

## Navigator Dose Adjustment Guidelines for Patients on Insulin Pumps

### YOUR TARGET GLUCOSE VALUES ARE:

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	mmol/L
Pre Meal Peak	4.0-7.0
Post Meal Bedtime	<10
Overnight	5.0-.8.0
	4.5-8.0

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### PRE-MEAL BOLUS CALCULATION

**Insulin to Carbohydrate Ratio (ICR)** – how many units of insulin for how many grams of carbohydrate i.e. 1 unit for every XXg of carbohydrate.

**Correction Factor** - what 1 unit will lower your blood glucose by

**Basal Rates** – Background insulin

At the start of the assessment, you should continue to use your current insulin to carbohydrate ratios (ICR), correction factor and basal rates.

If you do not know your insulin to carbohydrate ratios (ICR) or correction factor you can use the 100 and 500 Rule.

#### **Correction Factor – 100 Rule**

Divide 100 by your total daily insulin dose (basal and bolus) will provide you with your correction dose i.e. if your total daily insulin dose is 40 units, then 1 unit will lower your blood glucose by 2.5mmol/L

$$100 \div 40 = 2.5$$

#### **Insulin to Carbohydrate Ratio – 500 Rule**

Divide 500 by your total daily insulin dose (basal and bolus) will provide you with your correction dose i.e. if your total daily insulin dose is 40 units, then you should use 1 unit for every 12.5g of carbohydrate.

To calculate correction doses, we will set your correction target at 4.5-7.0mmol/L during the day and 4.0-8.0mmol/L overnight. Smart pump patients will use 3.5 hour duration of action for the insulin-on-board" calculator.

***If your blood sugar is 4.0mmol/L or lower:***

Begin to eat, but do not bolus until your blood sugar is above 4.5mmol/L and then cover all of the carbohydrates in the meal.

***If your blood sugar is above 4.0mmol/L:***

Do your usual calculation of the amount of insulin needed to cover the carbohydrates in the meal and make a correction for high blood sugar. Look at the Navigator arrow and make the following adjustments:

↑ 90° Up	Increase meal dose by % 20%
↗ 45° Up	Increase meal dose by % 10%
↔ No change	No change in meal dose
↘ 45° Down	Decrease meal dose by % 10%
↓ 90° Down	Decrease meal dose by % 20%

## **ALERTS**

### **High Alert**

The high alert will be set at 14.0mmol/L and the projected high alert at medium.

If the high or projected high alarm goes off during the day, check to make sure that you took your premeal or correction dose. If not, take the amount of insulin that you should have, as shown above.

If you did take your meal bolus, then wait at least 2 hours before taking a correction dose, since there may be a lot of insulin left over from your last bolus.

The correction dose should be calculated to correct to 4.0-7.0mmol/L during the day and 4.0-8.0mmol/L during the night.

If you are using a "smart pump", use the dose calculator to determine the amount of the correction dose (as per guidelines above).

### **Low Alert**

Your low alert will be set at 3.3-3.9mmol/L

If the low alert goes off then eat about 15 grams of carbohydrate.

If the predicted low alert goes off, then eat about 10 grams of carbohydrate.

You should check your blood sugar level with your blood glucose meter any time the high or

low alarm/event goes off high or low event is considered first alarm in a one hour period). Your blood sugar will not need to be tested again for the next hour if the alarms continues. You should also check your blood sugar if you have symptoms that are not consistent with your blood glucose values (for example: you feel low but your blood glucose meter does not show that you are low).

## **BASAL RATES**

### ***Adjusting Overnight Basal Rates:***

You should review your blood sugar levels once or twice a week. If you find a blood sugar pattern not in the target range described above on at least 2 out of 3 nights, you should think about making a change to your overnight basal rates. Before changing basal rates you should also make sure that there aren't other reasons for high or low-night time blood sugar levels, such as:

- Bedtime correction doses
- Missed meal or snack boluses
- Extremes in physical activity
- Meals with high fat or protein contents
- Illness
- Infusion site problem

### ***Overnight blood sugar and basal rate patterns:***

Should be broken down into 2-4 hour time periods as set in the Navigator software:

Bedtime is 9 PM to midnight

Nighttime is midnight to 4 AM

Prebreakfast (or dawn) is 4 AM to 7 AM

Blood sugar patterns that suggest a change in the basal rate is needed are those where the blood sugar level is too high or too low or if the blood sugar level goes up or down by more than 1.1-1.7mmol/L over the 3 to 4-hour time period.

When there is a pattern for too high or too low blood sugar values in a given time period, then an adjustment should be made in the basal rate(s) beginning 1 hour before that time period.

Example: There is a trend for your blood sugar levels to go up quickly between 4 and 7 AM. You should increase the basal rate beginning at 3 AM. Frequent small adjustments in the 0.025-0.1 U/hr are generally preferred over large changes.

***Adjusting daytime bolus and basal rates:***

For adjustments of daytime doses: divide the day into time periods of about 3 hours.

Breakfast is 7 AM to 10 AM

Pre lunch is 10 AM to Noon

Post lunch is noon to 3 PM

Pre dinner is 3 PM to 6 PM

Dinner is 6 PM to 9PM.

**CHANGES THE INSULIN TO CARBOHYDRATE RATIOS**

***Changes to the ICR***

Change the insulin to carbohydrate ratios if your blood sugar levels are too high or too low 2-3 hours after the meal.

Examples:

If your ICR is 1 unit for 15g of carbohydrate and 2 hours post breakfast your blood glucose is 10.2mmol/L, change ICR from 1 unit for 15g to 1 unit for 10g carbohydrate.

If your ICR is 1 unit for 15g of carbohydrate and 2 hours post breakfast your blood glucose is 2.8mmol/L, change ICR from 1 unit for 15g to 1 unit for 20g carbohydrate.

***Change basal rates if the blood sugar values before the next meal are too high or low***

Some changes post meals will involve a change to the basal rate rather than the amount of bolus insulin that is given with meal as calculated by your ICR. Changes to the basal rates will be needed if the blood sugar values before the next meal are too high or low.

Examples:

If an increase in the bolus dose before breakfast leads to good blood sugar levels after breakfast, but low blood sugar values before lunch, then lower the basal rate between breakfast and lunch.

If a reduction in the bolus dose before breakfast leads to good blood sugar levels after breakfast, but high blood sugar values before lunch, then increase the basal rate between breakfast and lunch.