

# patient education program

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

## Insulin Calculations

*For Rapid-Acting Insulin ONLY (Humalog (lispro), Novolog (aspart), etc.)*

The dose of insulin you take before you eat will be figured using two things:

1) **Insulin to Carbohydrate Ratio** – the amount of rapid-acting insulin needed for the carbohydrate you are going to eat.

- Written like this: 1:15
- Means to take 1 unit of insulin for every 15 grams of carbohydrate in this example
- Figured like this: Total carbohydrate grams to be eaten ÷ 15

2) **Correction Factor** – the amount of rapid-acting insulin needed to bring down a sugar that is above target. **It should not be given more than every 2 ½ hours**

- Written like this: 1:50>120
- Means to take 1 unit of insulin for every 50 points the blood sugar is above 120 in this example
- Figured like this: Current blood sugar – 120, then ÷ answer by 50

Rules of the game:

- When doing the math in general keep to 1 point behind the decimal, for example 2.4 not 2
- Do not round to whole or ½ units until the end - **this is step 4 on the next page**

• Standard rounding rules 

- Children less than 5 years round to the nearest ½ unit
- Children 5 years and older round to the nearest whole unit
  - $\leq 0.4$  rounds down
  - $\geq 0.5$  rounds up

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

## Let's Practice

### Example 1: 16-year-old

Going to eat 96 grams of carb

Insulin to carb ratio 1:5

Current blood sugar is 278

Correction factor 1:30>120

- 1)  $96 \text{ grams of carbs} \div 5 = 19.2 \text{ units}$
- 2)  $278 \text{ blood sugar (BS)} - 120 = 158$   
 $158 \div 30 = 5.2 \text{ units}$
- 3)  $19.2 + 5.2 = 24.4 \text{ units}$   
 $24.4 \rightarrow \mathbf{24 \text{ units}}$

### Example 2: 3-year-old

Going to eat 31 grams of carb

Insulin to carb ratio 1:60

Current blood sugar is 201

Correction factor 1:100>150

- 1)  $31 \text{ g} \div 60 = 0.51 \text{ units}$
- 2)  $201 \text{ BS} - 150 = 51$   
 $51 \div 100 = 0.51 \text{ units}$
- 3)  $0.51 + 0.51 = 1.02 \text{ units}$   
 $1.02 \rightarrow \mathbf{1 \text{ unit}}$

### Notes:

### Example 3: 11-year-old

Going to eat 77 grams of carb

Insulin to carb ratio 1:15

Current blood sugar is 111

Correction factor 1:50>120

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

### Example 4: 8-year-old

Going to eat 63 grams of carb

Insulin to carb ratio 1:20

Current blood sugar is 364

Correction factor 1:50>120

- 1)  $63 \text{ g} \div 20 = 3.1 \text{ units}$   
 $364 \text{ BS} - 120 = 244$
- 2)  $244 \div 50 = 4.8 \text{ units}$
- 3)  $3.1 + 4.8 = 7.9 \text{ units}$   
 $7.9 \rightarrow \mathbf{8 \text{ units}}$

### Notes:

## 4 Step Process

$$\text{I:C Ratio} = 1: \underline{\quad}$$

$$\text{CF} = 1: \underline{\quad} (\text{sensitivity}) > \underline{\quad} (\text{target})$$

<p><b>Step 1: Figure the dose of insulin for food</b></p> <ol style="list-style-type: none"> <li>1. Add up the grams of carb in the foods you will eat.</li> <li>2. Divide by your insulin-to-carb ratio</li> </ol> $\frac{\text{Total Grams of Carbohydrate to be Eaten}}{\text{Insulin to Carb Ratio}}$	<p><b>Practice:</b></p> $\underline{\quad} \text{ grams} \div \underline{\quad} = \underline{\quad}$
<p><b>Step 2: Figure the dose of insulin for blood sugar</b></p> <ol style="list-style-type: none"> <li>1. Subtract your target blood sugar from your current blood sugar. This will tell you how many points above target your blood sugar is.</li> <li>2. Divide the difference by your correction factor</li> </ol> $\frac{\text{Current Blood Sugar} - \text{Target Blood Sugar}}{\text{Correction Factor}} = \text{Correction Dose}$	<p><b>Practice:</b></p> $\underline{\quad} (\text{blood sugar}) - \underline{\quad} (\text{target}) = \underline{\quad}$ $\div \underline{\quad} (\text{sensitivity}) = \underline{\quad}$
<p><b>Step 3: Add the insulin from step 1 and 2 above</b></p>	<p><b>Practice:</b></p> $1 \underline{\quad} + 2 \underline{\quad} = \underline{\quad}$
<p><b>Step 4: Round to get your final dose</b></p>	<p><b>Practice:</b></p> $\underline{\quad} \rightarrow \underline{\quad} \text{ units}$