YOUTH WITH DIABETES

YWD Teacher's Training: Diabetes in School

Endorsed by the
Centre for Diabetes and Endocrinology (CDE)

The purpose of this booklet is to educate school staff members about diabetes and to share a set of practices that enable schools to ensure a safe learning environment for students with diabetes

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What is diabetes?

Diabetes is a chronic condition characterised by high blood glucose levels due to defects in the secretion of a hormone called insulin, or a defect in its action in the body.

Insulin is necessary to help glucose enter the body's cells, where it is used for energy. Glucose comes from digesting carbohydrate and is also produced by the liver. Carbohydrate comes from many different kinds of food and drink, including starchy foods such as bread, potatoes; fruit; some dairy products; glucose and other sweet food.

The difference between Type 1 and Type 2

Type 1 diabetes develops if the body is unable to produce any insulin at all. This is the most common diabetes in children. It is an auto-immune disease where the body's own immune system destroys the insulin-producing cells in the pancreas. It is treated by injecting insulin multiple times a day, and insulin is needed from the day of diagnosis to survive. Type 1 diabetes cannot be prevented.

Type 2 diabetes develops when the body can still make some insulin, but not enough, or when the insulin that is produced does not work properly. This type is on the rise in children due to the increase of child obesity and sedentary lifestyle. It is treated with weight control, healthy eating, exercise and oral diabetic medication (pills). Some people with type 2 diabetes may also use insulin.

Symptoms of diabetes

Schools can be in a position to notice the signs that a child has diabetes. The main symptoms are:

- increased or excessive thirst
- passing urine frequently (especially at night), onset of bed wetting
- extreme tiredness
- unexplained weight loss
- blurred vision
- nausea and vomiting
- extreme hunger

Diabetes is diagnosed by a simple blood test and once treated the symptoms are usually quickly relieved. However, if all of these symptoms are missed, it can lead to a life-threatening condition known as diabetes ketoacidosis (please see Ketones section below).

Managing Type 1 Diabetes

The goals of diabetes treatment in children are:

- To keep blood glucose levels as close to the levels of a person without diabetes as often as possible. This needs to be maintained to avoid acute (short term) or chronic (long term)complications
- To maintain normal growth and development
- To promote healthy physical, emotional, and social well-being

Efforts to maintain blood glucose levels in a target range involve balancing food, exercise and diabetes medicine, including the child's emotional status. Food raises blood glucose levels and exercise and diabetes medication (like insulin or oral medication) lower them.

Without good control, diabetes can result in long-term complications such as heart disease, kidney failure, nerve disease, amputations, blindness and strokes.

Checking blood glucose levels and targets

Regular blood glucose checks must be done to determine the amount of glucose in the blood in order to help keep the blood glucose level within the target range.

Testing blood glucose levels involves pricking the side of the finger to obtain a small drop of blood. A test strip is placed into a small electronic device, and once ready the blood droplet is then placed on the test strip. It usually takes 5 seconds to produce a result shown as a number. Younger children, those newly diagnosed or with learning difficulties may need assistance with blood testing.

Steps to test blood glucose levels:

1. Make sure the child's hands are washed before testing; dirty hands may affect the reading and this can lead to making the wrong insulin adjustments
2. Hands must be warm and dry before testing blood glucose
3. Insert the strip into the meter; most of the different meters will then turn on and show a small blood drop icon when ready

4. Prick the finger on the **side** of the finger tip. This is to prevent pain and damage to the nerve endings on the top of the finger tip. It is advised to supervise an alternative finger for children who continuously use the same finger
5. Apply the small blood drop to the strip in the glucose meter
6. Make a note of the blood glucose level in the child's log book and if reading is out of target range follow their parents' instructions

Blood Glucose Results:

The target range is designed to keep the child safe and prevent long term complications. This range is individualised by the child's health care team. A guideline for acceptable control during the day, before meals and after meals, is the following:

Toddlers and pre-school: between **6 –11 mmol/l**
Primary school children: between **5-10 mmol/l**
Teenagers and adolescents: between **5.5 – 10 mmol/l**

Normal blood glucose in people without diabetes: between 3.8-7.2 mmol/l

A blood glucose reading below 4mmol/l is considered hypoglycaemic, usually called "a low" or "a hypo"
A blood glucose reading above 10mmol/l is considered hyperglycaemic, called "high" or "hyper"
Symptoms of hypoglycaemia and hyperglycaemia are discussed below.

When to test:

- before meals
- before, during and after physical activity
- if the child is unwell
- any time the child feels that their blood glucose level is falling too low (see symptoms of hypoglycaemia) or climbing too high (see symptoms of hyperglycaemia)
- testing is also advised if you see a difference in the child's behaviour or reactions

It is medically safe for the child to test at their desk. It does not present a danger to other students or staff members. This reduces the amount of missed classroom time and the student does not have to delay treatment for low or high blood glucose levels.

Insulin Injections

Insulin is a life-saving drug for children with diabetes and if used correctly there should not be any complications or side effects. It is important to understand that there are different types of insulin. The child might be on a different insulin regimen using different types of insulin to a peer who also has diabetes.

Two injections a day:
Children who take two injections a day usually take them at breakfast and the evening meal, and so will not usually need to inject during the school day.

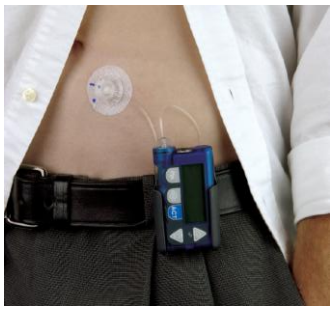
Multiple daily injections (also known as basal bolus):
An increasing number of children now take more than two injections a day. Taking more injections gives greater flexibility in when to eat and how much to eat, according to physical activity and blood glucose levels. Children on this regimen will require a short/rapid acting insulin injection with each meal as well as a long acting insulin injection at bedtime and/or in the morning. This will mean that they have to have an injection at school at lunchtime. Extra short/rapid acting insulin injections are given to correct high blood glucose levels.

Injections can be given either by syringe or insulin pens. With syringes, insulin will be drawn up from a vial. Insulin pens are preloaded with insulin and have a dial that adjusts the insulin dose.

If the child wishes, the school should identify a private area where the injections can be taken. If not the child should be allowed to inject where they feel it is most appropriate. At least two staff members should be trained to give insulin or supervise the student in self-administration for younger children or those newly diagnosed that may need help with injecting.

Insulin Pump

An insulin pump is a small electronic device that delivers insulin continuously via a thin flexible tube. The tube is connected to a cannula, which is inserted just under the skin. The cannula can usually stay in place for 2–3 days so should not need changing at school unless it becomes dislodged or blocked. The child should have extra supplies at school should this occur.



When the child eats, or if their blood glucose level is high, they will need to take extra insulin (called a bolus) and will do this by pressing a combination of buttons on the pump. Younger children or those new to a pump may need help with using their pump. Insulin pump companies happily send certified pump trainers to schools to assist with training.

While insulin pumps are fairly robust, they are expensive pieces of equipment and need to be looked after.

Storage of Insulin

Opened vials or pens of insulin may be left at room temperature for 30 days in a cool, dry place out of direct sunlight, which degrades the insulin and can cause hyperglycaemia. The child should keep a bag containing a blood glucose meter, insulin, and treatment for low glucose levels with them at all times or in a classroom where it is easy to access when needed and during breaks. This bag must be kept out of the sun. Unopened vials or pens should be stored in a refrigerator. They may be used until their expiration date and must then be discarded.

Hypoglycaemia: low blood glucose

Definition:

Hypoglycaemia occurs when blood glucose levels are **below** a child's target range, usually **under 4mmol/l**.

This can happen when:

- The body gets too much insulin or not enough food
- Meals or snacks are missed or eaten late
- Not eating all the carbohydrates in the meal or snack
- The child gets more exercise than planned

A. Mild to moderate hypoglycaemia

Symptoms:

The signs can be different for each child and the child or their parent can tell you what their warning signs are. They generally include the following:

- Shakiness, trembling
- Pale skin
- Sweating
- Rapid pulse
- Hunger
- Irritability, crying
- Poor coordination
- Giggling or being silly
- Dizziness
- Blurred vision
- Fatigue, sleepiness
- Headache
- Slurred speech
- Lack of concentration, daydreaming
- Aggressive

Treatment:

1. Students should not be left alone nor sent to the office with another young student during suspected hypoglycaemia
2. Check blood glucose level, if you are not able to do so assume hypoglycaemia
3. Immediately give the child a fast-acting carbohydrate food or beverage as recommended by the parents
4. Or any ONE of the following can be used:
    - ½ can of regular coke (NOT Coke Light or Tab)
    - ½ glass of fruit juice
    - 3 - 5 glucose tablets (eg. Super C)
    - 2-3 teaspoons honey or syrup
    - 7 jelly babies
    - 100ml Lucozade

5. Re-check child's blood glucose level after 15 minutes
6. Give another fast-acting carbohydrate if blood glucose remains low
7. When child feels better, feed a meal or snack as soon as possible, such as a sandwich, fruit, milk or biscuits
8. Give child time to recover. Eg, a test should not be given right after an episode of hypoglycaemia.
9. The child should not do any activity or exercise after hypoglycaemia until they have fully recovered with stable, in-target blood glucose levels
10. Always make a note to the parents in the event of a low and how it was treated
11. Headaches are common after hypoglycaemia

B. Severe Hypoglycaemia: THIS IS A MEDICAL EMERGENCY

Symptoms:

- Loss of consciousness
- Seizures or convulsions
- Inability to swallow

Very young children who aren't aware of the symptoms or who can't communicate that they are feeling "low" need careful observation for subtle signs like daydreaming, lying on their arms, not reacting to any interactions or irritability.

Treatment:

1. Never put food or liquid into the mouth of a child that is unconscious, convulsing or cannot swallow
2. Position the child in the recovery position (lying on left side); check that the airway is clear and that the child is breathing
3. If the child is convulsing, protect the child from injury of nearby objects
4. Have a designated person give the child a Glucagon injection (see below)
5. Notify the parents and child's doctor immediately

Glucagon

Definition:

Glucagon is a hormone which raises blood glucose within 10 minutes. It needs to be given by injection when the child is unconscious, convulsing or unable to swallow due to severe hypoglycaemia. The injection of Glucagon can be taught by parents or medical personnel. Any staff member who is trained to administer Glucagon should know where it is kept at all times. You cannot harm the child by giving them a Glucagon injection but rather save their life.

Instructions:

Glucagon comes in a bright orange box. Inside is a dry-powder or tablet in a vial and a pre-filled syringe containing liquid that is used for dissolving the powder.

1. Take the orange cap off the vial
2. Inject all the liquid into the vial
3. Mix the solution by shaking it
4. Draw up the solution with the same syringe
5. Inject the solution into the buttocks or upper thigh of the child
    - For children **under 25kg**, inject **half** of the solution
    - For children **over 25kg**, inject **all** of the solution
    - If the child is having convulsions, have another person hold the child down while injecting the Glucagon
6. Rub the injection site to increase absorption
7. The child should recover within 15 minutes, if not call an ambulance
8. Give the child fast acting carbohydrates and a snack as described in hypoglycaemia treatment when they regain consciousness
9. Stay with the child until their parents or emergency medical services have taken over their care

Headaches and vomiting are common symptoms after administering Glucagon. Call the parents, as the child will most likely want to go home to recuperate.

Hyperglycaemia: high blood glucose

Definition:

Hyperglycemia occurs when blood glucose levels are above a child's target range, usually above 10mmol/l.

Causes:

- The body gets too little insulin, too much food, or decreased exercise
- The body is under stress from a cold, sore throat, or other illness
- The child is emotionally upset

Symptoms:

- Increased or excessive thirst
- Fatigue, weakness
- Increased need to use the restroom
- Blurry vision
- Nausea

Treatment:

1. Check the child's blood glucose level
2. Give glucose-free beverages (like water or Coke Light)
3. Allow free access to the bathroom
4. Give insulin according to parent's instructions
5. Check for ketones (see below)

Ketones

Definition:

When the body's cells don't get enough insulin, the body starts to burn fat instead of glucose for energy, producing waste products called ketones. Very high levels of ketones cause a condition called ketoacidosis, which makes the pH of the blood more acidic. Ketones can be detected with a simple urine or blood test. Ketoacidosis is a dangerous condition and must be treated promptly. Left untreated for many hours or days, it can lead to a diabetic coma. Ketones also occur when a child with diabetes becomes ill (eg influenza, tonsillitis etc). The body needs more insulin at this time. Ketones may also occur when the child has missed an insulin injection or the blood glucose is over 14mmol/l for an extended period.

Symptoms:

- Abdominal pain
- Nausea
- Vomiting
- Fruity-smelling breath
- Dehydration (sunken eyes; dry, cracked lips)
- Drowsiness, laboured breathing

A positive urine test for ketones is when the colour of the strip with the urine sample on it changes to a pink or purple colour. The darker the colour, the higher the level of ketones..

Treatment:

1. Test for ketones using a urine test under any one of the following conditions
    a. Blood glucose value above 14 mmol/l
    b. Stomach pain
    c. Nausea and/or vomiting
    d. Any other illness
2. Test the child's blood glucose
3. Notify parents immediately
4. Give insulin and fluid according to parents instructions
5. Allow free access to the bathroom
6. Do not let the child perform any physical activity for the rest of the day

Carbohydrate counting

The nutritional needs of children with diabetes do not differ from the needs of children without diabetes. They should follow a healthy meal plan just like anyone else.

However, with insulin regimens, the timing, amount, and content of foods need to be matched to the amount of insulin and physical activity. Meals should not be skipped and adequate time to finish lunch is needed for children with diabetes to help prevent hypoglycaemia. The child may need to eat in class when treating hypoglycaemia.

Food containing carbohydrate will increase the child's blood glucose levels. Protein and fats do not increase blood glucose.

Some examples of carbohydrates:

- Bread, muffins, doughnuts
- Cereal, pasta, rice
- All fruits
- Milk, yoghurt, ice cream
- Sweets, biscuits, chocolates

Children with diabetes are able to eat any foods they like as long as they match the carbohydrate content with their insulin dose. This is the basis of carbohydrate counting. Obviously this should be done in moderation, as continuous unhealthy eating will lead to weight gain and poor diabetes management.

It is advised that children should avoid glucose-containing soft drinks such as regular Coke, Fanta, Cream Soda, etc. as the glucose in these are absorbed too rapidly for their insulin to work effectively. However, these are good treatments for hypoglycaemia. It is thus important that the tuckshop or food services of the school sell glucose-free drinks and healthy alternatives. This will also allow other students to make healthier choices.

Class parties

We now know that there is no food that a child with diabetes cannot eat, as long as it is scheduled into the meal plan and is balanced with the correct amount of insulin. So at class parties, diabetic children are welcome to enjoy the treats like cake. However, parents may feel differently, so please consult them with regard to their child prior to a scheduled class party.

Playing sports and other participation

Children with diabetes can and should play games and sports. Everyone can benefit from regular physical activity. Exercise helps to lower blood glucose levels, maintain cardiovascular fitness, and control weight. Diabetes need not hinder a child from representing their school in any sporting event.

A child with diabetes may need to eat a snack before, during, or after strenuous exercise. The child may also need to check blood glucose levels before taking part in a game or sport to determine when to eat a snack and how much food to eat. Insulin pumps may need to be removed for contact sports and swimming. They easily detach from the cannula and can be clipped back on after the activity or swim. It is important to always keep extra snacks readily available for when the child is doing sports. Students with diabetes should also be allowed to wear their medical ID during physical activity. Diabetes should not be an excuse for opting out of school activities. If this does happen regularly, speak to their parents to find out more about the individual situation.

Children with diabetes should not exercise if they are having symptoms of hypoglycaemia or if blood glucose is so high that they have started to produce ketones.

Exams and school performance

Children with diabetes function optimally when their blood glucose is within target range. During hypoglycaemia, the brain is deprived of glucose, causing cognitive changes. Should this occur during a test or exam, they will need access to food. It is advised to allow the child to check their blood glucose level prior to starting a test or exam. During the test, they should be allowed to treat their hypo and recuperate for 15 minutes away from their paper, and then be allowed to return and have extra time to make up for the time lost.

For hyperglycaemia, the child may need the bathroom more often during tests or exams. Hyperglycaemia also affects the child's ability to concentrate and may lead to irritability.

Substitute teachers

It is essential that a substitute teacher be informed that they have a child with diabetes in the class. The basics of hypoglycaemia, special allowances for the student such as extra bathroom breaks, eating in class etc should be explained. This will also apply to school outings and visits.

Psychology of diabetes

Diabetes treatment is life-long, continuous and frequently frustrating condition for the child and their family.

Children react differently to having diabetes. They may be accepting, resentful, open to discussing it, or attempt to hide it. Often, the same child will experience all of these feelings over time. School personnel should be aware of the student's feelings about having diabetes and identify ways to ensure the student is treated the same as others. The best way to handle this will depend on the individual child's personality. Some children will check their blood glucose or give themselves an insulin injection for show-and-tell. Older children have presented science projects on diabetes and its care. However, a child who is shy or sensitive about having diabetes may not wish to be singled out in this way. Take cues from the child on how to handle his or her diabetes. Be sure to respect the student's privacy rights.

For the teenager with diabetes, having to take insulin, check blood glucose, and follow a meal plan is tiresome and can compound the normal difficulties of adolescence. It is typical behaviour for a teen with diabetes to ease up on diabetes care and try to act like everyone else.

A child with diabetes need not be singled out for special attention; this could make them feel different, may lead to embarrassment, or make them feel angry and resentful about having diabetes.

Being high or low may have an impact on the child's behaviour in the classroom. This may include unusual:

- Lack of concentration
- Being irritable
- Being restless or agitated
- Being argumentative
- Being tired
- Asking to go to the bathroom or drink water frequently

If clarification about the child's diabetes management is needed, or there is concern about the child's behaviour or emotional health, it is best to discuss this with their parents. Each child with diabetes is an individual and each has a different management regimen. Giving advice based on your previous diabetes experience should be avoided.

Bullying and Teasing

Children may be at risk for becoming targets for bullying or teasing by their classmates and sadly, sometimes by teachers based on their diabetes. They may be targeted for things like having to check their blood glucose levels, having to give injections, being on a stricter meal plan or being called a “druggy” for using needles. In some situations this will make the child adhere less to their diabetes management, such as not testing their blood glucose levels, or not eating when they have a hypo.

Talk to the child and parents to establish how they are feeling about school and be aware of the worries they may have. You may also explain diabetes to the child’s friends or classmates if the child does not mind you doing so. Educating other students about diabetes is important to help answer any misconceptions the students may have.

Disposing of sharps

Disposal of sharp objects such as lancets and needles can be in a heavy-duty plastic or metal container with a tight-fitting lid that may be kept at school or in the student’s bag. Used blood glucose test strips and other materials may be discarded in the regular dustbins.

Excursions and school camps

School trips are an exciting and important part of school life and there is no reason for a child with diabetes to be excluded. It is useful to provide parents with the menu and program prior to the camp so that they may plan insulin doses and meals.

Day Trips:
Going on a day trip should not cause any real problems, as the routine will be much like that at school. The child should take:

- their insulin and injection kit
- their blood testing kit
- hypo remedies
- pump supplies (if appropriate)
- extra food/snacks in case of delays
- emergency contact information

Overnight Stays:
If the child cannot do their own injections/manage their pump and/or check their own blood glucose levels, this will need to be done by a member of staff. Staff should meet with the child’s parents well in advance of the trip to discuss what help is required and who will assist. The same equipment will need to be packed, just with more supplies to last the duration of the trip.

The extra physical activity, change in routine and excitement of the camp will increase the risk of hypos. The child should have access to fast-acting glucose at all times, and the supervisors should be aware of hypo symptoms.

Overseas Tour:
Children with diabetes are easily able to travel abroad. They need a letter from their doctor stating their diagnosis and the need for medical supplies to show the border control. Diabetes medication and supplies must be carried in hand luggage and should be split between two bags in case a bag is lost or stolen.

Myth busters

"Diabetes is contagious."

False. You cannot "catch" diabetes from someone who has it. But diabetes can run in families. Researchers are still studying how and why diabetes occurs in certain children and families and not in others.

"You can just take a pill instead of insulin injections."

False. Insulin cannot be swallowed like a medicine as it is a protein and would be broken down in the stomach. Type 2 patients take pills that stimulate their pancreas to make more insulin. Type 1 children cannot make any insulin at all, so they need insulin injections.

"Children with diabetes can get better and stop insulin."

False. Diabetes has no cure. It is a life-long condition but can be successfully managed with regular glucose tests, insulin, healthy eating and exercise.

"Children with diabetes became diabetic from eating too many sweets."

False. Type 1 diabetes has a genetic predisposition whereby the immune system destroys pancreatic cells that produce insulin. Type 1 diabetes can also occur as a complication of another chronic condition such as Cystic Fibrosis.

Legal considerations

According to the South African Children's Act [38 of 2005] Chapter 2, Section 11(2), "Children with disability or chronic illness", it states that

In any matter concerning a child with chronic illness due consideration must be given to –

a) providing the child with parental care, family care or special care as and when appropriate;
b) providing the child with conditions that ensure dignity, promote self-reliance and facilitate active participation within the community; and
c) providing the child with necessary support services.

Chapter 2, Section 10, "Child participation" states,

Every child that is of such an age, maturity and stage of development as to be able to participate in any matter concerning that child has the right to participate in an appropriate way and views expressed by the child must be given due consideration.

Chapter 3, Subsection 7(1j) "Best interests of child standard", states that

Whenever the provision of this Act requires the best interests of the child standard to be applied, the following factors must be taken into consideration where relevant, namely-

(j) any chronic illness from which the child may suffer;

The aim of section 11 is to ensure that these children are treated with dignity, that their right to participation is respected and to provide necessary support services to ensure that they are not further discriminated against or neglected due to their chronic illness or disability. A child, who is living with a disability or is chronically ill, must be given every opportunity to take part in social, cultural, religious or educational activities.
Students with diabetes must have the same access to educational and school-sponsored opportunities as students without diabetes. Related aids and services designed to meet the individual needs of the student must be accommodated by the school and its staff.

SUMMARY: What you as the teacher need to do

- Know the identity of students with diabetes in your classroom
- Allow the child to eat, drink and use the bathroom as and when necessary
- You must be able to test the child's blood glucose
- You need to be able to recognise and treat hypoglycaemia
- At least two members of staff should be trained and must be able to give a Glucagon injection in an emergency
- Always carry a quick snack whenever you and your student leave the class for assembly, fire drills, field trips etc.
- Communication between the school and parents is vitally important in ensuring adequate diabetes management at school and to ensure the child's safety
- Discrimination at school because of diabetes should not be tolerated from either staff or other learners
- Don't draw unnecessary attention to your student's condition, respect the student's confidentiality and right to privacy
- Extra supplies should be kept at the school, these include testing strips, lancets, needles or syringes, batteries for the glucose meter, insulin pump supplies, quick-acting and slow-acting carbohydrate snacks and the Glucagon emergency kit. These should be supplied by the parents

Key terms:

Hypoglycaemia: low blood glucose, usually below 4mmol/l
Hyperglycaemia: high blood glucose, usually above 10mmol/l
Ketoacidosis: damaging build up of ketones in the blood because there is not enough insulin in the body
Glucagon: a hormone that raises blood glucose, given by injection to a diabetic child who is suffering from severe hypoglycaemia and is unconscious or convulsing

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