

# SCHOOL HEALTH MANUAL

DIABETES

5/01

MAINE SCHOOL HEALTH ADVISORY COMMITTEE

with input from

MAINE DEPARTMENT OF EDUCATION

MAINE DEPARTMENT OF HUMAN SERVICES

AND OTHER RELATED ORGANIZATIONS

## COMMENTS

The School Health Manual is available electronically. Each section of the Manual is available as a separate electronic file from the Department of Education WEB Page at <http://www.maine.gov/education/sh/index.html> This will allow for sections to be updated on an ongoing basis.

Comments may be given to members of the School Health Advisory Committee or sent to the below.

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## DIABETES IN SCHOOL CHILDREN

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The American Diabetes Association has published the “Care of Children with Diabetes in the School and Day Care Setting.” The Maine Diabetes Control Program provides information for management of diabetes in the schools.

### **CARE OF CHILDREN WITH DIABETES IN THE SCHOOL AND DAY CARE SETTING**

Federal laws that protect children with diabetes include the Rehabilitation Act of 1973, Section 504, the Individuals with Disabilities Education Act of 1991 (originally the Education for All Handicapped Children Act of 1975) and the Americans with Disabilities Act of 1992. Under these laws, diabetes has been determined to be a disability, and it is illegal for schools and/or day care centers to discriminate against children with diabetes. In addition, any school that receives federal funding or any facility considered open to the public must reasonably accommodate the special needs of children with diabetes. Indeed, federal law requires an individualized assessment of any child with diabetes. The required accommodations should be provided within the child's usual school setting with as little disruption to the school's and the child's routine as possible and allowing the child full participation in all school activities.

Appropriate diabetes care in the school and day care setting is necessary for the immediate safety of the child and for the child's long-term well being and optimal academic performance. The Diabetes Control and Complications Trial showed a significant link between blood glucose control and the later development of diabetes complications with improved glycemic control decreasing the risk of these complications (16,17). Achieving good glycemic control usually requires a diabetes management regimen consisting of frequent blood glucose monitoring, regular physical activity, and medical nutrition therapy, and may require multiple doses of insulin per day or insulin administered with an infusion pump. Crucial to achieving good glycemic control is an understanding of the effects of physical activity, nutrition therapy, and insulin on blood glucose levels.

School and day care personnel must have an understanding of diabetes and its management to facilitate the appropriate care of the child with diabetes. Knowledgeable personnel are essential if the child is to achieve the good metabolic control required to decrease the risks for later development of diabetes complications. Studies have shown that the majority of school personnel have an inadequate understanding of diabetes and that parents of children with diabetes lack confidence in their teachers' ability to manage diabetes effectively (3,18,19). Consequently, diabetes education needs to be targeted at day care providers, teachers, and other school personnel

who interact with the child, including school administrators, school coaches, school nurses, health aides, bus drivers, secretaries, etc.

This purpose of this position statement is to provide recommendations for the management of children with diabetes in the school and day care setting.

## **GENERAL GUIDELINES FOR THE CARE OF THE CHILD IN THE SCHOOL AND DAY CAN SETTING**

### **I I Diabetes Care Plan**

An individualized Diabetes Care Plan should be developed by the parent/ guardian, the child's diabetes care team and the School or day care provider. Inherent in this process are responsibilities assumed by all parties, including the parent/guardian the school personnel, and the child. These responsibilities are outlined in this position statement. The Diabetes Care Plan should address the specific needs of the child and provide specific instructions for each of the following.

1. 1. Blood glucose monitoring, including the frequency and circumstances requiring testing.
2. 2. Insulin administration (if necessary), including doses/injection times prescribed for specific blood glucose values and the storage of insulin.
3. 3. Meals and snacks, including food content, amounts, and timing.
4. 4. Symptoms and treatment of hypoglycemia (low blood sugar). including the administration of glucagon, if appropriate.
5. 5. Symptoms and treatment of hyperglycemia (high blood sugar).
6. 6. Testing for ketones and appropriate actions to take for abnormal ketone levels.

A sample Diabetes Care Plan can be found at the end of this section.

### **II II Responsibilities of the various stakeholders**

- A. The parent/guardian should provide the school or day care provider with the following:
1. 1. All materials and equipment necessary for diabetes care tasks, including blood glucose testing, insulin administration (if needed), and urine ketone testing. The parent/guardian is responsible for the maintenance of the blood glucose testing equipment (i.e.. cleaning and performing controlled testing per the manufacturer's instructions) and must provide materials necessary to ensure proper disposal of materials. A separate logbook should be kept at school with the diabetes supplies for the staff or student to record test results.
  2. 2. Supplies to treat hypoglycemia, including extra snack, and a glucagon emergency kit, if indicated in the Diabetes Care Plan.
  3. 3. Information about diabetes and training in the performance of diabetes related tasks.
  4. 4. Emergency phone numbers for parent/guardian and the diabetes care team so that the school can contact these individuals with diabetes related questions and/or during emergencies
- B. The school or day care provider should be expected to provide the following:
1. 1. Immediate availability to treatment of hypoglycemia without the necessity for the child to be without direct supervision by a knowledgeable adult and without the necessity for the child to travel long distances to obtain such treatment.
  2. 2. An adult and back-up adult trained to be able to: 1) perform finger stick blood glucose monitoring and record the results; 2) take appropriate actions for blood glucose levels outside of the target ranges as indicated in the child's Diabetes Care Plan; and 3) test the urine for ketones, when necessary, and respond to the results of this test.

3. 3. An adult and back-up adult trained in insulin administration (if needed) in accordance with the child's Diabetes Care Plan
4. 4. An adult and back-up adult trained to administer glucagon.
5. 5. A location in the school to provide privacy during testing and insulin administration, if desired by the child and family.
6. 6. An adult and back-up adult responsible for the child who will know the schedule of the child's meals and snacks and work with the parents to coordinate this schedule with that of the other children as closely as possible. This individual also will notify the parents in advance of any expected changes in the school schedule that affect the child's meal times or exercise routine. Young children should be reminded of snack times.
7. 7. Training to all adults who provide education/care for the child on the symptoms and treatment of hypoglycemia and hyperglycemia and other emergency procedures.
8. 8. Permission for the child to see school medical personnel upon request.
9. 9. Permission for the child to eat a snack anywhere, including the classroom or the school bus, if necessary to prevent hypoglycemia.
10. 10. Permission to miss school without consequences for required medical appointments to monitor the student's diabetes management. This should be an excused absence with a doctor's note.
11. 11. Permission for the child to use the restroom and access to fluids (i e., water), as necessary.
12. 12. Appropriate location for insulin and/or glucagon storage, if necessary.

An adequate number of school personnel should be trained in the necessary diabetes procedures (e.g., blood glucose monitoring, insulin and glucagon administration) to ensure that at least one adult is available to perform these procedures while the child is at school or on a field trip.

The child with diabetes should have immediate access to diabetes supplies at all times, with supervision as needed. Provisions similar to those described above must be available for field trips and extracurricular activities to enable full participation.

Members of the health care team should be available to provide instruction and materials to parents to facilitate the education of school personnel. In most circumstances, parents are able to provide the school personnel with sufficient oral and written information to allow the school to provide a safe and appropriate environment for the child. Materials from the American Diabetes Association and other sources are available and have been extremely helpful in accomplishing this goal.

### **III III Expectations of the child in diabetes care**

Children should be able to participate with parental consent in their diabetes care at school to the extent that is appropriate for the child's development and his/her experience with diabetes. The extent of the child's ability to participate in diabetes care should be agreed upon by the school personnel, the parent/guardian, and the health care team as necessary.

1. 1. *Preschool and day care.* The preschool child is usually unable to perform diabetes tasks independently. By 4 years of age, children may be expected to generally cooperate in diabetes tasks.
2. 2. *Elementary school.* The child should be expected to cooperate in all diabetes tasks at school. By age 8 years, most children are able to perform their own finger stick blood glucose tests with supervision,
3. 3. *Middle school or junior high school.* The student should be able to perform self-monitoring, of blood glucose under usual circumstances when not experiencing a low blood glucose level. By 13 years of age, most children can administer insulin with supervision.

4. 4. *High school.* The student should be able to perform self-monitoring of blood glucose under usual circumstances when not experiencing low blood glucose levels. In high school, most adolescents can self-administer insulin.

At all ages, individuals with diabetes may require help to perform a blood glucose test when the blood glucose is low. In addition, many individuals require a reminder to eat or drink during hypoglycemia and should not be left unsupervised until such treatment has taken place.

SEE SAMPLE BELOW

**SAMPLE**

**Diabetes Care Plan For** \_\_\_\_\_ **Date:** \_\_\_\_\_  
(name of child)

To be completed by parents and the health care team and kept with the a child's school records.

Phone numbers for parent(s)/guardian(s):

Parent/guardian # 1:

Name \_\_\_\_\_

Home: \_\_\_\_\_

Work: \_\_\_\_\_

Parent/guardian #2:

Name \_\_\_\_\_

Home: \_\_\_\_\_

Work: \_\_\_\_\_

Other emergency contact:

Name \_\_\_\_\_

Home: \_\_\_\_\_

Work: \_\_\_\_\_

Doctor/health care provider:

Name \_\_\_\_\_

Phone: \_\_\_\_\_

Notify parents in the following situations: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Blood Glucose**

Target range for blood glucose: \_\_\_\_\_ mg/dl to \_\_\_\_\_ mg/dl

Usual times to test blood glucose: \_\_\_\_\_  
\_\_\_\_\_

Times to do extra tests (check all that apply):

\_\_\_\_\_ Before Exercise  
\_\_\_\_\_ After Exercise  
\_\_\_\_\_ Other (explain) \_\_\_\_\_

Can child perform own blood glucose tests? Yes No

Type of blood glucose meter: \_\_\_\_\_

School personnel trained to monitor blood glucose: \_\_\_\_\_

**Insulin:** Times, types and dosages of insulin injections to be given during school:

<u>Time</u>	<u>Type(s)</u>	<u>Dosage</u>

Can child give own injections?                      Yes                      No

**Meals and Snacks**

Meal and snack times:

Snack	content:
Breakfast	_____
Midmorning snack	_____
Lunch	_____
Mid-afternoon snack	_____
Dinner	_____
Snack before exercise?	Yes    No    _____
Snack after exercise?	Yes    No    _____

Other times to give snacks?: \_\_\_\_\_  
 Preferred food snacks: \_\_\_\_\_  
 Foods to avoid, if any: \_\_\_\_\_  
 Foods preferred for school/class parties? \_\_\_\_\_

**Exercise and Sports**

A snack such as \_\_\_\_\_ should be readily available at the site of exercise and sports

Regularly scheduled activities: \_\_\_\_\_

Restrictions on activity, if any: \_\_\_\_\_

Child should not exercise if blood glucose is below \_\_\_\_\_ mg/dl.

**Hypoglycemia**

Usual symptoms of hypoglycemia: \_\_\_\_\_

Treatment of hypoglycemia: \_\_\_\_\_

Designated school staff member for administering glucagon: \_\_\_\_\_

**Hyperglycemia**

Usual symptoms: \_\_\_\_\_

Treatment of hyperglycemia: \_\_\_\_\_

**In the School**

Where are diabetes care supplies kept? \_\_\_\_\_

Where are supplies of snack foods kept? \_\_\_\_\_

School personnel trained in the symptoms and treatment of low blood sugar:

\_\_\_\_\_  
 \_\_\_\_\_

Reviewed by Student: \_\_\_\_\_ (student)

Acknowledged by: \_\_\_\_\_ (parent/guardian)

Acknowledged by: \_\_\_\_\_ (health provider)

Acknowledged and Received by: \_\_\_\_\_ (school representative)

Date: \_\_\_\_\_

MAINE DIABETES CONTROL PROGRAM  
11 State House Station, Augusta, Maine 04333  
287-5180/1-800-273-7147

The Maine Diabetes Control Program (DCP) assists school nurses and other school personnel to meet the special needs of the child with diabetes in the school setting. DCP established the Ambulatory Diabetes Education and Follow-up (ADEF) Program to assist persons with diabetes in learning the knowledge, skills, attitudes and behavior changes necessary to achieve and maintain good diabetes control, and to prevent the acute and long-term complications which result in unnecessary hospitalizations for the person with diabetes. The ADEF Program is delivered at over forty sites statewide by a registered nurse and dietitian that have received specialized training in diabetes self-management education and care.

Diabetes is a complex disease, characterized by abnormally high blood glucose levels. A deficiency in circulating insulin, tissue insensitivity to insulin, or both, underlie alterations in carbohydrate, protein, fat and electrolyte metabolism in a person with diabetes. The metabolic abnormalities ultimately lead to the microangiopathic and macroangiopathic complications of diabetes: visual impairments, renal disease, foot complications, stroke and heart disease.

Diabetes is classified as type 1 (characterized by beta cell destructions, usually leading to absolute insulin deficiency) or type 2 (individuals who have insulin resistance and usually have relative insulin deficiency). The focus for this discussion will be on type 1 since it usually (but not always) develops in young people.

Classic symptoms that suggest type 1 are increased thirst, increased frequency of urination, excessive hunger, and weight loss. Ketosis may result due to an inadequate insulin supply. The body cannot utilize circulating glucose in the blood for energy. Body muscle and fat are broken down to provide energy. The by-product of fat breakdown is ketones. Ketosis is present in only 30 percent of type 1 patients at the time of diagnosis.

Persons with type 1 require insulin administration, meal planning, exercise, and self-monitoring in order to manage their disease. Persons will have individualized management plans to meet their particular needs. It is vital at this time to give them the support they need to continue with their individualized management plans.

HOW IS DIABETES TREATED?

(A) Insulin Administration

Persons with type 1 diabetes produce little or no endogenous insulin, and thus require administration of exogenous insulin. There are many types of insulin made by different pharmaceutical companies. In general the three classes of insulin are: very fast acting such as Humalog or Novolog; fast acting such as regular, intermediate acting such as NPH and Lente; long lasting such as Ultralente; and ultra-long acting such as Lantus.

Table A gives the insulin preparation, onset of action, peak action, and length of action. This material combines information from several sources and the values are approximate. Also noted is that absorption rates at the individual sites may cause variance in control maintenance. (Most rapid to slowest: abdomen, arms, thigh, buttock.) It is important to acknowledge that every individual metabolizes insulin differently. Each management regime needs to meet the individual child's needs. Specific treatment plans are not discussed since each child's plan needs to be made with the physician, parent and school nurse.

Insulin may be kept at a controlled room temperature of 59° to 68 ° F if the entire contents will be used within a month. Most individuals now use disposable syringes for injections. Used syringes need to be handled per school procedure.

<b>TABLE A</b>					
<b>Insulin</b>					
Type	Brand Name	Onset	Peak	Duration	Comments
Very fast acting	Humalog Novolog	5 - 15 Minutes	45-90 Minutes	3 - 4 hours	Human – the fastest insulin available
Fast Acting	Humulin R Novolin R Velosulin Human	30 Minutes – 1 Hour	2 – 5 Hours	5 – 8 Hours	Human – often injected before meals to compensate for sugar intake from foods
	Iletin II Regular	30 Minutes – 2 Hours	3 - 4 Hours	4 – 6 Hours	Park-based
Intermediate Acting	Humulin L Humulin N Novolin L Novolin N	1 – 3 Hours	6 – 12 Hours	20 – 24 Hours	Human
	Iletin II Lente Iletin II NPH	4 – 6 Hours	8 – 14 Hours	16 – 20 Hours	Park-based
Long Acting	Humulin U	4 – 6 Hours	18 – 28 Hours	28 Hours	Human – usually used

					in combination with a faster acting insulin to provide proper control at meal times.
Ultra-long Acting	Lantus	1.1 Hours	No Peak	Constant concentration over 24 hours	Human – injected once daily at bedtime
Mixtures	Humulin 50/50 Humulin 70/30	Varies	Varies	Varies	The numbers refer to the percentage of NPH (first number ) and regular (second number)
Mixtures	Novalin 70/30	Varies	Varies		Available in vials, pen-filled cartridges and pre-filled syringes
	Humlog Mix 75/25	Varies	Varies		Available in vials, pen-filled cartridges and pre-fill syringes  75% NPL (a new NPH formula_ and 25% lispro: available in disposable pen

(B) Meal Planning

Meal planning for children with diabetes is as essential as meal planning for children without diabetes. A well-balanced diet that is adequate in essential nutrients (protein, carbohydrate, fat, vitamins, and minerals) needs to be provided to promote health, energy, and growth. The meal plan for the child with diabetes needs to emphasize foods lower in concentrated sugar and fat.

A dietitian needs to be consulted to work with the family and child with diabetes to develop an individualized meal plan. This plan needs to be flexible and adjusted to meet the child's activity level and willingness to eat certain foods. Meals need to be on time, otherwise hypoglycemia may occur. Mid-morning and mid-afternoon snacks may be necessary and needs to be allowed.

Foods served at school lunches, school parties or birthday parties need not be a problem. If the menu is known ahead of time, the meal plan can be adjusted to incorporate these foods. Children can be "trend-setters" by bringing nutritious foods to school parties which are often more popular than the traditional foods.

Frequent review of the meal plan with the dietitian is very important for adjustment of calories to ensure proper growth. This may be necessary on a quarterly basis during rapid developmental stages.

#### (C) Exercise

Regular exercise helps the person with diabetes achieve stable metabolic control. Many of the children with the best controlled diabetes are those that are consistently physically active. Physical activity seems to be a natural part of life for young children, but often requires a special effort for older youth, particularly teenage girls. The best way to make exercise a part of everyday living is to start early in the life of the child and have it be part of the normal routine.

There are many benefits of exercise. Each child needs to establish a regime that meets his/her individual needs. Some of the ways exercise helps to achieve good diabetes management include:

1. Psychological factors, i. e. exercise provides a feeling of well being
2. Fitness
3. Exercise helps to keep other body chemicals normal
4. Raises HDL cholesterol

The best kind of exercise is the aerobic kind. The most important type of exercise is the one which the child enjoys. The exercise program needs to begin slowly and increase a little at a time. Exercise needs to be strenuous enough to burn up excess calories. "Regularity" is the key to an exercise program and a routine needs to be established.

The best time to exercise will vary with each individual's schedule, but if possible, needs to be at the same time every day. This is because food, exercise and insulin need to be coordinated in order to maintain an optimal balance between the three. Children like to play after school and most organized sports activities take place then, just when most insulin are having their maximum effect.

Preventing low blood sugar during exercise is essential. This can be done by:

1. Having extra snacks available during exercise
2. Eating before strenuous exercise
3. Monitoring blood sugar before, during, and following exercise
4. Reducing the insulin dose with the physician's assistance

5. 5. Administering insulin in a site where the absorption will not be effected by the increased
6. 6. activity
7. 7. All or some combination of the above

## BLOOD GLUCOSE MONITORING

Blood glucose monitoring is an essential component of diabetes management. It allows the individual to monitor daily control and make adjustments in diabetes management. Some of the advantages of monitoring include:

1. 1. Accurate reflection of blood glucose levels (hyperglycemia or hypoglycemia)
2. 2. Assist with decision-making allowing for tighter control of blood glucose which may reduce the possibility of complications
3. 3. Self-control of diabetes management by the individual leading to better adherence

Individual lancets used at school are to be sent home, or disposed of per school procedure. Personnel may wish to investigate local school policy for other directives regarding finger lancing in combination with 504 IDEA or Special Education Services.

There are various types of blood glucose monitoring materials. The school personnel should be familiar with the type of testing material the individual uses and know how to use them.

**HYPERGLYCEMIA** is a blood sugar above a normal Fasting Plasma Glucose level of 126 mg/dl. Causes of hyperglycemia may include:

1. 1. too little insulin
2. 2. too much food
3. 3. too little exercise
4. 4. infection/fever
5. 5. emotional stress
- 6.
7. Symptoms of hyperglycemia may include:

1. 1. increased thirst and urination
2. 2. elevated blood sugar
3. 3. ketones in the urine
4. 4. weakness, abdominal pains, generalized aches
5. 5. loss of appetite, nausea, and vomiting
6. 6. heavy, labored breathing
- 7.

What to do in case of hyperglycemia:

1. test blood
2. test urine for ketosis
3. call the doctor

**HYPOGLYCEMIA** is a blood sugar below 70 mg/dl. Causes of hypoglycemia may include:

1. 1. too much insulin
2. 2. too little food
3. 3. exercise without proper management adjustments
4. 4. delayed meal

Symptoms of hypoglycemia may include:

1. 1. excessive sweating, faintness
2. 2. headache
3. 3. pounding of heart, trembling, impaired vision
4. 4. hunger
5. 5. irritability
6. 6. shakiness
7. 7. weakness
8. 8. personality change
9. 9. inability to waken

What to do in case of hypoglycemia (< 70 mg/dl):

1. 1. Initially TREAT with 15g of simple carbohydrate, such as:

Food Sources

Gelatin, regular, prepared	1/2 cup
Frosting Gel	1/2 oz.
Honey	1 Tbsp.
Juice (apple or orange)	1/2 cup
Milk, skim	1 cup
Soft drinks	
regular cola	1/2 cup
ginger ale	3/4 cup
Sugar, brown, packed	1 Tbsp.
Syrup, corn	1 Tbsp.

Commercial Sources

Glucose Tablets™	3 tablets (depends on brand)
Glucose™	1/2 if 80g bottle (40 gm)
Insta Glucose™	3/4 of 31g tube (18 gm)
Insulin Reaction Gel (Monogel™)	1/2 of 25g pkts.

3. Perform self-blood glucose test after 15 minutes to be sure the blood sugar has risen.
4. If the person is semiconscious but the swallow reflex is still present, treat with commercially prepared glucose gel, i.e., Glucose™ or Monogel™.
5. If the person is unconscious, contact the health care provider or emergency facility.

EMERGENCY MEDICATION

Glucagon (prescription medication) is given when the child is unresponsive due to hypoglycemia. Once able to swallow, feed the child to maintain adequate blood glucose levels.

WARNING: Glucagon may cause nausea and vomiting.

\* It's important to find out the usual characteristics of low blood sugar in each individual child, the best treatment, and guidelines for further care, prior the event. Remember to be prepared for this eventuality when away from school property.

### PSYCHO-SOCIAL ASPECTS OF DIABETES

The diagnosis of diabetes can cause any number of feelings in each family member as well as in the family as a group. These feelings often follow a similar pattern, sometimes referred to as the "grief process." The child may deny the disease or feel very sad. Anger is very common as is fear and guilt. Adaptation to the illness is aided by talking and sharing the above mentioned feelings. School nurses and teachers are in a position to listen to these children and give them the support they need.

The child with diabetes will be able to function as a typical student in the classroom. While the fact that a student has diabetes should certainly not be kept a secret from the other children, there are ways of being alert and aware without being overprotective.

The student may need to test his/her blood during the day and the teacher or nurse can allow time and privacy (if desired) to do this. Meals need to be on time, otherwise an insulin reaction may occur. Mid-morning and mid-afternoon snacks may be necessary and need to be allowed. The child with diabetes may participate in the normal activities of school. School personnel need to be familiar with the individual management plans for each child with diabetes. These need to be reviewed at least annually with the child's classroom teacher(s). Updated information needs to be shared if it will effect the child's schedule and/or participation in classroom activities.