Section 15: Prevention of and Screening for Type 2 Diabetes in Students

SECTION OVERVIEW

- Screening for Type 2 Diabetes in Children and Adolescents
- Reducing Risk for Pre-diabetes and Type 2 Diabetes in Children and Adolescents
- Overweight and Obesity in Children and Adolescents
- Body Mass Index
- Supporting Healthy Eating at School

Screening for Type 2 Diabetes in Children and Adolescents

The American Diabetes Association recommends screening children and adolescents who have an increased risk for developing type 2 diabetes. Table 18 provides information on the criteria used to test for type 2 diabetes in children and adolescents who are at risk and may not have any symptoms of diabetes.

Table 18: Testing Criteria for Type 2 Diabetes in Children and Adolescents at Risk❖

Criteria for Testing*	
Overweight (BMI > 85th percentile for age and sex, weight for height > 85th percentile, or weight > 120% of ideal for height)	
Plus any two of the following risk factors: ▪ Family history of type 2 diabetes in first- or second-degree relative ▪ Race/ethnicity (e.g., Native American, African American, Hispanic/Latino, Asian American, and Pacific Islander) ▪ Signs of insulin resistance or conditions associated with insulin resistance (e.g., acanthosis nigricans, hypertension, dyslipidemia, polycystic ovarian syndrome, or small-for-gestational-age birth weight) ▪ Maternal history of diabetes or gestational diabetes during the child's gestation	
Age of initiation:	age 10 years or at onset of puberty, if puberty occurs at a younger age
Frequency:	every 3 years

Adapted from: American Diabetes Association Clinical Practice Recommendations, 2010

❖ Children and adolescents at risk without symptoms.

** Testing should be individualized, based on clinical judgment, and be performed in a health care setting.*

School personnel and school nurses are critical in assisting health care providers in detecting, diagnosing, and obtaining early treatment of children and adolescents with type 1 and type 2 diabetes. Early detection, diagnosis, and treatment may reduce life-threatening complications. Despite medical advancements, students remain undiagnosed with type 1 and type 2 diabetes, resulting in delayed treatment. School personnel can be instrumental in recognizing the signs and symptoms of high blood glucose. Awareness and knowledge of high blood glucose (hyperglycemia) by school personnel may lead to early medical attention, preventing severe medical complications such as diabetic ketoacidosis (DKA). Rates of severe life-threatening DKA at diagnosis remain unacceptably high. For information on signs and symptoms of type 1 and type 2 diabetes, refer to *Section 4: Type 1 Diabetes* and *Section 5: Type 2 Diabetes*.

Reducing Risk for Pre-diabetes and Type 2 Diabetes in Children and Adolescents

In the United States, approximately 3,700 children and adolescents are diagnosed with type 2 diabetes each year and the number diagnosed with type 2 diabetes is increasing. Preventing pre-diabetes and type 2 diabetes will require coordinated efforts to reduce overweight and obesity. Schools provide an exceptional opportunity to assist students in learning and practicing healthy lifestyle behaviors; however, parents/guardians, health care providers, and communities also need to work together to promote healthy lifestyles for students, their families, and the community. There are several ways to reduce the risk of developing type 2 diabetes:

- Maintain a healthy weight
- Participate in recommended amount of physical activity
- Choose to eat the right amount of healthy foods

Reducing Risk Using Physical Activity and Healthy Eating

Increased physical activity and healthy eating are vital to reducing the risk of type 2 diabetes. Sedentary activities such as television, computer, electronics, and handheld games have contributed to increased inactivity in children and adolescents over the past decade. Physical inactivity can lead to long-term, serious consequences in youth. Regular physical activity promotes:

- Healthy body weight and body composition
- Building of lean muscle mass
- Strengthening of bones
- Increased flexibility and balance
- Improved self-esteem and mood
- Healthy sleep habits
- Better ability to focus in school
- Teamwork

A reduction in total body fat (e.g., improvement in body composition and reduction in abdominal girth) can occur as a result of regular physical activity, especially activity that is moderate to vigorous intensity three to five times a week for 30 to 60 minutes. Physical activity plays a critical role in lowering overall blood glucose levels by increasing insulin sensitivity and decreasing insulin resistance. One way to help prevent overweight and obesity (and, therefore, possibly prevent or delay the onset of type 2 diabetes) is to assist students and families in becoming more physically active and learning to enjoy an active lifestyle. Turning off the TV and computer or limiting students to two hours per day and introducing fun programs, such as 10,000 steps and the use of pedometers, are examples. For more information on physical activity, refer to *Section 8: Physical Activity for Students with Diabetes*.

Students need ideas about what they can do to reduce their risk for type 2 diabetes. They also need help to understand foods that are healthy to eat and how much to eat. The National Diabetes Education Program has developed excellent resources to assist students. A tip sheet titled "Tips for Teens: Lower Your Risk for Type 2 Diabetes" is included in *Section 14: Tools*.

Prevention Strategies for Schools

The Centers for Disease Control and Prevention suggests ten key strategies that schools can implement to help prevent overweight and obesity, as shown in Table 19. All strategies may not be possible to implement; however, working toward one or two of these goals is an excellent start toward a healthy lifestyle. For additional information on the ten strategies for schools, refer to: *www.cdc.gov/HealthyYouth/KeyStrategies*.

Table 19: Ten Strategies for Schools to Promote Physical Activity and Healthy Eating

Ten Key Strategies	
Build a Strong Foundation Strategies 1-4	**Take Action Strategies 5-10**
1. Address physical activity and nutrition through a Coordinated School Health Program. 2. Designate a school health coordinator and maintain an active school health council. 3. Assess the school's health policies and programs and develop a plan for improvements. 4. Strengthen the school's nutrition and physical activity policies.	5. Implement high-quality health promotion activities for school staff. 6. Implement a high-quality course of study in health education. 7. Implement a high-quality course of study in physical education. 8. Increase opportunities for students to engage in physical activity. 9. Implement a quality school meals program. 10. Ensure that students have appealing, healthy choices in foods and beverages offered outside of the school meals program.

Adapted from: Make a Difference at Your School!: www.cdc.gov/HealthyYouth/KeyStrategies

Overweight and Obesity in Children and Adolescents

Overweight and obesity are associated with increased risk of type 2 diabetes, high cholesterol, asthma, arthritis, sleep apnea, and general poor health status. Rates of overweight and obesity continue to rise in children and adolescents. The national epidemic of overweight and obesity is directly related to physical inactivity and poor dietary choices. Studies show that overweight and obese children and adolescents are more likely to become overweight or obese adults. Overweight and obesity in children and adolescents is complex, often with multiple causes. Overweight is defined as ≥ 85th percentile but < 95th percentile. Obesity is defined as ≥ 95th percentile.

Wisconsin data from the 2008 Pediatric Nutrition Surveillance System (PedNSS) show that 16% of children aged 2 to 4 are overweight and 14% are obese. (Note that these values are population values for children participating in the Special Supplemental Nutrition Program for Women, Infants, and Children; the values do not represent values for all Wisconsin children.) Data from the 2009 Youth Risk Behavioral Survey (YRBS) showed that 14% of Wisconsin high school students are overweight and 9% are obese. Therefore, nearly 25% of adolescents (1 in every 4) are either overweight or obese.

Body Mass Index

Body mass index (BMI) is the most widely accepted and practical method used to screen, measure, and determine body weight ratio. BMI is a formula (ratio between height and weight) that is a better predictor of disease risk than body weight alone. BMI correlates closely to direct measures of body fat in most people. However, BMI is not perfect as a measure and may overestimate the level of body fat in athletes or people with a muscular build for example. Although the BMI number is calculated the same way for children and adults, the criteria used to interpret the meaning of BMI for children and adolescents are different from that used for adults. BMI percentile is used to interpret BMI. The BMI percentile for a child is plotted on a growth chart and indicates how that child's BMI compares to the reference population of thousands of children on which the BMI chart is based. For example, if a boy is 10 years old and his BMI falls at the 70th percentile, that means that 30% of 10-year-old boys have a higher BMI and 70% have a lower BMI. BMI percentiles are used in children and adolescents because the amount of body fat changes with age and the amount of body fat differs between girls and boys.

Weighing and Measuring in Schools, compiled by the Wisconsin Nutrition and Physical Activity Program (Department of Health Services), provides guidance and policy recommendations about weighing and measuring students and offers resources for creating environments supportive of healthy lifestyles. The document can be found: *http://dhs.wisconsin.gov/health/physicalactivity/Sites/School/To_Weigh_Measure.pdf*.

Supporting Healthy Eating at School

Children and adolescents spend the majority of their day at school. Schools have a unique opportunity to significantly impact student health in a variety of ways. Emerging research documents the connection between physical activity, good nutrition, and academic performance.

Despite existing barriers to eating healthy (e.g., students eating off campus, students eating fast food), schools can play a critical role in reshaping social and physical environments. Schools can provide information, tools, and practical strategies to help students learn to choose and adopt healthy lifestyles. Healthy lifestyle habits are easier to establish early in childhood. Each school day is an opportunity for students to learn about improving their well-being and to practice skills that promote a healthy lifestyle. Examples of evidence-based Wisconsin nutrition strategies and effective interventions are found in a publication titled: *What Works in . . . Schools: http://dhs.wisconsin.gov/health/physicalactivity/pdf_files/WhatWorksSchoolsfinal.pdf*.

Research shows that children and adolescents can learn to choose healthier foods and may do so in adulthood, too. Healthy nutrition education curriculum is encouraged for all grade levels. The Wisconsin Department of Public Instruction has nutrition education information and guidance available at: *http://dpi.wi.gov/ne/index.html*, including newly developed nutrition education standards.

In 2007, the Institute of Medicine issued a report titled *Nutrition Standards for Foods in Schools: Leading the Way toward Healthier Youth.* Based on the recommendations and standards provided in this report, the Centers for Disease Control and Prevention now provides additional fact sheets for: 1) parents, guardians, teachers, and school staff, 2) school boards, school districts, and other school administrators, 3) school nutrition service personnel, and 4) students. These fact sheets are designed to answer commonly asked questions about the report and provide recommendations for implementing nutrition standards to improve the school food environment. Web links to these fact sheets are included in *Section 16: Resources*.

For resources on incorporating healthy eating lessons into the school day, refer to the "Supporting Healthy Lifestyles in the Schools" area in *Section 16: Resources*.