

# Manual for Training Public School Employees

in the

## Administration of Insulin and Glucagon

Office of Health Services  
Division of Special Education and Student Services  
Virginia Department of Education  
Revised July 2015



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## INTRODUCTION

One of the most common chronic diseases of childhood is diabetes. According to 2010 statistics from the National Institutes of Health (NIH) (2011), “about 215,000 people younger than 20 years had diabetes – type 1 or type 2 – in the United States.” During the years 2002-2005, the NIH noted that “15,600 youth were newly diagnosed with type 1 diabetes annually, and 3,600 youth were newly diagnosed with type 2 diabetes annually.” The American Diabetes Association (ADA) stated in their position statement, *Diabetes Care in the School and Day Care Setting*, “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” (2011a). The ADA advocates for parents and the health care team to collaborate with school personnel to allow children with diabetes to participate fully and safely in the school experience.

In 1999, the Virginia General Assembly passed legislation, *Code of Virginia (COV) § 22.1-274. E*, to ensure that trained personnel are in each public school where students diagnosed with diabetes are present. As directed by the Virginia General Assembly, guidelines were adopted by the Virginia Board of Nursing (VBON) on July 20, 1999, accepted by the Virginia Board of Medicine in July 1999, and adopted by the Virginia Board of Education in July 1999 (1999). The original 1999 document was first revised in November 2011. Following passage in 2014 of an act to amend the *Code of Virginia* by adding § 22.1-274.01:1, related to the further care of students who have been diagnosed with diabetes, this current manual is a revision of the 2011 manual.

The purpose of this manual is to provide the registered nurse or licensed physician with the tools to equip unlicensed school personnel to provide care confidently and safely to the student with diabetes, in the absence of professional health care providers in the school. This manual provides a blueprint of information that must be included in training programs for school staff, resources for further information, and sample documents. Basic information regarding diabetes, a glossary (Appendix A), diabetes management in school, guidance in selecting appropriate training personnel, setting up the training session, and diabetes resources for teachers and parents are included. This manual, coupled with a power point presentation, provide the trainer with a comprehensive teaching tool. The power point presentation may be accessed on the Virginia Department of Education Web page at:

[http://www.doe.virginia.gov/support/health\\_medical/index.shtml](http://www.doe.virginia.gov/support/health_medical/index.shtml). The overarching goal of the training program is to provide a safe school environment for students with diabetes where they can fully participate in the school experience.

The school nurse has multiple functions in the care of the student with diabetes. The role of the school nurse includes:

- case management;
- direct care;
- development of the Individualized Health Care Plan (IHP);
- creation of a written Emergency Action Plan (EAP) for unlicensed school staff;
- training and supervision of unlicensed staff in implementing the EAP as well as administering insulin and/or glucagon; and
- evaluation of care provided to the student.

According to the National Association of School Nurses, “An Individualized Health Plan (IHP) developed by the school nurse documents and communicates the student’s needs and the school’s management strategies for that student in the school setting” (2006). The school nurse develops the IHP based upon the Diabetes Medical Management Plan (DMMP), input from the parent, and a nursing assessment.

## **BACKGROUND**

The 1999 Virginia General Assembly passed legislation that amended and reenacted the *Code* with respect to the management of diabetes in the school setting. The following references outline the provisions in the *Code*.

- *COV* § 8.01-225.A.9 – Persons rendering emergency care exempt from liability;
- *COV* § 22.1-274.D – Ability of school board employees to refuse training in the administration of insulin and glucagon;
- *COV* § 22.1-274.E - Ensures that in school buildings of 10 or more instructional and administrative employees there are at least two or more employees trained in administration of insulin and glucagon if there is a student with diabetes in attendance. Ensures one or more employees trained in school buildings with less than 10 instructional and administrative employees if there is a student with diabetes in attendance.
- *COV* § 22.1-275.1 – Outlines participation of school health advisory boards in developing procedures relating to children with acute or chronic conditions;
- *COV* § 54.1-2901.A.13,20,26 - Allows employees of a school board, authorized by a prescriber, with written parental permission, and trained in administration of insulin and glucagon to administer insulin **or** glucagon;
- *COV* § 54.1-3001.9 – Exempts school board employees administering insulin and glucagon from the requirements imposed for the practice of nursing;
- *COV* § 54.1-3005.13 - Requires the Board of Nursing to develop and revise as necessary, in coordination with the Boards of Medicine and Education, guidelines for training school employees in the administration of insulin and glucagon.
- *COV* § 22.1-274.01:1 – Allows students who are diagnosed with diabetes with prior parental consent and approval from the prescriber to carry and use essential supplies in reasonable quantity to manage routine self-care, as well as emergency treatment of hypoglycemia or hyperglycemia, and to self-test and treat as needed on a school bus, school property, or at a school sponsored activity.

Specific code references may be accessed online, utilizing the Virginia General Assembly

Legislative Information System at: <http://leg1.state.va.us/lis.htm>.

The approved guidelines provide a framework for local school divisions to implement the policy established in the *Code*. In order to ensure that local school divisions are adequately prepared to administer insulin and glucagon, and to provide continuity in training school personnel, the Virginia Board of Education directed the Office of Special Education and Student Services to develop a manual to accompany the approved guidelines.



# Manual for Training Public School Employees in the Administration of Insulin and Glucagon

## Authorization

The *Code of Virginia* establishes the legal basis for providing diabetes training for unlicensed personnel in the school setting.

*Code of Virginia*. Chapter 570 of the 1999 Acts of the Assembly, An Act to amend and reenact §§ 8.01-225, 22.1-274, 22.1-275.1, 54.1-2901, 54.1-3001, 54.1-3005, and 54.1-3408 of the *Code of Virginia*, relating to care of public school students diagnosed with diabetes.

*Code of Virginia*. Chapter 488 and 554 of the 2014 Acts of the General Assembly to add § 22.1-274.01:1, relating to the right of a student to self-carry and self-treat, and to update training requirements for school personnel. Section 22.1-274.01:1 may be found in Appendix B.

## I. Parameters of Training

- A. Qualifications of instructional personnel. The trainer must be:
  1. A registered nurse (RN), licensed physician, or certified diabetes educator (CDE), with training or experience within the past two years in the management of diabetes in children and adolescents, and
  2. Trained in relevant sections of laws and regulations, such as *Individuals with Disabilities Education Act (IDEA)*; Rehabilitation Act of 1973, Section 504; and Occupational Safety and Health Act (OSHA).
- B. The initial training course shall continue until competency is demonstrated, but shall not be less than four hours.
- C. Skills shall be maintained with an annual training session lasting no less than one hour or until competency is demonstrated.
- D. Training shall be documented and shall include the instructor's name, trainee's name, date of training, a skills checklist, and documentation of competency of the trainee to administer insulin and/or glucagon. Samples of forms for training skills checklists and other appropriate documentation are included in Appendix C.
- E. All training materials will be reviewed/updated annually.

## **II. Content of the Training Curriculum**

The content of the training curriculum has been organized into modules. Each module covers required training components as outlined by the Boards of Education, Nursing, and Medicine in 1999, 2011, and 2015. Medical management of diabetes has changed dramatically since the original training guidelines were issued. The scope of the training material has expanded to reflect current practice. The modules contained in this program include:

- A. Rights and Responsibilities
- B. Overview of Diabetes
- C. Authorization for Treatment
- D. Principles of Medication Administration
- E. Individualized Healthcare Plan
- F. Therapeutic Management of Diabetes
- G. Monitoring the Student with Diabetes
- H. Insulin Administration
- I. Procedure for Operation of an Insulin Pump
- J. Hyperglycemia
- K. Hypoglycemia
- L. Disposal of Medical Supplies
- M. Documentation
- N. Emergency Action Plans
- O. Resources and References

## MODULE A: RIGHTS AND RESPONSIBILITIES

**The rights and responsibilities of the student, physician, parent or guardian, administrator, and the trainee shall be consistent with relevant state and federal laws and local school board policy.**

Federal laws that may apply to children with diabetes include the Rehabilitation Act of 1973, Section 504; Title II of the Americans with Disabilities Act (ADA) of 1990; the Individuals with Disabilities Education Act (IDEA) of 1990, amended 1997 and 2004; and federal regulations 34 C.F.R. 300.7 (9)(i), Child with a Disability.

State laws as outlined in the Background and Authorization sections of this manual, pp. 7-9.

### **1. *Individuals with Disabilities Educational Act (IDEA);***

The United States Congress, in 1975, passed Public Law 94-142, *The Education for All Handicapped Children Act*. This legislation is now referred to as *Individuals with Disabilities Education Act* or IDEA ensuring services to children with disabilities throughout the nation. IDEA governs how states and public agencies provide early intervention, special education and related services to more than 6.5 million eligible infants, toddlers, children and youth with disabilities. Infants and toddlers with disabilities (birth-2) and their families receive early intervention services under IDEA Part C. Children and youth (ages 3-21) receive special education and related services under IDEA Part B (<http://idea.ed.gov/>).

The basic rights guaranteed to students with disabilities under IDEA include the following:

- A free appropriate public education for all children.
- An education in the least restrictive environment based on the child's needs.
- An assessment of needs that is racially and culturally unbiased and is given in the child's native language or mode of communication.
- An individualized education program (IEP) prepared by a team of professionals and includes parents.
- Due process and a procedure for complaints to ensure the rights of the individual.

In 1986, 1990, 1991, 1997, and 2004, Public Law 94-142 was amended: however, the basic rights of children with disabilities did not change. These rights continue to provide protection against discrimination for children with disabilities, including those with diabetes.

The IDEA regulations define "disability." The definition includes a category for chronic or acute health problems that limit the individual's "alertness with respect to the educational environment" (U.S. Department of Education, n.d.). This category is called "other health impairment" (OHI).

Diabetes, as well as other health conditions such as asthma and epilepsy, is included in the examples. IDEA information may be accessed online at:

[http://idea.ed.gov/explore/view/p/%2Croot%2Cregs%2C300%2CA%2C300%252E8%2CIEP forms and resources for the Commonwealth of Virginia are available at](http://idea.ed.gov/explore/view/p/%2Croot%2Cregs%2C300%2CA%2C300%252E8%2CIEP%20forms%20and%20resources%20for%20the%20Commonwealth%20of%20Virginia)  
[http://www.doe.virginia.gov/special\\_ed/iep\\_instruct\\_svcs/iep/](http://www.doe.virginia.gov/special_ed/iep_instruct_svcs/iep/).

## **2. Section 504 of the Rehabilitation Act of 1973:**

Section 504 of the Rehabilitation Act of 1973 protects individuals with disabilities against discrimination because of their disability, in any program or activity receiving federal financial assistance, including public schools (U. S. Department of Education, 2010). Students with disabilities have the right to “a free and appropriate public education” (FAPE), regardless of the nature or severity of the person’s disability. FAPE includes the provision of educational services to the disabled student as adequately as the nondisabled students’ needs are met. This protection includes the right to the opportunity to participate fully in school activities: academic, nonacademic, and extracurricular.

In order to provide for the needs of a student with disabilities while at school, parents and school officials may develop a Section 504 Plan. In the case of a student whose disability is diabetes, a Section 504 Plan would outline the diabetes care and/or assistance the student needs in order to access the program of learning. Samples of accommodations might include such things as providing for the administration of insulin or glucagon throughout the school, or on the school bus, or at school sponsored activities, allowing the student free access to food or drink, or assisting the student with blood glucose checks. Information on Section 504 may be accessed online at: <http://www2.ed.gov/about/offices/list/ocr/docs/edlite-FAPE504.html>.

School divisions may have their own form for developing a Section 504 Plan. The American Diabetes Association Web page has a sample Section 504 Plan available online at: <http://www.diabetes.org/living-with-diabetes/parents-and-kids/diabetes-care-at-school/written-care-plans/section-504-plan.html>.

## **3. The Americans with Disabilities Act**

The Americans with Disabilities Act, Title II “requires that state and local governments give people with disabilities an equal opportunity to benefit from all of their programs, services, and activities (e.g. public education, employment, transportation, recreation, health care, social services, courts, voting, and town meetings) (U. S. Department of Justice, 2005). This law prohibits all schools, except those run by religious institutions, from discriminating against students with disabilities.

This law states that all students should have equal opportunity to participate in school sponsored activities, including field trips and after school events. It states that public schools should make reasonable accommodations for a student with diabetes. Accommodations are to be specified in the education plan and services may include:

- Assuring that there are staff members trained in checking blood glucose levels, recognizing and treating hypoglycemia and hyperglycemia, and administering insulin and/or glucagon
- Allowing students to monitor blood glucose levels in the classroom and other locations and to treat hypoglycemia and hyperglycemia promptly
- Providing appropriate supervision to ensure student participation in sports, extra-curricular activities, and field trips
- Accessing restroom facilities and drinking water as needed
- Permitting absences for medical appointments and extra sick days when necessary

More information on the Americans with Disabilities Act may be accessed online at: [http://www.ada.gov/regs2010/titleII\\_2010/titleII\\_2010\\_regulations.htm](http://www.ada.gov/regs2010/titleII_2010/titleII_2010_regulations.htm).

#### **4. Occupational Safety and Health Administration (OSHA)**

The OSHA/VOSH 1910.1030 Blood-borne Pathogens Standard final rule was issued in December 1991 to reduce the occupational transmission of infections caused by microorganisms sometimes found in human blood and certain other potentially infectious materials. As of 1992, a Blood-borne Pathogens Standard Exposure Control Plan is required in all Virginia schools. Following OSHA requirements, an Exposure Plan provides specific guidance on the management of sharps and other items contaminated with blood and body fluids. Exposure Plans shall be reviewed and updated at least annually and whenever necessary (U. S. Department of Labor, 2008). Some additional OSHA requirements include:

##### Sharps

- Contaminated needles and other contaminated sharps shall not be bent, recapped, or removed.
- Shearing or breaking of contaminated needles is prohibited.
- Used sharps containers must be closable, puncture resistant, labeled, or colored-coded, leak proof on sides and bottom, kept secure, and remain upright throughout use.

##### Sharps containers

- Sharps containers must be easily accessible to personnel and located as close as possible to the immediate area where sharps are used.

##### Personal protective equipment

- Disposable gloves (non-latex or vinyl) shall be worn when performing a procedure where there is a reasonable expectation that the employee may have contact with blood or other potentially infectious material. Single use gloves are replaced as soon as practical after coming in contact with blood or infectious material or, as soon as possible, if torn or the

ability to act as a barrier is compromised.

Additional information regarding OSHA standards for Blood-borne pathogens may be found at:

Occupational Safety and Health Administration: Part Number 1910: Occupational Safety and Health Standards: Blood-borne pathogens:  
[http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=10051](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051).

## **5. Family Educational Rights and Privacy Act (FERPA) (20 U.S.C. § 1232g; 34 CFR Part 99)**

Federal legislation protects the privacy of student educational records with legislation commonly referred to as the Family Educational Rights and Privacy Act or FERPA (U. S. Department of Education, 2011). The law applies to all schools which receive funds under an applicable program of the U.S. Department of Education.

FERPA gives parents, and eligible students (those 18 years of age), certain rights with respect to their children's education records.

Parents or eligible students have the right to inspect and review the student's education records maintained by the school. They have the right to request that a school correct records which they believe to be inaccurate or misleading.

Generally, schools must have written permission from the parent or eligible student in order to release any information from a student's education record. However, FERPA allows schools to disclose those records, without consent, to the following parties or under the following conditions (U. S. Department of Education, 2011):

- school officials with legitimate educational interest;
- other schools to which a student is transferring;
- specified officials for audit or evaluation purposes;
- appropriate parties in connection with financial aid to a student;
- organizations conducting certain studies for or on behalf of the school;
- accrediting organizations;
- to comply with a judicial order or lawfully issued subpoena;
- appropriate officials in cases of health and safety emergencies; and
- state and local authorities, within a juvenile justice system, pursuant to specific state law.

Additional information on FERPA may be accessed online at:  
<http://www2.ed.gov/policy/gen/guid/fpco/ferpa/index.html>.

## **6. The Drug Control Act (Chapter 34 of Title 54.1 of the *Code of Virginia*)**

To provide for the training of public school staff in the administration of insulin and glucagon, the Virginia General Assembly amended The Drug Control Act of the *Code of Virginia* (1999) as follows:

*Code of Virginia* § 54.1-3408. H. Pursuant to a written order or standing protocol issued by the prescriber within the course of his professional practice, such prescriber may authorize, with the consent of the parents as defined in § 22.1-1, an employee of a school board who is trained in the administration of insulin and glucagon to assist with the administration of insulin or administer glucagon to a student diagnosed as having diabetes and who requires insulin injections during the school day or for whom glucagon has been prescribed for the emergency treatment of hypoglycemia. Such authorization shall only be effective when a licensed nurse, nurse practitioner, physician, or physician assistant is not present to perform the administration of the medication.

## **7. The Virginia Nurse Practice Act**

Chapter 30 of the *Code* regulates the practice of nursing in the Commonwealth. Section 54.1-3000 states that a "professional nurse" means a registered nurse whose practice is defined as follows:

"Professional nursing," "registered nursing" or "registered professional nursing" means the performance for compensation of any nursing acts in the observation, care and counsel of individuals or groups who are ill, injured or experiencing changes in normal health processes or the maintenance of health; in the prevention of illness or disease; in the supervision and teaching of those who are or will be involved in nursing care; in the delegation of selected nursing tasks and procedures to appropriately trained unlicensed persons as determined by the Board; or in the administration of medications and treatments as prescribed by any person authorized by law to prescribe such medications and treatment. Professional nursing, registered nursing and registered professional nursing require specialized education, judgment, and skill based upon knowledge and application of principles from the biological, physical, social, behavioral and nursing sciences.

The following section of the *Code* defines exceptions to the Laws Governing Nursing. The exceptions include a provision for school staff to receive training in the administration of insulin and glucagon:

Section 54.1-3001. Exceptions. This chapter shall not apply to the following:

9. Any employee of a school board, authorized by a prescriber and trained in the administration of insulin and glucagon, when, upon the authorization of a prescriber and the written request of the

parents as defined in § 22.1-1, assisting with the administration of insulin or administering glucagon to a student diagnosed as having diabetes and who requires insulin injections during the school day or for whom glucagon has been prescribed for the emergency treatment of hypoglycemia;

#### **8. Code of Virginia § 22.1-274.E. School health services.**

Virginia law includes provisions for school health services. Included in the *Code* is a requirement for schools to provide trained staff for the care of students with diabetes:

E. Each school board shall ensure that in school buildings with an instructional and administrative staff of 10 or more (i) at least three employees have current certification or training in emergency first aid, cardiopulmonary resuscitation, and the use of an automated external defibrillator and (ii) if one or more students diagnosed as having diabetes attend such school, at least two employees have been trained in the administration of insulin and glucagon. In school buildings with an instructional and administrative staff of fewer than 10, school boards shall ensure that (a) at least two employees have current certification or training in emergency first aid, cardiopulmonary resuscitation, and the use of an automated external defibrillator and (b) if one or more students diagnosed as having diabetes attend such school, at least one employee has been trained in the administration of insulin and glucagon. "Employee" includes any person employed by a local health department who is assigned to the public school pursuant to an agreement between the local health department and the school board. When a registered nurse, nurse practitioner, physician, or physician assistant is present, no employee who is not a registered nurse, nurse practitioner, physician, or physician assistant shall assist with the administration of insulin or administer glucagon. Prescriber authorization and parental consent shall be obtained for any employee who is not a registered nurse, nurse practitioner, physician, or physician assistant to assist with the administration of insulin and administer glucagon.

#### **9. Levels of Training**

In Virginia, the *Code* sets requirements above for the minimum number of staff to receive training when a student with diabetes attends the school. In addition, the National Diabetes Education Program (NDEP) (2010) ([http://ndep.nih.gov/media/NDEP61\\_SchoolGuide\\_4c\\_508.pdf](http://ndep.nih.gov/media/NDEP61_SchoolGuide_4c_508.pdf)) makes the following training recommendations to ensure effective diabetes management in the school setting:



**Level 1.** All school personnel should receive training that provides a basic understanding of diabetes, how to recognize and respond to the signs and symptoms of low blood glucose (hypoglycemia) and high blood glucose (hyperglycemia), and whom to contact immediately in case of emergency. Training for unlicensed staff should be done by a registered nurse, licensed physician, or certified diabetes educator.

**Level 2.** Classroom teachers and all school personnel who have responsibility for students with diabetes throughout the school day should receive Level 1 training plus additional training to carry out their individual roles and responsibilities and to know what to do in case of a diabetic emergency in the absence of a school nurse. Training for unlicensed staff should be done by a registered nurse, licensed physician, or certified diabetes educator.

**Level 3.** One or more school staff members should receive in-depth training about diabetes and routine and emergency care for each student with diabetes from a registered nurse, licensed physician, or certified diabetes educator such as the school nurse or a certified diabetes nurse educator. This training will help ensure that a school staff member is always available to help younger or less-experienced students or those with additional physical or mental impairments perform diabetes care tasks (e.g., administering insulin or checking their blood glucose) in the absence of a school nurse. Training for unlicensed staff should be done by a registered nurse, licensed physician, or certified diabetes educator.

## **10. Responsibilities for Collaboration**

In order to feel safe, maintain wellness, and progress educationally, students with diabetes depend upon the collaboration of their family, their health care team, and their school health team. The NDEP (2010)

([http://ndep.nih.gov/media/NDEP61\\_SchoolGuide\\_4c\\_508.pdf](http://ndep.nih.gov/media/NDEP61_SchoolGuide_4c_508.pdf)) has developed a comprehensive resource for students, parents, and school staff to carry out a student's Diabetes Medical Management Plan (DMMP). Everyone has a part to play in helping the student reach his or her potential and access the educational environment. No role is insignificant.

## MODULE B: OVERVIEW OF DIABETES

The National Institutes of Health's National Diabetes Information Clearinghouse (2008) defines diabetes as a "disorder of metabolism." When people eat, much of the food is broken down into glucose, the form of sugar in the blood. Glucose is the main source of energy for the body. As digestion occurs, the glucose moves into the blood, which transports it to the cells of the body where it is used for energy.

In order for glucose to move from the blood into the cells, there must be insulin present. Insulin is a hormone made by the pancreas and usually secreted in response to increased blood glucose levels. In people who have diabetes, the body makes little or no insulin or the body does not use insulin properly. Because the body is not using the glucose, high levels of glucose build up in the blood, spill into the urine, and then are passed out of the body. Even though the body has high levels of glucose in the blood, the body lacks the ability to utilize it, and the body's main source of fuel is lost.

If the body no longer makes insulin, an alternate source of insulin must be provided by either injections or from an insulin pump. If the body does not use insulin properly, individuals may take insulin and/or other glucose lowering medications. Insulin and other diabetes medications are used to manage blood glucose levels; they do not provide a cure for the disease.

"Diabetes must be managed 24 hours a day, 7 days a week," (The National Diabetes Education Program, 2010, p. 1). Managing diabetes is a constant quest to achieve the right balance between food intake, physical activity, and insulin amounts in order to keep blood sugar levels in the target range. Factors such as exercise, illness, and stress, make it difficult to always maintain that perfect balance. When the balance is tipped, the student experiences symptoms of blood sugars that are too high or too low. Blood sugars that are too high or too low are serious and require proper recognition and action by trained adults to help keep students healthy.

The American Diabetes Association's (ADA) *Position Statement: Standards of Medical Care* (2011b) provides a summary of diabetes management tools and goals, including blood glucose levels, suitable for use by most individuals. It is important to remember that the medical management of diabetes should be individualized to the needs of the person. Healthcare providers may vary target ranges for blood sugars taking into account the benefits and the risks, the frequency of low blood sugars, and the individual's ability to recognize a low. The ADA recommends a target A1C level of <7.5 percent for all pediatric groups; however, individualization is still encouraged ([http://care.diabetesjournals.org/content/38/Supplement\\_1/S4.full](http://care.diabetesjournals.org/content/38/Supplement_1/S4.full)). Taking care of diabetes is important. If not treated, diabetes can lead to serious health problems. The disease can affect the blood vessels, eyes, kidneys, nerves, gums, and teeth, and it is the leading cause of adult blindness, lower limb amputations, and kidney failure. People with diabetes also have a higher risk of heart disease and stroke. Research shows that these problems can be greatly reduced or delayed by keeping blood glucose levels near normal (Southall, 2004, p. 19).

The management of diabetes is rapidly changing. Technological advances provide more options for individualized care. Diabetes management requires an individual approach; it requires a

careful balance of a variety of factors including the student's age and developmental level. Additional factors include exercise and sports, diet, medication management, and blood glucose monitoring. It is necessary to consider all these factors when preparing the student's individualized health care plan and in planning for the least restrictive educational environment.

## **Types of Diabetes**

### **A. Type 1**

Type 1 diabetes mellitus (T1DM) is a complex metabolic disease. In people with T1DM, the immune system attacks the beta cells (the insulin-producing cells of the pancreas) and destroys them. Because the pancreas can no longer produce insulin, people with T1DM need to take insulin and/or oral medications on a daily basis to live. T1DM can occur at any age, but it begins most often in children and young adults. Currently, there is no cure for T1DM, but research into prevention and treatment is ongoing.

#### Symptoms

- increased thirst
- increased urination
- constant hunger
- weight loss
- blurred vision
- fatigue

#### Risk Factors

- genetics
- environment

### **B. Type 2**

The first step in the development of type 2 diabetes mellitus (T2DM) is often a problem with the body's response to insulin, or insulin resistance. For reasons scientists do not completely understand, the body cannot use its insulin very well. This means that the body needs increasing amounts of insulin to control blood glucose. The pancreas tries to make more insulin, but after several years, insulin production may drop off. Children with T2DM may need to take oral medication, insulin, or both.

T2DM is a disease found mainly in overweight adults ages 40 or older. With the epidemic of childhood obesity and low levels of physical activity in today's youth, more children and adolescents are being diagnosed with T2DM (Centers for Disease Control, 2015). A healthy diet, adequate exercise, and weight management may decrease the risk of getting T2DM.

#### Symptoms

- fatigue

- increased thirst
- increased urination
- nausea
- rapid weight loss
- blurred vision
- frequent infections
- slow healing of wounds or sores

### Risk Factors

The following are risk factors associated with the development of Type 2 Diabetes:

1. Being overweight (greater than 85<sup>th</sup> percentile for height/weight).
2. Having a family member who has type 2 diabetes or a mother who had gestational diabetes.
3. Being physically active less than three times a week.
4. Being African American, Hispanic/Latino, Native American, Asian, or Pacific Islander Ethnicity (CDC, 2015).

### **C. Gestational Diabetes**

It should be noted that signs of diabetes that first occur during pregnancy may be an indication of gestational diabetes. This type of diabetes occurs during pregnancy and typically subsides after delivery. According to the NDEP, women who have experienced diabetes during pregnancy may be more likely to develop T2DM later in life and the child from that pregnancy has an increased risk of developing obesity and T2DM (2010, p. 14).

## MODULE C: AUTHORIZATION FOR TREATMENT

**Documentation of the diagnosis by a licensed physician, nurse practitioner, or physician's assistant and authorization for treatment by the prescriber and the parent must be received by the school prior to care being provided in school.** The Diabetes Medical Management Plan (DMMP) and Medication Permission forms are available at the student's school. Forms may vary by school division. Physicians may also provide their own form(s) for diabetes management.

The Virginia Diabetes Council supports the use of a statewide DMMP, developed by a diverse group of stakeholders including school nurses and pediatric endocrinologists (Virginia Diabetes Council, 2010). The Virginia DMMP and accompanying protocol are available online at: <http://www.virginiadiabetes.org/resources.html>.

The NDEP (2010, pp. 99-106) also has a sample DMMP. This form is available online at: ([http://ndep.nih.gov/media/NDEP61\\_SchoolGuide\\_4c\\_508.pdf](http://ndep.nih.gov/media/NDEP61_SchoolGuide_4c_508.pdf)).

Authorization must be updated each school year as follows:

1. The student's parent or guardian needs to give written permission for the student to be treated at school, following the DMMP.
  - a. Per *COV* § 22.1-274.E, The parent and prescribing health care provider must give written permission for unlicensed, trained school personnel to administer insulin and/or glucagon in the absence of a licensed health care provider at school.
2. The treating health care provider must provide written authorization for insulin and/or glucagon to be given at school and procedures for treating diabetes. This information is contained in the DMMP.
3. Local school board policy may require additional forms for treating students with chronic health conditions.
4. RNs may only administer medications and treatments prescribed by persons authorized by law to prescribe such medications and treatments (*COV* § 54.1-3000). School nurses may consult the parent for a specific medication dose only if the prescribing health care provider has provided a written dosage range.

## MODULE D: PRINCIPLES OF MEDICATION ADMINISTRATION

Each local school division should have its own school board policy for the administration of medication in school.

The *COV* § 22.1-274.D (1999) specifies that certain employees may decline to provide health-related services without fear of disciplinary action:

D. With the exception of school administrative personnel and persons employed by school boards who have the specific duty to deliver health-related services, no licensed instructional employee, instructional aide, or clerical employee shall be disciplined, placed on probation or dismissed on the basis of such employee's refusal to (i) perform non-emergency health-related services for students or (ii) obtain training in the administration of insulin and glucagon. However, instructional aides and clerical employees may not refuse to dispense oral medications.

For the purposes of this subsection, "health-related services" means those activities which, when performed in a health care facility, must be delivered by or under the supervision of a licensed or certified health care professional.

The state laws and regulations that govern the legal practice of nursing in Virginia are commonly known as the Virginia Nurse Practice Act. These laws must be followed when developing local school board policy for the administration of medication at school by a RN or licensed practical nurse (LPN). The Virginia Nurse Practice Act does not permit RNs to delegate the administration of medication. Therefore, if medication administration is to be performed by personnel who do not hold appropriate health care licensure, the building administrator must designate who will perform this task in the absence of the nurse.

The following chart helps to clarify those who may and may not refuse to provide health-related services:

SCHOOL STAFF ASSISTANCE WITH STUDENT HEALTH NEEDS

<b>Personnel</b>	<b>Glucagon, Insulin and Blood Sugar Administration and Assistance</b>	<b>Oral Medications</b>	<b>Non-Emergency Procedures and Treatments**</b>
<b>Instructional Aides</b>	<b>May refuse</b>	<b>May not refuse</b>	<b>May refuse</b>
<b>Clerical</b>	<b>May refuse</b>	<b>May not refuse</b>	<b>May refuse</b>
<b>Instructional Staff</b>	<b>May refuse</b>	<b>May refuse</b>	<b>May refuse</b>
<b>Administrators</b>	<b>May not refuse</b>	<b>May not refuse</b>	<b>May not refuse</b>
<b>Persons Hired to render Care*</b>	<b>May not refuse</b>	<b>May not refuse</b>	<b>May not refuse</b>

\*Aside from the designated nursing staff, "persons hired to render care" also includes persons such as classroom assistants and "one-on-one" personal assistants hired with that specified job duty.

\*\*Non-emergency type procedures and treatments (health-related services for students), such as, but not limited to, simple dressing changes, nebulizer treatments, uncomplicated catheterizations, and helping with uncomplicated gastric tube feedings.

(Chart used with permission of the School Health Coordinator, Office of School Health Services, Virginia Beach City Public Schools.)

## **1. Medication authorization**

Authorization for medication administration should follow school division policy.

The written authorization should include the following information:

- student's name
- licensed prescriber's name, telephone number, and signature
- date prescription written
- name of the medication
- dosage to be administered
- route of administration
- time of day to be given
- frequency of administration and whether it can be repeated
- anticipated length of treatment
- diagnosis or reason the medication is needed (unless reason should remain confidential)
- serious reactions that may occur if the medication is not administered
- special handling instructions
- additional dosing at school as needed if home doses are missed

Medication authorizations that are lacking essential information for safe delivery of a medication or that are unclear warrant clarification by a licensed health care provider, ideally a school nurse, before medications are administered in the school setting. Any change in the child's medical condition necessitating a change in the original medication authorization requires a new written authorization and a corresponding change in the prescription label. Medication orders or changes in medication orders should never be accepted from parents or others who are not licensed to prescribe in Virginia. School nurses may consult the parent for a specific medication dosage only if the prescribing health care provider has given a written dosage range. The dose determined by the parent must be within the stated range.

Faxed authorizations may be acceptable as long as there is a signed parental consent for the medication authorized by fax. Best practice warrants that parents who are health care providers should not act as a child's private practitioner to authorize medications (VA Regulations Governing the Practice of Medicine Part II, Standards of Professional Conduct, Treating and prescribing for self or family. 18VAC85-20-25, <http://law.lis.virginia.gov/admincode/title18/agency85/chapter20/section25>).

In an emergency or under urgent circumstances, medication orders may be taken over the phone from a licensed prescriber. Telephone changes should be taken directly from the licensed prescriber by a licensed nurse only, if this is consistent with local school division policy.

Telephone authorization for changes in medications should be recorded on the student's record and be a one-time-order only. Telephone authorization should be followed by a written order from the licensed prescriber within 24 hours. Prior consultation with the parent is optimal. If orders are received due to a health care emergency, and prior consultation with the parent is not in the student's best interest, the parent should be notified as soon as possible after the event.

Medication authorization should be received on a standardized medication administration form. School divisions may have their own form for this purpose, available at the school and/or on the division's website. The Virginia Departments of Health and Education also have sample, standardized forms available for use, as referenced below. However, authorization on stationary or the licensed prescriber's prescription pad is acceptable when accompanied by a signed parental consent form. Life-saving or essential medication should not be withheld, because a prescriber failed to use a school form, and used a valid prescription instead.

The Virginia Department of Health's *School Health Guidelines* has a sample form (1999, p. 261) that is accessible online at:

[http://www.doe.virginia.gov/support/health\\_medical/virginia\\_school\\_health\\_guidelines/general\\_guidelines\\_admin-meds.pdf](http://www.doe.virginia.gov/support/health_medical/virginia_school_health_guidelines/general_guidelines_admin-meds.pdf).

The Virginia Department of Education also has sample forms in the *Manual for the Training of Public School Employees in the Administration of Medication* (2006, pp. 122-125) accessible online at:

[http://www.doe.virginia.gov/support/health\\_medical/medication/manual\\_training\\_admin-meds.pdf](http://www.doe.virginia.gov/support/health_medical/medication/manual_training_admin-meds.pdf)

## **2. Medication administration**

Since most children spend the majority of their waking hours in school, it is important that designated staff receive training to perform selected health care tasks that the children cannot do for themselves. One of these tasks is the administration of medication. Designees taking the training to administer insulin and glucagon should receive instruction in the basic principles of medication administration as well as an understanding of the signs and symptoms of diabetes, hyperglycemia, hypoglycemia, and administration of medications related to diabetes care.

The VDOE has a manual to assist school divisions in providing medication administration training to designated staff (Virginia Department of Education, 2006). It is entitled, *Manual for the Training of Public School Employees in the Administration of Medication*. The original authorization, as developed and approved by the Virginia Boards of Nursing, Medicine and Education, for school staff to receive training in the administration of insulin and glucagon included the basic principles of medication administration as one of the required training components. The "five rights of administering medication" are listed as an important safety precaution when administering medications. The "five rights" of giving medication are:

- Right student
- Right medication
- Right dose



- Right time
- Right route (by mouth, injection, etc.)

Citing the COV § 22.1-274, *The Manual for the Training of Public School Employees in the Administration of Medication* (Virginia Department of Education, 2006, p. 35) states:

- If a registered nurse, nurse practitioner, physician, or physician assistant is present, no other school employee may administer insulin or glucagon.
- The Virginia Nurse Practice Act does not permit registered nurses to delegate the administration of medication. Therefore, the building administrator must designate which staff members, who do not hold an appropriate health care license, will receive training and administer medication in the nurse's absence.
- **Prescriber authorization and parental consent shall be obtained for any employee who is not a registered nurse, nurse practitioner, physician or physician assistant to assist with the administration of insulin and administer glucagon.**
- The school nurse should provide ongoing training and feedback to school staff administering medications in his or her absence.
- The medication label should be reviewed by the school nurse, principal, or principal's designee prior to giving the first dose. (An exception would be the administration of medication in the insulin pump.)

*The Manual for the Training of Public School Employees in the Administration of Medication* (2006, pp. 35-39) further recommends the principal or school nurse should ensure that:

- medications are administered by trained school staff
- parents provide the school with the medication in a correctly labeled pharmacy container (The exception to reviewing the medication label would be for students receiving insulin per insulin pump)
- medication is given correctly and documented appropriately
- appropriate forms are completed prior to giving a medication, including prescriber authorization and parental consent
- medication is properly labeled and stored in a secure, safe place

### **3. Documentation of medication administration**

Documentation of medication administration is often referred to as the "sixth right" of medication administration. *The Manual for the Training of Public School Employees in the Administration of Medication* (2006, pp. 41-42) outlines the record keeping associated with medication administration to students. Each time a medication is administered to a student, a record should be kept of:

- the name of person administering the medication
- the name of student receiving the medication
- the name of the medication
- the time it was given

- the dose given
- the route or manner in which it was delivered (e.g., oral, subcutaneous, intramuscular)
- any unusual observations or circumstances

The documentation of medication administration should occur immediately after medication is given. Failure to document that a task has been completed could lead other staff to think a medication has not been given and result in the student receiving extra doses of medication. Failure to document could result in accusations against the individual for being neglectful of their responsibility. Documenting before a task is completed could lead other staff to think medication has been given and result in the student missing a dose of medication.

With the exception of the insulin pump reservoir, when medication is brought to school, the amount of the medication in the container should be documented. When the medication is insulin or glucagon, the vial should be unopened and within the expiration date. When a vial of insulin is opened, label the bottle with the date it was opened and initials of the person who opened the bottle. Open bottles of insulin should not be accepted.

#### **4. Storage of supplies**

Each local school division should have policies regarding the secure storage of medications and related supplies. Parents are responsible for providing medications, supplies, and equipment as called for in the DMMP. It is recommended by the *Manual for the Training of Public School Employees in the Administration of Medication* (Virginia Department of Education, 2006) that medications and syringes be stored in a clean locked cabinet or refrigerator with the keys being easily accessed by a responsible trained adult in an emergency. A sample list of diabetes care supplies can be found in Appendix D.

#### **5. Parent/guardian responsibilities**

According to the *Manual for the Training of Public School Employees in the Administration of Medication* (Virginia Department of Education, 2006, p. 36), prior to administering a medication (insulin or glucagon) at school, the parent shall:

- provide the school with a written authorization form from a licensed prescriber which includes: the student's name, name of the medication, dosage, time to be given, method by which it is to be given, name of the licensed prescriber, date of the prescription; expected duration of administration of the medication, and most importantly, possible toxic effects and side effects;
- provide a new written authorization form, signed by the licensed prescriber and the parent, for any changes in medication, dosage, or the manner in which it is administered;
- provide the medication in a container labeled as required by school policy;
- administer the first dose of any new medication at home; and
- transport medication to and from school per school division policy.

In addition to supplying the medication(s) their child needs, parents/guardians are responsible for providing the related supplies and equipment. A sample list of diabetes care supplies for school is

found in Appendix D. Additional guidance related to medication administration may be found in the *Manual for the Training of Public School Employees in the Administration of Medication* (Virginia Department of Education, 2006).

## **MODULE E: INDIVIDUALIZED CARE PLANS**

### **Individualized Health Care Plan (IHP), Emergency Action Plan, (EAP) Diabetes Medical Management Plan (DMMP)**

#### **Individualized Health Care Plan (IHP)**

An IHP is required for each student diagnosed with diabetes. The school nurse (RN) must prepare the plan. The IHP is the result of the nurse's assessment of the student's needs and prescriber's orders and how best to meet them within the school environment. The IHP should be updated at least annually and as the student's health care status or needs change.

The RN will write the IHP in collaboration with the parent/guardian and health care provider (American Academy of Pediatrics, 2008).

1. The IHP must not be mistaken as a replacement for an Individualized Education Plan (IEP) or Section 504 Plan. The IHP may be used as a supplement to the IEP or Section 504 Plan as deemed appropriate by the school division.
2. The RN uses nursing assessment skills to assess the student's health status, The IHP provides a foundation for:
  - a. communicating the specific care the student with diabetes needs on a daily basis and in the event of an emergency at school,
  - b. documenting the plan of care, and
  - c. identifying individuals participating in the care of the student.
3. The IHP will comply with state requirements as well as local school division policies and procedures. The following is a list of some recommended components in an IHP prepared for a student with diabetes (NDEP 2010, pp 22-24):
  - a. student-specific demographic information
  - b. current photograph of the student, if available
  - c. emergency contact information for parent/guardian, parent designees, and health care provider
  - d. list of known allergies and/or other chronic conditions
  - e. target blood glucose ranges and appropriate interventions to help achieve these ranges
    - i. blood glucose monitoring
    - ii. orders for medication administration, including doses and routes
    - iii. student –specific signs/symptoms of hypo or hyperglycemia with health care provider prescribed treatment
    - iv. nutritional needs/eating plans, including times and amounts
    - v. physical activity plan, including limitations
  - f. student's health care supply list and storage location(s)
  - g. nursing assessment and nursing diagnoses
  - h. assessment of the student's developmental level with expected level of independent

- self-care skills (as authorized by the prescriber), and competency/adherence history
- i. desired goals and outcomes for health and education
  - j. specific information regarding any nursing interventions that are assigned to designated trained staff. Assigned tasks must follow nursing practice guidelines for delegation of care (National Association of School Nurses, 2005).
  - k. list of specific designated unlicensed assistive personnel trained and authorized to provide care
  - l. information on any special accommodations that must be made for field trips or extra-curricular activities
  - m. “disaster” or “lock-down” planning, where a 24-72 hour supply of medication(s), supplies, food, and water are stored at the school (National Association of School Nurses, 2011, p. 3.7)

### **Emergency Action Plan (EAP)**

“Some chronic conditions have the potential to develop into a medical crisis and require an Emergency Action Plan (EAP)” (Zimmerman, 2006, p. 182). The EAP is derived from the IHP and provides staff with appropriate action steps in time of crisis.

Components of an EAP include:

- emergency contact information
- signs/symptoms that identify the situation as a health crisis
- step-by-step actions to be taken in the event of a health crisis
- basic information on the underlying health condition may or may not be included

All school personnel who interact with the student in a supervisory role, such as, classroom and special subject teachers, resource teachers, bus drivers, and cafeteria staff should receive a copy of the plan and opportunity for training and access to the school nurse for periodic updates in training.

### **Diabetes Medical Management Plan (DMMP)**

The DMMP is a plan that describes the diabetes care regimen and identifies the health care needs of a student with diabetes. The health care provider and the parent or guardian should complete this form. It is the basis for the IHP and EAP, and it provides the school personnel information that is necessary to safely care for the student during the school day, on field trips, and when participating in school sponsored extracurricular activities and during unusual school situations such as emergency evacuation or extended sheltering in place. A new DMMP should be completed each school year, and it should be in place before the first day of school. If the health care provider makes changes to a student’s plan of care during the school year, the school will need a new or updated DMMP form in order to implement the changes.

## **Samples of Forms**

Forms used by school districts may vary, but the information needed to safely care for students with appropriate parent and provider approval should be consistent with the recommendations. In the Appendix of *Guidelines for Specialized Health Care Procedures* (Southall, 2004), there are templates of various forms, including an IHP and EAP. This manual is available on the Virginia Department of Education's Health and Medical page at:

[http://www.doe.virginia.gov/support/health\\_medical/index.shtml](http://www.doe.virginia.gov/support/health_medical/index.shtml).

The NDEP has a sample DMMP in their publication, *Helping the Student with Diabetes Succeed: A Guide for School Personnel* (2010, pp. 99-106). It is available online at:

<http://ndep.nih.gov/publications/PublicationDetail.aspx?PubId=97&redirect=true#main>.

The National Association of School Nurses (NASN) has published a comprehensive tool kit, *Managing Diabetes at School: Tools for the School Nurse* (2011) with forms and resources. It is available to order from the online NASN Bookstore at <http://www.nasn.org>.

The Virginia Diabetes Council (VDC) has approved a comprehensive DMMP for school use. There is a link to the document and accompanying instructions on the Virginia Department of Education's Health & Medical page:

[http://www.doe.virginia.gov/support/health\\_medical/index.shtml](http://www.doe.virginia.gov/support/health_medical/index.shtml).

The VDC form and instructions are also available online at their Web site:

<http://www.virginiadiabetes.org/resources.html>.

Sample forms to document the training of staff in diabetes care skills are also available in Appendix C. Sample algorithms for blood glucose monitoring/care are included in Appendix E.

## **MODULE F: THERAPEUTIC MANAGEMENT OF DIABETES**

### **Management of Type I Diabetes Mellitus**

Students with type 1 diabetes mellitus (T1DM) do not make insulin, and therefore require the administration of insulin to cover both carbohydrates eaten and blood glucose (BG) levels that are out of the child's target BG goal range set by his/her healthcare provider. Insulin replacement must occur over the course of an entire day. Therefore, most children on multiple daily injection (MDI) therapy (3 or more injections a day), or insulin pump therapy, otherwise known as continuous subcutaneous insulin infusion (CSII), will require insulin delivery at school, both as a routine or in the event of a need for correction. In addition, some children with T1DM may also require oral medications as part of their DMMP.

In order for school personnel to administer, or assist in the accurate dosing and administration of insulin, BG levels must be monitored, and carbohydrates counted prior to calculating and giving the insulin dose. In addition to insulin, proper nutrition and physical exercise are key to the health of an individual with Type 1 Diabetes.

### **Recommended School Supplies for Type I Diabetes Mellitus**

Parents are responsible for providing the school with all the supplies and equipment necessary to implement the DMMP and related educational plans (The National Diabetes Education Program, 2010; American Diabetes Association, 2011a). Parents will need to meet with the school nurse, teacher(s), and necessary school personnel before the student with diabetes attends school to discuss the needs of the student and the school schedule.

Arrangements should be made in advance with students who self-carry and self-manage, so that they keep their diabetic supply kit in a dedicated place where it can be found in an emergency when the individual with diabetes may be unable to take care of him/herself. However, because diabetic supplies can be life-saving, back up supplies should also be kept in the health office to reduce what the student must carry and to serve as an emergency back-up should the student's kit be misplaced, inaccessible, depleted of essential materials, or in the event of a building emergency, such as emergency evacuation, sheltering-in-place, weather emergencies, etc.

The parent needs to provide the following supplies, to sustain a student's needs for at least 72 hours. Extra supplies should be housed in the school health office and replenished by the parent as they are used. This is in addition to the supplies carried by students who self-manage their diabetes. For an itemized list of supplies, see Appendix D.

- blood glucose meter, extra batteries, and test strips
- ketone sticks
- alcohol swabs
- lancing device and lancets
- urine ketone strips
- glucagon emergency kit
- concentrated sugar source

- glucose tablets
- cake icing or gel (fat free)
- other hypoglycemia treatment supplies (e.g., small juice boxes)
- all essential snacks (i.e., cheese or peanut butter crackers)
- an insulin supply: in a vial with insulin syringes; in an insulin pen with disposable needles; or in an insulin pump with supplies
- insulin pump supplies with pump change set-ups

### **Management of Type 2 Diabetes Mellitus**

In Type 2 Diabetes (T2DM), the body initially makes, but does not use insulin properly. This is called insulin resistance. In early cases, the pancreas makes extra insulin to compensate. However, over time the pancreas cannot keep up with the need by continuing to make enough insulin to keep the blood glucose at normal levels, and the individual needs medical intervention.

For T2DM, the first recommended treatment is usually a change in life style, often with a loss in weight. Increased physical activity and following a specified meal plan may help to contribute to weight loss and result in better control of BG levels without medications. Sometimes these measures are not enough to bring BG levels into the target range and medications may be added to the DMMP (American Diabetes Association, 2011b). The DMMP written by the private health care provider will specify what medications the student needs, which at least initially, may only be taken at home before or after school. T2DM is often managed with oral medication, but insulin, via injection may also be used to achieve glycemic control. Parents are responsible for providing medications and supplies necessary during the school day to meet their child's needs. Students with Type 2 Diabetes will need a DMMP, the same as a student with Type I Diabetes. However, because medications usually are not given in school for Type 2 Diabetes, and most students with T2DM may not have BG monitoring done at school, the only additional supply needed may be a snack in the event the student becomes symptomatic from low blood glucose. Proper nutrition and adequate exercise are the cornerstones of management for Type 2 Diabetes. If any supplies are needed according to the DMMP, the parent must provide sufficient amounts to last at least 72 hours, as discussed above in Type 1 Diabetes.

### **Nutrition**

Students with both Type 1 and Type 2 Diabetes have the same nutritional needs as other students. All children need to eat a healthy, well-balanced, portion-controlled diet satisfying age, weight and height caloric needs to promote optimal growth and development. For students who are taking insulin, however, careful monitoring of food intake is a part of the therapeutic plan. According to the NDEP (2010, p. 50), the significant difference in meal planning for the student with diabetes is that the timing, amount, and content of the food eaten are carefully matched to the timing, dosing, and action of the insulin. The nutritional component of diabetes management should be in the DMMP. Staff assisting students with tracking of food must become familiar with carbohydrate calculations.

Because carbohydrates (carbs) affect BG levels more than any other nutrient, they are the major focus of most meal planning approaches. When assisting a child or adolescent with diabetes



management, especially insulin dosing, it is important to count the total amount of carbs in a meal or snack. Carbs are composed of starches or sugars and are found in dairy products, starchy vegetables, grains, pastas, fruits, juices, and sweets. Adults assisting children and adolescents with diabetes management must be sure to check for “hidden” carbs in foods such as condiments, sauces, and dressings. While there are no “forbidden foods,” the NDEP does recommend that students limit “liquid carbs” such as sweetened beverages like sports drinks, fruit juices, and soft drinks with sugar to the treatment of hypoglycemia as these carb containing foods raise BG levels quickly (2010, p. 50).

Students with diabetes usually have an individualized meal plan based upon carb counting or an exchange system. When the health care provider develops the meal plan portion of the DMMP, he/she takes into account the other components of the DMMP, factors such as medication and activity level. The goal is to balance these components of diabetes management to help the student achieve optimal glycemic control. Because students might need assistance in determining what and how much to eat, especially when newly diagnosed, school staff specified in the IHP must be knowledgeable of the student’s meal plan requirements (Southall, 2004).

A “carb choice” or serving is the amount of food that contains 15 grams of carbohydrate. Adults assisting students with diabetes must remember it is important to read the labels on foods to determine the number of servings in a container and the number of grams of carbs per serving. Adults must even check the labels on products listed as sugar-free, such as cookies, candies, and ice cream. They often contain carb amounts similar to their non-sugar-free counterparts. It is preferable to use regular products in appropriate portions, rather than trusting that “sugar-free” products are suitable for a person with diabetes.

Adults working with families of students with diabetes may find it useful to encourage parents to plan ahead and review weekly school lunch menus to determine the carbohydrate content of the meals available. The food service manager should have access to the nutritional content of the food available in the cafeteria. If a food vendor for an item changes, or the vendor updates their food label, assistive personnel should be sure to check to see if there are differences in the nutritional content of the new food item(s). Books (such as *The CalorieKing Calorie, Fat, & Carbohydrate Counter*, Borushek, 2011), Apps (such as ControlMyWeight, <http://www.calorieking.com/products/controlmyweight/>), and other resources are available to help with carb counting. If the parent provides food from home, the parent should provide the school with the carb count for the food item or meal (Bulter, 2011). A diabetes educator can also help locate resources for nutritional needs.

Carb counting is most often done in one of two ways: Consistent Carb Intake or Insulin-to-Carb Ratio (NDEP, 2010, pp. 51-52). The DMMP will specify which type of meal plan the student should follow.

- Consistent Carb Intake Meal Plan
  - Students who follow this plan are provided a set amount of carbs or carb servings to eat for meals and snacks. Students who take intermediate-acting insulin in the morning or a predetermined amount at lunch are most likely to use this plan (NDEP, 2010, pp. 52-53). Meal and snack times should remain constant. Insulin doses usually remain consistent as well. This plan is usually easy to follow, but does not readily

allow for flexibility when the unexpected happens or a schedule is not routine.

- Insulin-to-Carb Ratio Plan

- Insulin dosage is based on two calculations: a ratio of insulin-to-carbs eaten and a correction factor. These ratios are specified in the DMMP by the prescribing health care provider.
  - The insulin-to-carb ratio is the amount of insulin given to cover for a stated amount of carbs that are eaten. The prescriber will commonly express it as a ratio, for example 1:15. The amount is individualized for each person in his/her DMMP and the ratio may even vary by meal.

**Sample calculation of an insulin-to-carb ratio:**

The student's lunchtime insulin-to-carb ratio is 1:15.  
The child ate 60 grams of carbs. The formula is:  
 $60 \div 15 = 4$  units of insulin

- The correction factor is the amount of insulin the student needs to lower the BG into target range. The target BG is subtracted from the actual pre-meal BG. The prescriber will specify how much insulin is required for results that are over the target BG. This calculation is student-specific and may vary.
- It is important to note that a correction dose should not be given within the 3 hours after: eating carbs, a previous correction dose, or treatment for a low BG unless there is a specific order from the health care prescriber.

**Sample calculation of a correction dose:**

The student's pre-meal BG is 300. The student's target BG is 150. The correction dose is 1 unit of insulin for every 50 mg/dL over 150. The formula is:  
 $300 - 150 = 150 \div 50 = 3$  units of insulin

- The two calculations are then added together to obtain the insulin dosage for the child.

**Sample calculation of total insulin dose**

Insulin-to-carb dose plus correction dose = total units  
The formula is:  
 $4 + 3 = 7$  units of rapid-acting insulin

The insulin-to-carb ratio method gives more flexibility to the student, but it may also take more time and attention to track the carbs throughout the day. For younger students, a trained adult should know the child's meal plan and work with the parent to coordinate it with the school's scheduled snack and meal times when possible.

The parent should be notified in advance whenever special events are scheduled that might affect the meal plan. This includes special parties or events during the normal school day, after school activities, and day or extended field trips. Birthday celebrations often present unexpected situations where food decisions must be made. Talking to the parent in advance and deciding how they would like to handle unexpected treats can help avoid difficulty and enable the student to participate in the celebration. The parent may choose to have the school nurse keep snacks on hand or arrange to have the child bring the food item home. School days when there is an increased amount of physical activity may necessitate the child having extra snacks. Examples are the days when there is physical education class or a "Field Day."

### **Physical Activity**

Everyone can benefit from regular exercise. Exercise and physical activity are critical parts of diabetes management. In addition to maintaining cardiovascular fitness and controlling weight, physical activity can help to lower BG levels. Students with diabetes should participate fully in physical education classes and team sports.

To maintain BG levels within the target range during extra physical activity, students may need to make adjustments in their insulin and food intake. To prevent hypoglycemia, they also may need to check their blood glucose levels more frequently while engaging in physical activity. The DMMP should direct what BG levels are acceptable for exercise. If BG levels are high, ketone testing may be ordered as well as appropriate follow up if ketones are present.

The student with diabetes should eat prior to exercising if it has been more than two hours since the student has eaten, or as directed in the DMMP. It is best to exercise or take physical education classes 30-60 minutes after a meal to allow time for food to be absorbed. A person with diabetes always needs to have a fast-acting sugar and a complex carbohydrate readily available for treatment of low blood sugar, along with plenty of water. Physical education instructors and sports coaches should be able to recognize and assist with the treatment of hypoglycemia. In an emergency, they should follow the student's Emergency Action Plan.

Exercise increases the flow of blood in general, but especially to the muscles that are being used the most. Insulin is absorbed faster when there is increased blood flow to the exercising muscles. For example, if the insulin is injected in the arm before a run or swim, it may be absorbed quickly and cause a low blood sugar. Muscles use the body's sugar stores during and after exercise: therefore, the body needs to replace this supply of sugar. The body does this by taking glucose out of the blood, lowering the blood sugar level, a process that may continue for up to 12 hours after exercising. Students using pumps may maintain or disconnect from the pump for sports activities. The IHP should address storage of the pump if it is removed for physical activity. It should be stored in a secure location. If a student keeps the pump on, he/she may set it at a temporary, reduced rate of insulin while he/she is at play. Specific instructions for what the student should do and how temporary basal rates should be adjusted should be addressed in the DMMP. According to the *Virginia Guidelines for Specialized Health Care Procedures*, the student's DMMP and IHP should

include specific instructions for physical activity (Southall, 2004, pp. 23-24). If these instructions are lacking, the prescriber should be contacted for guidance. Feedback to the prescriber about exercise tolerance and measured glucose levels is considered good practice.

### **Support of Developmentally Appropriate Self-Management of Diabetes Care**

The NDEP states that in addition to dealing with the usual developmental issues that are associated with growing up, children with diabetes must also learn to manage the complexities of this life-long chronic illness (2010). Since diabetes impacts all aspects of someone's life, this can complicate how the child or adolescent works through normal developmental challenges. Individuals will react differently to having diabetes, and the associated emotions may run the gamut from accepting, to denial, to resentful. Students may be open with others about their illness or try to hide it from others.

Children and adolescents, in general, do not want to be different from their peers, but having diabetes and the associated self-care tasks can make them feel different, especially if others treat them differently. They may feel conflicting pressures to comply with their DMMP but also to fit in with their peers. It is important that the student feel supported and that staff be aware of emotional or behavioral issues that may need referral.

The child's ability and willingness to learn and assume responsibility for self-care tasks is individualized. The ADA's (2011a, p. S72) position on diabetes care in school is that:

Children and youth should be allowed to provide their own diabetes care at school to the extent that it 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 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.

It is important that though the child is independent with certain tasks, "supervision by caregivers must continue" (Juvenile Diabetes Research Foundation, 2011). The DMMP and the plans of care will specify which tasks the provider considers the child to have mastered and the ones for which the student needs assistance. No matter the level of independence, a student experiencing symptoms of either a high or low BG during an emergency may not be self-directed and may need someone to help.

The following list of ways to support the student's healthy response to diabetes is based upon "Tips for Teachers of Students with Diabetes," which the ADA adapted from a Loudoun County, Virginia document.

- Understand that all children with diabetes are different and react differently to symptoms of low BG.
- Try not to draw attention to the child's diabetes.
- Be inconspicuous in your reminders about snacks and self-care tasks.

- Do not label children with diabetes. Never refer to the child as the “diabetic kid.”
- Do not sympathize or empathize, but learn what you can do to support them.
- Always be prepared and have a snack available. Take it with you whenever you leave the classroom.
- Never leave the child with diabetes alone if they are experiencing symptoms of a low BG. If they need to go to the office or see the nurse, send a buddy with them.
- The child with diabetes needs unrestricted access to the bathroom and to water.
- Be patient, especially if they have symptoms of a low BG. Variations in BG can interfere with the student’s ability to organize things or to concentrate.
- For academic testing, children with diabetes may need to check their blood sugar before, during, or after the test as the stress of test taking may alter blood sugar levels.
- Communication with substitute teachers is important in providing continuity of care for the child with diabetes.
- Knowledge is power. Educate yourself about diabetes and keep the lines of communication open.

A child or adolescent with diabetes warrants the dignity, privacy, and confidentiality of any person with a medical condition. School staff should refrain from casual discussions in hallways or faculty lounges, even when names are not mentioned, because they can prove damaging. Diabetes is a bona fide medical condition that can cause irritability and confusion that could be mistaken for misbehavior when blood sugars are too high or too low. Adults responsible for a student with diabetes should remember to check a student’s blood glucose levels if there is an unusual change in the student’s behavior.

### **Barriers to Appropriate Diabetes Management**

Lack of knowledge and or fear can be a barrier to appropriate diabetes care. Caring for someone with diabetes can be stressful for the individual and the family, especially when the child or adolescent does not recognize or is embarrassed by or afraid of low BG symptoms. They may manage their diabetes by not taking all of their insulin or eating extra carbs. The normal difficulties encountered by parents and their children may be compounded by the stress of diabetes care. School staff, especially school nurses, can provide parents with the support they need as well as assistance with educational resources.

As the child moves into the teenage years, children who were previously compliant may rebel or not be totally honest about self-care tasks such as BG testing. In addition, the physiological changes of adolescence, such as rapid growth and surges in hormones, may make it more difficult to keep BG in the target range, despite compliance (Juvenile Diabetes Research Foundation, 2011). The ADA cited research that showed it was more difficult to achieve near normal BG levels in teens than in adults (2011b, p. S38). This can lead to the teen with diabetes feeling frustrated and contribute to the child’s becoming less engaged or compliant with the DMMP. Teens need support to move toward independence, but they also need supervision to make sure they are caring for themselves properly.

## Age Appropriate Self-Care Guidelines

Each student is unique in his or her ability to perform self-care tasks. Various factors such as age of diagnosis, child's current developmental level, and the willingness on the part of the child and parent can influence the age at which the child assumes various self-care tasks. The following is a list of age-appropriate self-care tasks, based upon recommendations from the NDEP (2010, pp. 60-61) and the National Association of School Nursing's school nursing text (2013, pp. 894-895):

- Toddlers and preschool-aged children
  - are usually unable to perform diabetes care tasks independently.
  - need an adult to provide all or most aspects of care.
  - can usually determine which finger to prick, choose an injection site, and are generally cooperative.
  - aged four to five can collect own urine for ketone check, turn on glucometer, pinch their own skin, help with recording results, and begin to identify symptoms of low BG.
  
- Elementary school-aged children
  - may be able to perform their own BG checks, but still need adult supervision.
  - begin to learn, with adult supervision, some self-care tasks such as insulin administration by syringe or pump, meal planning with recognition of foods that contain carbs, carb counting, ketone testing, and record keeping related to self-care tasks.
  - begin to understand the impact of insulin, physical activity, and nutrition on BG levels.
  - unless they have an inability to recognize symptoms of low BG, should be able to recognize and tell an adult they feel symptomatic.
  
- Middle and high school-aged children
  - are usually able to provide self-care, depending on the length of diagnosis, level of maturity, and cognitive ability.
  - should be encouraged and empowered to be independent with self-care.
  - will need help if experiencing a low BG.

There may be circumstances when the student, especially the adolescent or even an experienced younger student has permission to carry medications and/or supplies for self-care (example: blood glucose testing, insulin, glucagon or glucose supplies). When this level of independence is considered part of the therapeutic regimen by the prescriber, the following documentation is required, and once in place, the practice must be allowed by the school (*COV* § 22.1-274.01:1):

- authorization from the health care provider for the student to self-manage diabetes care as part of the student's therapeutic regimen, assuring that the student is capable of managing his/her care independently, or detailing the assistance needed by the school nurse or appropriately trained school personnel
- permission from the parent that the child is educated to provide self-care responsibly,
- assessment by the school nurse as to the student's ability to perform the task(s) responsibly and independently in the school setting, and the development of an emergency action plan is best practice.

In developing a good working partnership among the medical home, the family, the student, and the school, there is the optimal opportunity for a mutually beneficial relationship achieving the medical home's and parent's goals of self-management and the school's need of assuring the safety of the student with diabetes as well as all students. Students who demonstrate appropriate BG testing technique and competence in managing insulin requirements must be allowed to self-test their BG levels in any setting, such as the classroom, at various campus areas, on field trips, and/or other locations as appropriate (National Association of School Nurses, 2006, p. 770). Students should also demonstrate an understanding of school policy and procedure in the performance of self-care tasks (Virginia Diabetes Council, 2010).

While Virginia law permits students with diabetes to self-carry and manage their medical needs, it should be noted that when the a student carries and self-administers medications or performs self-care tasks independently, there is an implied expectation that he or she will carry out self-care in a responsible, safe, and mature manner. It is expected that the student keep medications in a secure, dedicated location known to the student and the school nurse or other trained staff member to facilitate assistance in the event of an emergency. Extra supplies, provided by the parent/guardian, should be housed in the health or main office in the event the student's personal supply is lost or cannot be located in an emergency. Parents, students, and the school nurse should determine documentation of self-care and appropriate staff intervention. An emergency action plan should be established.

Students who carry their own supplies and self-manage their diabetes are not exempt from disciplinary action if they fail to follow school policies and procedures. The parent, student, and school nurse should develop a plan for monitoring compliance to the diabetes plan based upon the health care provider's recommendations. Concerns that the student is not following the plan should be communicated to the parent and health care provider.

## **MODULE G: MONITORING THE STUDENT WITH DIABETES**

### **Testing Blood Glucose**

**Note: Parent provides necessary equipment, supplies, and medications. Student should be encouraged to participate in self-care, as indicated in the DMMP.**

Successful diabetes management depends largely on BG monitoring, which measures the effects of balancing food, physical activity, and medication. All diabetes care is based on the BG level. Self-tests of BG results are measured in milligrams per deciliter (mg/dL). The physician usually requests that a student self-check BG levels, with or without adult oversight, depending on the skill level of the student, at various times during the school day such as:

- before eating snacks or lunch,
- before physical activity,
- before leaving school on the bus,
- as needed, such as when the student has symptoms of either a high or low BG.

Frequent testing and recording of BG levels provides the most accurate picture of the student's diabetes control. The BG self-test provides the information necessary to make appropriate choices about food and activities, as well as insulin dosing. The primary health care provider or diabetes educator will provide guidance on how frequently the student's blood sugar should be checked during the day in the DMMP. There is no specific number of BG checks which should be done per day as different people require different treatment options. The student's doctor or diabetes educator can work with parents and student to determine the best plan for treatment. Though it can vary, students taking insulin generally require a minimum of three or four tests per day, unless the student is wearing an insulin pump that has a built-in glucose monitor.

Optimal communication between the school and the home and prescriber is important. If a student's BG during the school day is chronically low or high or outside the BG parameters given on the DMMP, it is essential that the school share the BG log, as soon as a concern develops.

Students with T1DM who are participating on sports teams may have to check their blood sugar level more frequently, especially during the first weeks of practice. Changes in the level of physical activity may alter dietary and insulin needs. One of the purposes of BG monitoring is to keep BG levels in the target range specified on the DMMP. BG target ranges are very individualized and are determined by the healthcare provider. The range is customized to the student's needs and will change as growth and diabetes treatment changes. Monitoring of A1C levels by the treating provider which indicate how well the student is maintaining the target range may also result in changes in the insulin dosing prescription in school.

For students with T2DM, monitoring BG levels is just as important. Certain medications used in the treatment of T2DM can cause hypoglycemia. Regular BG monitoring can help determine if a change in the student's treatment is needed.



According to the NDEP (2010, p. 94), parents are responsible for providing the school with all equipment, supplies, medications, and plans for the care of their student with diabetes. Parents are to be notified in advance when supplies are running low and as soon as possible, if equipment needs to be replaced.

Disposable gloves (non-latex or vinyl), that meet OSHA requirements for handling body fluids, are to be worn if someone is performing the testing other than the student (U. S. Department of Labor, 2008). The employer is responsible for providing personal protective equipment for its employees, as well as safe used sharps containers and hazardous waste receptacles if needed.

There are a variety of BG meters (glucometers) available. When several students with diabetes are in the school, different types of meters may be used, and staff responsible for monitoring will need to become familiar with all of them. Best practice warrants that a registered nurse, licensed physician, or certified diabetes educator, knowledgeable in the use of glucose meters, must train unlicensed school personnel, who are designated to care for students with diabetes, in the proper use of each glucose meter model, as well as those insulin pumps with built-in glucose monitors. Because of the number and variety of meters available on the market, each with different features and instructions, a copy of the instructions for each student's meter should be kept in the health office (American Diabetes Association, 2008). Reference materials and instruction manuals for glucose monitoring meters should be available from the parent or manufacturer's toll-free number and Web site.

As of March 2015, there were 59 companies that carry 220 glucose monitoring devices, each operating differently (<http://www.medicalexpo.com/medical-manufacturer/blood-glucose-meter-607.html>). Therefore, it is essential that parents provide manufacturer instructions for the specific glucose monitoring device to the school. Furthermore, individuals involved with glucose monitoring must be familiar with the manufacturer's instructions to ensure correct operation of the device for accurate readings, proper cleaning, battery replacement, and storage.

BG monitoring is an important component of diabetes care. Appendix C contains samples of various diabetes skills checklists, including BG monitoring. The benefits of blood sugar monitoring at school include:

- immediate test results so that adjustments in food, medication, or activity can be made;
- information to assess response to therapy and maximize student's ability to participate in learning opportunities;
- confirmation of whether symptoms relate to low (hypoglycemic) or high (hyperglycemic) blood sugar levels, and
- decreased risk to the student of long-term health complications.

Since the BG test results are the basis for diabetes care, it is important to use the proper procedure to assure accuracy of the results. Sample algorithms for blood glucose management are contained in Appendix F. The ADA Web page lists several causes of inaccurate blood sugar test results as:

- operator error, such as finger not clean and dry,

- poor technique, including inadequate blood drop (not enough blood),
- code on test strip does not match code on meter (calibration),
- outdated or incorrectly stored test strip,
- unclean meter, and/or
- product malfunction.

### **Procedure for Blood Glucose Testing**

**Note: Parent provides necessary equipment, supplies, and medications. Student should be encouraged to participate in self-care, as indicated in the DMMP.**

1. Review directions for blood testing meter, if not familiar with its operation.
2. Perform control solution checks on a regular basis and when starting a new box of test strips (AADE, p.170).
3. Have student wash and dry hands. If adult plans to assist, wash and dry hands and don non-latex or vinyl gloves before helping student.
4. Assemble supplies
  - a. alcohol pad
  - b. finger lancing device
  - c. blood testing meter (glucometer)
  - d. appropriate blood testing strips
  - e. tissue or cotton balls and small bandage
  - f. gloves for assisting, if indicated
  - g. student log
5. Washing student's hands and test site is sufficient for prepping the site; however, alcohol may be used for further prepping. Make sure the test site is dry before testing. Alcohol may cause toughening of the skin or burning sensation. If moisture (water or alcohol) remains on the skin, test results may be altered. Encourage the student to rotate sites to help prevent callus formation.
6. Place glucose testing strip into electronic meter according to manufacturer's instructions. The meter will turn on automatically. Check strip code, if required.
7. Ready the lancing device according to manufacturer's instructions.
8. Select a test site. If using a finger, use the sides of fingertip. (The pads of the fingertips may be more sensitive.) Hang the arm below the level of the heart for 30 seconds to increase blood flow. **If hypoglycemia is suspected: only use the finger for testing, do not use alternate testing site.**
9. Hold the lancing device to the side of the fingertip and push the button to prick the skin. Gently "milk" the finger in a downward motion from above the pricked site to obtain a large enough drop of blood to cover the test pad on the test strip. Avoid squeezing the site

excessively because excess squeezing can contaminate the sample with tissue fluid, cause hemolysis of the sample, and traumatize the site.

10. Place blood on testing strip and complete testing, according to manufacturer's instructions. Compress lanced area with tissue or cotton ball until bleeding stops.
11. If adult is assisting, dispose of test strip and tissue or cotton ball in lined wastebasket. Immediately and carefully dispose of lancing device in sharps container. Remove and dispose of gloves. Wash hands.
12. If student is doing testing, remind student to dispose of lancing device in sharps container, or in their own disposing kit. Remind student to dispose of test strip, tissue, cotton ball or other dirty supplies in lined wastebasket. Remind student to wash hands thoroughly.
13. Record BG reading results in the student's log or have student record results in log. Refer to student's DMMP for appropriate actions. Do not refer to the BG readings as "good" or "bad." Refer to the numbers as "in" or "out" of target range, "above" or "below" target range. Report "out of target" readings to parent as indicated on the DMMP. Be prepared to share the log with the treating provider if requested or if you are seeing a pattern of "out of target range" results.

**Sources:**

- American Association of Diabetes Educators (2011). *The Art and Science of Diabetes Self-management Education Desk Reference* (2<sup>nd</sup> ed.), p. 170. Chicago, IL.
- American Diabetes Association. (2008). *Diabetes Care Tasks At School: What Key Personnel Need To Know*. Available online at: <http://www.diabetes.org/living-with-diabetes/parents-and-kids/diabetes-care-at-school/school-staff-trainings/diabetes-care-tasks.html>.
- Southall, V.H. (2004). *Guidelines for specialized health care procedures*. Retrieved May 14, 2011, from Virginia Department of Education: Health and Medical at: [http://www.doe.virginia.gov/support/health\\_medical/index.shtml](http://www.doe.virginia.gov/support/health_medical/index.shtml).

**Testing Urine**

Urine testing for glucose is no longer used for diabetic management. It is recommended that urine be tested to detect the presence of ketones when BG levels are elevated. The DMMP will provide authorization and instructions for monitoring the urine for ketones at school. The parent will provide the necessary supplies for testing urine for ketones. When opening a bottle of ketone test strips, the assisting adult should be sure to note the date and their initials on the bottle. Ketone strips in a bottle expire six (6) months after opening (National Association of School Nurses, 2011, p. 4.8).

When the body cannot use glucose, it uses its own fat and muscle tissue for energy. Ketones are acids that are left in the blood when fat is used for energy. This can happen when there is not enough insulin given, during an illness or time of extreme bodily stress, or with dehydration

(American Diabetes Association, 2008). If the body does not receive adequate amounts of insulin, so that it can utilize glucose, not only will blood glucose rise, but ketones will continue to build up in the blood. Increased levels of ketones result in a condition called diabetic ketoacidosis, also referred to as “DKA.”

When there are ketones present, the body will try to get rid of them through the kidneys and lungs. The ketones will show up in the urine and may cause the breath to smell fruity or like nail polish remover (acetone). Besides fruity breath, symptoms may include nausea, vomiting, abdominal pain, rapid breathing, thirst, frequent urination, and fatigue/lethargy/drowsiness. It is important to detect and treat the presence of ketones early to prevent the build-up of ketones and progression of symptoms to DKA. DKA is an emergency and the number one reason for the hospitalization of children with diabetes. Untreated, progression to DKA may lead to severe dehydration, coma, permanent brain damage, or death” (American Diabetes Association, 2008).

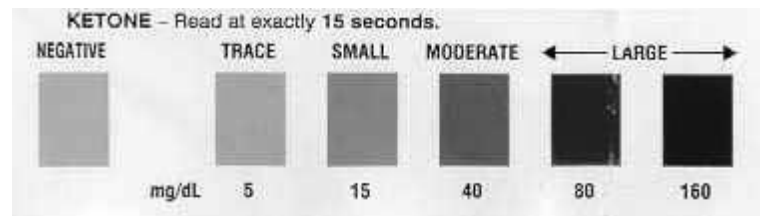
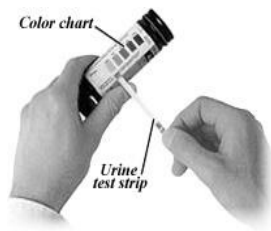
DKA usually progresses over hours or days, but may progress more quickly if the student uses an insulin pump that is not functioning properly or is programmed incorrectly or if the student has an illness or infection (American Diabetes Association, 2008). The student is most at risk when symptoms are mistaken for the flu, BG is not checked, and high BG is untreated.

### **Procedure for Testing Urine**

1. Review directions for urine ketone testing, if not familiar with them. Wash hands.
2. Gather supplies:
  - a. bottle of ketone test strips (check expiration date)
  - b. urine cup
  - c. gloves, if caregiver performing the test
  - d. clock or watch with second hand
3. Have student urinate into cup. Ideally student should handle urine and conduct testing if that is part of the DMMP.
4. If caregiver is doing the testing, he/she should don gloves. Dip the test strip into the urine and shake off excess urine, or observe the student doing same.



5. Wait the specified amount of time in the directions on the bottle of test strips, usually 15 seconds.
6. Read the results by comparing the color on the test strip to the chart on the bottle.



7. Record the results on the student's log and take action per the DMMP.
  - a. In general, if results are moderate or large, the student should not engage in physical activity and the parent/guardian should be called to take the student home for observation and/or medical care.
  - b. If urine ketone results are trace or small; notify the parent, increase the fluid intake, and monitor the child. Retest urine and/or BG per DMMP.

**Sources:**

- American Diabetes Association. (2008). *Diabetes Care Tasks At School: What Key Personnel Need To Know*. Available at <http://www.diabetes.org/living-with-diabetes/parents-and-kids/diabetes-care-at-school/school-staff-trainings/diabetes-care-tasks.html>.
- National Association of School Nurses. (2011). *Managing diabetes at school: Tools for the school nurse*. Silver Springs: MD, National Association of School Nurses. [https://portal.nasn.org/members\\_online/members/viewitem.asp?item=S065&catalog=MAN&pn=1&af=NASN](https://portal.nasn.org/members_online/members/viewitem.asp?item=S065&catalog=MAN&pn=1&af=NASN)
- Southall, V.H. (2004). *Guidelines for specialized health care procedures*. Retrieved May 14, 2011, from Virginia Department of Education: Health and Medical at: [http://www.doe.virginia.gov/support/health\\_medical/index.shtml](http://www.doe.virginia.gov/support/health_medical/index.shtml).

## MODULE H: INSULIN ADMINISTRATION

### Proper Storage of Insulin:

The FDA (<http://www.fda.gov/Drugs/EmergencyPreparedness/ucm085213.htm>) provides the following guidance on insulin storage specifically:

According to the product labels from all three U.S. insulin manufacturers, it is recommended that insulin be stored in a refrigerator at approximately 36°F to 46°F. Unopened and stored in this manner, these products maintain potency until the expiration date on the package.

Insulin products contained in vials or cartridges supplied by the manufacturers (opened or unopened) may be left unrefrigerated at a temperature between 59°F and 86°F for up to 28 days and continue to work.

Note: Insulin loses some effectiveness when exposed to extreme temperatures. **Do not use** insulin that has been frozen. Keep insulin away from direct heat and out of direct sunlight.

If patients or healthcare providers have specific questions about the suitability of their insulin, they may call the respective manufacturer at the following numbers:

Lilly: 1-800-545-5979

Sanofi-Aventis: 1-800-633-1610

Novo Nordisk: 1-800-727-6500

Additional information provided by ConsumerMedSafety.org

(<http://www.consumermedsafety.org/insulin-safety-center/item/420>) suggests opened insulin be handled as follows:

**Vial:** Once the vial is punctured, it is OPEN. Once you stick a needle in the vial, it is OPEN. OPEN vials can be stored in the fridge or at controlled room temperature. Regardless of where it is stored, OPEN insulin will only last 28 days before it must be thrown in the trash. Insulin kept in the fridge should be removed and allowed to reach room temperature before injection.

**PEN:** Once used for the first time, insulin pens should not be stored in the fridge. Instead, they should be stored at controlled room temperature. The number of days you can use the pen will depend on which pen you use. Talk to your doctor or pharmacist. Pens last 7-28 days if stored at controlled room temperature. The number of days depends on which pen you use.

### Additional Storage Information for Insulin Pumps:

Insulin contained in the infusion set of a pump device (e.g., reservoir, tubing, catheters) may need to be discarded after 48 hours, or per manufacturer's instructions. Insulin contained in the infusion set of a pump device and exposed to temperature exceeding 98.6°F should be discarded.

It is very important for you to become familiar with the recommendations for the insulin product that you use.

### **Storage of Glucagon**

According to Eli Lilly (2012, <http://www.drugs.com/pro/glucagon.html>), before reconstitution, vials of Glucagon, as well as the diluting solution for Glucagon, may be stored at controlled room temperatures between 68° to 77°F. After reconstitution, Glucagon should be used immediately. **Discard any unused portion.** Solutions should be clear and of a water-like consistency at the time of use.

A system should be in place for regularly checking expiration dates and communicating with parents when expiration dates are approaching. Glucagon should be replaced just prior to the expiration date.

### **Types of Insulin**

According to the FDA (2015) (<http://www.fda.gov/Drugs/EmergencyPreparedness/ucm085213.htm>), there are four basic types of insulin, each is classed by how it works:

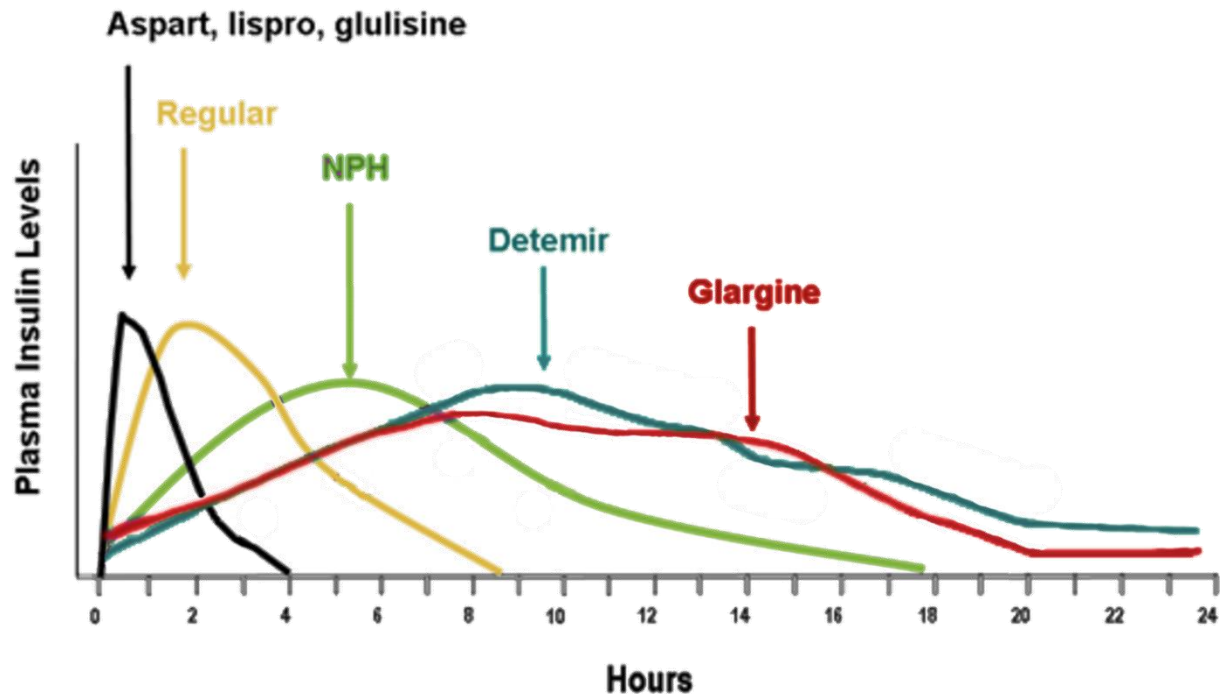
- Rapid-acting – Lispro (Humalog ®), Aspart (Novolog ®), Glulisine (Apidra)
- Short-acting – Regular (Humulin R, Novolin R)
- Intermediate-acting – NPH (Humulin N, Novolin N)
- Long-acting - Glargine (Lantus), Detemir (Levemir)

**Rapid-acting insulins** take effect quickly, within 10-15 minutes. This type of insulin is used primarily to treat high blood sugars, to “cover” an increase in blood sugar after eating and/or right before meals. It is also used in insulin pumps. If the student receives an injection of rapid-acting insulin, it may be injected no more than 15 minutes before the start of a meal or snack to avoid dangerously low blood glucose levels. This type of insulin may be referred to as *bolus* insulin.

**Regular or Short-acting insulins** are similar to rapid-acting ones, but are to be injected approximately 30 minutes before the start of each meal. They may also be called *bolus* insulin, but when compared to rapid-acting insulin, their peak is delayed and their duration is longer.

**Intermediate and long-acting insulins** are called *basal* insulins. They are not used to treat acute high blood sugar, but rather for coverage during times when the person is not eating, overnight or between meals.

The following chart was copied from the ADA Power Point, *Insulin Basics 2008*. It shows the different types of insulin with their peaks and durations:



## Dosage

Doses of insulin are measured in “units.” “There are 10 milliliters in one vial of insulin, which is equivalent to 1000 units. One unit of insulin can alter a blood glucose level; therefore, *it is imperative that the ordered dosage be EXACT!*” (Southall, 2004). Insulin syringes come in several sizes with half to one unit markings. The appropriate syringe should be used based upon the insulin dose. You should never approximate the dosage in the syringe, but measure exactly. Insulin should only be administered from a properly labeled prescription vial from a pharmacy, or a cartridge pre-filled insulin pen, or an insulin pump.

Specific written authorization from the student’s health care prescriber and written parental consent is required for insulin administration. Written dosing instructions and consents must be contained in the DMMP. If instructions are unclear, or if the individual calculating insulin dosing is uncertain of measurements, that individual must stop, must not administer the insulin, and must seek immediate assistance from the school nurse, the School Physician or School Nurse Practitioner, the prescriber, or hospital Emergency Department. Insulin may not be given unless the individual administering it is certain the dosing is precise and correct. If no one is available to clarify the dosing, the parent should be notified immediately.

The following diabetes care procedures have been adapted from the *Guidelines for Specialized Health Care Procedures* (2004), the National Association of School Nurses’ *Managing Diabetes at School: Tools for the School Nurse* (2011), and the ADA’s training curriculum, *Diabetes Care Tasks at School: What Key Personnel Need to Know* (2008). The ADA Power Points are



available online at: <http://www.diabetes.org/living-with-diabetes/parents-and-kids/diabetes-care-at-school/school-staff-trainings/diabetes-care-tasks.html>.

### **A. Procedure for Insulin Administration by Syringe**

This injection procedure is for the administration of Regular or rapid-acting insulin, not for mixing with other insulin.

Training of unlicensed staff must be done by a registered nurse (preferably a certified diabetes educator) or physician (preferably an endocrinologist). Insulin must be administered only in accordance with the orders of a licensed prescriber and accompanied by written parent permission. Specific guidelines must be provided by the primary health care provider for the conditions (blood glucose levels) under which specific units of insulin may be administered. Unlicensed staff may not deviate from the medical regimen written by the prescriber. One exception is if the prescriber gives a verbal phone order to the school nurse, which should be witnessed by another responsible adult, written down by the school nurse in the student's permanent medical record, and followed up with a written order from the prescriber within 24 hours. School nurses and unlicensed assistive personnel may not take orders for insulin dosing changes from a parent without pre-arranged sliding scale medical orders.

**Note: Parent provides necessary equipment, supplies, and medications. Student should be encouraged to participate in self-care, as indicated in the DMMP.**

1. Wash hands.
2. Assemble equipment
  - a. vial of insulin
  - b. insulin syringe with needle
  - c. alcohol prep pad
  - d. cotton balls or spot bandage (optional)
  - e. gloves, if done by anyone other than the student
  - f. sharps container
3. If insulin is cold, warm the vial in the palm of the hand to room temperature. *Injecting cold insulin may cause pain and may affect absorption.*
4. Check insulin type/brand for agreement with the prescriber's order. Double check.
  - a. If this is a new bottle of insulin, remove or have the student remove the flat, colored cap. Record the date the bottle is opened and the initials of the person who opened the bottle on the label. **Do not** remove the rubber stopper or the metal band under the cap.
  - b. **Check expiration date** of the vial of insulin. If the bottle was previously opened, also check the date it was opened and follow guidance under "insulin administration" above. If the insulin is past the expiration date, it may not be used.
5. Clean the rubber top of the insulin vial with an alcohol wipe, and let dry for a few seconds.
6. Remove the cap from the syringe. Point the needle away from you and the student and slowly

pull back on the plunger to fill the syringe with air equal to the number of units of insulin needed. Measure twice because a dosing error by misplacing a zero can be devastating. Lift the vial of insulin without touching the rubber top you just cleaned. Carefully plunge the needle into the vial, being cautious not to hit your hand holding the vial with the needle. Keeping the needle below the liquid in the vial, slowly push the plunger to inject air from syringe into the insulin bottle while keeping the needle with attached syringe remaining in bottle. Invert vial and pull plunger back just beyond the number of units desired. While keeping the syringe in an upright position, clear any air by pulling plunger back and tapping syringe to raise air bubbles to the top. Push plunger slowly to remove air bubble and to pull the desired amount of units of insulin into the syringe, ensuring that no air bubbles remain. Withdraw the syringe. ***Air bubbles left in the syringe can alter the desired dose.***

7. For a clean unused needle, slip the needle back into cap without touching cap or needle. (See procedure for One-Handed Needle Recapping in the *Virginia Guidelines for Specialized Health Care Procedures*, if syringe must be recapped.)
8. Put on gloves, select the site to be used and prep with alcohol and let dry. If area is dirty, wash with soap and water and dry. Any subcutaneous tissue can be used for injection sites. The best absorption is in the lower abdomen, followed by the upper, outer arms, tops of the thighs and lastly the upper areas of the buttocks. Exercise and heat (like the warmth from a heating pad or whirlpool) also hastens absorption of an injected area. Ask the student whether they have a preferred site and listen to the student's guidance.
9. Pinch up skin and tissue with one hand. With the other hand, hold the syringe, with the eye of the needle pointing upward, like a pencil. Dart the needle into the "soft pocket" (area that lies directly in front or behind the pinched up skin) at a 90 degree angle.
10. Inject insulin in one to five seconds by pushing steadily on the plunger. Do not aspirate or pull back the plunger.
11. Release pinched up skin, count to five, then remove needle while applying gentle pressure at the injection site for 10-15 seconds. This will help to prevent leakage from the site. Hold dirty needle and syringe pointed away from you and the student and consciously avoid accidental needle sticks. Take care to avoid injecting into the muscle, as it will hasten absorption. Do not massage the area as it irritates the tissue and hastens absorption.
12. Continue to point used needle and syringe away from you and away from the student. Do not recap used needles. When finished with the needle and syringe, carefully dispose of them directly into the used sharps container. **Do Not Recap Used Needles.**

*Recapping a contaminated needle can result in a needle stick injury.*

13. Document in student log the dose of insulin given; time given, site used and any reactions or problems noted. If there is a problem injecting, or if the full dose was not given, contact the school nurse coordinator for assistance.

## **B. Procedure for Insulin Administration by Pen Injector**

An insulin pen is an insulin delivery system that generally: looks like a large pen, uses an insulin cartridge rather than a vial, and uses disposable needles. Insulin pens assist in preventing dose errors that may occur with measuring from a vial with a syringe. It provides a means of delivering an accurate dose in a convenient manner. Insulin pens should be handled and stored according to manufacturer's instructions. There are several styles of insulin pens, depending on the manufacturer, but the procedure for use is similar. Always read the directions from the manufacturer, and if you are uncertain of how to use the pen, stop, and contact your supervisor for assistance. Do not attempt to use a pen if there is any question about administering the correct dose.

Some pens use replaceable insulin cartridges. When the cartridge is empty, a new cartridge must be placed in the pen by the student or a trained adult. Other pens do not use replaceable cartridges and the whole pen is disposed of when the cartridge is empty. Most pens use special pen needles which can be extremely short and thin. All pens use replaceable needles.

It is easy to use an insulin pen. If a pen with insulin suspension is used, such as NPH or a pre-mixed insulin, gently shake the pen to be sure the insulin is mixed prior to use. Pens are easy enough for children to use, and are excellent for use at school. Pens made by different manufacturers are either measured in half or full units. Pen needles should be removed after each use to prevent air from entering the cartridge and to prevent insulin from leaking out. There are many different pen needles available, in varying lengths and diameters.



The smallest pen needles are very short and very thin and help minimize the discomfort of injection. Pens need to be held in place for several seconds after the insulin is delivered to make sure that no insulin leaks out. Syringe users who switch to pens should pay close attention to the injection site and test their blood glucose often as they become accustomed to pen injections.

While pens offer injection convenience, they don't allow mixing of multiple types of insulin. Pens offer repeatability in dosing accuracy compared with syringes. Also, because dosing with a pen involves dialing a mechanical device and not looking at the side of a syringe, insulin users with reduced visual acuity can be assured of accurate dosing with a pen.



Depending on the DMMP, student level of interest and development, involve the student in each of the following steps.

1. Obtain a blood glucose reading prior to insulin administration.
2. Determine insulin dose with health care provider's orders.
3. Wash hands and put on gloves.
4. Assemble equipment
  - a. insulin pen device
  - b. pen needle
  - c. alcohol prep pad
  - d. cotton balls or spot bandage (optional)
  - e. gloves (if done by anyone other than student)
  - f. sharps container
5. Check insulin type/brand. This must match health care provider's written orders. If not, stop and contact prescriber for guidance.
6. Check the level of insulin remaining in the insulin cartridge. Cartridges are made for multiple doses. Ensure that enough insulin remains in the cartridge for accurate dosing.
7. Attach new needle. Remove outer plastic cap and plastic needle cover. Place outer cap on a flat surface with open end facing up. This will assist with needle disposal after insulin is given.
8. Prime the needle by dialing in two (2) units of insulin to perform an "air shot." Insulin should appear at the needle tip; if it does not, repeat procedure. Changes in temperature can cause air intake. This procedure ensures that any accumulated air will be released, thereby ensuring accurate insulin dosage.
9. Dial in prescribed dose. Double check your dose on the device against the written order.
10. Cleanse the skin with alcohol and allow the skin to dry before administering the injection.

11. If allowed by the DMMP and permitted by the parent, ask the student if he/she wants to do the injection or to have you do it, or if the student wants to assist you in the process: pinch up the skin at the selected site and dart the needle into the soft pocket at a 90 degree angle. The soft pocket lies directly in front of or in back of the pinched up skin.
12. Push the plunger down and inject insulin at a steady rate.
13. Release the pinched up skin. Count slowly to five (5) and then remove the needle. Some pen manufacturers require a longer count.
14. Grasping the pen with the needle pointed away from you and the student, place the needle into plastic needle cap that was left upright on a flat surface. Unscrew the needle tip, avoiding sticking yourself, and carefully discard into a sharps container. Do not lift the cap up with fingers to cover needle tip. Leave cap on the counter and use the pen to place the needle into cap to avoid the possibility of a needle stick injury (see Procedure for One-Handed Needle Recapping). The needle must be changed after each injection, as leaving the pen needle attached leaves an open passageway into the insulin and contamination may occur.
15. Document appropriately in student log.
16. If an accidental needle stick occurs with a contaminated needle, wash the area thoroughly with soap and warm water, allowing bleeding to occur to cleanse the wound. Notify your supervisor immediately in accordance with the school division's Blood-borne Exposure Control Plan.

## **MODULE I: Procedure for Operation of an Insulin Pump**

### **Insulin Pumps**

An insulin pump attempts to mimic the pancreas by delivering insulin over the course of a day, allowing a student with diabetes to match their insulin to their lifestyle, rather than relying on an insulin injection and having to match their lifestyle to how the insulin is working. Every action a pump makes starts with the user. Everything that is important in controlling diabetes by using insulin and syringes is just as important when wearing a pump. To use a pump one must be willing to check blood glucose levels frequently and learn how to make adjustments in insulin, food, and physical activity in response to those test results. The student may or may not need assistance with these tasks, it depends upon the individual (American Diabetes Association, 2015).

Each pump is different and those trained to administer insulin need to be trained on the individual student's model. The parent is responsible for ensuring that the school has the instruction manual and customer service number for the specific pump that the student is using. The customer service phone number may be located on the back of the pump for emergency assistance. In the DMMP, it should specify where at school the student will keep a set of backup pump supplies and an alternate means of administering insulin, in the event of a problem such as pump malfunctions, loosened cannulas, elevated BG above target range, or ketones in the urine (American Diabetes Association, 2008). According to school division policy, staff should be trained how to suspend or disconnect the pump and to change the battery following manufacturer's instructions.

Insulin pumps are small, computerized devices programmed to deliver a continuous flow of insulin, even while a person with diabetes sleeps. Continuous flow allows for tighter control of insulin levels for most individuals, which preserves organs that can be damaged by poorly controlled diabetes.

The FDA has approved more than 55 different insulin pumps. It is the responsibility of licensed and unlicensed staff to become familiar with the manufacturer's instructions for the proper and safe operation of a student's specific insulin pump. Unlicensed staff should be advised during training not to accept responsibility for operation of an insulin pump until they are confident of its operation and of the student's DMMP.

A pump system generally consists of:

- a pumping mechanism that holds batteries and a cartridge filled with a two to three day supply of rapid-acting insulin. The pump, which is similar in size to a small cell phone, is worn outside the body on a belt or in a pocket. Specific brands may be tubeless and adhered directly to the skin.
- a tube (catheter) that carries insulin from the pump to another tube (cannula) implanted by a thin needle just under the skin, typically in the belly or back.

The pump must be programmed to deliver a “basal” amount of insulin throughout the day and can be programmed for additional doses (boluses) as needed for meals and when the wearer’s blood sugar is high. Newer models may have calculation and/or reminder “wizard” functions to help users (American Diabetes Association, 2008).

The fewer hands touching the cannula, the lesser the risk for infection. Therefore, the cannula should be changed at home by the family every two or three days. Trained staff or the student can disconnect the tube from the set for sports, showering, or any other short activity per the DMMP.

## MODULE J: HYPERGLYCEMIA

Hyperglycemia, “high blood sugar”, or ↑BG, is when the level of sugar in the blood is typically greater than the number specified on the DMMP for a specific student. Over a long period of time, even moderately high BG levels can lead to serious complications, such as blindness, heart disease, kidney failure, and amputations. Acutely, hyperglycemia can result in poor academic performance by interfering with the ability to concentrate and reason. Common symptoms included blurred vision, fatigue, increased thirst or hunger and frequent need to urinate.

### Prevention

Hyperglycemia or ↑BG levels in children who are diagnosed with diabetes can be the result of such things as:

- taking too little insulin
- ingesting food that is not covered by the appropriate amount of insulin
- decreasing the usual amount of exercise or activity
- using “expired” insulin or insulin that was not stored properly and has lost potency
- having an illness, infection, or injury
- being stressed or emotionally upset
- having hormone fluctuations as with menstrual cycles or using certain medications
- rebounding from a low blood sugar
- poor compliance with DMMP
- no apparent reason

Timing is very important in the prevention of hyperglycemia. The ADA recommends that individuals with diabetes stick to a schedule: eating on time, checking the BG on time, taking medications on time, and exercising on time. Individuals with diabetes must ensure that insulin dosing is accurate, meals and snacks are appropriate in content and timing, and a regular routine is maintained.

### Symptoms

The usual signs of hyperglycemia are:

<b>Mild</b>	<b>Moderate</b>	<b>Severe</b>
<ul style="list-style-type: none"><li>• Increased thirst</li><li>• Frequent urination</li><li>• Fatigue/sleepiness</li><li>• Increased hunger</li><li>• Loss of concentration</li><li>• Blurred vision</li><li>• Urine ketones (0-small)</li></ul>	<ul style="list-style-type: none"><li>• Sweet smelling breath</li><li>• Dry mouth</li><li>• Nausea</li><li>• Stomach cramps</li><li>• Vomiting</li><li>• Urine Ketones (Moderate-Large)</li></ul>	<ul style="list-style-type: none"><li>• Labored breathing</li><li>• Very weak</li><li>• Confused</li><li>• Unconscious</li><li>• Urine ketones (Moderate-Large)</li></ul>



## **Treatment**

The goal of treatment is to lower the blood sugar using the DMMP and/or Emergency Action Plan. Treatment is dependent on how high the blood sugar is, whether or not urine ketones are present, and if the student is symptomatic. Possible interventions include administering additional insulin, encouraging hydration through the use of sugar-free fluids such as water and diet soda, limiting physical activity, and if needed, referral to the private provider. The following chart shows sample management plans, but each child's DMMP must be followed.

<b>Mild</b>	<b>Moderate</b>	<b>Severe</b>
<ol style="list-style-type: none"><li>1. Drink zero-calorie fluids (i.e. water)</li><li>2. Check urine ketones</li><li>3. Decrease activity if ketones present</li><li>4. Notify parents</li></ol>	<ol style="list-style-type: none"><li>1. Drink zero-calorie fluids (i.e. water)</li><li>2. Check urine ketones</li><li>3. Decrease activity, call the doctor, anti-nausea suppository if prescribed</li><li>4. Notify parents</li></ol>	<ol style="list-style-type: none"><li>1. Call 911</li><li>2. Notify parents</li><li>3. Notify health care provider if parent cannot be reached</li></ol>

The DMMP should include parameters as to when to notify parents and/or the physician in the event of hyperglycemia unresponsive to school interventions. Schools should allow students with diabetes to have free and unrestricted access to water or sugar-free liquids and the restroom as needed.

Prolonged hyperglycemia can cause a potentially life-threatening condition called diabetic ketoacidosis (DKA) which is a medical emergency requiring immediate transportation via ambulance to a medical center. Symptoms of DKA include a fruity or acetone breath odor, nausea, vomiting, stomach pain, and, if untreated, deep breathing, increasing sleepiness, coma, and death. Students who use insulin pumps can go into DKA in a matter of hours if their pumps stop delivering insulin appropriately. Therefore, all staff involved with the care of a student with diabetes must be trained in the recognition and management of hyperglycemia.

### **Sources:**

- American Diabetes Association. (2008). *Diabetes Care Tasks At School: What Key Personnel Need To Know*. Available online at: <http://www.diabetes.org/living-with-diabetes/parents-and-kids/diabetes-care-at-school/school-staff-trainings/diabetes-care-tasks.html>.
- American Diabetes Association. (2014). *Diagnosing Diabetes and Learning About Pre-diabetes*. Available online at: <http://www.diabetes.org/diabetes-basics/diagnosis/?loc=symptoms%20-%20sthash.BtavhXMi.dpuf>.
- Southall, V.H. (2004). *Guidelines for specialized health care procedures*. Retrieved May 14, 2011, from Virginia Department of Education: Health and Medical at: [http://www.doe.virginia.gov/support/health\\_medical/index.shtml](http://www.doe.virginia.gov/support/health_medical/index.shtml).

## MODULE K: HYPOGLYCEMIA

Hypoglycemia, also called “low blood sugar” or “low blood glucose” (↓BG), insulin reaction or insulin shock is defined by the American Diabetes Association (2015, <http://www.diabetes.org/living-with-diabetes/treatment-and-care/blood-glucose-control/hypoglycemia-low-blood.html>) as blood glucose values below 70 mg/dL. It is the greatest immediate danger to students with diabetes. **Low blood sugar can develop within minutes and requires immediate attention. Staff supervising a child with diabetes and suspected “low blood sugar” should not leave the child unattended at any time.**

**HYPOGLYCEMIA IS A MEDICAL EMERGENCY THAT REQUIRES IMMEDIATE ACTION WITH A SUGAR CONTAINING PRODUCT OR GLUCAGON FOLLOWING THE DMMP AND/OR EMERGENCY ACTION PLAN.**

### Causes

- too much insulin
- skipping or delaying meals or snacks
- not eating enough food to cover the amount of insulin taken
- exercising too long or intensely
- combination of any of the above

### Symptoms

Hypoglycemia is not always preventable, especially in newly diagnosed students, or in students where control is difficult. Not all students, especially young children, will recognize the symptoms. It is imperative, therefore for school personnel to become familiar with the signs and symptoms and to be trained in immediate and proper management.

#### 1. **Mild/Moderate Symptoms:**

- a. shakiness
- b. weakness
- c. dizziness
- d. cold, clammy skin
- e. hunger
- f. drowsiness
- g. sweating
- h. paleness
- i. rapid heart beat
- j. visual disturbances
- k. complaining of “feeling funny”
- l. numbness or tingling of lips
- m. yawning
- n. headache
- o. confusion
- p. inability to concentrate

- q. changes in behavior (irritability, crying, combativeness)
- r. slurred speech
- s. nausea

## 2. Severe Symptoms:

- a. inability to swallow
- b. unconsciousness (extreme cases)
- c. seizures (extreme cases)

Symptoms vary from person to person and from episode to episode. Warning signs and symptoms of low blood sugar may happen suddenly and can be mistaken for misbehavior. Many students will not have an awareness of low blood sugar symptoms until around ages 7 or 8 years. In addition, adolescents who are not accepting a diagnosis may ignore early warning signs when they first occur.

### Prevention Strategies

- Allow students to check blood sugar routinely per the DMMP or as needed.
- Allow testing in the classroom.
- Facilitate a regular schedule for eating meals and snacks. Meals and snacks should not be skipped.
- Allow students with diabetes to eat in the classroom per the DMMP or as needed.
- Reinforce with students that injection sites should be rotated.
- Always double check insulin dosing before giving it.
- Plan for extra food and/or reducing insulin amounts before exercise, in accordance with the DMMP, and in case of emergency school situations, such as shelter-in-place, emergency evacuations, lock-downs, etc. Should lunch be interrupted the child should be allowed to take his food with him.
- Prescribers may suggest increasing the bedtime snack on unusually active days to avoid hypoglycemia during the night while asleep.

### Treatment

Treatment is dependent on the severity of the symptoms and may vary with individuals per their DMMP and Emergency Action Plan. Since some of the symptoms are similar to those for hyperglycemia, **if in doubt, always treat for hypoglycemia first. Do not delay emergency treatment, but obtain a blood glucose level when possible.** Specific treatment should be outlined in the DMMP, prepared by the health care team, but will look similar to the information given below:

#### For students who can swallow, follow the “Rule of 15”

1. Treat with 15 grams of a fast-acting carbohydrate source
  - a. Examples of appropriate foods
    - i. 4 oz. juice
    - ii. 4 oz. regular soda

- iii. 2-4 glucose tablets
  - iv. 5-6 Lifesavers or similar candy
  - v. 6-8 oz. milk
2. Wait 15 minutes, then, recheck the blood sugar.
  3. If the blood sugar is less than the target range in the DMMP keep repeating the 15 grams of carbohydrate and rechecking blood sugar level 15 minutes later until the BG level is back in the desired range. If staff supervising a child with symptoms of hypoglycemia, are unable to raise the BG to levels indicated in the DMMP despite fast-acting glucose sources, they must contact 911 and notify the parents immediately.
  4. When the blood sugar level is back in the target range per the DMMP, and it is time for a snack or meal, supervising trained staff should allow the student to eat as usual and cover the meal with insulin as ordered in the DMMP. If the meal or snack time is more than an hour away, or the student will be participating in physical activity between the episode of ↓BG and the next normally scheduled meal, give a protein and carbohydrate snack per the DMMP.
    - a. Examples of appropriate foods
      - i. ½ sandwich with ½ cup milk
      - ii. 4 graham crackers squares with peanut butter or cheese
      - iii. 6 saltine crackers with peanut butter or cheese

### **Severe Hypoglycemia: MEDICAL EMERGENCY**

**For those students who cannot swallow, may be unconscious, unresponsive or having a seizure or whose blood sugar does not respond to treatment per the DMMP, or when glucagon is not available or cannot be administered immediately, this is a medical emergency that requires 911 response.**

#### Administration of Glucagon

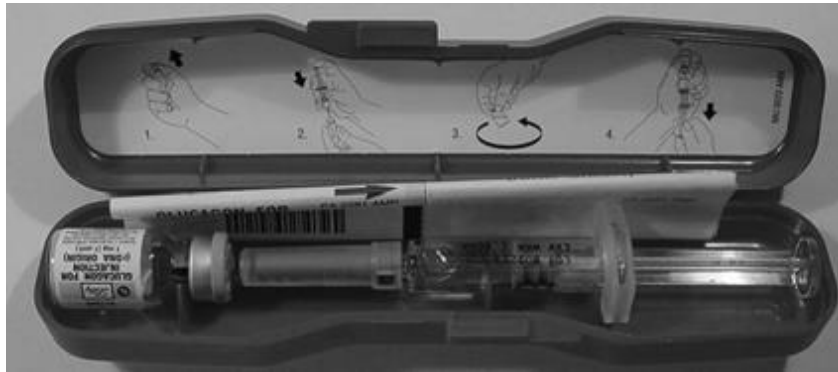
**Note: Parent provides necessary equipment, supplies, and medications. Even self-directed individuals are not considered independent during severe hypoglycemic events and will need immediate assistance by a trained staff member.**

1. Verify signs of severe low blood glucose. Do not delay treatment pending BG testing if any of the signs or symptoms of hypoglycemia are noted:
  - a. unable to swallow
  - b. unconscious
  - c. combative
  - d. uncooperative
  - e. having seizures
2. Call or ask someone to call 911. Do not leave individual unattended.

3. Position child on his/her side in a safe area with head positioned to the side. Administer glucagon per Emergency Action Plan. After administration of glucagon, as the child regains consciousness, nausea and vomiting usually occurs and student must be kept on his/her side to prevent choking.

4. Inject glucagon following the procedure below.

- a. Obtain glucagon kit. Wash hands (if possible) and put on gloves. If gloves are not available, do not delay treatment, but use judicious precaution to avoid blood exposures.



- b. Flip cap off of the glass vial (bottle) containing the dry powder. Remove the needle cover from the syringe.
- c. Take the fluid-filled syringe in the glucagon emergency kit and inject the fluid into the vial containing the glucagon powder. Shake gently or roll to mix until all powder is dissolved and solution is clear. Inspect medication for color, clarity, and presence of lumps. Solution should be clear and colorless.
- d. Hold the vial upside down and withdraw the prescribed amount of glucagon back into the syringe. The prescribed amount should be specified in the student's individualized health care plan and emergency action plan. Withdraw the needle from the vial. Generally, if the student weighs >45 pounds, the full vial (1 cc) of glucagon may be injected. If the child weighs <45 pounds, inject ½ of the solution.
- e. When possible, the injection site should be exposed and cleaned. However, glucagon can be administered through clothing, if necessary. Suggested sites include the outer thigh, upper outer buttock, or arm.
- f. Inject the needle straight into the muscle of the selected site and inject glucagon.
- g. Withdraw the needle and press the site with a cotton ball or wipe. Massage the injection site for 10 seconds; apply bandage if needed.

- h. Do not recap syringe. Put used syringe in sharps container.
  - i. Stay with the student. It may take 15-20 minutes for the student to regain consciousness.
5. If BG testing kit is available, check or recheck the blood sugar. Follow the student's specific instructions for response to results. Some students may have a second injection of glucagon ordered if glucose remains low.
6. The student may be given sips of fruit juice or regular soda once awake and able to drink. This may be followed by a snack containing protein and carbohydrates such as a peanut butter sandwich or cheese crackers to keep blood sugar levels elevated to normal levels and to prevent recurrence.
7. Do not be surprised if the student does not remember being unconscious, incoherent or has a headache. The blood sugar may also rise over 200 and nausea or vomiting may occur.
8. When emergency services arrive, turn care of the student over to the ambulance crew.
9. Notify parents and diabetes medical management team.
10. Document in student log.

**Source:**

- American Diabetes Association. (2008). *Diabetes Care Tasks At School: What Key Personnel Need To Know*. Available at: <http://www.diabetes.org/living-with-diabetes/parents-and-kids/diabetes-care-at-school/school-staff-trainings/diabetes-care-tasks.html>.
- American Diabetes Association. (2015). *Hypoglycemia (Low Blood Glucose)*. Available at: <http://www.diabetes.org/living-with-diabetes/treatment-and-care/blood-glucose-control/hypoglycemia-low-blood.html>.

## MODULE L: DISPOSAL OF MEDICAL SUPPLIES

### Disposal of medical supplies

Used needles, syringes, and lancets must be disposed of in a properly labeled biohazard sharps container as they are used. Each local school division will have policies and protocols regarding disposal of medications and syringes.

School divisions should have a protocol for notifying parents about the need to pick up unused medication(s) and/or supplies. Parents should pick up unused medication within one week of the expiration date or by the last day of school. Parents should be notified and given sufficient time to pick up remaining medication, according to school policy or protocols. Medication remaining after the designated date for pick up shall be destroyed (Virginia Department of Education, 2006, p. 36). Therefore, parents should be advised in advance of the division's protocol for destroying unclaimed medication(s)/supplies. The *Manual for the Training of Public School Employees in the Administration of Medication* (Virginia Department of Education, 2006, p. 53) advises that:

- Parents should pick up unused medication within one week of the expiration date or when it is no longer needed at school.
- In the case of medications used by the student daily/routinely, parents should be notified that they need to pick up the medication/supplies and given sufficient time to do so.
- Medications are costly and every effort should be made to contact a parent to arrange for their pick-up of non-expired diabetes supplies. However, supplies that are not picked up should be destroyed on the last student day. Destruction should be in accordance with current state and federal environmental and health care standards and district protocols with appropriate witnessing and documentation. (See also US FDA Disposal of Unused Medicines: What You Should Know, <http://www.fda.gov/Drugs/ResourcesForYou/Consumers/BuyingUsingMedicineSafely/EnsuringSafeUseofMedicine/SafeDisposalofMedicines/ucm186187.htm>)

## MODULE M: DOCUMENTATION

All care given to a student with diabetes must be recorded in the student's cumulative medical record. Documentation is the legal record that medication has been ordered, parents have given permission to administer it, and that the school staff has given the medication and/or performed procedures or essential interventions. Students should have individual health records for documenting medication administration and/or completion of procedures. Documentation is commonly considered the "sixth right" of medication administration.

Because student health records are education records, they are protected under the Family Education Rights and Privacy Act (FERPA). However, for communication by the school to occur with a medical provider, the medical provider cannot share or exchange information without a Health Insurance Portability and Accountability Act (HIPAA) compliant release. Schools may create one form to suit both purposes.

Health records should be securely maintained to ensure student privacy, per school board policy. Forms for documenting the administration of medications and treatments vary by school district. Whatever forms are used, the record must be clear, concise, and complete. Furthermore, if all essential information is documented by a prescriber as required, but is on a different form, schools should consider accepting the document, since it is the information rather than the form that matters. Student health records should be maintained in accordance with the appropriate Records Retention and Disposition Schedule(s) from the Library of Virginia (2011).

The following documentation must be maintained for students with diabetes:

- signed authorizations, updated annually by the parent and health care provider
  - diabetes medical management plan (DMMP) written by the prescriber
  - individualized health care plan (IHP) written by a nurse for the nurse and/or trained staff who are assisting a student in the nurse's absence
  - emergency action plan written by a nurse for unlicensed staff supervising the student
  - permission for unlicensed assistive personnel to give insulin/glucagon in the absence of a licensed health care provider as outlined in the *COV* written by the school and signed by the parent, as part of the DMMP
- medication administration log
- blood sugar log
- carbohydrate count log
- nurses notes of any care provided, including non-diabetes related care
- description of any complications from medications and/or treatments



## **MODULE N: EMERGENCY ACTION PLAN**

Each student diagnosed with diabetes should have an emergency action plan and a diabetes emergency kit. The kit should be kept in a secure dedicated location known to the student and to any school staff member who may be treating hypoglycemia. If the student leaves the campus, e.g., to go on a field trip, the kit must go with the student. The label on the kit should state “Diabetes Emergency Kit” along with the student’s name.

A school nurse should write a simple emergency action plan for school personnel who come in contact with the student with diabetes during the school day. The emergency action plan should be based on the information in the student’s DMMP. The plan should summarize in simple terms (e.g. “If you see this..., then do this...”) how to recognize and treat hypoglycemia and hyperglycemia. It should be distributed to all personnel who have responsibility for the student, during the school day and during school-sponsored activities (The National Diabetes Education Program, 2010, p. 97). Sample plans are available in Section 3 of the NDEP book, *Helping the Student with Diabetes Succeed: A Guide for School Personnel*.

For each student in the school with diabetes, a source of fast-acting sugar and a small snack (ex. cheese crackers and box juice) should be readily available to the student. The school Health Office “Grab and Go” Emergency Evacuation Bag should also be stocked with similar non-perishable foods in case of a diabetic emergency (Southall, 2004, p. 26).

In the event of natural disasters, weather extremes, or other emergency situations, such as building evacuations, sheltering-in-place, or lock-downs, students may need to stay at school. The family should be encouraged to provide an emergency supply kit containing a 72 hour supply of essentials to adequately manage the student in the event of a prolonged school or community emergency.

## MODULE O: RESOURCES & REFERENCES

American Diabetes Association  
ATTN: National Call Center  
1701 North Beauregard Street  
Alexandria, Virginia 22311  
<http://www.diabetes.org/>  
1-800-342-2383

Juvenile Diabetes Foundation  
120 Wall Street, 19<sup>th</sup> Floor  
New York, New York 10005-4001  
<http://www.jdrf.org/>  
1-800-JDF-CURE  
1-212-785-9595

American Academy of Pediatrics. (2008). Role of the school nurse in providing school health services. *Pediatrics*, 121(5), 1052-1056. Retrieved June 18, 2011, from <http://pediatrics.aappublications.org/content/121/5/1052.full.pdf+html>.

American Diabetes Association. (2008). *Diabetes care tasks at school: What key personnel need to know*. Retrieved June 19, 2011, from American Diabetes Association: <http://www.diabetes.org/living-with-diabetes/parents-and-kids/diabetes-care-at-school/school-staff-trainings/diabetes-care-tasks.html>.

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American Diabetes Association. (2011b). Standards of medical care in diabetes – 2011. Retrieved June 12, 2011, from *Diabetes Care*, 34 Suppl 1S11-S61. Retrieved June 12, 2011, from: [http://care.diabetesjournals.org/content/34/Supplement\\_1](http://care.diabetesjournals.org/content/34/Supplement_1).

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American Diabetes Association. (2004). *Sample Section 504 Plan & Diabetes Medical Management Plan for a student with diabetes*. Available online at: <http://www.diabetes.org/advocacy-and-legalresources/discrimination/school/504plan.jsp>.

American Diabetes Association. (2015). *Diabetes Forecast Magazine* Insulin pumps 2015: <http://www.diabetesforecast.org/2015/mar-apr/images/insulin-pumps-2015.pdf>.

Borushek, A. (2011). *CalorieKing calorie, fat and carbohydrate counter*. Costa Mesa, CA: Family Health Publications.

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*Code of Virginia*. (1999). § 22.1-274. *School health services*. Retrieved May 14, 2011, from Legislative information system: <http://leg1.state.va.us/lis.htm>.

Juvenile Diabetes Research Foundation. (2011). *Helping your child or teen live with type 1 diabetes*. Retrieved June 19, 2011, from Juvenile Diabetes Research Foundation: [http://www.jdrf.org/index.cfm?page\\_id=103523](http://www.jdrf.org/index.cfm?page_id=103523).

Library of Virginia. (2011). *Records Management*. Retrieved May 1, 2011, from Library of Virginia: <http://www.lva.virginia.gov/agencies/records/>.

National Association of School Nurses. (2005). *Delegation of care: Overview for the registered nurse practicing in the school setting*. Scarborough, ME: National Association of School Nurses.

National Association of School Nurses. (2012, January). *Diabetes management in the school setting*. Retrieved June 4, 2015, from National Association of School Nurses: Position Statements: <http://www.nasn.org/PolicyAdvocacy/PositionPapersandReports/NASNPositionStatementsFullView/tabid/462/ArticleId/22/Diabetes-Management-in-the-School-Setting-Adopted-January-2012>.

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<http://ndep.nih.gov/publications/PublicationDetail.aspx?PubId=97&redirect=true#main>.

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<http://www2.ed.gov/policy/gen/guid/fpco/ferpa/index.html>.

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<http://idea.ed.gov/explore/view/p/%2Croot%2Cregs%2C300%2CA%2C300%252E8%2C>.

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<http://www2.ed.gov/about/offices/list/ocr/docs/edlite-FAPE504.html>.

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U. S. Department of Justice. (2010, September). *Americans with Disabilities Act: Title II Regulations*. Retrieved June 15, 2011, from Americans with Disabilities Act:  
[http://www.ada.gov/regs2010/titleII\\_2010/titleII\\_2010\\_regulations.pdf](http://www.ada.gov/regs2010/titleII_2010/titleII_2010_regulations.pdf).

U. S. Department of Labor. (2008). Occupational Safety & Health Standards: Part 1910: Blood-borne pathogens. Retrieved June 10, 2011, from Occupational Safety and Health Administration:  
[http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=10051](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051).

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[http://www.dhp.state.va.us/Nursing/nursing\\_guidelines.htm](http://www.dhp.state.va.us/Nursing/nursing_guidelines.htm).

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Virginia Department of Education. (2006). *Manual for the training of public school employees in the administration of medication*. (G. P. Smith, & E. G. Cruise, Eds.) Richmond, VA: Virginia Department of Education.

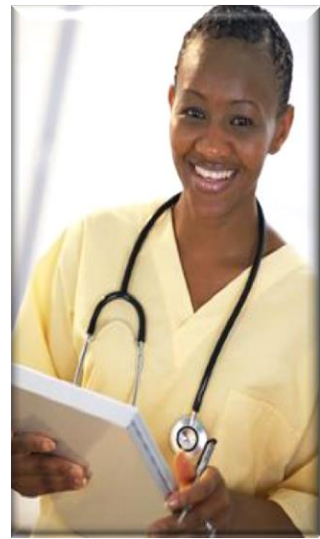
Virginia Department of Health. (1999). *Virginia School Health Guidelines* (2nd ed.). (T. P. Keen, N. Ford, A. W. Cox, J. K. Henry, G. P. Smith, & J. Tarr, Eds.) Richmond, VA: Virginia Department of Health. Retrieved June 15, 2011, from: [http://www.doe.virginia.gov/support/health\\_medical/virginia\\_school\\_health\\_guidelines/general\\_guidelines\\_admin-meds.pdf](http://www.doe.virginia.gov/support/health_medical/virginia_school_health_guidelines/general_guidelines_admin-meds.pdf).

Virginia Diabetes Council. (2010). *VDC Resources: School Resources, Forms and Protocol*. Retrieved June 15, 2011, from Virginia Diabetes Council: <http://www.virginiadiabetes.org/resources.html>.

Virginia General Assembly. (1999). *The Drug Control Act: Chapter 34 of Title 54.1*. Retrieved June 15, 2011, from Legislative Information System: *Code of Virginia*: <http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+TOC540100000340000000000000>.

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# Appendices



## Appendix A Glossary

**Blood Glucose Level:** The amount of glucose or sugar in the blood. For monitoring/testing the student independently or with assistance, use a drop of their blood and a specially calibrated device, called a Glucometer or Glucose Meter, to determine the current blood glucose level.

**Bolus:** A single dose of insulin delivered all at once. This may be needed as part of routine daily care when a child eats. It may be needed in an emergency to lower an especially high blood glucose level in response to a high blood glucose reading according to the DMMP.

**Delegation:** The transference to a competent licensed or unlicensed individual the authority to perform a selected task or activity in a selected situation by a nurse qualified by licensure and experience to perform the task or activity.

**Diabetic Ketoacidosis (DKA):** Severe, out-of-control high blood glucose levels that need emergency treatment. DKA happens when blood glucose levels get too high or insulin levels are far less than the body needs. This may happen because of illness or taking too little insulin. The body starts using stored fat for energy and ketone bodies and acids build up in the blood. The signs include nausea and vomiting, stomach pain, deep, rapid breathing, flushed face, rapid weak pulse, dry skin and a fruity breath odor. Fluids and insulin must be given quickly since ketoacidosis can lead to coma and even death. DKA is considered a life-threatening emergency that requires transportation to a medical center.

**Direct supervision** means the supervisor is on the premises but not necessarily immediately physically present where the tasks and activities are being performed. Immediate access by phone until direct contact can be established is implied.

**Carbohydrate Counting:** The method of calculating the number of grams of carbohydrate in the food the student eats. In conventional insulin therapy when used in its simplest form, this is a method of maintaining consistency in carbohydrate intake from day-to-day. When this is used in intensive therapy it serves as the basis for determining the amount of insulin to administer for any given meal.

**Glucagon:** A hormone produced in the pancreas that raises the level of glucose in the blood. Available as a life-saving medication, glucagon injection may be given to child with diabetes in an emergency to raise extremely low blood glucose levels if a student is unable to intake oral glucose sources.

**Hyperglycemia:** A condition in which blood glucose levels are elevated above the DMMP guidance, requiring decisive intervention.

**Hypoglycemia:** A condition in which blood glucose levels are low below the DMMP guidance, requiring decisive intervention. Hypoglycemia is considered a life-threatening condition.



**Individualized Health Care Plan:** A nursing care plan developed by the school nurse describing the way health related services will be provided to specific students in the school setting. It can be a stand-alone care plan or an attachment to the *Diabetes Medical Management Plan*, which is provided by the physician and parent/guardian. The attachment should specify the unlicensed assistive person who will be delegated and trained to provide selected tasks in the school setting regarding blood glucose monitoring and insulin administration and to follow the Emergency Action Plan in the event of an emergency. It should also include any other information not covered in the Information Sheet for the School Management of Diabetes Mellitus that the school nurse identified during the care planning process with parents and school personnel.

**Insulin:** A hormone secreted by the islet cells in the pancreas that allows the body's cells to absorb glucose for energy. It is used as a medication when the body does not make enough insulin to maintain proper blood glucose levels.

**Mg/dL- Milligrams per deciliter:** A unit of measurement used in blood glucose monitoring to describe how much glucose is in a specific amount of blood.

**Non-medical assistive personnel:** Any individual who has been trained and designated to perform health-related services for students while they are in school, but who are not receiving compensation for nursing or medical services. May also be referred to as unlicensed assistive personnel (UAP).

**Nursing Care Plan:** See **Individualized Health Care Plan (IHCP)**.

**School Nurse:** A professional nurse, registered and licensed to practice in Virginia who is employed by the county health department, local school district or contracted by the county health department or local school district from a community based agency. The school nurse may be assigned to one or more schools and provides leadership and services consistent with the Virginia Nurse Practice Act (Chapter 30) and the Virginia Departments of Education and Health School Health Services Program. Ideally, the school nurse should have a minimum of a Bachelor of Science degree, National School Nurse Certification, with experience and additional education in pediatric assessment and intervention of the school-age child.

**Sliding Scale:** A medical order for adjusting the insulin dose on the basis of blood glucose monitoring without a need to call the prescriber for any given reading that is within the sliding scale (set parameters). It is sometimes referred to as supplemental insulin or a correction dose. In some cases the amount of insulin to be given is calculated with a simple mathematical formula specific to the student. Readings that are above or below the sliding scale readings require immediate and decisive action by the supervising adult by conferring with the DMMP and Emergency Action Plan, and/or phone conference with the prescriber.

**Supervision:**

**Indirect Supervision** is the provision of guidance by a qualified nurse and periodic inspection by the nurse for the accomplishment of a nursing task or activity provided by unlicensed assistive



personnel. The nurse must be qualified and legally entitled to perform such task or activity.

**Direct Supervision** means the supervisor is on the premises, but not necessarily immediately physically present where the tasks and activities are being performed. Immediate access by phone until direct contact can be established is implied.

## Appendix B

### **Excerpts from Code of Virginia Pertaining to the Administration of Insulin and Glucagon in the School Setting**

§ [8.01-225](#). Persons rendering emergency care, obstetrical services exempt from liability.

A. Any person who:

9. Is an employee of a school board, authorized by a prescriber and trained in the administration of insulin and glucagon, who, upon the written request of the parents as defined in § [22.1-1](#), assists with the administration of insulin or administers glucagon to a student diagnosed as having diabetes who requires insulin injections during the school day or for whom glucagon has been prescribed for the emergency treatment of hypoglycemia shall not be liable for any civil damages for ordinary negligence in acts or omissions resulting from the rendering of such treatment if the insulin is administered according to the child's medication schedule or such employee has reason to believe that the individual receiving the glucagon is suffering or is about to suffer life-threatening hypoglycemia. Whenever any employee of a school board is covered by the immunity granted herein, the school board employing him shall not be liable for any civil damages for ordinary negligence in acts or omissions resulting from the rendering of such insulin or glucagon treatment.

§ [22.1-274](#). School health services.

D. With the exception of school administrative personnel and persons employed by school boards who have the specific duty to deliver health-related services, no licensed instructional employee, instructional aide, or clerical employee shall be disciplined, placed on probation, or dismissed on the basis of such employee's refusal to (i) perform nonemergency health-related services for students or (ii) obtain training in the administration of insulin and glucagon. However, instructional aides and clerical employees may not refuse to dispense oral medications.

For the purposes of this subsection, "health-related services" means those activities that, when performed in a health care facility, must be delivered by or under the supervision of a licensed or certified professional.

E. Each school board shall ensure that in school buildings with an instructional and administrative staff of 10 or more (i) at least three employees have current certification or training in emergency first aid, cardiopulmonary resuscitation, and the use of an automated external defibrillator and (ii) if one or more students diagnosed as having diabetes attend such school, at least two employees have been trained in the administration of insulin and glucagon. In school buildings with an instructional and administrative staff of fewer than 10, school boards shall ensure that (a) at least two employees have current certification or training in emergency first aid, cardiopulmonary resuscitation, and the use of an automated external defibrillator and (b) if one or more students diagnosed as having diabetes attend such school, at least one employee has been trained in the administration of insulin and glucagon. "Employee" includes any person employed by a local health department who is assigned to the public school pursuant to an agreement between the local health department and the school board. When a registered nurse, nurse practitioner,

physician, or physician assistant is present, no employee who is not a registered nurse, nurse practitioner, physician, or physician assistant shall assist with the administration of insulin or administer glucagon. Prescriber authorization and parental consent shall be obtained for any employee who is not a registered nurse, nurse practitioner, physician, or physician assistant to assist with the administration of insulin and administer glucagon.

§ [22.1-274.01:1](#). Students who are diagnosed with diabetes; self-care.

Each local school board shall permit each enrolled student who is diagnosed with diabetes, with parental consent and written approval from the prescriber, as that term is defined in § [54.1-3401](#), to (i) carry with him and use supplies, including a reasonable and appropriate short-term supply of carbohydrates, an insulin pump, and equipment for immediate treatment of high and low blood glucose levels, and (ii) self-check his own blood glucose levels on a school bus, on school property, and at a school-sponsored activity.

§ [22.1-275.1](#). School health advisory board.

Each school board may establish a school health advisory board of no more than 20 members which shall consist of broad-based community representation including, but not limited to, parents, students, health professionals, educators, and others. If established, the school health advisory board shall assist with the development of health policy in the school division and the evaluation of the status of school health, health education, the school environment, and health services.

Any school health advisory board shall hold meetings at least semi-annually and shall annually report on the status and needs of student health in the school division to any relevant school, the school board, the Virginia Department of Health, and the Virginia Department of Education.

The local school board may request that the school health advisory board recommend to the local school board procedures relating to children with acute or chronic illnesses or conditions, including, but not limited to, appropriate emergency procedures for any life-threatening conditions and designation of school personnel to implement the appropriate emergency procedures. The procedures relating to children with acute or chronic illnesses or conditions shall be developed with due consideration of the size and staffing of the schools within the jurisdiction.

§ [54.1-2901](#). Exceptions and exemptions generally.

A. The provisions of this chapter shall not prevent or prohibit:

13. Any person from the rendering of first aid or medical assistance in an emergency in the absence of a person licensed to practice medicine or osteopathy under the provisions of this chapter;

20. Any person from rendering emergency care pursuant to the provisions of § [8.01-225](#);

26. Any employee of a school board, authorized by a prescriber and trained in the administration of insulin and glucagon, when, upon the authorization of a prescriber and the written request of

the parents as defined in § [22.1-1](#), assisting with the administration of insulin or administering glucagon to a student diagnosed as having diabetes and who requires insulin injections during the school day or for whom glucagon has been prescribed for the emergency treatment of hypoglycemia;

§ [54.1-3001](#). Exemptions.

This chapter shall not apply to the following:

9. Any employee of a school board, authorized by a prescriber and trained in the administration of insulin and glucagon, when, upon the authorization of a prescriber and the written request of the parents as defined in § [22.1-1](#), assisting with the administration of insulin or administering glucagon to a student diagnosed as having diabetes and who requires insulin injections during the school day or for whom glucagon has been prescribed for the emergency treatment of hypoglycemia;

§ [54.1-3005](#). Specific powers and duties of Board of Nursing.

In addition to the general powers and duties conferred in this title, the Board shall have the following specific powers and duties:

13. To develop and revise as may be necessary, in coordination with the Boards of Medicine and Education, guidelines for the training of employees of a school board in the administration of insulin and glucagon for the purpose of assisting with routine insulin injections and providing emergency treatment for life-threatening hypoglycemia. The first set of such guidelines shall be finalized by September 1, 1999, and shall be made available to local school boards for a fee not to exceed the costs of publication;

§ [54.1-3408](#). Professional use by practitioners.

H. Pursuant to a written order or standing protocol issued by the prescriber within the course of his professional practice, such prescriber may authorize, with the consent of the parents as defined in § [22.1-1](#), an employee of a school board who is trained in the administration of insulin and glucagon to assist with the administration of insulin or administer glucagon to a student diagnosed as having diabetes and who requires insulin injections during the school day or for whom glucagon has been prescribed for the emergency treatment of hypoglycemia. Such authorization shall only be effective when a licensed nurse, nurse practitioner, physician or physician assistant is not present to perform the administration of the medication.

M. In addition, this section shall not prevent the administration of drugs by a person who administers such drugs in accordance with a physician's instructions pertaining to dosage, frequency, and manner of administration and with written authorization of a parent, and in accordance with school board regulations relating to training, security and record keeping, when the drugs administered would be normally self-administered by a student of a Virginia public school. Training for such persons shall be accomplished through a program approved by the local school boards, in consultation with the local departments of health.

Appendix C

Sample Skills Checklists

**BLOOD GLUCOSE/BLOOD KETONE MONITORING SKILLS CHECKLIST**

Unlicensed Assistive Personnel (UAP): \_\_\_\_\_

School Nurse/Instructor: \_\_\_\_\_

	Training Date/Initials	Return Demonstrations			
		Date/Initial*	Date/Initial*	Date/Initial*	Date/Initial*
<b>A. States name &amp; purpose of procedure.</b>					
<b>B. Preparation:</b>					
1. Reviews Standard Precautions.					
2. Identifies where procedure is done.					
<b>C. Identifies supplies:</b>					
1. Meter					
2. Test strips or cartridges, etc.					
3. Lancing device					
4. Gloves					
<b>D. Procedure:</b>					
1. Washes hands.					
2. Assembles supplies.					
3. Puts gloves on.					
4. Prepares lancing device.					
5. Turns meter on, checks codes (if applicable).					
6. Places strip into meter or prepares otherwise.					
7. Cleans selected area, allows to dry.					
8. Lances area.					
9. Places blood onto test strip.					
10. Places cotton ball or tissue over lanced area.					
11. Reads result.					

12. Turns meter off, removes strip.					
13. Disposes of strip, gloves and other supplies appropriately.					
14. Cleans up testing area.					
15. Washes hands.					
16. Records results.					

\* Place appropriate code: (+) = task performed well; (-) = task not performed well  
*Adapted with permission from National Association of School Nurses, 2011*

\_\_\_\_\_  
School Nurse Signature/Initials:

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

\_\_\_\_\_  
Unlicensed Assistive Personnel Signature/Initials:

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

## URINE KETONE MONITORING SKILLS CHECKLIST

Unlicensed Assistive Personnel (UAP): \_\_\_\_\_

School Nurse/Instructor: \_\_\_\_\_

	Training Date/Initials	Return Demonstrations			
		Date/Initial*	Date/Initial*	Date/Initial*	Date/Initial*
<b>A. States name &amp; purpose of procedure.</b>					
<b>B. Preparation:</b>					
1. Reviews Standard Precautions.					
2. Identifies where procedure is done.					
<b>C. Identifies supplies:</b>					
1. Gloves					
2. Testing strips					
3. Cup of urine					
4. Protected testing area (waterproof disposable pad)					
5. Watch or clock with second hand					
<b>D. Procedure:</b>					
1. Washes hands.					
2. Assembles supplies.					
3. Puts on gloves.					
4. Places cup of urine on protected area (waterproof disposable pad).					
5. Dips ketone testing strip in urine taps off excess.					
6. Times appropriately.					
7. Compares strip to bottle, accurately reads results.					
8. Disposes of all supplies appropriately.					
9. Removes gloves and disposes.					
10. Washes hands.					
11. Records results.					

\* Place appropriate code: (+) = task performed well; (-) = task not performed well  
Adapted with permission from National Association of School Nurses, 2011

School Nurse Signature/Initials: \_\_\_\_\_

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

Unlicensed Assistive Personnel Signature/Initials: \_\_\_\_\_

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

## CALCULATING INSULIN BOLUS DOSE BASED ON CARBOHYDRATE INTAKE

Unlicensed Assistive Personnel Signature/Initials & Date (UAP): \_\_\_\_\_

School Nurse/Instructor Signature/Initials & Date: \_\_\_\_\_

	Training Date/Initials	Return Demonstrations			
		Date/Initial*	Date/Initial*	Date/Initial*	Date/Initial*
<b>A. States name &amp; purpose of procedure.</b>					
<b>B. Preparation:</b>					
1. Reviews student's DMMP for student specific instructions.					
2. Reviews standard precautions.					
3. Identifies student's ability to participate in calculations.					
<b>C. Identifies supplies:</b>					
1. Carbohydrate Table/ Nutrition Label (15 gm = 1 carb serving)					
2. Pencil/pen paper					
3. Calculator (optional)					
<b>D. Procedure:</b>					
1. Describes time when bolus insulin usually given.					
2. Verifies the student's insulin to carbohydrate ratio order.					
3. Correctly identifies the number of grams/servings of carbohydrate intake.					
4. Demonstrates correct calculation of bolus insulin dose for carbs.					
5. Verifies the student's correction factor insulin scale order.					
6. Demonstrates correct calculation of correction factor insulin dose.					
7. Correctly demonstrates the calculation of the total insulin dose.					

Adapted from: *Nursing Guidelines for the Delegation of Care for Students with Diabetes in Florida Schools*, 2003. P.65-68.



## INSULIN ADMINISTRATION: SYRINGE SKILLS CHECKLIST

Unlicensed Assistive Personnel (UAP): \_\_\_\_\_

School Nurse/Instructor: \_\_\_\_\_

	Training Date/Initial	Return Demonstrations			
		Date/Initial*	Date/Initial*	Date/Initial*	Date/Initial*
<b>A. States name &amp; purpose of procedure.</b>					
<b>B. Preparation:</b>					
1. Reviews Standard Precautions.					
2. Identifies where procedure is done.					
3. Identifies expiration date of insulin					
<b>C. Identifies supplies:</b>					
1. Gloves					
2. Insulin bottle					
3. Syringe					
4. Alcohol wipe and cotton ball					
5. Sharps container					
<b>D. Procedure:</b>					
1. Washes hands.					
2. Gathers supplies (insulin bottle, syringe, alcohol wipe, cotton ball).					
3. Puts gloves on.					
4. Wipes top of bottle with alcohol wipe and lets dry for a few seconds.					
5. Pulls the plunger down to let ___ units of air into the syringe.					
6. Pushes the needle through the center of the rubber top of the insulin bottle.					

\* Place appropriate code: (+) = task performed well; (-) = task not performed well  
 Adapted with permission from National Association of School Nurses, 2011

### INSULIN ADMINISTRATION: SYRINGE SKILLS CHECKLIST

	Training Date/Initial	Return Demonstrations			
		Date/Initial*	Date/Initial*	Date/Initial*	Date/Initial*
7. Pushes the air into the bottle and leaves the needle in the bottle.					
8. Turns the insulin bottle and syringe upside down					
9. Pulls the plunger down slowly to the correct number of units.					
10. Looks for air bubbles, taps the syringe to raise air bubbles to the top. Pushes the air bubbles back in the bottle and repeats Step 8.					
11. Checks to make sure _____ units of insulin are in the syringe and removes the syringe from the bottle.					
12. Assists the student in choosing the injection site.					
a. Pinches skin and inserts insulin syringe and needle.					
b. Pushes plunger in to deliver insulin and counts to five with skin pinched and needle in place.					
c. Let go of pinched skin but keeps needle in place in skin and counts to five.					
d. Removes insulin needle from skin. Gentle pressure with cotton ball as needed.					
14. Disposes of syringe in sharps container. Does not recap syringe.					

\* Place appropriate code: (+) = task performed well; (-) = task not performed well  
*Adapted with permission from National Association of School Nurses, 2011*

\_\_\_\_\_  
 School Nurse Signature/Initials:

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

\_\_\_\_\_  
 Unlicensed Assistive Personnel Signature/Initials:

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

## INSULIN ADMINISTRATION: PEN DEVICE SKILLS CHECKLIST

Unlicensed Assistive Personnel (UAP): \_\_\_\_\_

School Nurse/Instructor: \_\_\_\_\_

	Training Date/Initial	Return Demonstrations			
		Date/Initial*	Date/Initial*	Date/Initial*	Date/Initial*
<b>A. States name &amp; purpose of procedure.</b>					
<b>B. Preparation:</b>					
1. Reviews Standard Precautions.					
2. Identifies where procedure is done.					
3. Identifies expiration date of insulin					
<b>C. Identifies supplies:</b>					
1. Gloves					
2. Insulin pen					
3. Insulin cartridge					
4. Pen needle					
5. Alcohol wipe and cotton Ball					
<b>D. Procedure:</b>					
1. Washes hands.					
2. Gathers supplies (insulin pen or cartridge, pen needle, alcohol wipe, cotton ball).					
3. Puts gloves on.					
4. Load insulin cartridge, if needed and wipe insulin pen top with alcohol wipe.					
5. Screws the needle onto the end of the insulin pen. Removes caps and sets outer cap on flat surface.					
6. Primes the needle by dialing the pen to 2 units.					
7. Pushes the plunger until a small drop or stream of insulin is seen, and repeats as needed.					

\* Place appropriate code: (+) = task performed well; (-) = task not performed well  
*Adapted with permission from National Association of School Nurses, 2011*

**INSULIN ADMINISTRATION: PEN DEVICE SKILLS CHECKLIST**

Unlicensed Assistive Personnel (UAP): \_\_\_\_\_

School Nurse/Instructor: \_\_\_\_\_

	Training Date/Initial	Return Demonstrations			
		Date/Initial*	Date/Initial*	Date/Initial*	Date/Initial*
8. Turns the dose knob to the dose ordered.					
9. Assists the student in choosing the injection site.					
e. Pinches skin and inserts insulin pen needle.					
f. Pushes injection button down completely to deliver insulin and counts to five with skin pinched and needle in place.					
g. Let go of pinched skin but keeps needle in place in skin and counts to five.					
h. Removes insulin needle from skin. Dabs with cotton ball if needed.					
10. Carefully replaces the outer cap of the needle without touching the outer cap, unscrews the needle and disposes of properly in a sharps container.					

\* Place appropriate code: (+) = task performed well; (-) = task not performed well  
*Adapted with permission from National Association of School Nurses, 2011*

\_\_\_\_\_  
 School Nurse Signature/Initials:

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

\_\_\_\_\_  
 Unlicensed Assistive Personnel Signature/Initials:

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

## INSULIN PUMP THERAPY SKILLS CHECKLIST

Unlicensed Assistive Personnel (UAP): \_\_\_\_\_

School Nurse: \_\_\_\_\_

	Training Date/Initial	Return Demonstration			
		Date/Initial*	Date/Initial*	Date/Initial*	Date/Initial*
A. Students using an insulin pump need to have the following supplies available at school:					
1. Extra insulin and syringes or insulin pen for pump malfunctions.					
2. Extra pump supplies: Infusion set and inserter, reservoir, insulin and batteries.					
B. UAP instructed on type of pump and basic operating functions of the pump and demonstrates:					
1. How to give a bolus					
2. How to use the dose calculator function in the pump					
3. How to suspend the pump					
4. How to check the status of the pump					
5. How to verify the last bolus given					
6. How to verify the pump is not in "no deliver" mode					
7. How to change the batteries in the pump					
8. How to check insulin reservoir and insertion site					
9. How to identify and respond to alarms					
C. For students using an insulin dose calculator (Bolus Wizard®) UAP demonstrates how to look at pump dose calculations for dose of insulin, and dose is within parameters and activate to administer dose.					
D. If the pump infusion set is no longer functional, and the student is unable to re-insert their own infusion set, a parent/guardian will be contacted to come to school to re-insert the infusion set.					
E. Follows written protocols for monitoring of blood glucose and ketones, and hypo/hyperglycemia ECP, and IHP.					

\* Place appropriate code: (+) = task performed well; (-) = task not performed well  
Adapted with permission from National Association of School Nurses, 2015

## GLUCAGON INJECTION SKILLS CHECKLIST

Unlicensed Assistive Personnel (UAP): \_\_\_\_\_

School Nurse/Instructor: \_\_\_\_\_

	Training Date/Initial	Return Demonstrations			
		Date/Initial*	Date/Initial*	Date/Initial*	Date/Initial*
<b>A. STATES NAME &amp; PURPOSE OF PROCEDURE</b>					
<b>B. PREPARATION:</b>					
1. Reviews standard precautions					
2. Identifies procedure is done if severe hypoglycemia					
3. Identifies expiration date of glucagon					
4. Identifies accompanying steps:					
<ul style="list-style-type: none"> <li>• Send someone to call EMS/911, notify school nurse &amp; parent/guardian</li> </ul>					
<ul style="list-style-type: none"> <li>• Maintain open airway</li> </ul>					
<ul style="list-style-type: none"> <li>• Give glucose gel in buccal pouch (if ordered)</li> </ul>					
<ul style="list-style-type: none"> <li>• Give glucose source when student is awake and able to swallow</li> </ul>					
<ul style="list-style-type: none"> <li>• Remain with student until EMS arrive</li> </ul>					
<b>C. IDENTIFIES SUPPLIES:</b>					
1. Glucagon kit					
2. Alcohol wipe & cotton ball					
3. Sharps container					
4. Gloves					
<b>D. PROCEDURE</b>					
1. Washes hands					
2. Gathers supplies (glucagon kit, alcohol wipe, cotton ball, gloves)					
3. Puts on gloves					
4. Removes flip-off seal from vial of glucagon powder, wipe with alcohol wipe					
5. Removes needle cover from syringe.					

\* Place appropriate code: (+) = task performed well; (-) = task not performed well  
*Adapted with permission from National Association of School Nurses, 2011*

## GLUCAGON INJECTION SKILLS CHECKLIST

Unlicensed Assistive Personnel (UAP): \_\_\_\_\_

School Nurse/Instructor: \_\_\_\_\_

	Training Date/Initial	Return Demonstrations			
		Date/Initial*	Date/Initial*	Date/Initial*	Date/Initial*
6. Injects entire contents of syringe into vial of glucagon powder (held upright).					
7. Swirls vial gently until dissolved/clear.					
8. Holds vial upside down, and withdraw all solution from the vial into syringe.					
9. Withdraws needle from vial, hold syringe upright, and remove air/bubbles from syringe.					
10. Exposes injection site (upper, out area of thigh, arm).					
11. Holds syringe safely; use other hand to clean injection site with alcohol wipe.					
12. For subcutaneous injection only: "Pinches up skin/tissue (still holding alcohol wipe).					
13. For subcutaneous and intramuscular injection: Inserts needle straight into tissue of injection site and inject glucagon.					
14. Withdraws needle and press gently with alcohol wipe or cotton ball at injection site.					
15. Turns child on side.					
16. Puts used syringe and vial in sharps container.					
17. Documents per school policy.					

\* Place appropriate code: (+) = task performed well; (-) = task not performed well  
*Adapted with permission from National Association of School Nurses, 2011*

\_\_\_\_\_  
 School Nurse Signature/Initials:

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

\_\_\_\_\_  
 Unlicensed Assistive Personnel Signature/Initials:

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

## Appendix D

### **DIABETES SUPPLIES FOR SCHOOLS PROVIDED BY FAMILY**

According to the NDEP (2010, p. 94), parents are responsible for providing the school all the diabetes supplies and equipment needed in the DMMP. The following is a list of typical supplies:

#### **Insulin:**

- Insulin and insulin administration supplies
  - Insulin bottle and/or pen with cartridges
  - Insulin syringes/pen needles
  - Alcohol wipes/antiseptic wipes (optional)
- Pump supplies
  - Including equipment needed to change reservoir and infusion set, manufacturer's operating instructions, and extra batteries

#### **Blood Glucose Monitoring Supplies:**

- Blood glucose meter and manufacturer's instructions<sup>i</sup>
- Test strips (with code information, if needed)
- Finger-sticking device
- Lancets
- Cotton balls
- Logbook to record blood sugar and amounts of insulin
- Protective covering (e.g., plastic wrap) as needed
- Control solution

#### **Food:**

- Snack foods
- Choices for Physical activity - 15 grams carbohydrate:
  - 1 – 4ounce juice box
  - 1 cup Gatorade
  - 1 sliced orange or apple
  - 1 small box raisins
  - 6 saltines
  - 1 cup light yogurt
  - ¾ cup dry cereal
- Choices for Physical activity - 30 grams carbohydrate:
  - 1 cereal bar
  - 1 – 8 ounce juice box
  - 2 slices bread
  - 1 small bagel
- Choices for Physical activity - 45-50 grams carbohydrate plus protein
  - 1 sports nutrition bar



- 1 Package (6) cheese or peanut butter sandwich crackers plus 4 oz. juice
- Protein Sources:
  - Peanut butter
  - Sliced or String Cheese
  - Lunch Meat
  - Egg
  - Peanuts, Walnuts, or Almonds

**Low blood sugar (hypoglycemia) supplies:**

- Quick-acting glucose products
  - 3-4 glucose tablets
  - 15 grams glucose gel
  - 4 oz. regular soda
  - 4 oz. juice (unsweetened)
  - 3 tsp. sugar in water
  - 3 tsp. jelly, syrup, or honey
- Glucagon emergency kit

Appendix E  
 Sample Blood Glucose Management Algorithms  
**LOW BLOOD GLUCOSE (HYPOGLYCEMIA) EMERGENCY CARE PLAN**

Student Name: \_\_\_\_\_ Date: \_\_\_\_\_  
 Grade/Teacher: \_\_\_\_\_ School Year/Date & School: \_\_\_\_\_  
 Parent/Guardian Name: \_\_\_\_\_ Phone: ( ) \_\_\_\_\_  
 Emergency Contact: \_\_\_\_\_ Phone: ( ) \_\_\_\_\_  
 Health Care Provider: \_\_\_\_\_ Phone: ( ) \_\_\_\_\_

**CAUSES**  
 Too much insulin  
 Missed food  
 Delayed food  
 Too much exercise  
 Unscheduled exercise

**ONSET**  
 Sudden

**PICTURE**

**Never send a child with suspected low blood sugar anywhere alone.**

**SYMPTOMS**  
 Low blood sugar  
 Less than 70 mg/dl

**MILD**  
 Hunger                      Dizziness  
 Irritable                    Shakiness  
 Weak                         Anxious  
 Pallor                        Headache  
 Crying  
 Sweating  
 Unable to concentrate  
 Other

**MODERATE**  
 Sleepiness  
 Behavior Change  
 Confusion  
 Slurred speech  
 Poor coordination  
 Other \_\_\_\_\_

**SEVERE**  
 Unable to swallow  
 Combative  
 Unconscious  
 Seizures

**ACTION**

- Treat for low blood sugar on the spot
- Check blood sugar if possible
- Notify School Nurse

Name: \_\_\_\_\_  
 Contact Number: \_\_\_\_\_

**MILD**

- Provide fast-acting sugar source:
  - 3-4 glucose tabs
  - 4 oz. juice
  - 6 oz. regular soda
  - 3 tsp. glucose gel
- Wait 10-15 minutes
- Retest blood sugar
- If blood sugar is less than 70 mg/dl, repeat sugar source
- Provide snack if no meal for 1 hour
- If blood sugar within target range, student may return to class if feeling better
- Communicate school nurse
- Communicate parent/guardian

**MODERATE**

- Provide fast-acting sugar source:
  - 3-4 glucose tabs
  - 4 oz. juice
  - 4 oz. regular soda
  - 3 tsp. glucose gel
- Wait 10-15 minutes
- Retest blood sugar
- If blood sugar is less than 70 mg/dl, repeat sugar source
- Provide snack if no meal for 1 hr.
- If blood sugar within target range, student may return to class if feeling better
- Notify school nurse
- Notify parent/guardian

**SEVERE**

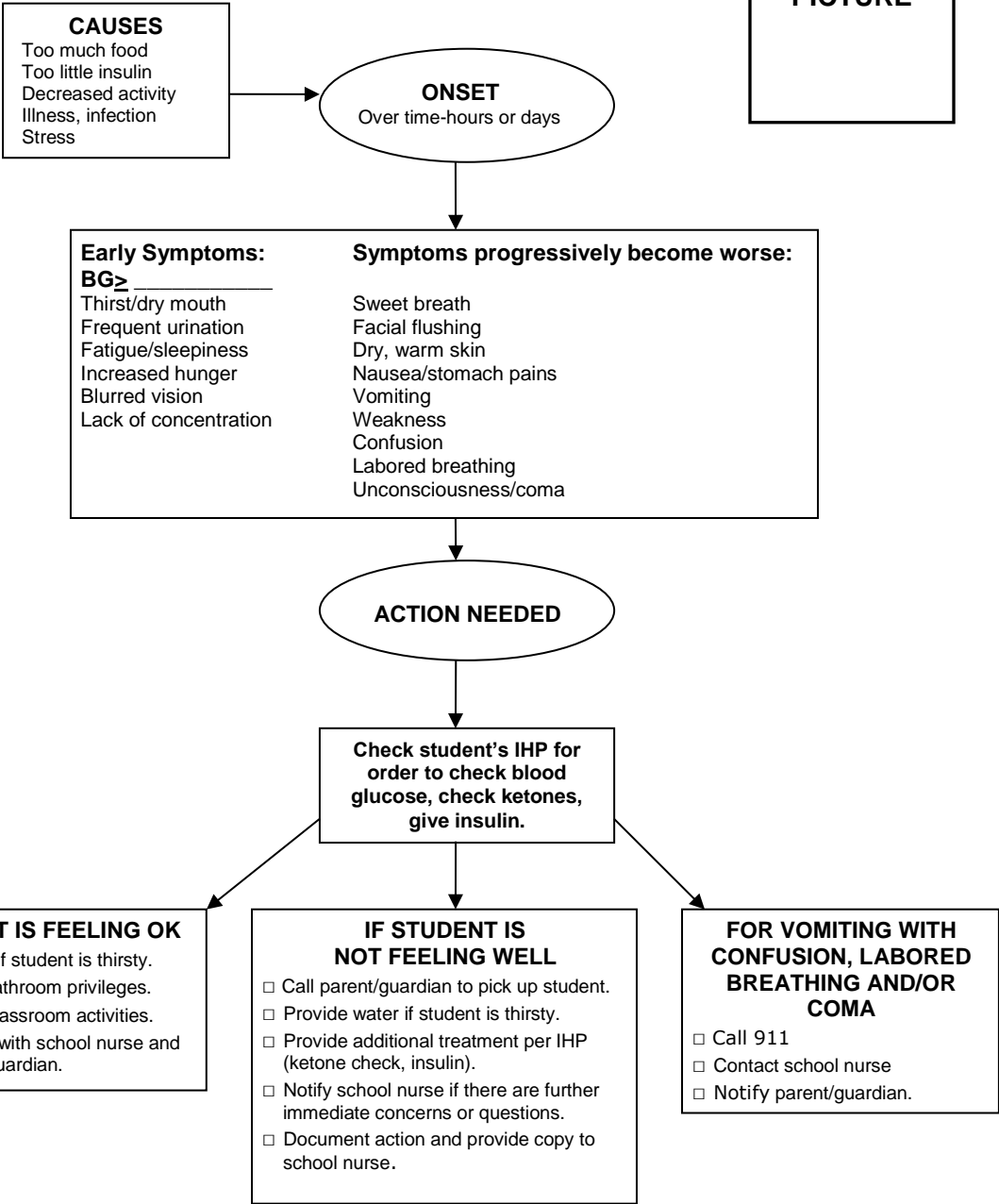
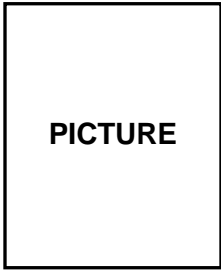
- Call 911**
- Don't give anything by mouth
- Give Glucagon, if ordered
- Position on side
- Stay with student
- Notify school nurse
- Notify parent/guardian

\_\_\_\_\_  
 School Nurse Signature

\_\_\_\_\_  
 Date  
*Adapted with permission from National Association of School Nurses, 2011*

## HIGH BLOOD GLUCOSE (HYPERGLYCEMIA) MANAGEMENT ALGORITHM

Student Name: \_\_\_\_\_  
 Grade/Teacher: \_\_\_\_\_  
 School Year/Date & School: \_\_\_\_\_



School Nurse Signature: \_\_\_\_\_

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

*Adapted with permission from National Association of School Nurses, 2011*

School & School Year: \_\_\_\_\_

School Nurse Signature & Date: \_\_\_\_\_

**Algorithm for Managing Blood Sugar Results**  
**Obtain Blood Glucose Reading**

**Student Name:** \_\_\_\_\_ **Grade/Teacher:** \_\_\_\_\_

PICTURE

**Below 70**

**70 – \_\_\_\_\_**

**Above \_\_\_\_\_**

1. Give Fast acting sugar source.\*
2. Observe for 10-15 minutes.

3. Retest blood glucose, if less than 70 repeat sugar source according to procedure. If ordered, give carbohydrate and protein snack (e.g., crackers and cheese) or send to lunch early.

4. Notify parent/guardian
5. Notify school nurse if two or more episodes in one week.

6. If Student Becomes Unconscious, Seizures, or is Unable to Swallow:
  - a. Call 911
  - b. Turn student on side to ensure open airway.
  - c. Administer glucagon as prescribed.
  - d. Notify school nurse and parent/guardian.

1. If 70 or above the student feels OK, may resume school activities. Provide treatment according to orders.

2. If 70 or above and student is feeling "low," retest immediately. Give fast acting sugar source. Wait 10-15 minutes. Retest blood glucose. If ordered, give carbohydrate and protein snack.

**If Student Feels OK**  
**Ketones Negative or Trace Small**

1. Provide water if student is thirsty and/or has dry mucous membranes.

2. Provide free access to the bathroom.

3. Provide additional treatment per IHP (e.g., insulin administration, ketone check, activity restriction).

4. May resume classroom activities.

5. Document action and provide copy to school nurse.

6. Inform parent/guardian.

7. If pump, additional attention required, (e.g., filling of reservoir, changing set, Insulin administration).

8. Recheck blood glucose and ketones if symptoms persist.

**Student Does Not Feel OK**  
**Ketones Moderate to Large**

1. Call parent/guardian.

2. Provide water if student is thirsty and/or has dry mucous membranes.

3. Provide free access to the bathroom.

4. Provide additional treatment per IHP (e.g., insulin administration, ketone check, activity restriction).

5. If pump, additional attention required, (e.g., filling of reservoir, changing set, insulin administration.)

6. Notify school nurse if there are further immediate concerns or questions. Document action and provide copy to school nurse.

7. Recheck blood glucose and ketones if symptoms change while waiting for parent/guardian or 911.

8. FOR VOMITING WITH CONFUSION, LABORED BREATHING AND/OR COMA

- Call 911
- Notify parent/guardian
- Contact school nurse

**\* Fast Acting Sugar Sources**

- 3-4 glucose tablets
- 15 grams glucose gel
- 6 oz. regular soda

- 4 oz. juice (unsweetened)
- 3 tsp. sugar in water
- 3 tsp. jelly, syrup, or honey