A GUIDE FOR PARENTS, GUARDIANS AND CAREGIVERS

Is the Insulin Pump Right for Me?

This Guide Tells You about the Pump and Helps You Decide If the Pump is Right for You.

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Dear Reader

We are a group of adults, children and parents orcaregivers of children with Type 1 Diabetes. We gave advice on putting this guide together. We also gave advice on other guides you may want to read:

- How Do I Use an Insulin Pump?
- Is the Insulin Pen Right for Me?
- How Can I Manage My Child's Type 1 Diabetes Better?
- Is the Continuous Glucose Monitor Right for Me?
- How Can a Continuous Glucose Monitor Help Me Manage My Diabetes Better?
- How Can a Continuous Glucose Monitor Help and Carb Counting Help Me Manage My Diabetes Better?

Some of us use an insulin pump and some of us do not. Some of us had thought about using the pump. Some had not thought about it until we helped with this guide.

We want to try and help people understand what we have learned from our teachers and from each other. That is why we want to share it with you.

Insulin pumps have been around for many years. But now more people with diabetes can have one. It is a very useful way to give insulin. Many people like the pump and some prefer to give shots.

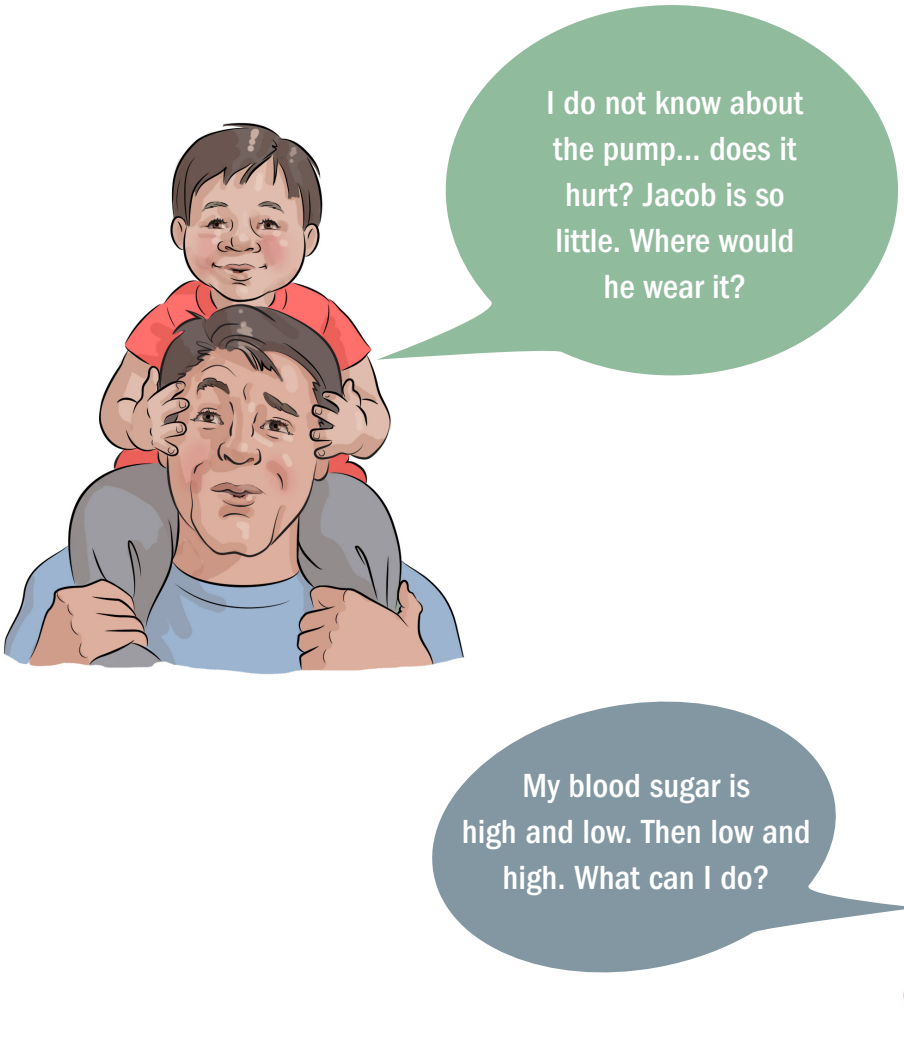
We want to help you figure out if you would like to use the pump for your child. And if you do, we offer ideas on how to use it.

We also hope that in the future there will be even more ways to help us manage diabetes and one day cure it. In the meantime, we invite you to be curious and explore the insulin pump.

Let's get started!

HERE IS WHAT ELENORA HAS TO SAY ABOUT THE INSULIN PUMP:

"Sophia was only two years old and her blood sugars would be high and low all through the day and would often drop at night. I had to check her blood sugar over ten times a day. Her doctor said it was time to try something new. So we looked at using a pump. I was afraid at first. I met with the diabetes educator to learn how to use the pump. It was a bit hard at first but help was always a phone call away. I called the diabetes educator about 4 times the first week. Sophia's blood sugars were much better and she did not miss shots. I would say after three months, I felt very comfortable dealing with the pump and any issue it could have".



Introduction

I'm curious to learn more about the pump.

We are glad you are curious to learn more about the insulin pump. It could be right for your child to manage their diabetes.

We want to help you learn about this awesome technology. Using the insulin pump to manage your child's diabetes can help improve blood sugar control. It can give you and your child more freedom.

Do you have more guides I could read?

Yes. You may want to read our other guides:

- How Do I Use an Insulin Pump?
- s the Insulin Pen Right for Me?
- How Can I Manage My Type 1 Diabetes Better?
- Is the Continuous Glucose Monitor Right for Me?
- How Can a Continuous Glucose Monitor Help Me Manage My Diabetes Better?
- How Can a Continuous Glucose Monitor Help and Carb Counting Help Me Manage My Diabetes Better?

I am the one that needs to make choices about how I treat my child's Type 1 Diabetes.

That is right. This is about your child's health, your child's life, and your choice to become the most active member on your child's diabetes team.

In this guide, we talk about your child's "team." That is because it often takes many people to help you take care of your child's diabetes.

The first part of your child's team is always you and your child. Family members and friends you include in helping you with your child's diabetes are part of your child's team. Then you have your child's doctor. Your child may also see a diabetes educator, a nurse, nurse practitioner or physician assistant. Your child may see a dietitian and maybe a social worker or a psychologist. The pharmacist and eye doctor are part of your child's team, and anyone else you want to include. These people are part of your child's diabetes care team. Each can help you take better care of your child's diabetes.

Thank you for inviting us to join your team!

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SECTION 1 — Insulin Pump Basics?

What is an insulin pump? Tell me more about it.

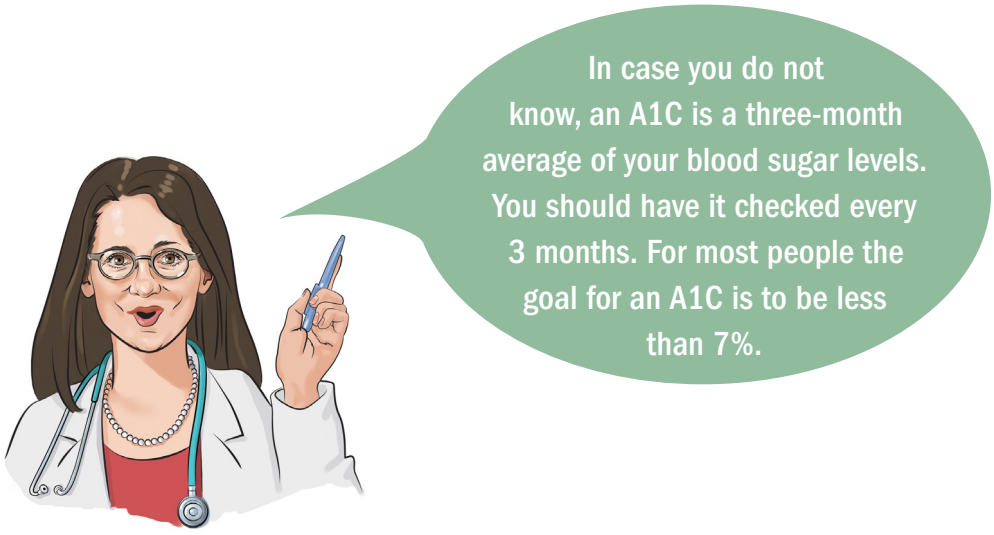
When a person has diabetes, it is best to take insulin as close to the way the body makes it. When someone does not have diabetes, an organ in the body called the pancreas makes insulin for the body. When someone has Type 1 Diabetes, that person puts insulin into the body with shots or a pump.

An insulin pump is a device to send out insulin into the body. The person with diabetes wears a small machine on the outside of their body.

If your child has an insulin pump, you do not have to give them insulin shots every day. A computer in the pump controls the flow of insulin into the body.

How can an insulin pump help me manage my child's type 1 diabetes better?

The pump can help your child reach their blood sugar and A1C targets.



There are five other reasons that the insulin pump can help you manage your child's diabetes better:

1. It only uses rapid acting insulin.

2. It sends out rapid acting insulin close to the way the pancreas does.

3. It sends out both basal and bolus insulin in very precise amounts.

4. It helps you figure out what doses to give automatically.

5. It is quicker and easier to give insulin when it is needed.

What do I need to be able to use the pump for my child?

A machine like the pump takes more steps to use safely than giving shots. To use a pump, you and your child have to be committed to pump therapy. Pump therapy means: Using a pump to deliver insulin. You must also be committed to be an active team member of their diabetes care team.

Being an active team member means:

- Learning to work the pump
- Going to all doctors' visits
- Checking blood sugars
- Treating low blood sugars right away

As a parent or caregiver, you have to be fully involved until the child is able to handle all of the tasks. As a parents or caregiver, you are the pump operator.

As children get older, they can start getting more involved. Some children as young as 4 have learned to fill the pump with insulin and work the pump buttons. You can talk with your child diabetes team to see what your child can start learning to do. Until they are teens, they may not be able to solve pump problems. Also, it can still be too hard to make bolus dose changes or other care that involves math.

If you switch your child to the pump, you will not be doing this alone. There will be a lot of help and training along the way to make sure you use the pump safely.

To use the pump, the **young child** needs to be willing and able to:

- Wear the pump
- Handle the needle-insertion process
- Leave pump buttons alone until they really know what will happen if touched

A **child's main caregiver**, needs to be willing and able to:

- Operate an insulin pump
- Know how to give basal insulin
- Know how to give bolus insulin
- Count carbs or use some other insulin-to-food ratio
- Correct for high or low blood sugar levels
- Make insulin doses for changes for exercise, sick days, travel, or other special times

- Problem solve high blood sugars to make sure the pump is working the way it should
- Measure ketones and know what to do if they are present
- Have the time to care for the child's diabetes every day
- Partner with school staff and other caregivers who are willing and able to work with a pump

To use the pump, **older children and teens** need to be able and willing to:

- Know how important it is to follow the steps to safely care for their diabetes day in and day out.
- See their diabetes team on a regular basis and work with them to understand:
  - How a pump works
  - How they can use it to help them with their diabetes
- Test their blood sugar levels at 6 to 8 times a day.
- Count the carbohydrates or carbs that they are eating so they can put that number into the pump. This is how the pump knows how much insulin to give them for the meals.
- Have enough vision and hearing to see and hear their pump alerts.
- Work with school personnel and other caregivers who are willing and able to work with a pump
- Have their diabetes health care team approve that they are ready and able to use the pump. This means that they are already taking care of their diabetes in a safe and careful way by:
  - Testing blood sugars
  - Treating low blood sugars in the right way
  - Coming to visits

Are all insulin pumps the same?

No. Companies make different pumps. These pumps are similar. But each pump has its own unique features. Some pumps have calorie and carb counting screens. Some pumps use tubing and others do not.

What do insulin pumps look like?

Here are some photos of pumps:

What things do pumps have in common?

All pumps have:

- A small tube that gives your child insulin under the skin
- A chamber you fill with insulin every 3 days
- A motor that pushes insulin into your body
- Software that controls the motor
- Screens that:
  - Show you the time of day, the date, how much life the battery has left and how much insulin your child has gotten
  - Let you enter data like your child's blood sugar and how many carbs they plan to eat
- Buttons to move through the different screens and features
- Alarms to let you know if it is not working like it should
- Safety features that prevent you from giving too much or too little insulin
- A battery or a plug for charging the pump

What does the software in the pump do?

The software in the pump does many things. Each pump is a little different.

In general, the software will:

- Tell you the date and time
- Store lots of information in your child's pump like weeks of blood sugar readings, basal rates and bolus doses
- Let the pump send out and correct the amount of basal insulin

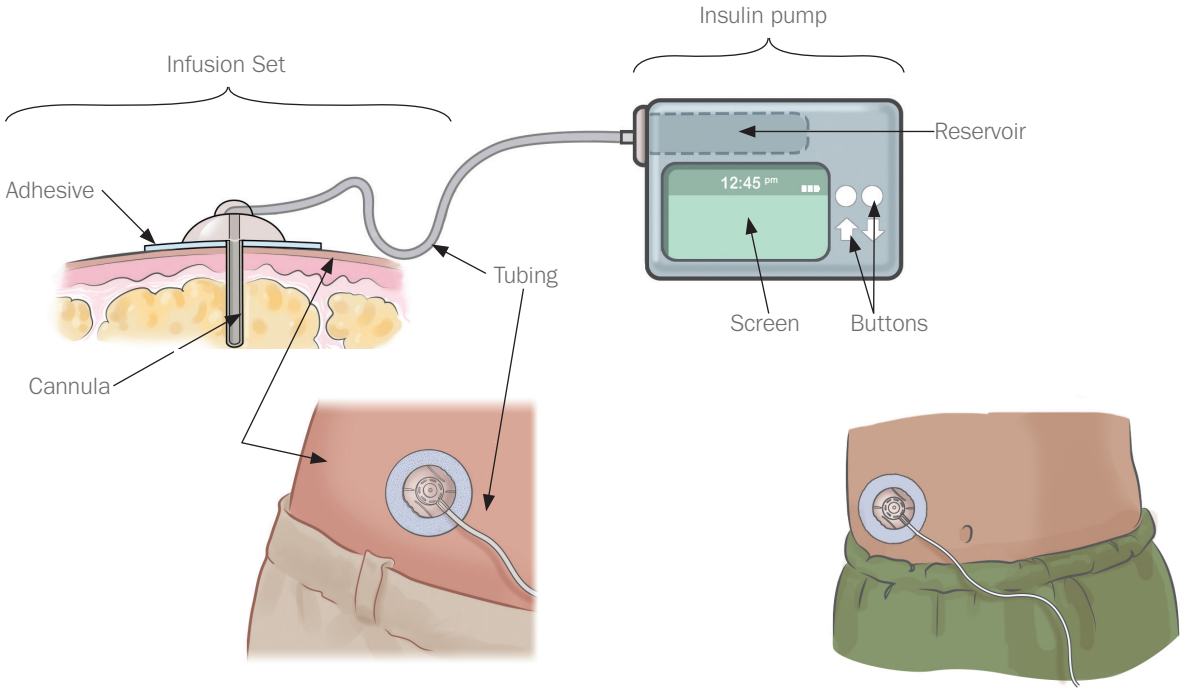
- Figure out the correct amount of insulin your child needs based on a sugar reading and a carb count that you enter

Some pumps have a large database of foods with carb counts. Each person has their own "pump settings" so that the pump gives the right amount of insulin for them.

What Are the Types of Pumps?

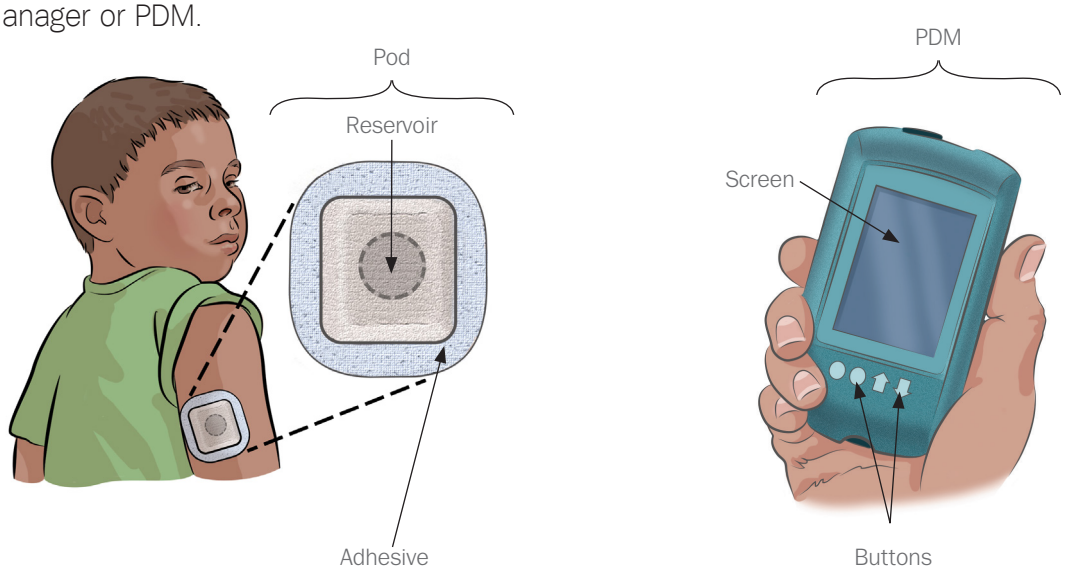
PUMP WITH TUBING

Some pumps have tubing. These pumps look like a small box that has tubing. The tubing attaches to a little "button" that you put on your child every 3 days. These are "tethered" pumps. You can take them on and off.



PUMP WITHOUT TUBING

One type of pump does not have tubing. This means that the whole pump itself is stuck on the body. This pump stays on your child's body at all times. There is also a hand-held device that sends information to the pump. It is a Personal Diabetes Manager or PDM.



What kind of insulin does the pump use?

The pump uses the same rapid acting insulin for the basal as well as bolus rates.

What is the difference between insulin with shots and with the pump?

With **shots**, you give two types of insulin:

- Long acting insulin that stays in your child's body all day and all night. It cannot be changed once you have given your child the shot
- Rapid acting insulin before meals and snacks and to correct high sugar levels

With **the pump**, you give one type of insulin: rapid acting insulin.

- Your child gets a constant little dose of rapid acting insulin that you can adjust whenever you need to.
- That means that you have much more control over the insulin in your child's body because you can adjust it based on what your child's body needs.
- The insulin is only short acting.

  So, if your child needs less, you can give less. Or you can give more. Your child might need less if they are exercising. Your child might need more after eating a heavy meal of pasta or rice.

Where would my child wear the pump?

The pump is attached to your child's body all the time, even when they are sleeping. A lot of people ask, **"How can a person wear it all the time?"**

People who wear pumps find all sorts of clever ways to wear it. They make it work for their lives. Some people are shy and keep it hidden. Others choose to show it. Your child can choose how they want to wear it.

FOR PUMPS THAT DO NOT HAVE TUBING:

They are attached to your child's body, in the place where you put them. So, they stay on all the time:

- When they exercise or play
- When they take a shower
- When they go swimming
- When they wear a fancy outfit
- When they are sleeping

FOR PUMPS THAT DO HAVE TUBING:

In most cases, it takes only a day or two to find the ways that work best for your child. Here are just a few ideas of how to wear the pump with tubing:

- Use the clip that comes with the pump and clip it to a waistband or belt.
- Put the pump with or without the clip into the pocket of your child's pants.
- Keep it in your child's shirt pocket.
- Put the pump in your child's sock.
- For preteens and teens that wear a bra, slip it into the bra.
- Get special clothes for your child to wear made to hold a pump like a pump belt, and shorts and underwear with built in pockets.with built in pockets.

Pumps with tubing can be next to your child when they sleep.

When they sleep, you or they can:

- Clip it to the waist of their pajama pants.
- Clip it onto their pajama top or a pocket.
- Put it next to them in the bed, under their pillow, or on the bedside table.

What would my child do with the pump with tubing when they exercise, play sports or take a shower?

Your child can take off a pump with tubing from the body for up to two hours. The little piece that connects the pump to your child's body stays on. But you or your child can take off the tubing and the pump itself and then set them down in a safe place.

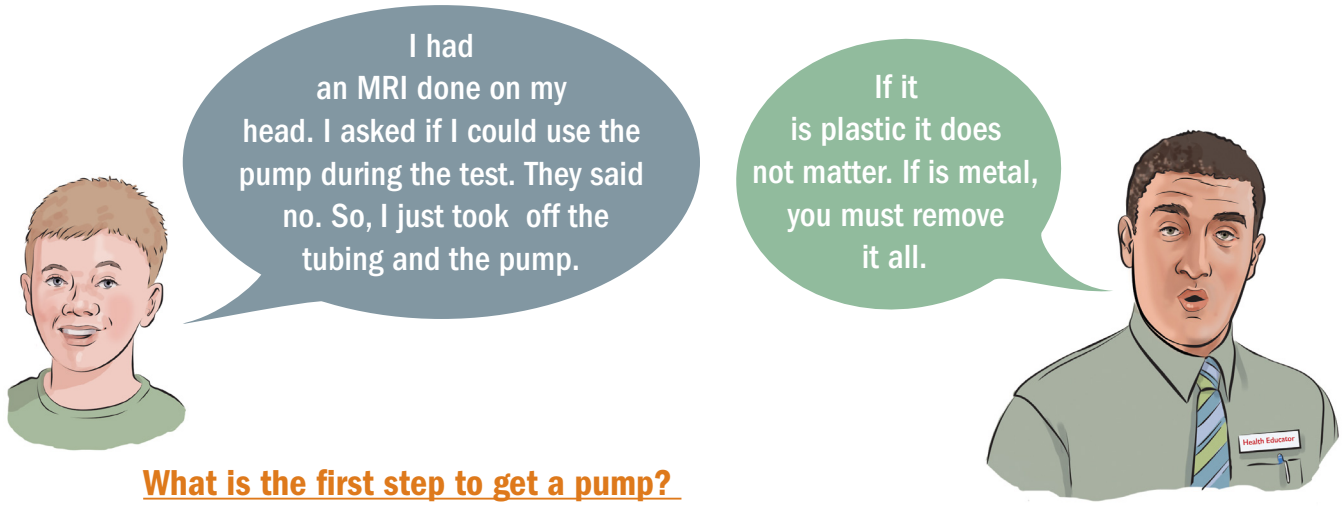
How would I handle the pump with tubing if we wanted to spend a lot of the summer in the pool or at the beach?

A little secret about a pump is that your child does not have to wear it all the time. So, if they want to spend the summer in the swimming pool or at the beach, you can switch back to shots for a while.

If you give your child insulin every day, you can choose how you want to give it.

If my child needed a medical test like an X-ray, a CT Scan or an MRI, would we have to remove the pump?

Sometimes yes and sometimes no. Ask your child's doctor or the person doing the test if they can leave the pump on or not.



What is the first step to get a pump?

Talk with your child's diabetes team. Your child's team will work with you to see if the pump is right for your child. The team must prescribe the pump.

Someone from your child's diabetes team must write a letter to say why your child should have a pump. This happens most often when the diabetes team first orders the pump for your child.

Then what?

If your child gets an insulin pump, you will learn how to program it. Then you will tell it how much insulin to give your child. You program it to give out both basal and bolus insulin.

Every year your child's diabetes team will need to fill out the paperwork all over again so that your child can keep getting their supplies. This is one reason why you must see your child's diabetes team on a regular basis—so they have the information they need to keep your child healthy.

Will health insurance cover the cost of the insulin pump?

Not all insurance plans cover the cost of the pump. Some do and some do not.

Ask someone from your child's diabetes team if your child's health plan will pay for their pump. They might know because they have prescribed pumps before.

If your child's health plan will pay for a pump, you can call the plan to find out which pumps your child could get. If the pump you are hoping for is not covered, it is ok to ask for what you want. Sometimes a "no" for a certain kind of pump can turn into a "yes" if you have good reasons for a specific type of pump.

Another way to find out is to contact the pump company. The pump company wants to sell you a pump. So, if you give them your child's name and health plan information they will find out if the insurance your child has will cover the pump.

Many health plans, or insurance companies, pay most of the cost of a pump. But not all the cost. If your child's plan does cover the pump, they will also find out how much money you would have to pay.

What if the amount I have to pay from my pocket for the pump is too much?

You do not have to buy the pump if you feel you cannot afford it.

Sometimes health plans have something called a "deductible." That means each year you must cover some part of the costs of your child's medical care. This often means that it is better to buy big items like a pump later in the year, when you have already paid all that you must for the year.

Are there other costs that I need to know about the pump?

You will also need to get:

- The supplies for the pump
- The insulin to put in it

When your child's health plan pays for the pump, they also must pay for the supplies.

Most often, your child's doctor will need to fill out forms and send them to your child's insurance company. This is an insurance company rule to get the pump and the supplies. You will need to see your child's diabetes team regularly. During the visit, they will complete the forms, so you can continue to get your child's supplies.

How long does a pump last?

The pump will last for about 4 years. About every 4 years, you will be able to get a new pump. But in most cases, not more often than that.

So, when you choose the pump you are starting a 4-year relationship.

What would a pump cost if I had to pay for it myself?

If your child does not have health insurance, pumps with tubing can cost between $4,500 and $7,000. Monthly supplies cost about $150 to $250. The cost of supplies depends on the pump.

Tubeless pumps can cost about $800 for the Personal Diabetes Manager, or PDM. Monthly supplies cost about $400 to $500.

What if I bought the pump on my own and then have trouble paying for the supplies?

Your child can go on and off the pump. So, if there is a time when you cannot pay for all the pump supplies, your child can go back to taking shots. Then your child can return to the pump when you can pay for supplies.

Is there any way to get a discount if I pay for the pump myself?

Some pump companies may offer a pump discount if you are paying for it yourself. You can talk to your child's diabetes team or ask the pump company if they offer any discounts.

What if my child and I try the pump and we do not like it?

Many people feel that their quality of life is better by using the insulin pump. They feel like they are more in control. But if you and your child try it and do not like it you can always go back to shots. Most pump companies let you return the pump within the first 30 days after you receive it.

SECTION 2 — How Do You Use the Pump to Manage Diabetes?

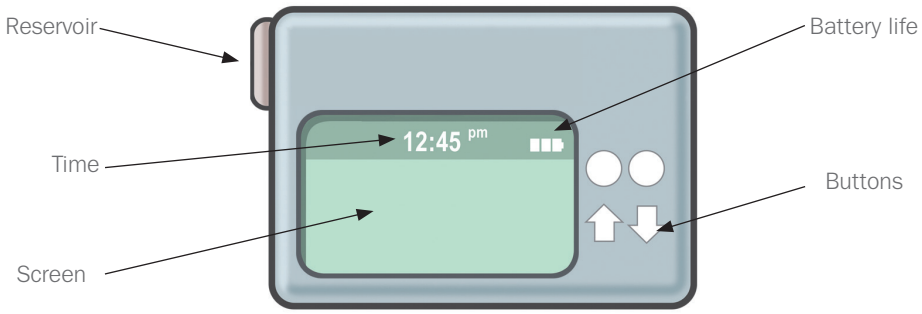
Remind me what types of insulin pumps there are?

There are two main types of pumps. One is a **tethered pump.** This means a pump with tubing. The other is a **tubeless pump.**

Can you tell me more about pumps with tubing?

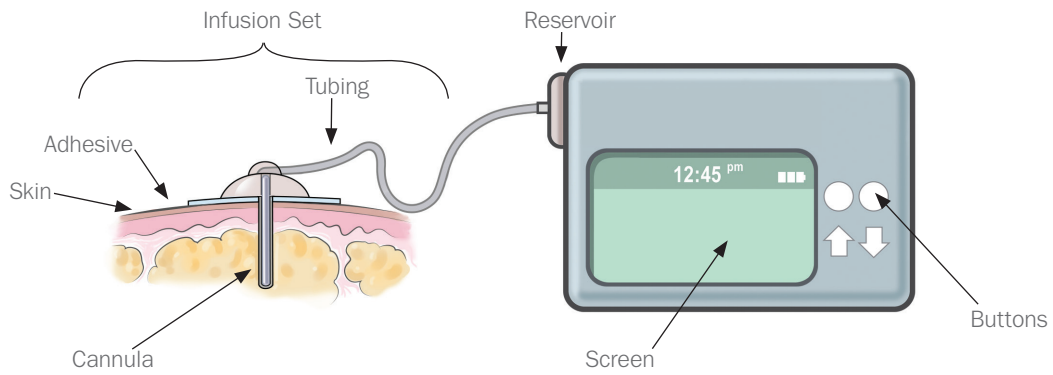
Pumps with tubing are about the size of a deck of cards. They come in many types and colors.

INSULIN PUMP WITH TUBING:



There is a **screen** on the pump. **Buttons** are on the pump to program the amount of insulin that goes into the body.

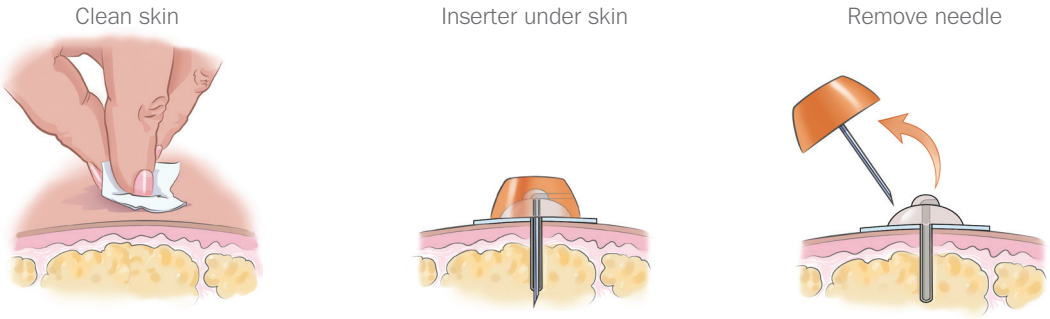
There is a **computer** inside the pump. It controls a **motor**. The motor gives out the insulin in a tiny amount from the **reservoir**.



These pumps connect to the body with **tubing**. This tubing runs to a small button like patch that you put on the body. This is the **infusion set.**

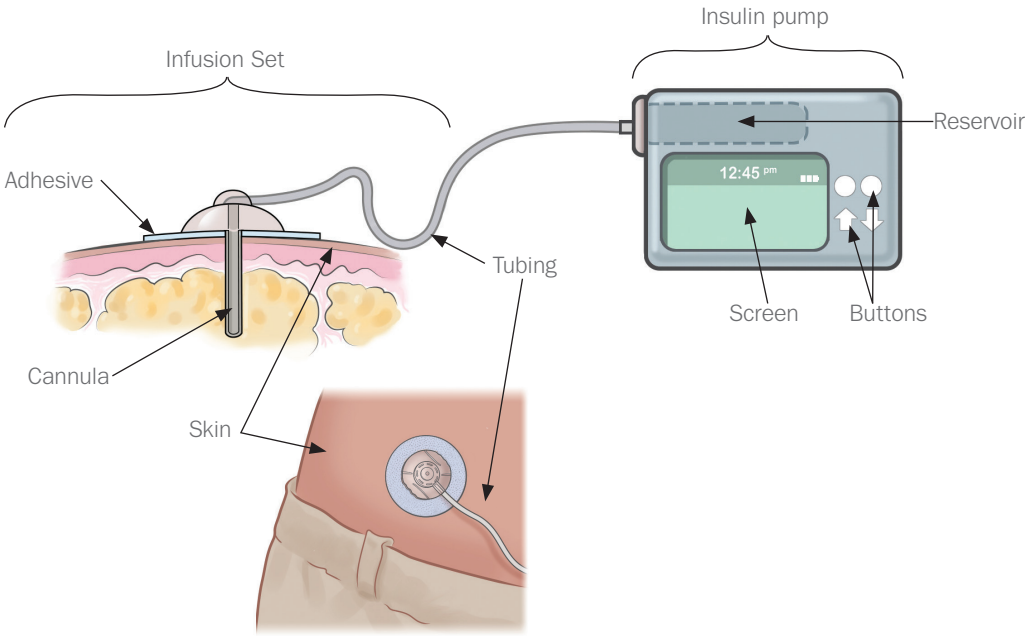
The infusion set is made of a small soft plastic tube or a very small steel needle that goes under the skin. This is what lets the insulin into the body. This tube or needle is a **cannula.**

You put the cannula into the body using a device. This device has a needle to help get the cannula under the skin. Then you remove the needle leaving the cannula in place.

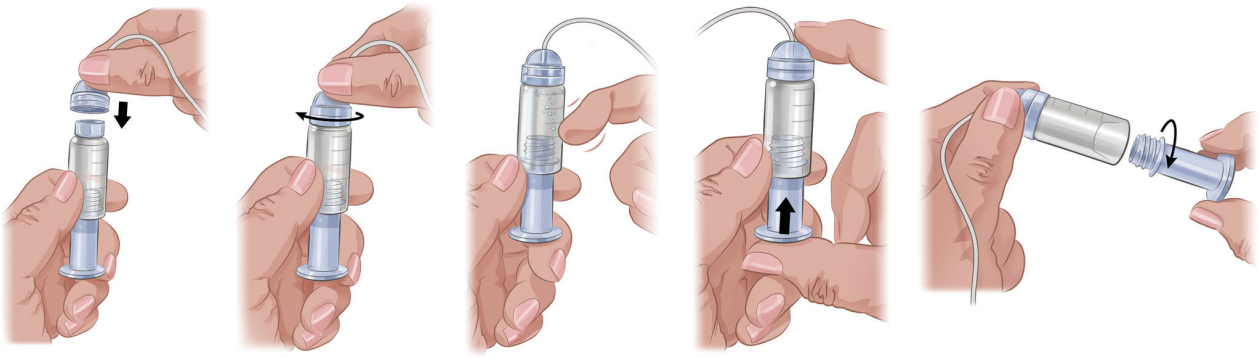


About every three days, you take the old cannula out and put a new one in. Once you learn how to do it, it is easy.

The insulin goes inside the **reservoir**. The reservoir is a small container. The insulin flows from the reservoir into the tubing and through the cannula that you insert under the skin. That is how your body gets the insulin it needs.



Filling the reservoir: You follow the directions to put insulin into the reservoir. The reservoir comes out of the pump. You put more insulin in every 2 or 3 days. Once you get the hang of it, it takes about 5 minutes to put on a new set.

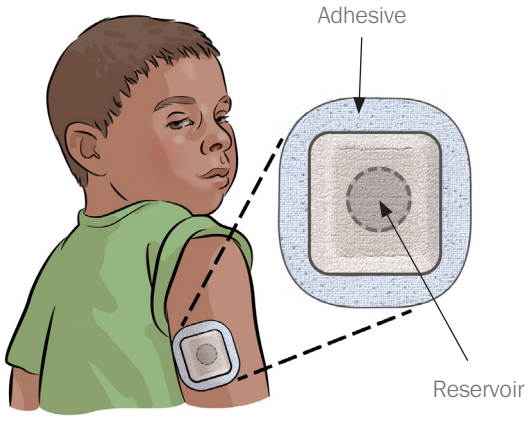


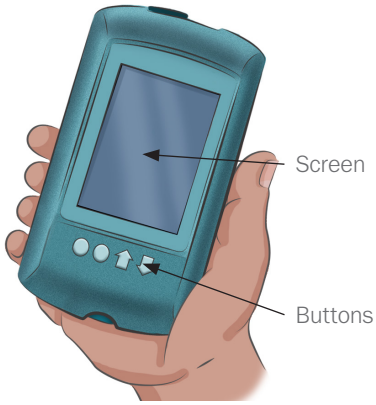
When you start, someone from your child's diabetes team will help you learn how to use the pump with tubing. You will follow the instructions in the book that comes with your child's pump. After you have been shown how to use the pump, you will do it yourself. If you have questions, you can call the phone number in your child's pump book for help.

Can you tell me more about pumps without tubing?

Pumps without tubes attach right onto your child's body. They do not have tubing. They just have a tiny plastic tube that goes from the pump under the skin.

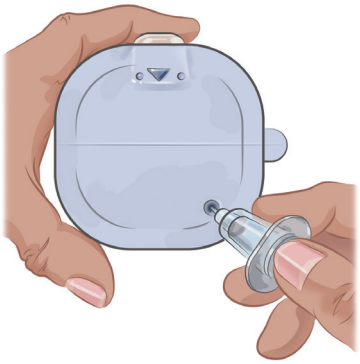
The Omni Pod® is the only tubeless pump on the market today. People call it "the Pod."



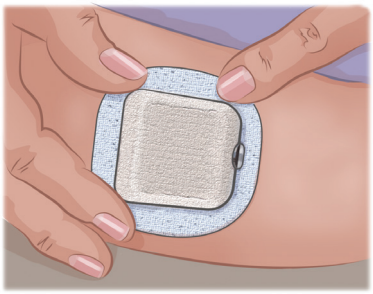


1. Fill the Pod with insulin.

You will fill the pod with a needle and insulin filled syringe. There is a small hole or port to place the needle. Press down and fill pod with insulin. The Pod automatically gets the air bubbles out of the insulin itself. This is priming. The Pod then performs a series of safety checks to prepare to send out insulin.



2. Then you put the Pod where you want it to go. This can be almost anywhere you can give your child a shot.



3. Press start.

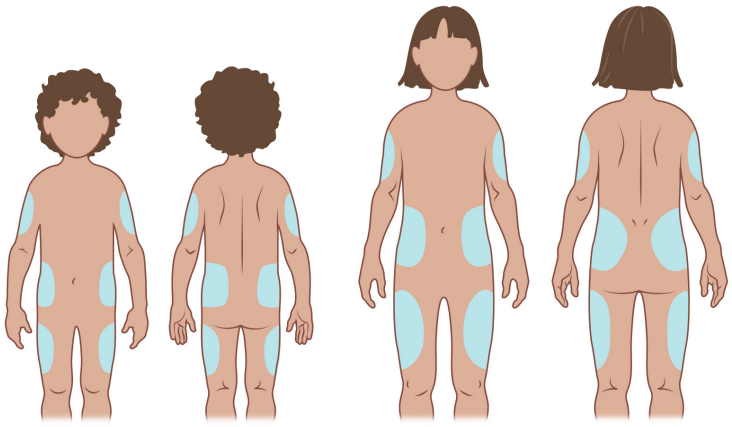
The cannula inserts itself. It starts sending out insulin into the body.

Pumps without tubing have a separate controller. It tells the motor in the pump how much insulin to give out and how often. This controller is a Personal Diabetes Manager or PDM.

The controller is wireless. It looks a bit like a smart phone. It sends commands to the pump, or pod. It controls all the actions of this pump. There is no display screen on the pump, only on the controller.

Where on my child's body would I put the pump?

The pictures below show you the places where you can insert the infusion set or put a tubeless pump or give an insulin shot.



Sites for pump with tubing Sites for tubeless pump

Most people attach to the abdomen. This is because it is easy to reach the fatty tissue. People attach it above or below the beltline and waistline. If your child is very thin or very muscular you may want to choose another site where there is more fat. Make sure to check your pump manual for the best sites.

It is best to avoid areas where the skin is puffy from putting the infusion set in the same place a number of times. Some people have scar tissue that makes it harder for the body to absorb insulin.

You will learn where your child's body absorbs insulin the best.

What does "site rotation" mean?

Site rotation means when you attach the infusion set or tubeless pump to a different place on your child's body.

How often should I rotate to a different site?

Your child's diabetes team will tell you how often to move the infusion set or tubeless pump from one place to another.

Most people need to replace and move, or rotate, the set every 48 to 72 hours. That means every 2 to 3 days. Sometimes the diabetes team may tell you to do it more often. They mostly do this if there is any sign of the pump site is not working right.

If I use the pump for my child, do I still need to check their blood sugar?

Yes. You will still need to test your child's sugar levels when they are on the pump. It does not do it for them.

How do I check my child's blood sugar with the insulin pump?

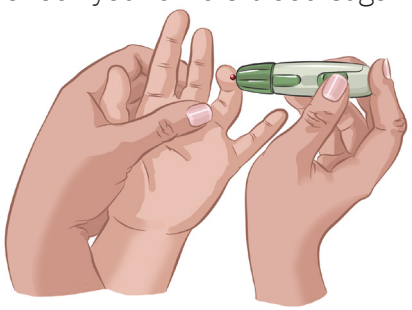
You will still need to do a finger stick and use a blood sugar meter to test your child's blood sugar. Your child's blood sugar number is the number their pump uses to figure out their insulin dose.

Some pumps have blood sugar meters that are "paired" with them. The meter sends the number of your child's sugar level to the pump. This makes life easier so you do not have to enter the number by hand.

Whether your child's pump has a meter with it or not, you still need to poke your child's fingertip or arm for blood.

Here are the two things you can do to have success and be safe with the pump:

1. Check your child's blood sugar on a regular basis.



2. Put a blood sugar number into the pump either:
   - Each time before your child eats and in between meals
   - Or as often as your child's diabetes team tells you to do it

How often do I need to check my child's blood sugar when starting on the pump?

Your child's diabetes team will tell you how often and at what times you should check your child's blood sugar once they start on the pump. In most cases, you must check more often at first, to be sure things are set right. Later you can test less often. You will always have to check blood sugar at least 4 to 6 times per day.

Check blood sugar:	Why?
Before each meal (breakfast, lunch, and dinner)	When you compare your child's blood sugar level before meals to your child's level after meals, you can know if their insulin to carbs ratio is set correctly.
2 hours after each meal (breakfast, lunch, and dinner)	
At bedtime	When you compare your child's blood sugar level during your sleep schedule, you can know if their overnight basal rates are set correctly.
Mid-sleep (or every 3 to 4 hours during sleep)	
When your child wakes up	

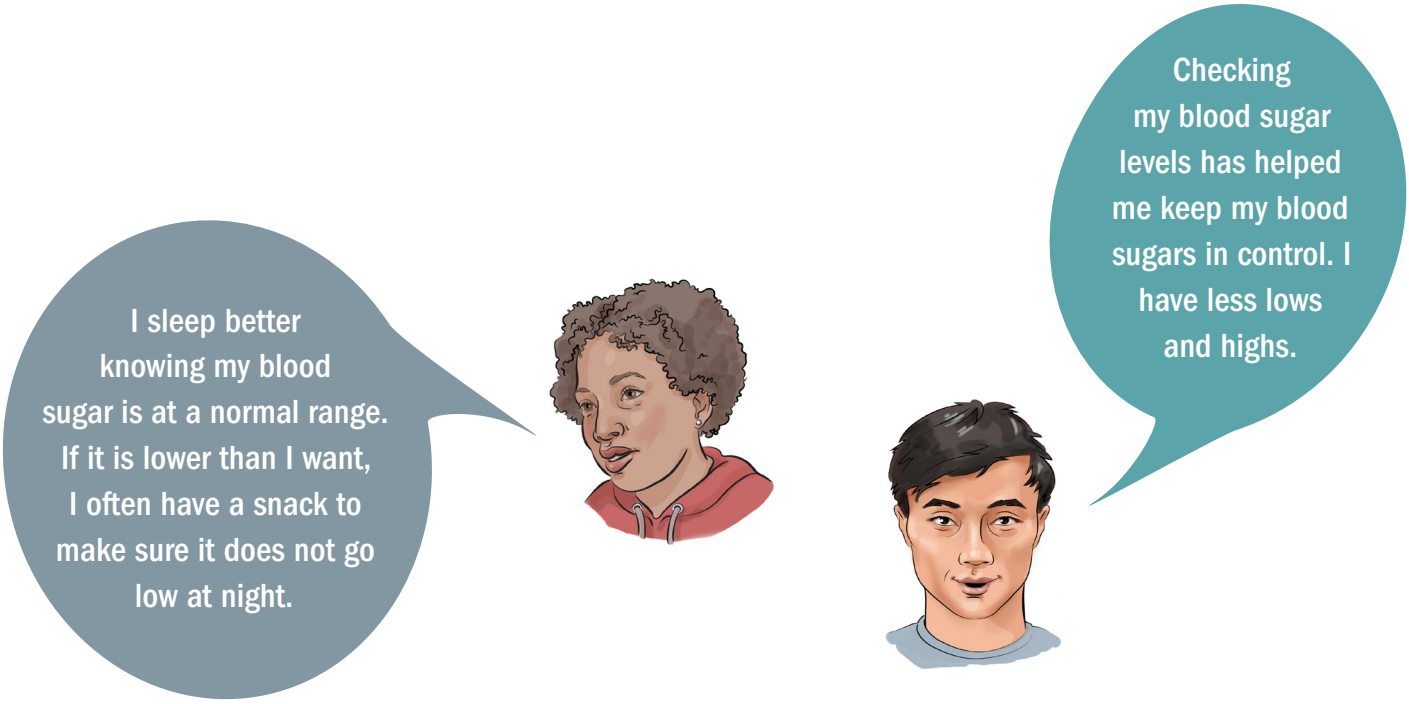
How often do I need to check my child's blood sugar once I am set up on the pump?

Here is a sample of the schedule to check your child's blood sugar that you might use once they are set-up on the pump:

Check blood sugar:	Why?
When they wake up	Finds out if fasting blood sugars are high or low
Before each meal (breakfast, lunch, and dinner)	Find out: ■ Take more insulin for a blood sugar that is above your target or ■ Take less insulin if your blood sugar is below your target
At bedtime	Gives information to help you prevent low or high blood sugars during sleep
Sometimes in mid-sleep	Find out: ■ If their blood sugar levels are stable through the night and ■ If their nighttime basal rates are set correctly

Your child's team will also likely have you check your child's sugars:

- If you feel like their blood sugar level is too low or too high
- Before and after snack time
- Before and after exercise or school PE
- Before and after playing sports
- Before riding a bike or a scooter, skateboarding or driving a car.



How would I know what blood sugar range I should aim for?

When your child starts on the pump, their diabetes team will tell you the blood sugar range you are aiming for. This is your child's target range.

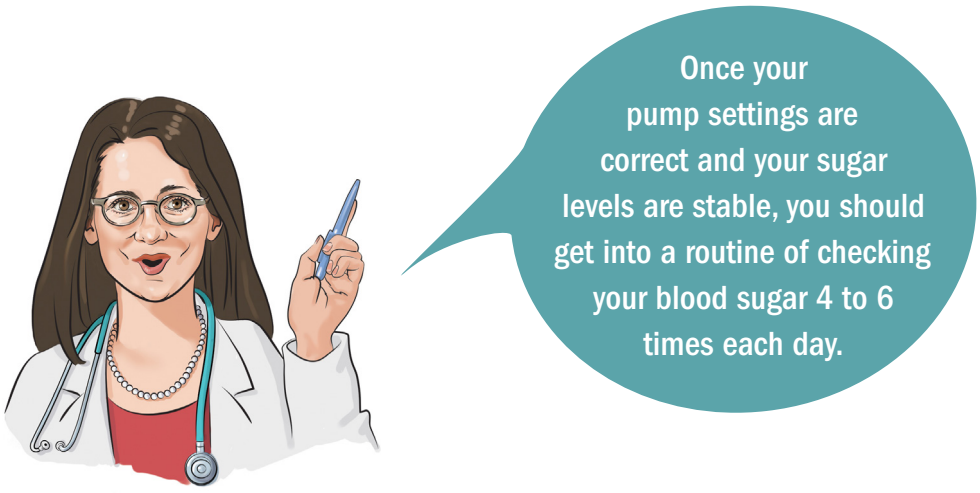
Your child's target range will be set in their pump. But your child's food and activity can change their sugar levels. So, your child's sugar readings may not always be 100% within their target range, especially at first.

Your child's blood sugar readings should stay within their sugar target range most of the time once you learn how to use the pump and your child's pump settings are where they should be.

Know that your child's blood sugar should improve when they use the pump. And your child's target range may also be lower. This is because the pump gives out insulin in small doses. The pump acts more like a pancreas, which helps control your child's diabetes better.

What should I do if my child's blood sugars are above or below their target range often?

If you start to notice that your child's blood sugar levels are often above or below their target range, this means that their insulin needs to be changed and the settings on the pump may need adjusting. Contact someone on your child's diabetes care team right away to tell them.



What is the difference between managing basal and bolus insulin with shots and the pump?

Both shots and the pump can control your child's diabetes. Either way, to stay healthy you need to do the work it takes. To control your child's sugars well, you need to:

- Pay attention to what their body needs.
- Test their blood sugar levels.
- Count their carbohydrates or carbs.

THIS CHART EXPLAINS THE DIFFERENCE BETWEEN SHOTS AND THE PUMP:

	Shots	Pump
Long Acting Insulin	Inject once or twice a day.	None
Rapid Acting Insulin	Inject before meals and snacks.	Given constantly throughout the day and night.
Figuring out bolus before eating	Use dose the doctor tells you.	Use the dose the pump suggests.
How many shots?	In most cases 5 to 7 per day.	No shots in most cases. You change infusion set every 3 days.
Is it safe?	Yes, because long acting insulin lasts for many hours in their body.	Yes, if you use the pump correctly and watch for problems.
Biggest drawback	Having to give your child shots.	Wearing something on their body all the time.

SECTION 3 — Conclusion

Are we ready for my child to use an insulin pump?

We hope that the information we have shared has helped you start to learn what an insulin pump is and how it works. It is up to you and your child to decide if you want to try using one.

Here is a checklist to help you see if you and your child are ready to try the pump. You can check "Yes," "No" or "Not Sure" for each line. Fill it out and talk with your child's diabetes team about it.

Are We Ready:	Yes	No	Not Sure
Work closely with your child's diabetes team? This means going in for visits as often as needed, talking on the phone or emailing each other.			
Test your child's blood sugar on a regular basis? This means checking at least 4 times a day each day of the week.			
Show that you can see the pump windows and hear the pump alerts?			
Complete and pass a diabetes and pump training class to show that you are ready to use the pump safely?			
Put the information into the pump that it needs to figure out a dose? This means the amount of carbs your child is eating and what your child's blood sugar level is.			
Treat low blood sugars in the right way? This means always carrying simple sugar with you for yor child and having glucagon at home in case of a severe low.			
Try to figure out and fix pump problems?			
Change the infusion set at least every 3 days?			
Have insulin and needles always ready in case your child's pump is not working correctly?			
Call the pump company or your child's diabetes team if you have a problem?			
Find and partner with school staff and other caregivers who are willing and able to work with a pump?			

The control of my child's diabetes is in my hands!

That is right. No matter what you decide about the pump, the control of your child's diabetes is in your hands. You can control it with shots or a pump. When you control it, you can avoid many of the serious problems that can happen if your child's sugars stay too high for too long.

What is the next step?

The next step can be to talk with your child's diabetes team to see if the pump is right for you and your child.

Ask to see a pump to hold and check out. In most cases, insurance covers one or two types of pumps. So be sure to ask to see that type of pump, if your child has insurance.

How else can I learn about pumps?

A great way to learn about pumps is from people who use them. Your child's diabetes team may be able to suggest people you can talk with. Or you can look on-line to see what other people write about pumps.

Should I rush into this?

In most cases, there is no rush to start using a pump. So, you can spend time thinking about it.

If I start my child on the pump, are we stuck with it?

Remember that you can get a pump and try it for your child. Then you could change your mind and go back to shots. It is not permanent.

If you do get one, you and your child should try it for a few months to see how you both adjust to it. The first few weeks may be hard because it is new. Then the two of you will begin to see if you like it or not.

Either way, I am committed to taking care of my child's diabetes.

Congrats for being committed to take good care of your child's diabetes. We know that it is not easy to treat Type 1 Diabetes. We know you can do it well.

Keep up the good work!

APPENDIX 1 — Resources

In this appendix, we offer some resources that may help you. We have the information in this order:

- Organizations
- Carb Counting and Nutrition
- Insulin Pump Companies
- Insulin and Insulin Pens
- Diabetes Supplies and Medications

We have provided internet links. These are US based links so most information is in English. If a site is available in your language, we recommend using that link. To see the information in Spanish or other languages, try Google Translate. It does a pretty good job at changing the information into the language you wish. But, a computer program does this translation so it may not be accurate.

To use Google Translate go to **http://translate.google.com/manager/website/** and follow the step-by-step guide. This is free!

Organizations

AMERICAN ASSOCIATION OF DIABETES EDUCATORS (AADE)

(800) 338-3633
www.aadenet.org

This is a group of diabetes educators. This is their link for patient resources: https://www.diabeteseducator.org/patient-resources. Here they offer information for people with diabetes.

AMERICAN DIABETES ASSOCIATION (ADA)

(800) 342-2383
www.diabetes.org
Spanish link: http://www.diabetes.org/es/?loc=util-header_es

This is the biggest group of people with diabetes and diabetes professionals. It helps people with both Type 1 as well as Type 2 Diabetes. There are local chapters that you can contact for help or to volunteer. They also have an online store to buy books, gifts and other helpful items.

ACADEMY OF NUTRITION AND DIETETICS

(800) 877-1600

www.eatright.org

This is a site for information about food and nutrition.

CHILDREN WITH DIABETES

www.childrenwithdiabetes.com

This started as a group having mostly to do with children with diabetes. Now it includes young adults as well as parents of people with Type 1 Diabetes.

It is a good site to learn about many tools and resources for people with Type 1 Diabetes.

CLINICAL RESEARCH STUDIES WEBSITE

clinicaltrials.gov

This site lists all the clinical research studies that are in process in the United States. You can do a search using the key words "Type 1 Diabetes" if you want to find those research studies.

DIABETES MINE

www.healthline.com/diabetesmine

This is a blog about Type 1 Diabetes. It has been around for many years and is very helpful. A woman who has Type 1 Diabetes started it. It shares many people's experiences and advice.

DIABETES SISTERS

www.diabetessisters.org

This is a group for women with diabetes, mostly Type 1. They share ideas and experiences.

DIABETIC DANICA

www.facebook.com/DiabeticDanica

Danica is a kind young woman with Type 1 Diabetes. She makes YouTube videos about having Type 1 Diabetes and how to use diabetes devices. These videos can be helpful.

DIABTRIBE

www.diatribe.org

Diatribe is a non-profit organization. It evaluates and comments on new approaches and treatments for diabetes, both Type 1 and Type 2.

GLU

www.myglu.org

GLU is the largest interactive on-line network for people with Type 1 Diabetes as well as their care givers and family members. The nonprofit Helmsley Charitable Trust funds it.

It offers excellent advice and information about Type 1 Diabetes. You can also connect with others who have the same questions and concerns about diabetes as you do.

JDRF

www.jdrf.org

This used to be the Juvenile Diabetes Research Foundation. It was started to help do research on Type 1 Diabetes. Now it helps people living with Type 1 Diabetes as well as funds research. There are local JDRF offices that may be helpful to you.

TRIAL NET

www.diabetestrialnet.org

This is a group of researchers who work on preventing and treating early Type 1 Diabetes. Contact your local Trial Net site for screening risk of new onset Type 1 diabetes for yourself or family members.

TUDIABETES

www.tudiabetes.org
Spanish link: http://www.estudiabetes.org

This is a large on-line group of people with both Type 1 and Type 2 Diabetes. They share concerns and ideas in Spanish about living with diabetes.

CARBOHYDRATE (CARB) COUNTING AND NUTRITION RESOURCES

CALORIE KING

www.calorieking.com

This offers information on foods, carbs, calories and more.

CARBS AND CALS

www.carbsandcals.com

This offers books and a $5 App that gives pictures of foods and their carb count.

THE DIABETES CARBOHYDRATE AND FAT GRAM GUIDE

(The American Diabetes Association)

This guide has quick, easy meal planning using carbohydrate and fat gram counts. You can buy it on many shopping websites like Amazon, Barns and Noble and the American Diabetes Association online store. www.store.diabetes.org

THE DOCTOR'S POCKET CALORIE, FAT & CARBOHYDRATE COUNTER

(949) 642-1993

Family Health Publications publish this. You can buy it on many shopping websites like Amazon and Barns and Noble and the calorie king online store at www.calorieking.com.

FIGWEE

www.figwee.com

This is an iPhone App for $2.99 that gives pictures of many different foods along with their carbohydrate count.

NUTRITION IN THE FAST LANE

(Franklin Publishing)
(800) 643-1993
www.fastfoodfacts.com

This book has nutrition information for 60 of the most common restaurants in the United States.

NUTRITION AND DIABETES

(International Diabetes Center)
(888) 637-2675
www.idcpublishing.com

This web site has books for sale in English and Spanish for $3 on nutrition and diabetes.

INSULIN PUMP COMPANIES

These websites give you lots of information about their pumps. They also offer on-line lessons about how to use their pumps.

It can be very useful to look at these sites. You can learn about pumps. You can review how to use the pump you have as well.

ACCU-CHECK PUMPS: ROCHE DIAGNOSTICS

(800) 280-7801
www.accu-checkinsulinpumps.com

This site provides information on the Accu-check Spirit pump.

ANIMAS PUMPS: ANIMAS CORPORATION

(877) 937-7867
www.animas.com

These pumps include the Animas Ping and Animas Vibe.

OMNIPOD PUMPS: INSULET CORPORATION

(800) 591-3455
www.myomnipod.com

This site shares about the Omnipod system. It also gives you the option to try a demo Omnipod pump.

MINIMED PUMPS: MEDTRONICS, INC.

(800) 646-4633
www.medtronicdiabetes.com/home

This is the site for all the MiniMed Medtronic devices.

TSLIM PUMPS: TANDEM DIABETES CARE

(858) 366-6900
www.tandemdiabetes.com

This site describes the features of the TSlim pump.

INSULIN AND INSULIN PENS

SHORT ACTING INSULIN (REGULAR INSULIN) AND INTERMEDIATE ACTING INSULIN (NPH)

These are the oldest and lowest cost types of insulin. They are Regular insulin (short acting) and NPH insulin (intermediate acting insulin).

There are different names for these kinds of insulin including Novolin R, Humulin R, and others. Often these insulins come in vials. But sometimes they come in pens.

www.humulin.com/other-humulin-products.aspx

This offers information on Humulin Regular and NPH insulin as well as 70/30.

Novolin Regular and NPH do not have a website in the U.S. but you can buy them here.

www.diabetesselfmanagement.com/blog/relion-insulin-and-other-products-at-walmart

ReliOn Regular and NPH insulin come in vials. They are part of Walmart's low cost selection of diabetes supplies and products.

RAPID ACTING INSULIN

Apidra (Glulisine) made by Sanofi

www.apidra.com

These come in vials and pens.

Humalog (Lispro) made by Lilly Pharmaceuticals

www.humalog.com/index.aspx

These come in both disposable and refillable pens as well as vials.

Novolog (Aspart) made by Novo Nordisk

www.novolog.com

These come in both disposable and refillable pens as well as vials.

LONG ACTING INSULIN

Biosimilar Glargine

www.basaglar.com

This is a copy of the insulin known as glargine (U100 Lantus). It acts in a similar way and costs somewhat less. It is a long acting basal insulin.

U100 Lantus or Glargine insulin

www.lantus.com

This comes in vials and pens. It is a long acting basal insulin.

U300 Lantus or Glargine insulin

www.toujeo.com

This concentrated Lantus (glargine) insulin acts longer than U100 glargine. It only comes in a pen.

Levemir or Detemir insulin

www.levemir.com

Levemir comes in pens and vials. It is a long acting insulin but it is somewhat shorter acting than Lantus, Degludec or Toujeo.

Tresiba or Degludec insulin

www.tresiba.com

This is the very longest lasting basal insulin. It only comes in pens. It comes in two strengths: U100 and U200.

Glucagon Pens

www.lillyglucagon.com

This is the site for the Lilly brand of glucagon.

www.cornerstones4care.com/tracking/what-to-know/glucagen.html

This is the website for the Glucagon Kit which is the Novo-Nordisk brand of glucagon.

DIABETES SUPPLIES AND MEDICATIONS

CASES FOR INSULIN

www.frioinsulincoolingcase.com

These cases keep insulin cool and are easy to carry.

www.myabetic.com
These are carrying cases for insulin and supplies.

GLUCOSE TABLETS

www.dex4.com

These are one type of glucose tablet on the market. Many pharmacies have their own generic brands. You can look for a type of glucose tablet that you think tastes the best. But be warned, these do not taste like candy.

PEN NEEDLES

www.novonordisk.com/patients/diabetes-care/insulin-pens-and-needles.html

These are insulin pens and needles made by Novo-Nordisk.

PEN NEEDLES AND INSULIN SYRINGES

www.bd.com/diabetes

BD makes many diabetes products. They include syringes, pen needles and insulin infusion sets. BD offers very helpful educational information.

WEBSITE FOR COMPARING THE LOCAL COSTS OF MEDICATIONS

www.GoodRX.com

This is a good free App for finding the best prices for your medications. You enter the medication you are looking for and your location. Then it tells you the cost of it at your nearby pharmacies. It also gives you discount coupons.

APPENDIX 2 — Glossary of Diabetes Terms

In this glossary, we list and define key words that have to do with diabetes. You can use this to look up words you want to learn more about.

A1c

This is also:

- HbA1c
- Hemoglobin A1c
- Glycosylated hemoglobin

It is a blood test. The test can be a finger stick or blood taken from your vein. It tells you what your average blood sugar has been over the past three months. It does this by measuring the percentage of red blood cells in your body that have glucose stuck to them.

In most cases, normal A1c levels are 4% to 5.6%. The goal is to have your A1c as close to normal as possible, without having too many low blood sugar reactions. Your diabetes team will help you figure out what is the best target for you.

Be sure to do this test as often as your diabetes team orders it, about every 3 months.

Antibodies

These are proteins the body makes to protect itself from outside threats. These threats can include bacteria or viruses.

People get type 1 diabetes when their antibodies destroy the body's own beta cells that make insulin.

Aspart

This is the generic name of one kind of rapid-acting insulin. The branded (trade) name for aspart is Novolog. See rapid-acting insulin for more information.

Apidra

This is a branded (trade) drug name of one kind of rapid-acting insulin. The generic name for Apidra is glulisine. See rapid-acting insulin for more information.

Autoimmune disease

This is a disease caused by a problem in the body's immune (infection fighting) system that causes an attack on the body itself, rather than an infection. Type 1 diabetes is this kind of disease.

Basaglar

This is a brand drug name of one kind of basal insulin. The generic name for Basaglar is glargine. This long-acting basal insulin drug comes in one strength written as U100. See basal insulin and long-acting insulin for more information.

Basal insulin

You give this insulin with a shot once or twice a day. In most cases this insulin is only for patients on multiple daily shots. Basal insulin comes in different strengths shown as U100, U200 and U300. There are two types of basal insulin, long-acting insulin and intermediate acting insulin. See long-acting insulin and intermediate acting insulin for more information.

Basal insulins are:

Generic name	Brand name
NPH U100	Humulin (N) or Novolin (N) or ReliOn (N)
Degludec U100	Tresiba U100
Degludec U200	Tresiba U200
Detemir U100	Levemir
Glargine U100	Lantus or Basaglar
Glargine U300	Toujeo

Basal rate

Your body needs insulin on an ongoing basis even when you are not eating. The basal rate is the amount of insulin you need to give by shots or with an insulin pump. When the basal rate or basal insulin dose is set just right, the blood sugar does not go high or low when you are not eating.

For those using a pump, basal rates are in units per hour. You may see units per hour written as units/hour or u/hr. Typical rates are between 0.4 u/hr. and 1.6 u/hr. If you are using shots, you give yourself basal insulin doses in daily units, such as 15 units or 20 units. Your diabetes team will tell you what your basal doses should be.

Beta cells or ß -cells

Beta cells or ß-cells are cells that make insulin.

These cells are in the part of the pancreas called the Islets of Langerhans. See Cells for more information.

Blood glucose (BG) or Blood sugar

Blood glucose is also blood sugar.

This is the main sugar that is in the blood. This sugar is the body's main source of energy.

Bloodstream

The blood flowing through the circulatory system in the living body.

Blood sugar level

This means how much sugar is in the blood.

Blood sugar levels are measured in the U.S. in milligrams per deciliter, or mg/dl. In other countries, in milimoles, or mmol/l.

A normal range (for someone without diabetes) is about 70 to 100 mg/dl (3.9 to 5.6 mmol/L) before breakfast and below 140 mg/dl (7.8 mmol/L) after meals.

Blood sugar meter

This is a small, portable machine. People with diabetes use it to check their blood sugar levels.

After pricking the skin with a lancet, you place a drop of blood on a test strip. The test strip is placed in the machine. Then the meter, or monitor, shows the blood sugar level as a number on the digital display.

Blood sugar monitoring

This means checking your blood sugar level on a regular basis to manage diabetes.

You need a blood sugar meter or blood sugar test strips that change color when a drop of blood touches them. This is so you can check your blood sugar often.

Bolus

This is a burst of short or rapid acting insulin. It acts over a short period.

Most often, a bolus is to offset the blood sugar rise that happens after eating or drinking carbohydrates. It is also a correction dose to bring down a high blood sugar level back to normal.

The insulins for this are:

Generic name	Brand name
Insulin Regular	Humulin (R) or Novolin (R) or ReliOn (R)
Lispro	Humalog
Aspart	NovoLog
Glulisine	Apidra

Cannula

This is a small and flexible tiny piece of tubing. It stays under the skin once you remove the needle from the infusion set of an insulin pump.

Carbohydrate or Carb

Carbohydrates are also called carbs. Carbohydrates are one of the three main parts in foods:

1. Carbs
2. Fats
3. Proteins

They are the most important part of foods to control sugar. Carbohydrates are mainly sugars and starches. They have four calories per gram.

Carb bolus

This is a spurt of insulin that gets sent out quickly in the body to match carbs you are about to eat in a meal or snack. Most people use between 1 unit of rapid acting insulin for each 5 grams of carbs up to 1 unit for each 25 grams of carbs.

Carb counting

This means counting the grams of carbs in any food you eat or liquid you drink. This is a useful way to find out the amount of insulin you need to keep a normal blood sugar.

Carb factor or Carb Ratio or Insulin-to-carb ratio

This is the number of grams of carbs that one unit of insulin covers for a person. This varies from person to person. Your diabetes team will tell you your ratio.

Catheter

This is also pump tubing. Insulin goes through this plastic tube from the pump to the insertion set of a pump.

Cells

Cells are the smallest units of life. They are basic building blocks for all known life forms. Cells make up the parts of your body, like your skin, bones, heart, liver, or lungs. A person has over 10 trillion cells in their body.

Certified diabetes educator (CDE)

This is a health care professional with expertise in diabetes education. Trained and certified.

Continuous subcutaneous insulin infusion (CSII) or Insulin pump

CSII is the formal name for an insulin pump. See Insulin pump for more information.

Coma

This is a sleep-like state where a person is not conscious. Very high or very low blood sugar in people with diabetes can cause a coma.

Continuous glucose monitor (CGM)

A system consisting of a sensor, transmitter and receiver which determines subcutaneous or under the skin glucose levels every 1 to 5 minutes.

Correction bolus

A spurt of short or rapid acting insulin sent out quickly in the body. It is to bring a high blood sugar level back within a person's target range before a meal, after a meal, or at bedtime.

Correction factor or Insulin sensitivity factor

This is the fall in blood sugar level that one unit of insulin will produce. It is set by your diabetes team. It is often in the range of 25 to75 but can be more or less depending on what your body needs.

A correction factor of 50 (2.8) is used as a starting point. This means that 1 unit of insulin will lower your blood sugar by 50 mg/dl (2.8 mmol/L). For instance, if your correction factor is 50 and your blood sugar is 200 mg/dl (11.1 mmol/L), you expect that giving 1 unit of insulin will lower your sugar by 50 points. Which means that after 1 unit of insulin, the blood sugar will fall from 200 mg/dl (11.1 mmol/L) to 150 mg/dl (8.3 mmol/L).

Dehydration

This is when a person does not have enough water in their body. This can come from drinking too little fluid. It can also come from losing too much body fluid when a person pees or urinates often, sweats, has diarrhea or vomiting.

Delayed-onset hypoglycemia

A drop in blood sugar levels that can happen many hours after intense exercise.

Diabetes team

A group of people who help you take care of your diabetes. You are the most important member of your team. The other people on your team can be:

- Doctor
- Nurse or nurse practitioner or physician assistant
- Diabetes educator
- Dietitian or diabetes educator
- Social worker
- Psychologist
- Eye doctor

These people are part of your diabetes team. Each one of them can help you take better care of your diabetes.

Diabetic coma

This is when a person with diabetes is not conscious and is in a sleep-like state. Very high or very low blood sugar in people with diabetes can cause this.

Diabetic ketoacidosis (DKA) or Ketoacidosis

This is a very serious condition where the body does not have the insulin it needs. This results in dehydration and the buildup of acids in the blood. This needs to be treated in the hospital. It is life-threatening.

Dietitian

A health care professional who tells people about meal planning, carb counting, weight control and diabetes management. A registered dietitian (RD) has more training. Dietitians can also be diabetes educators.

Degludec

This is a generic drug name of one kind of basal insulin. The brand name for degludec is Tresiba. This long-acting basal insulin drug comes in two strengths written as either U100 or U200. See basal insulin and long-acting insulin for more information.

Detemir

This is a generic drug name of one kind of basal insulin. The brand name for detemir is Levemir. This long-acting basal insulin drug comes in one strength written as U100. See basal insulin and long-acting insulin for more information.

Endocrinologist

A doctor with the title MD or DO trained to treat diseases related to glandular problems. This includes diabetes.

Exchange lists

These lists are one of the ways for people with diabetes can plan meals. The lists have different types of food and show the amount carbs, proteins and fats in a serving size. Knowing this information helps you know how much insulin you will need if you eat that food.

Extended bolus

The insulin pump sends out a bolus over a fixed period set by the patient. For example, the pump could be set to give the bolus dose over 2 or 3 hours instead of right away. In most cases, the pump gives the bolus right away. This is a way to give insulin over a longer period, which is good for foods that the body absorbs more slowly, such as foods with a lot of fat in them.

Fasting

This means not eating food or drinking any fluids except water.

Fasting plasma glucose (FPG) test

A lab test that people take after fasting for 8 to 10 hours. In most cases, people fast overnight and take the FPG test in the morning.

An FPG level of less than 100 mg/dl (5.6 mmol/L) is normal. A level of 100 to 125 mg/dl (5.6 to 6.9 mmol/L) means prediabetes. A level of 126 mg/dl (7.0 mmol/L) or more means a person likely has diabetes. When a level is over 126 mg/dl (7.0 mmol/L), there will be more tests to confirm if the person has diabetes.

Fats

Fats are one of the three main parts of foods along with carbohydrates and protein. Fats occur alone as liquids or solids. This includes oils and margarines. They also can be a part of other foods.

Fats come from animals, veggies, nuts or seeds. Fats have 9 calories per gram.

Fiber

A kind of carb that passes through the digestive system intact. It does not raise blood sugar levels. It comes from plants.

Fiber adds bulk to your diet. It is very important for keeping your intestines healthy.

Food bolus

A dose of insulin that a person with diabetes takes before meals or snacks. This is to cover the expected rise in blood sugar from the food. Often, food boluses match the amount of carbohydrates in the food.

Glargine

This is a generic drug name of one kind of basal insulin. The brand name for glargine is Lantus or Basaglar or Toujeo. This long-acting basal insulin drug comes in two strengths written as either U100 or U300. See basal insulin and long-acting insulin for more information.

Glucagon—the hormone

This is a hormone. The alpha cells make it in the Islet of Langerhans in the pancreas. This hormone raises blood sugar levels. The opposite hormone to insulin that lowers blood sugar levels. In people without diabetes, the glucagon and insulin work together, to keep blood sugars normal. In people with diabetes, not enough glucagon is made to keep the blood sugars normal so they can fall too low.

Glucagon—the medication

Glucagon is given as a shot to help raise your blood sugar level. It is something that another person would give you if you were having a low blood sugar reaction and were not able to eat or drink sugar to bring it back up. The shot raises the blood sugar quickly. It does this by releasing sugar that is stored in the liver.

Glucagon emergency kit

A kit that has glucagon and a syringe. It is used to treat severe low blood sugar. Glucagon is a hormone that quickly increases blood sugar.

You need a prescription to get glucagon. It is a shot that someone else must give you. You should always have a glucagon kit at home, just in case. Be sure the one you have is not expired.

Glucose

A simple sugar that is in the blood. The body uses glucose for energy.

Glucose tablets

These are tablets that you chew and swallow. They are made of pure glucose. People take them to treat low blood sugar.

Glulisine

This is a generic drug name of one kind of rapid-acting insulin. The trade name for glulisine is Aprida. See rapid-acting insulin for more information.

Glycemic index (GI)

This is a method to classify foods, most of all carbs. The Index is based on how much the blood sugar level goes up after eating the certain food.

Glycogen

When you eat, carbohydrates they turn into a form of sugar called glycogen. This is a storage form of glucose in your liver and muscles. The glycogen is stored in your liver and muscles. When you have a low blood sugar, fast, or exercise, the glycogen turns into glucose and is release into the blood stream when you need it.

Gram

This is a small unit of weight in the metric system. People with diabetes use grams to weigh food.

Hormone

This is a chemical substance made by a gland or tissue. The blood carries it to other cells in the body. There, the hormone attaches to cells and causes them to do a certain job. For instance, when insulin attaches to a muscle cell it lets sugar go inside the cell. This is described as a "lock and key" effect. The hormone is the key and the cell is the lock. When the hormone insulin attaches to the cell, it opens the door and let's sugar inside.

Insulin and glucagon are hormones.

Humulin [N]

This is a brand drug name of one kind of intermediate-acting insulin. The generic name for Humulin [N] is NPH. See intermediate-acting insulin for more information. It is a cloudy insulin.

Humulin [R]

This is a brand drug name of one kind of short-acting insulin. The generic name for Humulin [R] is Insulin Regular. See short-acting insulin for more information.

Humalog

This is a brand drug name of one kind of rapid-acting insulin. The generic name for Humalog is lispro. See rapid-acting insulin for more information.

Hyperglycemia or High blood sugar

This is when a person has a higher than normal level of sugar in the blood. In most cases, this means a blood sugar level of more than 180 mg/dl (10.0 mmol/L).

Hypoglycemia or Low blood sugar or Insulin reaction

This is when a person has a lower than normal sugar level in the blood. In most cases, this means a blood sugar level of less than 70 mg/dl (3.9 mmol/L).

Symptoms can vary. They can include feeling confused, nervous, shaky, drowsy or moody. They can also include sweating, headaches or numbness in the arms and hands.

If it is not treated, severe low blood sugar can cause loss of consciousness, convulsions, or even death.

Infusion set

This is part of an insulin pump. This set transfers insulin from the pump through an infusion line to below the skin. The set includes the tubing, tubing connector, insertion set, cannula and adhesive.

Infusion site or Insertion site

This is the area on the body where someone who uses an insulin pump inserts the cannula or needle.

Injection or Shot

This is when someone inserts liquid medication or nutrients into the body with a syringe. A person with diabetes injects insulin just under the skin, into what is subcutaneous tissue. Subcutaneous means below the skin.

Injection sites

These are places on the body where people most often inject insulin.

Injection site rotation and Infusion site rotation

The place you change on the body where you inject insulin or put the infusion sites. When you rotate, it prevents lipodystrophy. This means an abnormal build-up of fat under the skin.

Insertion set

The part of the infusion set that a person inserts through the skin. It may be a thin or a large metal needle. When the person removes the needle, it leaves a small Teflon catheter or cannula under the skin.

Insulin

This is a hormone made by beta cells in the Islet of Langerhans in the pancreas. The body sends out insulin when blood sugar levels go up, for instance after eating a meal. Its job is to lower blood sugar levels to normal.

Insulin lets sugar go into cells. Sugar gives your cells the energy to live. Without insulin, the sugar stays on the outside of the cells and goes up to very high levels in the blood. Without insulin, you would die because your cells would have no energy to live.

When your body cannot make its own insulin, there are different types for insulin drugs you can take. Your diabetes team will figure out the best insulin for you. The table below explains about the different types of insulin. You can also look up the types and names of insulin in this glossary for more information.

Generic Name (Brand Names)	**Onset —** Time for insulin to reach blood-stream	**Peak —** Period when insulin is most effective	**Duration** – How long the insulin works
RAPID-ACTING INSULIN			
Lispro (Humalog)	About 15 to 30 minutes	About 30 to 90 minutes	About 3 to 5 hours
Aspart (Novolog)	About 15 to 30 minutes	About 30 to 90 minutes	About 3 to 5 hours
Glulisine (Apidra)	About 15 to 30 minutes	About 30 to 90 minutes	About 3 to5 hours
SHORT-ACTING INSULIN			
Insulin Regular [R] (Humulin [R], Novolin [R] or ReliOn [R]	About 30 minutes to 1 hour	About 2 to 5 hours	About 5 to 8 hours
INTERMEDIATE-ACTING INSULIN AND CALLED A BASAL INSULIN			
NPH [N] (Humulin [N], Novolin [N] or ReliOn [N]	About 1 to 2 hours	About 4 to 12 hours	About 18 to 24 hours
LONG-ACTING INSULIN AND CALLED A BASAL INSULIN			
U100 Glargine (Basaglar or Lantus)	About 1 to 1 and a half hours	Maybe slight peak at 12 hours in some people; no peak time in others	About 20 to 24 hours
U300 glargine (Toujeo)	About 1 to 1 and a half hours	No peak	About 28 to 36 hours
Detemir (Levemir)	About 1to 2 hours	About 6 to 8 hours	Up to 24 hours
Degludec (Tresiba)	About 30 to 90 minutes	No peak time	About 42 hours
PRE-MIXED INSULIN			
	About 30 minutes	About 2 to 4 hours	About 14 to 24 hours
50% NPH/50% regular insulin Humulin 50/50	About 30 minutes	About 2 to 5 hours	About 8 to 24 hours
70% long acting/30% rapid acting insulin Novolog 70/30	About 10 to 20 minutes	About 1 to 4 hours	Up to 24 hours
75% long acting/25% rapid acting insulin Humalog mix 75/25	About 15 minutes	About 30 minutes to 2 and a half hours	About 16 to 20 hours

Insulin adjustments

A change in the amount of insulin a person with diabetes takes. Based on factors like meal planning, activity levels and blood sugar levels.

Insulin pen

A device that injects insulin. It looks like a pen for writing.

There are two kinds of insulin pens:

1. Prefilled pen with insulin that is disposable
2. Reusable pen that holds replaceable cartridges of insulin

To inject the insulin under the skin, you need to screw on a needle to the top of the pen.

Insulin pump

This is a small machine about the size of a small cellphone. It is computerized. You can program it to deliver a constant amount of basal insulin and give a bolus of insulin for a meal or high blood sugar. It takes the place of insulin shots.

A pump sends out fast-acting insulin through a plastic catheter, or tube. A Teflon infusion set or a small metal needle connects to the tube. You insert the set or small needle through the skin. The body gradually absorbs the insulin into the bloodstream.

Insulin Regular

This is a generic drug name of one kind of short-acting insulin. The brand name for insulin Regular is Humulin [R], Novolin [R], or ReliOn [R]. See short-acting insulin for more information.

Insulin sensitivity

This is a term to describe how the body reacts to insulin. Everyone reacts differently whether your body is making its own insulin or you must get insulin by shots or a pump. If a person is sensitive to insulin, it means that a smaller amount will lower the level of sugar in the blood. If a person is not sensitive to insulin it means she or he will need more insulin to lower the level of sugar in the blood. When a person needs more insulin to lower blood sugar, they are more resistant to insulin.

Insulin-to-carb ratio

A formula you use to match the dose of insulin to the amount of carbs you eat and drink.

Intermediate-acting insulin

This is a type of basal insulin. It controls blood sugar for about half the day or overnight. This insulin starts working in about 1 to 2 hours. It works best in your body at 4 to 12 hours and then starts fading. How it works is different for each person.

NPH is the generic name of the drug. Humulin [N], Novolin [N], or ReliOn [N] are brand names

This insulin looks cloudy. You can mix it with regular or rapid-acting insulin in a syringe. See basal insulin, regular insulin and rapid-acting insulin for more information.

Islets of Langerhans

Small islands of cells scattered throughout the pancreas that make hormones. They have beta-cells, which make insulin and alpha cells which make glucagon. Other cells include delta cells, PP cells and Epsilon cells which make other hormones.

Ketoacidosis—See Diabetic ketoacidosis

Ketones

The body releases these acids when body fat breaks down.

Ketones can build up to dangerous levels in the absence of insulin. This is because the body is not able to break down sugar as fuel.

A urine or a blood test can measure them. A urine dip stick is usually used.

Lancet

A spring-loaded device that you use to prick the skin with a small needle. You do this to get a drop of blood to check your blood sugar.

Lipodystrophy

This is when the fat tissue below the skin becomes swollen, hard or forms dimples. It also limits the body from absorbing insulin if you inject in that area.

Giving yourself many shots into the same area of skin or putting the pump cannula in the same site time after time often causes this.

Lantus

This is a brand drug name of one kind of basal insulin. The generic name for Lantus is glargine. This long-acting basal insulin drug comes in one strength written as U100. See basal insulin and long-acting insulin for more information.

Levemir

This is a brand drug name of one kind of basal insulin. The generic name for Levemir is detemir. This long-acting basal insulin drug comes in one strength written as U100. See basal insulin and long-acting insulin for more information.

Lispro

This is a generic drug name of one kind of rapid-acting insulin. The brand name for lispro is Humalog. See rapid-acting insulin for more information.

Long-acting insulin

This type of basal insulin controls blood sugar consistently for an entire day or longer. After injecting, it begins working many hours and can stay in the bloodstream up to 42 hours. How long it works can be different for different people. It may start weakening a few hours earlier for some, while it may work a few hours longer for others. It comes in different strengths shown as U100, U200 and U300.

See basal insulin to learn more.

Long-acting insulins are:

Generic name	Brand name
Degludec U100	Tresiba U100
Degludec U200	Tresiba U200
Detemir U100	Levemir
Glargine U100	Lantus or Basaglar
Glargine U300	Toujeo

Medical insurance or health insurance

This is a plan that a person signs up for that pays for some or all the costs of medical and surgical care. These plans differ from state to state. Sometimes people must buy their own insurance. Other times they get it from their job or the government. Government plans include Medicare and Medicaid. In some states, the plan may have its own name. For instance, in California it is Medi-Cal.

Multiple daily injections (MDI)

This is a schedule where you give yourself many insulin shots each day. In most cases, you use a long-acting insulin along with shots of rapid-acting insulin before each meal or snack. Some people also use intermediate-acting insulin. See long-acting, intermediate-acting and rapid-acting insulin for more information.

Novolin [N]

This is a brand drug name of one kind of intermediate-acting insulin. The generic name for Novolin [N] is NPH. See intermediate-acting insulin for more information. It is a cloudy insulin.

Novolin [R]

This is a brand drug name of one kind of short-acting insulin. The generic name for Novolin [R] is Insulin Regular. See short-acting insulin for more information.

NPH

This is a generic drug name of an intermediate-acting insulin. The brand names for NPH are Humulin [N], Novolin [N] or ReliOn [N]. See intermediate-acting insulin for more information.

Occlusion

The infusion set or infusion site clogs or blocks. This can stop or slow insulin delivery.

In most cases, an occlusion happens when the cannula gets pinched, kinked or dislodged. The cannula blocks when insulin crystals form.

An occlusion can be partial. That means it only reduces, but does not stop the flow of insulin. Or it can be complete. That means no insulin gets through the tubing.

Pancreas

This gland is near the stomach. It is deep in the center of the body. It releases insulin and other hormones. It also releases digestive enzymes.

Pharmacist

This health care professional prepares and gives medicine to people. She or he also gives information on medicines.

Pre-mixed insulin

In most cases, people with diabetes take these two or three times a day before a meal. They are insulins where a shorter and longer acting insulin mixed. In most cases, they look cloudy. The numbers after the name describe how much long-acting and short-acting insulin is in the mix. They have many names, including:

- Humulin 70/30 (70% long acting/30% short acting insulin)
- Novolin 70/30 (70% long acting/30% short acting insulin)
- Novolog 70/30 (70% long acting/30% rapid acting insulin)
- Humulin 50/50 (50% long acting/50% short acting insulin)
- Humalog mix 75/25 (75% long acting/25% rapid acting insulin)

Proteins

These are one of the three main parts of foods along with carbohydrates and fats. Proteins are made of amino acids. Foods like milk, meat, fish, and eggs have protein.

The body burns proteins more slowly than fats or carbohydrates. There are four calories per gram of protein.

Rapid-acting insulin

If you give yourself shots, you will give both long-acting insulin and short or rapid-acting insulin. The rapid-acting insulin covers insulin needs for meals. You give yourself a shot at the same time you eat.

If you use a pump, you only use rapid acting insulin. The pump gives out rapid-acting insulin in small amounts on an ongoing basis. You also program your pump to give you a bolus of insulin for meals. See long acting insulin and bolus for more information.

Rapid acting insulins are:

Generic name	Brand name
Lispro	Humalog
Aspart	Novolog
Glulisine	Apidra

Reservoir, syringe, cartridge

This container holds the fast-acting insulin inside a pump.

Self-management

In diabetes, this means the ongoing process of managing diabetes. It includes when you:

- Plan meals
- Plan physical activity
- Check blood sugar
- Take diabetes medicines
- Handle diabetes when you are sick
- Handle low and high blood sugar
- Manage your diabetes on trips

People with diabetes design their own self-management treatment plan. They do this with the support of their diabetes team. This includes doctors, nurses, dietitians, pharmacists and others.

Sensitivity factor

This is the amount that a single unit of insulin lowers the blood sugar level in a person. Often this is first set at 50. But based on how a person reacts to insulin it can change.

A lower number, such as 25, means that the person is less sensitive to insulin. A higher number, such as 75, means that the person is more sensitive to insulin.

Sharps container

This is a container where you get rid of used needles and syringes. It is often made of hard plastic so that needles cannot poke through.

Self-monitoring of blood glucose (SMBG)

This is when you check your blood sugar with a blood sugar meter.

Short-acting insulin

Short-acting insulin covers insulin needs for meals. You give yourself a shot about 30 minutes before you eat. Short-acting insulin brand names are Humulin [R], Novolin [R] or ReliOn [R]. The generic name is regular insulin.

Starch

This is a type of complex carbohydrate. Some examples are bread, pasta and rice.

Sugar

A kind of carbohydrate that most often has a sweet taste. This includes glucose, fructose and sucrose. In the diabetes world, the word sugar is often used instead of glucose. Blood glucose and blood sugar mean the same thing.

Sugar alcohol

This is a sugar substitute. It has simple sugars with an alcohol molecule attached to them. This lowers the calorie content. It also delays the effect on blood sugar levels.

Syringe

This is a device used to inject medication or other liquids into body tissues. The syringe for insulin has a hollow plastic tube with a plunger inside. It also has a needle on the end.

Team management

This is an approach to treat diabetes where a team provides medical care. See Diabetes team for more information.

Total daily dose (TDD)

The total amount of insulin a person uses in a day. It means adding all the insulin doses: faster and slower acting insulin together. You use the TDD to help figure out the basal rate, carb factor and correction factor.

Tresiba

This is a brand drug name of one kind of basal insulin. The generic name for Tresiba is degludec. This long-acting basal insulin drug comes in two strengths written as either U100 or U200. See basal insulin and long-acting insulin for more information.

Toujeo

This is a brand drug name of one kind of basal insulin. The generic name for Toujeo is glargine. This long-acting basal insulin drug comes in one strength written as U300. See basal insulin and long-acting insulin for more information.

Type 1 Diabetes

In Type 1 Diabetes, the pancreas makes little or no insulin. This is because the beta cells in the body that make insulin are destroyed.

It is an autoimmune disease. This is caused by a defect where the body's internal defense system attacks a part of the body itself.

Most often, this type of diabetes appears suddenly. It is more common in people younger than 30. But it can appear at any age.

The ways to treat it are:

- Give daily insulin shots or use an insulin pump
- Count carbohydrates
- Exercise regularly
- Self-monitor blood sugar levels each day through finger sticks or by using a continuous glucose monitoring (CGM).

Units of insulin

This is the basic measure of insulin. U-100 insulin means 100 units of insulin per milliliter (mL) or cubic centimeter (cc) of solution.

It is a way to describe the concentration of insulin. In the United States, there are U100, U200, U300 and U500 insulins.