



Hot Topic

Diabetes – What You Need to Know

INSULIN PUMPS

What is it?

Insulin pumps are used by diabetics to help manage their diabetes. An insulin pump mimics the pancreas by giving out a basal rate of insulin, which is a constant infusion of a small amount of insulin. Before each meal, a bolus dose (a burst of insulin) is taken based on the amount of carbohydrate to be eaten.

Who uses it?

Insulin pumps have been available since 1979. They have become increasingly popular over the past several years because of their convenience, flexibility and ease of use. The insulin pump isn't for everyone, however. The user must be willing to check their blood sugar at least four times a day, before each meal and before bed and remember to bolus every time before eating. Insulin pump users must also know how to count carbohydrates and should have their diabetes in control prior to starting the pump.

How does it work?

External insulin pumps connect to narrow, flexible plastic tubing that ends with a needle inserted just under the skin near the abdomen. The insulin pump is about the size of a deck of cards, weighs about 3 ounces and can be worn on a belt or in a pocket. Users set the pump to give a basal amount of insulin continuously throughout the day. Pumps release "bolus" doses of insulin at meals and at times when blood sugar is too high based on the users' programming.

How do I get started?

Training for the pump usually involves a one-hour training session with a diabetes educator, and a return visit several days later to set up the pump, set basal rates and administer a bolus, and learn when and how to change the infusion set.

What are the advantages and disadvantages?

The insulin pump has become very popular because it offers a lot of freedom, but the user can't put it on and forgets about it. Because the pump is a mechanical device, it requires maintenance. The pump needs to be checked regularly to make sure the battery hasn't run out, the infusion set clogged or dislodge or the tube kinked or clogged. There is also a risk that the insertion site might become irritated or infected. The user will have to change the insertion site every two or

three days in order to avoid infection. In addition, there's always the possibility of forgetting to bolus. This happens more often with children, particularly teenagers. Users must also remember they will need to take the pump off if they swim or engage in contact sports. Since insulin pumps can cost anywhere from \$5,000 to \$6,000 and the monthly cost of pump treatment is about \$480, users will need to make sure their insurance company will cover the cost of a pump and supplies.

Self-care tips

For diabetics who choose to switch to an insulin pump, frequent blood glucose monitoring is essential to determine insulin dosages and to ensure that insulin is delivered. In addition, diabetes still must be controlled through a combination of nutrition, exercise and medication.

This information has been designed as a comprehensive and quick reference guide written by our health care reviewers. The health information written by our authors is intended to be a supplement to the care provided by your physician. It is not intended nor implied to be a substitute for professional medical advice. www.hmc.psu.edu/healthinfo/i/insulinpumps.htm

Research

Diabetes Care 26:1142-1146, 2003; Safety and Effectiveness of Insulin Pump Therapy in Children and Adolescents with Type 1 Diabetes

OBJECTIVE: To evaluate the safety and effectiveness of insulin pump therapy in children and adolescents with type 1 diabetes.

CONCLUSIONS: This study suggests that pump therapy is safe and effective in selected children and adolescents with type 1 diabetes.

Diabetes Care 26:2871-2875, 2003; Changing Prevalence of Overweight Children and Adolescents at Onset of Insulin-Treated Diabetes

OBJECTIVE: The aim of this study was to compare the prevalence of being overweight in black and white children and adolescents at onset of insulin-treated diabetes during two time periods: 1979–1989 (period I) and 1990–1998 (period II).

CONCLUSIONS: At onset of the disease, the prevalence of being overweight has tripled from the 1980s to the 1990s, following the trend in the general population. Weight gain may be an accelerating factor for onset of insulin-treated diabetes and may have contributed to the increased incidence of diabetes in youth seen in some populations.

Pediatric Research: Volume 45(4) PART 2 OF 2 April 1999p 87A; Insulin Sensitivity in African-American Children with and without Family History of Type 2 Diabetes

Epidemiological evidence suggests that the risk to develop Type 2 diabetes is genetically determined. African-Americans are at increased risk for Type 2 diabetes. Moreover, over the last decade there has been an alarming increase in the rate of obesity-related Type 2 diabetes in adolescents with a propensity in Blacks. We had previously demonstrated that African-American children are hyperinsulinemic and insulin resistant compared with their White-American peers. (*J Pediatr* 129:440, 1996; *J Clin Endocrinol Metab* 82:1923,

1997). The aim of the present investigation was to assess the impact of family history of Type 2 diabetes on insulin sensitivity and secretion in African-American children.

Data suggest that in African-American children, family history of Type 2 diabetes is a risk factor for insulin resistance. These children manifest important metabolic alterations including impaired insulin stimulated total and nonoxidative glucose disposal early in the first decade of life. We propose that this familial tendency combined with environmental influences could lead to Type 2 diabetes decades later. Therefore, in high risk populations early intervention with lifestyle changes should be implemented in childhood.

**From the National Diabetes Education Program of the National Institutes of Health –
Articles from the School Nurse News:**

The Need to Prevent Nicotine Addiction and Diabetes in Our Youth (September 2007)

[Html version](#)

[Print version \(PDF* 52k\)](#)

Current Clinical Research on Type 2 Diabetes and Its Prevention in Youth (May 2007)

[Html version](#)

[Print version \(PDF* 137k\)](#)

Nursing Practice

Evaluating for Insulin Resistance

In children and teens (ages 2 to 20 years), body mass index (BMI)-for-age can be plotted on gender-specific growth charts and used for assessment. Overweight (BMI \geq 95th percentile-for-age) or “at risk of overweight” (85th to < 95th percentile) status in the absence of any related comorbidity is a finding, not a disease. Acanthosis nigricans (AN) is a skin marker. It is considered a finding or risk factor, not a disease. Youth referred for AN should be evaluated for several possible conditions, including insulin resistance. Insulin resistance indicates that cells have a reduced sensitivity to available insulin. It is typically associated with excess body weight, abdominal adiposity, elevated insulin levels, hypertension and dyslipidemia.

Risk factors for insulin resistance include:

- Height/weight measurement $>$ 85th percentile for gender and age and/or BMI (Growth charts at www.cdc.gov/GROWTHCHART)
- Family history (assess 3 generations for type 2 diabetes or cardiovascular disease)
- Ethnic/racial group (higher in African American, Hispanic/Latino, American Indian, and Asian/Pacific Islander populations)
- Puberty (due to increased GH production)

For Recommended clinical evaluation, laboratory tests, disease management, follow-up, resources and billing codes go to the DSHS Insulin Resistance Resource Tool for Primary care physicians at www.dshs.state.tx.us/diabetes/PDF/insresist.pdf.

Acanthosis Nigricans and Insulin Resistance

Described in 1889 by a German dermatologist, acanthosis nigricans (AN) is a physical skin finding that may be a marker for high blood insulin levels, suggesting insulin resistance. In 1976 acanthosis nigricans was linked to hyperinsulinemia, a consequence of insulin resistance that is associated with obesity.

Due to concern for diabetes in Texas, the 76th Texas Legislature authorized acanthosis nigricans pilot screening in nine counties: Cameron, Hidalgo, Jim Hogg, Webb, Willacy, Starr, Zapata, El Paso, and Hudspeth. The goals of this legislation, House Bill 1860, were to identify children with AN and intervene to reduce their risk of developing diabetes. The project, Acanthosis Nigricans: The Education and Screening (ANTES), is under the auspices of the Texas-Mexico Border Health Coordination Office at The University of Texas-Pan American.



[View the Disease Prevention News article, Acanthosis Nigricans and Insulin Resistance](#) (PDF, 95kb, [viewing information](#))

From the National Diabetes Education Program of the National Institutes of Health – Articles from the School Nurse News:

***Guidelines for Insulin Management of Diabetes in School* (March 2007)**

[Html version](#)

[Print version \(PDF* 321k\)](#)

***Update on Insulin Pump Therapy* (January 2007)**

[Html version](#)

[Print version \(PDF* 254k\)](#)

Diabetes 101

A helpful reminder about the basics of diabetes, this capsulated fact sheet reviews the prevalence, the progress, the types, symptoms and management of diabetes. Use as a handout, refresher or supplement with other diabetes information. Excerpts from: *Helping the Child With Diabetes Succeed: A Guide for School Personnel*; a project of the National Institutes of Health and the Centers for Disease Control and Prevention, June 2003. To access the fact sheet go to www.dshs.state.tx.us/schoolhealth/schoolnursenotes/Diabetes101.doc.

THE LAW

The Care of Students with Diabetes in Schools:

In 2005, the 79th legislature enacted the care of students with diabetes in schools now codified in the HEALTH & SAFETY CODE CHAPTER 168. CARE OF STUDENTS WITH DIABETES Sec. 168.001., which mandated the following:

- Identification and training of school staff to assist with the care of students, referred to as unlicensed diabetes care assistants (UDCAs);
- Development and implementation of a medical management and treatment plan;
- Development of an individualized health plan; and
- A provision that a student can self-manage his/her care at any time during the school day anywhere on the school grounds or at any school-related activity.

Training for the UDCA's is required to be coordinated by the school nurse. If there is no school nurse, the bill requires that the training be conducted by a health care professional with expertise in the care of persons with diabetes. The number of UDCA's will vary depending on whether a school campus has a full-time school nurse who is a registered nurse. A school with a full-time school nurse must have one trained UDCA; a school without a full-time school nurse is required to have three UDCA's.

The bill also requires bus drivers and other staff that transport students have a one-page information sheet that identifies students with diabetes, identifies potential emergencies and the appropriate response(s) to those situations; and, provides the telephone number of a contact person in case of an emergency.

The code also requires the Texas Diabetes Council (TDC) to develop training guidelines. On July 21, 2005 the Council recommended the National Diabetes Education Program's *Helping the Student with Diabetes Succeed*, a guide to educate school personnel about diabetes, how it is managed and how each member of the school staff can help meet students' needs. These guidelines may be used in training the unlicensed diabetes care assistants as outlined in the bill. The guidelines can be accessed through the TDC website at www.texasdiabetescouncil.org. The code can be found in its entirety at <http://tlo2.tlc.state.tx.us/statutes/docs/HS/content/word/hs.002.00.000168.00.doc>. See the Resources section of this newsletter for more information as it relates to HB984.

From the Field

Pflugerville ISD's (PISD) Unlicensed Diabetic Care Assistants (UDCA) Training Program – Susan Franzetti, R.N., M.S.N., Coordinator

With more than 30 students with diagnosed diabetes and a 31.9% Hispanic student population (Hispanics have a 50% lifetime risk of developing diabetes according to a 2004 CDC report) and the 2005 mandate of HB 984, PISD set the following objectives for implementing their UDCA Training Program:

- Gather information about HB984,
- Educate school nurses on current standards of care related to diabetes,
- Train personnel to become UDCA's,
- Train transportation personnel about diabetes and diabetic emergency actions, and
- Increase student ability to self-manage diabetes.

Armed with knowledge and skills related to diabetes, the aim of the program is to reduce the incidence of diabetes emergencies and complications and allow the student more normalcy through participation in extracurricular activities. The program also strives to encourage physical activity, improved school attendance and increased academic opportunities. Additionally, the program disseminates knowledge and skills related to diabetes to people of various education, economic and cultural backgrounds within the district; and, to students who are pre-diabetic or have a family member with diabetes so they will be able to participate or intervene in their care.

The results of the program to date are:

- Having a UDCA at each campus with a student with diabetes,
- A consistent knowledge base and practice throughout PISD,

- Contracted transportation personnel educated on diabetes emergency actions,
- Stakeholder involvement, and
- An overall increase in knowledge about diabetes benchmarked through actions, stakeholder involvement, and an overall increase in knowledge about diabetes benchmarked through decreased diabetic emergencies and an increase in student self management and participation outside of school.

For additional information about the PISD program, contact Susan Franzetti, R.N., M.S.N. at susan.franzetti@pflugervilleisd.net.

Resources

Guidelines for Training School Employees who are not Licensed Healthcare Professionals to Implement House Bill 984 (79th Legislature) Related to the Care of Elementary and Secondary School Students with Diabetes (Updated July 2008, PDF, 49 kb, [viewing information](#)) To view this guide, go to www.dshs.state.tx.us/diabetes/PDF/HB984.pdf

Frequently Asked Questions Related to Implementing House Bill (HB) 984 (Revised 07/01/08, PDF, 47 kb, [viewing information](#)) To access this document, go to www.dshs.state.tx.us/diabetes/PDF/FAQHB984.pdf.

The Texas School Nurses Organization (TSNO) provides specific recommendations for nursing practice and campus implementation of HB 984, including sample protocols, fact sheets and training agendas. Go to the TSNO Web site at www.tsn.org.

The American Diabetes Association (ADA) also has training materials for use in schools. Go to the ADA Web site at www.diabetes.org/advocacy-and-legalresources/discrimination/school/schooltraining.jsp.

National Diabetes Education Program from National Institutes of Health and CDC

The National Diabetes Education Program (NDEP) is the leading Federal government public education program that promotes diabetes prevention and control. Learn more about diabetes, download diabetes education resources and tools, learn how to work with the NDEP to promote diabetes prevention and control, and find out more about how NDEP works to change the way diabetes is treated. Go to http://ndep.nih.gov/diabetes/pubs/NDEP_Overview_Brochure.pdf.

Helping the Student with Diabetes Succeed

Use this comprehensive guide from the National Diabetes Education Program designed to empower school personnel, parents and students to create a safe learning environment and equal access to educational opportunities for all children with diabetes. Download or order the free guide by going to the National Diabetes Education Program Resources Web page at www.ndep.nih.gov/resources/school.htm.

Tip Sheets for Teens with Diabetes

This engaging series of tip sheets provides useful information about diabetes and encourages teens to take action to manage their disease for a long and healthy life. Written in clear and

simple language, the tip sheets are helpful for anyone who has diabetes and his or her loved ones. Download or order the free tip sheets by going to the National Diabetes Education Program Resources Web page at www.ndep.nih.gov/resources/school.htm.

Tips for Teens: Lower Your Risk for Type 2 Diabetes

This bright, easy-to-read tip sheet encourages teens to take steps to lower their risk for type 2 diabetes. It provides advice about how to reach a healthy weight and lead an active lifestyle. Healthy food and activity guides are included. Download or order the free tip sheets by going to the National Diabetes Education Program Resources Web page at www.ndep.nih.gov/resources/school.htm. These tip sheets also come in Spanish.

The Diabetes Mall – Current Diabetes Pumps

This site provides a easy to read comparison in matrix form of current insulin pumps. The Diabetes Mall does not sell pumps or promote one pump over another. The site simply provides the features of each pump to enable the potential buyer to make an informed choice. Access the Diabetes Mall – Current Pumps at www.diabetesnet.com/diabetes_technology/insulin_pump_models.php.

The Diabetes Mall – Older Diabetes Pumps

This site provides the same kind of information in the same format as the site listed above, but for older pumps. Access the Diabetes Mall – Older Pumps at www.diabetesnet.com/diabetes_technology/insulin_pump_models_old.php.



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