Basal-Bolus Insulin Therapy (BBIT)

Ordering and Implementing Basal Bolus Insulin Therapy in Sunrise Clinical Manager (SCM)

For those who prescribe and administer insulin

AHS Diabetes Obesity & Nutrition Strategic Clinical Network (DON SCN)

Provincial Diabetes Inpatient Management Initiative

April 2016

PDF of presentation (see bottom right of the presenting window)

Basal Bolus Insulin Therapy (BBIT)

Previous presentation:

- Rationale for BBIT: https://connect.ucalgary.ca/bbit
- Targets 5-10 mmol/L

This presentation:

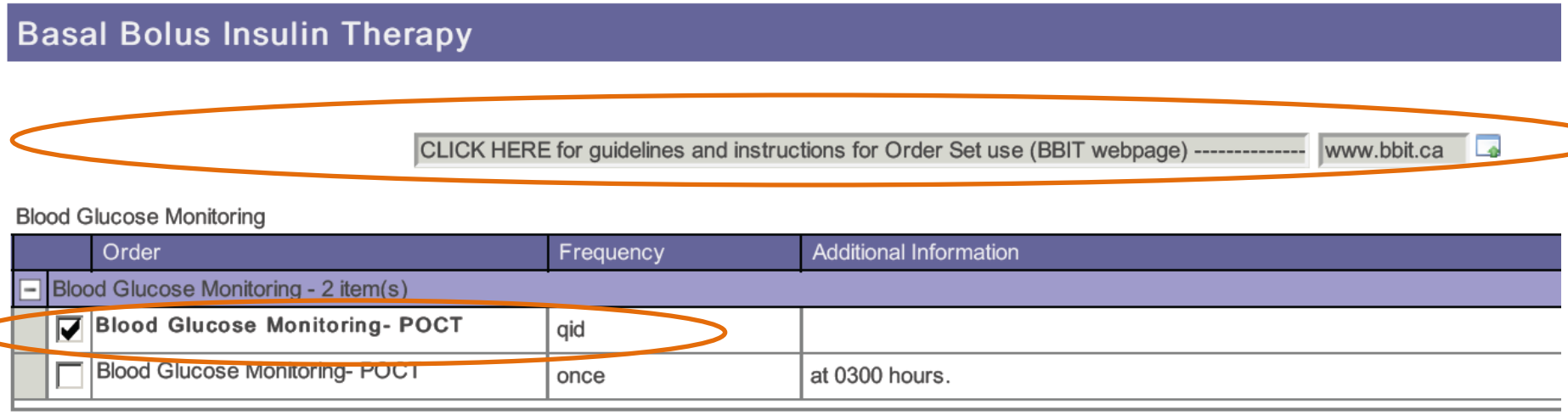
- Ordering BBIT in SCM
- Administering insulin per BBIT orders

Ordering Insulin: Example Patient

100kg pt, type 2 diabetes on insulin but can't recall doses…
Instead of a sliding scale, order BBIT:

1. Basal Insulin
   - N, glargine (Lantus) and detemir (Levemir) are available on AHS formulary.
2. Meal Bolus Insulin
   - R, aspart (Novorapid) and lispro (Humalog) are available on AHS formulary
3. Correction Scale Insulin
   - R, aspart (Novorapid) and lispro (Humalog) are available on AHS formulary

Ordering Basal Bolus Insulin



Basal Bolus Insulin Therapy

CLICK HERE for guidelines and instructions for Order Set use (BBIT webpage) ---------- www.bbit.ca

Blood Glucose Monitoring

	Order	Frequency	Additional Information
−	Blood Glucose Monitoring - 2 item(s)		
☑	**Blood Glucose Monitoring- POCT**	qid	
☐	Blood Glucose Monitoring- POCT	once	at 0300 hours.

Ordering Basal Bolus Insulin: Total Daily Dose

Total Daily Dose (TDD)

If patient is a new start in hospital: Type 1, Slim Type 2, over age 70, renal dysfunction. TDD = Weight(kg) x 0.3 to 0.5 Units/kg/day.

If patient is a new start in hospital: Insulin resistance, steroid treatment, Overweight Type 2. TDD = Weight(kg) x 0.5 to 1 Units/kg/day.

If patient is already on insulin: TDD = total of all insulin doses administered in the last 24 hours.

Please select 1 of the following 2 options in order to proceed:

- [ ] Calculate Total Daily Dose (TDD)
- [ ] Total Daily Dose (TDD) from Previous Day

Total Daily Dose Calculation

The SCM screen image is not yet available. Please check back later.

TDD calculation: Sample patient 100 kg

0.5 units/kg X 100 kg/DAY = 50 units total daily insulin

SCM will use TDD to automatically calculate:

50% of TDD = units basal insulin per day

50% of TDD / 3 meals = units bolus insulin per meal

Basal Insulin

BASAL INSULIN

SELECT TRADE | Please select Trade name for Basal Insulin.

BASAL INSULIN

Recommended Total Daily BASAL Insulin (1/2 Calculated TDD) = 25

Use home dose or 1/2 TDD (given initially as equal, twice daily doses at breakfast and bedtime: Glargine may be given once daily).

	Order	Trade	Dose	Unit	Dose Calculation	Route	Frequency
−	Basal - DAILY DOSE - 1 item(s)						
☐	insulin basal inj	*	*	unit(s)	_ unit(s)/Kg/DOSE	SUBCUTANEOUSLY	qhs
−	Basal - BID DOSE - 2 item(s)						
☐	insulin basal inj	*	*	unit(s)	_ unit(s)/Kg/DOSE	SUBCUTANEOUSLY	daily with breakfast
☐	insulin basal inj	*	*	unit(s)	_ unit(s)/Kg/DOSE	SUBCUTANEOUSLY	qhs

Ordering Bolus Insulin

BOLUS + CORRECTION INSULIN

SELECT TRADE | Please select Trade name for Bolus and Correction Insulin.

BOLUS INSULIN

Recommended BOLUS Insulin PER MEAL (1/2 Calculated TDD divided into 3 equal meal doses) = 8

Home dose (consider reduction of 25-50% for hospital diet) or 1/2 TDD, divided initially into 3 equal doses.

	Order	Trade	Dose	Unit	Dose Calculation	Route	Frequency	Additional Information
Bolus - DOSE PER MEAL - 1 item(s)								
☐	insulin bolus inj	*	*	unit(s)	_ unit(s)/Kg/DOSE	SUBCUTANEOUSLY	tid with meals	Please hold if patient NPO. When providing Bolus and Correction doses, these may be combined and administered as a single injection.
Bolus - TID DOSE - 3 item(s)								
☐	insulin bolus inj	*	*	unit(s)	_ unit(s)/Kg/DOSE	SUBCUTANEOUSLY	daily with breakfast	Please hold if patient NPO. When providing Bolus and Correction doses, these may be combined and administered as a single injection.
☐	insulin bolus inj	*	*	unit(s)	_ unit(s)/Kg/DOSE	SUBCUTANEOUSLY	daily with lunch	Please hold if patient NPO. When providing Bolus and Correction doses, these may be combined and administered as a single injection.
☐	insulin bolus inj	*	*	unit(s)	_ unit(s)/Kg/DOSE	SUBCUTANEOUSLY	daily with supper	Please hold if patient NPO. When providing Bolus and Correction doses, these may be combined and administered as a single injection.

CORRECTION INSULIN

Total Daily Dose (TDD) = 50

	Order	Trade	Route	Correction Scale Dose	Frequency	Advisory Note
−	Use if TDD is 30 or less - 1 item(s)					
☐	insulin correction SC inj	*	SUBCUTANEOUSLY	Use Hypoglycemia Protocol if Blood Glucose (mmol/L) 0 - 4 0 unit(s) if Blood Glucose (mmol/L) 4.1 - 10 1 unit(s) if Blood Glucose (mmol/L) 10.1 - 14 2 unit(s) if Blood Glucose (mmol/L) 14.1 - 18 Call MD if Blood Glucose (mmol/L) >18	tid with meals	Low Insulin Resistance. The following correction scale adds 1 unit of insulin for each 4 mmol/L above the blood glucose target of 6.
−	Use if TDD is 31 - 50 - 1 item(s)					
☐	insulin correction SC inj	*	SUBCUTANEOUSLY	Use Hypoglycemia Protocol if Blood Glucose (mmol/L) 0 - 4 0 unit(s) if Blood Glucose (mmol/L) 4.1 - 9 1 unit(s) if Blood Glucose (mmol/L) 9.1 - 12 2 unit(s) if Blood Glucose (mmol/L) 12.1 - 15 3 unit(s) if Blood Glucose (mmol/L) 15.1 - 18 Call MD if Blood Glucose (mmol/L) >18	tid with meals	Moderate Insulin Resistance. The following correction scale adds 1 unit of insulin for each 3 mmol/L above the blood glucose target of 6.
−	Use if TDD is 51 - 80 - 1 item(s)					
☐	insulin correction SC inj	*	SUBCUTANEOUSLY	Use Hypoglycemia Protocol if Blood Glucose (mmol/L) 0 - 4 0 unit(s) if Blood Glucose (mmol/L) 4.1 - 10 2 unit(s) if Blood Glucose (mmol/L) 10.1 - 12 3 unit(s) if Blood Glucose (mmol/L) 12.1 - 14 4 unit(s) if Blood Glucose (mmol/L) 14.1 - 16 5 unit(s) if Blood Glucose (mmol/L) 16.1 - 18 Call MD if Blood Glucose (mmol/L) >18	tid with meals	High Insulin Resistance. The following correction scale adds 1 unit of insulin for each 2 mmol/L above the blood glucose target of 6.
−	Use if TDD is greater than 80 - 1 item(s)					
☐	insulin correction SC inj	*	SUBCUTANEOUSLY	Use Hypoglycemia Protocol if Blood Glucose (mmol/L) 0 - 4 0 unit(s) if Blood Glucose (mmol/L) 4.1 - 9 2 unit(s) if Blood Glucose (mmol/L) 9.1 - 11 4 unit(s) if Blood Glucose (mmol/L) 11.1 - 13 6 unit(s) if Blood Glucose (mmol/L) 13.1 - 15 8 unit(s) if Blood Glucose (mmol/L) 15.1 - 17 10 unit(s) if Blood Glucose (mmol/L) 17.1 - 18 Call MD if Blood Glucose (mmol/L) >18	tid with meals	Very High Insulin Resistance. The following correction scale adds 1 unit of insulin for each mmol/L above the blood glucose target of 6.

Correction Scale

Use if TDD is 31 - 50 - 1 item(s)							
		insulin correction SC inj	*	SUBCUTANEOUSLY	Use Hypoglycemia Protocol if Blood Glucose (mmol/L) 0 - 4 0 unit(s) if Blood Glucose (mmol/L) 4.1 - 9 1 unit(s) if Blood Glucose (mmol/L) 9.1 - 12 2 unit(s) if Blood Glucose (mmol/L) 12.1 - 15 3 unit(s) if Blood Glucose (mmol/L) 15.1 - 18 Call MD if Blood Glucose (mmol/L) >18	tid with meals	Moderate Insulin Resistance. The following correction scale adds 1 unit of insulin for each 3 mmol/L above the blood glucose target of 6.

Summary Example Patient

100kg pt, type 2 diabetes on insulin but can't recall doses

•TDD = 100 kg x 0.5 units/kg/day = 50 units

1. Basal Insulin: ½ TDD = 25 units (12 units Humulin N bid)

2. Bolus Insulin: ½ TDD = 25 units, divided into 3 equal meals (8 units lispro before meals)
   - If pt NPO – NO BOLUS

3. Correction Scale Insulin: 1 unit lispro to lower 3 mmol/L if above 9 mmol/L as per scale provided, which will bring sugars within the target range of 5-10 mmol/L
   - Based on total daily insulin dose per prompts in SCM orders

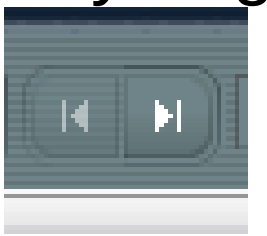
Try Again!

- Review blood glucose daily
- Adjust insulin doses every 1-2 days as necessary
- If the ac breakfast glucose is outside the target of 5-11, consider changing the evening basal dose by 10-20%
- If a patient is requiring a correction dose consistently, add the correction value to the preceding meal's bolus dose
  - e.g. If a patient requires 2 extra units at lunch daily, increase the breakfast bolus dose by 2 units to prevent the elevated blood sugar at lunch

Examples: For those who administer insulin

The next few slides provide examples of how to interpret BBIT orders

If you don’t want to review these, click your forward button until you get to the slide entitled “Patient Safety”



Example: Fasting 12.6 mmol/L

1. Basal insulin :
   12 units Humulin N at breakfast
2. Bolus insulin:
   8 units lispro ***+ correction insulin 2 units = 10 units***
3. Correction scale lispro insulin tid with meals

Use if TDD is 31 - 50 - 1 item(s)						
☐	insulin correction SC inj	*	SUBCUTANEOUSLY	Use Hypoglycemia Protocol if Blood Glucose (mmol/L) 0 - 4 0 unit(s) if Blood Glucose (mmol/L) 4.1 - 9 1 unit(s) if Blood Glucose (mmol/L) 9.1 - 12 2 unit(s) if Blood Glucose (mmol/L) 12.1 - 15 3 unit(s) if Blood Glucose (mmol/L) 15.1 - 18 Call MD if Blood Glucose (mmol/L) >18	tid with meals	Moderate Insulin Resistance. The following correction scale adds 1 unit of insulin for each 3 mmol/L above the blood glucose target of 6.

Your Turn

Lunch 14.3 mmol/L. Bolus order is 8 units lispro for meals. Correction scale insulin is below. Choose the total dose of Humulin R insulin the client requires at lunch to cover both the meal and the high glucose reading.

Use if TDD is 31 - 50 - 1 item(s)						
☐	insulin correction SC inj	*	SUBCUTANEOUSLY	Use Hypoglycemia Protocol if Blood Glucose (mmol/L) 0 - 4 0 unit(s) if Blood Glucose (mmol/L) 4.1 - 9 1 unit(s) if Blood Glucose (mmol/L) 9.1 - 12 2 unit(s) if Blood Glucose (mmol/L) 12.1 - 15 3 unit(s) if Blood Glucose (mmol/L) 15.1 - 18 Call MD if Blood Glucose (mmol/L) >18	tid with meals	Moderate Insulin Resistance. The following correction sca adds 1 unit of insulin for each 3 mmol/L above the blood glucose target of 6.

- ○ A) 8 units
- ○ B) 9 units
- ○ C) 13 units
- ◉ D) 10 units

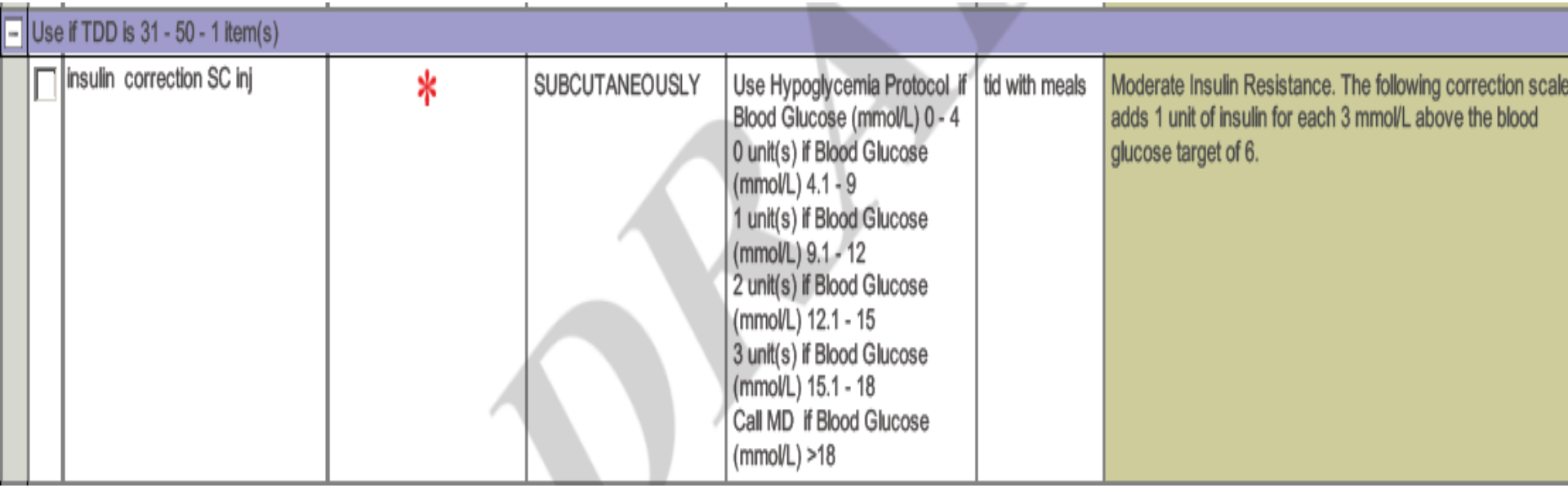
Submit

The correct answer is:

10 units

8 units lispro for meal bolus
+ 2 units lispro for correction
= 10 units lispro

Supper 3.7 mmol/L. Patient complains of hunger and sweating. Bolus order is 8 units lispro for meals. Correction scale insulin is below.



Use if TDD is 31 - 50 - 1 item(s)						
insulin correction SC inj	*	SUBCUTANEOUSLY	Use Hypoglycemia Protocol if Blood Glucose (mmol/L) 0 - 4 0 unit(s) if Blood Glucose (mmol/L) 4.1 - 9 1 unit(s) if Blood Glucose (mmol/L) 9.1 - 12 2 unit(s) if Blood Glucose (mmol/L) 12.1 - 15 3 unit(s) if Blood Glucose (mmol/L) 15.1 - 18 Call MD if Blood Glucose (mmol/L) >18	tid with meals	Moderate Insulin Resistance. The following correction scale adds 1 unit of insulin for each 3 mmol/L above the blood glucose target of 6.

- A) Give 15 grams oral glucose, retest capillary glucose in 15 minutes, if over 4 mmol/L or greater feed supper and give no lispro insulin at supper
- B) Give 15 grams oral glucose and 5 units lispro insulin at supper
- C) Give 15 grams oral glucose, retest capillary glucose in 15 minutes, if 4 mmol/L or greater give 8 units lispro insulin with supper
- D) Give 30-45 grams oral glucose, have patient eat supper immediately, give no lispro insulin at supper, retest glucose after supper

Submit

The correct answer is:

C) Give 15 grams oral glucose, retest capillary glucose in 15 minutes, if 4 mmol /L or greater give 8 units lispro insulin with supper

If after rechecking glucose it is still < 4 mmol/L for this patient, give another 15 g oral glucose and retest in 15 minutes. Repeat until glucose is above 4 mmol/L

AHS Hypoglycemia Protocol

Readings under 4 mmol/L

15 grams glucose
15 min wait to retest

Repeat if not over 4 mmol/L

Supper 5.6 mmol/L. Bolus order is 8 units lispro for meals. Correction scale insulin is below. Choose the **total dose** of lispro insulin to be administered to the patient at supper. Click submit when done.

Use if TDD is 31 - 50 - 1 item(s)						
insulin correction SC inj	*	SUBCUTANEOUSLY	Use Hypoglycemia Protocol if Blood Glucose (mmol/L) 0 - 4 0 unit(s) if Blood Glucose (mmol/L) 4.1 - 9 1 unit(s) if Blood Glucose (mmol/L) 9.1 - 12 2 unit(s) if Blood Glucose (mmol/L) 12.1 - 15 3 unit(s) if Blood Glucose (mmol/L) 15.1 - 18 Call MD if Blood Glucose (mmol/L) >18	tid with meals	Moderate Insulin Resistance. The following correction scale adds 1 unit of insulin for each 3 mmol/L above the blood glucose target of 6.

- (•) A) 8 units
- ( ) B) 9 units
- ( ) C) 10 units
- ( ) D) 11 units

Submit

The correct answer is:

8 units

8 units for meal bolus
+ 0 units for correction
= 8 units lispro

Patient Safety

1. Most important aspect is communication!!
2. Type 1 diabetic patients ALWAYS need some insulin to prevent diabetic ketoacidosis
3. If patient NPO, they should NOT get their meal BOLUS (short acting) insulin. Patient will still receive their scheduled basal insulin and correction insulin as per correction scale orders.
4. Designed to under-shoot for first few days to prevent hypoglycemia→ requires aggressive titration
5. Chemstrips MUST be done qid (ac meals, qhs)
6. BBIT tool to aid, not replace, clinical judgment

Holding Insulin

- Our goal is to MAINTAIN a normal blood glucose, which will mean administering insulin even when a patient is meeting the CDA target of 5-10 mmol/L, particularly if the patient is about to eat a meal.
- Holding insulin ALWAYS requires an ORDER from the most responsible ordering provider.

Questions?

www.bbit.ca

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