



# Glucagon Administration

Molalla River School District

# Background & Laws

- Laws that have been created to allow for administration of epinephrine in the school based setting were revised to include glucagon administration for Type 1 Diabetic Students in the schools setting (ORS 433.800 –830; OAR 333-55-000 through 035)
- The rationale of these laws suggest that staff who are administering lifesaving medication should have some background in disease physiology and recognition of dangerous symptoms.
- Individuals experiencing severe hypoglycemia often experience acute cognitive impairment which makes it difficult to self administer.
- Laws and training were set up to protect staff responding to diabetic students .

# Individual Health Protocols

- Individual Health Protocols (IHP's) are created for all Type 1 Diabetic Students.
- IHP's name delegated care givers for each student.
- Even if students are self managers, we are still responsible for their emergency response including administration of emergency glucagon.
- Training in diabetic emergencies allows for recognition of symptoms of those experiencing hypoglycemic events even if you are not a named delegated caregiver for the students IHP.

# Diabetes

## Type 1 Diabetes

- Onset generally occurs in children.
- Insulin is no longer produced and insulin must be used.
- Without insulin sugar cannot enter cells to be used for energy.
- Insulin is administered through injections or pumps.

## Type 2 Diabetes

- Generally occurs in adults, though prevalence is increasing in adolescents and in some cases children.
- Insulin resistance occurs in which the body can no longer effectively use insulin, generally related to diet and lifestyle.
- Sometime insulin production stops altogether.
- Generally treated with pills, may progress to insulin.

# Insulin Delivery

Insulin Pump



Injectable Insulin



# Hyperglycemia (high blood sugar)

- Dangerous over time
- Occurs with too inappropriate carb to insulin ratios, illness, stress
- Sometimes students have no insulin and in such cases will become very sick.
- High blood glucose is dangerous over time.
- Symptoms include:
  - Extreme thirst
  - Frequent urination
  - Headache
  - Fatigue
  - Blurred vision
  - Fruity breath
  - Nausea and vomiting

**PLEASE NOTIFY YOUR DISTRICT NURSE IMMEDIATELY OF THESE SYMPTOMS IN STUDENTS.**

## Hypoglycemia (Low blood sugar)

- The most acutely dangerous condition that can occur in diabetes.
- Caused by:
  - Too much insulin
  - Not enough food
  - Skipping or not finishing meals
  - More exercise than normal
  - Drinking alcohol without eating

Symptoms of  
Hypoglycemia  
(play video)





# SYMPTOMS OF HYPOGLYCEMIA

**Symptoms of hypoglycemia can range from mild to severe, and include any or all of the following:**

<b>Mild Symptoms</b>	<b>Moderate Symptoms</b>	<b>Severe Symptoms</b>
<ul style="list-style-type: none"><li>• Hunger</li><li>• Sweating</li><li>• Feeling shaky</li><li>• Feeling nervous</li></ul>	<ul style="list-style-type: none"><li>• Headache</li><li>• Behavior changes</li><li>• Blurred, impaired or double vision</li><li>• Crabbiness or confusion</li><li>• Drowsiness</li><li>• Weakness</li><li>• Difficulty talking</li></ul>	<ul style="list-style-type: none"><li>• Unresponsive (i.e. unable or unwilling to take oral feeding)</li><li>• Loss of consciousness</li><li>• Convulsions (seizure activity)</li></ul>

# Treating Hypoglycemia

Standard of Care

Oregon Health Authority

American Diabetes Association

Oregon Medical Association

## **Intervention for Mild or Moderate Symptoms of Hypoglycemia**

**Treat low blood sugar right away with a fast-acting source of sugar.** It will not get better on its own. If the health care provider for the person with diabetes has outlined a plan for testing the blood sugar, do so before initiating treatment. Otherwise if the person is able to eat and swallow, provide one of the following sources of fast-acting sugar right away (recommended by the American Diabetes Association.)

- 4-8 ounces of juice
- 6 ounces of regular soda (not sugar-free or diet)
- 3 packets or 1 tablespoon of sugar (not sugar substitute) dissolved in small amount of water.
- 3-4 chewable glucose tablets or 1 dose of glucose gel (15g dose)
- 1 tablespoon of honey
- 2-4 pieces of hard candy

## 15-minute rule

### **15 MINUTE RULE FOR MILD-MODERATE HYPOGLYCEMIA**

Observe and recheck blood glucose in 15 minutes. Repeat fast-acting carbohydrate if blood glucose is not within appropriate range. If blood glucose is improved, but next regular meal is more than one hour away, follow treatment with an extra snack per medical provider's orders (usually a carbohydrate and protein.) If after two treatments, blood glucose is not above 80 or continues to fall, call the parent, designated contact (such as in the workplace) or 911.

Severe  
Hypoglycemia  
(play video)





# SEVERE HYPOGLYCEMIA

(Oregon Health Authority  
Protocol)

## Treatment for Severe Symptoms of Hypoglycemia

Prepare to treat the person for severe symptoms of hypoglycemia if any of the following occur:

- the person is unable or unwilling to take a treatment
- the person does not feel better after the second treatment
- the symptoms worsen to the point of being unable to swallow
- loss of consciousness or seizures occur.

**Reminder:** Symptoms of hypoglycemia may vary from person to person. If the emergency glucagon provider is uncertain as to whether the person is experiencing high or low blood glucose, test blood glucose with a meter. If a meter is not available, it is safer to treat for hypoglycemia than delay treatment.

# TREATMENT OF SEVERE HYPOGLYCEMIA

(Oregon Health Authority Protocol)

## Observation and Intervention Steps for Severe Hypoglycemia

**If person is unresponsive (breathing or pulse are absent) call 9-1-1 and initiate cardiopulmonary resuscitation (CPR.)**

- 1. If breathing and pulse are present, assume the person with diabetes is having severe hypoglycemia. DO NOT give any food or liquid to a person who cannot swallow or is unconscious/unresponsive.**
- 2. Delegate someone to call 9-1-1 or other emergency response system.** (If the person is unwilling or unable to take oral feeding, unresponsive or unconscious.)
  - a. If possible, also have someone call the affected person's parent/guardian and health care provider.**

# Treatment of Severe Hypoglycemia continued...

(Oregon Health Authority  
Protocol)

3. **OBTAIN GLUCAGON EMERGENCY KIT** and check person's name against kit. Verify any special physician instructions including correct dosage. NOTE: BRING supplies to the person, do not move the person. Time is critical for administering treatment to ensure recovery.
4. **PREPARE AND ADMINISTER** glucagon for injection. (See page 11 for detailed instructions.)
5. **Clamp** or cut insulin tubing close to pump if on an insulin pump.

# GLUCAGON

- Glucagon is a hormone that works with other hormones and bodily functions to control glucose levels in the blood. It comes from alpha cells found in the pancreas and is closely related to insulin-secreting beta cells, making it a crucial component that keeps the body's blood glucose levels stable.
- Although secreted by the pancreas, glucagon directly impacts the liver as it works to control blood sugar levels. Specifically, glucagon prevents blood glucose levels from dropping to a dangerous point. It does this first by stimulating the conversion of stored glycogen to glucose in the liver. This glucose can be released into the bloodstream, a process known as glycogenolysis.





# Glucagon

Should be stored at room temp

Should be easily accessible

Should never be mixed in advance

## Dosage for Administration of Glucagon:

Glucagon is manufactured in 1-mg vials. The health provider will prescribe the individualized dose for the person or child with diabetes when the prescription is obtained. The following dosages are usually recommended:

USE	DOSE	WEIGHT
Adults and Children	1 mg	>20 kg or 44 lbs
Smaller Children	0.5mg	<20 kg or 44 lbs

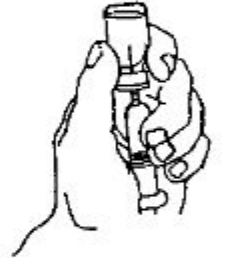
## Equipment for Treatment of Severe Hypoglycemia:

1. Glucagon Emergency Kit
2. Alcohol Swab (if available, otherwise do not delay treatment.)
3. Nonsterile gloves

# ADMISTERING GLUCAGON (Oregon Health Authority Protocol)

## TO PREPARE GLUCAGON FOR INJECTION

1. Remove the flip-off seal from the bottle of powdered glucagon. Remove the needle cover from the syringe filled with diluting fluid. **DO NOT REMOVE THE PLASTIC CLIP FROM THE SYRINGE.**
2. Insert the needle into the center of the rubber stopper on the vial of powdered glucagon.
3. Push the plunger on the syringe to inject the entire contents of the liquid solution into the vial of powdered glucagon.
4. Leave the needle on the syringe in the vial.
5. Shake bottle gently until glucagon powder dissolves and the solution becomes clear.



**If the glucagon solution is not clear and water-like, do not administer. Monitor the person for absent pulse/respiration, or seizure activity until rescue personnel arrive.**

## ADMINISTRATION OF GLUCAGON (OHA) CONTINUED

6. Withdraw the prescribed amount of medication.

For an adult or child over 44 lb. withdraw all of the solution from the bottle (1 mg mark on syringe.) would usually be withdrawn.

If the dose is to be given to a small child under 44 lb. withdraw  $\frac{1}{2}$  of the solution from the bottle (0.5 mg mark on syringe.) would usually be withdrawn.

*NOTE:* Very young children may require different doses. Check medical orders to verify dose.

8. Put on gloves.
9. Cleanse the injection site on arm or thigh with alcohol swab if available.
10. Insert the needle into the loose skin or muscle and administer all of the prescribed medication.
11. Apply light pressure at the injection site and withdraw the needle.



# ADMINISTRATION OF GLUCAGON (OHA) CONTINUED

## Care of the Person Experiencing Hypoglycemia After Administration of Glucagon

1. Turn the person on his/her side. One of the most common side effects of glucagon is vomiting. Therefore, positioning the person on his/her side will prevent possible choking and allow for drainage of secretions in the mouth.
2. Continue to monitor for signs of absent pulse/breathing, or seizure activity.
3. Glucagon is a fast-acting drug and the person will usually improve within 10-15 minutes.

**Warning:** Although rare, the person may be unresponsive for other reasons (ie head injury, drug overdose, high blood sugar level). In such a case, the person will NOT respond to administration of glucagon and will require immediate medical attention.

# ADMINISTRATION OF GLUCAGON (OHA) CONTINUED

4. When the person responds and is able to eat and swallow without difficulty, feed the person a fast-acting source of sugar such as those listed on [page 7](#).

**Warning:** Many times after a person has received glucagon or experienced severe hypoglycemia, he/she may be nauseated and vomit, or be unable to keep foods/ liquids down. It is best to start a person on small sips of clear liquids before providing solid foods. Options include:

- sugar dissolved in water
  - 6 ounces regular soda pop (7-up, ginger ale, Sprite, etc.)
  - honey and water
5. Once the person can safely swallow clear liquids without vomiting, provide a longer-acting source of sugar (carbohydrate with protein) such as cheese and crackers or a meat sandwich.
  6. The person who has recovered from being treated with glucagon for hypoglycemia should receive immediate and continuing medical attention. If summoned, emergency responders will make the decision if the person needs to be transported to a medical facility.

# REVIEW

- What is Diabetes?
- What is hypoglycemia?
- What is glucagon?
- Treating hypoglycemia.
- Treating Severe hypoglycemia.

# QUIZ

[https://docs.google.com/a/molallariv.k12.or.us/forms/d/e/1FAIpQLSeTqVzCZw\\_x4cobJwKe1agHS5cnVfkyvG7bf1Y1nqVq2FWERQ/viewform?c=o&w=1](https://docs.google.com/a/molallariv.k12.or.us/forms/d/e/1FAIpQLSeTqVzCZw_x4cobJwKe1agHS5cnVfkyvG7bf1Y1nqVq2FWERQ/viewform?c=o&w=1)

Questions?





# References

- References
- Oregon Health Authority. (2011). Training Protocol for Glucagon Providers. Retrieved from <http://www.ode.state.or.us/groups/supportstaff/hklb/schoolnurses/glucagon.pdf>
- Safe at School for Children with Diabetes. (n.d.). Retrieved from <http://www.diabetes.org/living-with-diabetes/parents-and-kids/diabetes-care-at-school/>