10.1 Find Your Average Hourly Basal Rate
With a calculator, divide your betterTDD by 48 to get an hourly basal rate = half of your TDD:
Hourly basal rate = your betterTDD ÷ 48
For example, 48 u TDD ÷ 48 = 1.0 u/hour

10.2 Basal Percentages of TDD	
43% or less	Those: • Sensitive to insulin, • Physically fit, • On a high carb or Asian diet • Producing residual insulin
44-58%	Most people
59% or more	Those: • On a low-carb diet • Who miss, delay, or give inadequate carb boluses.

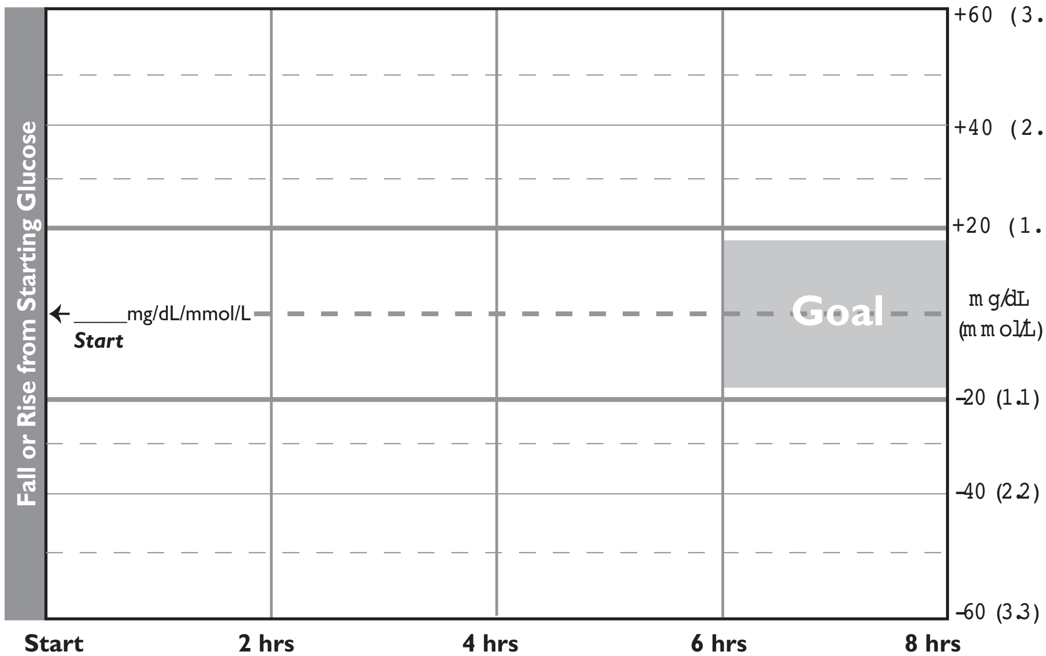
10.3 Find Hourly Basal Rate as Percentage of Average TDD	
To get a basal percentage of:	**Multiply average TDD by:**
40%	0.0167
45%	0.0188
50%	0.0208
55%	0.0229
60%	0.0250
Example: if avg. TDD = 40u a day and you want 50% as basal, 40u x 0.0208 = 0.832 u/hr	

10.4 Check Your Basal Rates

Basals Tested: ____u/hr@____ am/pm ____u/hr@____ am/pm ____u/hr@____ am/pm

Date: ____/____/_____ ____u/hr@____ am/pm ____u/hr@____ am/pm

	Start	**+ 2 hrs**	**+ 4hrs**	**+ 6 hrs**	**+ 8 hrs**
Time:	______ am/pm	______ am/pm	______ am/pm	______ am/pm	______ am/pm
BG:	______ mg/dL	______ mg/dL/mmol/L	______ mg/dL/mmol/L	______ mg/dL/mmol/L	______ mg/dL
Change in BG:		______ mg/dL/mmol/L	______ mg/dL/mmol/L	______ mg/dL/mmol/L	______ mg/dL



Goal: A basal rate that keeps your glucose within 20 mg/dL (1.1 mmol/L) of the starting glucose.

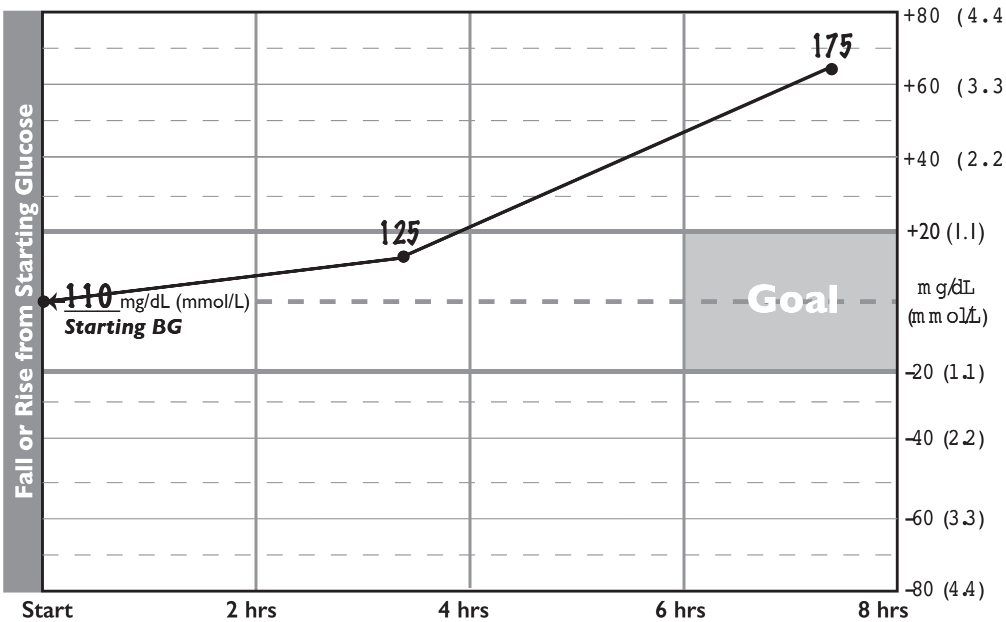
1. Start a basal check any time your glucose is between 90 and 120 mg/dL (5.0 - 6.7 mmol/L), you have not eaten in the last 3 hours, and have not taken a bolus in the last 5 hours. Check an AID by the degree of basal chatter or by temporarily suspending it.
2. Eat no carbs. Small amounts of protein (a few nuts, cheese, boiled egg, etc.) are OK.
3. Record and plot your CGM glucose every 1-2 hours on the graph.
4. If your glucose goes below 70 mg/dL (4 mmol/L), stop and have carbs.
5. if your glucose rises or falls over 20 mg/dL (1.1 mmol/L), use Table 10.7 to adjust your basal rates by matching how many mg/dL or mmol/L your glucose rises or falls with the same change in the first row of Table 10.4.
6. Repeat until your glucose stays relatively flat on two consecutive tests.

10.5 Example: Chris Checks his Overnight Basal

Basals Tested: 1.1 u/hr@ 12 am/(pm) ____u/hr@____ am/pm ____u/hr@____ am/pm

Date: 3 / 22 / 24 ____u/hr@____ am/pm ____u/hr@____ am/pm

	Start	**+ 2 hrs**	**+ 4hrs**	**+ 6 hrs**	**+ 8 hrs**
Time:	11:00 am/(pm)	______ am/pm	2:50 (am)/pm	______ am/pm	7:20 (am)/pm
BG:	110 mg/dL	______ mg/dL/mmol/L	125 mg/dL/mmol/L	______ mg/dL/mmol/L	175 mg/dL/mmol/L
Change in BG:		______ mg/dL/mmol/L	+15 mg/dL/mmol/L	______ mg/dL/mmol/L	+65 mg/dL/mmol/L



With an average TDD of 60 units a day, Chris started on his pump with a single basal rate of 1.1 u/hr (44% basal or 26.4 u/day). On this basal, his bedtime reading of 110 mg/dL (6.1 mmol/L) rose to 125 mg/dL (6.9 mmol/L) at 2 a.m. and 175 mg/dL (9.7 mmol/L) before breakfast. From Table 10.9, with a TDD of 60 units and a glucose rise of 65 mg/dL (3.3 mmol/L), Chris determined he needed about 1.6 more units in his overnight basal.

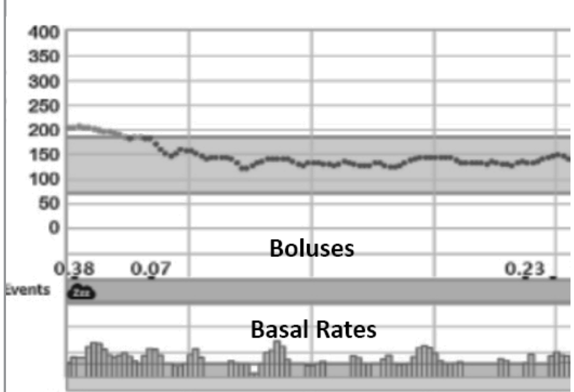
From the results, his physician suggested raising his basal from 1.1 u/hr to 1.2 u/hr from 9 pm to 2 am, then to 1.3 u/hr between 2 am and 6 am, an increase of 1.4 units overnight. A followup basal check showed that his glucose still rose by 25 mg/dL (1.4 mmol/L) overnight. His glucose finally remained flat overnight when he raised his 9 pm basal rate from 1.2 to 1.25 u/hr and his 2 am basal from 1.30 to 1.35 u/hr, flattening his overnight glucose.

10.6 Total Units for Changes in Basal Rate		
When you change a basal rate, it helps to know how many total units the change brings.		
Change in Basal Rate	**Total units over 8 hrs**	**Total units over 24 hrs**
+/- 0.010 u/hr	0.08 u	0.24 u
+/- 0.025 u/hr	0.20 u	0.60 u
+/- 0.050 u/hr	0.40 u	1.20 u
+/- 0.100 u/hr	0.80 u	2.40 u

Basal adjustments of 0.025 and 0.1 u/hr equal 0.6 and 2.4 units over the entire day. For a glucose that falls or rises slightly during a basal test, a basal change of 0.01 to 0.025 u/hr may fix this.

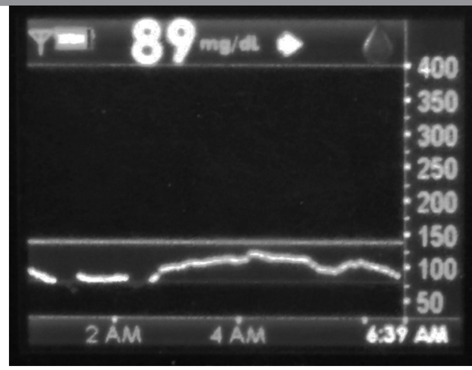
To find out how much a change in basal rate affects your glucose, **multiply the total change in basal units by your CorrF**. For example, with a CorrF of 40 mg/dL per unit, lowering or raising your basal rate by 0.05 u/hr over 8 hours reduces insulin by 0.4 units X 40 mg/dL/unit = 16 mg/dL, lowering glucose by about 16 mg/dL or raising it by about 16 mg/dL.

10.7 Real-time CGM Basal Check



When testing basals, look at whether the AID is increasing or decreasing the programmed rate. Here the AID is increasing the programmed basal rate throughout the night. A higher basal rate would help.

10.8 Real-time CGM Basal Check



On this 6-hour night basal check, the person had 15 grams of carb at 2:30 am to treat a low glucose. The glucose rose temporarily and then dropped again. Lowering the overnight basal from 0.775 u/hr to 0.725 u/hr flattened the glucose overnight.

10.9 How to Adjust Your Basal Rate

1. With a glucose FALL or RISE of:	20 mg/dL 1.1 mmol/L	30 mg/dL 1.7 mmol/L	40 mg/dL 2.2 mmol/L	50 mg/dL 2.8 mmol/L	60 mg/dL 3.3 mmol/L	70 mg/dL 3.9 mmol/L	80 mg/dL 4.4 mmol/L
2. And this TDD:	**3. LOWER or RAISE the basal rate for 8 hours by:**						
20 u	0.025 u/hr	0.025 u/hr	0.025 u/hr	0.025 u/hr	0.075 u/hr	0.075 u/hr	0.075 u/hr
30 u	0.05 u/hr	0.05 u/hr	0.05 u/hr	0.05 u/hr	0.125 u/hr	0.125 u/hr	0.125 u/hr
40 u	0.075 u/hr	0.075 u/hr	0.075 u/hr	0.075 u/hr	0.15 u/hr	0.15 u/hr	0.15 u/hr
50 u	0.1 u/hr	0.1 u/hr	0.1 u/hr	0.1 u/hr	0.225 u/hr	0.225 u/hr	0.225 u/hr
60 u	0.125 u/hr	0.125 u/hr	0.125 u/hr	0.125 u/hr	0.25 u/hr	0.25 u/hr	0.25 u/hr
80 u	0.15 u/hr	0.15 u/hr	0.15 u/hr	0.15 u/hr	0.325 u/hr	0.325 u/hr	0.325 u/hr
100 u	0.2 u/hr	0.2 u/hr	0.2 u/hr	0.2 u/hr	0.4 u/hr	0.4 u/hr	0.4 u/hr

1. If your glucose rises or falls over 20 mg/dL (1.1 mmol/L) from the starting glucose in a basal check, use this table to raise or lower your current rates. Raise your basal rate if your glucose rises during the basal test and lower it if your glucose falls.
2. Adjust basal rates until they keep your glucose within 20 mg/dL over 6 to 8 hours on 2 checks.

Example: For a glucose rise of 80 mg/dL during an 8-hour test with a TDD of 30 units a day, the current basal rate would be raised by as much as 0.10 u/hr for 8 hrs.

10.10 Case Study Basal Change

Six days after her pump start, Gwenn was thrilled that her breakfast reading was in her target range at 90 mg/dL (5 mmol/L). At her clinic visit later that day, her doctor reviewed her CGM data download. Her glucose had been 180 mg/dL (10 mmol/L) at 2 a.m. and her last bolus was given at 6 pm the evening before, with no bolus after that. Even so, her glucose fell over 90 mg/dL (5 mmol/L) by breakfast! Gwenn and her physician lowered her overnight basal rate despite her "perfect" breakfast reading.

10.11 The Dawn Phenomenon

After growth spurts, a child or teen's TDD and basal rates increase, multiplying several times during growth. Teens and young adults may require a slightly higher basal rate in the pre-dawn hours to counteract a **Dawn Phenomenon**, where more growth hormone is released in the early morning hours. This causes glucose levels to rise unless offset by an even earlier rise in basal delivery.

Remember that an insufficient basal rate in the pre-dawn hours looks exactly like a Dawn Phenomenon and is often the real source for high before-breakfast glucose levels.[109, 110] High breakfast glucose levels in the teen years are often corrected by a small increase in the overnight basal rate, starting near midnight. An AID makes these adjustments automatically.

10.12 How Common Are Carb Count Errors?

Carb counting requires estimating a meal's carb content. This can be influenced by portion size, food composition, preparation method, and more. In an analysis of carb counts in 448 meals by people with Type 1 diabetes, nutritionists found that 63% of the counts were underestimated. Underestimating carbs impairs glucose management even on an AID. A 2011 study published in Diabetes Technology & Therapeutics found that among 64 participants with Type 1 diabetes who used a bolus calculator, 47% made errors in carbohydrate counting, 29% made errors in insulin dosing, and 20% made errors in both.