

## **Basal Rate Testing**

Blood sugar is affected at any time by 1) basal insulin 2) food (carbohydrate) intake 3) bolus insulin (meal time and correction) 4) activity and 5) other factors such as stress and illness. Basal rate testing is a process to examine the basal rate provided by an insulin pump, while trying to eliminate or minimize the influence of the other factors.

Basal rates need to be tested:

1. When you are started on your pump.
2. Routinely every 3-4months.
3. Anytime you see a pattern of unexplained high or low blood glucoses.

The proper basal rate will keep your blood glucose stable when you are NOT eating (overnight and between meals). Because of this, basal rates must be tested when you are NOT eating. Basal rates are tested in segments and not all at once. There are 4 time intervals: overnight, morning, afternoon, and evening.

Checklist for all basal rate testing:

1. Starts 4 hours after last food consumption or insulin bolus given.
2. Blood glucose has to be between 80-200mg/dL.
3. No food consumption during test, unless hypoglycemia occurs (low blood glucose)
4. Frequent blood glucose testing is required.

You should perform the basal rate test on the day your insulin infusion set is changed or the next day (not the third day).

The day of the basal rate test and 24hrs before, do not perform any extreme exercise or drink alcohol.

Your last meal before the basal rate test should be one that the carbohydrates can be easily and accurately determined. Choose low fat foods for this meal.

Do not plan basal rate testing during times of illness, menses, unusual stress, or after a hypoglycemic episode.

Usually, overnight testing is done first, followed by the other time intervals on different days.

If you have a low blood glucose (<80mg/dL) during the test, correct the low and stop the test. Discuss reducing the basal insulin rate during the time interval tested with your doctor and plan to retest the new basal rate.

If you have a high blood glucose (>200mg/dL) during the test, correct the high and stop the test. Discuss increasing the basal insulin rate during the time interval tested with your doctor and plan to retest the new basal rate.

Basal rates are correct if blood glucose does not decrease or increase more than 40-50mg/dL during the testing period.

**Using your basal rate testing results to adjust your basal rate:**

If your blood glucose rises more than 40mg/dL during a testing interval (for example between 2am and 6am), the basal rate may be increased by 0.05-0.1 units/hr (for this example, increase rate starting at midnight through 6am). If your blood glucose falls more than 40mg/dL during this time period, the basal rate would have been decreased by 0.05-0.1 units/hr.

Resources: [www.insulin-pumpers.org/howto.shtml](http://www.insulin-pumpers.org/howto.shtml)

Pumping Insulin by John Walsh and Ruth Roberts

### **Overnight Basal Rate Test:**

This should be the first test you do and is best done on the second night on the pump.

Eat a low fat dinner and take your usual insulin bolus at least 4 hours prior to bedtime. Then do not eat or take any correction boluses for high blood glucoses until after the test.

Check your bedtime blood glucose prior to starting the test. If it is between 80-200mg/dL you can start the test.

Set your alarm to wake you up to check your blood glucose halfway between bedtime and when you normally wake up.

Check your blood glucose when you normally wake up.

For example, if your bedtime is at 10pm and you get up at 6am:

Eat dinner at 6pm and cover your dinner with your usual insulin bolus.

Check your blood sugar at 10pm and if it is 80-200mg/dL start the test.

Check your blood glucose at 2am and 6am.

After 6am, end the test and eat breakfast at your usual time.

You may want to use a continuous glucose monitor to assist with the overnight basal testing.

### **Morning Basal Rate Test:**

No Breakfast

Upon awakening, blood glucose must be between 80-200mg/dL in order to start your test.

No Breakfast, No food, No insulin bolus until 4 hours have passed, check blood glucose every 1-2hrs for 4hrs, at end of test eat lunch.

(for example, 8am blood glucose is 135mg/dL, start test, do not eat, check your blood glucose at 10am and 12 noon)

**Afternoon Basal Rate Test:**

Eat breakfast, do NOT eat lunch

4 hours after breakfast start test if blood glucose is between 80-200mg/dL.

Do not eat food or give insulin bolus until 4 hours have passed

Check blood glucose every 1-2hour for 4 hours. At end of test, eat dinner.

**Evening Basal Rate Test:**

Eat breakfast, eat lunch, do NOT eat dinner

4 hours after lunch start test if blood glucose is between 80-200mg/dL.

Do not eat food or give insulin bolus until 4 hours have passed. At end of test you may have a snack.

Comments about the basal rate:

Many people have more than one basal rate setting at different time intervals.

The amount of basal insulin given in 24 hours is usually 40-50% of the total daily dose (basal and bolus insulin). If you eat small amounts throughout the day, you may do better with a basal rate that is 50-60% of your total daily dose.

A lower basal rate is often needed between 8pm and 2am when people are usually the most sensitive to insulin and between 10am and 4pm when people are usually the most physically active.

A higher basal rate is often needed at 1-3am to 9-10am to offset the “dawn phenomenon”.

Keep in mind that insulin delivery and absorption can be variable so it is best to test a given time interval 2-3 times and then make adjustments based on a typical response.

Once a basal rate is adjusted, plan to repeat the testing of that interval to see if the new settings are working appropriately.