Evaluating and Fine-Tuning Basal Rates

The goal for basal insulin is to help keep your blood glucose (BG) stable without the need for extra food or insulin. For example, you should be able to skip a meal without having to snack to prevent a low BG.

Basal rates that are accurately set should keep your BG relatively stable in the absence of food, exercise or extra insulin.

Initially, your basal rate(s) is estimated by your healthcare provider (HCP). Soon after starting pump therapy, your basal rate will need to be fine-tuned and other basal rate segments will likely be added to your basal program. Remember, you can have up to 12 different basal rates in one program.

To evaluate your basal rates and to see where you might need changes, you will need to check BG levels often. You will also need to try to eliminate other factors that may affect your BG levels, including food, bolus insulin, and increased activity. See the information below and on the next page for some specific tips to help you evaluate your basal rates.

Tips to Evaluate Basal Rates:

Timing

- It is helpful to divide the day into 4 timeframes and evaluate one at a time: overnight, morning, afternoon, and evening. Start with overnight.
- Evaluations can begin 4 hours after the last bolus dose and the last food/drink was consumed. You may consume water during testing.

Food

- During daytime evaluations, you will need to skip a meal.
- The meal prior to the evaluation should be a predictable one. You should be certain of the number of carbs.
- The meal prior to the evaluation should be a low-fat meal.

BG

- Generally, your BG should be in a reasonable range at the beginning of an evaluation.
- A BG in the 100-150 mg/dL range is reasonable, but check with your HCP for your personal minimum and maximum range.
- Stop the evaluation if your BG values go above your maximum or below your minimum target range. Treat any low or high BG as usual.

Things to Avoid During a Basal Evaluation

- Do not disconnect from your pump and do not set a temporary basal rate.
- Do not plan a basal rate evaluation during events that might affect the results: illness, fatigue, unusual stress, or after severe low BG. For women, the menstrual cycle may have an effect.
- Prior to a basal rate evaluation, you should not drink alcohol.
- Prior to a basal rate evaluation, you may need to avoid exercise. If you exercise consistently (same type of activity, same time every day) then skipping your exercise session may not be necessary or even good to do. Check with your HCP.

The following chart will give you specific instructions for completing the different basal rate evaluations:

Evaluation time frames	Evaluation directions	When to check BG
Overnight	1. Eat an early dinner and take your usual meal bolus. 2. Eat a predictable meal with a known number of carb grams. 3. Choose a low-fat dinner. 4. Do not eat after dinner. 5. Begin the evaluation about 4 hours after dinner if your BG is in a reasonable range.	4 hours after dinner, Bedtime, Midnight, 2-3 am, Upon waking
Morning	1. Begin the evaluation if your BG is in a reasonable range. 2. Skip breakfast. 3. Do not eat or drink until lunch.	Every 1-2 hours, Upon waking until lunch
Afternoon	1. Begin the evaluation if your BG is in a reasonable range 4 hours after breakfast. 2. Skip lunch. 3. Do not eat or drink until dinner.	4 hours after breakfast, Every 1-2 hours until dinner
Evening	1. Begin the evaluation if your BG is in a reasonable range 4 hours after lunch. 2. Skip dinner. 3. End the evaluation at bedtime and have a snack if desired (bolus as usual for your snack).	4 hours after lunch, Every 1-2 hours until bedtime

Basal Evaluation Log

Use the following charts to help you pull together information from your basal rate evaluations. Begin evaluations if your BG is between ____mg/dL and ___mg/dL.

Overnight

Dinner carb/dinner bolus	Time	4 hours after dinner	Bedtime	12 AM	3 AM	Upon waking
	BG day 1					
	BG day 2					
	BG day 3					

Morning

Bedtime carb/ bedtime bolus	Time	Upon waking	Hour 1	Hour 2	Hour 3	Hour 4
	BG day 1					
	BG day 2					
	BG day 3					

Afternoon

Breakfast carb/ breakfast bolus	Time	4 hours after breakfast	Hour 1	Hour 2	Hour 3	Hour 4
	BG day 1					
	BG day 2					
	BG day 3					

Evening

Lunch carb/ lunch bolus	Time	4 hours after lunch	Hour 1	Hour 2	Hour 3	Hour 4
	BG day 1					
	BG day 2					
	BG day 3					

Before making adjustments to your basal rates, it's best to see a repeating trend in BG values. This means you should complete each of the evaluations a minimum of two times; three would be best. This may seem like a great deal of work, but the value of having appropriate basal rates will be worth it. You can work your basal rate evaluations into your busy schedule. For example, you may be too busy to stop for lunch one day. Plan to do a few extra BG checks and make it an afternoon evaluation!

Don't get frustrated! You may keep trying to do a particular evaluation but you can't because your BG "isn't cooperating." For example, each time you attempt an overnight evaluation, your BG after dinner is too high. You are still getting valuable data here…maybe the evening basal is too low, or maybe you need a bigger bolus to cover your dinner. This is something to discuss with your HCP.

Using the Data to Make Adjustments

The Basal Evaluation Logs in this section will help you to record the data you collect during your basal evaluations, or you may use Insulin Pump Flow sheets (see the chapter on Record Keeping, page 42) to record the data.

Example of Basal Evaluation Log

Afternoon

Breakfast carb/ breakfast bolus	Time	4 hours after breakfast	Hour 1	Hour 2	Hour 3	Hour 4
37g/2.45 units	BG day 1	149 mg/dL	119 mg/dL	115 mg/dL	100 mg/dL	86 mg/dL
45g/3.00 units	BG day 2	126 mg/dL	120 mg/dL	95 mg/dL	85 mg/dL	80 mg/dL
35g/2.35 units	BG day 3	135 mg/dL	103 mg/dL	97 mg/dL	90 mg/dL	79 mg/dL

Once you have done the work of collecting the data from your evaluations, it is time to study and use it to make useful changes. Initially you should check with your HCP prior to changing basal rates. You may get to the stage when you and your HCP feel you can make your own basal rate adjustments. The example basal log above indicates a drop in BG of more than 30 points with the largest drop starting at hour 1. A lower basal rate should would be indicated during this time frame.

Here are Some Basic Guidelines Typically Used to Adjust Basal Rates:

- During a basal evaluation, BG changes of more than 30 mg/dL between readings indicate the need to adjust the basal rates.
- It is best to see a repeating trend on multiple days before making a basal change.
- Make basal changes in small increments, typically 0.025 to 0.100 U/hr.
- The basal rate should be increased or decreased 1-2 hours before the BG begins its rise or fall if using Novolog®, Humalog®, or Apidra® in the pump. If you use a different type of insulin, check with your HCP for specifics on timing.
- Make one change at a time.
- Reevaluate that time frame after any changes to the basal rate are made.
- Your goal should be to find the basal rates that work the best most of the time. Don't expect perfection!

Last but not least, it is important to know that your basal rate needs are likely to change over time. It is a good idea to repeat basal evaluations if you start to notice your BG is not as well controlled as it has been before. Life changes such as divorce, graduation, school, or a new job may require reevaluation of basal rates. Also remember that you may need a different set of basal rates depending on different factors such as weekday versus weekend.