Carb Factor

Use The 500 Rule To Determine Your Starting Insulin to Carb Ratio

The 500 Rule (aka 450 Rule) from Using Insulin and the Pocket Pancreas is a great way to estimate how many grams of carbohydrate will be covered by one unit of Humalog or Novolog insulin. This is your insulin to carb ratio or your carb factor. Once you know this, you can count the grams of carb in the food you want to eat and divide by your carb factor to find how many units of bolus insulin are needed to cover the carbs. This allows flexibility in your food choices because any number of carbs can be covered with a matching dose of insulin.

The 500 Rule used to determine your carb factor depends on accurately knowing your TDD. As with basal doses, an accurate carb factor can be determined only after you've calculated an accurate TDD for yourself.

The 500 Rule:

- estimates grams of carb per unit of Humalog or Novolog insulins (the 450 Rule is used with Regular insulin)
- 500 divided by your TDD (Total Daily Dose of insulin) = grams of carb covered by one unit of Humalog or Novolog
- Lets you keep your post meal readings normal!

Example:
Someone's TDD = 50 units (i.e., the total amount of say Humalog and Lente insulins they used per day).
500/50 = 10 grams of carbohydrate covered by each unit of Humalog insulin

TDD = all fast insulin taken before meals, plus all long-acting insulin used in a day. If Humalog is used everyday to correct high readings, this may also need to be factored into the TDD. For instance, if someone's TDD is "30 units" (5 H before each meal, plus 15 Lantus at bedtime), but they need 8 to 12 units more almost every day to bring down highs, at least some of this 8 to 12 units will need to be factored into a new TDD.

Caution: The 500 Rule will be most accurate for those who make no insulin of their own and receive 50% to 60% of their TDD as basal insulin. It works best for those who are using a basal/bolus approach. For others, such as those who use two injections a day with the morning basal insulin covering carbs at lunch, the 500 Rule works only as a rough guide for matching carbohydrate.

The 500/450 Rules

	500 Rule	**450 Rule**
Total Daily Insulin Dose	Carb Covered by 1 Unit of **Humalog**	Carb Covered by 1 Unit of **Regular**
20	25 grams	23 grams
25	20 grams	18 grams
30	17 grams	15 grams
35	14 grams	13 grams
40	13 grams	11 grams
50	10 grams	9 grams
60	8 grams	8 grams

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Caution: This Rule works best for those with Type 1 diabetes who have no insulin production. With Type 2 diabetes, there is usually extra internal insulin production plus resistance to insulin. Although these factors make it harder to know the exact "total insulin" (injected plus internally produced), the result is that insulin doses may be underestimated in Type 2, giving lower doses than actually needed.

A good control program uses blood sugar tests in an organized way to adjust insulin doses. With your physician's help, long-acting insulin doses are first matched to your background insulin need. This keeps the blood sugar level while fasting. Then the table can be used to estimate how many grams of carbohydrate will be covered by each unit of Humalog or Regular insulin. When someone is using Multiple Daily Injections (MDI) or an insulin pump, the 500 Rule provides a good guide to how much Humalog or Novolog is needed to match carbohydrates.

For those who are not using MDI but who take fast insulin for breakfast and dinner, the Rule can be used as a rough guide to match the carbohydrate in these meals. But here, it's accuracy isn't as great as with true MDI, because some long-acting insulin is actually covering some of the meal carbohydrates.

From the book “Using Insulin” by John Walsh PA, CDE

