



# Diabetes and Puberty: A Glycemic Challenge

How the physical and psychological aspects of adolescence affect self-management.

**OVERVIEW:** As children with diabetes enter adolescence, the physical and psychological changes of puberty add to the challenges of disease management. This often leads to increased stress for both parent and child and to poor overall glucose control with potential short- and long-term complications. During this period of transition, nurses play a central role in teaching patients and their families about the effects of puberty on insulin sensitivity and glucose metabolism, and in discussing how the emotional and behavioral changes associated with this challenging time can affect diabetes management.

**Keywords:** adolescence, diabetes, management, puberty, teens

Laura, a 13-year-old girl with type 1 diabetes, is under the care of an endocrinologist who works at a diabetes clinic. (This case is a composite based on the author's experience.) The clinic staff includes other endocrinologists, nurses who are certified diabetes educators (CDEs), nutritionists, and social workers. To maintain optimal diabetes care, patients and their families are encouraged to meet with all members of their diabetes care team every three to six months. However, Laura and her parents haven't made an appointment with an educator since the CDE they had been seeing moved away three years ago. They have seen Laura's endocrinologist on a fairly regular semiannual basis, however, and they are scheduled to see the endocrinologist again next week. But before the appointment, Laura's parents arranged to meet with their team's current CDE because they're concerned about Laura's diabetes management. Prior to their visit, Laura had some preliminary blood work done so that her current glycated hemoglobin (HbA<sub>1c</sub>) data would be available for review. In addition, Laura's parents spoke with the CDE by phone, explaining that Laura often gets upset with them when they ask about her diabetes management and has stopped sharing her blood glucose

data with them, always claiming in an exasperated tone that she is "fine." They feel frustrated that Laura seems not to want them involved in her diabetes management and are exhausted by constant worry.

The CDE downloads the data from Laura's blood glucose meter into a computer program that generates a report, which shows that Laura has been checking her glucose levels only once or twice a day since her most recent visit six months earlier. Laura's HbA<sub>1c</sub> level is 10.2%, which correlates to an average blood glucose value of 246 mg/dL—126 mg/dL higher than her daytime target average of 120 mg/dL. Six months ago, her HbA<sub>1c</sub> was 8%, correlating to an average blood glucose value of 180 mg/dL. Since that time, she has grown three centimeters and gained two kilograms.

Laura doesn't talk much during the visit, and after the CDE reviews the HbA<sub>1c</sub> results with the family, Laura seems sad and her parents appear to be upset with her. The CDE asks Laura if she's been urinating more frequently than usual or feeling tired. Laura acknowledges that she has been urinating more frequently, sometimes having to get up in the middle of the night, and that she's also been feeling very tired.



Trenton Jantzi replaces his insulin pump infusion site during a break at school. The high-school senior must change his infusion site every three days. Photo by Mark Ylen / Democrat-Herald.

The CDE asks Laura how she feels about her diabetes self-management. Laura explains that she doesn't like checking her glucose because "it's always high anyway" and doesn't like using her insulin pen in front of her peers because "it's a hassle" and makes her "stick out from the crowd." Laura's medical record indicates that the endocrinologist has suggested the insulin pump as an option on previous occasions, but neither Laura nor her parents have expressed interest. Laura has been using the long-acting basal insulin glargine (Lantus) at the same once-daily dose that was prescribed for her six months ago. She also uses the same insulin-to-carbohydrate ratio and correction factor for hyperglycemia in administering aspart (Novolog), her short-acting bolus insulin.

The CDE knows that puberty often worsens blood glucose levels. Based on Laura's growth and physical development, the CDE assesses Laura's pubertal maturation at Tanner Stage 3 (see *Understanding the Tanner Stages*). When with her peers, Laura is reluctant to use her insulin pen. Her short responses to questions and general lack of participation in the conversation may indicate that she is angry, sad, frustrated, or experiencing conflict with her parents. She is not checking her blood glucose levels often enough, and neither

her prescribed basal insulin dose nor her bolus insulin ratios are sufficient to achieve target glucose levels, as shown by her glucose records and elevated HbA<sub>1c</sub>. Since she was diagnosed at a young age, it's very likely that patient teaching was initially directed at Laura's parents rather than at Laura. Now that she has entered puberty, it's crucial that the family learn how to address the management of diabetes during this time of physical and psychological changes in a way that both involves Laura's parents and allows Laura to maintain a reasonable degree of independence.

Although the national prevalence of type 2 diabetes, once considered a disorder specific to adulthood, has grown at an alarming rate among children and adolescents in recent years, with a May 7 study in *JAMA* showing an increase of more than 30% among 10-to-19-year-olds from 2001 to 2009 alone, the prevalence of type 1 diabetes remains far greater and has also increased, if slightly less rapidly, by 21% among 0-to-19-year-olds during the same time period.<sup>1</sup> While there are important differences in the ways that each type is managed, both may be dramatically affected by puberty. This article describes the ways in which the hormonal changes of puberty affect insulin sensitivity and glucose metabolism, the psychological and

## Understanding the Tanner Stages

Maturation during puberty is most commonly assessed in terms of the following stages described by James M. Tanner, a British pediatrician who was among the first to study adolescent growth (for more information, see “Puberty and the Tanner Stages” at [www.childgrowthfoundation.org/CMS/FILES/Puberty\\_and\\_the\\_Tanner\\_Stages.pdf](http://www.childgrowthfoundation.org/CMS/FILES/Puberty_and_the_Tanner_Stages.pdf)).

Stage	Female	Female growth (cm/y)	Male	Male growth (cm/y)	Pubic hair (female and male)
1	Prepubertal	5–6	Prepubertal	5–6	Prepubertal (velus only)
2	Elevated breasts and papillae; enlarged areolae	7–8	Enlarged scrotum and testes; scrotal skin reddens and changes in texture	5–6	Sparse, long, slightly pigmented, straight or curled, at base of penis or along labia
3	Breasts and areolae further enlarge; no separation of their contour	8	Penis lengthens; further growth of testes	7–8	Darker, coarser, curlier hair, spreading sparsely over pubic junction
4	Areolae and papillae form secondary mounds above breast	7	Penis increases in length and circumference; development of glans; further growth of testes and scrotum; scrotal skin darkens	10	Darker, coarser, curlier hair, spreading sparsely over pubic junction
5	Mature stage: only papillae are projected above breast contour, as areolae recede	No further increase after 16 years	Adult genitalia	No further increase after 17 years	Adult in type and quantity, with horizontal distribution

behavioral aspects of adolescence that may interfere with diabetes self-management, and strategies for teaching and counseling adolescents with diabetes as they make the transition to adulthood.

### ADOLESCENT PHYSIOLOGY AND GLYCEMIC CONTROL

Adolescents tend to have worse glycemic control than adults, regardless of the treatment regimen followed. This was the case in the Diabetes Control and Complications Trial, a study of patients with type 1 diabetes who were assigned to either intensive or conventional diabetes management groups.<sup>2</sup> Subjects in the intensive management group had blood glucose levels measured at least four times daily and received insulin three or more times daily, either by injection or through an insulin pump. Subjects in the conventional management group injected insulin once or twice daily, monitored urinary or blood glucose values once daily, and received information on diet and exercise. Although average HbA<sub>1c</sub> levels were

1.7% lower in adolescents in the intensive management group compared with the conventional management group over two to three months, in both groups, adolescents had nearly a 1% higher average HbA<sub>1c</sub> level than adults in the comparable group.

The worsening glucose control observed among adolescents is attributable to both physical and psychosocial changes that occur during puberty. Understanding these changes and their effects can help adolescents and their parents to better cope with the challenges of managing diabetes during puberty and can lead to improved glycemic control.

**Puberty and insulin resistance.** Puberty diminishes the body's ability to respond to insulin, whether or not the pubescent child has diabetes. A study conducted by Moran and colleagues found that insulin sensitivity in children without diabetes is significantly diminished at the onset of puberty and returns to nearly prepubertal levels with physical maturation.<sup>3</sup>

The insulin resistance that occurs during puberty is not completely understood, but is due in part to the counterregulatory hormones growth hormone (GH) and insulin-like growth factor-1 (IGF-1), which work against the action of insulin and are secreted at elevated levels during puberty to promote rapid growth and development.<sup>4</sup> Just as androgens, estrogens, and progestogens, which are responsible for changes in body composition, hair growth, body odor, and menarche and breast development in females, are released in greater quantities throughout puberty, the same is true of GH and IGF-1, with GH secretion actually doubling.<sup>4</sup> As a result, throughout puberty, the response to insulin decreases in all children and declines 25% to 30% in those with diabetes, causing insulin requirements to rise sharply.<sup>5,6</sup> In addition, GH and IGF-1 are part of the insulin-signaling pathway, and in people who retain at least some beta cell function (children with type 2 diabetes and some children in the early stages of type 1, for example) they also interfere with the release of insulin from the pancreas.<sup>7</sup>

**At menarche**, adolescent girls undergo additional hormonal changes that may exacerbate insulin resistance and affect glucose levels at various points in the menstrual cycle. For example, there is evidence

glycemic control, and self-care behaviors, the practitioner and patient need to determine how often they will be in touch. Poor glycemic control may lead to delayed menarche, impaired growth, menstrual irregularities, and such long-term diabetes complications as retinopathy and nerve or kidney damage.

**The timing of glucose checks** should be individualized, and mutually agreed upon goals should be set. The American Diabetes Association (ADA) suggests that patients of all ages using multiple-dose insulin therapy or insulin pump therapy should check their blood glucose levels at least at the following times<sup>10</sup>:

- before all meals and snacks
- occasionally two to three hours after meals
- at bedtime
- before exercise
- before performing such vital tasks as driving or operating heavy machinery
- when they suspect blood glucose is low
- after treating low blood glucose, until it's within their target range

For many patients, this means checking blood glucose levels six to eight times daily or more frequently.<sup>10</sup>

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suggesting that in some women with type 1 diabetes, hyperglycemia occurs in the luteal phase of the menstrual cycle.<sup>8,9</sup> For this reason, when female patients with diabetes begin menstruating, if they find that glucose levels are elevated between days 14 and 28 of their menstrual cycle, they should plan to increase glucose monitoring during this phase of every cycle so they may adjust their basal or bolus insulin doses or carbohydrate and correction ratios accordingly. When menstrual cycles are irregular, it can be more of a challenge for patients to predict when glucose levels will rise, but close monitoring should be encouraged to help maintain glycemic control.

### MAINTAINING TARGET GLUCOSE RANGES DURING PUBERTY

It is important for pubescent patients to be in frequent contact with their primary diabetes practitioner so that insulin doses may be adjusted to meet glucose targets during this period of rapid growth and hormonal changes. Depending on the patient's goals,

For patients with type 2 diabetes who are not taking insulin or who are using basal insulin therapy, the optimal frequency of blood glucose monitoring has not been established; but using blood glucose values to regulate intake, exercise, and therapy is an important part of the patient teaching that helps guide treatment.<sup>10</sup> Recommendations should be based on the patient's treatment goals, and in the case of adolescents on the changes that occur during puberty.

**Adolescent glucose targets.** An adolescent approaching or going through puberty may report having consistently high blood glucose levels, even when following her or his prescribed diabetes regimen. Increased insulin resistance and higher insulin requirements during puberty render the insulin doses prescribed before puberty no longer effective in keeping glucose levels within target ranges. According to the ADA, adolescents and young adults ages 13 through 19 should have a plasma glucose level of 90 to 130 mg/dL before meals and 90 to 150 mg/dL



at bedtime and throughout the night (the recommended before-meal and nighttime goals for patients over 19 are 70 to 130 mg/dL and less than 180 mg/dL, respectively).<sup>10</sup>

**The ‘dawn phenomenon.’** If a patient’s glucose data show high fasting levels in the morning subsequent to a bedtime value that’s within target range, the increase is likely owing to the counterregulatory effects of GH and cortisol, for which secretion peaks, respectively, late at night and in the early morning hours, resulting in an increased need for insulin between 3 AM and 8 AM.<sup>11</sup> This so-called dawn phenomenon occurs in both type 1 and type 2 diabetes.<sup>11,12</sup>

If you suspect your patient experiences an early morning increase in blood glucose as a result of these hormonal effects, suggest checking blood glucose levels between 3 AM and 5 AM for several consecutive nights.<sup>11</sup> If the patient is experiencing this effect, either the bedtime insulin dose or, for patients using insulin pumps, the overnight basal rate may be increased to compensate—provided that the patient isn’t experiencing nocturnal hypoglycemia. You might suggest that patients experiencing the dawn phenomenon consider using an insulin pump if they are not already, as it is the most successful means of reducing this effect. It might also be helpful to suggest experimenting with such dietary modifications as increasing the protein-to-carbohydrate ratio within the day’s last meal and eating breakfast. These actions may help reduce the secretion of insulin-antagonistic hormones.<sup>11</sup>

## Real-time continuous glucose monitoring can help some adolescents identify trends in their blood glucose levels.

**Identifying blood glucose trends.** Real-time continuous glucose monitoring (RT-CGM) can help some adolescents identify trends in their blood glucose levels. The RT-CGM systems require the subcutaneous insertion of a device into the patient’s abdomen, thigh, or arm. The systems then continuously measure glucose levels in the interstitial fluid, which must be calibrated using blood glucose checks. Patients and providers can review measurements in real time or retrospectively assess trends by downloading reports.

Some adolescents find RT-CGM annoying, uncomfortable, or intrusive.<sup>13</sup> The technology, however, can be very helpful in diagnosing the dawn phenomenon and in identifying glycemic trends associated with menses. RT-CGM may be particularly useful in combating hypoglycemia unawareness, also called hypoglycemia-associated autonomic failure, which is an inability to recognize signs and symptoms of low blood glucose levels and respond appropriately.<sup>10</sup> Hypoglycemia unawareness can occur in young children and adolescents, especially those who have had diabetes with hypoglycemic episodes for many years, and can result in dangerously low blood glucose levels that require emergency medical attention.

There is more evidence supporting the use of RT-CGM to lower HbA<sub>1c</sub> in adults than in children and adolescents, although young patients who use it correctly and consistently find it helpful for this purpose.<sup>10</sup>

**Insulin pump therapy** can be an effective means of managing diabetes during puberty. The insulin pump continuously delivers fast-acting insulin, as directed by the patient, through a subcutaneous catheter. The pump may be particularly attractive to adolescents with hectic schedules because it<sup>12,14,15</sup>

- eliminates the need for frequent injections.
- allows patients whose insulin doses vary frequently with hormonal fluctuations or physical activity to adjust basal insulin as needed.
- can autocalculate recommended doses based on personalized preset limits, which can make dose decisions easier, quicker, and more accurate.
- can deliver a bolus insulin dose over a specified, extended period, which better corresponds with the rise in blood glucose precipitated by a particular food. For example, a food high in both fat and carbohydrate, such as pizza, may digest over a longer period of time, raising blood glucose levels for a number of hours after the meal.

Despite occasional difficulties with the insulin pump, such as local infections or pump malfunctions, adolescent patients report that the pump improves quality of life and allows them to fine-tune their diabetes care based on personal needs.<sup>15</sup> While some adolescents who use an insulin pump or RT-CGM develop anxiety about “wearing an external representation of chronic illness,”<sup>16</sup> the few studies that have investigated insulin pump use in adolescents with type 1 diabetes found that discontinuation seldom had to do with body image, appearance, or social aspects of pump use. Chief concerns that led to insulin pump discontinuation in these studies included the time commitment required at the start of pump therapy, pump failure, embarrassment associated with alarms, and nonadherence attributed to the pump’s convenience (that is, patients may forget such important

## Online Resources for Teens with Diabetes

### American Diabetes Association (ADA)

[www.diabetes.org](http://www.diabetes.org)

The ADA Web site provides general information about type 1, type 2, and gestational diabetes; diabetes care and management; finding support; and managing diabetes in school. The "Living with Diabetes" section includes "For Parents and Kids," and "Teens" ([www.diabetes.org/living-with-diabetes/parents-and-kids/teens](http://www.diabetes.org/living-with-diabetes/parents-and-kids/teens)).

### Behavioral Diabetes Institute (BDI)

<http://behavioraldiabetesinstitute.org>

The BDI provides "tools to face the psychological demands of diabetes." The section for parents of children and teens features workshops, courses, and e-learning modules.

### Children with Diabetes

[www.childrenwithdiabetes.com](http://www.childrenwithdiabetes.com)

An online community for kids and adults with diabetes and their families, Children with Diabetes features forums, conference information, advice from diabetes experts, information for school personnel and babysitters, a directory of camps for children with diabetes, and much more.

### College Diabetes Network (CDN)

<https://collegediabetesnetwork.org>

The CDN Web site provides information on scholarships available to students with type 1 diabetes, job opportunities and internships related to diabetes research and treatment, considerations for students with diabetes who plan to study abroad, and advocacy and student rights. Pages on CDN chapters at various campuses are under development.

### Despite Diabetes

[www.despitediabetes.com](http://www.despitediabetes.com)

Despite Diabetes is a blog written by JDRF volunteer and outreach speaker Moira McCarthy, who "shares her experience and advice on the highs and lows of raising a child with type 1 diabetes."

### Glu

<https://myglu.org>

Part of the nonprofit organization T1D Exchange, Glu is "an active and diverse type 1 diabetes online community designed to accelerate research and amplify the collective voice" of those living with the disease.

### JDRF

<http://jdrf.org>

Formerly the Juvenile Diabetes Research Foundation, JDRF is a global organization that funds research into type 1 diabetes with a goal of eradicating the disease altogether. From the home page, click on "Life with T1D" to access "toolkits, articles, information, and online groups for people of all ages and stages of life" with the disease; to access the "Teen" section directly, go to <http://jdrf.org/life-with-t1d/teenagers>.

### National Diabetes Education Program (NDEP)

<http://ndep.nih.gov>

The NDEP Web site provides information, publications, and resources for people with diabetes, including resources for transitioning from pediatric to adult health care (<http://ndep.nih.gov/transitions/resourceslist.aspx>). *Tips for Teens with Diabetes: Dealing with the Ups and Downs of Diabetes* is a four-page pamphlet created by teens with diabetes and reviewed by diabetes experts ([www.ndep.nih.gov/media/NDEP81\\_tipsteensdealing\\_bw\\_508.pdf](http://www.ndep.nih.gov/media/NDEP81_tipsteensdealing_bw_508.pdf)).

### TuDiabetes.org

[www.tudiabetes.org](http://www.tudiabetes.org)

TuDiabetes.org is an online community for people of all ages who have been "touched by diabetes." Described by one member as "like 'My Space' on insulin," the site includes blog posts, discussion forums, and videos for people with type 1, type 2, or gestational diabetes and those close to them.

steps as delivering insulin boluses or checking blood glucose because they come to rely on the pump to do all the work for them).<sup>17</sup>

**Encouraging health maintenance.** Research suggests that adolescents with diabetes are most successful in maintaining healthy habits (getting regular physical activity and adequate sleep, making sensible meal choices, and maintaining good glycemic control) when<sup>18-20</sup>

- their parents and other family members are supportive and involved in diabetes care.
- diabetes-related family conflict is minimized.
- psychological and psychosocial services are used as needed.
- the approach to care is personalized.

include a discussion of precautions to be taken if the patient is engaging in risky behaviors despite having been discouraged from doing so.

For example, when drinking alcohol, people with diabetes must eat, be with people who are aware of their diabetes, wear medical identification, and understand that alcohol affects blood glucose levels and, in excess, can disguise signs and symptoms of low blood glucose. They should know that alcohol consumption in the evening can cause an initial increase in blood glucose followed by morning hypoglycemia. Advise patients who drink alcohol to check their blood glucose levels both before and after drinking. To lower the risk of morning hypoglycemia, suggest eating a 15-gram carbohy-

## The desire to fit in may lead adolescents with diabetes to succumb to peer pressure and ignore their disease in order to feel ‘normal.’

To stimulate dialogue, help patients examine their feelings, and empower them to create a realistic, personalized self-management plan, providers often incorporate motivational interviewing, or active listening, an evidence-based behavioral intervention that uses open-ended and reflective questions.<sup>21</sup> Some examples of open-ended questions are: “How well do you think you manage your diabetes?” or “How important do you think it is to keep your blood glucose level within the target range?”

### ADOLESCENT PSYCHOLOGY AND BEHAVIOR

In treating adolescents with diabetes, it’s important to consider the psychological and emotional changes that occur during puberty, as some may affect behavior and seriously impede diabetes management. Be vigilant for signs of such changes in adolescent patients and be prepared to provide relevant patient teaching.

**Risky behaviors.** Adolescents often want to “fit in” with their peers. They tend to seek independence from their parents and may challenge authority, including that of those who are helping them manage their diabetes. The desire to fit in may lead them to succumb to peer pressure and participate in such risky behaviors as drinking alcohol, using recreational drugs, having unprotected sex, or ignoring their disease in order to feel “normal.”

In all routine visits, include instruction and guidance regarding the challenges, responsibilities, and risks that might be present during puberty and the effects of each on diabetes care. Counseling should

include a discussion of precautions to be taken if the patient is engaging in risky behaviors despite having been discouraged from doing so. For example, when drinking alcohol, people with diabetes must eat, be with people who are aware of their diabetes, wear medical identification, and understand that alcohol affects blood glucose levels and, in excess, can disguise signs and symptoms of low blood glucose. They should know that alcohol consumption in the evening can cause an initial increase in blood glucose followed by morning hypoglycemia. Advise patients who drink alcohol to check their blood glucose levels both before and after drinking. To lower the risk of morning hypoglycemia, suggest eating a 15-gram carbohydrate snack (such as an ounce of cheese and seven whole wheat crackers) per alcoholic beverage, without taking insulin. Sweet alcoholic drinks made with soda or juice increase glucose levels more than drinks like beer or straight liquor, which are lower in carbohydrates. Although insulin treatment may be required if alcoholic drinks are consumed, doses should be reduced and patients should have glucose tablets or another quick-acting sugar source available in case of morning hypoglycemia. Patients who use an insulin pump might also lower their basal insulin rate throughout the night if they’ve been drinking alcohol. In addition to preventing hypoglycemia, patients should be advised to stay well hydrated while drinking alcohol. As a general rule, the ADA suggests that adult women have no more than one and adult men no more than two alcoholic drinks in a single day.

It’s important for nurses to discuss the use of condoms in preventing sexually transmitted infections (STIs) with all adolescents, but particularly in those who have diabetes. As with all infections, STIs can complicate diabetes management by raising blood glucose levels, and diabetes, especially if poorly controlled, can hinder response to treatment. Because of the high risk associated with pregnancy in diabetes, contraception and preconception counseling should be given to all females with diabetes as soon as they have the ability to reproduce. From preconception through pregnancy, optimal glucose control can reduce the risks of both maternal and fetal complications.

**Depression, anxiety, and low self-esteem**, for which all adolescents are at elevated risk, can further complicate diabetes self-management. Among adolescents with diabetes, depression is reported to be two to three times higher than among their nondiabetic peers.<sup>4</sup>

In some cases, low self-esteem is related to poor body image—and eating disorders are more common in adolescent girls who have diabetes than in those who do not. In an effort to lose weight, adolescent girls with diabetes may binge and purge, skip insulin treatments, or follow severely restricted diets. A cross-sectional, case-controlled study including 404 adolescent girls, 101 with type 1 diabetes and 303 nondiabetic cohorts, found that 8% of those who had diabetes engaged in two or more “disturbed eating behaviors” and 10% engaged in intense, excessive exercise for weight control, whereas only 1% of those without diabetes engaged in either behavior.<sup>22</sup>

Ongoing assessment and referral to treatment for depression, eating disorders, or other mental health disorders, as needed, should be part of the clinical care for adolescents with diabetes. Psychological and behavioral disorders in children and adolescents require intensive treatment, which should be tailored to the young person with diabetes.<sup>4, 19, 23</sup>

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#### **ASSESSING READINESS FOR INDEPENDENCE**

Adolescence is a time of erratic schedules and such new responsibilities as preparing to take on diabetes self-management and to move from pediatric to adult diabetes care. The changes can be overwhelming for both parent and child. Some parents have trouble relinquishing any responsibility for diabetes management to their child, while others are too quick to hand over all responsibility. It is therefore important to start thinking about this transition early on and discussing it at clinical appointments, especially when there are indications of conflict regarding the transition of care.

Most adolescents can be given some degree of independence in caring for their diabetes, although readiness in this group varies widely. Those who have had

diabetes for many years may need substantial provider and parental guidance, especially if they were young children at diagnosis or are feeling burned-out from trying to manage diabetes 24 hours a day, seven days a week for a long period of time. These patients may have never directly received comprehensive diabetes patient teaching because, at diagnosis, the education was directed at their parents. Others, who received the proper education and support, may need minimal assistance.

With their parents and diabetes care team, adolescents can help make decisions about their diabetes management and the level of independence for which they're prepared. As long as any barriers to self-management exist, the adolescent's family should be included in the care plan.

#### **RESPONDING TO LAURA**

The nurse educating Laura, or an adolescent in a situation like Laura's, needs to show support and provide encouragement. Getting to know Laura and finding out her interests and favorite activities can be a helpful strategy when working with her and her family to design an effective, personalized treatment plan. Asking such open-ended questions as, “How confident are you in determining your insulin doses?” and “What would help you to check your glucose level more frequently?” can help the clinician determine the level of independence for which Laura is prepared.

Since Laura was so young at diagnosis, the majority of her patient teaching may have been directed at her parents. The nurse needs to find out if there are any specific areas of diabetes management that Laura should review and whether Laura and her family understand the effects of puberty, growth, and menses on blood glucose levels. This could help them understand why Laura's levels are “always high” and might eliminate some of the tension between Laura and her parents.

As Laura progresses through puberty, her insulin requirements are likely to change more often than she sees her diabetes care team. Thus the nurse needs to explain the importance of checking blood glucose levels, reporting results to the clinical team for review, and making insulin dose adjustments between clinical visits. A nurse might also remind the family that poorly controlled diabetes has severe consequences, while assuring them that effective management is now well within a patient's reach and can greatly reduce the risks of this chronic condition.<sup>2</sup>

In discussing obstacles and challenges, including Laura's dislike of using her insulin pen in front of others, the nurse might suggest that Laura teach her close friends about diabetes to help reduce her apprehension, recommending specific Web sites, blogs, chat rooms, and support groups that other



adolescent patients have found helpful (see *Online Resources for Teens with Diabetes*). It would also be appropriate to discuss switching to the insulin pump as an option, because it allows patients to administer insulin more discretely and to change insulin doses based on their activities, growth, and hormonal changes. Any discussion of the pump needs to take into account Laura's feelings about wearing an external treatment device and should be clear about such potential problems as local infections and pump malfunctions.

## Most adolescents can be given some degree of independence in caring for their diabetes, although readiness in this group varies widely.

It isn't too early to discuss risky behaviors like drinking or skipping shots and their effects on diabetes management, as this type of patient teaching should occur in advance of any such behaviors. The nurse should also assess Laura for depression, and if it's determined that she requires additional support or psychological intervention, refer her to a social worker or behavioral specialist.

Although diabetes adds to the challenges of puberty, with appropriate patient teaching, careful monitoring, smart lifestyle choices, and support, the transition from childhood to adulthood can be a happy and healthy one. ▼

For 23 additional continuing nursing education activities on topics related to diabetes, go to [www.nursingcenter.com/ce](http://www.nursingcenter.com/ce).

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