Basal-Bolus Insulin

Long-acting and rapid-acting insulin therapy

UW Medicine
DIABETES INSTITUTE
750 Republican Street, Seattle, WA 98109

What do the words basal-bolus insulin mean?	Many people with diabetes often use a combination of long-acting (basal) and rapid-acting (bolus) insulin. This kind of insulin therapy is called basal-bolus or multiple daily injection (MDI) insulin therapy. The goal of using basal-bolus insulin therapy is to help keep your blood glucoses in range like your body would before diabetes developed. Both of these insulins are measured in "units".
Basal insulin (long acting)	The kind of insulin you inject as "background insulin" to keep blood glucose levels stable overnight and between meals.
Insulin names: Glargine (Lantus/Basaglar) or Detemir (Levemir) or Tresiba	• Works to keep blood glucose in the target range between meals and overnight. • Usually give the same dose every day at the same time • Lasts 12-24 hours. • Taken at the same time every day.
Bolus insulin (rapid acting)	The kind of insulin you inject to bring your blood glucose down into range (correction) or to match up with your food.
Insulin names: aspart (Novolog), lispro (Humalog, Admelog), glulisine (Apidra)	• Works to quickly remove extra glucose from your blood (CORRECT YOUR BG) and/or to remove your glucose from your blood after you eat carbohydrates (COVER YOUR CARBS) • This dose will be different each time you give it depending on what your blood glucose is before you eat and what you are eating • Starts working 10-15 minutes after injection, lasts about 3 hours. • Works best when taken before eating carbohydrates

How much bolus insulin to take is based on two things:

- Total Carbohydrates in grams (g)
- Current blood glucose from meter or CGM (mg/dl)

Total Carbohydrates in grams

Count your carbohydrates:

1. Does the food have carbohydrates?
2. How much are you having
3. Look up the total

Insulin to Carbohydrate Ratio (ICR)

- Once you know how many carbs you are eating, you can use your Insulin to Carbohydrate Ratio to figure out how much insulin you need to take.
- Your insulin to carbohydrate ratio is based on what your body needs. For some people it looks like:
- 1 unit of Humalog/Novolog per 10 carbs – 1:10g
- 1 unit of Humalog/Novolog per 4 carbs – 1:4g
- When you know your insulin to carbohydrate ratio you can use it to DIVIDE your total carbs by the carb ratio to calculate your dose
- Works best when taken before eating carbohydrates

Current blood glucose

If your blood glucose is higher than your target number, you will need to give insulin to lower it. In order to know how much insulin to give, you will use a correction factor and a blood glucose target.

Correction Factor (CF)

The Correction Factor is how much 1 unit of insulin will lower your blood glucose. For example, if your correction factor is 50, then 1 unit of Humalog or Novolog will lower your blood glucose by 50 mg/dl. If your target is 100 mg/dl and your blood glucose is 150 mg/dl, then you would give 1 unit of insulin to lower your blood glucose. You may have a different target number for the daytime and nighttime.

To calculate your Correction Bolus, you need to know your Correction Factor.

In order to calculate the amount of correction insulin you need, use this formula:

(Current blood glucose - target blood glucose) ÷ Correction Factor = Correction Bolus

DO NOT correct your blood glucose unless it has been 3 hours since you last gave Humalog or Novolog.

When you are giving insulin before a meal, you can add your correction and carb bolus together and give one injection.

CarbBolus+CorrectionBolus=TotalBolusDose