Guide to Diabetes Management

V.3 2025

Rady Children's Diabetes Clinic

Guide To Diabetes Management

Table of Contents

Guide To Diabetes Management

Introduction: Learning to Care for your Child with Diabetes

We are here to teach you what you need to know to care for your child's diabetes. Our goal is to provide you the education and the tools needed for your child to continue enjoying all their normal activities. Your child will be discharged from the hospital once your education team feels that you have the basic knowledge and skills to care for your child at home. Continued education and medical care will be provided to support you. Your child will attend regularly scheduled appointments with an endocrinologist or nurse practitioner. Our diabetes team is available in between visits for blood glucose reviews, to answer any questions, etc.

Our Diabetes Education Program

Rady Children's Diabetes Center's education program is recognized by the American Diabetes Association. We are committed to providing education services that are aligned with the National Standards for Diabetes Self-Management Education and Support and the American Diabetes Association DSMES Recognition requirements.

On diagnosis, families are required to receive comprehensive initial diabetes education. Initial education will be provided multiple times during hospitalization and in the outpatient clinic over a few months. Annual education visits are provided to assist with ongoing diabetes and support.

In the hospital, you will be provided with the skills and education needed to go home safely. Ongoing education will be scheduled once you are discharged. Continuing education will be available to you during your time with our clinic.

Your diabetes education will focus on the following areas:

- Diabetes Disease Process - What is Diabetes?
- Blood Glucose Monitoring – Glucose meters & Continuous Glucose Monitors
- Taking Medications – Insulin and Insulin Plans
- Hypoglycemia – What is low blood sugar and how to treat it
- Hyperglycemia & Sick Day Management
- Healthy Eating – Nutrition and Carbohydrate counting
- Being Active - Exercise
- Acute Complications & Chronic Complications
- Lifestyle & Healthy Coping - Resources
- Diabetes Distress & Support – Resources
- Following up at our Diabetes Clinic

Tips for Hospital Stay

Please review the binder and answer questions at the end of each section. Write down any questions you may have using the notes page at the end of the questions. This will help guide the education the nurse provides for you/your child and family. The RN will be caring for other patients during your hospital stay but will provide the necessary education needed to allow you/your child to return home safely.

Watch Diabetes videos

Go to: https://www.rchsd.org/programs-services/endocrinology-diabetes/patient-and-parent-education/

- Scroll down to Videos and Click on Rady Children's English
- A list of videos about diabetes will pop up – there are 7 short videos to watch

Download apps for Dexcom and Glooko or Freestyle Libre

Our goal is for all our patients to be on continuous glucose monitoring system and be connected to Glooko. Glooko allows your blood glucose data to be uploaded to your electronic medical record.

Watch Dexcom video: https://www.dexcom.com/training-videos
Watch Freestyle video: https://www.freestyleprovider.abbott/us-en/patient-training.html

Check out our website: Our website will provide you with patient education and many resources.

Pediatric Endocrinology and Diabetes | Rady Children's Hospital

https://www.rchsd.org/programs-services/endocrinology-diabetes/

Continuous Glucose Monitor (CGM) – the diabetes team will order a CGM to be placed on day 1 of admission. This will allow caregivers to view blood sugars continuously every 5 minutes.

How to get started on a CGM – please follow the following steps:

Apps*: **For user's phone:***

Dexcom G7:

Allows the person wearing the CGM to receive data on your smartphone

- Must download to set up Dexcom
- Needs to be on child's phone or adult that is with child most of day (there will be loss of data if child is not near the phone)
- Open app, select create account, verify through email address
- **Parent sets up an account then adds child as a user**
- TIP*:* Please have write down/save username and password for Dexcom account and take picture to save on phone

User name:_____ Password:_____

After setting up Dexcom account:

Go to *Connections* tab:

- Click on *Clarity Clinic* and add clinic code: **rchsdpeds**
- This will allow us to see you/your child's data when requested.
- Click on *Share* to invite family and friends to remotely see the CGM data.

For parent's phone:

Dexcom Follow: Allows family/friends to remotely see the CGM data.

- Needs to be on family phone (parents, grandparents, siblings, etc.)
- Can have up to 10 followers

Glooko:

- Allows data to be automatically sync'd into your electronic health record.
- Download Glooko app on the phone
- Create an account using the patient's name, date of birth and clinic's
- Click on Profile to connect to clinic: Proconnect code: **rchsdpeds**
- Set up Dexcom by clicking Sync in upper right corner – New Device or Add Device – select Dexcom. -- Next step will ask you to enter in username and passcode of Dexcom account.
- This will only need to be sync one time

CONNECTING YOUR DEVICE WITH GLOOKO: FreeStyle Libre CGMs

- Open or download the Glooko® Mobile App and log in.
- Tap “Sync device” on the home screen, tap the Blue “Add new device” button, select “Continuous Glucose Monitors” and then select “LibreLink”.
- Enter your LibreLink credentials and click “Sign In” to complete the pairing.
- Success! The sync is complete and LibreLink is displayed in your Device List.

ProConnect Code**: rchsdpeds**

CONNECTING YOUR DEVICE WITH GLOOKO: Dexcom CGMs

- Open or download the Glooko® Mobile App and log in.
- Tap “Sync device” on the home screen, tap the Blue “Add new device” button, select “Continuous Glucose Monitors” and then select “Dexcom”.
- Enter your Dexcom user name & password and click “Sign In” to complete the pairing.
- Success! The sync is complete and Dexcom is displayed in your Device List.

ProConnect Code**: rchsdpeds**

Glooko support: 1-800-206-6601

Libre 2 & 3 App Set Up

Register with your name and email address

Once connected, click the 3 lines in left hand corner
Click on Connected Apps

- *Click on Libre View and select connect to a practice*
- *Our Practice ID is 8589664032*
- *Libre View = connects your account to our clinic account*
- *LibreLinkUp – allows others to follow your trends*

Tips for Wearing Continuous Glucose Monitors (CGM)

- ✓ The person wearing the CGM needs to be within 15 feet of device retrieving data (phone, receiver).
- ✓ Make sure the CGM app (Dexcom or Freestyle Libre) is always running in the background, do not close out of app.
- ✓ Make sure Bluetooth is always on.
- ✓ If the cellphone dies – once turned back on, open the CGM app right away.
- ✓ Take photo of CGM codes.
- ✓ CGM's are waterproof – you can bathe, shower, swim. May have some loss of data if fully submerged in water. Come out of water for data to return.
- ✓ Compression low blood sugars can happen when pressure is placed on the device while sleeping. This is not a true reading of the person's blood sugar. You will want to move the person to release pressure of the device.
- ✓ An adhesion tip sheet is available on our website at https://www.rchsd.org/programs-services/endocrinology-diabetes/. Click on patient/parent education and scroll down to CGM section, taping tips.
- ✓ Occasionally Dexcom site will bleed. This is okay, "bleeders are readers". You can clean the site as best as you can and continue with use.
- ✓ Keep track of usernames and passwords.
- ✓ For technical problems with CGM call (loss of data, sensor errors) company.

Insurance/Pharmacy

- ✓ An order will be sent for the Dexcom to your local pharmacy of your choosing.
- ✓ The pharmacy will contact you to get your information, if you do not hear from them please call them.
- ✓ Once insurance has approved the Dexcom you will either pick it up at the pharmacy or it will be mailed to your home.
- ✓ You will need to reorder supplies every month or 90 days (about 3 months) depending on insurance. Please record where your Dexcom comes from. Try taking a picture of the label to remember.

What You Will Need for Discharge Home

- Watch the diabetes videos
- Download Dexcom app and Glooko app
- Demonstrate using glucometer and continuous glucose monitor
- Demonstrate administering insulin to you or your child
- Verbalize causes, treatments, signs and symptoms of hypo and hyperglycemia
- Perform urine ketone testing
- Answer questions after each section of the guidebook
- MyChart set up and able to send messages

Medications & Diabetes Supplies: It is important to write down/take photos of where you receive your diabetes medications and supplies. It may be the same pharmacy, or they may be different. This is all determined by your insurance and medical group.

When we prescribe medication such as insulin, testing supplies, continuous glucose monitors, the prescription is good for 1 year. You will be able to refill your supplies by calling that pharmacy or diabetes supply company. Your diabetes team will refill your supplies yearly at appointments. Some of your supplies may require prior authorization to get approved depending on your insurance. Our pharmacy technicians will assist in this process.

Let's make sure you have all your supplies before you go home. Please check off items before you leave!

- Glucometer
- Testing strips
- Lancets/lancet device
- Insulin syringes or pen needles
- Rapid acting insulin such as Novolog, Humalog, Admelog or Fiasp
- Intermediate insulin such as NPH (if applicable)
- Long-acting insulin such as Lantus, Tresiba, Semglee, Basaglar
- Glucose gel
- Glucagon (injectable or inhaled)
- Ketone strips
- Sharps Container
- Letter for school nurse with Dr's orders

Name of Pharmacy: _____ Phone Number: _____

Name of Diabetes Supply Company: _____Phone Number: _____

Guide To Diabetes Management

Contacting Your Diabetes Team
Nurses Line (858) 966-4032

MyChart: allows you to directly send and receive messages and lab results from your doctor.
Do not use MyChart for urgent matters.

Below are some guidelines for who to call and when to call you feel that you need help.

After Hospital Discharge until your first outpatient Diabetes Appointment
Monday -Friday 0830-1130am – call 858-966-4032, press option for nurse
Call in or send a MyChart message to report glucose values every 3 days.

If your child has a low blood sugar of less than 70, treat it as you normally would, and call the NEXT day. Do not wait 2-3 days to call in this case. If the next day is a weekend or holiday, you may call the On-Call nurse at 858-576-1700, press 0 for Operator (ask for Endocrinology).

After 2 weeks, you do not need to call if all blood glucose readings are between 90-200. Otherwise, continue to call or send a MyChart message every 3 days or sooner.

Guidelines for calling in Blood sugar numbers

- Have your child's logbook readily available or make sure your CGM (Dexcom) is connected to our clinic
- Report the blood sugars over the last 3 days, starting with pre-breakfast, pre-lunch, pre-dinner and pre- bedtime.
- If you have MyChart, please send this information in a message the night before and our nursing team will call you the next morning.

Urgent Matters

- Call Nurse Line on weekdays and On-Call nurse on weeknights and weekends

Things to keep in mind

On-call doctors provide care for patients during the day while they are in the hospital and clinic. In addition, they take calls from home overnight (often 5-6 days in a row).

Late night and overnight calls (after 9pm) should be reserved for urgent matters/questions

We are happy to provide guidance at any time, but non-urgent matters (calling in blood sugars or requesting refills) should be called in during the day. We appreciate your consideration and compliance with this request.

If you have a CGM and it failed – please contact the company of the product to report and get replacement. Insurance approval is based on prescription. We cannot send a prescription if the product fails. If you are without a CGM, then we ask that you check blood sugars with a glucometer.

Communicating with your Diabetes Team

Below are some guidelines for who to call and when to call when you feel that you need help.

After Hospital Discharge until your First Outpatient Diabetes Appointment:

- Call in or send a MyChart message to report blood glucose values every 3 days
- **Weekdays Mon - Fri 8:30 - 11:30 AM**
  - Call **858-966- 4032**, press option for nurse
- If your child has a low blood glucose LESS than 70, treat it as you normally would, and call the NEXT day. Do not wait 2-3 days to call in this case. If the next day is a weekend or holiday, you may call the **On-Call nurse (858-966-1700, press 0 for the operator)**.
- After 2 weeks, you do not need to call if all blood glucose readings are between 90 and 200. Otherwise, continue to call every 3 days, sooner if there is a low blood glucose less than 70.

Guidelines for Calling in Blood Sugar Numbers:

- Have your child's logbook readily available
- Report the blood sugar numbers over the last 3 days, starting with pre-breakfast, then pre-lunch, then pre-dinner, then bedtime blood sugar.
- If you have **MyChart**: please send this information in a message the night before and our nursing team will call you the next morning.

Call the Nurses Line at (858) 966-4032 from 8:30 am-4:30 pm on Mon-Fri if you need help with your children's diabetes care or for prescriptions

To Send a Message Directly to your Diabetes Team:

- **Sign up for MyChart**
- MyChart allows you to directly send and receive messages and lab results from your doctor
- Never leave messages for urgent matters. Call the Nurses Line on weekdays or the On-Call nurse on weeknights and weekends.

Urgent/Emergent Questions after 4:30pm or Weekends & Holidays: Call the On-Call Nurse at 858-966-1700, press 0 for operator, ask for the Diabetes On-Call Nurse

To Schedule an Appointment:

- Call (858) 966-5999
- You may also schedule appointments on MyChart

Things to Keep in Mind:

- On-Call doctors are providing care for patients during the day while they are in the hospital and the clinic and during the night when they are at home (often 5-7 days in a row)
- **Late-night and overnight calls (after 9 pm) should be reserved for urgent questions**
- We are happy to provide guidance at any time, but non-urgent matters (such as calling in blood sugars and requesting prescription refills) should be called in during the day. We appreciate your consideration and compliance with this request.

Glossary of Terms

Type 1 Diabetes: The most common type found in children and young adults. This condition occurs when the pancreas does not make enough insulin. Thus, insulin injections are always required.

Type 2 Diabetes: The condition in which the body typically still makes insulin but is unable to use it effectively to metabolize sugar. The most common type of diabetes in adults over the age of 40 years but can also be found in overweight preteens and teenagers, especially those with a family history. Insulin is still made in normal or increased amounts, but it does not work very well in helping the body use sugar.

Endocrinologist: A physician who specializes in diabetes.

Insulin: A substance (hormone) made by the pancreas that allows sugar to pass into cells.

Glucagon: A hormone made in the pancreas, like insulin. It has the opposite effect of insulin and raises blood sugar level.

Ketones: A substance made by the body when there isn't enough insulin, so sugar cannot be used for energy. Acids form when the body breaks down fat for energy.

Diabetic Ketoacidosis: Occurs when ketones (acid) build up in your body when there is not enough insulin. The longer the body is without insulin, the higher the ketone (acid) build up is.

Hyperglycemia: High blood sugar.

Hypoglycemia: Low blood sugar.

Carbohydrates: Sugar molecules. Along with protein and fat, carbohydrates are one of three main nutrients found in foods and drinks. The body breaks down carbohydrates into glucose. Glucose, or blood sugar, is the main source of energy for the body's cells, tissues, and organs. Glucose can be used immediately or stored in the liver and muscles for later use.

Pancreas: The organ where insulin is normally made. People with type 1 diabetes cannot make enough insulin and are thus insulin deficient and are dependent on insulin given as injections or by an insulin pump. The rest of the pancreas works normally.

Beta Cells: The groups of cells within the pancreas that make insulin.

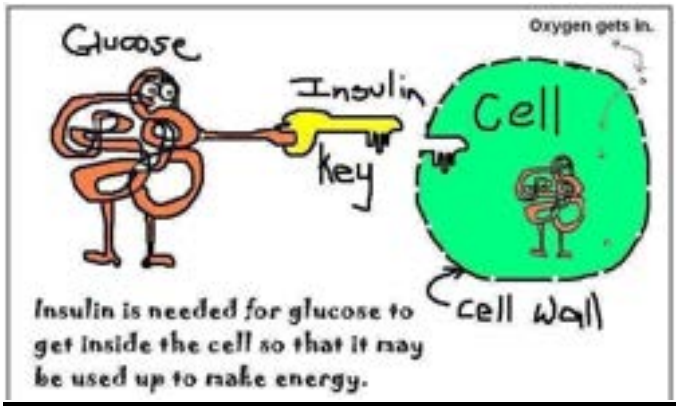
Islet Autoantibody: The labs we measure in a person's blood to show that they have had an immune reaction against the cells (islet cells) in the pancreas that make insulin, or against insulin itself. They are present in the blood of people with type 1 diabetes. People with type 2 diabetes do not typically have these antibodies.

Type 1 diabetes is one of the most common chronic conditions of childhood. This condition occurs when the pancreas does not make enough insulin. Thus, insulin injections are always required. T1D is due to an autoimmune disease and the cause is not known, other than the body attacks cells in the pancreas that produce insulin.

Symptoms of type 1 diabetes include:

- Frequent urination
- Frequent drinking of liquids
- Weight loss
- Changes in appetite
- Changes in behavior

Why do we need Insulin?
Insulin allows sugar to pass into our cells so that it can be used for energy.



When glucose is in the blood stream, it cannot enter the cells by itself. It needs insulin. Insulin is a hormone produced by the beta-cells in the pancreas and secreted into the bloodstream. Acting as a key, insulin unlocks the cells to let glucose enter. Then, the cell can break glucose down into energy so you can run, swim, ski and do all your activities. For most people, the pancreas makes and secretes insulin to help glucose enter cells. For people with type 1 diabetes, the pancreas no longer produces its own insulin. They must receive insulin from an injection or an insulin pump.

What happens if you don't have insulin?
Your glucose cannot enter your cells, but your body is still hungry for energy. Since your cells cannot use glucose, your body starts to break down fat and muscle to use for energy. This breakdown causes ketones. Ketones can make you extremely sick and cause DKA (Diabetic Ketoacidosis).

Diabetes Disease Questions:

In type 1 diabetes, without insulin, glucose levels will:

a. Stay the same
b. Keep getting higher
c. Keep getting lower
d. Fluctuate between high and low
e. I am not sure

In type 1 diabetes, the immune system

a. Attacks the pancreas
b. Attacks the liver
c. Attacks the stomach
d. Attacks the kidneys
e. I am not sure

Insulin is a hormone that

a. Raises glucose levels
b. Lowers glucose levels
c. Makes you feel satisfied after meals
d. Helps you lose weight
e. I am not sure

Glucagon is a hormone that

a. Raises glucose levels
b. Lowers glucose levels
c. Makes you feel satisfied after meals
d. Helps you lose weight
e. I am not sure

Notes:

Monitoring Blood/CGM Sugar Monitoring

The goal for people living with diabetes is to manage blood sugars as effectively as possible to prevent excessive low and high values while enjoying life to the fullest. Blood glucose testing is one of our tools to help you know if your child's blood glucose is in the target range (70-180).

Why is it important to check blood glucose values?

- To make sure blood glucose is in target range (70-180)
- For safety (especially before driving a car or exercising)
- To know if blood sugar is too low (hypoglycemia) or too high (hyperglycemia)
- To determine the correct insulin dose
- To let you know how stress, activity, illness, or food affects blood glucose
- To reduce risk of hypoglycemia and DKA

When do I need to check my glucose values? While you are in the hospital and insulin doses are changing, you will need to check your blood glucose values (either by glucose meter or CGM):

- When you first wake up
- Before each meal or snack containing carbohydrates
- Before bedtime
- Overnight as directed
- Before/after activity
- Feeling symptoms of hypoglycemia
- Illness
- Before driving

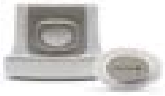
Blood Sugar (Glucose) Meters

You will be provided with a blood glucose meter, blood glucose strips, lancet device, and lancets based on your insurance plan. A glucose meter is used to measure the amount of glucose in your blood. It is a portable medical device that tests your blood through a fingerstick sample.
You will always need to have a working glucometer available

Continuous Glucose Monitor (CGM): A CGM is a small, wearable device that will measure glucose levels every 1-5 minutes throughout the day and night. A tiny wire sensor is inserted under the skin and measures glucose values in the subcutaneous fluid.

- CGM reads glucose levels from the interstitial fluid
- Blood glucose meters read glucose levels from the blood
- Readings can be different but are still considered accurate
- Usually within 20% of each other, unless the blood sugar levels are rapidly rising or falling
- The CGM and meter will report different glucose levels, this is normal
- FDA Approved for dosing and treatment decisions

If the glucose alerts and readings from the CGM do not match symptoms or expectations, use a blood glucose meter to make diabetes treatment decisions



Dexcom: www.dexcom.com

Dexcom videos – www.dexcom.com/training-videos
Dexcom G7 and G6 Training Videos | CGM Tutorials | Dexcom
Technical support for equipment issues: 1-844-607-8398
Dexcom Care for issues with the sensor or apps: 1-877-339-2664

Insurance/Pharmacy Tips:

- A prescription will be sent for the Dexcom to your local pharmacy of your choosing.
- The pharmacy will contact you to get your information. If you do not hear from the pharmacy, please call them.
- Once the insurance has approved Dexcom, you will either pick it up at the pharmacy or it will be mailed to your home.
- You will need to reorder supplies every month or 90 days (about 3 months) depending on insurance. Please record where your Dexcom comes from. It is helpful to take pictures of shipping labels.

Freestyle Libre: **www.freestyle.abbott**

Freestyle videos- Freestyle Abbott
Support | Product Guides & Tutorials | FreeStyle Libre (CGM) systems
Tips for Wearing Continuous Glucose Monitors:

- The person wearing the CGM needs to be within 15 feet of the device retrieving data (phone, receiver).
- Make sure Dexcom G7 app is always running in the background, do not close out of app.
- Make sure Bluetooth is always on.
- If the cellphone dies – once turned back on, open Dexcom G7 app right away.
- Take photos of Dexcom sensor codes.
- Dexcom is waterproof – you can bathe, shower, swim. May have some loss of data if fully submerged in water. Have your child periodically come out of water for data to return.
- Compression low blood sugars can happen when pressure is placed on the device while sleeping. This is not a true reading of the person's blood sugar. You will want to move the person to release the pressure of the device.
- An adhesion tip sheet is available on our website at https://www.rchsd.org/programs-services/endocrinology-diabetes/. Click on patient/parent education and scroll down to CGM section, taping tips.
- Occasionally Dexcom site will bleed. This is okay, "bleeders are readers". You can clean the site as best as you can and continue with use.
- Keep track of usernames and passwords.
- For technical problems (loss of data, sensor errors) with CGM, contact Dexcom.

Blood Glucose Monitoring

A continuous glucose monitor:
a. Measures glucose from the blood, the same as a glucose meter does
b. Measures glucose from the fluid between the cells
c. Measures glucose from the skin
d. I am not sure

If the number on your glucose meter and continuous glucose monitor are not the same:
a. That is to be expected because they measure glucose from different sites
b. That is not a concern because there is a lag in glucose readings with a continuous glucose monitor
c. That is a concern because the numbers should be the same
d. I am not sure

If your continuous glucose monitor does not last 10 days, what is your next step:
a. Call my pharmacy to get more refills
b. Call the device company to report the device did not last and request replacement
c. Call my dr's office to request a replacement
d. I am not sure

If you are not using your continuous glucose monitor, it is important to check blood glucose levels a minimum of:
a. Twice a day
b. Three times a day
c. Four times a day
d. I am not sure

For people living with type 1 diabetes, the goal is to have at 70% of the blood sugar values to be:
a. 50-100
b. 70-180
c. 180-240
d. None of the above
e. I am not sure

Notes:

PANTHER™
Diabetes Technology. Deciphered.™

Time in Range Explained

Glucose targets for Type 1 Diabetes are moving away from **A1c** and toward how much **time is spent between 70–180 mg/dL.**

This is called **Time in Range** (TIR) and is calculated from CGM or fingerstick blood glucose (if more than 4/day).

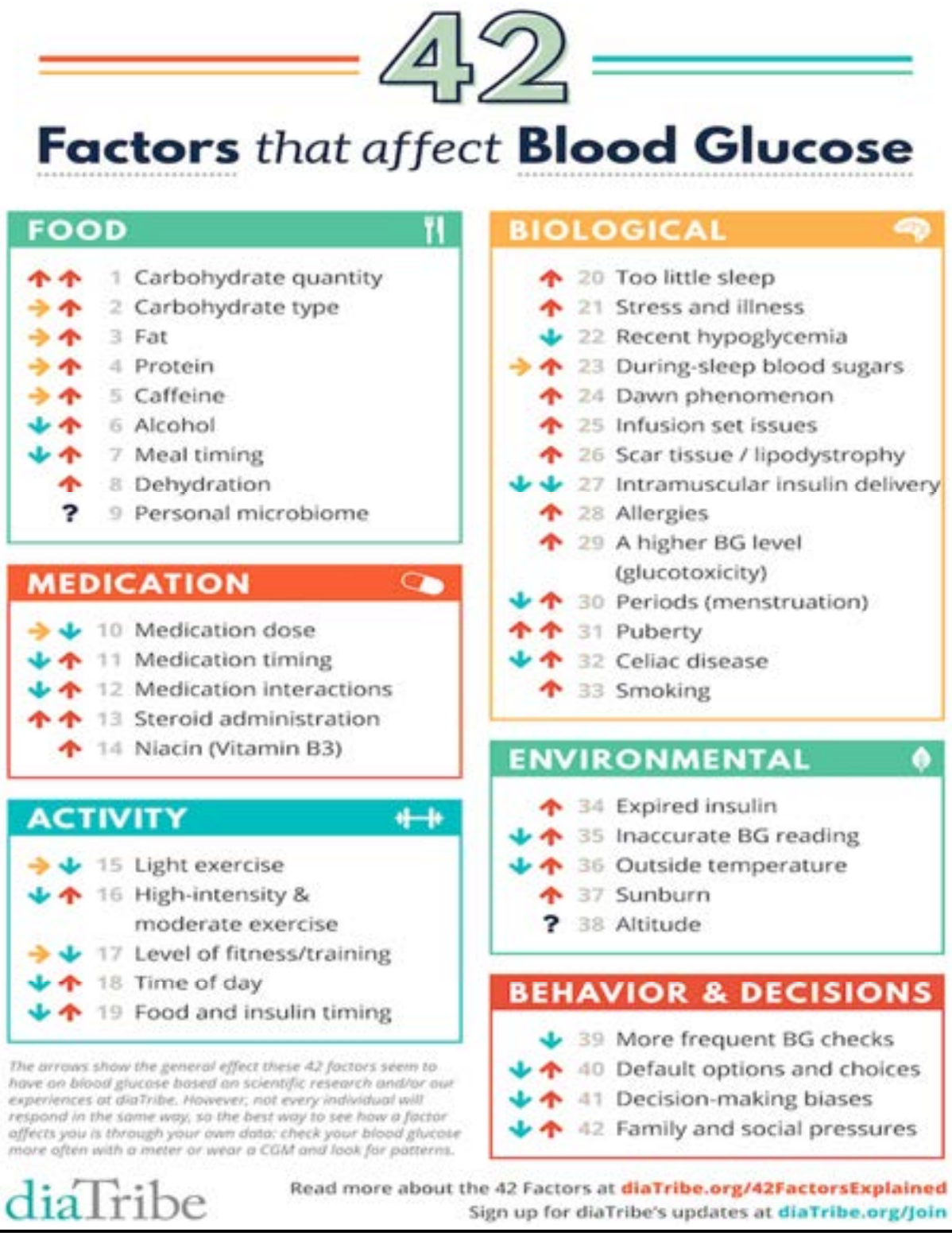
TIR gives a better picture of how often you have high and low glucose levels.

Diabetes Care 2019 doi: 10.2337/dci19-0028

A1c	Time-In-Range
10	10%
9.5	20%
9	30%
8.5	40%
8	50%
7.5	60%
7 GOAL	70%
6.5	80%
6	90%

The American Diabetes Association (ADA) goals for most people with diabetes is a Time in Range of 70%, which correlates to an A1c of around 7.

Try setting personal goals to increase your TIR, which can improve your lifelong health with diabetes!


42
Factors that affect Blood Glucose
FOOD
1 Carbohydrate quantity
2 Carbohydrate type
3 Fat
4 Protein
5 Caffeine
6 Alcohol
7 Meal timing
8 Dehydration
9 Personal microbiome
MEDICATION
10 Medication dose
11 Medication timing
12 Medication interactions
13 Steroid administration
14 Niacin (Vitamin B3)
ACTIVITY
15 Light exercise
16 High-intensity & moderate exercise
17 Level of fitness/training
18 Time of day
19 Food and insulin timing
BIOLOGICAL
20 Too little sleep
21 Stress and illness
22 Recent hypoglycemia
23 During-sleep blood sugars
24 Dawn phenomenon
25 Infusion set issues
26 Scar tissue / lipodystrophy
27 Intramuscular insulin delivery
28 Allergies
29 A higher BG level (glucotoxicity)
30 Periods (menstruation)
31 Puberty
32 Celiac disease
33 Smoking
ENVIRONMENTAL
34 Expired insulin
35 Inaccurate BG reading
36 Outside temperature
37 Sunburn
38 Altitude
BEHAVIOR & DECISIONS
39 More frequent BG checks
40 Default options and choices
41 Decision-making biases
42 Family and social pressures
The arrows show the general effect these 42 factors seem to have on blood glucose based on scientific research and/or our experiences at diaTribe. However, not every individual will respond in the same way, so the best way to see how a factor affects you is through your own data: check your blood glucose more often with a meter or wear a CGM and look for patterns.
diaTribe
Read more about the 42 Factors at diaTribe.org/42FactorsExplained
Sign up for diaTribe's updates at diaTribe.org/Join

Insulin

As explained, people with type 1 diabetes need to take insulin by injection since their own body does not produce insulin. People with type 2 diabetes, their body still makes insulin, but it may not make enough, or it may not work correctly. You may need extra insulin. Insulin cannot be taken by mouth since the stomach is extremely acidic and would destroy the insulin. Insulin is injected below the skin into the fat (subcutaneously) with a fine needle. There are several different types of insulin that cover different needs.

Insulin Therapy

Basal bolus insulin injection therapy is a common type of insulin therapy.

Basal insulin (long-acting): is your 24-hour insulin and is usually taken once per day. Take it at the same time every day. The dose typically does not change from day to day. It will keep your blood glucose in range if you do not eat.

Bolus insulin (rapid-acting): is taken every time you eat carbohydrates (a meal dose) and/or when blood glucose is above your goal (a correction dose). Your total dose before each main meal (breakfast, lunch and dinner) will be meal + correction dose. Your dose for snacks, between meals, will typically be meal dose only (see "three-hour rule below). The dose amount changes based on glucose and carbohydrate intake. You may need extra bolus insulin when ketones are present.

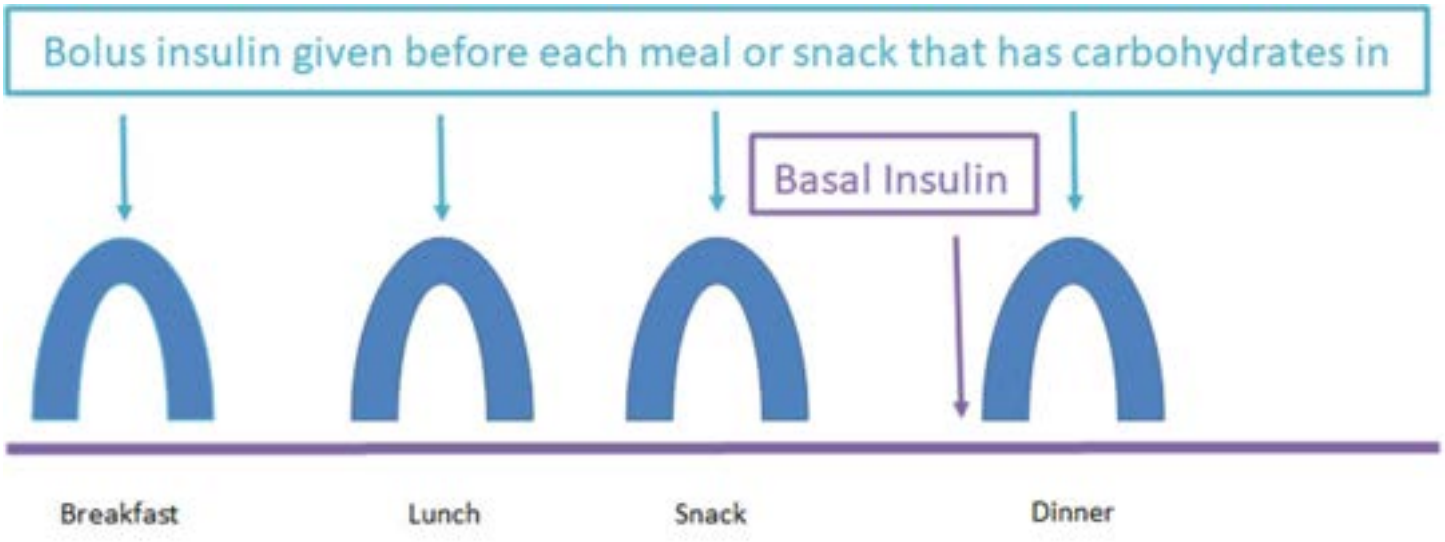
The "three-hour rule" for rapid acting insulin prevents "insulin stacking" and potential low blood glucose and hypoglycemia. What is the three-hour rule?

When eating carbohydrates, always give a meal bolus to cover the carbohydrate you are eating. If it has been more than 3 hours since you last gave rapid-acting insulin, your dose of insulin would include a meal bolus + a correction bolus. If you took insulin less than 3 hours ago, your dose of insulin would include only your meal bolus. If you were to include a correction bolus, you are "insulin stacking" and this could result in a low BG from taking too much insulin.

Intermediate-acting insulin (NPH) is usually taken before breakfast, mixed and injected with rapid-acting insulin. Some children will take NPH with their morning injection as NPH starts to work around lunch time. It is taken to cover the carbohydrates eaten at lunch and avoids the need for an injection during school time. Children taking NPH need to eat lunch of set carbohydrates, 4-6 hours after taking the injection. Intermediate-acting insulins must be gently mixed before using.
All types of insulin should be kept in the refrigerator prior to opening but should never be frozen. Once opened, insulin should be stored at room temperature (avoid excessive heat or cold).

An illustration of the action of each insulin

The purple line below represents **basal** insulin that is given once a day, usually at dinner. It is long-acting, lasting about 24 hours in the body. The blue hump represents the **bolus** insulin that is given for meals and snacks containing carbohydrates. It is rapid acting; it works quickly but only lasts about 3-4 hours in the body.



Insulin Therapies:

Type of Insulin	Vial	3ml Pen	3ml half unit Pen	3ml Cartridge	Color	Onset	Peak	Duration	Expiration once opened	Side Effects
Rapid Acting – Bolus										
Novolog	Yes	FlexPen	Echo	Yes	Clear	15 minutes	1-2 hours	3-4 hours	28 days	Hypoglycemia
Humalog	Yes	KwikPen	KwikPen JR	Yes	Clear	15 minutes	1-2 hours	3-4 hours	28 days	Hypoglycemia
Admelog	yes	SoloStar	No	No	Clear	15 minutes	1-2 hours	3-4 hours	28 days	Hypoglycemia
Lyumjev	Yes	KwikPen	KwikPen JR	No	Clear	15 minutes	1-2 hours	3-4 hours	28 days	Hypoglycemia
Apidra	Yes	SoloStar	No	No	Clear	15 minutes	1-2 hours	3-4 hours	28 days	Hypoglycemia
Fiasp	Yes	Flex Touch	No	Yes	Clear	15 minutes	1-2 hours	3-4 hours	28 days	Hypoglycemia
Long Acting – basal insulin										
Lantus	Yes	SoloStar	No	No	Clear	1-2 hours	No peak	24-26 hours	28 days	Hypoglycemia Burning at injection site
Basaglar	No	KwikPen	No	No	Clear	1-2 hours	No peak	24-26 hours	28 days	Hypoglycemia Burning at injection site
Semglee	Yes	Generic	No	No	Clear	1-2 hours	No peak	24-26 hours	28 days	Hypoglycemia Burning at injection site
Toujeo	No	SoloStar U-300	No	No	Clear	1-2 hours	No peak	24-26 hours	56 days	Hypoglycemia Burning at injection site
Tresiba	Yes	Flex Touch	No	No	Clear	60 minutes	No peak	42 hours	56 days	Hypoglycemia
Intermediate Acting										
Humulin N	Yes	KwikPen	No	No	Cloudy	1-2 hours	4-6 hours	12-18 hours	28 days	Hypoglycemia
Novolin N	Yes	FlexPen	No	No	Cloudy	1-2 hours	4-6 hours	12-18 hours	28 days	Hypoglycemia

Information on Ways to Administer Insulin

Insulin Syringes

The traditional way to give insulin is to use an insulin syringe. Insulin is drawn from a vial into a syringe and injected into the body. This is different than a traditional medication syringe. Insulin syringes measure insulin as units not milliliters. A standard insulin syringe holds either 3/10 cc (30 units), ½ cc (50 units), or 1 cc (100 units). A 3/10 cc syringe is simpler to use with small insulin doses (30 units or less). This is probably the size of insulin syringe you will use.

Insulin Pens

An insulin pen (or just "pen") is an insulin delivery system that looks like a large pen, uses an insulin cartridge rather than a vial, and uses short and thin disposable needles. The disposable pens come with a prefilled insulin cartridge and are thrown away when the pen is empty or after being used for a month, whichever is sooner.

Using a pen is quite easy. You simply screw on a pen needle, prime to clear out any air in the needle, dial the desired dose, inject the needle, and press the button to deliver the insulin. Pens are easy enough for kids to use and are excellent for use at school or while out and about.

Pen needles are removed after each use to prevent air from entering the cartridge and to prevent insulin from leaking out. There are many different pen needles available, in varying lengths and diameters.

The smallest pen needles are very short and very thin and help minimize the discomfort of injection. Unlike syringes, pens need to be held in place for several seconds after the insulin is delivered to ensure that no insulin leaks out. Syringe users who switch to pens should pay close attention to the injection site and monitor their blood glucose as they become accustomed to pen injections.

Dosing increments vary by pen, with some pens allowing 1/2-unit dosing, while others dose in one- or two-unit increments. While pens offer injection convenience, they don't allow mixing of multiple insulins, so if you inject short and long-acting insulins together (e.g., Humalog and Lantus), you'll double your number of injections.

Pens offer reliability in dosing accuracy compared with syringes. Also, because dosing with a pen involves dialing a mechanical device and not looking at the side of a syringe, insulin users with vision problems can be assured of accurate dosing with a pen.

Smart Pens

Smart insulin pens are the next generation, taking advantage of precision dosing with an app that can import glucose results, calculate recommended insulin doses, and keep track of dosing history. Smart pens can also share digital data with healthcare providers and caregivers, in addition to the convenience of having insulin handy while on the go. For more information, you can look up the InPen online.

Insulin Pumps

Instead of using insulin syringes or insulin pens, some people use insulin pumps (also called continuous subcutaneous insulin infusions or CSII). An insulin pump is a small device, about the size of a deck of cards, which is worn outside the body. It delivers rapid-acting insulin into the body through an infusion set – a small, flexible plastic tube which is put into the skin using a tiny needle. Think of the infusion set like an IV except it goes in the subcutaneous tissues (fat tissue just under the skin) rather than a vein or artery. The infusion set needle starts at the site but is then removed; the plastic catheter stays behind to deliver the dose. The plastic catheter is short, fine and flexible so you usually can't feel it once it's in place. The infusion set connects to the pump and needs to be replaced every 2-3 days.

Insulin pumps deliver insulin in two ways:

- Basal rate is the background/continuous drip of insulin 24 hours a day. Pumps automatically deliver small doses of rapid-acting insulin throughout the day to simulate how the pancreas delivers basal insulin. This takes the place of the injectable once a day long-acting insulin dose.

- Bolus insulin is given immediately at the touch of a button to cover carbohydrates consumed or if a correction dose is needed to lower a high blood sugar level. This is called the bolus dose. The user needs to enter glucose levels and carbohydrates regularly for delivery of insulin for food and correction boluses.

The pump acts as a mini calculator. It can tell if a correction dose is needed based on your blood sugar value, total carbohydrates consumed and length of time since your last insulin dose. The pump rate can also be slowed down or sped up for a prescribed amount of time. For example, if you are exercising and do not want to get low blood sugar during your workout, you could temporarily stop or decrease the basal rate while you're exercising. The latest insulin delivery systems, called Automated Insulin Delivery (AID), combine CGM and insulin pump technologies. AID systems use CGM data to automatically increase or decrease insulin delivery through the pump, to keep glucose levels in range while decreasing some of the work of managing diabetes. The pump offers great blood sugar control without the need for daily shots. Keep in mind that an insulin pump needs to be worn 24 hours a day.

The insulin pumps currently prescribed by our clinic are the Medtronic 780G, Tandem t:Slim, Tandem Mobi, Omnipod and iLet insulin pump. You can go online and research these pumps if you are interested. You should also check if the device is covered by your insurance. You will need to talk to your doctor about starting on a pump. Most pumps require that the person needs to be using a minimum amount of insulin before starting. You will also need to attend an “Introduction to Insulin Pumps” class where you will learn about insulin pumps.

Choosing the right method for administering insulin should be based on individual needs, lifestyle, and guidance from healthcare providers. Each method offers different benefits that can help effectively manage diabetes while considering personal comfort and practical implications. Always consult your healthcare team when deciding on insulin methods to ensure the best approach for your health.

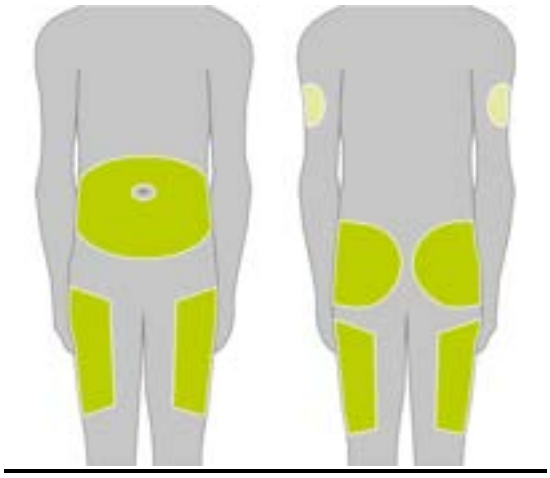
References

Diabetes Technology. Deciphered. | PANTHER Program www.pantherprogram.org – Device Comparisons
U-M Pediatric Diabetes Clinic | Forms & Handouts https://www.umpedsdiabetes.com/forms-handouts - Comparing diabetes devices

Drawing Up and Giving Insulin

Insulin is injected into the fat layer beneath the skin. Proper technique is important so that insulin is not injected too shallow into the skin (which may cause a lump, pain or red spot and slower absorption of insulin) or too deep into the muscle (which may cause pain and insulin to be absorbed too quickly). Insulin can be given by a syringe or an insulin pen.

Injection Sites:



- Abdomen (stomach): Stay 2 inches away from the belly button or scars. Insulin is absorbed the fastest from the abdomen.
- Arms: Measure one hand width down from the shoulder and one hand width up from the elbow. Use the fleshy outer surface.
- Legs: Measure one hand width down from the groin and one hand width up from the knee. Use the top and outer part of the leg, staying away from the inner part of the thigh.
- Buttocks: Use the upper outer area.

Injecting cold insulin may sting. If you store your insulin in the refrigerator, warm it to room temperature before injecting.

Insulin Storage: Keep unopened bottles/pens of insulin in the refrigerator or in a cool place. Opened bottles may be kept at room temperature, away from direct sunlight. Insulin vials, pens and cartridges expire 30 days after opening.

Drawing Up Insulin with an Insulin Syringe and Insulin Vial:

YouTube video: Cincinnati Children's video How to Draw Up an Insulin Syringe | Cincinnati Children's

Gather everything you will need:

- The bottle/bottles you will be using (double check the insulin vial to make sure you have the correct insulin)
- Syringe. Insulin syringes come in 3 different sizes. 3/10 ml holds up to 30 units of insulin and are available with both whole and half unit markings. 1/2 ml holds up to 50 units of insulin and 1 ml holds up to 100 units of insulin
- Alcohol wipes the tops of bottles
- Current insulin plan

Steps for drawing up insulin:

1. Wash your hands with soap and water
2. Clean the rubber stopper on the insulin vial with an alcohol pad
3. Check blood glucose or CGM for current glucose value
4. Determine the amount of carbohydrates that will be eaten
5. Calculate insulin dose from current insulin plan.
6. Pull back the syringe plunger until the top edge of the plunger tip lines up with the correct number of insulin units you will give.
7. Push the needle through the rubber stopper of the insulin vial. Then push the plunger down, forcing the air into the vial. Leave the needle in the vial.
8. Turn the vial and the syringe upside down and hold together with one hand at eye level. Use the other hand to pull down the plunger to the unit line slightly below the dose of insulin you will give.
9. Check the syringe for air bubbles. Air bubbles are not dangerous but take up space preventing you from giving a full insulin dose. If any are present, push the plunger all the way up pushing all the insulin back into the vial. Pull the plunger back down pulling insulin to the correct amount of insulin you need to give. This process might need to be repeated 2 or 3 times to remove all air bubbles.
10. Take the needle out of the vial. Now you are ready to give the insulin.

Preparing an Insulin Pen:

Gather everything you need

- The insulin pen you will be using
- An insulin pen needle
- Alcohol wipe
- Your insulin plan

1. Clean the rubber stopper on the end of the insulin pen.
2. Remove the paper tab from the needle and screw the needle on tight to the end of the pen
3. Clean the skin where the injection will be given
4. Remove the outside cap and needle cover
5. Enter 2-3 units in the pen as a “priming dose”. With the needle pointed upward into the air, push the plunger, and observe that the insulin comes out. Repeat if no insulin is seen. Priming ensures that the full dose of insulin is given and that the pen is working.
6. Dial the correct dose of insulin to be given.

Injecting Insulin

1. Choose the area of the body where you are going to give the injection. Rotate/change the spot where you give your insulin to prevent swelling, lumps, and scar tissue.
2. Make sure the area you will be giving the injection is clean.
3. Pinch up the skin and inject insulin into fatty tissue making sure to push the plunger of the syringe or pen all the way down.
4. After the insulin is in, wait at least 3-5 seconds before removing the needle. This will help avoid insulin leakage from the injection site. If you are using an insulin pen, make sure the dosing window is at 0 before removing the needle.
5. Place the syringe or pen needle in a sharps container.

Safe Disposal of Needles (Sharps)

It is important not to throw needles directly into the trash. Someone could get stuck with the needle. You can buy red sharps container at your pharmacy, or you can use an empty hard plastic container with a cap (like a bleach or liquid laundry detergent bottle). When the container is full, place the lids on the container and tape the lid with heavy tape. Write “sharps” on the container. Your full containers can be brought to the Rady Diabetes Clinic or search WasteFreeSD.org for a sharp disposal location near your home.

Understanding Your Insulin Plan

Rapid-acting (bolus) insulin will need to be given:
- When eating carbohydrate containing foods.
- When glucose is high and correction rules allow.
- When ketones are present.

When calculating a rapid-acting (bolus) insulin dose, you will need to understand the following terms:
- Carbohydrate Ratio: The number of grams of carbohydrates that will be covered by one unit of rapid-acting insulin.
- Correction Scale: How much rapid-acting insulin you will need to give to correct a high glucose level to your target range.

1. Set Carbohydrate Insulin Plan

In a set carbohydrate insulin plan, the amount of insulin is kept constant from day to day. The amount of carbs is kept the same for each meal and snack from one day to the next. Often families start with this insulin plan and then move to a flexible carbohydrate plan as you gain confidence and carb-counting skills.

Breakfast	Lunch	Dinner	Bedtime (more than 3 hours after dinner)
		LONG (**basal**)acting insulin units	
RAPID acting insulin **correction bolus**	RAPID acting insulin **correction bolus**	RAPID acting insulin **correction bolus**	RAPID acting insulin **correction bolus**
Glucose Dose	Glucose Dose	Glucose Dose	Glucose Dose
70-150 ____units	70-150 ____units	70-150 ____units	70-150 ____units
151-200 ____units	151-200 ____units	151-200 ____units	151-200 ____units
201-250 ____units	201-250 ____units	201-250 ____units	201-250 ____units
251-300 ____units	251-300 ____units	251-300 ____units	251-300 ____units
301-350 ____units	301-350 ____units	301-350 ____units	301-350 ____units
351-400 ____units	351-400 ____units	351-400 ____units	351-400 ____units
>401 ____units	>401 ____units	>401 ____units	>401 ____units

2. Flexible Carbohydrate Insulin Plan

Adjusting insulin for carbohydrates involves counting the carbs that are to be eaten and adjusting the insulin dose to match. This allows for greater freedom and flexibility in food choices. To calculate the dose, you will need to know the number of grams of carbohydrates that will be eaten PLUS the current glucose level.
To calculate the carbohydrate bolus, you will take the grams of carbohydrates to be eaten and divide it by the carb ratio for that meal. To calculate the correction bolus, you will take the current glucose level and find the dose on the correction scale for that time. You will then add the carbohydrate bolus and correction bolus together for the total insulin bolus.

Breakfast	Lunch	Dinner	Bedtime (more than 3 hours after dinner)
		LONG acting **(basal)** insulin units	
RAPID acting insulin **correction bolus**	RAPID acting insulin **correction bolus**	RAPID acting insulin **correction bolus**	RAPID acting insulin **correction bolus**
Glucose Dose	Glucose Dose	Glucose Dose	Glucose Dose
70-150 _____units	70-150 _____units	70-150 _____units	70-150 _____units
151-200 _____units	151-200 _____units	151-200 _____units	151-200 _____units
201-250 _____units	201-250 _____units	201-250 _____units	201-250 _____units
251-300 _____units	251-300 _____units	251-300 _____units	251-300 _____units
301-350 _____units	301-350 _____units	301-350 _____units	301-350 _____units
351-400 _____units	351-400 _____units	351-400 _____units	351-400 _____units
>401 _____units	>401 _____units	>401 _____units	>401 _____units
PLUS	**PLUS**	**PLUS**	**PLUS**
1 unit for every _____g	1 unit for every _____g	1 unit for every _____g	SNACKS: 1 unit for every ___g

Taking Medications

How does insulin work?

a. Insulin lowers blood glucose by releasing it into the urine
b. Insulin lowers blood glucose by moving it from the blood into the cells
c. Insulin raises blood glucose by keeping it from entering the cells, so it stays in the bloods
d. Insulin lowers the amount of glucose made by the stomach
e. I am not sure

Large air bubbles in the syringe/pen needle:

a. Are not a problem
b. Can damage red blood cells if they are injected
c. Could lower the amount of injected insulin by taking up space in the syringe/pen
d. Are caused by bacterial contamination of the insulin
e. Can get into your blood vessels and go to your heart
f. I am not sure

Rapid acting insulin should be taken:

a. With no other type of insulin
b. Before meals and carbohydrate containing snacks
c. One time each day before bed
d. I am not sure

Injecting insulin into hard lumps under the skin:

a. May cause highs you can't predict
b. Is caused by rotating injection sites
c. Is not good because insulin won't absorb well
d. Both A and C
e. All the above
f. I am not sure

How long does rapid acting insulin stay active in your body:

a. 15 minutes
b. 90 minutes
c. 3-4 hours
d. I am not sure

If a person with type 1 diabetes is taking long-acting (basal) insulin (Lantus, Tresiba, Basaglar):

a. They also need to give rapid acting insulin with meals and snacks
b. They need only to give insulin 1 time a day
c. They don't need to check their blood glucose as often
d. They will need to eat breakfast to cover the long acting "peak"
e. I am not sure

The main purpose of carbohydrate counting is to:

a. Help people with diabetes lose weight
b. Make sure that the same amount of carbohydrates are eaten at every meal
c. Help people with diabetes determine the amount of insulin they need with the meal
d. None of the above
e. I am not sure

It is important for a person with diabetes to count carbohydrates in the foods they eat because:

a. Carbohydrates have the most immediate effect on blood glucose
b. Carbohydrates are bad for people with diabetes and should be eaten in very small amounts
c. Insulin dose depends on the amount of carbohydrates eaten
d. Both A and C
e. I am not sure

Notes:

Acute Diabetes Complications: Hypoglycemia

Hypoglycemia means low blood glucose.

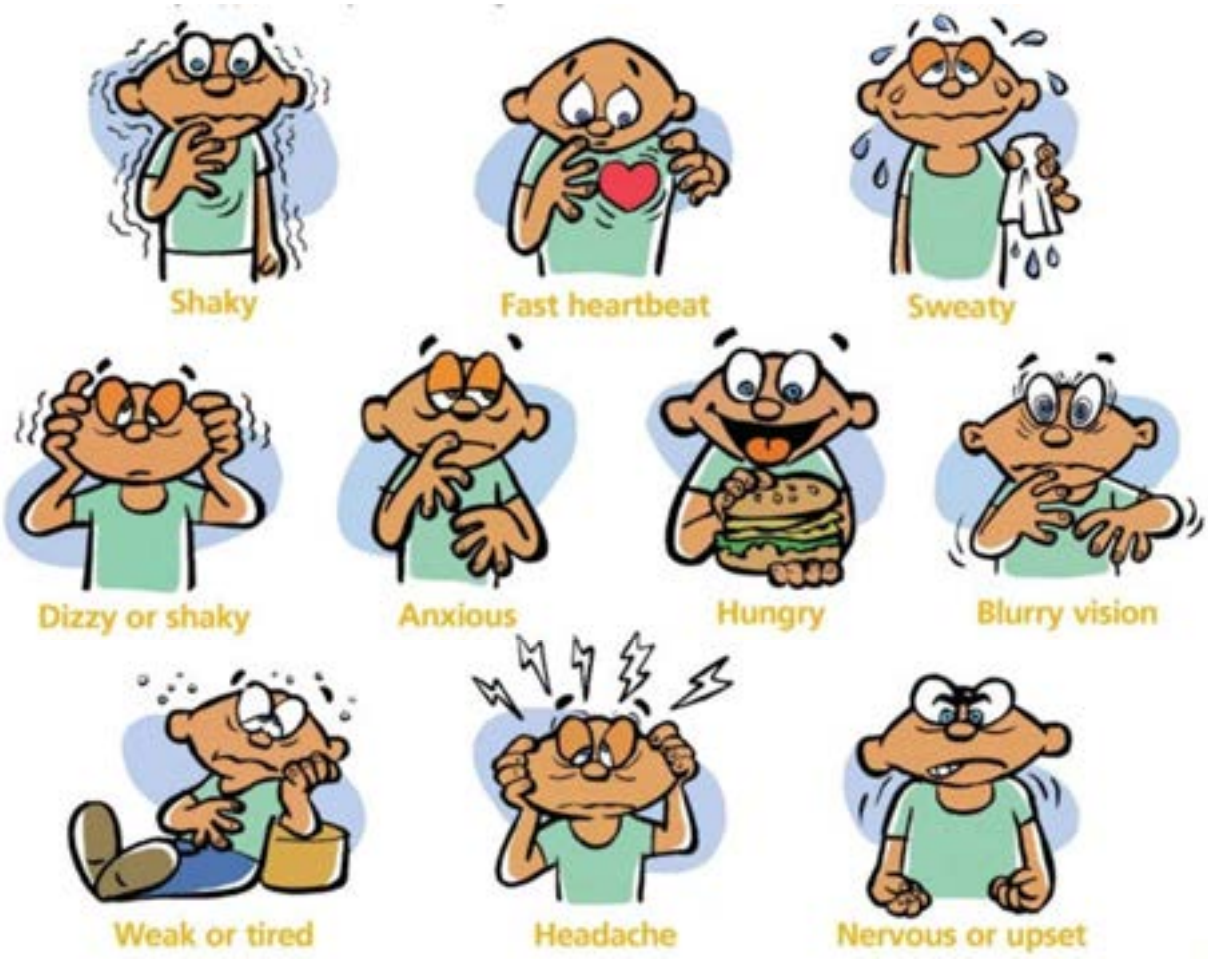
Hypoglycemia occurs when the glucose level drops below: **70 mg/dl**

Hypoglycemia can happen quickly and must be treated immediately. A person with hypoglycemia should not be left alone until the glucose level has returned to normal.

Causes of hypoglycemia:

- Not enough food
- Too much insulin/ incorrect dose of insulin
- Increased physical activity without taking extra carbohydrates
- Waiting more than 15 minutes to eat after taking mealtime insulin

What are signs of hypoglycemia?



Hypoglycemia is considered mild if a person with diabetes is awake and able to eat or drink.

TREAT Hypoglycemia IMMEDIATELY. Give some form of fast-acting carbohydrate as soon as possible. People with diabetes should always carry some form of fast-acting carbohydrate like glucose tablets or juice (see table). The sugar source (fast-acting carbohydrate) will be absorbed more quickly if it is given before eating solid food.

If alert and able to swallow:

- Whenever possible, verify glucose levels by monitoring CGM (Continuous Glucose Monitor) or fingerstick glucose.
- Treat immediately with a fast-acting carbohydrate (see the following chart).
- Wait for about 15 minutes for glucose levels to rise after treatment.
- Recheck glucose levels after about 15 minutes to ensure levels are above 70 mg/dl.
- If glucose level is still below 70 mg/dl, re-treat with fast-acting carbohydrate.
- If glucose level is above 70 mg/dl, return to normal daily activities. Consider giving an additional small snack to avoid further hypoglycemia.

Hyperglycemia (high blood glucose levels) may occur after treating hypoglycemia. If hyperglycemia happens after treatment, you may find that treating with less carbohydrate works best for you/your child. The most important action is to treat hypoglycemia (low glucose) immediately; if you notice hyperglycemia afterward, the amount of carbohydrate can be lowered the next time this happens until you find what works best for you/your child.

Sources of Fast-Acting Carbohydrate table adapted from Understanding Diabetes "Pink Panther" 15th edition			
Fast acting source of glucose	**5 years of age or less (10 grams)**	**6-10 years (10-15 grams)**	**Over 10 years (15-20 grams)**
Apple or orange juice	⅓ cup (2-3 ounces)	⅓ to ½ cup (4 ounces)	½ to ⅔ cup (4-5 ounces)
Glucose Tablets (based on 4g each)	2 tablets	3-4 tablets	4-5 tablets
Cake Decorating Gel (1 small tube = 12g)	1 tube	1 tube	1-2 tubes
Sugar (1 tsp = 4g)	2 tsp	3-4 tsp	4-5 tsp
Honey or syrup (1 tsp = 5g)	2 tsp (Do not use for children under 2)	2-3 tsp	3-4 tsp
Regular soda (1 oz = 3g)	3 oz	4-5 oz	5-6 oz
Skittles (1g each)	10 pieces	10-15 pieces	15-20 pieces
Sweet Tarts (1.7g each)	6 pieces	6-8 pieces	8-12 pieces
Raisins (1 Tbsp = 7 ½ g)	1-2 Tbsp	2 Tbsp	2 ½ Tbsp

Treatment for Moderate to Severe Hypoglycemia

Moderate hypoglycemia is when a person is awake but less alert, requiring extra assistance from another person. They may be confused or uncooperative or unwilling to swallow fast-acting carbohydrates.

Moderate hypoglycemia may be treated with glucose gel in the cheeks, or with glucagon (see table below).

Hypoglycemia is considered **severe** if unconscious, having a seizure, or unable to safely swallow.

- Treating severe hypoglycemia will require giving a form of glucagon, a rescue medication you will have at home after discharge from the hospital. Glucagon is a hormone made in the pancreas and can raise blood glucose levels in an emergency.

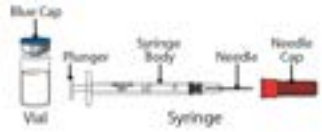
- This medication is rarely needed, but it is important for all caregivers to be prepared to use it when necessary.

- Glucagon raises blood glucose levels by causing the release of stored glucose in the liver and muscles.

- Treatment for severe hypoglycemia is glucagon given by injection or nasal administration. See table for details.

	MILD Alert and able to speak, eat, drink	MODERATE Less alert, unable to drink safely, needs assistance from another person	SEVERE Unresponsive or having seizure
Symptoms (Looks like…)	• Mood changes • Shaky • Weak • Pale • Sweaty • Sleepy/ tired • Hungry • Fast heartbeat • Blurry vision • Headache	• Confused • Unable to focus • Disoriented	• Loss of Consciousness • Unable to awaken • Seizure
Actions to take (What to do…)	Check glucose level (CGM or fingerstick) Give 2-4 oz of **juice** / sugary liquid (the amount depends on age) Recheck blood glucose in 10-15 min If < 70, repeat juice / sugary fluid. Recheck in 10-15 min. If > 70, have a solid snack.	Place in a position of **safety**. Check glucose level (CGM or fingerstick) Give **glucose gel** or **cake decorating gel** – put between gums and cheek & rub the gel in Consider giving glucagon Recheck blood glucose in 10-15 min and re-treat as needed until glucose is above 70 mg/dl Once alert, follow "Actions to take" under the "Mild" column	Place in a position of **safety**. Check glucose level (CGM or fingerstick) **Give glucagon and turn onto side due to risk of vomiting. Call 911** Monitor blood sugar every 10 min until higher than 80 mg/dl Continue to check blood glucose every hour for 4-5 hours Call doctor / nurse to report this episode
Recovery time	10-20 minutes	20-45 minutes	Please note: Effect can last 2-12 hours, with elevated risk for more "lows" for 24 hours.

Glucagon Options:

		Dose	Weight/Age Guidelines	Instructions
Baqsimi nasal glucagon		3 mg	Age 1+ years	Spray into one nostril. Make sure green line disappears. Does not need to be inhaled. Gets absorbed through tissue inside nose.
Gvoke Hypopen		0.5 mg	Age 2-11 years and <45 kg	Remove red cap. Press yellow tip into fat. Hold against skin for 2 clicks then a few extra seconds.
		1 mg	Age 2-11 years and >45 kg Age 12+ years	
Gvoke Kit 1 mg		0.5 mg (0.1 mL)	Age 2-11 years and <45 kg	Put syringe into vial. Withdraw 0.1 mL (0.5 mg) or 0.2 mL (1 mg) into syringe. Inject into fat.
		1 mg (0.2 mL)	Age 2-11 years and >45 kg Age 12+ years	
Zagalogue Autoinjector		0.6 mg	Age 6+ years	Remove grey cap. Remove from red protective case. Remove grey cap. Press yellow end against fat and hold for 10 seconds or until 2nd click.
Zegalogue Pre-Filled Syringe		0.6 mg	Age 6+ years	Remove grey cap. Remove from red protective case. Remove grey needle cover. Inject into fat.
Glucagon for Injection by Fresenius Kabi		0.5 mg (0.5 mL)	<25 kg or < age 6 and unknown wt	Inject syringe contents into vial. Mix. Withdraw 0.5 mL or 1 mL. Inject SubQ or IM or IV.
		1 mg (1 mL)	>25 kg > age 6 and unknown wt	

After all glucagon delivery: turn child on their side in case of nausea and vomiting. Call 911. When your child wakes up and can swallow, encourage small sips of carbohydrates containing fluid (Juice, Soda, Gatorade) as tolerated.

Hypoglycemia

A low blood sugar is best treated with:

a. Chocolate bar
b. Granola bar
c. Peanut butter
d. 4 oz of fruit juice
e. I am not sure

If your blood sugar is 60mg/dl:

a. Treat with 10-15 grams of fast acting carbs
b. Go ahead and eat your next meal early
c. Do nothing
d. Wait and check blood glucose in 30 minutes to see if blood glucose level is higher
e. I am not sure

Symptoms of blood glucose levels less than 40mg/dl can include:

a. Appearing dazed and confused
b. Seizure
c. No symptoms
d. All the above
e. I am not sure

Emergency glucagon is given:

a. For blood glucose more than 250 with excess thirst and urination
b. For a blood glucose less than 60 with shakiness and sweating
c. For loss of consciousness with a very low glucose
d. I am not sure

If you have a glucose level under 70 mg/dl during moderate to strenuous exercise, you should:

a. Do nothing and continue to exercise
b. Eat 5-10 grams of rapid acting carbohydrate, wait 10 minutes, and check again
c. Eat 10-15 grams of rapid acting carbohydrate, wait 15 minutes to check, and eat more carbohydrate if you still feel low while you are waiting to check
d. Eat 10-15 grams of rapid acting carbohydrate, wait 15 minutes, and check again
e. I am not sure

Notes:

Diabetic Ketoacidosis

Hyperglycemia means high blood glucose, or too much glucose in the blood. Glucose levels above 180 mg/dl are considered hyperglycemia. Most episodes of hyperglycemia can be corrected with the next dose of insulin. Contact your diabetes team when there are trends of hyperglycemia since insulin doses may need adjustment. Hyperglycemia is not necessarily an immediate emergency but indicates that the person with diabetes is at risk for developing ketones, especially if glucose is 300 mg/dl or greater.

Signs/symptoms of hyperglycemia include:

- Thirst
- Frequent urination
- Hunger headache
- Irritability

Ketones occur when there is not enough insulin in the body and can occur with hyperglycemia and/or illness. Ketones start in trace or small amounts and build up to moderate or large amounts over hours. When ketones build up in the blood, a person can develop DKA (Diabetic Ketoacidosis). DKA is extremely dangerous. **Early detection and reversal by giving extra insulin is critical to avoid diabetic ketoacidosis.**

DKA is due to a lack of adequate insulin from:

- Missed insulin doses or not taking enough insulin
- Damaged insulin (from getting too hot or from freezing)
- Infections/illness
- Traumatic stress on the body

Signs/symptoms that DKA is developing:

- Presence of ketones in the urine or blood (moderate to large)
- Glucose can be low or normal but is often
- Abdominal pain, nausea, vomiting
- Lack of energy
- Fruity (sweet) or acetone (nail polish remover) odor to the breath
- Rapid breathing

Preventing Diabetic Ketoacidosis

- Always check for ketones when glucose is above 300 mg/dl for 2 hours on CGM< or two glucose tests in a row
- Always check for ketones anytime glucose reaches 400 mg/dl
- Always check for ketones when sick and/or vomiting
- **Follow Ketone Action Plan carefully. Call the diabetes team for any questions.**
- **Follow Sick Day management guidelines.** Proper management of glucose levels, fluid and insulin needs during illness is essential.
- Never skip/omit insulin.
- Drink water to help flush ketones out of the body.

Sick Days

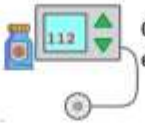
Ketones are more likely to develop no matter what the glucose levels are when your child is sick. Blood glucose levels may rise due to the stress response of illness. More insulin may be required to prevent or treat ketones. When your child is ill, their body **continues to need insulin and carbohydrates to prevent formation of ketones.**

Follow these guidelines when your child is sick

Check glucose every **2** hours and give correction as needed until ketones are negative.

Give your child lots of liquids to stay hydrated.

Check urine ketones every **2-3** hours and follow the **Ketone Action Plan** for extra insulin until ketones are negative.



Continue insulin infusion through pump, even if your child is not eating.

Follow these guidelines when your child is vomiting

Take Zofran (Ondansetron) if prescribed by your doctor.

Give small sips (1 tablespoon) of clear sugared liquids (such as Gatorade) every 15 minutes.

If there is no vomiting after 30 minutes, increase the amount of liquids to 2 ounces (¼ cup) every 15 minutes.

If vomiting restarts, don't offer liquids for another hour and then restart the small amounts of liquids.

Continue checking glucose and ketones every 2 hours and refer to the Ketone Action Plan for instructions. **If vomiting occurs more than 2 times, call your diabetes team.**

What are the warning signs to seek help?

Go to the emergency department if your child has large ketones and any of the following symptoms:

- ✔ Chest heaviness
- ✔ Rapid breathing or trouble breathing
- ✔ Confusion
- ✔ Severe abdominal pain
- ✔ Your child is too dehydrated to check for urine ketones (not urinating)
- ✔ Your child has vomited twice and can't keep liquids down

If you are uncertain about any of these instructions, please call Rady's diabetes team at:

858-966-4032, choose option for nurse - Monday through Friday from 8:30am to 4:30pm

Non-business hours, weekends, and holidays, call the hospital operator at 858-576-1700, press 0 and ask for the endocrinologist on call to be paged.

Checking for Ketones

What are ketones?

- ✓ When your body does not have enough insulin to move glucose into the cells to create energy, it breaks down fat for energy. The break-down of fat can result in ketones in your blood and urine.

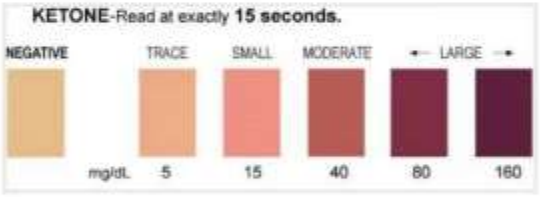
Why check for ketones?

- ✓ Checking for ketones is very important. A high level of ketones in the body can lead to diabetic ketoacidosis (DKA), which can be serious and needs immediate treatment.

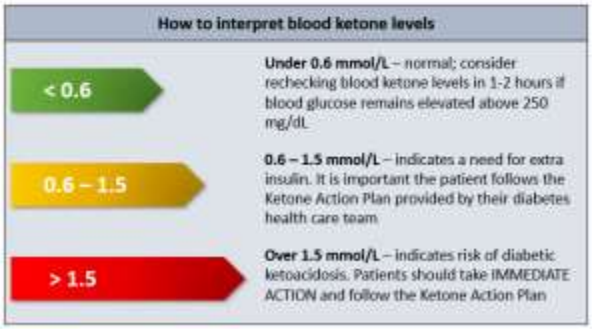
When do I check for ketones?

- ✓ When CGM shows glucose levels above 250 mg/dl for two hours or more or when blood glucose levels are above 250 mg/dl, twice in a row
- ✓ Anytime glucose levels are above 400 mg/dl
- ✓ When your child is sick, regardless of glucose levels
- ✓ When your child is vomiting

Urine ketones: to test, apply a drop of urine on the square of the ketone strip. Wait exactly 15 seconds, then compare the strip color with the color chart on the bottle.



Blood ketones: to test, put ketone strip into meter and apply a drop of blood. Compare the meter reading to the chart below.



When your child has moderate or large ketones, their body needs extra insulin.

Follow the Ketone Action Plan on the next page.

Ketone Action Plan for people using Insulin Injections (vials and pens)

Urine Ketones: Negative, Trace or Small or **Blood ketones:** 0.0 to 0.6 mmol/L	**If glucose is above range:** ☐ Give normal correction dose per insulin plan ☐ Drink extra water ☐ Check blood glucose and ketones every 3 hours until negative ✓ Ok to exercise.
Urine Ketones: Moderate or **Blood ketones:** 0.6 to 1.5 mmol/L	**If blood glucose is under 180 mg/dl:** ☐ Give 3-4 ounces of sugared liquids (Gatorade, juice) every 15 minutes until glucose is above 180 mg/dl ☐ Once glucose level is above 180, give extra insulin for moderate ketones (see below for doses) **If blood glucose is above 180 mg/dl:** ☐ If child is **less than 6 years old**, add 0.5 units to the usual dose ☐ If child is **between 6-10 years old**, add 1 unit to the usual dose ☐ If child is **more than 10 years old**, add 2 units to the usual dose ☐ Drink extra water ☐ Check glucose and ketone levels every 3 hours until ketones are negative ✓ No exercise until ketones are small, trace, or negative (blood ketones less than 0.6 mmol/L)
Urine Ketones: Large or **Blood ketones:** above 1.5 mmol/L	**If blood glucose is under 180 mg/dl:** ☐ Give 3-4 ounces of sugared liquids (Gatorade, juice) every 15 minutes until glucose is above 180 mg/dl ☐ Once glucose is above 180 mg/dl, give extra insulin for large ketones (see below for doses) **If blood glucose is above 180 mg/dl:** ☐ If child is **less than 6 years old**, add 1 unit to the usual dose ☐ If child is **between 6-10 years old**, add 2 units to the usual dose ☐ If child is **more than 10 years old**, add 3 units to the usual dose ☐ Drink extra water ☐ Check glucose and ketone levels every 3 hours until ketones are negative ✓ No exercise until ketones are small, trace, or negative (blood ketones less than 0.6 mmol/L) **If feeling unwell or have large ketones that continue for 4 hours or more, call the on-call doctor.**

If you are uncertain about any of these instructions, please call Rady's diabetes team at:

858-966-4032, choose option for nurse - Monday through Friday from 8:30am to 4:30pm

Non-business hours, weekends, and holidays, call the hospital operator at 858-576-1700, press 0 and ask for the endocrinologist on call to be paged.

If newly diagnosed, please call your diabetes team before dosing insulin. Rapid acting insulin is used in the treatment of ketones.

Hyperglycemia/DKA/Ketones

When are ketones made?

a. When the blood glucose gets too low
b. When a person with type 1 diabetes is sick
c. When a person with type 1 diabetes does not have enough insulin
d. B and C
e. All of the above
f. I am not sure

If a person has moderate/large ketones, they should:

a. Eat 30 grams of carbohydrates
b. Take extra fast acting insulin as directed by a diabetes care provider
c. Take extra long-acting insulin as directed by a diabetes care provider
d. All the above
e. I am not sure

If ketones are present, in addition to insulin you should:

a. Drink more juice
b. Eat more carbs
c. Drink more water
d. Eat fewer carbs
e. I am not sure

Diabetes ketoacidosis

a. Is the high buildup of acid in the blood from ketones
b. Causes deep breathing and fruity breath
c. Causes nausea and vomiting
d. All the above
e. I am not sure

Frequent urination, thirst, and headache, are often signs of:

a. Hyperglycemia
b. Hypoglycemia
c. Dehydrations
d. I am not sure

High glucose levels, nausea and abdominal pain can be symptoms of:

a. Diabetic Ketoacidosis
b. Hypoglycemia
c. Illness
d. A and C
e. B and C
f. I am not sure

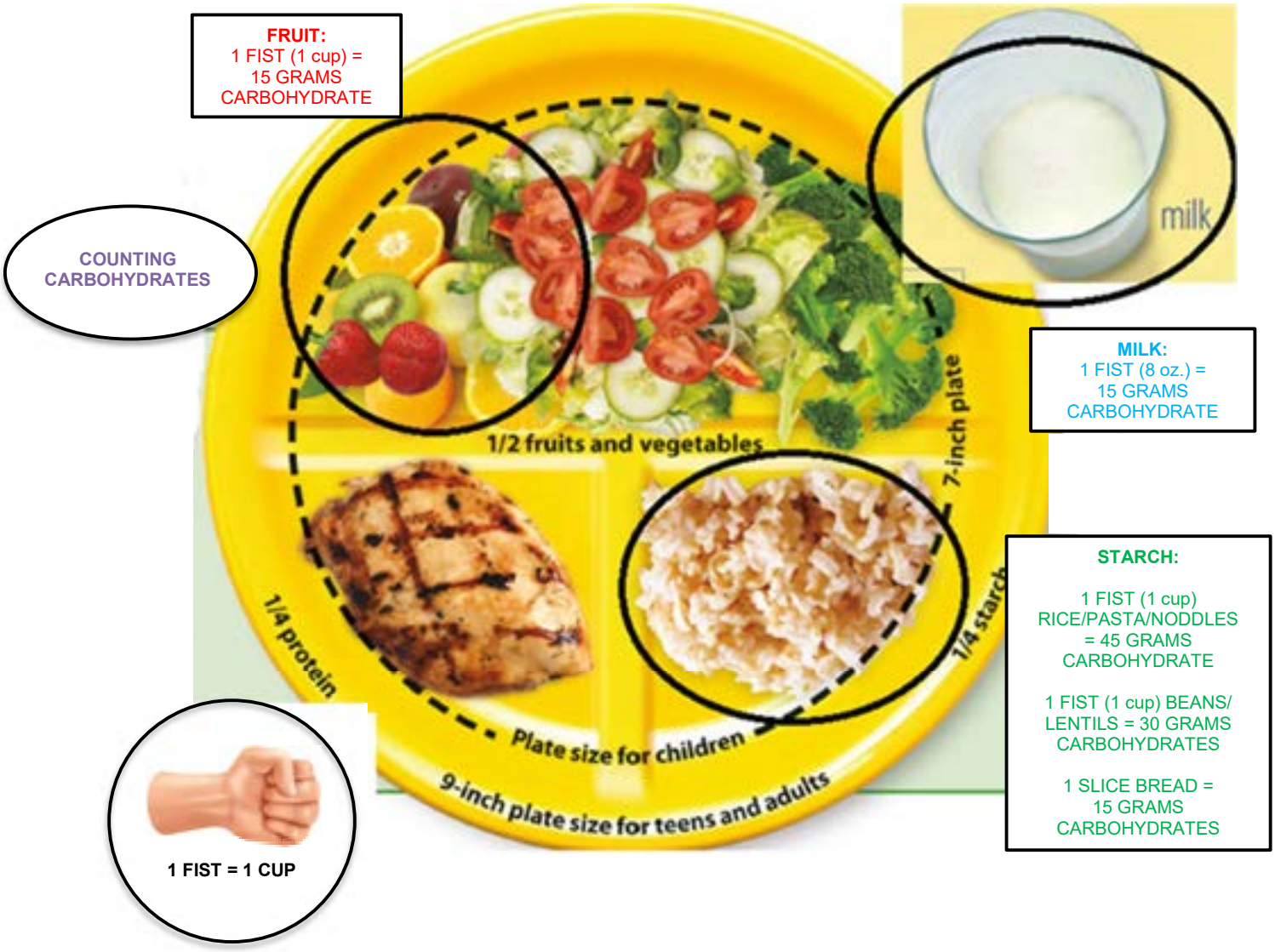
Notes page

Diabetes and Nutrition:

Eating well with diabetes means finding the balance between your favorite foods and incorporating the nutrients you need to live well with diabetes. We all eat different foods for many different reasons thus all foods fit. All foods become glucose over time, but carbohydrates have the greatest impact on blood glucose. Carbohydrate counting allows you to balance your preferred foods and give insulin to match carbohydrates consumed.

Simplify Meal Planning with Diabetes: Plate Method

The Plate Method is the easiest way to visualize carbohydrate counting. Remember, all foods fit with a balanced meal with vegetables, fruits, protein, carbohydrates, and fat. Work with your Registered Dietitian Nutritionist RDN to find a balance that reflects your preference and style of eating.



INSULIN TO CARBOHYDRATE RATIO

Important Terms:

BG – blood glucose
Coverage/ratio – Insulin used to "cover" carbohydrates consumed
Correction – Insulin used to bring BG back to target when BG is elevated
Treatment – Carbs consumed to raise a BG after hypoglycemia
Basal Insulin/Background insulin – Long-acting Insulin such as Lantus/Levemir/Tresiba

What Is an Insulin-to- Carb Ratio? An insulin-to-carb ratio helps you dose how much rapid-acting insulin you need to "cover" the carbohydrate you will eat at a meal or snack. Different people have different insulin-to-carb ratios. Additionally, insulin-to-carb ratios may change over the course of your lifetime or even throughout the day. Insulin-to-carb ratio will use multiple injections.

What Is an Insulin Correction? The insulin correction (sliding scale) is used to determine the amount of insulin you need to bring your blood glucose into target range.

Breakfast	Lunch	Dinner	Bedtime
		Long-acting insulin *** units	
rapid-acting insulin 70-150 * Units 151-200 * Units 201-250 * Units 251-300 * Units 301-350 * Units 351-400 * Units 401-450 * Units 451-500 * Units	rapid-acting insulin 70-150 * Units 151-200 * Units 201-250 * Units 251-300 * Units 301-350 * Units 351-400 * Units 401-450 * Units 451-500 * Units	rapid-acting insulin 70-150 * Units 151-200 * Units 201-250 * Units 251-300 * Units 301-350 * Units 351-400 * Units 401-450 * Units 451-500 * Units	rapid-acting insulin 70-150 * Units 151-200 * Units 201-250 * Units 251-300 * Units 301-350 * Units 351-400 * Units 401-450 * Units 451-500 * Units
PLUS	PLUS	PLUS	PLUS

Insulin to Carbohydrate Ratio: rapid-acting insulin

1 unit for every ** grams	1 unit for every ** grams	1 unit for every ** grams	1 unit for every ** grams

Total rapid-acting insulin = carb coverage + correction

*Use "rapid-acting insulin correction" just at main meals and bedtime. Make sure main meals/"rapid-acting insulin correction" are at least 3 hours apart.

Putting it all together:

STEP 1: Calculate an insulin dose for food:
- Add up the grams of carbohydrate in the foods you will eat.
- Divide the total grams of carb by your insulin-to-carb ratio.

$$\frac{\text{Total Grams of Carbohydrate to be Eaten}}{\text{Insulin-to-Carb Ratio}}$$

Example: let's say you plan to eat 45 grams of carbohydrate and your insulin-to-carb ratio is 1 unit of insulin for every 15 grams of carbohydrate eaten. To figure out how much insulin to give, divide 45 by 15.

$$\frac{45 \text{ Grams of Carbohydrate}}{15} = 3 \text{ units of insulin is needed for this amount of carbohydrate.}$$

STEP 2: Determine how much insulin you will need for correction (to lower your blood sugar) - Sliding scale or Correction can be used to bring BG back to target.

STEP 3: Add the insulin needed for carbs to the insulin to correct high blood glucose for your total dose:
1. Determine how much insulin you will need for correction (to lower your blood sugar)
2. Determine how much insulin you will need for your carbs eaten
3. Add these 2 numbers together → this is your total dose for that meal.

Example: You are going to eat 60g of carbohydrates for lunch, your blood sugar is 210, how much insulin do you give?

This is your insulin plan:

Breakfast	Lunch	Dinner	Bedtime
		Lantus 50 units	
Humalog 70-150 0 Units 151-200 2 Units 201-250 4 Units 251-300 6 Units 301-350 8 Units 351-400 10 Units 401-450 12 Units 451-500 14 Units	Humalog 70-150 0 Units 151-200 2 Units 201-250 4 Units 251-300 6 Units 301-350 8 Units 351-400 10 Units 401-450 12 Units 451-500 14 Units	Humalog 70-150 0 Units 151-200 2 Units 201-250 4 Units 251-300 6 Units 301-350 8 Units 351-400 10 Units 401-450 12 Units 451-500 14 Units	Humalog 70-150 0 Units 151-200 0 Units 201-250 2 Units 251-300 4 Units 301-350 6 Units >351 8 Units
Insulin to Carbohydrate Ratio:			
1 unit for every 15g	1 unit for every 15g	1 unit for every 15g	1 unit for every 15g

$\frac{60g}{15}$ = 4 units for food (carbs) + 4 units to correct high blood glucose = total dose = 8 units

Your new insulin plan:

1. Insulin-to-carb ratio: You will need 1 unit of short-acting insulin for each _____ grams of carb.
2. Blood glucose correction factor: Use sliding scale to bring BG back to target.


Basic Carb Counting
CHO = carbohydrate
*All portions assuming cooked
Grains
15 g CHO
Whole Wheat Bread
1 slice
Oatmeal
½ cup
Pancake
4" diameter
Cereal
Read Label
Pasta
½ cup
Rice
½ cup
Vegetables
15 g CHO
Low CHO
Beans
½ cup
Corn
½ cup
Peas
½ cup
Baked Potato
1 Medium
Mashed Potatoes
½ cup
French Fries
Read Label
Broccoli
Spinach
Asparagus
Celery
Carrots
Tomatoes
Fruit
15 g CHO
Banana
4 oz (½)
Apple
1 small
Grapes
3 oz (15 medium)
Orange
1 small
Juice
½ cup
Raisins
2 tbsp
Milk
15 g CHO
Milk, Whole
8 oz (1 cup)
Milk, Skim
8 oz (1 cup)
Milk Chocolate
4 oz (½ cup)
Yogurt
Read Label
Cheese
Low CHO
Protein
Low CHO
Chicken
Egg
Ground Beef
Salmon
Protein Floured/Breaded
Contains CHO
Fats
Low CHO
Butter/Margarine
Mayonnaise
Cream Cheese
Peanut Butter (2 tbsp)
Low CHO
Nuts/Seeds
Low CHO
Other
15 g CHO
Cookie
2 small (2" dia.)
Unfrosted Brownie
2" square
Vanilla Ice Cream
½ cup
Strawberry Jam
1 tbsp
Frosted Cake (2" square)
30 g CHO

Diabetes Tools & Apps

Tools:

1. The Calorie King-Calorie, Fat and Carb Counter by Allan Borushek, RD.
2. NutriPortion Measuring Cups: detailed measuring cups.
3. Greater Goods Nutrition Food Scale: scale that can be used to estimate carbohydrate in foods without labels (Walmart, Amazon, greatergoods.com)
4. Hello Fresh, Fresh & Fit, Sun Basket (organic) and Blue Apron: delivery cooking programs with recipes that contain calorie and carb counts.

Apps and Websites for Smart Phones:

- **Calorie King:** Perfect for carb counting more challenging foods or eating out.
- **Rapid Calc:** Diabetes calculator for ratios that includes correction for blood sugars.
- **Carb Guide with Lenny:** Visual carb counter for kids under 10 years old.
- **Track 3 for Diabetes:** Tracks both blood glucose plus carbohydrates.
- **Figwee Visual Food Diary: First** visual app that matches Perfect Portion Scale.
- **MyFitnessPal:** Calorie/ Carb and exercise counter with bar code scanner.
- **Go Meals:** Gives you a balanced plate approach with calories/ protein and % fat.
- **Recipe Builder Pro**: calorie and nutrition info calculator with recipe designer.
- **Recipenutrition.com:** another website for calculating recipes/carb counts.
- **Sworkit Kids:** 30 second to 30 minutes workouts for kids.
- **BigOven:** 350,000+ recipes with grocery list.
- www.diabtribe.org
- www.beyondtype1.org
- www.childrenwithdiabetes.com

Carbohydrate Portions Using Measuring cups

Dry measuring cups:

Liquid measuring cups:

Nutrition Facts Labels

To count carbohydrates, look at three things:

- **Serving Size**
- **Servings Per Container**
- **Total Carbohydrate grams per serving**

Be careful when reading the label. Be mindful of the serving size to determine the total grams of carbohydrate consumed. If you have more than one serving, you will need to multiply the total carbohydrates (grams) by the number of servings you consumed.

Now let's practice using a sample food label:

Nutrition Facts

4 servings per container

Serving size 1/2 cup (114g)

Amount per serving

Calories 90

	% Daily Value*
Total Fat: 3g	5%
Saturated Fat: 0g	0%
Cholesterol 0mg	0%
Sodium 300mg	13%
Total Carbohydrate 13g	4%
Dietary Fiber 3g	12%
Sugars 3g	
Protein 3g	
Vitamin A	80%
Vitamin C	60%
Calcium	4%
Iron	4%

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

Serving size: The serving size for this product is ½ cup. The number in parenthesis shows the weight of the portion. One serving weights 114g when using a food scale.

There are 4 servings in the whole container.

One serving, which is ½ cup of this product, provides 13g of carbohydrates.

Dietary Fiber is part of the total carbohydrates. Fiber does not digest so you can subtract the grams of fiber from the total carbohydrate grams. The grams of sugar are already included in the total carbohydrate count. The natural sugars in milk or fruit for example, along with added sugars are all grouped together.

What if you eat more, or less than, one serving? Let's practice with this example label.

- The serving size listed is ½ cup (or 114 grams if you are weighing the product).
- The grams of total carbohydrate per serving is 13 grams.
- If you eat 1 cup, that is two servings. You would be getting 26 grams of total carbohydrate (1 serving = 13 grams of total carbohydrate, 2 servings = 26 grams of total carbohydrate).
- Or, if you only eat ¼ cup, then you would only get 6.5 grams of carbohydrate (1 serving = 13 grams of total carbohydrate, 1/2 servings = 6.5 grams of total carbohydrate).

Low Carb Foods

One serving of each of these foods has 5 or less grams of carbs, so be sure to double check the carbs if you have multiple servings. **"Low Carb" doesn't always mean "low in calories" so make sure to include more lean protein and vegetables.**

Non-starchy veggies: includes most vegetables such as celery, carrots, tomatoes, cucumbers, asparagus, broccoli, jicama, cauliflower, mushrooms, zucchini, spinach, Italian squash, chayote, and artichokes.

*Try these vegetables: grilled, sautéed, or with a low-calorie dressing.

Unsweetened Plant-based milks: includes almonds, soy, oats, and cashew.

Meat, Fish & eggs: includes chicken, beef, pork, deli cuts, lamb, sausages, fish, bacon, beef jerky. Eggs are a wonderful source of protein and low in carbs. Enjoy them hard boiled, scrambled, or any way you like. Egg whites are a great choice.

Tofu & cheese: includes firm tofu, unsweetened silken tofu, soy nuts, unsweetened soy milk, cheddar, mozzarella, feta, cream cheese, cheese sticks, cottage cheese, Swiss and parmesan.

Nuts & Seeds: includes almonds, peanuts, walnuts, sunflower seeds, pumpkin seeds, almond butter, peanut butter, cashew butter, sunflower seed butter.

Select condiments & oils: includes vinegar, mustard, hot sauce, mayo, bouillon, salad dressing, sour cream, butter, ghee, olive oil, canola oil, safflower oil, flaxseed oil, salsa, horseradish, pickles

Packaged low-carb snacks: For your convenience choose to buy prepared snacks to have on hand. Be mindful of "low-carb" claims: Don't rely on the "front-of-package" claims like "low-carb". Look at the food label and focus on ingredients you can pronounce with less food additives. Focus on whole grains, nuts, seeds, and calcium rich ingredients.

Low Carb Foods and Snacks Ideas

Please take note that these are estimates with carb counting/ low carb options. Pay attention to how your body responds to food by looking at patterns in your blood sugars

Lettuce Wrap:
- Instead of having a taco shell, try using lettuce as a wrap.
- Fill it up with chicken, shredded cheese or tuna salad.

Deli Wrap:
- Cheese wrapped in turkey or other deli meat
- You can add avocado for more flavor and healthy fat.

Dip Ideas:
- Mix 2 TBSP of plain yogurt with sour cream and avocado.
- Add salt and pepper. Or you can add other dressing seasoning packets.

Tuna Boat:
- Cut red peppers in half (boat shape), remove seeds.
- Fill with tuna salad (mixed with Greek yogurt).
- Optional: chopped celery, shredded carrots, onion, tomato, or any non-starchy vegetables.

Ants on a log:
- Cut celery in half.
- Spread almond or peanut butter on top.
- Finish with sunflower seeds.

Easy deviled Eggs:
- Slice eggs in half lengthwise and carefully remove yolk.
- Mash yolks with mayo. Optional: add mustard, salt, pepper, to taste.
- Spoon yolk mixture into egg whites.

Avocado egg salad:
- Use mashed avocado in place of mayo on your egg salad.
- Mash ½ avocado with hard-boiled egg. Season lightly with salt and pepper to taste.
- Spoon mixture into a lettuce wrap.

Tuna salad lettuce wrap:
- Combine 3 oz. can of tuna with ¼ cup of mayo and ¼ cup of diced celery.
- Season the mix with salt and pepper to taste.
- Spoon tuna salad into a butter lettuce leaf.

Source: The CalorieKing® Calorie, Fat & Carbohydrate Counter. Edition 20

Low Carb Drinks Below 5 Grams of Carb/Serving

Don't forget water is best!
Try to choose more drink options that use less artificial sweeteners and colors.

Le Croix® / Spindrift®
Soleil® / AHA®
Naturally flavored without Added sweeteners

Gatorade Zero® / Propel®
Powerade Zero®
Sports drink with electrolytes

Fresh Fruit Infused Water

Add any of your favorite fruit and/or veggies with water

Crystal Light®
Low carb powdered drink mix

Metromint®
Peppermint infused water with fruit extract – no artificial sweeteners or dyes

Hansen's Stix w/ Stevia®

Diet/ Unsweetened Iced Tea

Diet Soda
Carb free alternative to regular soda.

Hot Chocolate with Cocoa Powder
Mixed with Stevia or Splenda to sweeten

Healthy Daytime Snacks

Snacks can serve a lot of purposes: keeping you from being too hungry between meals, preventing hypoglycemia, helping you recover from a workout and more.

Snacking tips

- Eat mindfully. Avoid eating in front of a computer or TV. Focusing on food will help you realize when you're full.
- Find the fiber. When you look at labels on whole-grain bread, tortillas, or crackers, aim for at least 5 grams of fiber per serving.
- Talk to your doctor or dietitian if you're having trouble regulating your blood sugar during the day.

Examples of 10-20 Gram Carb Snacks (Always Check Labels)

- Fresh Fruit: 1 small apple or orange (Fist Size) or ½ banana (4 oz)
- 1 small apple with peanut butter
- Chips – small bag ~ 1 oz. bag
- 2 Popcorn cakes with peanut butter or cream cheese
- 3 cups air popped popcorn. Try sprinkling with parmesan cheese, chili/lime, salt/pepper.
- 1 cup of Yogurt / 1 Gogurt tube
- Annies crackers (label) / Goldfish crackers (label)
- ¼ cup Trail Mix
- Kind Bar (label)
- Popcorners (label)
- Unsweetened Applesauce 4oz.
- ½ small bagel with light or whipped cream cheese, nut butter spread or low-fat/light cheese
- 1 bar of whole fruit juice bar
- Baby carrots with ¼ cup of hummus

Bedtime Snack Ideas

Eat 15-20 g CHO if BG <100 mg/dL - *If under the age of 4 or active after dinner your target for bedtime snack to start is 130 mg and ENDO team will monitor BG patterns

Sliced apple and peanut butter:

1 small apple with 1 TBSP of peanut butter
Total 15-20 grams

Low-fat cheese and whole wheat/whole grain crackers:

5-6 whole-grain crackers with low fat cheese
Total 15-20 grams

Greek yogurt with berries:

1 serving (1 cup) with ½ cup of berries
Total 15-20 grams

High Fiber Cereal and Milk

(5 biscuits=8 g) + 4 ounces (1/2 cup) of soy milk
Total 15-20 grams

Vegetables and hummus:

1/3 cup of hummus with non-starchy veggies
Total 15-20 grams

Avocado with whole wheat toast

1 slice of wheat bread with ½ avocado
Total 15-20 grams

All snacks throughout the day do not need to have added fat and protein. Keep in mind that some individuals are fine with carbs alone as a bedtime snack and do not go low at night.

Daily Meal Planner

BREAKFAST

AM SNACK

LUNCH

PM SNACK

DINNER

BED TIME SNACK

Carb Counting Resources

	Book	Website	Phone App	Recipe Analyzer	Barcode Scanning
CalorieKing	✓	✓	✓		✓
MyFitnessPal		✓	✓	✓	✓*
MyNetDiary			✓		✓
Cronometer		✓	✓	✓	✓
Lose It!			✓		✓
Nutritionix		✓	✓		✓
Nutrition DATA		✓	✓	✓	
VeryWellFit.com		✓		✓	
Whisk (cooking app)			✓	✓	
SNAQ (food tracker & carb estimator using photos)			✓		

*Barcode Scanning available with paid subscription to MyFitnessPal

Food Scales

Ozeri ZK14 Pronto Digital Food Scale
Best Budget · Under $10

Greater Goods Nourish Digital Food Scale
Best for Counting Macros · Under $40

Etekcity Smart Food Nutrition Scale
Best App-Enabled · Under $30

Adapted from: https://www.verywellfit.com/best-food-scales-4173446

Measuring Equivalents

3 teaspoons = 1 Tablespoon
4 Tablespoons = ¼ cup
16 Tablespoons = 1 cup
4 fl ounces = ½ cup
8 fl ounces = 1 cup
1 cup = ½ pint

Barbara Davis Center for Childhood Diabetes

Diabetes & Nutrition Healthy Eating

A person living with type 1 diabetes:

a. Should always avoid sweet food like candy, cookies and cake
b. Can eat anything they want if they cover the food with insulin
c. Should be able to eat whatever they want at any time without insulin
d. I am not sure

An important thing about foods labeled sugar-free is:

a. They won't raise your blood sugar
b. You don't need to take insulin before eating them
c. They may still contain a lot of carbs
d. I am not sure

Use the Nutrition Facts table below to answer the question. How many grams of carbohydrate would be in 1 cup of this cereal?

Nutrition Facts / Datos de Nutrición

13 servings per container/13 raciones por envase

Serving size/Tamaño por ración **1 ½ cup/1 ½ taza (39g)**

	Cheerios	with ½ cup skim milk/con ½ taza de leche descremada
Calories/Calorías	**140**	**210**
	% DV/VD**	% DV/VD**
Total Fat/Grasa Total 2.5g*	3%	4%
Saturated Fat/Grasa Saturada 0.5g	3%	4%
Trans Fat/Grasa Trans 0g		
Polyunsaturated Fat/Grasa Polinsaturada 1g		
Monounsaturated Fat/Grasa Monoinsaturada 1g		
Cholesterol/Colesterol 0mg	0%	1%
Sodium/Sodio 190mg	8%	12%
Total Carbohydrate/Carbohidrato Total 29g	10%	14%
Dietary Fiber/Fibra Dietética 4g	15%	15%
Soluble Fiber/Fibra Soluble 2g		
Total Sugars/Azúcares Totales 2g		
Incl. Added Sugars/Incluye azúcares añadidos 1g	2%	2%
Protein/Proteínas 5g		

a. 29g
b. ~20g
c. ~38g
d. I am not sure

Exercise: How Much and Health Benefits

Health Benefits of Exercise

- More in-target blood glucose levels
- Improves insulin sensitivity
- Helps maintain proper body weight
- Helps reduce risks for chronic disease development later in life
- Helps lower blood fat/cholesterol levels
- Improves sense of "well-being"

How Much Exercise to Maximize Health Benefits?

CHILDREN (age 3-5)
Encouraged to be physically active and have plenty of opportunities to move throughout the day

*General Guidelines from the AHA. Individuals should be medically evaluated to ensure these goals are appropriate.

CHILDREN and ADOLESCENTS with Type 1 or Type 2 Diabetes (age 5-17)
DAILY: 60 minutes or more of moderate-vigorous intensity aerobic exercise **PLUS 3 or more days of vigorous muscle and bone strengthening (anaerobic exercise)**

*General Guidelines from the ADA and ACSM. Individuals should be medically evaluated to ensure these goals are appropriate.

ADULTS with Type 1 or Type 2 Diabetes (age >18)
Aerobic Exercise (cardio): 3-7 days per week (with no more than 2 consecutive days without activity) **Performed at moderate-vigorous intensity: feeling challenging to very hard** **Total of at least 150 minutes per WEEK (or at least 30 minutes 5d/wk)** **PLUS** **Resistance/Anaerobic Exercise: at least 3 days per week on nonconsecutive days** **8-10 exercises total for the full body: 1-3 sets of 10-15 repetitions (machines, free weights, resistance bands, body weight)**

*General Guidelines from the ADA and ACSM. Individuals should be medically evaluated to ensure these goals are appropriate.

Effect of Activity on Blood Glucose

Types of Exercise and Effect on Blood Sugar			
Type of Exercise	Examples	Intensity/Duration	Blood Glucose Response **During** Activity
Anaerobic (muscle and bone strengthening)	Weightlifting, tag, sprinting, gymnastics, volleyball, dodgeball, basketball, tennis, lacrosse, body weight exercises, climbing, karate	**High Intensity and Short Duration**	↑ Blood Sugar Tends to result in more adrenaline output and higher blood glucose levels than aerobic exercise
Mixed (Anaerobic and Aerobic)	Skiing, rowing, field hockey, running/cross country middle distances, soccer, rugby	Mix of high intensity and lower intensity movements	More likely to result in fewer changes to blood glucose during activity however, fluctuations may occur.
Aerobic (heart and lung efficiency – cardio)	Jogging, dancing, cycling, brisk walking, swimming laps	**Lower Intensity and Longer Duration**	↓ Blood Sugar Lowered blood glucose values due to use of sugar for exercise energy

Effect of Regular Aerobic and Anaerobic Activity on Blood Sugar
Regular exercise helps insulin work more efficiently by increasing insulin sensitivity, often resulting in <u>more in-target blood glucose levels</u> and may result in lower daily insulin needs for all types of diabetes

Effect of Aerobic and Anaerobic Exercise Hours <u>After</u> Exercise	
Delayed Hypoglycemia (Lower Blood Sugar After Exercise)	**<u>Lower blood sugar values several hours after exercise</u>** (typically 3-12 hours post exercise) Following heavy aerobic exercise, glucose values are often lowered into the night due to the body refilling glycogen/sugar stores in the liver and muscles and increased insulin sensitivity. Rises in blood glucose during anaerobic activity are usually temporary and will often also result in lowered blood glucose levels hours after exercise as well.

Hypoglycemia and Exercise

Prevention of Hypoglycemia: exercise can be a risk factor for low blood sugar. This is because when you exercise, your body is more sensitive to insulin and typically requires less.
Exercise is an important key to health, so it is important to continue exercising, while also staying safe.

How to Exercise Safely with Diabetes (on an insulin regimen)

Test blood sugar before, during, after exercise, and before bed: using a Continuous Glucose Monitor (CGM) or Glucometer

Get your blood sugar to target before exercise: use *Hypoglycemia and Exercise Chart* for Target Blood Sugars at start of exercise to determine if carbs are needed.
- 126-180 mg/dL is a general guideline for the start of exercise if you are unsure and on an insulin regimen

Carry fast acting sugar/carbohydrate snacks with you: used to raise blood glucose to target before exercise and to treat potential low blood sugars that may occur with exercise

Wear a Diabetes ID
- Wear diabetes identification for your safety
- Inform you teachers, coaches, and friends of your diagnosis for your safety and for the comfort community provides

Keep a log of your blood sugars, especially with the addition of exercise: keeping a log will help your diabetes care team identify patterns and make appropriate insulin adjustments.

Stay Hydrated during Exercise: depending on blood glucose or patient specific goals and activity, water or a sports drink for a sugar source may be best.

Other Precautions:
- Do not exercise when ketones are present
- Do not exercise when blood sugar is >300 mg/dL (blood sugar may rise with competition stress or anaerobic activity but should not last longer than 3 hours) - check for ketones
- Do not exercise when you do not have a fast-acting sugar/carbohydrate snack to treat a potential low blood sugar when on an insulin regimen
- Do not exercise when you are feeling sick, dizzy, nauseous, having a headache, or excessively sweating – exercise should be stopped, and blood sugar should be checked

Exercise Strategies to Level Blood Sugar from Study: (*Exercise Management for Young People With Type 1 Diabetes: A Structured Approach to the Exercise Consultation)*

Aerobic cool down: can be used to prevent hyperglycemia post anaerobic exercise. A 10-minute walking cool down post anaerobic exercise has been shown to reduce hyperglycemia.

Anaerobic sprint after aerobic activity: maximal 10s sprint before or after moderate intensity exercise and/or Maximal 2s sprint every 2 minutes during aerobic activity has been shown to reduce hypoglycemia during and post aerobic exercise.

Target Blood Sugar Before Exercise

Extra Food to Cover Exercise:			
Glucose Value	**Before Exercise**	**During Exercise**	**After Exercise**
<90 mg/dL (<5.0 mmol/L)	**Aerobic and Anaerobic Exercise:** • Eat 10-20g of carbs before starting • Wait until glucose is above 90 to start exercise	**Aerobic:** • 10/20 g carbs per hour of activity* **Anaerobic:** • Typically extra carbohydrate not needed **For all activity:** • Drink fluids	Eat meal or 10-15g carbohydrate snack within an hour of exercise. Drink fluids with meal/snack Before sleep, may eat additional bedtime snack, especially with prolonged or intense activity.
90-125 mg/dL (5.0 – 6.9 mmol/L)	**Aerobic Exercise:** • Eat 10-20g of carbs before starting **Anaerobic Exercise:** • No carbs, start exercise		
126-180 mg/dL (<7.0 – 10.0 mmol/L) BS TARGET prior to PE	**Aerobic and Anaerobic Exercise:** • No carbs, start exercise		
181--250 mg/dL (10.1 – 13.9 mmol/L)	**Aerobic and Anaerobic Exercise:** No carbs, start exercise	**Aerobic:** • Follow trend; when dropping below 180, give 10-20g carbohydrate per hour of activity **Anaerobic:** • Typically extra carbohydrate not needed **For all activity:** Drink fluids	
>250 mg/dL (>14.0 mmol/L)	**Aerobic and Anaerobic Exercise:** • No carbs • Check ketones. Do not start exercise if ketones detected (blood ketone meter: >0.6; urine strips: small, moderate or large)		

* Amount of carbs given during activity will vary based on intensity of activity and insulin on board during activity. Younger children may need fewer carbs then older teens and adults.

* Source: Pink Panther Book – chapter 13, pg 146.

Being Active/Exercise

Exercise affects your glucose by:

a. Raising it
b. Lowering it
c. Exercise can raise and/or lower blood glucose
d. I am not sure

Why does exercise cause lower blood glucose levels hours after exercising?

a. A lot of glucose is used up in exercise
b. It makes you less sensitive to insulin
c. Your pancreas secretes extra insulin with exercise
d. I am not sure

Regular exercise

a. Increase your need for insulin (insulin resistance)
b. Decrease your need for insulin (insulin sensitivity)
c. Not change your insulin requirement
d. Worsen blood glucose control
e. I am not sure

Intense exercise can cause low glucose levels (hypoglycemia)

a. During exercise
b. Two hours after exercise
c. At night when you are sleeping
d. All of the above
e. A and B
f. I am not sure

You should always check your glucose level before exercise.

a. True
b. False
c. I am not sure

Notes:

Diabetes & School

- Make sure to meet with your school nurse before returning to school.
- Take the school note Diabetes Management Plan (DMMP) that will be provided to you, which serves as doctor orders for the school to follow while your child is at school.
- Write up a 504 plan or individualized education program - this explains the school's specific responsibilities, who should be trained to provide diabetes care tasks when nurse is not available.
- A written 504 Plan provides reasonable modifications and accommodations to meet the individualized needs of an eligible student with diabetes in accordance with Section 504 of the Rehabilitation Act of 1973. A 504 Plan is an agreement between the parent/guardian and school to ensure:

    - Their child receives the necessary care prescribed by their diabetes provider, as outlined in their Diabetes Medical Management Plan (DMMP) attached hereto and made a part hereof
    - Their child receives appropriate accommodation and modifications to allow equal access to all school and school-sponsored opportunities
    - Parents/guardians, school staff, and other stakeholders understand their responsibilities to the child with diabetes

- The 504 Plan can be found at diabetes.org and search for 504 plans. This will direct you to Safe At School initiative that provides information and other resources about diabetes care in the school setting.

    - Sample 504 plan
    - Resources for care at school
    - School training materials for schools

Section 504 Plan | ADA (diabetes.org)

Any supplies and extras the school nurse and other personnel will need to care for your child. Contents may vary depending on your child's needs and treatment plan (MDI vs. pump, CGM, etc.)

Diabetes Boxes & Hypoglycemia (low blood sugar) Boxes

NURSE'S OFFICE SUPPLY BOX

Any supplies and extras the school nurse and other personnel will need to care for your child. Contents may vary depending on your child's needs and treatment plan (MDI vs. pump, CGM, etc.)

Contains items such as:

- extra test strips
- lancets
- pen needles
- batteries (extra)
- ketone strips
- back up meter
- alcohol pads
- extra pod or pump
- Flonase spray
- pump / Dexcom patches
- Lidocaine cream
- skin prep wipes
- Glucagon
- Tegaderm
- VetWrap or Coban tape

Diabetes and Travel

What Can I Bring with Me on the Plane | American Diabetes Association:

https://diabetes.org/tools-support/know-your-rights/what-can-i-bring-with-me-on-plane

TSA specifically states that diabetes-related supplies, equipment, and medications, including liquids, are allowed through the checkpoint once they have been properly screened by X-ray or hand inspection. Passengers should declare these items and separate them from other belongings before screening begins.

General Tips:

- Arrive at the airport 2-3 hours prior to the flight
- Review TSA's website for travel updates
- Download My TSA Mobile App
- Whenever possible, bring prescription labels for medication and medical devices (while not required by TSA, making them available will make the security process go more quickly) Consider printing out and bringing an optional" TSA Disability Notification Card"
- Pack medications in a separate clear, sealed bag. Bags that are placed in your carry-on-luggage need to be removed and separated from your other belongings for screening
- Keep a quick-acting source of glucose to treat low blood sugar as well as an easy-to-carry snack as a nutrition bar
- Carry or wear medical identification and carry contact information for your physician
- Pack extra supplies

Despite the general rule prohibiting passengers from bringing most liquids and gels through security, people with diabetes may take their insulin, other medications, and other liquids and gels, including juice and cake gel, through TSA checkpoints, even if they are in containers greater than 3.4 ounces. All medical liquids in containers greater than 3.4 ounces must be removed from your carry-on luggage and declared to TSA. They should not be placed in the quart-sized zip-top bag used for non-medical liquids. A travel letter can be provided upon request via MyChart. Please allow ample time for us to prepare.

Lifestyle & Healthy Coping/ School

A Diabetes Medical Management Plan (DMMP):

a. Describes the action a school will take to make sure the student with diabetes is safe, is treated fairly, and has the same access to education as other students
b. Includes the doctor's orders and treatment plan provided by the child's diabetes care team
c. Developed by the school nurse in partnership with family and healthcare team
d. Plans on how to treat hypoglycemia, ketones, and what to do in an emergency
e. I am not sure

A 504 plan:

a. Describes the actions a school will take to make sure the student with diabetes is safe, is treated fairly, and has the same access to education as other students
b. The doctor's orders provided by the child's diabetes care team
c. Developed by the school nurse in partnership with family and healthcare team
d. Plans on how to treat hypoglycemia, ketones, and what to do in an emergency
e. I am not sure

Who should provide diabetes supplies for the child to use at school?

a. The diabetes care team
b. The parent/child/caregiver
c. The school nurse
d. The social worker
e. I am not sure

Notes:

Community Resources
American Diabetes Association: www.diabetes.org
Taking Care of Your Diabetes: www.TCOYD.org TCOYD educates & motivates people with diabetes to take a more active role in their condition and provides innovative & integrative continuing education to medical professionals caring for people with diabetes
DiaTribe: www.diabtribe.org The DiaTribe Foundation seeks to empower readers with useful, actionable information that gives them hope for a better future and helps them live happier and healthier lives. Our tagline is "Making Sense of Diabetes."
Children with Diabetes: www.childrenwithdiabetes.com Children with Diabetes focus on care today, so we are ready for a cure tomorrow. As a global resource, we provide support, education and inspiration to empower families and all people living with diabetes to enjoy healthy, enriched lives.
CAMPS: **Camp Wana Kura: www.diabetes.org** Day Camp in San Diego County **Diabetes Camping & Education Association: www.diabetescamp.org** **Camp Conrad-Chinnock: www.campconradchinnock.weebly.com** Overnight camps in the San Bernardino Mountains
Medical Alert Company: www.medicalert.org
T1D Exchange: www.t1dexchange.org A nonprofit dedicated to facilitating research and driving improvements in care and outcomes for people with T1 diabetes.
Beyond Type 1: www.beyondtype1.org: A nonprofit organization changing what it means to live with diabetes. Through platforms, programs, resources, and grants, Beyond Type 1 unites the global diabetes community and provides solutions to improve lives today.
TEENS ROCK! A free weekly zoom meetup for teens living with type 1 diabetes. This group is a safe space for teens to bond with unlimited topics and conversation. Along with the weekly group, we hold free events such as monthly virtual painting nights. We organize in person meet ups in San Diego and Riverside area. **Email: cbyer-mendoza@rchsd.org for more information**

DiabetesWise: www.diabeteswise.org Finding diabetes technology that works for you
Diabetic Youth Services: www.dys4kids.org
Breakthrough T1D: http://www.breakthrought1d.org/ Breakthrough T1D is the leading global type 1 diabetes research and advocacy organization. Their mission: fuel research, advocating for change and empower and support. Contact local chapter for local events, exercise and support group. Connects with young people living with diabetes.
Counseling Resource List: https://www.rchsd.org/programs-services/endocrinology-diabetes/resources/
Scholarship information: https://beyondtype1.org/national-college-scholarships-for-people-with-type-1-diabetes/
The Diabetes Link: https://thediabeteslink.org/ **Where Young Adults Thrive** The Diabetes Link is the go-to for peer support, resources, and leadership opportunities designed specifically for young adults. We will be an ally that connects you to the people, programs, and practical information that can help make your life easier and more enjoyable now and into the future.

Diabetes and Psychology Support

A new diagnosis of type 1 diabetes (T1D) can be overwhelming for children and their families. It often brings about significant changes in behavior, emotions, and overall functioning. The adjustment period can be challenging for everyone involved, including the child diagnosed, parents, and even siblings.

Our **psychology team** provides evidence-based interventions to address the various psychosocial challenges that may arise. These interventions can help individuals and families cope with the emotional and behavioral aspects of living with T1D.

Common Psychosocial Challenges:

- *Coping with a new diagnosis*: It's common to experience a range of emotions after a T1D diagnosis, including shock, denial, anger, sadness, and anxiety. Youth may struggle to understand their diagnosis and its implications, while parents may feel overwhelmed with the new responsibilities of managing their child's condition.

- *Diabetes-related distress and burnout*: The daily demands of managing T1D, such as frequent blood glucose monitoring, insulin injections or pump therapy, and dietary restrictions, can lead to significant distress and burnout. This can affect both the child and their caregivers.

- *Impact on functional activities*: T1D can disrupt a child's school activities, social life, and overall independence. They may need to take breaks for blood glucose checks or insulin administration, and they may feel different from their peers.

- *Depression and Anxiety*: Living with a chronic condition like T1D can increase the risk of depression and anxiety. Children may experience low mood, loss of interest in activities, and excessive worry.

- *Behavioral challenges*: Some children may exhibit behavioral challenges as a way of coping with their diagnosis. This can include acting out, withdrawing from activities, or refusing to follow their diabetes treatment plan.

- *Treatment adherence*: Adhering to the complex T1D treatment regimen can be difficult, especially for children and adolescents. They may struggle with taking injections, managing pump therapy, or following dietary restrictions.

How Our Psychology Team Can Help

Our psychology team provides a variety of evidence-based interventions to address these psychosocial challenges, including:

* **Individual therapy**: Provides a safe space for children and parents to express their feelings, develop coping strategies, and address specific concerns related to T1D.

* **Family therapy**: Helps families communicate effectively, navigate challenges together, and strengthen their support system.

* **Behavioral interventions**: Focuses on developing strategies to improve treatment adherence, manage diabetes-related distress, and address behavioral challenges.

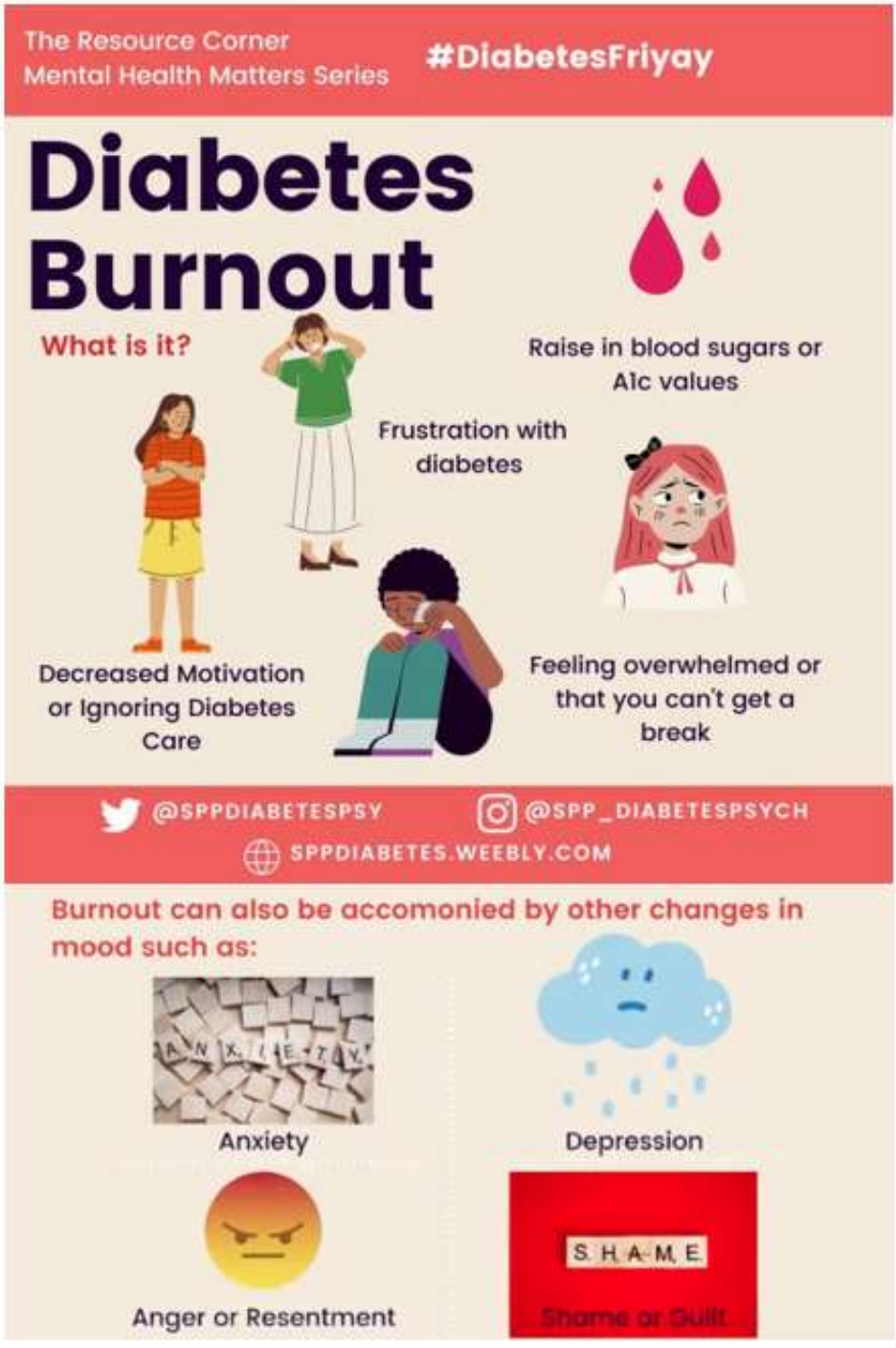
* **Psychoeducation**: Provides information about T1D, its management, and its potential impact on mental health.

* **Groups**: Connects families with others who are going through similar experiences, providing a sense of community and shared understanding.

Our goal is to help children with T1D and their families:
* Develop effective coping strategies
* Reduce diabetes-related distress and burnout
* Improve treatment adherence
* Maintain a healthy emotional and social well-being
* Thrive despite the challenges of living with T1D

If you or your child is struggling with the psychosocial challenges of a new T1D diagnosis, please reach out to our psychology team. We are here to provide support and guidance on your journey. Please ask your medical provider to place a referral for Pediatric Psychology and we'll be in touch.

Warning signs of Diabetes Burnout and Fatigue



If you start seeing these signs and symptoms, early intervention is best and can be helpful to address by building active coping strategies.

Helping Children of Different Ages Cope with Diabetes

Here are some traits typical of children and some suggestions for helping children of different ages cope with diabetes. Please note that every child is an individual and may be in different stages at different times. This is to serve as a reference.

Birth to 2 years
- Very rapid growth, increased motor skills and speech development
- Changes in eating habits
- Changes in sleep patterns
- Learning to trust/bond with caregiver

Things You Can Do:
- Adjust insulin program around eating patterns when possible
- Get all supplies ready before approaching child for diabetes care
- Use play as a teaching tool. For example, play with Rufus the Bear
- Sometimes it is helpful to stick to a schedule for checking glucose and giving insulin
- Provide a comfortable soothing environment for tests. Think about what usually works to calm your child, such as back rubs or singing
- Share tasks among caregivers to prevent burnout
- Create a schedule or routine
- Set limits for the child

Toddler (2 to 3 years old)
- Can participate in some self-care by helping get supplies ready
- Looks for parental approval but also will test limits
- May have decreased appetite and picky eating habits
- Has more regular sleep patterns
- Has difficulty understanding that something negative and painful will help him/her feel better
- Loves to be in charge

Things You Can Do:
- Help your child with control issues by allowing him/her to choose between two choices of food, and injection site. When you provide choices, your child feels more in control. But limit the number of choices to help minimize battles and stress
- Praise the child
- Have materials ready
- Use stories, books and games as teaching tools

Pre-School (4 to 5 years old)
- Peer issues begin to emerge
- Can understand rules
- Self-centered and creative
- Begin to do things on their own
- Eating behavior is less erratic
- Is very energetic
- Hypoglycemia can be a concern
- Has regular sleep patterns

Things You Can Do:
- Let your child assist you with care, pushing button on lancet device
- Use the reward system more, with stickers and charts
- Avoid labeling test results as good or bad
- Help children identify symptoms of low glucose levels
- Involve children in meal planning and food choices
- Stories, books, and games work well to help children express their feelings

School Age (6 to 10 years old)
- Fear of being different
- Can perform some self-care skills with supervision and usually is more efficient than the adolescent
- Eager to learn and is a concrete thinker
- Begins to understand cause and effect of actions
- Begins to test independent form family
- Spends more time away from home, and has other outside influences

Things You Can Do:
- Plan for school lunches, parties, and special events
- Work with school to ensure a supportive atmosphere away from home.
- Make diabetes routine flexible to allow for school and peer activities
- Parents continue to manage glucose monitoring tasks while allowing for some independence

Early Adolescence (11 to 14 years old)
- Erratic growth
- Body image is important
- Developing a strong sense of identity
- Becoming more mature and independent
- More influenced by peers
- May challenge authority more
- May have self-esteem issues
- Asks challenging questions

Things You Can Do:

- Incorporate hectic lifestyle into diabetes plan
- Work with your child on problem solving skills and techniques
- Allow independent visits with members of health care team, for example a visit with social worker or psychologist regarding adjustment issues
- Praise children when they are doing well with care
- Supervise and participate in daily care
- Work as a team to agree on roles of parent and children with diabetes care
- Monitor signs of depression, eating disorders and risky behaviors
- Reach out for additional support if needed (call or see diabetes social worker, attend support groups, or seek out counseling)

Adolescence (15 to 18 years old)

- Can think abstractly and hypothetically
- Able to understand how doing something can prevent future problems
- Finding a sense of identity
- Risk taking behaviors, which can affect diabetes care, for example, not taking insulin
- May have changing eating patterns and more of an emphasis in controlling their weight
- Unpredictable social activities
- More freedom from parental supervision with school, work, activities, etc
- Feels invincible and that nothing bad can happen to them
- Need for peer approval

Things You Can Do:

- Incorporate hectic lifestyle into diabetes plan
- Allow independence in problem solving, as long as outcome is agreeable to both
- Be willing to give multiple shots per day
- Be non-judgmental. For example, you may note that glucose is high or low but avoid describing this as good or bad
- Supervise and participate in daily care
- Monitor for signs of depression, eating disorders and risky behaviors
- Increase support and parent involvement at signs of burnout
- Understand that even children who were previously coping well with diagnosis and responsiblity may experience regression later.
- Reach out for additional support if needed.

AGE RELATED RESPONSIBILITIES AND TRAITS		
	Non – diabetes- Related	Diabetes - Related
Age below 3 years	• Developing gross motor skills • Developing speech skills • Learning to trust • Responding to love	• Parents/caregivers must do all the care • Acceptance of diabetes care as part of normal life • Parents may give shots (pump boluses) after seeing what is eaten • CGM use is common
Age 3-7 years	• Imaginative & concrete thinkers • Cannot think abstractly • Self-centered	• Parent/caregiver does all tasks • Gradually learns to cooperate for blood/CGM glucose levels and insulin shots • Inconsistent with food choices – may still need shots/boluses after meals • Gradually learns to recognize hypoglycemia • Undeveloped concept of time • Adult needs to do all insulin pump management
Age 8-12 years	• Concrete thinkers • More logical and understanding • More curious • More social • More responsible	• Can learn to do own blood sugars • Can draw up and give shots/boluses with supervision • Can make own food choices; can learn initial carb counting • Do not appreciate that doing something now helps to prevent later problems • Can recognize and treat hypoglycemia • Can do pump boluses but needs supervision to remember to pre bolus before a meal
Age 13-18 years	• More independent • Behavior varies • Body image is important • Away from home more • More responsible • Abstract thinking • Able to understand the importance of doing something now to prevent future problems in the future	• More independent but still needs parental involvement and review to make decisions about dosage and reminders about pre-meal boluses • Knows which food to eat; can do carbohydrate counting • Gradually recognizes the importance of optimal sugar management to prevent later complications • May be more willing to inject multiple shots or pump boluses per day

Type 1 Diabetes Screening for Relatives of People Living with Type 1 Diabetes

What is early detection of type 1 diabetes?

T1D develops in stages over time and can be detected by a simple blood test (T1D autoantibody test) before glucose is elevated and insulin is required. T1D autoantibodies signal that the body's immune system is attacking the insulin-producing cells in the pancreas. If a person has two or more confirmed autoantibodies, they have a high likelihood for progression to stage 3 T1D.

Stages of Type 1 Diabetes:

STAGE 1	STAGE 2	STAGE 3
Multiple autoantibodies Blood glucose normal **No symptoms**	Autoantibodies present (usually multiple) Blood glucose abnormal (dysglycemia) **No symptoms**	Autoantibodies present Blood glucose elevated (hyperglycemia) **Often symptomatic**

What are the benefits of screening for T1D?

We can identify people with early stages of T1D even before symptoms and the need for insulin arise. One useful way is screening for autoantibodies, which indicate the autoimmune process in the pancreas has begun.

By identifying T1D early, it may be possible to **prevent the onset of diabetic ketoacidosis (DKA)**, one of the most serious complications of diabetes. In addition, it gives autoantibody-positive individuals the chance to plan and prepare. It also allows eligible autoantibody positive individuals to receive FDA-approved therapies to delay onset of symptomatic T1D and/or participation in research or clinical trials aimed at delaying/preventing the onset of symptomatic T1D.

Rady Children's T1D-at-Risk Program

• In-person visits are conducted by a Children's Diabetes and Endocrinology provider at Rady Children's Hospital, San Diego.

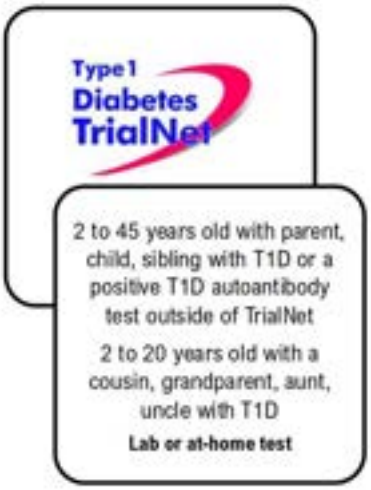
• The program offers autoantibody screening for children ages 2-18 using a simple finger-poke blood sample, along with staging of T1D, ongoing monitoring for progression, and counseling regarding FDA-approved therapy options when appropriate.

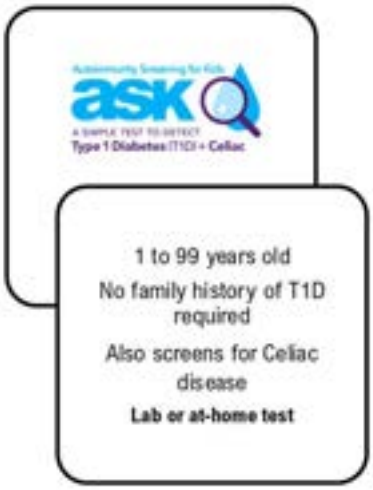
Guide To Diabetes Management

Schedule a visit with our T1D at Risk Screening and Monitoring Program:

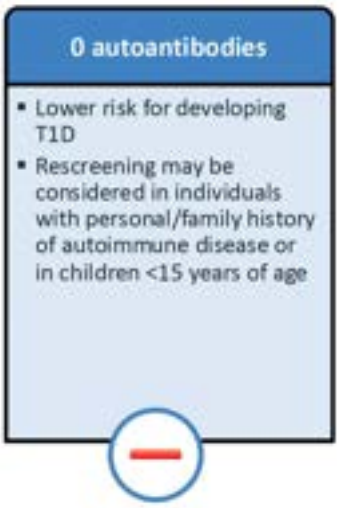
- Talk to your physician while at the hospital to be referred.
- After hospital discharge ask your primary care physician about a referral for T1D screening and monitoring at **Rady Children's T1D at Risk Clinic**.

Other Screening Options:





Interpretation of Results:



Guide To Diabetes Management

Your "In Clinic" Tests and Treatment

- **Hemoglobin A1C** is a blood test taken via finger stick. It gives us an estimate of what your blood glucose levels have been for the last 3 months. The ideal level for an adult with diabetes is 7.0 or below, and below 7.5 for children and teens.

- **RetCam** is a specialized camera in a dark room that allows your care team to take pictures of the retina of the eyes to look for abnormalities. No eye drops are involved. The pictures will be sent to an ophthalmologist for review.

- **Urine Microalbumin** is a test to look for very small amounts of a protein called "albumin" in your urine. Small amounts of albumin in urine (called microalbumin) may be one of the first signs of kidney disease related to diabetes. Your MA will provide you with a urine cup at your visit—please be sure this is labeled with your name and birthdate before you leave it in the room.

- **Lipid Panel** is a test that measures fat (cholesterol and triglyceride) in your blood. This is a blood test that is obtained via fingerstick at certain appointments.

Other Important Tests

In addition to daily blood sugar testing, people with diabetes need regular follow up with their endocrinologist (a doctor specializing in diabetes). There are several tests that monitor how well a person's diabetes is being managed or if there are complications.

Blood pressure
High blood sugar can lead to high blood pressure and some heart conditions. Your doctor can keep your blood pressure in check and help you keep your heart healthy.

Thyroid function tests (T_3, T_4, TSH)
How well your thyroid is working can affect your blood sugar control and how much insulin you need. So periodic monitoring is helpful.

Liver function tests (cholesterol levels: HDL, LDL, triglyceride)
Diabetes can increase the risk of fatty liver disease, a condition where excess fat builds up in the liver. These tests can tell your doctor if you need better control of your cholesterols.

Kidney function tests (protein, creatinine, BUN, albumin)
The role of the kidneys is to filter "waste" and water from blood and then make urine. When blood sugar levels are high, sugar is passed into urine. And when this occurs, the pressure becomes high in the kidney filtering system. This can damage the kidneys and cause serious complications. The kidney function tests can tell you if your kidneys are working well.

Diabetes Complications

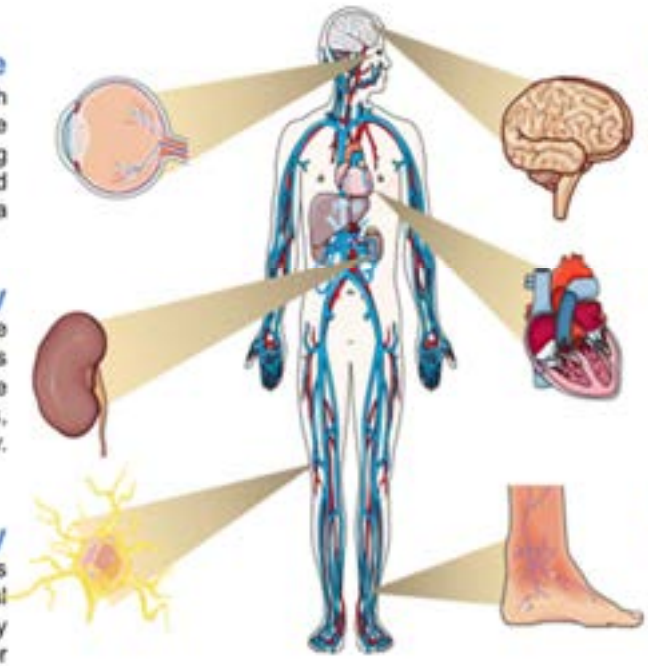
Major Complications of Diabetes

Microvascular

Eye
High blood glucose and high blood pressure can damage eye blood vessels, causing retinopathy, cataracts and glaucoma

Kidney
High blood pressure damages small blood vessels and excess blood glucose overworks the kidneys, resulting in nephropathy.

Neuropathy
Hyperglycemia damages nerves in the peripheral nervous system. This may result in pain and/or numbness. Feet wounds may go undetected, get infected and lead to gangrene.



Macrovascular

Brain
Increased risk of stroke and cerebrovascular disease, including transient ischemic attack, cognitive impairment, etc.

Heart
High blood pressure and insulin resistance increase risk of coronary heart disease

Extremities
Peripheral vascular disease results from narrowing of blood vessels increasing the risk for reduced or lack of blood flow in legs. Feet wounds are likely to heal slowly contributing to gangrene and other complications.

Guide To Diabetes Management

Members of Our Team

Patient access representatives (PAR) are staff members who help our patients check in, check out, create MyChart accounts, and make follow-up appointments. The PAR team will be assisting you and can also help provide any wait time updates for your doctor or nurse practitioner on the day of your visit.

Medical assistants (MA) are staff members who will take vital signs and direct the patient to a room before seeing the doctor or nurse practitioner. Your MA might also complete other in-clinic tests ordered by your doctor like labs or eye exams, as well as administer certain medications, like a flu shot. If you have questions about who you will see today in the clinic, ask your MA! Your MA will also update you on wait times once you're in the exam room.

Registered Nurses (RN) are nurses who will help the medical team provide care and education. Our clinic has RN Care Coordinators who specialize in Diabetes and Endocrinology. An RN can help review medication refills (including insurance issues), school/camp forms, goals, and education topics identified by you or your doctor/nurse practitioner.

Nurse practitioners (NP/DNP) are nurses with advanced graduate-level education who are licensed to diagnose and prescribe treatment, including medications, and perform complex clinical procedures. They work in collaboration with physicians and other health care professionals. Depending on your diagnosis, you might rotate your appointments between seeing a NP/DNP and Doctor (MD).

Attendings (MD/DO) are the lead doctors responsible for your care. They have completed medical school, pediatric residency, advanced endocrinology training, and are specialized in providing care related to Endocrinology.

Fellows (MD/DO) are doctors who have completed their primary residency in pediatrics and have chosen to pursue advanced training in a particular specialty. Doctors will have 3 years in a pediatric endocrinology fellowship before they can become attending physicians in Endocrinology.

Residents (MD/DO) are doctors in a residency program. Residents are MDs or DOs that are getting 3 years of extra training specifically in pediatrics, before becoming an attending physician. Your resident doctor may be in their first, second, or third year as a pediatric resident. A resident might start your appointment and take notes for your attending doctor before they come in the room.

Medical Student (future MD/DO) have completed their bachelor's degree and are now in medical school learning to become a doctor. The medical students you meet will be in their third or fourth year of medical school. A medical student might start your appointment and take notes for your attending doctor before they come in the room.

Dietitians (RD) specialize in food and nutrition. They advise families and children on making healthy lifestyle choices and how to maintain a balanced diet that works with any medical conditions they have.

Social workers (SW, LCSW) offer assistance and support services for patients and families, including grief counseling, crisis intervention, or referrals for community resources.

Exercise Physiologists are health care professionals who have completed a degree in Exercise Physiology and/or have been certified by the American Society of Exercise Physiologists. They provide health education and exercise plans to help patients improve their quality of life, weight, and overall physical health.

Diabetes Care Managers help educate patients and their families and help coordinate health services care for all aspects of the patient's health care, not just related to the diagnosis.

Pharmacy Technicians work on authorizations of diabetes supplies and medications. They work with insurance companies, durable medical supply companies and pharmacies.