

Diabetes Care in the School and Day Care Setting

AMERICAN DIABETES ASSOCIATION

Diabetes is one of the most common chronic diseases of childhood (1). There are ~186,300 individuals <20 years of age with diabetes in the U.S. Based on 2002–2003 data, the rate of new type 1 diabetes cases was 19.0 per 100,000 children and of type 2 diabetes was 5.3 per 100,000 (2). The majority of these young people attend school and/or some type of day care and need knowledgeable staff to provide a safe school environment. Both parents and the health care team should work together to provide school systems and day care providers with the information necessary to allow children with diabetes to participate fully and safely in the school experience (3,4).

DIABETES AND THE LAW

— Federal laws that protect children with diabetes include Section 504 of the Rehabilitation Act of 1973 (5), the Individuals with Disabilities Education Act (originally the Education for All Handicapped Children Act of 1975) (6), and the Americans with Disabilities Act (7). Under these laws, diabetes has been considered to be a disability, and it is illegal for schools and/or day care centers to discriminate against children with disabilities. 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 documented in a written plan developed under the applicable federal law such as a Section 504 Plan or Individualized Education Program (IEP). The needs of a student with diabetes should be provided for 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 (8,9).

Despite these protections, children in the school and day care setting still face discrimination. For example, some day care centers may refuse admission to children with diabetes, and children in the classroom may not be provided the assistance necessary to monitor blood glucose and administer insulin and may be prohibited from eating needed snacks. The American Diabetes Association works to ensure the safe and fair treatment of children with diabetes in the school and day care setting (10–15) (www.diabetes.org/schooldiscrimination).

Diabetes care in schools

Appropriate diabetes care in the school and day care setting is necessary for the child’s immediate safety, long-term well being, and optimal academic performance. The Diabetes Control and Complications Trial showed a significant link between blood glucose control and later development of diabetes complications, with improved glycemic control decreasing the risk of these complications (16,17). To achieve glycemic control, a child must check blood glucose frequently, monitor food intake, take medications, and engage in regular physical activity. Insulin is usually taken in multiple daily injections or through an infusion pump. Crucial to achieving glycemic control is an understanding of the effects of physical activity, nutrition therapy, and insulin on blood glucose levels.

To facilitate the appropriate care of the student with diabetes, the school nurse as well as other school and day care

personnel must have an understanding of diabetes and must be trained in its management and in the treatment of diabetes emergencies (3,18,19,20,34,36). Knowledgeable trained personnel are essential if the student is to avoid the immediate health risks of low blood glucose and to achieve the metabolic control required to decrease risks for later development of diabetes complications (3,20). Studies have shown that the majority of school personnel have an inadequate understanding of diabetes (21,22). Consequently, diabetes education must be targeted toward day care providers, teachers, and other school personnel who interact with the child, including school administrators, school nurses, coaches, health aides, bus drivers, secretaries, etc. (3,20). Current recommendations and up-to-date resources regarding appropriate care for children with diabetes in the school are universally available to all school personnel (3,23).

The 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 CARE SETTING

I. Diabetes Medical Management Plan

An individualized Diabetes Medical Management Plan (DMMP) should be developed by the student’s personal diabetes health care team with input from the parent/guardian. Inherent in this process are delineated responsibilities assumed by all parties, including the parent/guardian, the school personnel, and the student (3,24,25). These responsibilities are outlined in this position statement. In addition, the DMMP should be used as the basis for the development of written education plans such as the Section 504 Plan or the IEP. The DMMP should address the

Originally approved 1998. Revised 2008.

DOI: 10.2337/dc09-S068

© 2009 by the American Diabetes Association. Readers may use this article as long as the work is properly cited, the use is educational and not for profit, and the work is not altered. See <http://creativecommons.org/licenses/by-nc-nd/3.0/> for details.

specific needs of the child and provide specific instructions for each of the following:

1. Blood glucose monitoring, including the frequency and circumstances requiring blood glucose checks, and use of continuous glucose monitoring if utilized.
2. Insulin administration (if necessary), including doses/injection times prescribed for specific blood glucose values and for carbohydrate intake, the storage of insulin, and, when appropriate, physician authorization of parent/guardian adjustments to insulin dosage.
3. Meals and snacks, including food content, amounts, and timing.
4. Symptoms and treatment of hypoglycemia (low blood glucose), including the administration of glucagon if recommended by the student's treating physician.
5. Symptoms and treatment of hyperglycemia (high blood glucose).
6. Checking for ketones and appropriate actions to take for abnormal ketone levels, if requested by the student's health care provider.
7. Participation in physical activity.
8. Emergency evacuation/school lockdown instructions.

A sample DMMP (<http://www.diabetes.org/uedocuments/DMMP-finalfor matted.pdf>) may be accessed online and customized for each individual student. For detailed information on the symptoms and treatment of hypoglycemia and hyperglycemia, refer to *Medical Management of Type 1 Diabetes* (26). A brief description of diabetes targeted to school and day care personnel is included in the APPENDIX; it may be helpful to include this information as an introduction to the DMMP.

II. Responsibilities of the various care providers (3)

A. The parent/guardian should provide the school or day care provider with the following:

1. All materials, equipment, insulin, and other medication necessary for diabetes care tasks, including blood glucose monitoring, insulin administration (if needed), and urine or blood ketone monitoring. The parent/guardian is responsible for the

maintenance of the blood glucose monitoring 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 blood glucose and ketone results; blood glucose values should be transmitted to the parent/guardian for review as often as requested. Some students maintain a record of blood glucose results in meter memory rather than recording in a logbook, especially if the same meter is used at home and at school.

2. The DMMP completed and signed by the student's personal diabetes health care team.
3. Supplies to treat hypoglycemia, including a source of glucose and a glucagon emergency kit, if indicated in the DMMP.
4. Information about diabetes and the performance of diabetes-related tasks.
5. Emergency phone numbers for the parent/guardian and the diabetes health care team so that the school can contact these individuals with diabetes-related questions and/or during emergencies.
6. Information about the student's meal/snack schedule. The parent should work with the school during the teacher preparation period before the beginning of the school year or before the student returns to school after diagnosis to coordinate this schedule with that of the other students as closely as possible. For young children, instructions should be given for when food is provided during school parties and other activities.
7. In most locations, and increasingly, a signed release of confidentiality from the legal guardian will be required so that the health care team can communicate with the school. Copies should be retained both at the school and in the health care professionals' offices.

B. The school or day care provider should provide the following:

1. Opportunities for the appropriate level of ongoing training and diabetes education for the school nurse.
2. Training for school personnel as fol-

lows: level 1 training for all school staff members, which includes a basic overview of diabetes, typical needs of a student with diabetes, recognition of hypoglycemia and hyperglycemia, and who to contact for help; level 2 training for school staff members who have responsibility for a student or students with diabetes, which includes all content from level 1 plus recognition and treatment of hypoglycemia and hyperglycemia and required accommodations for those students; and level 3 training for a small group of school staff members who will perform student-specific routine and emergency care tasks such as blood glucose monitoring, insulin administration, and glucagon administration when a school nurse is not available to perform these tasks and which will include level 1 and 2 training as well.

3. Immediate accessibility to the treatment of hypoglycemia by a knowledgeable adult. The student should remain supervised until appropriate treatment has been administered, and the treatment should be available as close to where the student is as possible.
4. Accessibility to scheduled insulin at times set out in the student's DMMP as well as immediate accessibility to treatment for hyperglycemia including insulin administration as set out by the student's DMMP.
5. A location in the school that provides privacy during blood glucose monitoring and insulin administration, if desired by the student and family, or permission for the student to check his or her blood glucose level and take appropriate action to treat hypoglycemia in the classroom or anywhere the student is in conjunction with a school activity, if indicated in the student's DMMP.
6. School nurse and back-up trained school personnel who can check blood glucose and ketones and administer insulin, glucagon, and other medications as indicated by the student's DMMP.
7. School nurse and back-up trained school personnel responsible for the student who will know the schedule of the student's meals and snacks and work with the parent/guardian to coordinate this schedule with that of the other students as closely as possible. This individual will also notify

Table 1—Resources for teachers, child care providers, parents, and health professionals

Helping the Student with Diabetes Succeed: A Guide for School Personnel. National Diabetes Education Program, 2003. Available at http://www.ndep.nih.gov/Diabetes/pubs/Youth_SchoolGuide.pdf

Diabetes Care Tasks at School: What Key Personnel Need to Know. Alexandria, VA, American Diabetes Association, 2005. Available online at www.diabetes.org/schooltraining.

Your School & Your Rights: Protecting Children with Diabetes Against Discrimination in Schools and Day Care Centers. Alexandria, VA, American Diabetes Association, 2005 (brochure). Available online at <http://www.diabetes.org/advocacy-and-legalresources/discrimination/school/scrights.jsp>.*

Children with Diabetes: Information for School and Child Care Providers. Alexandria, VA, American Diabetes Association, 2004 (brochure). Available at <http://www.diabetes.org/uedocuments/c-ren-wdiabetes-brochure-caregivers.pdf>.*

ADA's *Safe at School* campaign and information on how to keep children with diabetes safe at school. Call 1-800-DIABETES and go to www.diabetes.org/safeatschool or www.diabetes.org/schooldiscrimination.

American Diabetes Association: *Complete Guide to Diabetes*. Alexandria, VA, American Diabetes Association, 2005. Call 1-800-232-6733.

Raising a Child with Diabetes: A Guide for Parents. Alexandria, VA, American Diabetes Association, 2000. Call 1-800-232-6733.

Clarke W: Advocating for the child with diabetes. *Diabetes Spectrum* 12:230-236, 1999.

School Discrimination Resources. Alexandria, VA, American Diabetes Association, 2006. Available at <http://www.diabetes.org/advocacy-and-legalresources/discrimination/school/resources.jsp>.*

Wizdom: A Kit of Wit and Wisdom for Kids with Diabetes (and their parents). Alexandria, VA, American Diabetes Association, 2000. Order information and select resources available at www.diabetes.org/wizdom.

ADA's *Planet D*, on-line information for children and youth with diabetes. Accessible at <http://tracker.diabetes.org/index.php>.

*Available in the American Diabetes Association's Education Discrimination Packet by calling 1-800-DIABETES.

- the parent/guardian in advance of any expected changes in the school schedule that affect the student's meal times or exercise routine and will remind young children of snack times.
- 8. Permission for self-sufficient and capable students to carry equipment, supplies, medication, and snacks; to perform diabetes management tasks; and to have cell phone access to reach parent/guardian and health care provider.
- 9. Permission for the student to see the school nurse and other trained school personnel upon request.
- 10. Permission for the student to eat a snack anywhere, including the classroom or the school bus, if necessary to prevent or treat hypoglycemia.
- 11. Permission to miss school without consequences for illness and required medical appointments to monitor the student's diabetes management. This should be an excused absence with a doctor's note, if required by usual school policy.
- 12. Permission for the student to use the restroom and have access to fluids (i.e., water) as necessary.

- 13. An appropriate location for insulin and/or glucagon storage, if necessary.
- 14. A plan for the disposal of sharps based upon an agreement with the student's family, local ordinances, and Universal Precaution Standards.
- 15. Information on serving size and caloric, carbohydrate, and fat content of foods served in the school (27).

The school nurse should be the key coordinator and provider of care and should coordinate the training of an adequate number of school personnel as specified above and ensure that if the school nurse is not present at least one adult is present who is trained to perform these procedures in a timely manner while the student is at school, on field trips, participating in school-sponsored extracurricular activities, and on transportation provided by the school or day care facility. This is needed in order to enable full participation in school activities (3,18,20). These school personnel need not be health care professionals (3,9,20,28,33,35).

It is the school's responsibility to provide appropriate training of an adequate number of school staff on diabetes-related

tasks and in the treatment of diabetes emergencies. This training should be provided by the school nurse or another qualified health care professional with expertise in diabetes. Members of the student's diabetes health care team should provide school personnel and parents/guardians with educational materials from the American Diabetes Association and other sources targeted to school personnel and/or parents. Table 1 includes a listing of appropriate resources.

III. Expectations of the student in diabetes care

Children and youth should be allowed to provide their own diabetes care at school to the extent that is appropriate based on the student's development and his or her experience with diabetes. The extent of the student'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. The ages at which children are able to perform self-care tasks are variable and depend on the individual, and a child's capabilities and willingness to provide self-care should be respected (18).

1. *Toddlers and preschool-aged children:* unable to perform diabetes tasks independently and will need an adult to provide all aspects of diabetes care. Many of these younger children will have difficulty in recognizing hypoglycemia, so it is important that school personnel are able to recognize and provide prompt treatment. However, children in this age range can usually determine which finger to prick, can choose an injection site, and are generally cooperative.
2. *Elementary school-aged children:* depending on the length of diagnosis and level of maturity, may be able to perform their own blood glucose checks, but usually will require supervision. Older elementary school-aged children are generally beginning to self-administer insulin with supervision and understand the effect of insulin, physical activity, and nutrition on blood glucose levels. Unless the child has hypoglycemic unawareness, he or she should usually be able to let an adult know when experiencing hypoglycemia.
3. *Middle school and high school-aged children:* usually able to provide self-care depending on the length of diagnosis and level of maturity but will

always need help when experiencing severe hypoglycemia. Independence in older children should be encouraged to enable the child to make his or her decisions about his or her own care.

Students' competence and capability for performing diabetes-related tasks are set out in the DMMP and then adapted to the school setting by the school health team and the parent/guardian. At all ages, individuals with diabetes may require help to perform a blood glucose check 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 and the blood glucose value has returned to the normal range. Ultimately, each person with diabetes becomes responsible for all aspects of routine care, and it is important for school personnel to facilitate a student in reaching this goal. However, regardless of a student's ability to provide self-care, help will always be needed in the event of a diabetes emergency.

MONITORING BLOOD GLUCOSE IN THE CLASSROOM

It is best for a student with diabetes to monitor blood glucose levels and respond to the results as quickly and conveniently as possible. This is important to avoid medical problems being worsened by a delay in monitoring and treatment and to minimize educational problems caused by missing instruction in the classroom. Accordingly, as stated earlier, a student should be permitted to monitor his or her blood glucose level and take appropriate action to treat hypoglycemia and hyperglycemia in the classroom or anywhere the student is in conjunction with a school activity, if preferred by the student and indicated in the student's DMMP (3,24). However, some students desire privacy for blood glucose monitoring and other diabetes care tasks, and this preference should also be accommodated.

In summary, with proper planning and the education and training of school personnel, children and youth with diabetes can fully participate in the school experience. To this end, the family, the health care team, and the school should work together to ensure a safe learning environment.

APPENDIX

Background information on diabetes for school personnel (3)

Diabetes is a serious, chronic disease that impairs the body's ability to use food. Insulin, a hormone produced by the pancreas, helps the body convert food into energy. In people with diabetes, either the pancreas does not make insulin or the body cannot use insulin properly. Without insulin, the body's main energy source—glucose—cannot be used as fuel. Rather, glucose builds up in the blood. Over many years, high blood glucose levels can cause damage to the eyes, kidneys, nerves, heart, and blood vessels.

The majority of school-aged youth with diabetes have type 1 diabetes. People with type 1 diabetes do not produce insulin and must receive insulin through either injections or an insulin pump. Insulin taken in this manner does not cure diabetes and may cause the student's blood glucose level to become dangerously low. Type 2 diabetes, the most common form of the disease, typically afflicting obese adults, has been shown to be increasing in youth. This may be due to the increase in obesity and decrease in physical activity in young people. Students with type 2 diabetes may be able to control their disease through diet and exercise alone or may require oral medications and/or insulin injections. All people with type 1 and type 2 diabetes must carefully balance food, medications, and activity level to keep blood glucose levels as close to normal as possible.

Low blood glucose (hypoglycemia) is the most common immediate health problem for students with diabetes. It occurs when the body gets too much insulin, too little food, a delayed meal, or more than the usual amount of exercise. Symptoms of mild to moderate hypoglycemia include tremors, sweating, light-headedness, irritability, confusion, and drowsiness. In younger children other symptoms may include inattention, falling asleep at inappropriate times, unexplained behavior, and temper tantrums. A student with this degree of hypoglycemia will need to ingest carbohydrates promptly and may require assistance. Severe hypoglycemia, which is rare, may lead to unconsciousness and convulsions and can be life-threatening if not treated promptly with glucagon as per the student's DMMP (18,24,29,30,31).

High blood glucose (hyperglycemia) occurs when the body gets too little insu-

lin, too much food, or too little exercise; it may also be caused by stress or an illness such as a cold. The most common symptoms of hyperglycemia are thirst, frequent urination, and blurry vision. If untreated over a period of days, hyperglycemia and insufficient insulin can lead to a serious condition called diabetic ketoacidosis (DKA), which is characterized by nausea, vomiting, and a high level of ketones in the blood and urine. For students using insulin infusion pumps, lack of insulin supply may lead to DKA more rapidly. DKA can be life-threatening and thus requires immediate medical attention (32).

References

1. American Diabetes Association: *American Diabetes Association Complete Guide to Diabetes*. 4th ed. Alexandria, VA, American Diabetes Association, 2005
2. Centers for Disease Control and Prevention: *National Diabetes Fact Sheet: General Information and National Estimates on Diabetes in the U.S.*, 2007. Atlanta, GA, U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2008
3. National Diabetes Education Program: *Helping the Student with Diabetes Succeed: A Guide for School Personnel*. Bethesda, MD, National Institutes of Health (NIH publication no. 03-5127), 2003
4. Nabors L, Troillett A, Nash T, Masiulis B: School nurse perceptions of barriers and supports for children with diabetes. *J Sch Health* 75:119–124, 2005
5. Section 504 of the Rehabilitation Act of 1973, 29 U.S.C. 794, implementing regulations at 35 CFR Part 104
6. Individuals with Disabilities Education Act, 20 U.S.C. 111 et seq., implementing regulations at 34 CRF Part 300
7. Title II of the Americans with Disabilities Act of 1990, 42 U.S.C. 12134 et seq., implementing regulations at 28 CFR Part 35
8. Rapp J: Students with diabetes in schools. In *Inquiry & Analysis*. Alexandria, VA, National School Boards Association Council of School Attorneys, June 2005
9. Arent S, Kaufman F: Federal laws and diabetes management at school. *School Nurse News*, November 2004
10. *Jesi Stuthard and ADA v. Kindercare Learning Centers, Inc.* Case no. C2-96-0185 (USCD South Ohio 8/96)
11. *Calvin Davis and ADA v. LaPetite Academy, Inc.* Case no. CIV97-0083-PHX-SMM (USCD Arizona 1997)
12. Agreement, Loudoun County Public Schools (VA) and the Office for Civil Rights, United States Department of Edu-

- cation (Complaint nos. 11-99-1003, 11-99-1064, 11-99-1069, 1999)
13. Henderson County (NC) Pub. Schls., Complaint no. 11-00-1008, 34 IDLER 43 (OCR 2000)
 14. Rapp J, Arent S, Dimmick B, Jackson C: *Legal Rights of Students with Diabetes*. 1st ed. Alexandria, VA, American Diabetes Association, October 2005, updated October 2007
 15. Greene MA: Diabetes legal advocacy comes of age. *Diabetes Spectr* 19:171-179, 2006
 16. Diabetes Control and Complications Trial Research Group: Effect of intensive diabetes treatment on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med* 329:977-986, 1993
 17. Diabetes Control and Complications Trial Research Group: Effect of intensive diabetes treatment on the development and progression of long-term complications in adolescents with insulin-dependent diabetes mellitus. *J Pediatr* 125:177-188, 1994
 18. American Diabetes Association: Care of children and adolescents with type 1 diabetes (Position Statement). *Diabetes Care* 28:186-212, 2005
 19. Barrett JC, Goodwin DK, Kendrick O: Nursing, food service, and the child with diabetes. *J Sch Nurs* 18:150-156, 2002
 20. Jameson P: Developing diabetes training programs for school personnel. *School Nurse News*, September 2004
 21. Wysocki T, Meinhold P, Cox DJ, Clarke WL: Survey of diabetes professionals regarding developmental changes in diabetes self-care. *Diabetes Care* 13:65-68, 1990
 22. Lindsey R, Jarrett L, Hillman K: Elementary schoolteachers' understanding of diabetes. *Diabetes Educ* 13:312-314, 1987
 23. American Diabetes Association: *Diabetes Care Tasks at School: What Key Personnel Need to Know*. Alexandria, VA, American Diabetes Association, 2005 (available online at www.diabetes/schooltraining)
 24. Jameson P: Helping students with diabetes thrive in school. In *On the Cutting Edge, American Dietetic Association's Diabetes Care and Education Practice Group Newsletter*. Summer 2006, p. 26-29
 25. Owen S: Pediatric pumps—barriers and breakthroughs. *Pediatric Pumps* 32 (Suppl. 1), January/February 2006
 26. American Diabetes Association: *Medical Management of Type 1 Diabetes*. 5th ed. Alexandria, VA, American Diabetes Association, 2008
 27. *Accommodating Children with Special Dietary Needs in the School Nutrition Program: Guidance for School Food Service Staff*. Washington, DC, U.S. Department of Agriculture Food and Nutrition Service, 2001
 28. American Diabetes Association: Safe at School Campaign Statement of Principles endorsed by American Academy of Pediatrics, American Association of Clinical Endocrinologists, American Association of Diabetes Educators, American Diabetes Association, American Dietetic Association, Children with Diabetes, Disability Rights Education Defense Fund, Juvenile Diabetes Research Foundation, Lawson Wilkins Pediatric Endocrine Society, Pediatric Endocrine Nursing Society [article online]. Available from <http://www.diabetes.org/advocacy-and-legalresources/discrimination/safeatschoolprinciples.jsp>
 29. Evert A: Managing hypoglycemia in the school setting. *School Nurse News*, November 2005
 30. Bulsara MD, Holman CD, David EA, Jones TW: The impact of a decade of changing treatment on rates of severe hypoglycemia in a population-based cohort of children with type 1 diabetes. *Diabetes Care* 27:2293-2298, 2004
 31. Nabors L, Lehmkuhl H, Christos N, Andreone TF: Children with diabetes: perceptions of supports for self-management at school. *J Sch Health* 73:216-221, 2003
 32. Kaufman FR: Diabetes mellitus. *Pediatr Rev* 18:383-392, 1997
 33. Pediatric Endocrine Nursing Society: *Children With Diabetes at School*. September 2005. Available from the Pediatric Endocrinology Nursing Society, 7794 Grow Dr., Pensacola, FL 32514
 34. Committee on School Health, American Academy of Pediatrics: Guidelines for the administration of medication in school. *Pediatrics* 112 (3 Pt. 1):697-699, 2003
 35. Hellems MA, Clarke WL: Safe at school: a Virginia experience. *Diabetes Care* 30:1396-1398, 2007
 36. American Medical Association: Report 4 of the Council on Science and Public Health (A-08): *Ensuring the Best In-School Care for Children with Diabetes* [article online], June 2008. Available at <http://www.ama-assn.org/ama/pub/category/18643.html>