

# When To Adjust Your Child's Insulin Dose



The role of insulin in your child's body is important: it allows their body to take the glucose (sugar) from the food they eat and convert it to energy. Children with diabetes either no longer make insulin or can't use it effectively, which means they will need insulin injections to keep their body functioning as it should.

Because insulin is so important to your child's health, it's important to give them the right amount. If your child takes too much insulin, their blood sugar can become low, which can cause symptoms such as a rapid heartbeat, nausea, fatigue, and even loss of consciousness. If they don't take enough, you may notice symptoms of high blood sugars (weight loss and increased urination, thirst, and appetite).

Sometimes, your child may have high blood sugar, which can mean they ate more than they planned, got sick, or were stressed, among other things. In order to bring down their blood sugar, they'll need an extra dose of insulin — or a correction factor.

Your child will also need insulin for the food they eat. Calculate this using your child's insulin-to-carbohydrate ratio — the amount of insulin your child needs to cover a specific amount (grams) of carbohydrates from their food and drinks.

Remember, there is no such thing as a perfect insulin dose. The insulin requirements are constantly changing — so you'll need to make adjustments on their doses or call the Diabetes Team if you're unsure what to do.

Pattern control is used to help you make good decisions on making insulin adjustments. This involves knowing your child's target blood sugar range, testing the blood sugar regularly, and looking for patterns. Then, you can make adjustments as necessary.

Here's what you need to know about insulin-to-carbohydrate ratios, correction factors, and pattern ratios.

## Using Your Child's Insulin-To-Carbohydrate Ratio

The insulin-to-carbohydrate ratio is important in helping your child get enough insulin for the amount of food they eat. The ratio includes the units of insulin and the carbohydrates your child eats.

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### Your Child's Insulin-To-Carb Ratio Will Look Like This:

\_\_\_\_\_ units of mealtime insulin for every \_\_\_\_\_ grams of carbohydrate

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For example, a ratio of 1:15 means your child will take one unit of mealtime insulin for every 15 grams of carbohydrate they eat.

To calculate this, take the total grams of carb for your child's meal and divide by the factor (in the previous example, the factor is 15). If your child's ratio is 1:12, you would take the total grams of carb and divide it by 12.

Here are two examples of insulin-to-carb calculations:

- If your child's ratio is 1:15, and their breakfast will be 48 grams of carb:
- 48 divided by 15 equals 3.2, which means your child would need to take 3.2 units of insulin to cover this meal.
- If your child's ratio is 1:12, and their breakfast will be 48 grams of carb:
- 48 divided by 12 equals 4, which means your child would need to take 4 units of insulin to cover this meal.

## Correction Factors For High Blood Sugar

A correction factor is only used when your child's blood sugar is over their target.

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### Your Child's Correction Factor Will Look Like This:

(Number of units) unit for every (factor) point that blood sugar is over (target blood sugar)

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For example, a correction factor of 1:50>150 means your child will take one unit of fast-acting insulin for every 50 points (factor) their blood sugar is over 150 (target blood sugar).

To calculate this, take your child's current blood sugar and subtract their target blood sugar. Divide the result by 50, and multiply that result by the number of units.

Here is an example of a correction factor calculation:

If your child's correction factor is 1:50>150 and their current blood sugar is 233:

- (Blood sugar) 233 minus 150 (target) equals 83
- 83 divided by 50 equals 1.6
- 1.6 multiplied by 1 (number of units) equals 1.6

This means your child needs to take 1.6 units of insulin to bring their elevated blood sugar down to their target blood sugar.

## Mealtime Dosing Calculations

Simply add their insulin-to-carbohydrate ratio dose together with their correction dose. Round the total — and that's your child's mealtime dose.

Rounding should be done as follows:

- For children less than 5 years old, round to the nearest ½ unit.
- For children over 5 years old, round to the nearest unit.

# How To Use Pattern Control For Insulin Adjustments

You may need to change your child's insulin doses from time to time. By identifying patterns, you can adjust their insulin to meet their target blood sugar range. You can do this if your child uses an insulin pump or multi-dose injection therapy.

## Steps To Using Pattern Control For Insulin Adjustments

1. Know your child's target range (within the American Diabetes Guidelines). You should be prepared to make insulin adjustments on your own using these guidelines.

Age	Before Meals	Bedtime/Overnight
Under 5 years old	80-180	100-180
5 to 19 years old	70-150	90-150

2. Test the blood sugar 8 times per day (including midnight and 3 AM when appropriate) for 2 to 3 days and record in a logbook.

3. Look for patterns, including:

- Low or high blood sugars at a particular time of the day or night
- Before meals or night blood sugars:
  - In order to basal rates with insulin pumps
  - In order to adjust long-acting insulin with multi-dose injection therapy
- 2 to 3 hours after a meal blood sugars:
  - In order to adjust bolus amounts with insulin pumps
  - In order to adjust short-acting insulin with multi-dose injection therapy

4. Determine which insulin is causing the problem and make the adjustment. You should decrease insulin to fix low blood sugars and increase insulin to fix high blood sugars. An effective change is increasing or decreasing the dose by 10%. Use the following chart for help:

For Insulin Pumps	For Insulin Pumps	For Multi-Dose Injection Therapy
<b>If Bolus dose is:</b>	<b>If Basal rate is:</b>	<b>If the dose is:</b>
Less than 10 units: change by 1/2 unit	Less than 0.5: change by 0.05 units	Less than 10 units: change by 1/2 unit – 1 unit
10-14 units: change by 1 unit	0.5-2.0: change by 0.1 unit	10 to 14 units: change by 1 unit
15-24: change by 2 units	Greater than 2.0: change by 0.2 unit	15 to 24 units: change by 2 units
25-34: change by 3 units		25 to 34 units: change by 3 units
35-44: change by 4 units		35 to 44 units: change by 4 units

Avoid changing two doses at once, as it will be harder to determine which change was effective.

*More than one change may be appropriate if there are low blood sugars.*

5. Reassess by continuing to test your child’s blood sugar 8 times per 2 to 3 days (including midnight and 3 AM when appropriate). Make another change if necessary.

Remember, you should give the change time to work.

- Wait 2 to 3 days for insulin changes made for high blood sugars to take effect.
- If a low blood sugar occurs, you can lower the insulin each day until in normal range. Do not wait the usual 2 to 3 days.
- For insulin pumps:
  - You will also need to change insulin and infusion sites routinely — every 2 to 3 days or more frequently if your child is experiencing high blood sugars that are not responding to insulin boluses.

## When To Call The Diabetes Team

You should always fix low blood sugars right away. It’s also important to recognize when changes need to be made and adjust doses between clinic visits to reduce the chances of long term complications.

Call the Diabetes Team immediately if:

- Your child's blood sugars are worse after making a change in their insulin dose or if you make more than 3 changes in the dose since their last clinic visit
  - Moderate or large ketones are present
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Do you still have questions about when you should change your child's insulin doses? Contact the diabetes team at Children's Diabetes Center, Children's Hospital & Medical Center at 402-955-3871 for more information about insulin doses and pattern control.

Visit us online at [www.childrensomaha.org/diabetes](http://www.childrensomaha.org/diabetes)