

## Introduction

Diabetes is a chronic disease that affects the body's ability to metabolize food. The body converts much of the food we eat into glucose, the body's main source of energy. Glucose is carried throughout the body by the bloodstream and absorbed into body cells for fuel with the aid of insulin, a hormone produced by the pancreas. Children with Type 1 diabetes do not make enough insulin, those with Type 2 diabetes make enough insulin but it is unable to work properly at the cell level (insulin resistance). In either case the levels of blood glucose rise, causing symptoms like intense thirst, excessive urination, weight loss, weakness and blurred vision. The number of children being diagnosed with either Type 1 or Type 2 diabetes is increasing. Now approximately one in every 200 students has diabetes.

Students with Type 2 diabetes may not necessarily require insulin injections, but may take oral medications in addition to learning nutrition and lifestyle changes. Children with Type 1 diabetes must take insulin by injection or continuous infusion (pump) and carefully balance the amount of insulin, physical activity and carbohydrate intake.

If blood glucose levels are not maintained in a normal range (80-120 mg/dl) these youths can experience severe problems, both short term (severe high and low blood glucose) and long term (sustained high blood glucose). They are at risk of developing serious health problems over time including heart and kidney disease, blindness, high blood pressure and strokes, and nervous system damage if their diabetes is not well controlled. Frequent monitoring, proper care and management throughout the day are essential for students with diabetes physically and academically.

School age youths with diabetes need to develop independence in caring for their disease, maintain good control, and avoid missing valuable learning time and experiences. Intensive management is becoming the best treatment option for children with type 1 diabetes to prevent complications, but it is much more complex and requires a high level of knowledge, support, and responsibility for school staff.

We hope this guide will aide you and your staff in creating a safe and supportive environment for your students challenged by diabetes.

## Legal Parameters

**Federal laws** that protect children with diabetes include section 504 of the Rehabilitation act of 1973, the Individuals with Disabilities Education Act (IDEA) of 1975,1991. Under these laws children with diabetes cannot be discriminated against and must be given reasonable accommodation for the special needs of diabetes. These accommodations should be provided with as little disruption to the school's and child's routine as possible, and allow full participation in all school activities. —*American Diabetes Association Position Statement, Care of Children with Diabetes in the School and Day Care Setting, Diabetes Care, volume 26, Supplement 1, January 2003.*

**State laws** govern the training of non-medical school personnel in diabetes care tasks. In Ohio, the school nurse or his/her trained designee can legally administer insulin, perform blood glucose tests, etc. The training and evaluation of non-medical personnel should be well documented, and performed more often than once a year only by medical personnel, usually the school nurse. *American Federation of Teachers The Diabetes Dilemma: Demanding the Best for Our Children, [www.aft.org](http://www.aft.org)*

Parents of children with diabetes often are also very knowledgeable and should be available to *supplement* any training that is provided.

**School districts** vary widely on how the state and federal laws will be implemented and interpreted. The availability of school nurse staff, in-classroom aides, the content of teacher's contracts, and the student and parent's abilities will influence the diabetes management plan of care for the student with diabetes.

Many schools and/or the student's parents opt for the development of a **504 Plan** or **Individualized Education Plan (IEP)** for a particular student with diabetes. Details of non-discriminatory diabetes care for the student are clarified and agreed upon by both parties. If the plan is not implemented, the school can lose federal funding. In schools where there has been some difficulty in meeting the child's needs successfully these plans can insure that optimum diabetes care will be maintained in the school setting.

The lengthy process of developing and implementing IEP's can be perceived as an adversarial, legal necessity, and therefore should be a last resort. It is preferable to facilitate cooperation by educating staff and developing a diabetes management care plan with the student, family, and medical team for each school year.

Each school district also has its own specific forms to gain permission from both the parent and the student's physician to administer insulin, treat high and low blood glucose readings, and to administer glucagon. If the student has detailed physician orders that are signed by both student's parents and the physician for diabetes care, these will serve as adequate documentation for the administration of medication for that district. Juice, glucose tablets, and glucose gel, are technically *not* medication and do not require the above documentation.

## Diabetes Management 101

### Type 2 Diabetes

Formerly considered “adult onset” diabetes, this type of diabetes is being diagnosed in adolescents much more frequently. These youths are frequently obese, and the development of the symptoms of diabetes may occur over time. The first line of treatment is nutrition counseling and modification, coupled with increasing physical activity. Blood glucose levels are not monitored frequently during school hours unless the treatment regimen is being adjusted, and low blood sugars are infrequent unless they are taking oral medication to control their diabetes. These medications are usually taken at home, and help the insulin produced to work more effectively. Some oversight of nutritional intake may also be needed. Encouragement and support for improved nutrition and participation in team sports and physical activities are the primary role of school personnel. Identifying students at risk for Type 2 diabetes, (ethnic background, family history, obesity, darkening of the skin above joints, back of the neck, or in the underarm area) is also important when school physicals and assessments are completed.

### Type 1 Diabetes

Symptoms of high blood glucose usually have a more rapid onset, with sudden weight loss, excessive thirst, and profound weakness over one to two weeks. Symptoms can progress and can resemble intestinal flu at diagnosis. Very young children are often started on a relatively simple insulin regimen of “N” insulin (lasts about 18 hours) and *Humalog* or *Novolog* (act rapidly to lower blood sugar, and lasts about 3 hours). Shortly after diagnosis these children may experience many low blood sugars requiring the amount of insulin to be decreased dramatically. The pancreas, for a few months, secretes insulin once again, but will eventually decrease all insulin production. This period is called the “honeymoon” because diabetes is initially much easier to control. As pancreatic function diminishes, blood glucose levels rise and become much more difficult to control. Blood glucose can be low (<80) one day, and 300-400 the next. Such variations can cause physical symptoms that may affect schoolwork, therefore they need to be corrected as soon as possible. **The goal is for blood sugars to be 80-150 most of the time, but for some this is difficult to achieve, and an overall average in range is the best possible outcome.** Most children now routinely do a blood glucose test at least once a day at school, more often if they are experiencing many highs and lows. Please refer to the section on blood glucose monitoring.

## Insulin Treatment Regimens

The **NPH/Humlog or Novolog** insulin injection is taken at home with breakfast, and once injected, the insulin will work to lower blood sugar regardless of whether or not the student eats all of his lunch, runs during recess or not. That means the child must follow a fixed schedule of eating a set amount of carbohydrates carefully timed with when the insulin is working to lower blood sugar. Younger children are often started on this type of regimen when newly diagnosed to keep the number of injections required to a minimum. (2 per day). Children on this type of regimen may need extra insulin at times during the day if blood glucose levels are high. There is also a tendency to experience more extremes in blood sugar (highs and lows) on this type of regimen. For more effective and flexible blood glucose control many families choose intensive therapy to manage diabetes.

## Intensive Management

Many more school age children and their parents are now using some form of intensive management to control their child's diabetes. Either with injections, or by using the insulin pump, the goal of this type of treatment regimen is to more closely mimic what the pancreas does in someone who does not have diabetes. That means taking insulin all day long, on demand, when blood sugar levels rise, and when food is eaten. This allows for better control of blood sugars, and much greater flexibility in when and what the child eats.

Insulin on demand is coupled with some kind of background or 'basal' insulin, which is the amount of insulin your body needs at a resting state, without eating. To achieve better glucose control requires youths to test their blood glucose 5-6 times throughout the day, and take several injections of rapid acting insulin (*Humalog* or *Novolog*).

**Lantus Insulin** is a long acting insulin that works evenly for 24 hours to provide the insulin needed at rest, and without food. This injection is taken once daily, at night or in the morning at home. Then when the child has blood sugars that are over 120, they take just enough *Humalog* or *Novolog* insulin to lower the blood sugar to normal, and add to that a specified amount of insulin for the amount of carbohydrates they eat. These smaller doses of rapid acting insulin are called "bolus" doses and require insulin to be administered by injection at least once during the day while in school.

**Insulin Pump** users wear a small electronic device, similar in appearance to a pager, that is connected to plastic tubing that continuously delivers the background or basal insulin through a catheter that remains taped into the skin. When blood glucose levels are high and/or food is consumed, the pump is directed by the wearer to deliver an insulin bolus dose. On an insulin pump even better control can be achieved without multiple injections.

For both pump and *Lantus* users the bolus insulin is administered in amounts based on their pre-determined insulin to carbohydrate ratio (e.g. 1 unit of insulin for every 15 gms of carbohydrate eaten), and the amount of insulin they individually need to correct blood glucose if elevated (e.g. 1 unit for every 50 mg/dl over 150). To do these calculations

accurately they must know detailed information about the carbohydrate content of everything they consume, and be able to do the math every meal, every blood test, every day, around the clock.

Children as young as three and four years of age are on these types of regimens, and until they are in junior high and high school, much of the burden of diabetes care and insulin administration falls on school personnel, throughout the school day. Parents often can not be available on call for diabetes care, requiring teachers, aides, anyone properly trained by school nurses to count carbohydrates, actually give injections, and manage high and low blood sugars.