



University Hospitals and Clinics, Patient Education

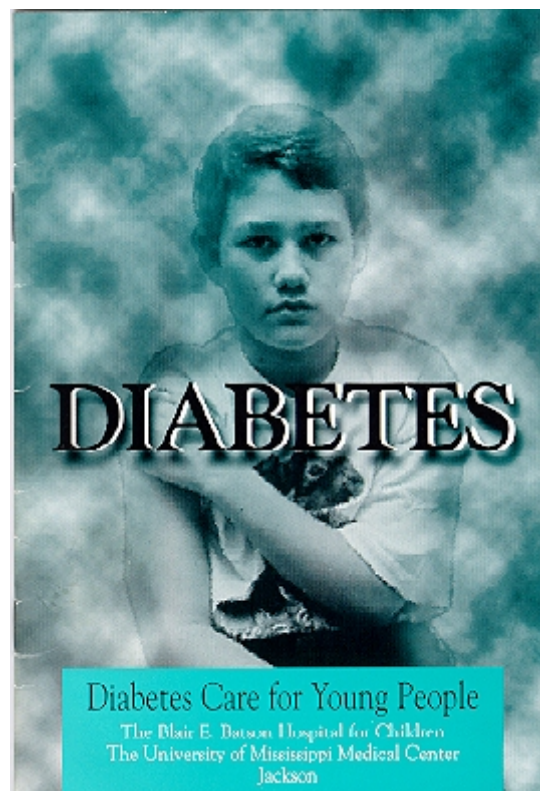
Adjusting to Your Illness



Diabetes Care for Young People

This booklet will give you some facts about diabetes.

The nurses, dietitians, psychologists, child/life specialists, social workers and doctors will help you learn how to live with diabetes.



**THE BLAIR E. BATSON
HOSPITAL FOR CHILDREN
THE UNIVERSITY OF MISSISSIPPI
MEDICAL CENTER
JACKSON**

Special thanks to Joey Netherland
for his help in making this booklet possible

Most often it is a shock to be diagnosed with diabetes. You are encouraged to give yourselves time to adjust. The goal is for you to learn enough about this disease, so that diabetes is just a part of your life and diabetes does not control your family's life. You can live successfully and comfortably with diabetes.

Definition of IDDM (Type I):

Type I diabetes is the most common type of diabetes that affects children and adolescents. The pancreas, located near the stomach, quits making insulin. The body cannot use glucose (sugar) in the foods that are eaten without insulin. Glucose is the fuel the body uses for energy. The cells of the body "starve" because sugar cannot get to them without insulin. The glucose (sugar) will stay in the blood and reach high levels which can disrupt blood flow and injure your body.

Ketones form when the body needs to use fat for energy when there is not enough insulin present for the use of sugars for energy.

Causes

Heredity

When there is a family history of diabetes mellitus, there is a greater chance of developing diabetes. However, sometimes there is no family history of diabetes.

Pancreas Destruction

Insulin making cells in the pancreas are destroyed by cells in the body which usually protect us from infections. The pancreas also can be damaged by direct injury, poisons or alcohol.

Myths

Diabetes is **not** caused by eating too many sweets.

Diabetes is **not** contagious. It cannot be "caught" by those coming in contact with people with diabetes.

Treatment

Insulin

Insulin is needed for the body to use food. One of the necessary ways to treat Type I Diabetes is with insulin. The human insulins are the most often used. "Pills" will not work in Type I. One kind of insulin is a faster-acting insulin, clear, or regular, that may be mixed with a longer acting insulin, cloudy or NPH. Regular (clear or R) insulin begins working within one-half

hour after it is injected. It works the most to reduce blood sugars two - three hours after it is given and usually has little effect four - six hours after it is given. NPH (cloudy/or N) insulin begins working one - two hours after it is injected, works most to reduce blood sugars in six - ten hours after it is given and usually has little effect in 16 - 24 hours. There are other kinds and mixtures of insulin that will be explained to you if you need them.

Mixing

Draw up the units of N as air into an insulin syringe, and inject this into the NPH bottle that has been placed upright on a flat surface. Draw up the units of R as air into syringe, and inject into the R insulin bottle. Turn upside down the R insulin bottle and draw up five - ten units. Look carefully for large air bubbles in syringe and remove these by tapping syringe and/or emptying and refilling syringe from the R bottle. When large air bubbles are all removed, draw up into the syringe the **correct amount** of R insulin. Turn upside down the NPH bottle and without pushing the R into the NPH bottle carefully withdraw the correct amount of NPH insulin to mix with the R already in the syringe. Be sure you have added the amounts of insulin to get your correct dose. For example, if you receive 20 units NPH and eight units R, the syringe should be on 28 units when you are ready to do the injection.

Storage

Keep insulin at comfortable room temperature. Avoid exposing it to extreme heat or cold (hot cars, sunny window, or freezers.) Extra bottles of insulin should be kept in the refrigerator. When traveling, always carry insulin in a cooler.

Injection Techniques

Measure correct dose of insulin in an insulin syringe. Clean skin with alcohol. Using a thumb and finger, gently raise up about a one-inch wide area and puncture the skin with the needle held at 45 - 90 degrees to the skin. Push the insulin into the skin with a steady pressure and count to five slowly before pulling the needle out of the skin. This will reduce the amount of leakage of insulin. Try to avoid rubbing the area. Record the dose given. If you have injected R or R+N insulin you must eat within 30 minutes after your insulin injection. The most frequently used two shot daily schedule works best if the morning shot is always given before breakfast between six - eight a.m. The evening shot is always given before supper between five - eight p.m.

Where to Inject Insulin

The back of the upper arms, the thighs, hip and the stomach are all okay for insulin injections. The leg sites are located between the groin and the knee. Avoid the inner aspect of the thigh and any obvious large blood vessels. The stomach area can be used everywhere except for a one-inch circle around the umbilicus (belly-button). The upper outer quadrant of hip (check with doctor for instruction on using hip). Change sites where insulin is given by referring to a site rotation schedule. Administer insulin at least two finger breadths away from a previous injection site. ([For more information see "Where to give injections".](#))

Diet

You will need to eat a certain number of calories at certain times throughout the day. You will talk to a dietitian to help you plan your menu. Nutra Sweet/aspartame and synthetic fat substitutes are now available, but they are expensive and may still count as calories in your overall diet program as well as having side effects of their own when taken in excessive amounts. Daily caloric intake is based upon 1,000 calories plus 100 calories per year of age. The breakdown of all food you eat causes changes in the blood sugar level. What you eat and how much you eat is important in maintaining a target blood sugar level. Meals must be eaten at about the same times everyday. Timing of meals and snacks is VERY IMPORTANT to provide the correct amount of calories at times when insulin is working to lower your blood sugar level.

Activity

Staying active is a third way you can help care for your diabetes. Riding your bike, playing baseball, hiking, or swimming are all great for you! It makes your muscles, lungs and heart strong. It helps you keep your weight in proportion with your height. You feel better when you exercise, and it is fun!

Activity helps you take care of your diabetes too. It helps the body cells use food and insulin much better. Being active at the same time everyday is the best--rather than having very active days mixed with quiet days. Overall, a steady daily physical activity schedule helps to keep your pre-meal and bedtime sugars in the target range of about 80-180 mg percent. Your muscles use more glucose (sugar) when you exercise. Hard exercise like lots of running and jumping can cause low blood glucose.

Your muscles use so much glucose for energy that the amount of glucose in your blood may get very low. Of course you don't want to have an insulin reaction (low blood sugar), so you may need to eat an EXTRA snack before or during exercise. If you have exercised particularly hard as in competitive games, you also may need an EXTRA snack at bedtime. Whether you need an EXTRA snack or not when exercising, depends on several things: how well your blood sugar is controlled before you exercise and the kind of exercise you do. Your muscles use more glucose for energy when you are swimming or playing ball, for example, than when you are walking. It depends on how long you exercise. Riding your bike for an hour uses more glucose than a quick five-minute bike trip to the home of a friend. Whether your glucose is high or low before you start exercising is important. If your blood glucose is already low, you should have an EXTRA snack. Exercise lowers the blood sugar of some boys and girls more than it does that of others. As you ride your bike or stay active in other ways during the next few weeks and months, you will find out more and more about how activity lowers YOUR blood glucose (sugar.) You can find this out by testing your blood glucose before and after exercise. THEN you will know more about when you need to eat an EXTRA snack. You can talk with the staff about ideas for snacks and activities.

Simple Safety Rules

- Test blood sugar before exercising!
- Have an EXTRA snack before strenuous exercising IF needed.
- Be sure to carry a form of sugar at all times to treat insulin reactions! Glucose tablets and glucose gels are good for this.
- Exercising with a buddy who knows you have diabetes is always best.
- Check for ketones if you feel sick or if your blood sugar is 300 or greater before exercising.

When not to exercise

If there are ketones present in your urine, DO NOT EXERCISE! It will cause your body to release stored glucose as well as burn more fat for energy and produce more ketones which are very upsetting to your body.

Monitoring

Glucose is necessary for the body to work and the body uses glucose for energy. Acceptable blood sugar ranges for children with diabetes are eighty

80-140 mg percent before breakfast and 80-180 before other meals and at bedtime. Low and high blood sugars cause you to feel abnormal and may interfere with your ability to do well in school. The blood sugar levels which cause one to feel sick vary with each individual and situation, but, in general, low blood sugar (hypoglycemia) is a level below 60 mg percent, and a high blood sugar (hyperglycemia) is a reading of more than 240 mg percent. In diabetes, glucose must be monitored to see what insulin the body actually needs. Glucose monitoring needs to be done at least before each insulin injection everyday and any other time you think your blood sugar is out of range. It is helpful to you and your doctor to obtain blood sugars before each meal and at bedtime a week before your clinic appointment

Technique for Glucose Monitoring

Wash hands in warm, soapy water; prick finger with lancet, and obtain a large drop of blood to quickly place on the monitoring strip. Continue with the procedure required for your type of blood glucose meter.

Urine Ketone Monitoring

The most frequently used urine monitoring in diabetes is checking for the presence of ketones, since urine glucose does not directly reflect blood glucose levels. Ketones are acids produced when body fat is broken down for energy. This breakdown can occur when body cells are unable to use blood glucose for energy. High levels of ketones are very irritating to the stomach and draw water out of body tissues to be passed in urine. Their presence in the urine is a danger sign requiring prompt attention.

Ketones Can Appear

- When there is not enough insulin to meet the body's needs, ketones can appear. This can be caused by too many calories with too little insulin, stress or illness. Illness increases the body's demand for fuel and the body begins to break down fat for fuel. Illness also reduces the effectiveness of insulin.
- Ketones can appear after insulin reactions or rapid drops in blood sugar when the fall in blood sugar levels has made the body turn to fat for energy.

Ketones are measured as trace, small, moderate, or large amounts. A dipstix is dipped into a urine sample and compared to a color chart on the

bottle. Children should normally have no ketones in their urine. The presence of ketones, particularly at moderate or large levels, is a warning sign that illness may be developing or that something in your diabetes care needs to be changed.

Hypoglycemia

A low blood sugar (less than 60-80 mg percent) can develop suddenly. You must pay attention to your body's signals telling you of this condition. Symptoms include hunger, fatigue, mood swings, paleness, dizziness, sweating, cold, clammy sensation, irritability, tingling, or numbing sensations in your fingers, toes, and/or lips, lack of concentrating ability, staggering, blank stare or gaze, seizures, coma. Either you or someone who knows you should CHECK YOUR BLOOD GLUCOSE as soon as any of the above symptoms are felt. If you are unable to check your blood glucose, TREATMENT SHOULD BE STARTED.

Treatment of Hypoglycemia

Treatment involves eating about 15 grams of carbohydrate (CHO),

- Four ounces fruit juice or,
- Four ounces of regular soft drink or,
- One packet or tube of glucose gel or,
- Small box of raisins or,
- Four oz. regular gelatin or,
- Two - three glucose tablets.

Chocolate and hard candy should be avoided because they tend to be irritating to the stomach and are variable in their sugar production.

CHECK YOUR BLOOD GLUCOSE every fifteen - thirty minutes after a low sugar reaction. If blood sugar is still low, repeat your treatment and seek help until your symptoms are completely gone and your blood sugar returns to greater than 80 mg. percent. This treatment should be followed by a protein source (meat, milk, eggs, cheese, peanut butter) if more than 30 - 45 minutes from mealtime or by the main meal itself.

Glucagon (For an emergency only)

If you are too weak or confused to eat or drink anything by mouth or are found to be having a seizure and require someone nearby to help you, glucagon needs to be given as an injection. One-half mg or one-half of the dose in the kit for children less than 40 pounds, and one mg or the entire

dose for children over 40 pounds. This can be given in any of the areas where insulin is given. Glucagon comes in a one mg ready to mix vial or syringe (one mg Glucagon Kit.) A U-100 insulin syringe may be used to mix and inject the glucagon if necessary. You will need a prescription for glucagon.

It takes about fifteen minutes for the glucagon to raise the blood sugars above 80mg. percent and it may cause vomiting. Place the child or teenager on his/her side in case vomiting occurs. **CONTACT YOUR DOCTOR** if glucagon has been given and report what has happened, or proceed to the nearest medical facility **after** glucagon is given.

Hyperglycemia is high blood glucose

Hyperglycemia is generally a blood glucose level greater than 250mg. percent . Symptoms include increased thirst, increased urination, tiredness, lack of ability to concentrate on your work, headaches, blurred vision, stomach-aches, nausea and vomiting.

Treatment

Treatment of hyperglycemia includes checking your blood glucose and **CHECKING YOUR URINE KETONES** about every three - four hours. Take extra insulin if you have measured your blood glucose and have instructions to do so from a nurse or doctor familiar with your care. If urine ketones are present, stay quiet, drink two - three ounces of sugar-free liquid every hour, and do not get involved in active play or sports. Hyperglycemia is caused by too much food or too little insulin, inconsistent physical exercise, illness, or physical/emotional stress. If urine ketones stay present at moderate to large range for more than 12 hours or if blood sugars stay more than 250 for more than eight hours, call your doctor.

Sick day rules

- Always take your daily NPH insulin, even if not eating your usual daily calories.
- Your R insulin may require adjustments with the help of your doctor or nurse who is familiar with your care.
- Illness and stress cause the body to generate more sugar and need more insulin than usual. A child must have enough food to cover his or her insulin dose and regain his or her health. Also, if necessary, you can eat small meals and extra snacks about every three - four

hours instead of the usual three main meals. CHECK URINE KETONES and if present, check ketones every two hours until resolved. If moderate to large urine ketones persist, contact your nurse or doctor or go to the hospital. Check your blood glucose levels every four hours. If greater than 250mg percent on more than two checks, contact your nurse or doctor.

It may be necessary to take frequent sugar-containing four-ounce servings of fluid with a decreased appetite. Drink at least one - two ounces of fluids every hour while you are ill. Call your nurse or doctor immediately if any of the following signs or feelings appear. (They indicate you are progressing into ketoacidosis or DKA and need immediate attention!)

- Large ketones in the urine on two or more checks.
- Progressive tiredness with dehydration. (Clues include extreme thirst, dry, or cracked lips, dry mouth.)
- Persistent vomiting or noticeable blood in vomited material. Vomiting can be caused by many illnesses, not just DKA, but it is always potentially a serious problem. Therefore, whatever the cause, if vomiting continues or progresses with bleeding, CONTACT your nurse or doctor or go to the hospital immediately!

Over-the-counter drugs and interactions with insulin and diabetic care

Be watchful of drugs given to your child during illnesses as many of them are syrup-based. Ask for drugs in pill form or discuss with your doctor or pharmacist about acceptable sugar-free and alcohol-free drugs.

I.D. Tags

Everyone with diabetes should be encouraged to wear a form of identification at all times. These tags can be lifesavers in emergency situations when prompt treatment is necessary. Bracelets and necklaces are available at most pharmacies. Infants and preschoolers with diabetes may possibly break their I.D. chains and create other hazards, so they should only be used when the child is not tugging at it.

Conclusion

We encourage you to live one day at a time with diabetes, and do the best you can everyday. If things go all wrong one day, begin the next day as a fresh start.

Diabetes Camps

There are several camps every summer for children and teenagers with diabetes. Contact the Mississippi office of the American Diabetes Association for camp information at:

Mississippi Affiliate of the ADA 16 Northtown Drive, Suite 100 Jackson, Mississippi 39211 Telephone: (601)957-7878	Twin Lakes Diabetes Camp 128 Rolling Drive Jackson, Mississippi 39211
---	---

Another organization involved with children with diabetes is:

Juvenile Diabetes Foundation International
120 Wall Street
New York 10005-4001
Telephone: (212)785-9500 or 1-800-JDF-CURE.

Useful References for Individuals with Diabetes

1. *An Instructional Aid on Insulin-Dependent Diabetes Mellitus*
Luther B. Travis, MD, FAAP, ADA Texas Affiliate
8140 N. Mopac, Building 1, Suite 130
Austin, Texas 78759.
2. *Understanding Insulin Dependent Diabetes*
H. Peter Chase, MD.
The Guild of the Children's Diabetes Foundation at Denver
700 Delaware St.
Denver, Colorado 80204
3. *Diabetes Stuff and More Stuff*
Virginia Hess, RN, CDE
Hospital Educators Resource Catalog, Inc.
P.O. Box 30090
Lincoln, Nebraska 68503
4. *Even Little Kids Get Diabetes*
Connie White Pinner
Albert Whitman and Co.
Morton Grove, Illinois, 1991
5. *Raising a Child With Diabetes. A Guide For Parents*
Linda Siminerio and Jean Betschart

American Diabetes Association
1660 Duke St.

Alexandria, Virginia, 22314, 1995

6. *In Control. A Guide For Teens With Diabetes*

Jean Betschart and Susan Thom.

Chronimed Publishers

P.O. Box 59032

Minneapolis, Minnesota, 55459-9686, 1995

7. *The Dinosaur Tamer and Other Stories for children with Diabetes*

Marcia Levine Mazur, Peter Banks, and Andres Keegan

American Diabetes Association

1660 Duke St.

Alexandria, VA 23314

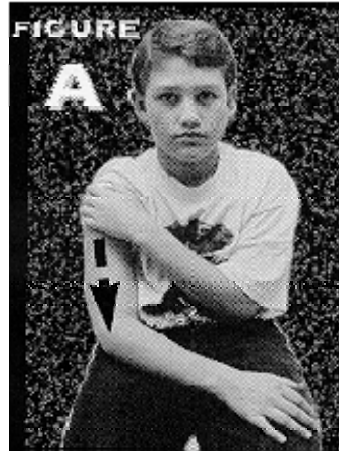
List of Supplies you will need for Diabetes Care

- Insulin
 - Syringes - 100 unit syringes or Lo-dose syringes which can measure 25, 30, or 50 units
 - Alcohol pads
 - Glucose meter
 - Glucose strips for meter
 - Lancet device
 - Lancets
 - Ketone strips
 - Glucagon
-

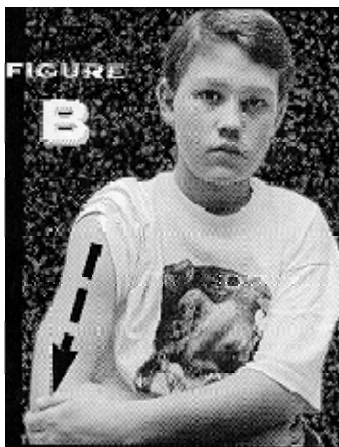
Where to give injections

Where to give injections on your child's arm:

Joey puts his left hand on his right arm by the shoulder, with his fingers closed. (**See figure A.**) The bottom of the hand is the highest point where the injections should be given.



Next, he grabs his arm just above the right elbow. (**See figure B.**) The top of the hand is the lowest point where injections should be given.



In the space between Joey's hands, he draws two imaginary lines down the arm--one down the side and one down the middle of the back of the arm. Joey then gives the injections along these two tracks, measuring from one spot to the next by the width of two of his fingers.

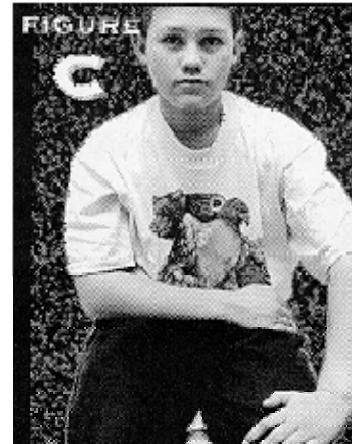
Where to give the injections on your child's abdomen:

Joey draws an imaginary one-inch circle around his navel. He doesn't give injections inside the circle because this area can be tender

Give the injections--like Joey--in the surrounding area of the abdomen and stomach.

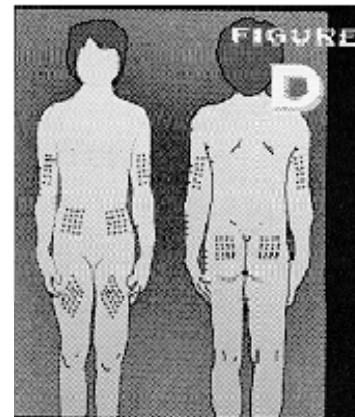
Where to give injections on your child's thigh:

Ask your child to put one hand at the top of his/her thigh (by the hip) and the other hand on the top of the knee on the same leg. The injection may be given in this area. **(See figure C.)** Check with your child's doctor or nurse for instructions on giving injections in the hip. **See figure D** for all possible injections sites.



If your child get puffiness or lumps near the area of an injection:

Don't give any more injections in that spot for three to six months. The lumps should go away.

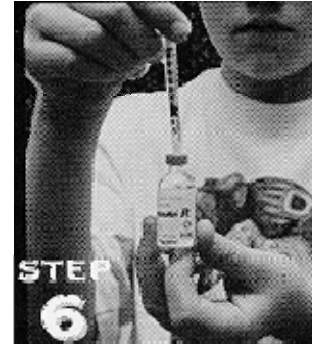


How to Draw Up Two Types of Insulin:

1. First, Joey washes his hands thoroughly.
2. He selects the injection site according to his rotation schedule.
3. Joey cleans the injection site with alcohol.



4. Joey gently rolls the cloudy insulin bottle between his hands to mix the insulin. He wipes the top of the insulin bottle with alcohol.
5. Joey draws back the plunger on the syringe to the correct number of units of NPH (cloudy) insulin to be given.
6. Holding the bottle of cloudy insulin upright, he inserts the needle into the bottle and pushes the plunger in. This injects air into the bottle.
7. Joey draws back the plunger on the syringe to the correct number of units of R (clear) insulin to be given.
8. Holding the bottle of rapid-acting insulin upright, he inserts the needle into the air space in the bottle and pushes the plunger in. This injects air into the bottle.
9. Keeping the needle in the bottle, Joey turns the bottle of clear insulin upside down and slowly presses the plunger until the syringe has more insulin in it than he needs.
10. He gently taps the syringe to move the air bubbles to the top.
11. With the needle still in the bottle, Joey slowly presses the plunger forward to expel the air bubbles and extra insulin.
12. He double-checks that he has the **correct number** of units of clear insulin in the syringe.
13. Joey gently pulls the needle out of the bottle of clear insulin.
14. He inserts the needle into the bottle of cloudy insulin and slowly



withdraws the correct number of units. He takes care that none of the clear insulin already in the syringe is pushed into the bottle of cloudy insulin. If the insulin is accidentally mixed in the bottle, Joey must discard the bottle of cloudy insulin.

15. He checks for air bubbles in the syringe. If there is a large air bubble in the syringe after he has added the cloudy insulin, Joey discards the syringe and starts again. If there is a small air bubble that can be tapped out without noticeably changing the dosage, he will go ahead and give the injection. Small air bubbles will not harm him, but they can alter the amount of insulin injected.

c1997
Department of Pediatrics, Section of Endocrinology/Renal
The University of Mississippi Medical Center
Jackson, MS 39216-4505

The University of Mississippi offers equal opportunity in education and employment, M/F/D/V.