



Introduce yourself.

Ask how many of your audience has known someone with diabetes.

What they know might be associated with is adults with diabetes (Type 2) or not the most current information.

Goals for today

- Understand what diabetes is.
- Recognize a hypoglycemic reaction.
- Understand the intended purpose and the side effects of a glucagon injection.
- Be able to draw up and inject glucagon as needed.

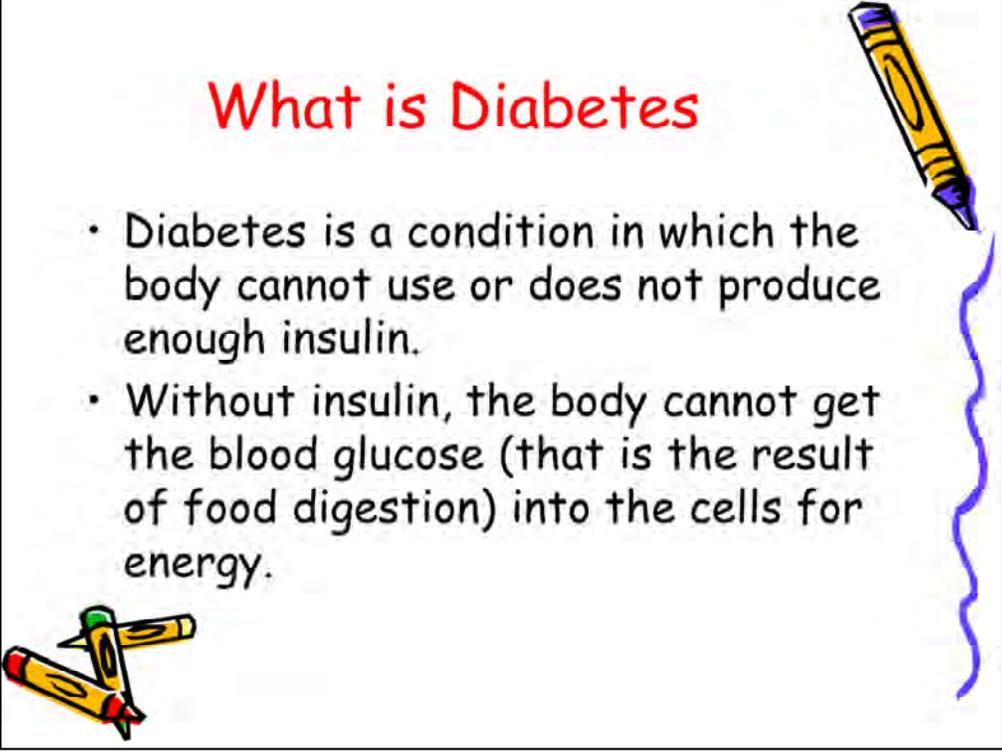


These are the goals for today.

You should know that we will actually practice giving an injection... I hope you will feel like you could give an injection to someone in need by the end of our training.

What is Diabetes

- Diabetes is a condition in which the body cannot use or does not produce enough insulin.
- Without insulin, the body cannot get the blood glucose (that is the result of food digestion) into the cells for energy.



So, what is diabetes...

Diabetes is one of the most common chronic diseases of childhood.

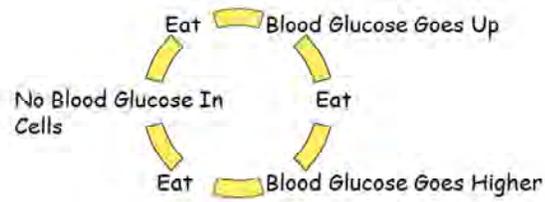
It is not preventable, not predictable.

The incidence is increasing worldwide.

Etiology is thought to include a genetic predisposition and a triggering event such as a viral infection or a antigenic stimulus.

This diagnosis affects not just the person... but their entire family and, in our case, the school as well!

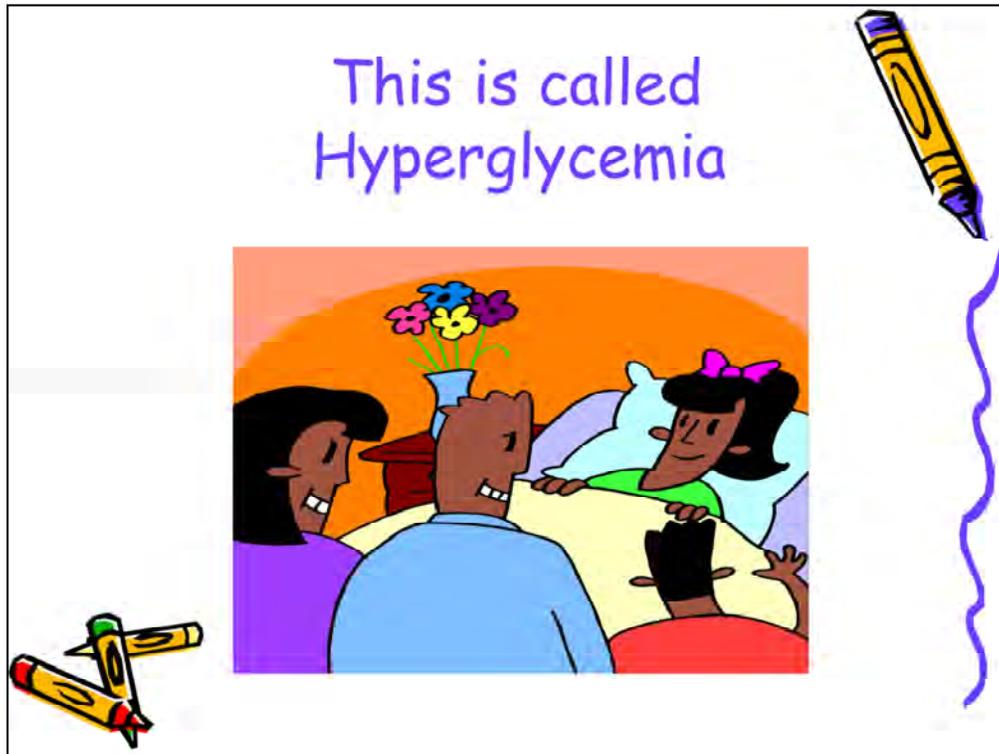
Without Insulin



High levels of blood glucose build up in the blood.

The blood glucose cannot get into the cell to provide energy.





This condition is called Hyperglycemia.

Hyperglycemia is a common problem with diabetes.

Hyperglycemia is how a person usually presents when they are first diagnosed with diabetes.

At the time of diagnosis they can be quite ill.

They are usually in the hospital until an insulin treatment plan is established.

Once they are stabilized, hyperglycemia becomes an issue for testing blood and one that requires insulin, but it is not the life threatening emergency that a low blood sugar creates.

HYPERGLYCEMIA

Signs and symptoms

- Frequent urination
- Increased thirst
- Increased hunger
- Fatigue/weakness
- Weight loss
- Blurry vision
- Fast, deep breathing
- Slow or confused thinking

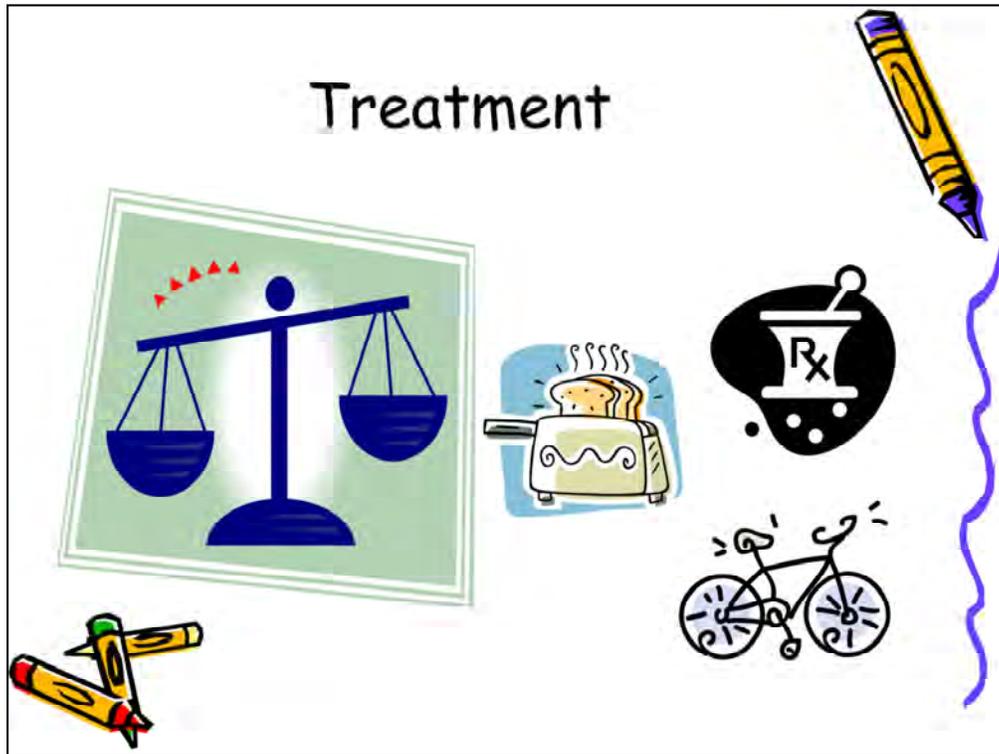


This is the student who is frequently requesting to go to the bathroom.

They are frequently complaining of being hungry and thirsty.

The student is often tired and appears not to be paying attention.

Grades may fall or test scores go down during this time.



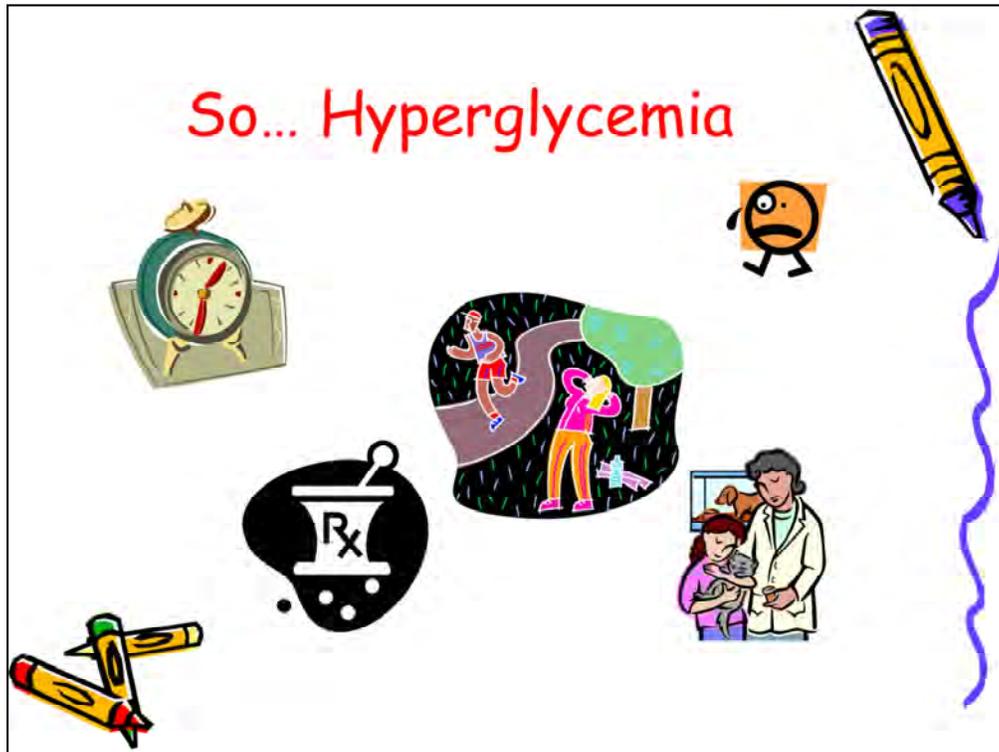
The treatment is aimed at maintaining the levels of sugar in the blood stream. It consists of insulin injections, understanding dietary requirements, and planning the amount of exercise for that time. It requires frequent blood sugar checks on a daily basis.

Replacing the insulin is tricky. The dose is calculated from the blood sugar with the food eaten. The amount of exercise is also a consideration.

The importance of maintaining good control is not only that the person feels better and can perform better in school, but we now know that good control will reduce the risk of long term complications and make for a healthier adult.

On a regular basis, another blood test (called an A1C) is taken by the health care provider. This test measures the blood sugar (glucose) level over an extended period of time (unlike the blood test that they use daily to calculate their insulin). The goal for the student with diabetes is to have an A1C as close to normal as possible... at least below 8.

Good control must be a balance with a risk for hypoglycemia and participation in all childhood activities.



We already know that too much sugar in the blood stream is not good. It is called??? (Answer... Hyperglycemia)

Hyperglycemia, however is not a school emergency and does not require leaving school. It comes on slowly over many hours. The student may complain of not feeling well or that they feel sick.

It is always good to check a blood sugar.

Allow free access to water and the bathroom. Exercise will also help the blood sugar (glucose) come down. Notify parents of the blood sugar (glucose) level. There can be many causes for hyperglycemia including stress, extra food, or illness.

This is a problem that is not good for their health, but can be handled at home. If it is happening often the doctor will more than likely prescribe an extra dose of insulin. But again this is not a school emergency.

Exercise and insulin will bring the blood sugar down.

Meal Plans

- Good nutrition is important to everyone, however a student with diabetes must plan their meals carefully.
- A balanced diet, with a moderation of concentrated sweets is the best.
- Counting the carbohydrates in foods is called Carb Counting.
- Insulin is given according to the carbs eaten.



Many people think that a person with diabetes can no longer have any sugar in their diet. What is true is that they must calculate how many carbohydrates they have eaten for the amount of insulin they have taken, or how much insulin they will need to take for what they plan to eat.

Good nutrition is important for all of us. A student with diabetes is taught a sensible and healthy way to eat. Whatever they choose to eat, however, the proper amount of insulin needs to be given to keep the blood sugar (glucose) in line.

Blood glucose checking

- Daily blood glucose checking is an important part of diabetes control.
- Blood glucose checks are usually done before meals, at bedtime, and with exercise.
- When in doubt, **CHECK** the blood glucose if the student is not feeling well or is complaining of feeling "low".



Daily blood testing requires a drop of blood to be placed on a special testing strip in a machine that will read the blood sugar (glucose) level in a matter of seconds. It provides you with the most clear information on how the control of sugar (glucose) is at that very moment. Written records and regular review of the results are helpful.

They need a drop of their blood (usually by pricking their finger). This can be done in the back of the classroom or where the health care plan designates. It should not be done in the lunch room.

Target range for readings of blood sugar (glucose) varies with age, but even in the best of all worlds, no one can achieve the target range 100% of the time.

The target range for children 7 years and younger is 100-200.

For children 7-12 years the target range is 80-180.

For students over 12 year of age the target is 70-160. These targets are modified based upon the child's maturity and ability to recognize symptoms of a low blood sugar (glucose). These target ranges are much lower than they were a few years ago. They offer

much better control of the blood sugar (glucose), but low blood sugar (glucose) reactions are also more common.

Insulin

- Insulin is a hormone secreted by the pancreas. With diabetes it must be given as an injection.
- The dose will vary with the blood glucose level, food intake and exercise.



All insulin for children is injected. It is given to “cover” carbohydrate intake and correct for “out of range” blood sugar (glucose).

There is no “routine” insulin schedule any longer. The treatment is tailored to meet the needs and the understanding of “diabetic skills” of every student. It was once considered “routine” even state of the art to have 3 injections of insulin a day... now you may need 7 injections a day.

There are many new kinds of insulin and new delivery systems. Some insulins act immediately, others are short acting, while some others are long acting.

The goal is to individualize the therapy so as to minimize the intrusion into their lives.

Some students will use a pump... other a pen... and some will use a regular syringe for the injection.

Insulin must be coordinated with food.

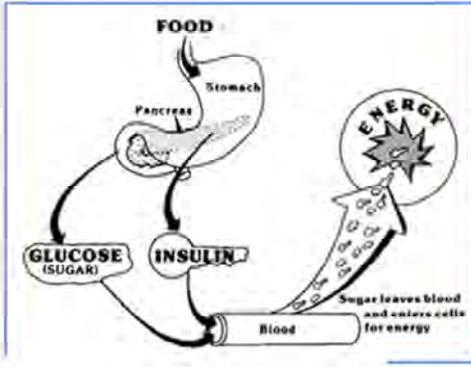
The more frequent use of pumps and long acting insulin has

increased the need for a lunch time insulin shot at school



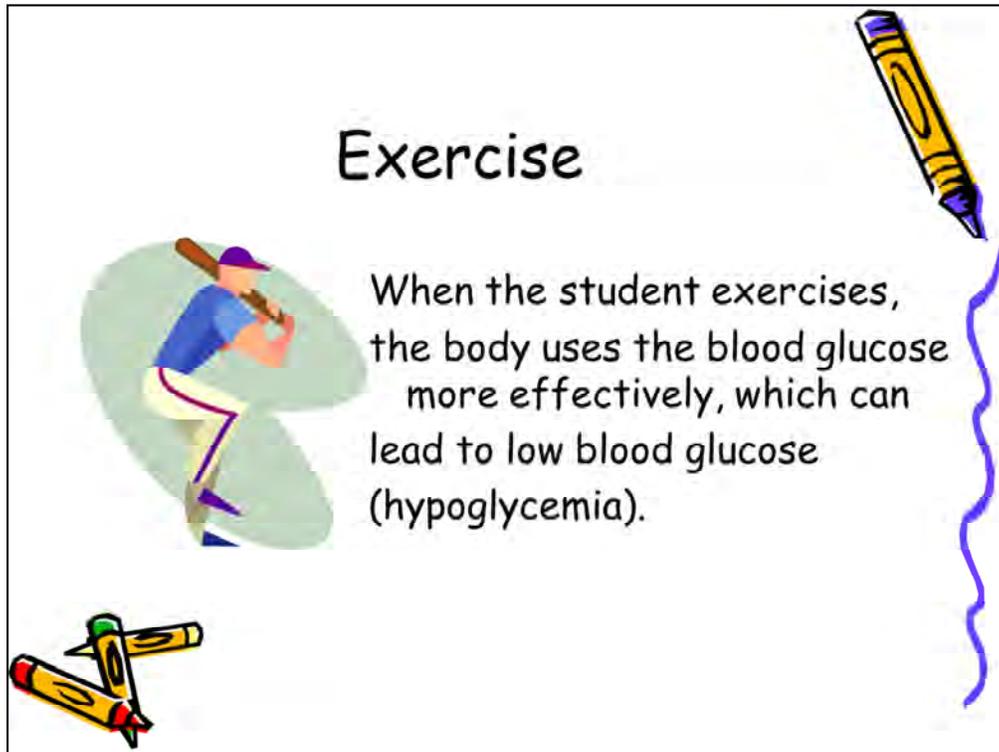
Insulin should...

- Lower the blood glucose.
- Facilitate the blood glucose getting into the cells to provide energy.



Insulin will lower the blood sugar (glucose). It is the “key” that allows the sugar to get into the cells. Remember, the sugar provides the energy to every cell very much like the gas in a car. Without fuel the motor will not run. Without the key... the insulin, our motor cannot get the fuel it needs. Without fuel the body cannot function. Again, without insulin the sugar builds up in the blood, but cannot get into the cells to provide the energy necessary.

But, too much insulin is another, more serious concern.



In recent years occasionally a star athlete will be noted to have diabetes. You may even see on the TV an athlete checking their blood during a game. This is because exercise can dramatically lower the sugar in the blood stream. It can cause the blood to get dangerously low. This is why the student with diabetes may need extra food to cover these events.

Just part of the delicate balancing act that good control of diabetes requires.

Insulin can cause blood glucose to fall too low when:

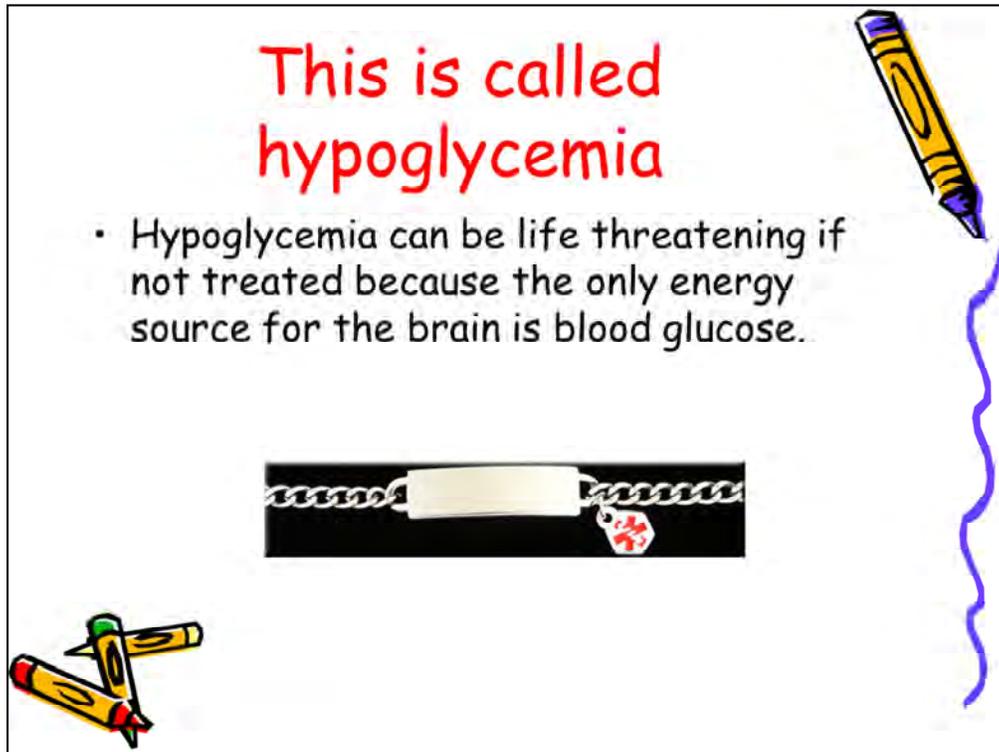
- Too much insulin is given.
- Not enough food is eaten.
- Too much exercise



But, with too much insulin... a life threatening condition develops... often referred to as an insulin reaction or low blood sugar. This is a school EMERGENCY!

This is called
hypoglycemia

- Hypoglycemia can be life threatening if not treated because the only energy source for the brain is blood glucose.



This is the real balancing act I have been talking about.
Unlike hyperglycemia... **HYPOGYCEMIA is a medical emergency!**

Symptoms for hypoglycemia

- Paleness
- Shakiness
- Hunger
- Headache
- Tingling
- Mood Change
- Sleepiness

Symptoms can progress to:

- Confusion
- Blurred Vision

Late stages of hypoglycemia include:

- Coma
- Seizure
- Death



Symptoms can vary. Some children have unique symptoms, but in general these are the most common symptom.

When in doubt, treat as a HYPOGLYCEMIC reaction, but it is always helpful to get a blood sugar (glucose).

Treatment for Hypoglycemia for a conscious person:

- If you can, check the blood glucose. If it is below 70 mg/dL, treat as a hypoglycemic reaction.
- When in doubt or unable to check the blood glucose, treat as a hypoglycemic reaction.



The important thing to remember is that if you are in any doubt if this could be hypo or hyperglycemia you should treat as if it were hypoglycemia! It is safer to treat with sugar than to wait for the blood sugar to drop lower and the symptoms progress.

Treatment for Hypoglycemia for a conscious person:

- Give a drink high in sugar
 - 6oz. of regular soda pop (not diet),
 - 1/2-2/3 cup fruit juice
 - 3-4 glucose tablets.
- Follow with a milk and protein - or send them to lunch if they can eat within 10 to 15 minutes.



You should not over treat... but treating a low blood sugar is the most important thing to remember!.

This is the one time that a diabetic absolutely needs to have sugar! Without sugar the cells in the body will die!

Stay with the child!

- You should see a response within 15 - 20 minutes.
- You can repeat the treatment in 15 minutes if symptoms are still present or if they become worse.



No one can prevent all lows, but recurrent episodes may be preventable.

Recurrent mild episodes may be evident as poor school performance.

Most commonly happens after gym and before lunch.

Never send a student out of the classroom alone if you suspect a hypoglycemia reaction or they are not feeling well.

Hypoglycemia with decreased awareness

- Glucose gels and/or tablets can be used to treat hypoglycemia

Examples: Insta-glucose, Glutose 15, Glucose tablets, Dextrose tablets

- Gels are placed in the student's mouth toward the cheek and back teeth.



As the blood sugar continues to drop the symptoms become more and more obvious.

A decrease in the level of awareness is an indication of a very low sugar and must be addressed quickly.



Glucagon should be given when the hypoglycemia is severe enough that the individual cannot swallow safely. Once the blood sugar has gotten this low it is imperative that emergency medical help is called. Follow the direction of the emergency medical team.



The student's parents/guardian will supply the glucagon kit for school use. They will also provide the orders from the health care provider to give the glucagon and how much glucagon to give.

Glucagon is the fastest means of treating hypoglycemia.

Glucagon is a pancreatic peptide hormone. It acts to raise the blood level by releasing glucose (sugar) from the liver. It starts to raise the blood sugar within a few minutes, but the duration is short (15-20)... hence the need to call for emergency backup.

Without sugar to the brain severe brain damage or death can occur if not treated quickly.

Glucagon Adverse Reactions

- The most common side effects are **nausea and vomiting**. These reactions may also occur with hypoglycemia.
- Keep the student positioned on his or her side.



The side effects include nausea and vomiting. Therefore it is important to keep the student on their side until fully awake to avoid aspiration

Why has this become necessary

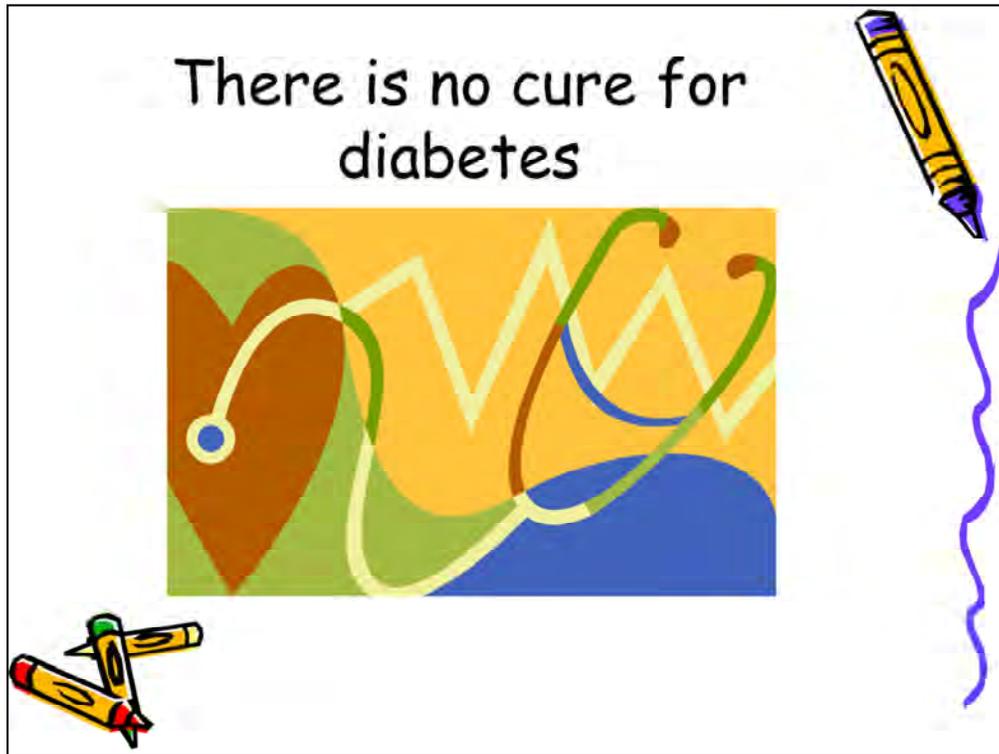
- The goal of diabetes care is to keep the blood glucose closer to normal. Despite best efforts hypoglycemia will occur.
- Glucagon is the fastest means to raise the blood glucose level.



Children may spend significant hours a day at school. Hypoglycemia must be treated to avoid more complications such as seizures and even death.



Others things to remember is illness and stress have a direct affect on blood sugar control. Blood sugars can go high with illness. Of courses the student should be home when they are sick, but many times students can become ill at school. It is good to know that any stress or illness can and will affect their blood sugars.



There is no cure for diabetes.

There is much research and study going on with diabetes.

There is hope that in the near future there will be a cure.

Until that time, it is important to keep the person as healthy as possible.

Steps for Glucagon Administration



Preparation

1. Remove flip top seal from vial containing dry powder
2. Remove needle protector from syringe



Mixing Solution

3. Slowly inject all sterile water in syringe into the bottle containing the powder

4. Gently swirl vial until all powder is dissolved and solution is clear (don't shake vial)



Drawing Out & Positioning

5. Withdraw all glucagon solution from vial

6. Turn student on his/her side



Dosing & Injecting

7. Insert needle straight in (90 degree angle)

arm (deltoid) muscle

leg (outer thigh)

Note: Inject through clothing only if necessary

8. Withdraw needle, apply light pressure at injection site



Completing the Procedure

9. Place used needle back in kit and close the lid (do not recap)
10. Give used kit to EMS personnel



Let's Practice



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