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

\[
256 \text{ (BS)} - 120 \text{ (target)} = 136 \implies 136 \div 50 \text{ (factor)} = 2.7
\]
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 units

**Step 4: Round**
The total of both is then rounded. This is your total meal time dose.

- 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

<table>
<thead>
<tr>
<th>Blood Sugar</th>
<th>Insulin Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00 – 0.24</td>
<td>0 units</td>
</tr>
<tr>
<td>0.25 – 0.74</td>
<td>0.5 unit</td>
</tr>
<tr>
<td>0.75 – 1.24</td>
<td>1 unit</td>
</tr>
<tr>
<td>1.25 – 1.74</td>
<td>1.5 units</td>
</tr>
<tr>
<td>1.75 – 2.24</td>
<td>2 units</td>
</tr>
<tr>
<td>2.25 – 2.74</td>
<td>2.5 units</td>
</tr>
<tr>
<td>2.75 – 3.24</td>
<td>3 units</td>
</tr>
<tr>
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</tr>
<tr>
<td>4.25 – 4.74</td>
<td>4.5 units</td>
</tr>
<tr>
<td>4.75 – 5.24</td>
<td>5 units</td>
</tr>
</tbody>
</table>

*Diabetes-Insulin Calculations*
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 ÷ 5 (ratio) = 19.2 units
2) 278 blood sugar – 120 (target) = 158 → 158 ÷ 30 (factor) = 5.2 units
3) 19.2 + 5.2 = 24.4 units
4) 24.4 → 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 ÷ 20 = 3.1 units
2) 364 BS – 120 = 244 → 244 ÷ 50 = 4.8 units
3) 3.1 + 4.8 = 7.9 units
4) 7.9 → 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 ÷ 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 → 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 ÷ 60 = 0.51 units
2) 201 BS – 180 (target) = 21 → 21 ÷ 100 = 0.21 units
3) 0.51 + 0.21 = 0.72 units
4) 0.72 → 0.5 units