

The Yale Children's Diabetes Center:

What You Need to Know When Newly Diagnosed

Type 1 diabetes "survival skills" for families

Welcome

If you are reading this book for the first time, you or someone you love has just been diagnosed with diabetes. We understand that this can be a very scary time and that there is a lot of information to learn before you go home. It may seem overwhelming and that you will never remember everything you are being taught.

The first thing we want you to do is TAKE A DEEP BREATH AND LET IT OUT SLOWLY.

You are not alone. Our team has worked with thousands of newly diagnosed families and we understand how difficult this time is. Please know that we are here to support you as you adjust to this “new normal”. Believe it or not, you will create a “new normal” for your family. It will not happen overnight but, rest assured, there will be a time within the first year after the diagnosis that you will look back and be amazed at how far you have come.

In the meantime, here are a few of the ways that our team will help your family with this adjustment:

- ❖ *You will have the opportunity to meet with our doctors, nurse practitioners, nutritionists, social workers and nurses while in the hospital*
- ❖ *This book is yours to keep, feel free to write notes or questions in this book*
- ❖ *A member of our team will speak to you every day for the first 1-2 weeks after you go home*
- ❖ *We will see you in our clinic 7-10 days after you leave the hospital and again 4-6 weeks later*
- ❖ *We will see you in clinic every 3 months thereafter*
- ❖ *We have team members available by phone for diabetes emergencies 24/7 and other team members are available via phone, email, and MyChart for non-urgent issues*

Need to Know

- ❖ We know it can be hard to remember all the information you are learning. We have created these “Need to Know” sidebars at the beginning of each chapter to highlight the most important information.
- ❖ In this book we use the term “You” to mean:
 - YOU, the child/teen with diabetes
 - YOU, the brother/sister of the person with diabetes
 - YOU, the parent/guardian of the person with diabetes
 - YOU, the loved one of the person with diabetes
- ❖ We want everyone who knows and loves the child/teen that is newly diagnosed to feel welcome to learn about diabetes. We hope that this book will foster this feeling. Please let us know if you need more than one copy, we are happy to provide extras.

Our Team

Our team is made up of the following healthcare professionals:

- ❖ Attending Physicians – *these world-renowned doctors are experts in the field of diabetes and also regularly participate in groundbreaking diabetes related research trials*
- ❖ Fellows – *Pediatricians who have decided to further their studies and become experts in diabetes and endocrinology.*
- ❖ Nurse Practitioners/Physician Assistants – *these providers are the core of our team, they provide the bulk of the day-to-day management and see most of the patients in our clinic.*
- ❖ Nurses – *our nurses can be found supporting our providers both during and after your clinic visits.*
- ❖ Nutritionists – *our nutritionists provide expertise in using food to help with the management of diabetes.*
- ❖ Social Workers – *our social workers are available to help with any concerns regarding work, school, coping with the diagnosis, sibling challenges or anything else that may come up.*
- ❖ Psychologist – *our psychologist counsels families on more specific issues related to coping with diabetes and assists families with other challenges such as ADHD, mental illness or procedural anxiety.*
- ❖ Exercise Physiologist- *our physiologist works mostly with our Type 2 diabetes team to help these families incorporate regular exercise into their diabetes management plan.*
- ❖ Research Coordinators – *our research coordinators support the MDs/NPs/PAs who run the clinical studies that have kept us on the cutting edge of diabetes management.*
- ❖ Administrative Support Staff – *our administrative staff directly support our providers so that they can give the best care possible. These team members are also responsible for answering and triaging calls from families, patients, and other providers.*

Our Philosophy

We believe that diabetes is a condition, not an illness. Managing blood glucose levels as close to normal as possible will lead to a long and healthy life.

We believe that diabetes should NOT get in the way of you doing anything you want to do.

We believe that successful management of diabetes is possible and our team is here to coach you to success.

We believe that you will quickly become the expert in your diabetes and will learn to manage this condition as independently as possible. We will always be available for consultation.

We believe that we all have the same goal, to keep you as healthy as possible!

A Note From the Chief

I started my training in Pediatric Endocrinology in 1975 in an era that I like to classify as the “bad old days of type 1 diabetes”. During that era, insulin was made from cow and pig pancreases and there was no good way to monitor blood sugar levels as blood glucose meters or hemoglobin A1c tests had not been developed. Things began to change quickly in 1979-1981 when methods were developed to test blood sugar levels at home, track the hemoglobin A1c and give insulin through a pump.

In 1993 the Diabetes Control and Complications Trial (DCCT) conclusively demonstrated that getting A1c levels as close to normal as possible significantly reduces the risk of complications from diabetes. In 2009, data from the Epidemiology of Diabetes and Its Complications (EDIC) showed this to be true even in people who had diabetes for more than 30 years.

Today we have “smart” insulin pumps, rapid-acting insulin, continuous glucose monitors and even the first step toward a fully automated artificial pancreas. All of these advances serve to keep people with diabetes healthier than ever before.

Our team has been at the forefront of most of these advances in diabetes treatment and control, and we will continue to be there and share all of our knowledge with you as we help you navigate this new path in your life.

What is Diabetes?

Diabetes is a condition where the sugar levels in the blood are too high. Sugar, also called *glucose*, is the body's main source of energy. Without a regular supply of glucose, the body cannot function properly. The body makes insulin in order to keep blood sugar levels from going up too high. Insulin is a hormone that is made in the Beta cells of the pancreas that allows glucose to enter into the body's cells. Diabetes happens when either the body cannot make any insulin or it does not make enough insulin.

There are several kinds of diabetes that can happen in a child. The most common types are listed below.

Type 1 Diabetes (T1D) This is an auto-immune disorder. That means that the body's immune system, which usually fights off germs and viruses, attacks your own body and damages or destroys certain cells or organs of the body. In the case of diabetes, the body fights against the Beta cells of the pancreas. The Beta cells are killed and the body no longer makes any insulin. While people with type 1 diabetes are still able to make some insulin when they are first diagnosed, ultimately their ability to make insulin will completely go away.

Right now, we do not know why your child got diabetes. We know that the ability to develop diabetes can be inherited (passed down from parent to child). However, many people have the same genes but they do not develop diabetes. We also know that something "triggers" the diabetes to happen but we are not sure what the trigger could be.

We do know that diabetes is not caused by eating too many sweets or by something that you or your child did or did not do. Right now we do not have a cure for diabetes. However, we do have many new ways to manage diabetes so a child can take part in any "normal" childhood activity.

Type 2 Diabetes (T2D): This is the fastest growing type of diabetes in children. It used to be only found in older people and is associated with being overweight/obese and with not exercising regularly. As we see more and more overweight/obese children, we are seeing more children with type 2 diabetes. Type 2 diabetes usually happens when the extra weight on people keeps their insulin from working the way it should. People with type 2 diabetes need much more insulin than people without diabetes and the pancreas cannot keep up with the extra demand.

Medication related diabetes: Some medications such as steroids or chemotherapy used to treat cancer can make blood sugar levels go very high. When this happens, you need to take insulin to make the sugar levels go back to normal. Many times, once the medication is stopped, the insulin can be stopped too. This can be a temporary kind of diabetes

- ❖ Diabetes happens when the body can no longer use sugar for energy
- ❖ Type 1 Diabetes (T1D) is an auto-immune disorder where the body destroys its own cells that make insulin. – You must take insulin (by injection or through a pump) to stay healthy
- ❖ Type 2 Diabetes (T2D) happens when the body cannot make enough insulin to meet demand – this can be treated with exercise, healthy food choices, pills and insulin

Cystic Fibrosis Related Diabetes: Children with Cystic Fibrosis (CF) can develop diabetes. While the exact cause is not known, it is thought that chronic inflammation of the pancreas from CF prevents the insulin making cells from working. It is very important that children with CF keep their blood sugar levels under good control in order to keep their lungs as healthy as possible.

The Pancreas, Beta Cells and Insulin

The first step in controlling diabetes is to understand how the body normally handles sugar.

As we explained earlier, sugar is the body's main source of energy. Sugar comes from the food we eat and it comes from the body itself – a steady supply of sugar is made in the liver to be used between meals. The body uses a special type of sugar called Glucose. Glucose can be used right away or it can be stored in the liver and muscle cells or changed into fat.

Insulin is made in a specialized part of the pancreas called Beta cells. The pancreas is a gland that is found in the abdomen, near the stomach. Besides making insulin, it makes several substances that help to digest and use the food we eat.

At meal-time, the carbohydrate in the food is digested and turned into glucose and absorbed into the bloodstream. As the sugar levels in the blood increase, the Beta cells in the pancreas make more insulin so that the extra sugar can be stored in the liver, muscle and fat cells. Without this extra insulin, blood sugar levels would go up too high and the body would not be able to store sugar for later use.

Need To Know

- ❖ Glucose is the special type of sugar that the body uses for energy
- ❖ All other types of sugar are changed into glucose by the body
- ❖ Insulin is a hormone that moves glucose from the bloodstream into the body's cells
- ❖ Insulin is made in the Beta cells of the pancreas

Need to Know

- ❖ All people with Type 1 diabetes must use insulin on a daily basis
- ❖ Some people with Type 2 diabetes may treat their diabetes with insulin and/or medications and/or exercise and weight loss
- ❖ Insulin can only be given as an injection
- ❖ People with Type 1 diabetes have to take several different types of insulin
- ❖ It is extremely important that you know what types of insulin you are on and the ONSET, PEAK and DURATION of each of these types of insulin

The Ins and Outs of Giving Insulin

All people with Type 1 diabetes and many people with Type 2 diabetes must take insulin every day in order to stay alive and healthy.

Insulin can only be given as a shot or with an insulin pump. Insulin cannot be given as a pill because the acid in the stomach would destroy the insulin.

There are many types of insulin available today. All of them can be put into one of four main groups: rapid acting insulin, intermediate acting insulin, long acting insulin or pre-mixed insulin.

Rapid Acting Insulin

This insulin works right away to drop the blood sugar

Brand Names: Humalog, Novolog or Apidra

ONSET (starts working): 10-15 minutes

PEAK (strongest effect): 1-2 hours

DURATION (all used up): 3-4 hours

Intermediate Acting Insulin

This insulin works slowly to drop the blood sugar

Brand Names: NPH, Novolin N, or Humulin N

ONSET (starts working): 2-4 hours

PEAK (strongest effect): 5-6 hours

DURATION (all used up): 10-12 hours

Long Acting Insulin

This insulin is a background or “basal” insulin

Brand Names: Lantus or Levemir

ONSET (starts working): 2-4 hours

PEAK (strongest effect): No Peak

DURATION (all used up): 14-24 hours

Drawing Up Insulin

The nurses will show you how to draw up insulin. Please read along while they are showing you the steps

Drawing up a single type of insulin into a syringe

1. Wash your hands with soap and water
2. Get insulin, syringes and alcohol wipes
3. If you are drawing up cloudy insulin, make sure to roll the bottle between your hands to mix up the insulin
4. Pull air into the syringe equal to the amount of insulin you will be taking out of the bottle. Example: if you are going to draw up 10 units of insulin, first put 10 units of air into the syringe
5. Wipe off the top of the insulin bottle with an alcohol wipe and let it dry
6. Take the syringe with the air in it and while the bottle is sitting on a flat surface, inject the air into the top of the bottle
7. Push all the air into the bottle and keep your finger on the plunger of the syringe to keep the air from going back into the syringe
8. Pick up the bottle with the syringe still in it and turn it upside down.
9. Pull out the number of units of insulin you need for your dose
10. Look for air bubbles in the syringe – you don't want any big bubbles in the syringe
11. Give the insulin (please see Injecting Insulin for more information)

Need to Know

- ❖ It is very important that you become comfortable with drawing up insulin
- ❖ Ask your nurse for “practice insulin” so that you can draw it up as many times as you want
- ❖ Air bubbles in the syringe take away from the insulin dose you are giving
- ❖ When in doubt, throw it out! If you think you drew up the insulin the

Drawing Up Insulin

The nurses will show you how to draw up insulin. Please read along while they are showing you the steps

Drawing up 2 types of insulin into the same syringe

1. Wash your hands with soap and water
2. Get insulin, syringes and alcohol wipes
3. If you are drawing up cloudy insulin, make sure to roll the bottle between your hands to mix up the insulin
4. Wipe the tops of both insulin bottles with alcohol and let them dry
5. Add up the two insulin doses so that you get your total insulin dose to be drawn into the syringe
 - a. Example: 7 units NPH (cloudy) + 5 units Humalog (clear) = 12 units total
6. Pull air into the syringe equal to the amount of NPH insulin (cloudy) that you will be taking out of the bottle.
7. Put the syringe into the top of NPH (cloudy) and push the air into the vial. Keep your finger on the plunger of the syringe to keep the air from going back in
8. Take syringe out of the bottle – make sure no insulin is in the syringe yet
9. Pull more air into the syringe equal to the amount of Humalog (clear) insulin you will need
10. Take the syringe and put it into the top of the Humalog bottle. The bottle should be sitting on a flat surface. Push all the air into the bottle and keep your finger on the plunger to keep the air from going back into the syringe
11. Pick up the bottle with the syringe still in it and turn it upside down
12. Pull out the number of units of insulin you will need for your dose
13. Go to the NPH (cloudy) bottle and put the syringe into the bottle without putting any pressure on the plunger
14. Draw up the amount of NPH (cloudy) insulin you need- remember that the number you will be drawing to will be the sum of the clear and cloudy insulin as determined in step # 5

Need to know

Injecting Insulin

- ❖ Insulin may be given in the arms, abdomen, buttocks and thighs.
- ❖ Insulin is given into the subcutaneous (fat) tissue.
- ❖ Remember to “pinch up” some skin and fat.
- ❖ Change sites—use a different site for each injection. This helps keep “fat lumps” (lipohypertrophy) from developing at injection sites.

Example: use the arms or abdomen in the morning, and the legs or buttocks at dinner or bedtime.

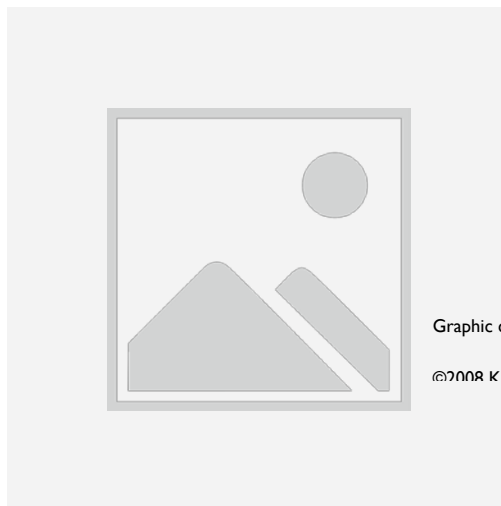
- ❖ Remember to let go of the pinch BEFORE taking the syringe out (otherwise you may squeeze out the insulin).
- ❖ Sometimes people can have an allergic reaction where insulin is injected.
 - you might see redness around the area you gave the insulin
 - child might complain that it itches
 - this is most common 3 to 12 weeks after diagnosis
 - call the Diabetes Team if you have any problems
 - bottom line: these reactions usually do not cause bigger problems and often go away after a short time
- ❖ A full body allergic reaction to insulin (body rash, hives, breathing problems) is extremely rare. If you every have any of these symptoms, please call 9-1-1 (or your local emergency services) and the diabetes team right away

- ❖ Insulin is given into the fat tissue

- ❖ It is very important to regularly change injection sites

- ❖ Intermediate or long-acting insulin must be given at the same time every day, no more than 30 minute difference on a daily basis

- ❖ Rapid acting insulin should be given right before eating



Graphic courtesy of KidsHealth.org. All rights reserved.

©2008 KidsHealth/The Nemours Foundation

Using an Insulin Pen

You may be using an insulin pen to deliver a dose of insulin. Insulin pens are devices designed to make giving insulin a little easier. They look much like a pen and cap (this is where the name comes from) and come pre-filled with 300 units of insulin. A knob at the end of the pen “dials up” the insulin dose. In most cases, each click that you hear is equal to 1 unit of insulin. The pens may be reused until they run out of insulin, at which point the entire pen is thrown out and a new one is started.

Insulin from a pen is given using a pen needle. This is a small needle that is put on the end of the pen using a twisting motion. The needle is changed every time that the pen is used. Some patients will use a needle more than once before changing it.

There are many types of insulin pens. You will be given exact instructions on how to use the insulin pen that is prescribed for you or your child.

A few points to remember about insulin pens:

- ❖ Before every use, it is important to “waste” 2-3 units into the sink or garbage. This is so that you can see that the needle is full of insulin. If this step is not done, the wrong dose of insulin (or no insulin at all) might be given.
- ❖ If you don’t see drops of insulin come out the needle when you are doing a “waste,” repeat the steps until you see insulin come out.
- ❖ Count the clicks and look in the dose window to confirm the right dose.
- ❖ The pen should be held straight up and down, directly over the place where the injection is going to be given.
- ❖ It is important to wait 5-10 seconds after injecting the insulin before pulling out the needle. This allows the entire insulin dose to leave the pen and enter the body.



Need to Know

- ❖ Blood sugar tests tell us how the insulin is working in your body
- ❖ The target range for blood sugar levels is 70-120 mg/dL (unless we have suggested a different range)
- ❖ The blood sugar level must be tested at least 4 times per day if you are taking insulin
- ❖ Extra tests should be done if you don't feel right or you are exercising/being physically active

Testing Your Blood Sugar

A very important part of taking care of your diabetes is testing your blood sugar. Knowing your blood sugar level answers many questions such as: how much insulin should you take? is it okay to exercise?, do I need to check for ketones?, should I change my insulin doses?

Today's blood sugar machines (called meters or glucometers) are very fast and use very small drops of blood. The drops of blood can come from the finger, palms or sometimes the arm. There are many machines available and the nurses will help you get started with one.

If you are taking insulin, you **MUST** test your blood sugar at least four times per day:

- ❖ Before Breakfast
- ❖ Before Lunch
- ❖ Before Dinner
- ❖ Before going to Bed

You might also need to test your blood sugar at extra times too. These might include:

- ❖ If you are not feeling right (to check for low or high sugar levels)
- ❖ Before exercising
- ❖ Before swimming
- ❖ In the middle of the night
- ❖ If you are having a "sick day"
- ❖ Your diabetes team suggests extra testing

How Do I Track My Blood Sugar Levels?

The families who successfully manage diabetes set aside one hour every week where they sit together to go over blood sugar numbers and decide whether there are patterns that indicate that a change in the regimen needs to be made. It is a good idea if both parents and the child/teen with diabetes sit down during this time and go over the numbers. It is important for children with diabetes to learn how to look for patterns in their blood sugar levels because someday children with diabetes become adults with diabetes!

Not too long ago, everyone had to write down their blood sugar numbers because the meters did not have a memory feature. Today's meters can remember hundreds blood sugar numbers and many meters have computer programs that allow you to download all the blood sugar numbers so that you can study them for patterns in your blood sugar levels.

Right now, at the very beginning, we are going to ask you to write down your blood sugar numbers the “old fashioned” way. This is because we will be speaking with you every day for the first 1-2 weeks and it is important that you have your blood sugar levels in one place.

Whichever way you choose to look for patterns in your blood sugar, *it is very important that you do it on a regular basis so that you know whether or not your insulin doses are doing their job*

Please see below for a sample log book page. Additional pages may be found in Appendix A.

Sample Log Book Page

Date	Breakfast BG	Lunch BG	Dinner BG	Bed BG	12AM	3AM	OTHER (note time)	Comments

Key Elements

- ❖ BG numbers are written across the day. This lets you break down a week’s worth of BG levels into columns for each test (this helps to pull out patterns in BG numbers)
- ❖ There is space for extra tests (remember to include the time you tested)
- ❖ There is a place for comments such as “soccer match” or “sick with flu”

What the Numbers Mean

For people without diabetes, “normal” blood glucose (BG) levels mean that their BG is between 70-120 mg/dL. For people with diabetes, we try our best to have as many numbers as possible in the “normal” range but in reality, that is pretty hard to do – in fact, it is impossible for a person with diabetes to have all of their BG values fall into the normal range.

What is possible is to have some of the BG values in the “normal” range and for the rest of them, we try and keep them as close to the range as possible. Research shows that in order to have “good” control of your diabetes, you only need to have 5-6 out of every 10 blood sugar levels in the “normal” zone, the others are going to be either higher or lower – and that is OK!

In general, we use the following guidelines:

- ❖ <70 mg/dL = Low BG (Hypoglycemia, more about this later)
- ❖ 70-120 mg/dL = “normal” range
- ❖ > 150 mg/dL = time to make a change
- ❖ > 300 mg/dL = High BG (Hyperglycemia, more about this later)

Blood Sugar Goals*

Time	EXCELLENT	GOOD	NEED IMPROVEMENT	POOR
Before Breakfast	90-110	70-140	140-180	Over 180
Before Meals And Snacks	70-120	80-140	140-180	Over 200
2 Hours after Meals and Snacks	Less than 160	Less than 180	181- 225	Over 225
Bedtime	100-150	100-180	180-250	Over 250

*Please remember that these are only general goals – yours may be different. Please talk with the diabetes team about your individual goals

Hemoglobin A1c Levels

In order to see how well your diabetes is controlled, we will measure your hemoglobin A1c. This test involves looking at sugar chains that have attached to your red blood cells to see an average of what your blood sugar has been recently. It is usually performed every three months because that is how long red blood cells live in our bodies.

In 1993, the Diabetes Control and Complications Trial was published. This was a large study that looked at the effects of blood sugar control and how it affected the development of complications. This study found that, with hemoglobin A1c as close to normal as possible; there was less risk of developing complications from diabetes.

This is a rough guideline of what average blood sugar each percentile of hemoglobin A1c is equal to:

Hemoglobin A1c	Average Blood Sugar (mg/dL)
6%	120
7%	150
8%	180
9%	210
10%	240
11%	270
12%	300

My A1c at Diagnosis:

_____ %

Our goal will be to normalize your hemoglobin A1c as much as possible while not having too many low blood sugars. **We generally have a target of a hemoglobin A1c less than 7.5%.**

Need to Know

- ❖ ANY BG LESS THAN 70 Mg/dL IS CONSIDERED LOW
- ❖ If you can, test first to confirm low BG, then treat
- ❖ Treat with FAST ACTING glucose: 10-15 grams
- ❖ WHEN IN DOUBT, go ahead and treat as if the BG is low

Low Blood Sugar

A low blood sugar is defined as any blood sugar level less than 70 mg/dL, *whether or not you have symptoms.*

The signs and symptoms can be different in each person, but here are some examples of what you might see or feel when your blood sugar is too low.



novo nordisk®

© Novo Nordisk, Inc. 12637R ChangingDiabetes-us.com 6/2006

Common Causes of a Low Blood Sugar:

- ❖ Too much insulin
- ❖ Too little food
- ❖ Too much, or unplanned exercise

We cannot prevent all low blood sugar levels from happening so instead we teach you how to treat the low blood sugar level and in the future we will teach you how to change your insulin doses if you notice a pattern of low blood sugar levels happening at the same time every day.

Treating Low Blood Sugar

<p>MILD No symptoms/few symptoms 10-15 grams fast-acting sugar (choose one)</p> <ul style="list-style-type: none"> ❖ 4 oz. (1/2cup) Juice ❖ 4 oz. (1/2cup) Soda ❖ 3 glucose tablets ❖ 3-4 Starbursts ❖ 15 Skittles ❖ 1 Tablespoon Honey ❖ 1 Tube- cake gel ❖ ½-1 tube glucose gel 	<p>MODERATE Symptoms are much stronger 15-20 grams fast-acting sugar (choose one)</p> <ul style="list-style-type: none"> ❖ 4-6 oz. Juice ❖ 4-6 oz. Soda ❖ 4-5 glucose tablets ❖ 4-5 Starbursts ❖ 15-20 Skittles ❖ 1.5 Tablespoons Honey ❖ 2 tubes – cake gel ❖ 1 tube glucose gel ❖ 	<p>SEVERE * Passed out or having a seizure</p> <ul style="list-style-type: none"> ❖ Glucagon Injection ❖ Call 9-1-1 or the emergency services in your area
<p>Fast-acting treatment should be followed by a small snack (10-15 grams) if it will be longer than 1 hour until the next meal or snack Suggested Snacks: 2 Graham cracker squares and 4 oz. milk, 4 peanut butter crackers, 1 granola bar, ½ sandwich</p>		<p>Glucagon can sometimes cause nausea and vomiting. Offer juice and crackers once awake in order to prevent this</p>

****A word about Severe Hypoglycemia:***

Severe hypoglycemia is rare and it is even rarer when you are newly diagnosed. It is not associated with a specific blood sugar level. Instead, recent research has shown that severe hypoglycemic events most commonly happen after the blood sugar has been low for hours and no treatment has been given during that time. There are times when the risk of having a severe hypoglycemic event is increased and we will work with you to learn how to identify these times and ways to lower the risk.

Need to Know

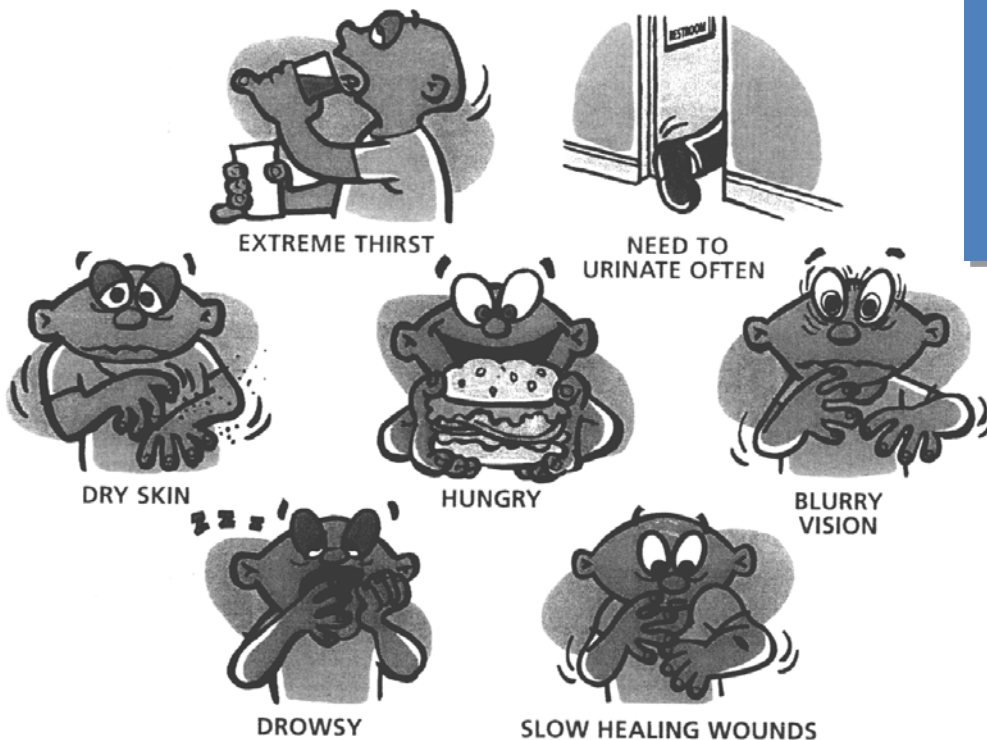
- ❖ Review your BG logs to look for patterns over 140-150 mg/dL
- ❖ DO NOT PANIC with one very high BG level (> 300 mg/dL)
- ❖ One very high level is not an immediate concern as long as you feel ok
- ❖ 2+ very high levels (at least 2 hours apart) means you need to start figuring out why this is happening and what you can do to lower your BG
- ❖ Test for ketones (blood or urine) with 2+ very high levels (at least 2 hours apart)

High Blood Sugar

Any level over 140- 150 mg/dL is a high level. You do not necessarily need to do anything about this level beyond watching to make sure that a pattern does not develop. Down the road, we will teach you how to make changes in your insulin doses to fix a pattern of high blood glucose levels.

Any level more than 300 mg/dL is considered a very high level. At some point everyone with diabetes will have a very high blood sugar level. One very high blood sugar level is not a cause for panic; it will not send you to the hospital. Instead, it should serve as an alarm – to let you know you need to do some additional blood glucose monitoring and, depending on how you treat your diabetes, it may also mean that you need to take some extra insulin.

Some people may not notice symptoms of a very high blood sugar level while others will. These are some common symptoms you might see when your blood sugar level is very high:



Ketones, Ketosis and Diabetic Ketoacidosis

Very high blood sugar numbers mean that the body does not have enough insulin around to use sugar as energy. Even though the level of sugar in the blood stream is very high, the body cells may be sending out a signal that they don't have enough energy. In this case, the body will start burning fat to make energy for the cells. *This is called Ketosis.*

Burning body fat for energy makes "leftovers" called ketones. Ketones are a problem because they can build up over several hours and get to such high levels in the body that they make the blood too acidic for organs to work correctly. *This leads to a life-threatening diabetes emergency called Diabetic Ketoacidosis (DKA).* Full-blown DKA must be treated in the intensive care unit at a hospital. It is very important to remember that DKA can be prevented.

You must start monitoring for ketones during the following conditions:

- ❖ Vomiting (regardless of the blood sugar level)
- ❖ 2 blood sugar levels in a row (at least 2 hours apart) that are > 300 mg/dL
- ❖ "Sick Day" – anytime you are too sick to go to school (regardless of your blood sugar level)

You can test for ketones in 2 ways:

URINE: Placing a stick in urine and then watching for a color change on the stick and matching that to colors on a label

BLOOD: Using a meter and test strip (like testing for your blood sugar level) and comparing reading to a chart indicating the level of ketones (see below)

Ketone Level	Urine Test	Blood Test
Normal (negative)	No color change	< 0.6
Ketones are elevated above normal	Trace	0.6-1.5
	Small	
High Levels of Ketones, very serious (call diabetes team right away)	Moderate	1.5-3.0
Danger Zone (call the diabetes team immediately)	Large	>3.0

Need to Know

Exercise and Diabetes

Physical activity is a great way to lower blood sugar levels. Exercise allows the muscle cells to get sugar from the bloodstream without needing insulin. *People with diabetes who exercise regularly have lower A1c levels and more consistent sugar levels than people who do not exercise.* However, for people with type 1 diabetes, no amount of exercise will eliminate the need for daily insulin injections.

Low blood sugar levels can occur during or after exercise, so it is important to know how to exercise safely by carefully managing glucose levels, insulin, and food when being physically active.

Exercise is especially important for people with diabetes and we encourage it, but it must be incorporated into the treatment plan. Please let us know about any physical activities that you might be doing and we will work with you to develop a plan for handling it.

Below are some suggestions about ways to deal with exercise. Remember, everyone's body is different and not all of these suggestions will work for everyone

- ❖ Exercise will lower blood sugar levels
- ❖ Test before and after exercise
- ❖ Take extra snacks, water and fluids with sugar (such as Gatorade®) with you when you exercise
- ❖ If you have trouble with exercise and diabetes, be sure to let our team know so we can help you work out the problems

Low-Intensity Activity (ex: walking, baseball, golf)

- ❖ Take your usual insulin doses
- ❖ Test BG before and after exercise
- ❖ If BG < 100 mg/dL before exercise: take 15 grams fast acting glucose (juice or tablets)
- ❖ If the activity will last longer than 2 hours, consider having a snack mid-way through of 15 grams carbohydrates

Moderate- Intensity Activity (ex: recreational cycling, recreational swimming)

- ❖ Lower that day's insulin dose by 10% (take off at least ½ unit)
- ❖ Test BG before and after exercise
- ❖ If BG < 130 mg/dL before exercise: take 15 grams fast acting glucose (juice or tablets)
- ❖ If activity is more than 1.5 hours, test BG mid-way through and have a snack of 15 grams of carbohydrates

High- Intensity Activity (ex: competitive swimming, soccer, lacrosse, aerobics, ice hockey)

- ❖ Lower that day's insulin doses by 20% (take off at least 1 unit)
- ❖ Test BG before, mid-way through and after exercise
- ❖ If BG < 150 mg/dL before exercise: take 15 grams fast acting glucose (juice or tablets)
- ❖ During activity if BG is between 100-150 mg/dL, sip on Gatorade® on breaks. If > 150 mg/dL, sip on water
- ❖ Mid-way through have a snack of 15 grams carbohydrates

What Do I Eat Now? A Basic Guide to Nutrition

The only things we ask you to stay away from are regular juice, regular soda and regular maple syrup. These three sources of carbohydrates (sugar) make the blood sugar very high but don't have any other nutrients in them. All other sources of carbohydrates (starches, sweets, fruits, milk products) are okay. The amount of carbohydrates eaten—not the type of carbohydrates—affects the blood sugar levels the most.

Continue to offer a child with diabetes the same healthy meals you would offer the rest of the family. A child with diabetes does not need special foods or a special diet. You do not need to purchase “diabetic” foods or “low-carb” foods. Sweets are allowed occasionally—just as you would allow for a child without diabetes.

In the beginning we will ask you to try to keep the amount of carbohydrates in each meal the same from day to day, so we can figure out how much insulin you need. Later on, we will teach you how to adjust your insulin for the amount of carbohydrates that you want to eat.

General Guidelines for dealing with food and diabetes

Eat a well-balanced diet.

Maintain appropriate weight.

Try to exercise every day.

Eat the same amount of carbohydrates every day.

Eat meals and snacks at the same time every day.

Don't over treat low blood sugars.

Adjust insulin according to the food you eat and how much exercise you are doing.

When exercising, eat snacks to avoid low blood sugars

Need to Know

- ❖ Carbohydrates are the “sugars” in the food we eat
- ❖ Protein and fat do not directly affect blood sugar levels
- ❖ “Sugar free” does not mean carbohydrate free
- ❖ “Sugar” is not a bad word
- ❖ Stay away from regular juice and soda unless you are treating a low BG level

Carbohydrate counting

Carbohydrate is another term for the starches and sugars we eat. Carbohydrates can be found in the following foods:

Bread	Green Peas	Punch
Crackers	Potatoes	Regular Soda
Grains	Winter Squash	Honey
Cereal	Fruit	Syrup
Rice	Yogurt	Molasses
Pasta	Milk	Sugar
Corn	Fruit Juice	Candy
Dried Beans	Lemonade	

Foods with carbohydrates have a direct effect on blood sugar levels because they are rapidly turned into sugar in your stomach and intestines. Quick-acting sugars like fruit juice, honey, and regular soda will raise your blood sugar in 15 to 30 minutes while slower-acting sugars like breads, pastas and beans will take longer, perhaps 30 to 60 minutes.

Fats, proteins and other types of nutrients found in foods do not affect blood sugar levels as much as carbohydrates. Children with diabetes should choose a meal plan that is low in saturated fats and has enough protein to promote normal growth and development.

You can find out the number of carbohydrates in any food in one of two ways. You can either use the Nutrition Facts Label found on the back of most packaged foods or you can use a book that lists foods and their carbohydrate content. (Please see Learning More: Additional Resources, beginning on page 44 for suggested carbohydrate counting books.)

Using a Nutrition Facts Label to count carbohydrates

The information in the nutrition facts label is based on ONE SERVING, but many packages contain more. Look at the serving size and how many servings you are eating. If you double the servings you eat, you double the number of carbohydrates you are eating. When you are comparing carbohydrates and nutrients between brands, see if the serving size is the same.

The goal of carbohydrate counting is to teach you and your child to measure the amount of sugar in the foods that you are eating. It is very important that the total number of carbohydrates per meal or snack stay the same from day to day. A child does not have to eat the same foods every day as long as the number of carbohydrates stays the same.



Skim Milk	
Serving Size 8 fl oz (240mL)	
Servings Per Container 2	
Amount Per Serving	
Calories 80	Calories from Fat 0
% Daily Value*	
Total Fat 0g	0%
Saturated Fat 0g	0%
Cholesterol less than 5mg	1%
Sodium 130mg	5%
Total Carbohydrate 12g	4%
Dietary Fiber 0g	0%
Sugars 11g	
Protein 8g	
Vitamin A 8%	Vitamin C 4%
Calcium 30%	Iron 0%
Vitamin D 25%	

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Suggested Carbohydrate Ranges for Meals and Snacks

Age in Years*	Total Carbs per day	Carbs per Meal	Carbs per Morning Snack	Carbs per Afternoon Snack	Carbs per Evening Snack
3-5 years	160-185 grams	30-40 grams	10-20 grams	10-20 grams	10 grams
5-7 years	185-215 grams	45-55 grams	15-25 grams	15-25 grams	< 15 grams
7-10 years	215-250 grams	45-60 grams	30 grams	30 grams	< 15 grams
10-13 years	250-285 grams	60-75 grams	NONE	30-45 grams	< 20 grams
Male >13 years	325-375 grams	75-90 grams	NONE	30-45 grams	< 20 grams
Female >13 years	275-300 grams	60-75 grams	NONE	30-45 grams	< 20 grams

* Children under age 3 should work with a nutritionist on an individual basis

During your stay in the hospital you will meet with a dietician to review your current eating habits and to create an individualized carbohydrate counting meal plan.

It is normal for you to be hungry right now, and during the next few weeks. Please let us know if you feel you are not getting enough food to eat as we can change your carbohydrate goals so that you are not so hungry. We might need to also increase the insulin doses as well but this is not a problem. Our goal is to match the insulin to what you want to eat instead of making you eat what matches the insulin.

Please also remember that as you grow you will need more food. That means more carbohydrates too. Every child is different but in general we expect teenagers to need a lot more food than children in elementary school. The table below lists suggested ranges for carbohydrates based on age. This is just a guideline. You will work with the diabetes team to make an individualized plan that works best for you.

Free Foods

There are times when the usual meal plan is not enough and you will be looking for something more to eat. During those times it is better to reach for foods that don't impact blood sugar levels. Here is a list of foods that may be eaten outside of usual meal or snack times and can help hunger without raising the blood sugar level.

PROTEIN	RAW VEGETABLES	FATS	SUGAR-FREE CHOICES	OTHER
Beef Chicken Turkey Pork/Ham Eggs Cheese Cheese Sticks Peanut Butter Nut Butters Light Tuna 1/2cup Nuts	Any type of vegetable is fine Carrots Celery Cucumbers Peppers Broccoli Green Beans Lettuce	2-3 TBSP Salad Dressing 2-3 TBSP Dip (ranch or other types)	Popsicles Hot Cocoa Jell-O® Crystal Light®	Dill Pickles Olives Broth/Consommé

Sick Day Management

Managing diabetes can be more difficult when a person is sick. Blood sugar levels can run high or low and the body is under a lot of stress and needs more energy to fight off the germs. When we talk about “sick days” we refer to an illness that is serious enough so that you must stay home from school. A mild cold, cough or headache does not qualify as a sick day. If your body cannot get energy from food or sugar, it will quickly start burning body fat. As we discussed before, burning body fat for energy leads to the development of ketones. Ketones can build up in the bloodstream and lead to Diabetic Ketoacidosis (DKA). This is a life threatening diabetes emergency.

Even when you are too sick to eat, you still need insulin, having enough insulin in your body can help prevent the switch from using sugar to using body fat for energy.

Sick Day Guidelines:

- ❖ Check the blood sugar every 2-3 hours around the clock
- ❖ Check ketones every few hours (even if the blood sugar is not high and/or the ketones were negative previously)
- ❖ If no vomiting, encourage sips of clear fluids
 - BG < 180 mg/dL: use fluids with sugar – Apple juice, Gatorade®, Ginger Ale, Regular popsicles
 - BG > 180 mg/dL: use fluids without sugar – Water, Crystal Lite®, Propel®, Diet Ginger ale, sugar-free popsicles
- ❖ If Vomiting is present
 - Wait at least 1 hour then start fluids very slowly (1 TBSP every 15 minutes for the first hour)
 - BG < 180 mg/dL: use fluids with sugar – Apple juice, Gatorade®, Ginger Ale, Regular popsicles
 - BG > 180 mg/dL: use fluids without sugar – Water, Crystal Lite®, Propel®, Diet Ginger ale, sugar-free popsicles
- ❖ DO NOT STOP INSULIN. You must always have insulin but the amount may change. Call the diabetes team if you need help figuring out how much to take
- ❖ If the BG is running very low and your are vomiting or can't drink anything:
 - Dip your finger into a bowl of table sugar mixed with cinnamon and suck the sugar off the finger
 - Use Glucagon (emergency kit) – draw it up with an insulin syringe
 - Age < 2 years old: give 2 “units”
 - Age 2-14 yrs.: give 1 “unit” per year of age
 - 15+ years: give 15 units
 - Once you use the Glucagon, please call the diabetes team right away so we can decide whether or not you need to be seen in the Emergency Room

- ❖ Vomiting is considered a diabetes emergency
- ❖ NEVER STOP YOUR INSULIN – call if you think the dose is not right
- ❖ During sick days check your BG and ketone levels every few hours

Diabetes and School

You spend many hours in school so it is very important that the school know that you have been diagnosed with diabetes. Your teachers, the principal and school nurse should be told right away. If you ride a bus to school, your bus driver needs to know as well. Sharing this information will help keep you safe and healthy in school and allow you to focus on learning.

Suggestions for School Success:

- ❖ Call the school while you are still in the hospital, ask to set up a meeting time with the school nurse and/or the principal
- ❖ Make sure you get a copy of “school orders” (called the Diabetes Medical Management Plan) from our team
 - These orders will instruct the school on how to manage your diabetes while you are there
- ❖ Put together a school “diabetes kit” – items you will need to have handy while at school
 - Extra glucose meter (if you don’t have one, just ask us!)
 - Blood glucose test strips and lancet device
 - Juice boxes
 - Glucose tablets
 - Glucose Gel
 - Glucagon kit (if your school has a nurse)
 - Granola bars or other small snacks
 - Ketone strips
 - Bottled water (if you will not drink school water)
- ❖ Keep something handy at all times in order to treat a low – younger children usually have juice boxes in the teacher’s desk. Older children will carry something in their pocket or their backpack
- ❖ Treatment for a low should go outside as well for recess or gym
- ❖ Make sure to set up a diabetes management plan before you start standardized tests – you should be allowed to test your BG and take steps to manage your diabetes whenever you need to and you should not be penalized for this
- ❖ Consider a 504 plan- a legal agreement between you and the school that details how your diabetes will be managed at school

- ❖ Call the school while you are still in the hospital, to let them know about your new diagnosis
- ❖ Make sure you have a copy of the Diabetes Medical Management Plan with you when you meet the school nurse
- ❖ Make sure your school has enough of your supplies throughout the year
- ❖ Put together a “diabetes school kit” – in a plastic box/bin
- ❖ Please call our social worker if you have any difficulties getting what you need while at school

Leaving the Hospital

Once you leave the hospital you are NOT completely on your own. We will continue to speak with you on a daily basis, generally through the first 2 weeks after diagnosis. We ask that you call every day for adjustment of the insulin doses.

Please know that you can also use these calls to ask us any questions that you might have. There is NO SUCH THING AS A DUMB QUESTION! We understand that once you leave the hospital, many questions can come up, so please ask us.

How to Reach the Diabetes Team

Dose adjustment calls

- ❖ Monday-Friday
 - Call 203-785-5831 and use press option #1.
 - Let the answering service know you are calling for dose adjustments
 - Please call between 12N – 2P (unless other arrangements have been made)
 - Please have handy all of your BG numbers and insulin doses
 - Please be sure to turn off your caller ID block
- ❖ Saturday, Sunday and Holidays
 - Call 203-785-5831 and press option # 1
 - You will be connected to the answering service – please ask them to page the on-call clinician
 - Please call between 12N-2P (unless other arrangements have been made)
 - Please have handy all of your BG numbers and insulin doses
 - Please be sure to turn off your caller ID block

Emergency calls

- ❖ A clinician is on call 24/7 to be available for true diabetes emergencies
- ❖ Use this service for the following:
 - Vomiting or extreme nausea
 - Moderate to large Ketones
 - Severe hypoglycemia (treat it first, then call our team)
 - 2+ BG levels in a row over 300 mg/dL, at least 2 hours apart
- ❖ In the beginning, if you are not sure if something is an emergency, please call us so we can help you decide – no matter the time, day or night
- ❖ Call 203-785-5831 and press option # 1
- ❖ You will be connected with the answering service – please ask them to page the on-call clinician
- ❖ Please be sure to turn off your caller ID block

How to Reach the Diabetes Team

Nurse calls

- ❖ Our clinical nurse coordinator is available between visits to answer urgent questions that cannot wait until your next trip to clinic
- ❖ This is a voicemail system and you can expect a call back the very same day
- ❖ Call 203-785-5192 to directly reach the voicemail box for our nurse coordinator
- ❖ You may also call 203-785-5831, press option # 4 to reach our front desk and ask to be transferred to the voicemail line

Prescription Line

- ❖ Please make every effort to ask for prescriptions while you are in your clinic visit
- ❖ If you find you are running out of supplies or need to change your prescription, please use our prescription voicemail box.
- ❖ Please note we will need up to 48 business hours to complete a prescription request
- ❖ Call 203-785-5831 and press option # 3 to reach the voicemail box

All other calls (appointment changes, forms, letters etc...)

- ❖ Again we kindly request that you ask for these during your clinic visits but if something comes up before the next visit, our administrative personnel are available to assist you
- ❖ Call 203-785-5831 and press option #3 to reach our main office

Coming to Clinic

Your first appointment in our clinic is on: _____

During this first appointment with our clinic, you will meet with one of our nurse practitioners. This first visit is long – sometimes up to 1.5 hours in length. At this and every visit after, we will measure and weigh you, check your blood pressure and run a hemoglobin A1c test. We will ask for a drop of blood (the same as when you test your BG) in order to run this test.

Please bring your log book, your meter and any questions you might have. You may also have the opportunity to meet with our social worker, psychologist and/or our nutritionist.

The next appointment will be scheduled for 4-6 weeks after your first one. After that, we will see you in clinic every 3 months. Our visits are not “traditional” visits to the doctor. We will only perform a brief physical exam, the bulk of our time together will be spent managing issues related to diabetes. If you have a specific question or concern that you would like to discuss, please let your clinician know at the beginning of the visit.

In our clinic you have the opportunity to schedule your follow-up appointments either by clinician or by date and time. If you need to come on the same day, at the same time, this can be accommodated. If you prefer to see the same clinician each visit, please let the receptionist know your preference and we will do everything we can to honor that request.

Our Location

1 Long Wharf Drive, 2nd floor – Pediatric Specialty Center, New Haven CT 06511

Please note there is a free parking lot on site. There are spaces in the front lot that are specifically reserved for the Pediatric Specialty Center.

Important Phone Numbers

Main Clinic Number: 203-785-5831

Main Clinic Fax Number: 203-764-6748

