

**Diabetes Highlights for SPS Staff**

**Section 1: Diabetes Overview (You are encouraged to read the complete guide online on the CSDE web site at** [*http://www.sde.ct.gov/sde/cwp/view.asp?a=2663&q=334554*](http://www.sde.ct.gov/sde/cwp/view.asp?a=2663&q=334554)**or the SPS web site at** *<http://www.southingtonschools.org/page.cfm?p=814>* **)**

Diabetes is a disorder of metabolism — the way in which the body converts food into energy. The body breaks food down by digestive juices into the fuel components needed to survive, including a sugar called glucose. Glucose is the body’s main source of energy. (Kinder, 2012).

In order for cells to take in glucose, a hormone called insulin must be present in the blood. Insulin acts as a “key” that unlocks “doors” on cell surfaces to allow glucose to enter the cells.

For people with diabetes, the body does not make or properly use insulin. If glucose cannot get inside cells, it builds up in the bloodstream. The buildup of glucose in the blood - sometimes referred to as high blood sugar or hyperglycemia (which means “too much glucose in the blood”) - is the hallmark of diabetes.

When the body no longer makes insulin, it must be obtained from another source – insulin injections or an insulin pump. When the body does not use insulin properly, oral medications may be taken instead of, or in addition to, insulin injections. However, neither insulin nor other medications are cures for diabetes; they only help control the disease.

**I. Types of Diabetes**

**A. Type 1 Diabetes**

Type 1 diabetes usually has a very rapid onset. It was previously called Juvenile Diabetes because most people develop it as children or teenagers.

* Most common in children
* Rapid onset
* Pancreas cannot produce insulin

**Symptoms**

* Increased thirst and urination
* Constant hunger
* Weight loss
* Blurred vision
* Fatigue

Blood glucose monitoring is essential to help assess how well the treatment plan is working. Most children can perform blood glucose checks by themselves but may need a private place to do so. Some children may need supervision from the school nurse to see that the procedure is done properly and results are recorded accurately. How often the child checks or whether he/she checks at school at all are decisions made by the child’s parents/guardians and physician and supported by school personnel.

**B. Type 2 diabetes**

Type 2 diabetes is the most common form of the disease, representing 90-95 percent of people with diabetes. To control their diabetes, children with type 2 diabetes may need to take oral medication, insulin or both.

**II. Effective Diabetes Management in Schools**

**A. Effective Diabetes Management**

Students with diabetes must monitor their blood glucose levels throughout the day by using a blood glucose meter. The meter gives a reading of the level of glucose in the blood at the time it is being checked. If blood glucose levels are too low (hypoglycemia) or too high (hyperglycemia), students can then take corrective action such as eating, modifying their activity level or administering insulin. Low blood glucose levels, which in rare cases, can be life-threatening, present the greatest immediate danger to people with diabetes (see [hypoglycemia](http://www.sde.ct.gov/sde/cwp/view.asp?a=2663&q=334554#hypoglycemia)).

Schools must adhere to Universal Precautions designed to reduce the risk of transmission of blood-borne pathogens, which include the use of barriers such as surgical gloves and other protective measures when dealing with blood and other body fluids or tissues.

 A written school plan for each student’s diabetes management helps the student, their families, school staff and the student’s health care providers know what is expected of them. These expectations should be specified in writing in the documents below as determined by the team.

* *Individual Health Care Plan (IHCP)* – The IHCP describes how the school intends to meet an individual child’s daily health and safety needs in all contexts, while under the care of the school.
* *Emergency Care Plan (ECP)* – The ECP describes how to recognize hypoglycemia and hyperglycemia and what to do as soon as signs or symptoms of these conditions are observed. The ECP is often part of the IHCP. Emergency care plans provide specific directions about what to do in an emergency.
* *Education plans* – These plans, such as the Section 504 Plan or Individualized Education Program (IEP), explain what accommodations, education aids and services might be necessary for each student.

Each student with diabetes has different needs, but school plans developed for such students are likely to include the following common elements:

* where and when blood glucose monitoring and treatment will take place (per parent/guardian written authorization and physician’s orders);
* identification of school personnel who are trained to assist the student on a daily basis and in the event the school nurse is absent or unavailable;
* location of the student’s diabetes management supplies;
* ensuring unlimited access to the restroom and water fountain;
* discussion of nutritional needs, including provisions for meals and snacks;
* issues related to full participation in all school-sponsored activities and field trips;
* accommodations such as alternative times for academic exams if the student is experiencing hypoglycemia or hyperglycemia;
* permission for absences by the local board of education, without penalty, for doctors’ appointments and diabetes-related illness; and
* maintenance of confidentiality and the student’s right to privacy.

**1. Monitoring Blood Glucose Levels**

Students usually check their blood glucose:
• before eating snacks or meals;
• before physical activity;
• when they have symptoms of high or low blood glucose.

**Self-monitoring**

The benefits of allowing blood glucose self-monitoring are significant. Students learn better when their blood glucose levels are within the proper range. It is important for schools to address the issue of locations of self-monitoring, as Connecticut law bars a school district from restricting the time or place on school grounds where a student with diabetes may test his or her blood-glucose levels, if the student has written permission from his parents or guardian and a written order from a physician.

They spend less time out of class and thus lose out on fewer learning opportunities provided to children without diabetes. They also gain independence and self-confidence, and experience fewer stigmas when monitoring is treated as a regular occurrence.

The CSDE’s *Guidelines for Blood Glucose Self-Monitoring in School* provides valuable guidance to school districts regarding self-monitoring blood glucose and is located on the [Health Promotion Services/School Nurse Web site](http://www.sde.ct.gov/sde/cwp/view.asp?a=2678&q=320768).

**Appropriate Blood Sugar Levels**

For a person who does not have diabetes, a normal fasting blood glucose level is 70-100 milligrams/deciliter (mg/dl). It will increase after meals, but usually not higher than 140 mg/dl. Blood sugar levels in a child with diabetes will vary depending on insulin action times, food consumed, activity level and illness. The child’s diabetes care plan should include his/her target range and outline corrective actions when the blood glucose level is outside the target range.

**Understanding Hypoglycemia (low blood glucose)**

Hypoglycemia is one of the most frequent complications of diabetes and can happen very suddenly.

Hypoglycemia, also called “low blood glucose” or “low blood sugar,” is one of the most frequent complications of diabetes and can happen very suddenly. Hypoglycemia is a blood glucose level less than 70 mg/dl. This is the greatest immediate danger to students with diabetes; sometimes it cannot be prevented. Hypoglycemia occurs when a student’s blood glucose level falls too low, usually as a result of administering too much insulin, skipping or delaying meals or snacks, not eating enough food as prescribed in the meal plan, exercising too long or too intensely or a combination of two or more of these factors. It is more likely to occur before lunch, at the end of the school day or during or after physical education classes. Hypoglycemia usually can be treated easily and effectively with food, non-diet drinks or glucose tablets. If it is not treated promptly, however, hypoglycemia can lead to unconsciousness and convulsions. **Students should never be left alone or sent anywhere alone (or with another child) when experiencing hypoglycemia.**

Not all students, especially young children, will recognize the symptoms of hypoglycemia with every episode. Therefore, school personnel should be familiar with the symptoms and treatment so that an urgent problem can be handled appropriately. Hypoglycemia can impair thinking abilities and sometimes can be mistaken for misbehavior. If a student has a sudden change in behavior, becomes lethargic, combative, or unconscious or is having a seizure or convulsion, presume that the student has hypoglycemia. Treat the situation as a hypoglycemic emergency and check the student’s blood glucose level immediately. If a blood glucose meter is not available in the immediate area, or if the blood glucose level is otherwise unknown, treat the student for hypoglycemia. **The student should never be left alone or sent anywhere alone when experiencing hypoglycemia.**

Symptoms of hypoglycemia are different for each student and may vary from episode to episode. They include:

**Mild/Moderate Symptoms**

* shaky
* sleepy
* changed personality
* sweaty
* dizzy
* inability to concentrate
* hungry
* confused
* changed behavior
* pale
* disoriented
* weak
* headache
* uncoordinated
* lethargic
* blurry vision
* irritable or nervous
* slurred speech

**Severe Symptoms**

* inability to swallow
* seizures or convulsions
* loss of consciousness

**What to Do for a Child who is Showing Signs and Symptoms of Mild Hypoglycemia (40-70mg/dl)**

Optimally, check blood glucose before treating a child suspected of hypoglycemia. When in doubt, treat according to MD orders. If the child’s hypoglycemia is **above 40 mg/dl**, give the child some quick-acting sugar (15 grams of carbohydrate), such as one of the following:

* ½ cup (4 fluid ounces) of juice;
* ¾ cup (6 fluid ounces) of REGULAR (not diet) soda;
* 3-4 glucose tablets;
* 4-5 small jelly beans or gum drops;
* 1 mini box of raisins; or
* 1 cup (8 fluid ounces) low fat or skim milk.

**What to Do for a Child with Moderate Hypoglycemia (less than 40mg/dl) but Responsive**

If the child’s blood glucose levels are 40 mg/dl or less and the child is still responsive and able to swallow and follow directions, double the treatment amounts indicated above. If the child has difficulty following directions or eating, but can swallow, administer an entire tube of glucose gel in between his or her cheek and gums and gently rub to be sure the sugar is being absorbed. Follow with food.

In any of the above cases, check blood glucose 15 minutes after treatment. If the blood glucose result is still less than 70 mg/dl or if the child still has symptoms, repeat the quick sugar treatment and blood glucose testing cycle until the child is symptom free and the blood glucose result is above 70 mg/dl. This can be summarized as the “Rule of 15.” Give 15 grams of carbohydrate, wait 15 minutes and then recheck. If the blood glucose is still less than 70 mg/dl, repeat the cycle giving another 15 grams of carbohydrate and rechecking in 15 minutes.

**“Rule of 15”**• Give 15 grams of carbohydrate.
• Wait 15 minutes, and then recheck blood glucose.
• If still less than 70 mg/dl, repeat another 15 grams of carbohydrate.
• Wait 15 minutes and then recheck.

The child may return to class after the blood glucose is above 70 mg/dl and he or she no longer has symptoms. Follow the MD orders for each child.

**What to Do for A Child who is Showing Signs and Symptoms of Severe Hypoglycemia**

Be sure the child is lying down in a safe area protected from injury. Position the child on his or her side. Call 911 and the appropriate emergency contacts, as described in the student’s ECP. Follow the steps outlined in the ECP, including use of glucagon or the treatment specified in the medical orders. Instaglucose may also be placed inside cheeks and rub in. Do not attempt to put anything between the teeth. As the child regains consciousness, nausea and vomiting may occur.

**What is Glucagon?**

Glucagon is a hormone that causes the liver to release sugar into the blood. It is used to raise the blood sugar when a child is unable to take liquids or food by mouth because of severe sleepiness, unconsciousness or seizure activity. Glucagon must be injected with a syringe into the skin like insulin. It should be administered as soon as possible. Glucagon is the medically endorsed treatment of choice for severe hypoglycemia. Other options and alternatives include glucose gel or other glucose supplements. It is important to remember that **the risk of not giving Glucagon is more life-threatening than giving it under these emergency conditions**.

If Glucagon is ordered in school:

* One Glucagon Emergency Kit supplied by the family is needed. Keep Glucagon at room temperature, and inform the appropriate staff of the storage location. Check the date of Glucagon kits on a regular basis. Discard if past the expiration date. Obtain a refill immediately.
* Glucagon must be mixed per the specified instructions.
* If Glucagon is part of a child’s ECP then a physician’s order and written parental permission is needed.
* Glucagon injections may be administered by “qualified school employees” to a student with diabetes that may require prompt treatment in order to protect the student against serious harm or death. "Qualified school employee" means a principal, teacher, licensed athletic trainer, licensed physical or occupational therapist employed by a school district, coach or school paraprofessional” (Public Act No. 12-198 *An Act Concerning the Administration of Medicine to Students with Diabetes, the Duties of School Medical Advisors, the Availability of CPR and AED Training Materials for Boards of Education and Physical Exercise During the School Day).*

If the school nurse is absence or unavailable, “qualified school employees” may administer glucagon to a student with diabetes who may require prompt treatment in order to protect against serious harm or death. No “qualified school employee” shall administer medication unless:

* such qualified school employee annually completes any training required by the school nurse and school medical advisor in the administration of medication with injectable equipment used to administer glucagon;
* the school nurse and school medical advisor have attested, in writing, that such qualified school employee has completed such training; and
* such qualified school employee voluntarily agrees to serve as a qualified school employee (Public Act No. 12-198 *An Act Concerning the Administration of Medicine to Students with Diabetes, the Duties of School Medical Advisors, the Availability of CPR and AED Training Materials for Boards of Education and Physical Exercise During the School Day)*.

If glucagon is not ordered, glucose gel may be an appropriate substitute for non-nursing school staff. Glycemic effects of glucagon are short lived so once the student is able to swallow, a carbohydrate liquid (such as juice, low-fat milk) should be given according the student’s IHCP or ECP.

**Understanding Hyperglycemia** (High Blood Glucose)

**Symptoms of hyperglycemia:**
• Increased thirst
• Frequent urination
• Nausea
• Blurred vision
• Fatigue

Hyperglycemia, also called “high blood glucose,” or “high blood sugar,” is a serious manifestation of diabetes that may be caused by too little insulin, illness, infection, injury, stress or emotional upset, ingestion of food that has not been covered by the appropriate amount of insulin or decreased exercise or activity. High blood glucose symptoms include increased thirst, frequent urination, nausea, blurry vision, and fatigue. In the short term, hyperglycemia can impair cognitive abilities and adversely affect academic performance.

Hyperglycemia does not usually result in acute problems. If, however, the student fails to take insulin, if a pump malfunctions and fails to deliver or delivers less insulin or if either physical or emotional stress causes the insulin not to work effectively, there will be a breakdown of fat, causing ketones (organic compounds that result when body fat is broken down for energy) to form.

Ketones will initially be cleared by the kidneys into the urine, but if there are more than the kidneys can handle, they will build up in the blood and may result in diabetic ketoacidosis (DKA). This complication will cause a fruity breath odor, nausea, vomiting, stomach pain and, if untreated, deep breathing and increasing sleepiness. Students who use insulin pumps can go into DKA within hours if their pumps stop delivering insulin appropriately.

DKA can be prevented if the student’s urine or blood is checked for ketones during times of illness, especially if vomiting occurs, or whenever the blood glucose level exceeds the target range provided in the IHCP. The test involves dipping a special strip into the urine and comparing the resulting color to a color chart or by blood ketone testing.

Treatment of hyperglycemia may involve drinking extra water or diet drinks or administering supplemental insulin in **accordance with the student’s healthcare provider’s orders**. Unrestricted access to liquids and the restroom must be provided, as high blood glucose levels increase urination and may lead to dehydration if the student cannot replace the fluids.

The student’s blood glucose level should be monitored closely until it returns to the target range specified in the IHCP. If treatment does not lower blood glucose levels and clear the ketones, if vomiting occurs or if the student is lethargic or experiences breathing difficulties, the school nurse or qualified school employee should call the parents/guardian or call for medical assistance, as outlined in the IHCP/ECP. Treatment guidelines for ketones and when to call parents should be listed in the student’s IHCP/ECP.

**Administering Insulin**

Students with type 1 diabetes and some students with type 2 diabetes require insulin to be given at regular times each day. Some students may need additional or corrective dosages of insulin to treat hyperglycemia or to cover a rise in blood glucose levels. The IHCP should specify the dosage, delivery system and schedule for insulin administration, which will differ for each student as prescribed by their health care provider, as well as specify who will administer prescribed insulin and under what circumstances.

Insulin has three characteristics:

* onset is how long insulin takes to reach the bloodstream and begin lowering blood glucose;
* peak time is when insulin is at its maximum strength in terms of lowering blood glucose; and
* duration is the number of hours insulin continues to lower blood glucose levels.

Opened vials of insulin should be refrigerated or may be left at room temperature for 30 days after opening. Unopened vials should be stored in the refrigerator and are good until the expiration date (see [appendix C](http://www.sde.ct.gov/sde/cwp/view.asp?a=2663&q=334562#toc2) for insulin storage and disposal.)

**Insulin Administration**

* **Insulin syringes** make it easy to draw up the proper dosage and shorter, smaller needles make injections easier and relatively painless.
* **An insulin pen** looks like a fountain pen. The pen holds a cartridge of insulin and a needle is screwed onto its tip just before use.
* **An insulin pump** is a computerized device that looks like a pager and is usually worn on the student’s waistband or belt. The pump is programmed to deliver small, steady doses in insulin throughout the day. Additional doses are given to cover food or high blood glucose levels. The pump holds a reservoir of insulin attached to a system of tubing called an infusion set.

**Advantages of an Insulin Pump**

* Most closely mimics the body’s normal release of insulin.
* Two types of insulin delivery
	+ Basal: small hourly dose that is preprogrammed
	+ Bolus: given to cover food or cover high blood sugar
* Pump therapy allows for greater flexibility in food choices and meal timing.
* Children who wear pumps can participate in all school activities.

Some students who need insulin during the school day are able to administer it on their own; others need supervision; and some need someone to administer the insulin for them. The school nurse should provide this help in accordance with the IHCP. School personnel who are responsible for the student’s care should be knowledgeable about the student’s insulin delivery system and how to respond to an emergency.

When a school nurse is not available to administer insulin and the student is not able to administer his/her own insulin, the school needs to develop alternative plans. In some circumstances, the parent or other immediate family member (such as the grandparent) is available to come into school during the school day to administer the child’s insulin.

**Special Nutrition Issues**

* School Meals
* After School
* School Parties
* Field Trips

**Carbohydrate counting** involves calculating the number of grams of carbohydrate or choices of carbohydrate the student eats.

A missed or delayed snack could result in hypoglycemia.

With some insulin regimens, it is important to maintain consistency in the timing and content of meals and snacks. The student should eat meals at the same time each day. Snacks are often necessary for a child with diabetes and must be eaten to balance the peak times of insulin action. **A missed or delayed snack could result in hypoglycemia**. The student also must have immediate access to a quick-acting form of glucose, such as juice or glucose tabs or gel.

**Accommodating Special Dietary Needs in School Nutrition Programs**

Substitutes or modifications to school meals can only be made with appropriate documentation from the child’s physician. School nutrition programs include the following:

* Afterschool Snack Program
* Child and Adult Care Food Program: At-Risk Supper Program implemented in schools
* Fresh Fruit and Vegetable Program
* National School Lunch Program
* School Breakfast Program
* Special Milk Program

**3. Physical Activity**

Physical activity is an important part of the overall management of diabetes. Physical education instructors and sports coaches must be able to recognize and assist with the treatment of hypoglycemia.

**General Physical Activity Guidelines**

1. Drink lots of sugar-free fluids, especially water.
2. Have rapid acting carbohydrate sources available.
3. Test blood glucose before, during and after physical activity.
4. Wear a diabetes ID.
5. To avoid low blood glucose, follow the health care provider’s recommendations about reducing the amount of insulin prior to physical activity.

**4. Planning Beyond the School Day**

Meeting the needs of students with diabetes requires advance planning for special events such as classroom parties, field trips, and school-sponsored extracurricular activities held before- or after- school. Students with diabetes often need support from an adult on school trips. Although it is not unusual to invite parents to chaperone field trips, parental attendance is **not** a prerequisite for participation by the student with diabetes. If parents do not accompany their child on field trips, the school nurse needs to determine the level of health care needed on this trip and whether or not it is necessary for a nurse to participate. Often a nurse is not needed on the trip; however, school personnel need to be properly trained to accompany the student with diabetes off-site and ensure that all the student’s supplies are brought along with the student as specified in their IHCP or ECP including snacks and supplies to treat hypoglycemia.

The plan for coverage and care during extracurricular activities should be included in the student’s IHCP, 504 plan, IEP, or other education plan. As with field trips, qualified school employees must be trained to ensure student safety and trained in responding to routine and emergency care.

**Transportation Issues**

Advanced planning is necessary for meeting the needs of students with diabetes while being transported to and from school. School bus drivers need to be aware that they often may have students with health care needs riding the buses and should be educated on diabetes and, in particular, the signs of hypoglycemia. School bus drivers also need to understand how to handle an emergency. The IHCP and ECP should address how emergencies will be managed on school transportation. In most situations, this plan will allow for the student to have access to food, supplies and equipment on the bus, if needed.

**5. Social and Emotional Aspects of Diabetes**

The diagnosis of diabetes in a child can have a significant impact on the entire family. In many cases, the diagnosis of diabetes, like other chronic health diseases, is a major event for both the child and the family.

*Adapted from the CSDE Learning and Diabetes: A Resource Guide for Connecticut Schools and*

*Families, 2012. Full version online at* [*http://www.sde.ct.gov/sde/cwp/view.asp?a=2663&q=334554*](http://www.sde.ct.gov/sde/cwp/view.asp?a=2663&q=334554) *or* [*http://www.southingtonschools.org/page.cfm?p=8146*](http://www.southingtonschools.org/page.cfm?p=8146)