Appendix 9
Examples of Insulin Initiation and Titration Regimens in People With Type 2 Diabetes

Examples of Insulin Initiation and Titration Regimens in People With Type 2 Diabetes

All people starting insulin should be counseled about the recognition, prevention and treatment of hypoglycemia. Consider a change in type or timing of insulin administration if glycemic targets are not being reached.

Example A: Basal insulin (degludec U-100 or U-200, detemir, glargine U-100 or U-300, NPH) added to non-insulin antihyperglycemic agents

- Insulin should be titrated to achieve target fasting BG levels of 4.0 to 7.0 mmol/L or individualized targets (e.g. 4.0 to 5.5 mmol/L if A1C target ≤7.0% not achieved; higher fasting BG targets may be considered in some people with diabetes where the goal of avoiding hypoglycemia is important; see Targets for Glycemic Control, p. 542).

- Individuals can be taught self-titration, or titration may be done in conjunction with a health-care provider.

- Suggested starting dose is 10 units once daily at bedtime.

- Suggested titration is 1 unit per day until target is reached. (Degludec should be titrated by 2 units every 3 to 4 days or 4 units once a week).

- A lower starting dose, slower titration and higher targets may be considered for elderly or normal-weight subjects.

- In order to safely titrate insulin, people with diabetes must perform self-monitoring of blood glucose at least once a day fasting.

- Insulin dose should not be increased if the individual experiences 2 episodes of hypoglycemia (BG <4.0 mmol/L) in 1 week or any episode of nocturnal hypoglycemia.

- Noninsulin antihyperglycemic agents (especially insulin secretagogues) may need to be reduced if daytime hypoglycemia occurs.

Example B: Basal Plus Strategy - Adding bolus (prandial or mealtime) insulin (aspart, faster-acting insulin aspart, glulisine, lispro) once daily to optimized basal insulin therapy

- When intensification of insulin therapy is necessary, start one injection of mealtime insulin to either main meal or breakfast.

- Starting dose is 2 to 4 units and the person with diabetes can be taught self titration or dose increase can be done by health-care providers.

- To safely increase dose, blood glucose levels should be measured at least prior to insulin dose then titrated by 1 unit daily to either of the following targets:
  - 2-hour post-meal glucose of ≤8.0 mmol/L.
  - Pre-meal glucose of the next meal of 4.0 to 7.0 mmol/L.

- Important to keep carbohydrate intake constant and may consider reduction or discontinuation of insulin secretagogues.

Example C: Basal-Bolus Insulin - Multiple Daily Injections Therapy

- Calculate total daily dose of 0.3 to 0.5 units/kg then distribute as follows:
  a. 40% of total insulin dose as basal insulin (degludec U-100 or U-200, detemir, glargine U-100 or U-300, NPH)
  b. 20% of total insulin as bolus (prandial) insulin 3 times per day using rapid-acting insulin analogues (aspart, faster-acting insulin aspart, glulisine, lispro).

Example D: Premixed Insulin (Humulin 30/70, Novolin 30/70, Humalog Mix 25, Humalog Mix 50, NovoMix 30, added to noninsulin antihyperglycemic agents

- Suggested starting dose is 5 to 10 units once or twice daily (prebreakfast and/or presupper).

- Suggested titration is 1 to 2 units added to prebreakfast dose and/or presupper dose daily until target BG values are reached based on prebreakfast and presupper BG readings.

- Prebreakfast premixed insulin achieves presupper target BG value (4.0 to 7.0 mmol/L).

- Presupper premixed insulin achieves target fasting BG value (4.0 to 7.0 mmol/L).

- 30/70 premixed insulin should be given 30 to 45 minutes before meals.

- Humalog Mix 25 or NovoMix 30 premixed insulin should be given immediately before eating.

- Stop increasing insulin doses when both target BG levels are reached.

- If both BG targets are not reached, continue to increase the relevant dose until both targets achieved.

- The individual needs to self-monitor BG at least twice daily to safely titrate insulin.

- Insulin dose should not be increased if the individual experiences 2 or more episodes of hypoglycemia (BG <4.0 mmol/L) in 1 week or any episode of nocturnal hypoglycemia.

- Noninsulin antihyperglycemic agents (especially insulin secretagogues) may need to be reduced or stopped at the start of this regimen or when daytime hypoglycemia occurs.
Sample Instructions for Patients with Type 2 Diabetes Who Are Starting and Adjusting Insulin

You will be taking _______________________ insulin at ______________________

It is important that you continue to take your other diabetes medications as prescribed unless you have been told to change the dose or stop them.

How to Adjust Your Insulin Doses:

• Your target fasting blood glucose level is _____________________ mmol/L.
• You will inject __________________ units of ________________________ at __________________.
• You will continue to increase your insulin dose by ________ unit(s) every ________ day(s) until your fasting glucose level is __________ mmol/L.
• Do not increase your insulin when your fasting glucose is __________ mmol/L.
• You should call for further instructions when your blood glucose reaches __________ mmol/L for 3 or more days: phone number ____________________.
• A side effect of insulin is low blood glucose (hypoglycemia); low blood glucose can occur with too much insulin, increased activity or not enough food.

Monitoring Your Blood Glucose

• It is important to test your blood glucose while your insulin treatment is being modified.
• You should test your blood glucose and record the value every day before breakfast and __________.
• Test before each meal, unless you are instructed differently.
• It is important to record your blood glucose values and any changes in activity or food in your diary and bring this to your next appointment; this information helps your diabetes health-care team understand your diabetes control.
• Unless otherwise instructed, you are trying to reach a target blood glucose of 4.0 to 7.0 mmol/L before meals, and 5.0 to 8.0 mmol/L after meals.
• If you think that your blood glucose is low, check it and record that information in your diary.

Instructions for Taking your Glucose-Lowering Diabetes Medications:

<table>
<thead>
<tr>
<th>Current Medications</th>
<th>Dose</th>
<th>Time of Day</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Diabetes Canada, 2018 Clinical Practice Guidelines, Appendix 9