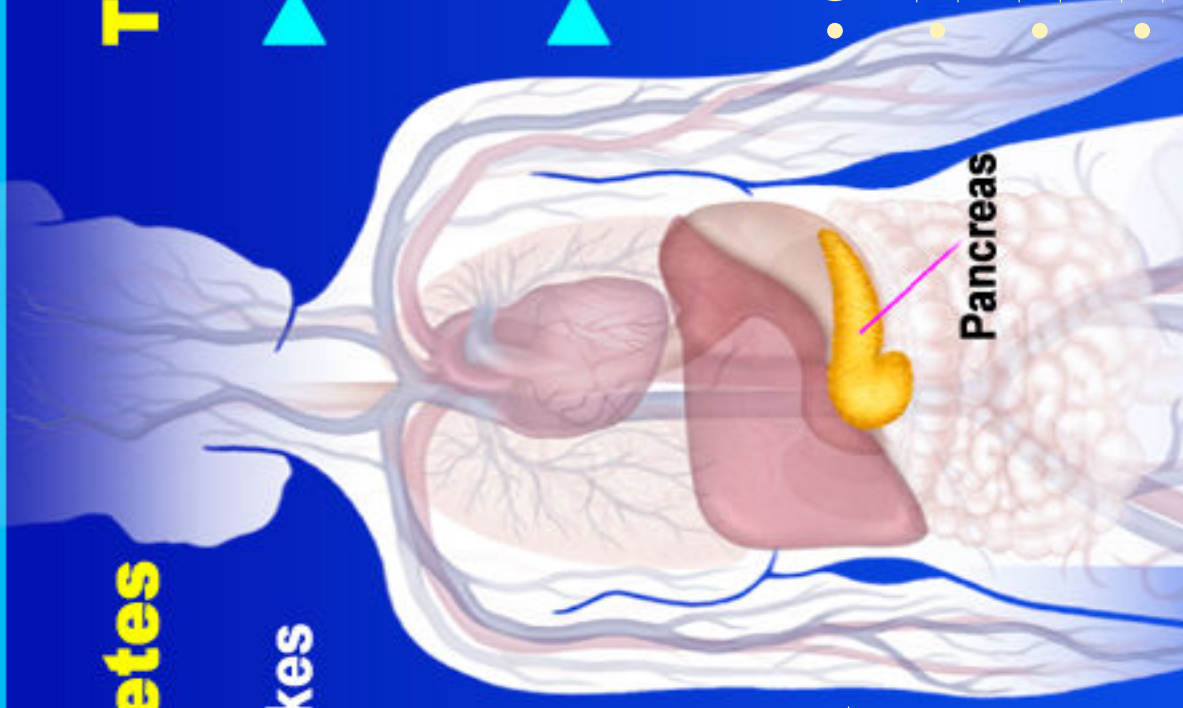
- Autoimmune\*
- Genetics
- Environmental
- More common in children

## Type 2 Diabetes

▶ Cells do not use insulin well (insulin resistance)

▶ Ability for pancreas to make insulin decreases over time

- Obesity
- Heredity
- Inactivity
- More common in adults



## Diabetes Basics

- Children with diabetes must monitor their blood glucose levels.
- Safe blood glucose levels are achieved through a careful **balance of food intake, physical activity and insulin.**
  - Insulin and physical activity - ↓ blood glucose
  - Food - ↑ blood glucose
  - Stress, illness or injury - ↑ ↓ blood glucose

## Diabetes Basics

- Sometimes, blood glucose levels are too high resulting in a condition called **hyperglycemia**.
- If this happens, insulin must be administered to lower blood glucose levels. **Insulin administration** for children with type 1 diabetes is essential for survival.
- Sometimes, blood glucose levels drop below the safe range resulting in a condition called **hypoglycemia**.

# Diabetes Care in Schools

## Emergency Hypoglycemia Care Plan\*

summarizes symptoms and treatment for hypoglycemia and provides emergency contact information.

The student's individual **Emergency Hypoglycemia Care Plan\*** (developed from the Diabetes Medical Management Plan) will be distributed to the appropriate trained volunteers and made available to administrators and staff as appropriate.

\*We highly recommend that Best Practices be followed: All Emergency Hypoglycemia Care Plans should have a permission section or form for parental consent allowing the information to be shared with appropriate school personnel on an as needs basis.

# Physician Orders for Students with Diabetes



## PHYSICIAN ORDERS FOR STUDENTS WITH DIABETES

DATE OF ORDERS: \_\_\_\_\_ EFFECTIVE SCHOOL YEAR: \_\_\_\_\_ 2008-2009  
 STUDENT'S NAME: \_\_\_\_\_ DATE OF BIRTH: \_\_\_\_\_  
 PARENT/GUARDIAN: \_\_\_\_\_  
 TELEPHONE: HOME \_\_\_\_\_ WORK \_\_\_\_\_ CELL \_\_\_\_\_  
 STUDENT'S DOCTOR/HEALTH CARE PROVIDER  
 NAME: \_\_\_\_\_ OFFICE TELEPHONE: \_\_\_\_\_  
 EMERGENCY TELEPHONE: \_\_\_\_\_ FAX NUMBER: \_\_\_\_\_

**HYPOGLYCEMIA (LOW BLOOD SUGAR)** Blood glucose level: Below \_\_\_\_\_ mg/dl  
 Treatment of hypoglycemia: Give 15 grams of fast acting sugar. Give 4 glucose tabs OR 4 oz. of juice OR 3 tsp sugar.  
 Recheck blood glucose after fifteen minutes, repeat if necessary.  
 Yes / No Follow with 15 gram mixed snack if not a regular snack or mealtime.

**ADMINISTRATION OF GLUCAGON** Dosage: \_\_\_\_\_ mg IM  
 Glucagon should be given if the student is unconscious, having a seizure, or unable to swallow.  
 If glucagon is required, administer it promptly. Then, call 911 and the parent(s)/guardian.

**HYPERGLYCEMIA (HIGH BLOOD SUGAR)** Blood glucose level: Above \_\_\_\_\_ mg/dl  
 Student should be allowed free access to liquids and the bathroom. Food should NOT be withheld. Student should NOT be excluded from school.

No treatment is necessary for hyperglycemia without moderate or large ketones.  
**CHECKING FOR URINE KETONES**  
 Urine should be checked for ketones if student has hyperglycemia, feels ill, or is vomiting.  
 Treatment for moderate or large ketones: Parent/health care provider should be contacted for further management.

**BLOOD GLUCOSE MONITORING**  
 Yes / No prior to meals Yes / No two hours after meals  
 Yes / No prior to exercise Yes / No other \_\_\_\_\_

**EXERCISE/SPORTS**  
 Student should not exercise if blood glucose level is below \_\_\_\_\_ mg/dl, above \_\_\_\_\_ mg/dl or if moderate or large ketones are present. A fast acting carbohydrate such as glucose tablets or fruit juice should be available at the site.  
 Yes / No Pre-treatment required \_\_\_\_\_ grams of carbohydrates prior to recess, gym class if blood glucose < \_\_\_\_\_ mg/dl.

**INSULIN ADMINISTRATION ORDERS**  
 Student does not require insulin within school hours. His/her typical morning dose is \_\_\_\_\_  
 Student receives multiple daily injections  
 Insulin (carbohydrate ratio(s)): \_\_\_\_\_  
 Correction factor(s): \_\_\_\_\_  
 Yes / No Student may self-administer insulin without supervision \_\_\_\_\_

**INSULIN PUMP THERAPY**  
 Type of pump: \_\_\_\_\_  
 Type of insulin in pump: \_\_\_\_\_  
 Type of infusion set: \_\_\_\_\_  
 Basal rates: \_\_\_\_\_  
 Insulin carbohydrate ratio(s): \_\_\_\_\_  
 Correction factor(s): \_\_\_\_\_  
 Pump manufacturer hotline: \_\_\_\_\_

STUDENT PUMP ABILITIES/SKILLS	INDEPENDENT	NEEDS ASSISTANCE
Bolus correct amount for carbohydrates consumed	_____	_____
Calculate and administer corrective bolus	_____	_____
Calculate and set temporary basal rates	_____	_____
Disconnect/reconnect pump	_____	_____
Insert infusion set	_____	_____
Troubleshoot alarms and malfunctions	_____	_____

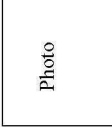
**DIABETES SUPPLIES**  
 Students are responsible for providing all appropriate diabetes supplies to the school nurse teacher, including, but not limited to: insulin, syringes, test strips, pump supplies, glucose tabs, glucagon emergency kit.

Student's Parent/Guardian \_\_\_\_\_ Date \_\_\_\_\_  
 Student's Physician/Health Care Provider \_\_\_\_\_ Date \_\_\_\_\_



April, 2008

## Emergency Hypoglycemia (low blood glucose) Care Plan for a Student with Diabetes



Student's Name \_\_\_\_\_ Date of Plan \_\_\_\_\_

Grade/Teacher \_\_\_\_\_

Emergency Contact Information: \_\_\_\_\_

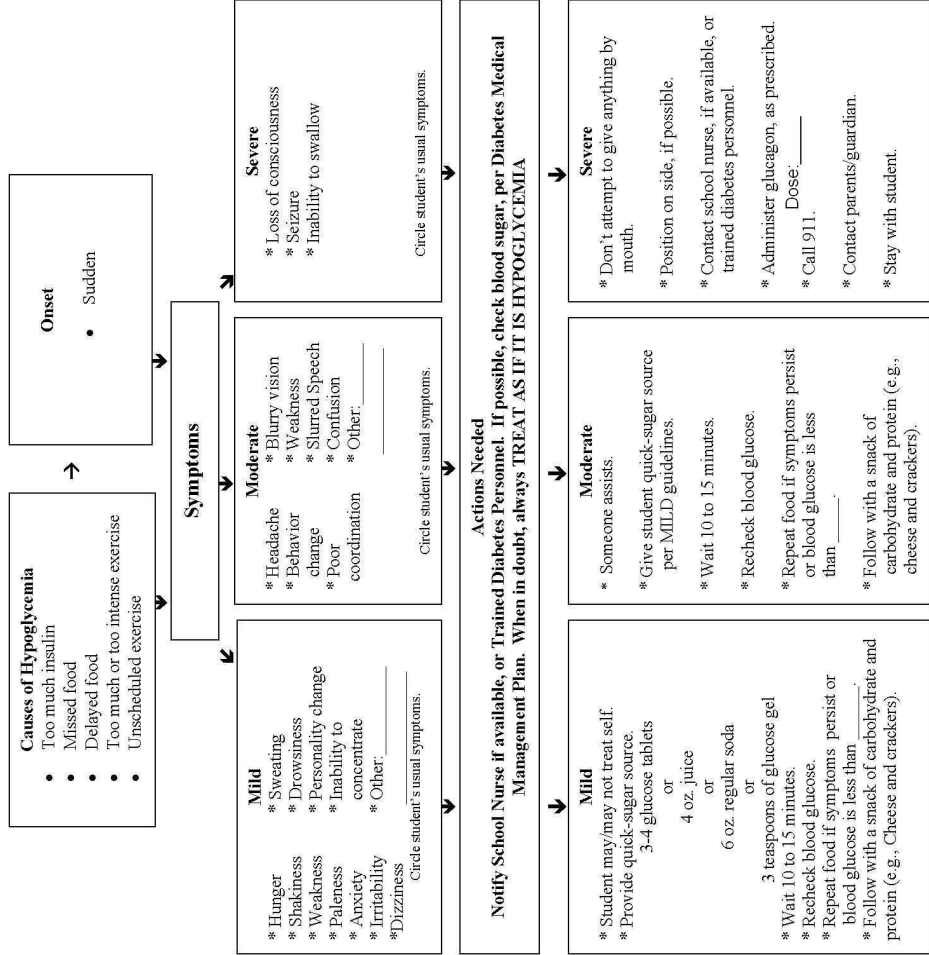
Mother/Guardian \_\_\_\_\_ Father/Guardian \_\_\_\_\_

Home phone \_\_\_\_\_ Work phone \_\_\_\_\_ Cell \_\_\_\_\_

Work phone \_\_\_\_\_ Cell \_\_\_\_\_

School Nurse/Trained Diabetes Personnel \_\_\_\_\_ Contact Number(s) \_\_\_\_\_

Never send a child with suspected low blood sugar anywhere alone.



## Diabetes Care in Schools (cont.)

The **school nurse** is the most appropriate person to provide routine and emergency care when needed.

However, a school nurse is not always available and hypoglycemia can occur at **ANY** time.



# Hypoglycemia (Low Blood Glucose)

**Hypoglycemia poses the most immediate risk to a student with diabetes because onset is sudden, it is not always preventable, and may progress to unconsciousness and convulsions if left untreated.**

## **Possible Causes:**

- **Too much insulin**
- **Too little food or delayed meal or snack**
- **Extra physical activity**
- **Illness**
- **Medications**
- **May occur for no apparent reason**



# Hypoglycemia: Signs & Symptoms

As blood  
glucose  
levels  
drop,  
symptoms  
become  
more  
severe.

## Mild Symptoms

Hunger	Sleepiness	Sweating
Shakiness	Changed behavior	Anxiety
Weakness	Paleness	Blurry vision
Dilated pupils	Increased heart rate/palpitations	

## Moderate Symptoms

Excessive Yawning	Extreme tiredness/fatigue	Confusion
Restlessness	Irritability/frustration	Sudden crying
Dazed Appearance	Refusal to take anything by mouth	

## Severe Symptoms

**Unconsciousness    Seizures (convulsions)**

**Inability to swallow**

## Mild and Moderate Hypoglycemia

When mild or moderate symptoms occur, **immediate treatment** is required to prevent progression to severe hypoglycemia:

- **Treat at onset of symptoms by having student eat or drink fast acting carbohydrates (if able to swallow).**
- **NEVER leave the student unattended.**

## Quick Acting Glucose for Mild to Moderate Hypoglycemia

**Treatment: Give 15 grams of carbohydrates by mouth if able to swallow\***

- 4 oz. fruit juice
- 3-4 glucose tablets
- 1 tube of glucose gel
- 6-8 oz. of sports drink
- 1 tablespoon of honey
- 6 oz. regular (not diet) soda (about half a can)
- 3 teaspoons table sugar (3 packets)
- One-half tube of cake gel

**\*After this treatment, utilize the school district policy and procedures for medical emergency care. Contact the appropriate medical staff for assessment of the student.**

# Severe Hypoglycemia

If a student exhibits unconsciousness or unresponsiveness, seizures (convulsions), or is unable to swallow, this is an **EMERGENCY**:

- **Have someone nearby call 911**
- **TREAT, then follow district policy for medical emergency care. Inform that you are treating a child with a hypoglycemic diabetes emergency.** Intervene promptly. A student experiencing severe hypoglycemia will **ALWAYS** need assistance.
- Treat on the spot and **NEVER** leave the student unattended.

## Responding to Severe Hypoglycemia

If severe hypoglycemia develops, a **LIFE-SAVING** injection of **glucagon** (a hormone that raises blood glucose levels) must be given.

If the school nurse is not available, other school personnel may be **trained to administer glucagon** in the case of a severe hypoglycemic emergency.

# Glucagon Kit Storage



- As designated in the student’s Diabetes Medical Management Plan, the kit should be:**
- **accessible to trained volunteer school personnel**
  - **stored at room temperature**
  - **monitored for expiration date**



# Emergency Kit Contents:

1 mg of freeze-dried glucagon (Vial)

1 ml of water for reconstitution (Syringe)



**Glucagon - Lilly**



**GlucaGen – Novo Nordisk**

**Combine glucagon and water immediately before use and discard any unused portion after injection.**

## First Steps

- Position student safely on side for comfort and protection from injury.
- NEVER attempt to place ANYTHING into the student's mouth.
- Notify the designated volunteer personnel trained to give glucagon.
- While treating, have another person follow the district policy for medical emergency care and contact parents/guardian per Emergency Hypoglycemia Care Plan.



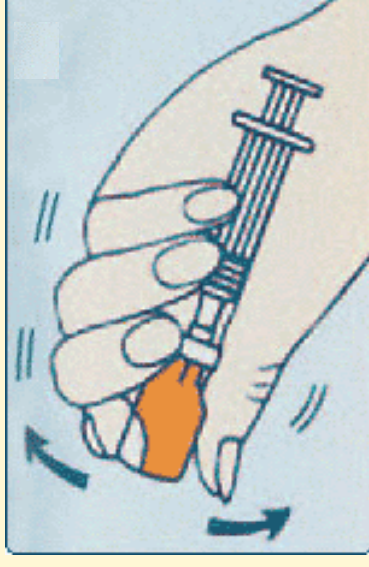
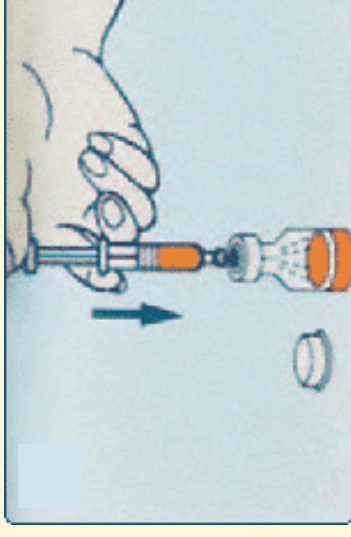
## Preparation

- Flip cap off vial (glass bottle) of glucagon dry powder.
- Remove hard plastic cap and grey rubber cap from syringe.



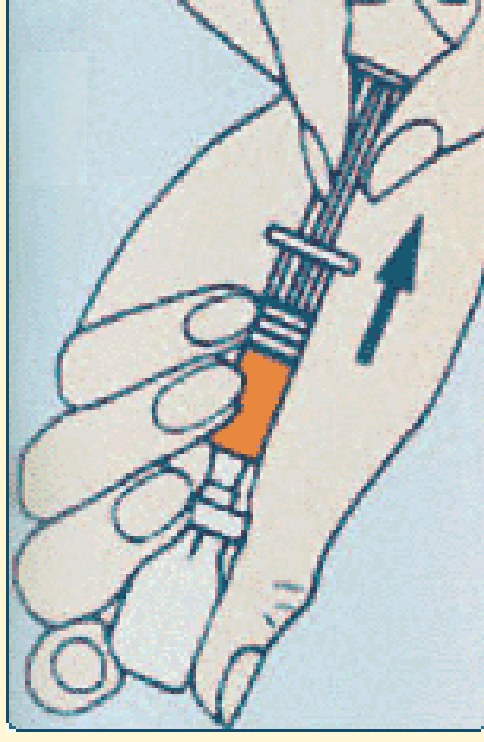
## Mixing Solution

- Insert needle through rubber stopper on vial of glucagon and inject entire contents of syringe into vial of powder.
- Without removing the syringe, hold syringe and vial in one hand and gently swirl until all powder is dissolved and solution is clear.
- Alternatively, the syringe may be removed for mixing, then reintroduced into the vial



## Withdrawing Solution

- Inspect. Solution must be clear and colorless.
- Slowly withdraw the amount of solution from the vial into the syringe as specified in the student's Emergency Hypoglycemia Care Plan.



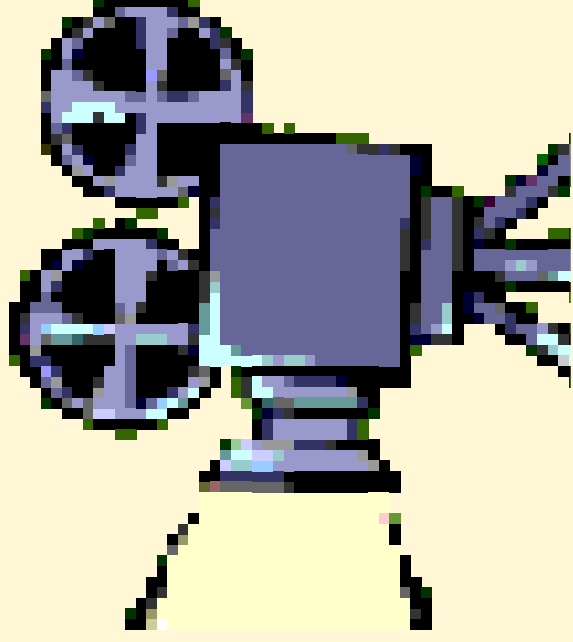
## Injecting Glucagon

- Clean injection site on buttock, upper arm, or thigh with alcohol swab, if available.
- Pinch the skin at the site of injection, hold syringe like a pen and quickly insert needle at a 90° into cleansed area; inject glucagon solution.

# Injecting Glucagon

- Withdraw needle, then apply light pressure at injection site. Discard needle into a sharps container or, if unavailable, back into its case.
- Do **not** recap needle.

# How To Administer Glucagon!



Double click on the projector to link your high speed internet connected computer to the site listed below, then run demo video as directed. Close video and internet windows to resume slideshow.

[www.novonordisk.com/diabetes/public/hypokit/glucagenhypokit/demo.asp](http://www.novonordisk.com/diabetes/public/hypokit/glucagenhypokit/demo.asp)

## After Injecting

- It may take 10-15 minutes for the student to regain consciousness.
- Vomiting may occur - keep the student positioned on side to prevent choking.

## Next Steps

- Once the student is awake and able to drink, give sips of fruit juice or regular soda and advance diet as tolerated.
- Remain with the student until emergency medical services assumes control. The student should not resume normal activities.
- Notify appropriate parties of incident details and attend debriefing meeting with school nurse. School nurse will document incident in appropriate health records.



## Don't Be Surprised If...

- The student does not remember being unconscious or is incoherent or lethargic.
- The student feels nauseated, vomits, or has a headache.

## Considerations

Recovery time from a severe hypoglycemic episode varies according to the duration and level of the blood glucose prior to treatment.

Some signs and symptoms, such as headache, may persist for several hours, although the blood sugar level is satisfactory. Continued monitoring is important.

## Quick Review

- Mild to moderate hypoglycemia can be treated with a quick acting source of carbohydrate (15 grams).
- Signs of severe hypoglycemia include:
  - Unconsciousness
  - Seizures
  - Inability to swallow

## Quick Review, continued

- Severe hypoglycemia is a medical emergency requiring immediate administration of glucagon.
- Treat, have someone call 911, then follow the district policy for medical emergency care.

# Thank you!

*“I feel more confident in sending my child to school knowing that he will be well taken care of in the event he has a low blood sugar. I am grateful to the school nurse and volunteers who are looking out for my son.”*