

patient education program

8200 Dodge Street Omaha, NE 68114-4113 402-955-5400 ChildrensOmaha.org

Insulin Calculations

For Short-Acting Insulin (Humalog/Novolog/Apidra)

Step 1: Insulin to Carbohydrate (Carb) Ratio

The **insulin to carb ratio** is the amount of short-acting insulin needed for the carbohydrates you eat.

- It's written like this 1:15
- This means you will take **1 unit** of insulin for **every 15 grams of carbohydrate** you eat
- To calculate this, take the total grams of carb for the meal and divide by the carb ratio

For example: Your ratio is **1:15** and your breakfast is **44 grams of carb**

$$44 \text{ grams} \div 15 \text{ (ratio)} = 2.9$$

You need **2.9 units** of insulin to cover this meal (don't round until step 4)

Step 2: Correction Factor

The **correction factor** is a dose of short-acting insulin given to bring down a high blood sugar. It is only used when your blood sugar is over your target. **It should not be given more frequently than every 2.5 hours.**

- It's written like this 1:50 > 120
- This means you will take **1 unit** of insulin for **every 50 points** (factor) your blood sugar is **over 120** (target blood sugar)
- To calculate this, take your *current* blood sugar minus your *target* blood sugar, then that result is divided by the factor of 50

For example: If your correction factor is **1:50 > 120** and your **current blood sugar (BS) is 256**

$$256 \text{ (BS)} - 120 \text{ (target)} = 136 \rightarrow 136 \div 50 \text{ (factor)} = 2.7$$

You need **2.7 units** of insulin to bring your blood sugar down (don't round until step 4)

Step 3: Add

Add the insulin to carbohydrate ratio dose together with the correction dose.

For example: $2.9 + 2.7 = 5.6 \text{ units}$

Step 4: Round

The **total of both** is then rounded. This is your **total meal time dose**.

Round as follows:

- Children less than 5 years – round to the nearest ½ unit
 - See chart on right
- Children over 5 years – round to the nearest whole unit
 - Standard rounding rules
 - ≤ 0.4 rounds down to the nearest whole number
 - ≥ 0.5 rounds up to the nearest whole number

For example: Children **over 5 years** = 5.6 rounds to **6 units**

Children **under 5 years** = 5.6 rounds to **5.5 units**

Half-Unit Rounding	
Blood Sugar	Insulin Dose
0.00 – 0.24	0 units
0.25 – 0.74	0.5 unit
0.75 – 1.24	1 unit
1.25 – 1.74	1.5 units
1.75 – 2.24	2 units
2.25 – 2.74	2.5 units
2.75 – 3.24	3 units
3.25 – 3.74	3.5 units
3.75 – 4.24	4 units
4.25 – 4.74	4.5 units
4.75 – 5.24	5 units

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Insulin Calculation Examples

Example 1: 16 year old boy

Going to eat 96 grams (g) of carb

Current blood sugar (BS) is 278

Insulin to carb ratio 1:5

Correction factor 1:30>120

- 1) 96 grams of carbs \div 5 (ratio) = 19.2 units
- 2) 278 blood sugar – 120 (target) = 158 \rightarrow 158 \div 30 (factor) = 5.2 units
- 3) 19.2 + 5.2 = 24.4 units
- 4) 24.4 \rightarrow **24 units**

Example 2: 8 year old girl

Going to eat 63 grams of carb

Current blood sugar is 364

Insulin to carb ratio 1:20

Correction factor 1:50>120

- 1) 63 g \div 20 = 3.1 units
- 2) 364 BS – 120 = 244 \rightarrow 244 \div 50 = 4.8 units
- 3) 3.1 + 4.8 = 7.9 units
- 4) 7.9 \rightarrow **8 units**

Example 3: 11 year old boy

Going to eat 77 grams of carb

Current blood sugar is 111

Insulin to carb ratio 1:15

Correction factor 1:50>120

- 1) 77 g \div 15 = 5.1 units
- 2) **THIS STEP IS NOT NEEDED SINCE BLOOD SUGAR IS IN TARGET RANGE**
- 3) 5.1 + 0 = 5.1 units
- 4) 5.1 \rightarrow **5 units** (for carbs only)

Example 4: 3 year old girl

Going to eat 31 grams of carb

Current blood sugar is 201

Insulin to carb ratio 1:60

Correction factor 1:100>180

- 1) 31 g \div 60 = 0.51 units
- 2) 201 BS – 180 (target) = 21 \rightarrow 21 \div 100 = 0.21 units
- 3) 0.51 + 0.21 = 0.72 units
- 4) 0.72 \rightarrow **0.5 units**