

# Exercise and Activity Guidelines

## For Children and Teens with Diabetes

---

### Guidelines to follow when you are active, playing a sport or exercising.

It is important to monitor and adjust your insulin regimen when you are being active like taking a hike, dancing, playing a sport or exercising. Use these guidelines to help you. Frequent blood glucose monitoring, planning your exercise and meals ahead of time, and communication with your diabetes team will offer the best results.

---

### How should I monitor my blood glucose when I am exercising or being active?

- Check your blood glucose before, and every 30 minutes during, activity.
  - If your blood glucose is greater than 250 mg/dL before activity, check your ketones.
  - **Do not** exercise or do the activity if you have moderate or large ketones or if you feel nauseated.
  - Any exercise with high blood glucose and ketones is dangerous and can lead to diabetic ketoacidosis.
  - **Do not** exercise or do the activity if your blood glucose is less than 80 mg/dL. Instead, treat the low blood glucose first, as recommended by your provider, and wait to exercise until your blood glucose has increased to above 80 mg/dL.
  - Make sure your coach is aware of your blood glucose management plan.
- 

### How should I adjust my meal or snack insulin?

#### For planned exercise up to 3 hours after a meal or snack:

- Reduce your pre-exercise meal or snack insulin if your exercise will occur less than 3 hours after a meal or snack.
- Calculate your meal or snack insulin dose as usual, using your insulin-to-carbohydrate ratio and blood glucose correction factor.
- Then, multiply this calculated insulin dose by the appropriate **activity multiplier** from the chart in **table 2** below.
- Keep in mind that these are only starting guidelines. Each of the activities in the chart below can be performed at different intensities. For example, some yard work may be moderate in intensity. Likewise, basketball or soccer practice on any given day could be low to moderate in intensity if there is less scrimmaging.

#### To Learn More

- Endocrine Clinic - 206-987-2640
- Ask your child's healthcare provider
- [seattlechildrens.org/patient-education](https://seattlechildrens.org/patient-education)

#### Free Interpreter Services

- In the hospital, ask your nurse.
- From outside the hospital, call the toll-free Family Interpreting Line, 1-866-583-1527. Tell the interpreter the name or extension you need.



### Example:

- 12-year-old Susan is on a volleyball team.
- Susan's insulin-to-carbohydrate ratio is 1 unit per 10 grams.
- Her correction factor is 1 unit per 50 mg/dL above 120 mg/dL.
- She eats a pre-exercise snack of 30 grams 1 hour before practice.
- Her blood glucose is 170 mg/dL.
- Her activity: volleyball practice for 1 hour
  1. Calculate insulin dose:  
 $3 \text{ units for carbohydrate} + 1 \text{ unit for blood glucose} = 4 \text{ units}$
  2. Multiply dose by the **activity multiplier from table 2 below**:  
 $4 \text{ units} \times 0.25 = 1 \text{ unit}$
  3. Bolus 1 unit insulin for pre-exercise snack
  4. Check blood glucose before and during activity

---

### What do I do about unplanned exercise or activity?

If you are exercising during **peak insulin activity** (less than 3 hours after injection or bolus), you will likely need to eat carbohydrate to prevent low blood glucose. Some carbohydrate may be necessary even if you are not exercising during a time of peak insulin activity.

**Table 3 – Carbohydrate Used per Hour of Activity Chart** below gives an estimate of how much carbohydrate your body is using per hour of activity. The amount of carbohydrate you will need to eat depends on:

- The intensity and duration of your exercise
- Your starting blood glucose
- Whether you also adjusted your insulin

For example, you will likely need less carbohydrate if you are playing casual basketball versus more competitive basketball.

---

### Are there activities that raise blood glucose?

#### Practice vs. games

Sometimes when you are more nervous or excited (such as in a competitive match or meet) the blood glucose will go up due to those nerves and excitement. This may require fewer extra carbohydrates or less reduction in insulin dose beforehand.

#### Type of exercise

Some types of activity or exercise are more likely to cause the blood glucose to fall. Aerobic activity, such as jogging, hiking and swimming will likely cause the blood glucose to fall steadily. Intermittent sprints or resistance training (such as weightlifting) might cause the blood glucose to rise. The best thing to do is to check your blood glucose frequently to understand how individual activities affect you, and then plan accordingly the next time. Your provider can help you with this.

Keep records of the amount and type of food eaten so you are able to adjust as needed or share with your diabetes care team.

**What should I eat before unplanned exercise or activity?**

Use table **1-Eating Before Activity**, to find what to eat based on your pre-activity blood glucose level and how long you will be active. Eating or drinking small amounts before and every 20 to 30 minutes offers the best results.

**Table 1: Eating Before Activity**

Duration of activity	Your pre-activity blood glucose		
	80-100 mg/dL	100-150 mg/dL	150-250 mg/dL
<b>Less than 30 minutes</b>	Liquid carbohydrate like sports drink, milk or juice	Solid carbohydrate: fresh fruit, yogurt, crackers, granola bar	No snack needed, unless hungry and 3-4 hours since last meal or snack; will require insulin
<b>30 to 60 minutes</b>	Combination of liquid and solid carbohydrate such as a sports drink and fruit, crackers, or granola bar	Combination of liquid and solid carbohydrate and protein: sports drink and ½ sandwich	Solid carbohydrate and protein: fresh fruit and nuts, crackers and cheese and deli meat or energy bar

**Remember to treat blood glucose if it is less than 80 mg/dl before starting to exercise.**

**What else do I need to remember?**

**During activity**

- Carry fast-acting carbohydrate to treat hypoglycemia (e.g., glucose tablets, sports drink or fruit snacks)
- Wear a medical ID
- Drink plenty of fluids

**After activity**

- Check your blood glucose at least every 3 hours after activity and **at least once overnight**. If you have had any hypoglycemia during or after the activity, check your blood glucose more frequently.
- If your blood glucose is high immediately after activity, wait 30 to 60 minutes to see if it is coming down. If it does not, then **give ½ of the calculated blood glucose correction insulin dose**.
- At bedtime after exercise, if your blood sugar is less than 120 mg/dL have a small snack containing both carbohydrates and protein, and check blood glucose again between midnight and 2 a.m.

## Should I adjust my insulin for all-day activities?

### All-day activity

If you are doing an all-day activity such as camp, tournaments, long-distance walking or hiking, skiing, water sports, etc., you may need to adjust your basal/long-acting insulin (example: Lantus).

If you usually give this dose in the evening, reduce your basal insulin by 20% the evening before and the evening after these types of activities. You calculate this by multiplying your basal insulin dose by 0.80. If you give this dose in the morning, reduce by 20% that morning, but give the usual dose the next morning.

### Example:

- Marcus, age 15, is planning to go skiing
- Insulin dose: 10 units Lantus given at 9 p.m.
- Planned activity: all-day skiing
  1. Marcus will reduce his basal insulin the night **before** and **after** skiing as follows:
  2.  $10 \text{ units} \times 0.80 = 8 \text{ units}$
  3. He will give himself 8 units of insulin the night before and the night after skiing.
  4. Marcus will check his blood glucose and keep records. He will follow up with his diabetes team for help with adjustments.

### Further reading:

- “Think Like a Pancreas: A Practical Guide to Managing Diabetes with Insulin,” by Gary Scheiner, 2012.
- “Diabetic Athlete’s Handbook,” by Sheri Colberg, 2008.

**Table 2: Activity Multiplier Chart**

Intensity	Types of activities	Activity multiplier	
		30 mins	60 mins
<b>Low</b>	Leisure walking or cycling, table tennis, playing catch, yard work, bowling	0.75	0.50
<b>Moderate</b>	Brisk walking, hiking, cycling, gymnastics, dance, tennis, volleyball, golf, baseball, recreational swimming or skiing, horseback riding, wrestling	0.50	0.25
<b>High</b>	Basketball, soccer, football, lacrosse, running, karate, tae kwon do, competitive swimming or skiing	0.25	0.25

**Table 3:  
Carbohydrate  
Used per Hour of  
Activity**

		Body weight (pounds)					
		50	75	100	125	150	175
Intensity	Activity	Carbohydrate grams per hour					
<b>Low</b>	Leisure walking or cycling, table tennis, playing catch, yard work, bowling	7-10	11-15	15-20	18-26	22-31	26-36
<b>Moderate</b>	Brisk walking, hiking, cycling, gymnastics, dance, tennis, volleyball, golf, baseball, recreational swimming or skiing, horseback riding, wrestling	12-18	18-26	23-35	29-44	35-53	41-61
<b>High</b>	Basketball, soccer, rowing, football, lacrosse, running, karate, tae kwon do, competitive swimming or skiing	20-29	31-44	41-58	51-66	61-79	72-92

Seattle Children's offers free interpreter services for patients, family members and legal representatives who are deaf or hard of hearing or speak a language other than English. Seattle Children's will make this information available in alternate formats upon request. Call the Family Resource Center at 206-987-2201. This handout has been reviewed by clinical staff at Seattle Children's. However, your needs are unique. Before you act or rely upon this information, please talk with your healthcare provider.

© 2024 Seattle Children's, Seattle, Washington. All rights reserved.

11/24  
PE1973