8.1 Which Pump Setting Do You Raise or Lower?

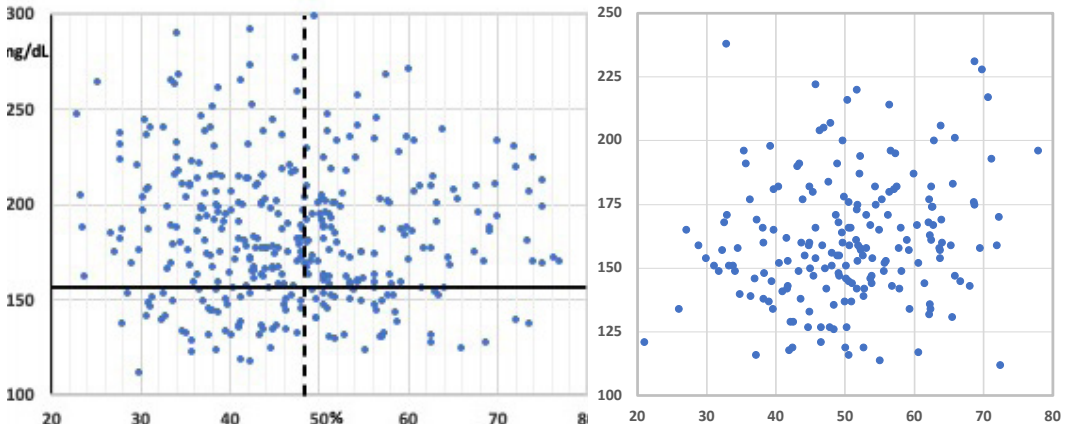
If you are having:	Change this setting in this direction:		
	Basal Rate	Carb Factor	Corr Factor
Frequent lows	↓	↑	↑
Frequent highs	↑	↓	↓

Smaller CarbF or CorrF numbers give larger boluses. Always adjust CarbFs and CorrFs in the direction opposite the glucose problem. For example, if you have high readings before lunch, lower your CarbF number at breakfast to make breakfast boluses larger.

8.2 Settings to Know

- Not a setting, the average TDD controls the average glucose and guides you to correct BC settings
- Basal rates and daily basal total
- Carb factor (CarbF or I:CR)
- Correction factor (CorrF)
- Correction target (or range)
- Duration of insulin action (DIA)

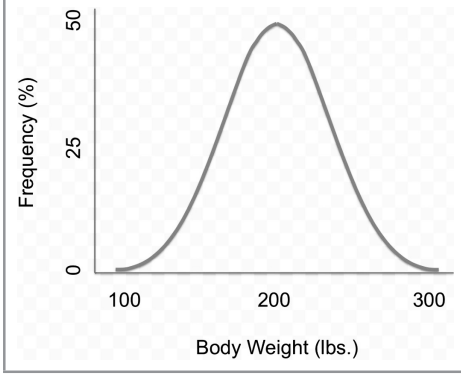
8.3 Improvement in Basal Settings 2007 to 2024



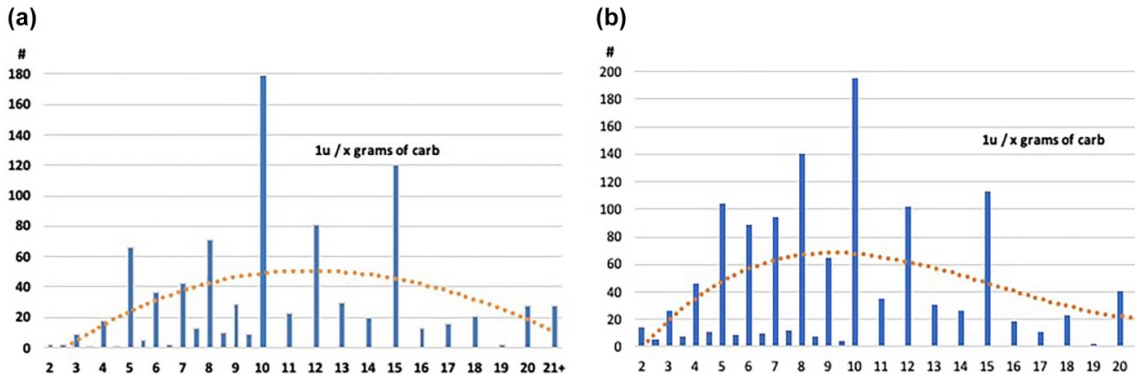
These graphs shows the average glucose on the left against basal percentage of the TDD at the bottom. The graph on the left shows 996 consecutive U.S. insulin pumps downloaded for a 2007 software upgrade. The graph on the right shows 193 AID devices analyzed in 2024. The horizontal line is at 154 mg/dL (A1c of ~7.0%) and the vertical dashed line shows a basal at 48% of the TDD.

Nearly 75% of the 2007 pumps had an average glucose higher than 154 mg/dL. The 2024 AID devices show marked improvement with 50% of the AID system results below 154 mg/dL. Note the centering of basal percentages and reduction in glucose levels in the 2024 data.

8.4 Gaussian Weight Distribution



8.5 CarbFs from Consecutive Pump Downloads in 2007 and 2018



The graph on the left shows CarbFs (ICRs) downloaded from 907 insulin pumps in 2007. The graph on the right shows the same for 1,301 non-AID insulin pumps downloaded in 2018. The X-axis on the left shows whole number CarbFs ±0.05 g (for example, 8.95 to 9.05 g/U) and fractional CarbF values between the whole number values. The Y-axis shows the number of pumps having these CarbFs.

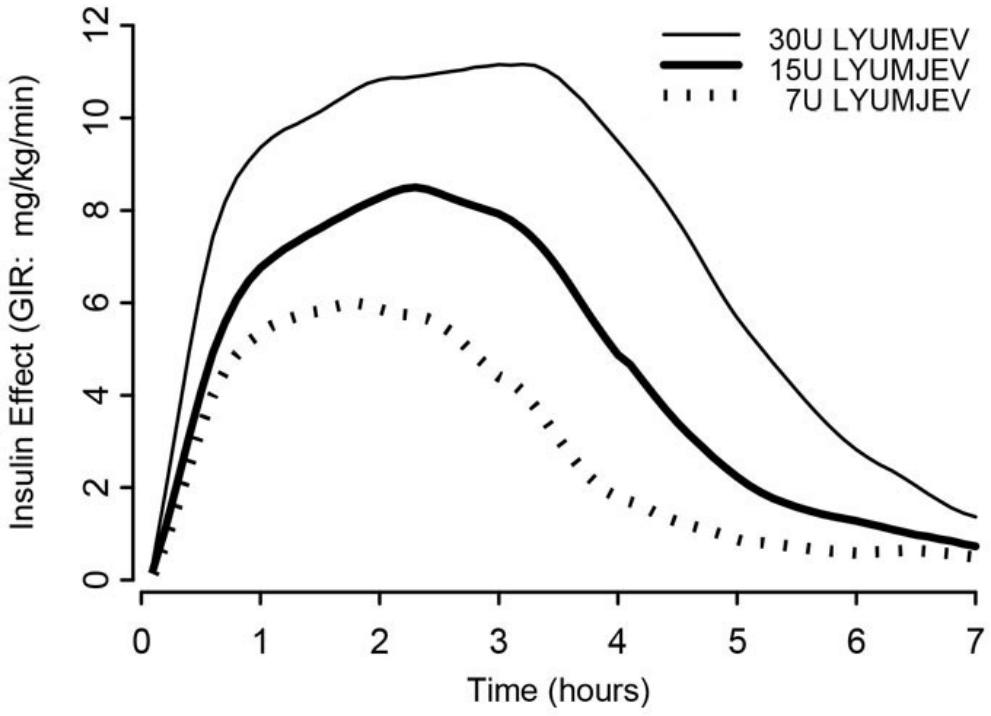
These CarbFs do not follow an expected bell-shaped curve, indicating that numerous pumps contained inaccurate or inappropriate CarbFs..

8.6 Estimated IOB 3 hours after a 10-Unit Bolus Using Different DIAs

	BC's Estimate of Bolus Insulin on Board			
For this DIA setting =	3 hr	4.5 hr	5.0 hr	5.5 hr
Estimated Remaining IOB =	0 u	2.5 u	3.4 u	4.0 u

When using the DIA time in the upper row, the IOB that a BC calculates to remain three hours after a 10 unit bolus is shown in the lower row. For a DIA of 3 hours, the estimated residual insulin activity is zero, while for a more realistic DIA of 5.0 hours, the remaining glucose-lowering activity at 3 hours is 3.4 units.

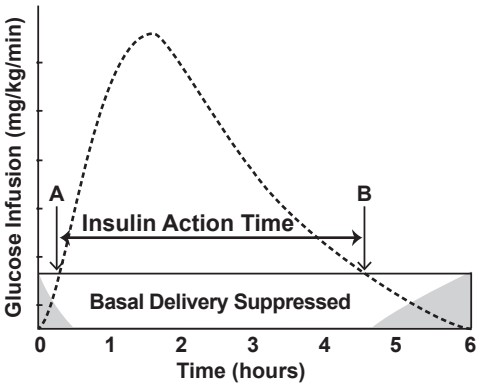
8.7 Lyumjev's Insulin Action Times



These lines show the glucose infusion needed to offset 7, 15, and 30 U of Lyumjev insulin in people without diabetes. Lumjev starts faster but works as long as other rapid insulins.

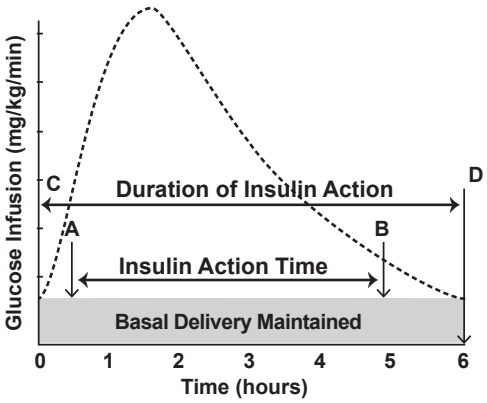
8.8 How Insulin Action Time Differs From Duration of Insulin Action

Fig. 1 Insulin Action Time



IAT is measured between points A and B, with suppression of basal delivery.

Fig. 2 Duration of Insulin Action



DIA is measured between points C and D while basal delivery is maintained.

Insulin product handouts give insulin action times (IAT) as "3 to 5 hours" for rapid insulins. In IAT studies, glucose is infused from an IV bag into a healthy person's arm to keep their glucose flat at 90 mg/dL after injections of different insulin doses. IAT, measured from A to B in Figure 1, starts late when the injection begins suppressing insulin release from the pancreas, and ends early when the pancreas starts to produce insulin.

Duration of insulin action (DIA) in Figure 2 starts as soon as insulin is injected or bolused (C) and ends when its glucose-lowering activity stops (D), while basal insulin delivery continues. The steady basal insulin delivery on a pump reduces the variability observed between small and large doses in IAT studies. Optimal DIA times for measuring IOB with today's rapid-acting insulins are 4.5 to 6 hours.[91-95].