

Real World Meal Planning Strategies for Children and Adolescents with Diabetes

By Alison Evert, MS, RD, CDE

You know the scenario. A child in your school has recently been diagnosed with diabetes and arrives in your office with an individualized meal plan from the healthcare provider or a Registered Dietitian. The child's meal plan tells you exactly how many carbohydrate (CHO) choices or grams of CHO have been prescribed for lunch, and perhaps for a snack. (Table 1 shows general carbohydrate choice recommendations for lunch and snacks.) The family or care givers also provides you with the child's prescribed blood glucose targets, diabetes medications, treatment recommendations for high and low blood glucose levels, and guidelines about when to call the parents and/or the healthcare provider as well as many other important accommodations. You will use this information to develop the child's individualized healthcare plan (IHP) or 504 Plan. All of this looks good on paper until there is a class party or the child forgets his or her home-packed lunch. We hope this article will provide you with helpful strategies for managing diabetes in the "Real World." Many of the following suggestions have been learned from children with diabetes and their parents.

Overview

Many children are now using multiple daily insulin injections or insulin pump therapy that can provide previously unheard of flexibility to accommodate unplanned eating situations or school parties. This type of plan also has been shown to reduce episodes of hypoglycemia. The new rapid-acting insulin analogs (Apidra[®], Humalog[®], and NovoLog[®]) given at mealtime, used along with long-acting insulin analogs (Lantus[®] or Levemir[®]), taken once or twice a day (or rapid-acting insulin given in minute amounts over 24 hours via an insulin pump) have dramatically changed the way that insulin is

now prescribed. A shot or bolus of rapid-acting insulin is delivered when the child eats, mimicking the way a normally-functioning pancreas secretes insulin. The IHP or 504 Plan will state how much insulin the child needs for a specified number of grams of CHO. This is called an insulin-to-carbohydrate ratio, and it is used in conjunction with the child's blood glucose correction factor, or sensitivity factor, to correct an elevated pre-meal blood glucose level. At times this dose may be reduced for planned exercise.

Many children still use a fixed or traditional insulin injection plan, such as two injections a day instead of multiple daily injections or insulin pump. With this type of insulin plan it is very important for the child to eat planned meals and snacks on a schedule to reduce the risk of hypoglycemia.

The dietary guidelines for a child with diabetes are the same as those for a child without diabetes—healthful eating is good for everyone. No child should be allowed to eat sweets indiscriminately. The new rapid-acting insulin analogs give children with diabetes the ability to include long forbidden foods without sacrificing optimal blood glucose control. However, this is not a license for children with diabetes to eat whatever they want, whenever they want it, as long as they "cover it" with rapid-acting insulin, since excessive weight gain may result.

School Parties

Here are some ideas from families and children with diabetes.

- Make arrangements with the room or party parents at the beginning of the school year to distribute a list of healthful snack alternatives for scheduled class parties. This approach provides appropriate snack choices for the child with a diabetes meal plan as well as healthful snack options for all of the children in the class.
- If unplanned treats are not permitted in the meal plan, suggest to the teacher or other adult in charge that the child carry the treat home in a safe food container to eat at a later time — the container protects the treat in the child's backpack on the way home from school.
- If approved in advance by the caregivers, substitute the party food or unplanned snack for the child's planned snack later in the day.
- Talk with the child about how to deal with snacks and parties. Let the child help decide how to handle parties and unplanned snacks in advance. Working out coping strategies for these special occasions ahead of time avoids having the child feel angry, deprived, "left out" or different from his or her peers.

TABLE 1. GENERAL CHO CHOICE RECOMMENDATIONS FOR LUNCH AND SNACKS

Lunch:

- Pre-school – 2 to 3 CHO choices per meal (30 to 45 grams)
- School-age – 3 to 4 CHO choices per meal (45 to 60 grams)
- High-school – 4 or more CHO choices per meal (60 or more grams)

Snacks:

- Pre-school – 1 CHO choices per snack (15 grams)
- School-age – 1 to 2 CHO choices per snack (15 to 30 grams)
- High-school – 1 to 2 more CHO choices per snack (15 to 30 grams)

Snack Tips

Snacks play a role in all children's meal plans, with and without diabetes. Young children have small stomachs and have to eat frequently to meet their nutritional needs, and adolescents require additional calories through puberty. There are three major reasons that a child with diabetes needs a snack (Ross, 2005):

- To prevent hunger between meals
- To assist in providing adequate energy to promote normal growth and development
- To help prevent hypoglycemia

Key factors that determine the size and frequency of snacks are age, appetite, level of physical activity, weight, typical family eating patterns and schedules, insulin action peaks, individual food preferences, allergies, and cultural influences (Ross, 2005). (See Table 2 for snack ideas.)

Snacking Considerations

- A child taking multiple daily injections or using an insulin pump usually needs to take a shot or a bolus to cover carbohydrate foods consumed at snack time. The long-acting insulin (Lantus® or Levemir®) does not have a pronounced peak, so the child typically needs to offset the post-snack blood glucose excursion with some rapid-acting insulin. The size of the child and individual sensitivity to insulin will determine whether the child needs to take a shot or bolus. Snack-time insulin coverage should be addressed in the IHP or 504 Plan.
- Work with the teacher and parents to coordinate the child's snack time with the other students in the class.
- Obtain permission for the child to eat a snack anywhere, including the school bus, classroom or school gymnasium to prevent or treat low blood glucose levels.

- A child may need to eat approximately 15 grams of CHO for every 20 to 30 minutes of planned physical activity to prevent low glucose. Pre and post blood glucose monitoring will confirm the child's individual caloric needs.
- General rules for snacking (Bertschart Roemer & McGee, 2003):
 - Children younger than 6 years of age generally require a snack when more than 4 to 5 hours elapse between meals.
 - Most children older than 6 years of age require snacks after school/mid-afternoon and bedtime.
 - Many older school-age children or teenagers prefer not to snack at school and can often consume large amounts of calories and carbohydrates after school.
- For the child on a fixed or structured insulin and meal plan, rather than multiple daily injections or an insulin pump, ask the parent to supply a treat box for

TABLE 2. NON-PERISHABLE SNACKS

Free-food Snacks*	1 CHO choice or 15 grams CHO	2 CHO Choices or 30 grams CHO
Beverages	Fruity Snacks	Fruity Snacks
Sugar-free beverages such as soda or bottled drinks	One packet fruit snacks	½ cup dried fruit
Sugar-free cocoa	One fruit leather	1 small container of canned fruit
Flavored sparkling water with zero CHO	One fruit-roll-up	4 ounces regular applesauce
Sugar-free candy or gum	Snack size box of raisins (2 tablespoons)	Crunchy Snacks
Sugar-free gelatin (type that can be stored at room temperature)	¼ cup dried fruit	Most commercial or single serving size cereal bar or granola bar
Cheese Stick	4 ounces unsweetened apple sauce	Cracker and cheese or peanut butter packet
Beef Jerky	Crunchy Snacks	One Pop Tart™
One chocolate Kiss™	One small granola bar	Small bag of chips (¾ ounce)
	3 graham cracker squares (2½ inch square)	Sweet Snack
	4-6 whole wheat crackers	4 ounce pudding cup (type that can be stored at room temperature)
	2 rice cakes (4 inch)	
	20 oyster crackers	
	½ ounce of pretzels	
	Sweet Snacks	
	2 sandwich cookies	
	5-6 vanilla wafers	
	5-6 unfrosted animal crackers	
	20 Teddy Graham™	
	One Rice Krispy Treat™ (single serving)	

* For times when the blood sugar is elevated or the child does not have insulin coverage prescribed in the IHP or 504 Plan

the classroom. The treat box can include a variety of foods chosen by the child for different situations based on the child's blood glucose level or planned snack-time. These foods can be substituted for snacks of unknown CHO content or for unplanned snacks.

Troubleshooting the School Cafeteria

Many school-age children have their lunch periods before recess, so it is often the case that the faster they eat, the longer they get to play. The responsibility of supervising the lunch-time meal falls to the lunch-room attendant or the classroom teacher. How can parents be assured that their child eats enough? As a general rule, CHO converts into glucose 1 to 2 hours after it is eaten and exerts the major blood glucose raising effect post-meal. Therefore, if the child consumes at least the prescribed amount of CHO at lunch he or she will have "fuel" for the next couple of hours. Protein foods take longer to digest—from 2 to 5 hours depending on the fat content. Higher-fat foods take even longer. Protein foods do not dramatically raise the blood glucose level and add "staying power" to the meal; dietitians recommend the inclusion of a protein food to enhance satiety.

Cafeteria Tips

- Eating a sandwich and beverage or the school lunch entrée and beverage means that the child has consumed approximately 45 grams of CHO, or 3 CHO choices.
- Home-packed lunches can include notes with the number of CHO choices or grams of CHO in each item as well as the prescribed amount of lunch-time CHO. The lunch-room attendant can then quickly determine how much is consumed before the child heads out to recess or back to the classroom.
- For unsupervised lunches, the child can take lunch remains home so the parent can see how much the child has eaten. This information can be used to make adjustments in the insulin or meal plan.
- Try to have the child check pre-meal blood glucose levels in the classroom

before lunch so there is more time for eating this very important mid-day meal. If the pre-meal blood glucose level is elevated and the child cannot independently take a correction shot or insulin pump bolus, the nurse may need to assist with insulin administration. Once the pre-meal insulin is delivered the child should eat within the next 15 minutes, to reduce the risk of hypoglycemia. If using the cafeteria, the child may need permission to go to the head of a long lunch line to ensure timely eating.

Lost or Forgotten Lunch

When a child forgets his or her home-packed lunch and the parents cannot be reached, the first thing to do is determine how many CHO choices or grams of CHO are prescribed in the meal plan. Children on multiple daily injections or an insulin pump can cover or match what they eat based on their individualized insulin-to-carbohydrate ratio. If a school lunch is an option, check the nutrient analyses calculated by the school district food service for the lunch offerings; possibly, the choices offered that day can be adjusted to fit the child's prescribed meal plan. Because many school districts or private schools do not have this information available, average CHO grams for many commonly served school lunch foods are provided in Table 3.

How to Deal with Lows or Highs

Treating lows for children on fixed insulin and meal plans:

For the child on a fixed meal plan, without supplementary insulin orders, the lunch-time beverage can be adjusted to reduce or increase the CHO content to deal with blood glucose levels outside of targets, as follows:

For lows pre-meal

For a blood glucose level under 70 mg/dL treat with 15 grams of rapidly-absorbed CHO. For blood glucose level under 50 mg/dL treat with 30 grams of rapidly-absorbed CHO, or have the child drink 1 cup or ½ pint of juice or chocolate milk. Then the child should eat the rest of the planned meal. *Note that these are suggested guidelines and healthcare providers may set different treatment guidelines for young*

children who are unable to recognize their lows independently.

For highs pre-meal

Substitute water for the milk or juice planned at the meal. Food should *not* be withheld.

Treating lows for children on insulin pumps

An insulin pump cartridge or reservoir is commonly filled with rapid-acting insulin or, in some cases, Regular insulin. The minute amounts of insulin that the child receives 24 hours a day does not have a pronounced peak. With no long-acting insulin in the blood, there is a reduced risk of a repeat episode once the low blood glucose level is corrected. Children on pumps need 15 grams of rapidly absorbed CHO, if under 70 mg/dL, and 30 grams of rapidly absorbed CHO if under 50 mg/dL. *Note that these are suggested guidelines and healthcare providers may set different treatment guidelines for young children who are unable to recognize their lows independently.*

The child typically does not need to eat anything else. Treating with an additional protein food and/or additional sources of CHO will result in elevated blood glucose levels and unnecessary calories. Guidelines for treatment of lows for children on insulin pumps should also be addressed in the child's IHP or 504 Plan by the healthcare provider.

How to Add Protein to the Meal

Parents and school nurses often have difficulty getting children to eat protein at their lunch-time meal. For children who don't like sandwiches or school lunch, here are some alternative sources of protein:

- Fruit and cheese chunk skewers
- Hot dog coins and cheese chunk skewers
- Cottage cheese
- Hard-boiled eggs
- Cheese sticks or slices
- Cream cheese-filled luncheon meat rolls
- Tuna or egg salad and crackers
- Graham crackers with peanut butter
- Cheese and crackers
- Peanut butter and crackers
- Cheese quesadilla

- Apple slices and a small container of peanut butter
- Macaroni and cheese in a “thermos”
- Slice of leftover pizza
- Chili or bean soup in a “thermos”
- Chipped/pressed meat
- Home-made English muffin pizza
- Balance Bar™
- Chunks of ham
- Pita bread with cheese, cream cheese, or peanut butter
- Nuts

Real-world meal planning strategies can help school nurses assist children and adolescents to manage diabetes effectively

in the school setting. Forcing a child without an appetite to eat consistently in an effort to stabilize blood glucose levels should be discouraged (American Diabetes Association, 2004). In some situations, children gain weight as a result of snacking to avoid lows, when all that is needed is an insulin adjustment. Conversely, snacks should not be withheld if the child is hungry merely to achieve optimal blood glucose control. Once again, the child’s insulin plan may need to be adjusted. It is not uncommon for a growing child to have meal and insulin plans adjusted several times a year. 🍷

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TABLE 3. CARBOHYDRATE (CHO) CONTENT OF COMMON SCHOOL LUNCH FOOD CHOICES

STARCH/COMBINATION FOODS

1 CHO choice or 15 grams of CHO	2 CHO choices or 30 grams of CHO	3 CHO choices or 45 grams of CHO
½ cup mashed potatoes 1 slice bread 1 corn tortilla (6 inch) ½ pita bread 1 small ear of corn ½ cup corn or peas ½ cup baked beans ½ cup stuffing ½ cup chow mein noodles 1 waffle (4 inch) ½ English muffin 1 biscuit 6 chicken nuggets 1 cup chicken noodle or tomato soup 2x2 inch piece of cornbread	1 sandwich with 2 slices of bread 1 hot dog in a bun 1 hamburger patty in a bun 1 chicken patty in a bun 1 slice pizza, medium thickness 1 small burrito 1 cup macaroni and cheese 1 cup hamburger casserole 1 cup chili with beans 1 cup spaghetti with meat sauce 1 small serving of French fries	1 cup or fist-sized portion of rice or pasta 1 bagel (3 ounces) 1 submarine sandwich (6 inch) 1 slice deep dish pizza 1 large burrito

FRUIT

1 CHO choice or 15 grams of CHO	2 CHO choices or 30 grams of CHO	3 CHO choices or 45 grams of CHO
½ cup fruit cup, unsweetened 1 small hand-sized portion of fruit such as an orange or apple 17 grapes ½ banana ½ cup fruit juice 1 cup cubed melon 2 tablespoons raisins	½ cup fruit cup, heavy syrup 1 small banana ½ cup regular applesauce	

DAIRY

1 CHO choice or 15 grams of CHO	2 CHO choices or 30 grams of CHO	3 CHO choices or 45 grams of CHO
1 cup or ½ pint milk 1 cup soy milk 1 container “lite” yogurt ½ cup vanilla ice cream	½ cup regular yogurt, flavored 1 cup or ½ pint chocolate milk ½ cup regular pudding	