Starting and Helping People with Type 2 Diabetes on Insulin

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Objectives

After attending this session, participants will be able to:

• Understand the unique needs and challenges to consider when initiating insulin therapy in people with type 2 diabetes

• Recognize hypoglycemia, its causes and the physical and psychological impact it has on people with diabetes

• Explain how self-monitoring of blood glucose (SMBG) can assist people using insulin to recognize issues, problem solve and adjust their insulin when blood glucose (BG) is not at target

• Recognize SMBG “best practices” and counsel people with type 2 diabetes on insulin therapy accordingly
Diabetes Progression
Type 2 Diabetes is a Progressive Disease

- 50% of β-cell function is already lost at diagnosis
- β-cell function will continue to decline despite treatment

Issues, Barriers and Patient Needs
Barriers to Starting Insulin Therapy

Clinician barriers to insulin therapy may be due to:

- Perceived complexity of the therapeutic regimen
- Belief that it is not effective in type 2 diabetes
- Fear of hypoglycemic episodes, weight gain and associated cardiovascular risks
- Fear that insulin therapy will require careful monitoring, more physician time, and other practice resources

Davis SN, Renda SM. Diabetes Educator 2006; 32(4):146S-52S.
Barriers to Starting Insulin Therapy

Insulin therapy may have negative connotations for some patients:

- Sense of loss of control over one’s life
- Reduced quality of life
- Sense of personal failure to control the disease
- Side effects such as weight gain and hypoglycemia
- Daily, possibly painful, injections

Establish a sense of patient control by informing patients that:

- Their symptoms will improve with insulin therapy
- They will be taking a more active role in managing their diabetes
- Basal insulin regimens are easy to administer and can be administered at bedtime
- There are strategies to prevent hypoglycemia

Davis SN, Renda SM. Diabetes Educator 2006; 32(4):146S-52S.
Initiating Insulin in Type 2 Diabetes
Insulin in Type 2 Diabetes

Insulin can be used:

- At diagnosis
- During illness, surgery or pregnancy
- At any time glycemic targets are not being met
  - Glycemic targets must be individualized.
  - Target for most individuals with diabetes is a glycated hemoglobin (A1C) ≤ 7.0%

Polling Question:

Which of the following is not a barrier to starting insulin?

A. Clinician fear it will require more time and practice resources
B. Sense of personal failure to control diabetes
C. Concerns over cost of therapy
D. Concerns that injections will be painful
Insulin in Type 2 Diabetes

Tailor treatment to the individual. There are many options:

- Start with a basal insulin in addition to oral antihyperglycemic agents
- Start with a premixed insulin in addition to oral antihyperglycemic agents
- Start with intensive insulin therapy (less common and not generally recommended)

Basal Insulin added to Oral Antihyperglycemic

Insulin
  • Neutral protamine hagedorn (NPH), glargine U-100, detemir, glargine U-300, degludec (U-100 and U-200)

Dosing
  • Starting dose is generally 10 units daily at bedtime. Can be administered at other times of day.

Titration
  • Several titration regimens are acceptable
  • For glargine U-100 or detemir, one regimen is to increase dose by 1 unit every night until fasting BG has reached their individual target (e.g., 4.0-7.0 mmol/L [ADA 90-130 mg/dL])
  • Stop titrating if 2 episodes of hypoglycemia occur in a week or any nocturnal hypoglycemia
  • Insulin glargine U-300 and insulin degludec should not be up-titrated more often than every 3-4 days due to their longer duration of activity


What to discuss with the Patient

**Type and starting dose of insulin**
- Explain onset, peak, duration, preparation and storage

**Titration schedule**
- When to check and what BG targets are being used for titration

**How to use injection device**

**Injection site and rotation of injections**

**Hypoglycemia: symptoms, treatment, prevention**
- Sick day guidelines
- Driving guidelines

**Follow-up date to discuss concerns**

Getting Started with Insulin:

Patient Handout

Insulin Injection Sites

Insulin Pens:
Your pen comes with an instruction book. Please review it to understand how your pen works, how to load the cartridge, and how to prepare your pen for an insulin injection.

Mixing Insulin:
Insulin that is already (with premixed) needs to be stored before using. The pen should be filled ten times, tapped ten times, and checked for a milky-white consistency.

Check Insulin Flow (Prime):
Attach pen needle. Roll up 2 units and, with pen up facing upwards, push the dosing button. If no stream of insulin appears, repeat with another 2 units.

Giving Your Injection:
After you have checked the insulin flow, push the dose of insulin to be taken. Insert pen tip into skin at a 90° angle. Push the dosing button until you feel resistance. Count 10 seconds before removing the needle from your skin to ensure you receive the full dose. With longer needles (5 mm), you may need to gently lift the skin before injection.

NOTE: It is really important to change (rotate) where you give yourself insulin to prevent fatty lumps from forming since these can affect how your body absorbs insulin. For example, you can move from one side of your abdomen to the other side, and you can also move your injection site to a different location within each site of your abdomen. Avoid a 2-inch area around the belly button as well as scar tissue.

Insulin Injection Sites

Proper Use of Pen Tips (needles):
Put pen tips on only once; they are sterile and can become hot or broken if re-used. Boxed pen tips can make the injections more painful. Leaving pen tips on the cartridge may cause leaking or allow air into the cartridge which may alter the concentration of the insulin.

Safe Sharps Disposal:
Pen tips and needles should be disposed of in a sharps container. Check with your local pharmacy. Many pharmacies supply safe, puncture-proof containers. When the container is full, it is returned to the pharmacy in exchange for a new container. Sharps containers should be disposed of in accordance with local legislation.

Diabetes Driving Guidelines
Prevention of hypoglycemia for all Insulin-treated drivers

- Monitor your blood glucose level immediately before and at least every 4 hours during long drives. Always carry blood glucose monitoring equipment and treatment for hypoglycemia within easy reach (e.g., attached to the seat).
- You should not drive when your blood glucose level is less than 4.0 mmol/L. You should not begin to drive without having some carbohydrates-containing food when your blood glucose level is between 4.0 – 5.0 mmol/L.
- Stop and treat yourself as soon as hypoglycemia and/or impaired driving is suspected. You should not drive for at least 45 – 60 minutes after effective treatment of mild to moderate hypoglycaemia (i.e., glucose level 2.5 – 4.0 mmol/L).

Professional Drivers must:
- Carry supplies when you are driving.
- Be aware of your glucose level.
- Avoiding the delivery of your glucose level falls below 6.0 mmol/L or raised.
- Should the glucose level exceed 4.0 mmol/L, you should stop driving until your glucose level falls below 4.0 mmol/L or raised.

Across the country, the Canadian Diabetes Association is leading the fight against diabetes by helping people with diabetes live healthy, balanced lives. In order to deliver excellence in diabetes care, our community-based network of partners help us provide education and services to people living in diabetes. For more information, visit diabetes.ca or call 1-800-BANTING.
# Insulin Type, Dose and Action

Provide Patient

- Type and starting dose of insulin
- Onset, peak, duration and storage

<table>
<thead>
<tr>
<th>Insulin Type</th>
<th>Onset</th>
<th>Peak</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basal Insulins</strong></td>
<td></td>
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<tr>
<td>Intermediate-acting insulin (cloudy):</td>
<td></td>
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<tr>
<td>• Insulin NPH</td>
<td>1 - 3 h</td>
<td>5 - 8 h</td>
<td>Up to 18 h</td>
</tr>
<tr>
<td><strong>Long-acting basal insulin analogues (clear)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Insulin detemir</td>
<td>90 min</td>
<td>Not</td>
<td>Up to 24 h</td>
</tr>
<tr>
<td>• Insulin glargine U-100</td>
<td>90 min</td>
<td>applicable</td>
<td>(detemir 16-24 h)</td>
</tr>
<tr>
<td>• Insulin glargine U-300</td>
<td>Up to 6 h¹</td>
<td></td>
<td>Up to 24 h</td>
</tr>
<tr>
<td>• Insulin degludec</td>
<td>60 min</td>
<td></td>
<td>(glargine 24 h)</td>
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<td></td>
<td></td>
<td></td>
<td>Up to 30 h</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Up to 42 h</td>
</tr>
</tbody>
</table>


Resource Slide
Insulin Pens

- Consult directions with each pen
- New pen needle for each injection
- Re-suspend cloudy insulin (NPH), tap to send any air bubbles to end of needle
- Prime with a 2 unit shot each time; a drop of insulin should appear. Repeat until a drop appears
- Dial dose and perform injection 90°
- Count to at least 10, then remove needle and discard in sharps container
- Use pen needle length of 4 to 6 mm

Injection Site Rotation

Injection Site
• Abdomen fastest, most consistent absorption, followed by the outer arm, thigh and buttock

Site Rotation
• Divide injection site into quadrants, use one quadrant weekly separating all injections by a finger width

Site Preparation
• Clean with soap and water
• Alcohol is not required; if used let dry completely
• With 4-6 mm pen needles a skin lift is usually not required unless very lean; hold skin and lift until injection complete

Hypoglycemia

Lower rates of hypoglycemia have been observed with rapid acting analogues than regular insulin

Use of long-acting basal insulin analogues reduces the risk of nocturnal hypoglycemia compared to NPH

Causes of hypoglycemia:
- Missed meals, smaller or delayed meals
- Too much medication
- Unplanned or extra activity
- Consuming alcohol

Symptoms of Hypoglycemia

Symptoms vary from person to person

**Early Signs**
- Trembling, shaking
- Dizzy, light headed
- Palpitations
- Sweating
- Anxiety
- Hunger
- Nausea
- Tingling
- Headache
- Blurred vision

**Late Signs**
- Difficulty concentrating
- Confusion
- Changed behaviour
- Drunk-like behaviour
- Trouble speaking
- Loss of consciousness

Hypoglycemia Treatment

Check BG and treat if below 4.0 mmol/L (ADA 70 mg/dL)

Give 15 g fast acting carbohydrate preferably as 3 to 4 dextrose tablets or:

- 15 mL (3 teaspoons) or 3 packets of table sugar
- 175 mL (3/4 cup) juice or regular soft drink
- 6 lifesavers (1=2.5 g of carbohydrate)
- 15 mL (1 tablespoonful) of honey
- 4 x dextrose 4 g tablets

Wait 15 minutes, retest BG and retreat with another 15 g carbohydrate if BG < 4.0 mmol/L (ADA 70 mg/dL)

If next meal is more than 1 hour away once hypoglycemia has been reversed, have a snack with 15 g carbohydrate and a protein source

Prevention of Hypoglycemia for all Insulin-Treated Drivers

Measure BG level immediately before and at least every 4 hours during long drives

Do not drive when BG level is < 4.0 mmol/L (ADA 70 mg/dL)
  • Do not begin to drive without having some carbohydrate-containing food when your BG level is 4.0 to 5.0 mmol/L (ADA 70 to 90 mg/dL)

Stop and treat yourself as soon as hypoglycemia and/or impaired driving is suspected
  • You should not drive for at least 45 to 60 minutes after effective treatment of mild to moderate hypoglycemia

Insulin Pen Start Checklist Help Sheet; CDA Getting Started with Insulin 2013
Polling Question:

Which of the following should be discussed with patients starting insulin?

A. Onset, peak, duration, preparation and storage of insulin
B. Injection site selection and rotation
C. Hypoglycemia recognition, treatment and prevention
D. All of the above
Patient Education and Tools

Patient should leave from insulin start session with:

• Insulin, pen or syringes and sharps container

• Dose of insulin, when to inject and titration protocol

• Knowing injection technique: how, where, site rotation

• Hypoglycemia sheet for signs, symptoms and treatment

• Log book, test times and BG targets

• Appointment for follow-up call
Intensifying Insulin Therapy
Basal Plus Strategy:
Adding Bolus Insulin

Dosing

• Starting dose: 2 to 4 units
• Patient can be taught self titration, or dose increase can be done by the health care practitioner
• The mealtime (bolus) insulin dose may be initiated at one meal daily (generally the largest meal of the day)

Titration

• To safely increase dose, 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 ≤ 10.0 mmol/L (ADA 180 md/dL) (or ≤ 8.0 mmol/L [144 mg/dL] in certain cases)
• Pre-next meal glucose of 4.0 to 7.0 mmol/L (ADA 90 to 130 mg/dL)


Using SMBG
Benefits of SMBG

SMBG identifies glycemic excursions to allow for day-to-day adjustments of activity, diet and medication. It can:

• Determine preprandial and postprandial hyperglycemia

• Confirm hypoglycemia, allowing for appropriate treatment

• Detect glycemic excursions, providing immediate feedback to patients about the effect of food choices, activity and medication on glycemic control

Awareness of SMBG and A1C provide the best information to assess glycemic control and help patients on insulin make changes and regain control

### Regular SMBG Frequency

<table>
<thead>
<tr>
<th>Situation</th>
<th>SMBG Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using multiple daily injections of insulin (≥ 4 times per day)</td>
<td>SMBG ≥ 4 times per day</td>
</tr>
<tr>
<td>Using an insulin pump</td>
<td></td>
</tr>
<tr>
<td>Using insulin &lt; 4 times per day</td>
<td>SMBG at least as often as insulin is being given</td>
</tr>
<tr>
<td>Pregnant (or planning a pregnancy), whether using insulin or not</td>
<td>SMBG individualized and may involve SMBG ≥ 4 times per day</td>
</tr>
<tr>
<td>Hospitalized or acutely ill</td>
<td></td>
</tr>
<tr>
<td>Starting a new medication known to cause hyperglycemia (e.g. steroids)</td>
<td>SMBG individualized and may involve SMBG ≥ 2 times per day</td>
</tr>
<tr>
<td>Experiencing an illness known to cause hyperglycemia (e.g. infection)</td>
<td></td>
</tr>
</tbody>
</table>

http://guidelines.diabetes.ca/BloodGlucoseLowering/SMBGRecommendationSheet
## Increased SMBG Frequency

<table>
<thead>
<tr>
<th>Situation</th>
<th>SMBG Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using drugs known to cause hypoglycemia (e.g. sulfonylureas, meglitinides)</td>
<td>SMBG at times when symptoms of hypoglycemia occur or at times when hypoglycemia has previously occurred</td>
</tr>
<tr>
<td>Has an occupation that requires strict avoidance of hypoglycemia</td>
<td>SMBG as often as required by employer</td>
</tr>
<tr>
<td>Not meeting glycemic targets</td>
<td>SMBG ≥ 2 times per day, to assist in lifestyle and/or medication changes until such time as glycemic targets are met</td>
</tr>
<tr>
<td>Newly diagnosed with diabetes (&lt; 6 months)</td>
<td>SMBG ≥ 1 time per day (at different times of day) to learn the effects of various meals, exercise and/or medications on BG</td>
</tr>
<tr>
<td>Treated with lifestyle and oral agents and is meeting glycemic targets</td>
<td>Some people with diabetes might benefit from very infrequent checking (SMBG once or twice per week) to ensure that glycemic targets are being met between A1C tests</td>
</tr>
</tbody>
</table>

http://guidelines.diabetes.ca/BloodGlucoseLowering/SMBGRecommendationSheet
Pattern Management

- Requires a review of all parameters that affect BG
- Involves reviewing a record of glucose values, food, physical activity, medication administration and other factors that may affect blood sugar

Do not react to one BG value. 3 to 4 days of information are required to determine a pattern

Organize results so that all BG values occurring at the same time of day can be seen and reviewed together

Prioritizing Treatment

If more than one pattern appears, prioritize the work of bringing the pattern back into target range:

1. Always fix hypoglycemia (< 4.0 mmol/L [ADA 70 mg/dL]) first

2. Bring fasting BG into target next

3. Work on hyperglycemia patterns, usually looking at pre-meal values followed by post-meal values

Remember to:

- Adjust only one insulin at a time
- Adjust the insulin dose by no more than 10% at a time
- Reassess BG values after several days before making further changes
# Adjusting Insulin

When adjusting insulin you need to adjust the insulin that affects the BG value you are concerned with.

<table>
<thead>
<tr>
<th>Blood glucose value at:</th>
<th>Adjust:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting/pre-breakfast</td>
<td>Bedtime basal</td>
</tr>
<tr>
<td>Pre-lunch</td>
<td>Breakfast bolus</td>
</tr>
<tr>
<td>Pre-supper</td>
<td>Lunch bolus</td>
</tr>
<tr>
<td>Bedtime</td>
<td>Supper bolus</td>
</tr>
</tbody>
</table>

# Adjusting Insulin

If on BID combinations of premixed insulin, typically pre-breakfast and pre-supper, you need to be aware of what insulin affects the BG value.

<table>
<thead>
<tr>
<th>Blood glucose value at:</th>
<th>Adjust:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting/pre-breakfast</td>
<td>Pre-supper premix</td>
</tr>
<tr>
<td>Pre-lunch</td>
<td>Pre-breakfast premix</td>
</tr>
<tr>
<td>Pre-supper</td>
<td>Pre-breakfast premix</td>
</tr>
<tr>
<td>Bedtime</td>
<td>Pre-supper premix</td>
</tr>
</tbody>
</table>

Polling Question:

In what order should you address recognized patterns in blood glucose records?

A. Fasting blood glucose, hypoglycemia then hyperglycemia

B. Hypoglycemia, hyperglycemia then fasting blood glucose

C. Hypoglycemia, fasting blood glucose then hyperglycemia
Summary

Due to progressive beta cell loss, insulin will be required in the majority of individuals with type 2 diabetes.

Basal insulin at bedtime is the most common method of starting insulin in type 2 diabetes and patients can self-titrate.

Use Basal Plus strategy to intensify insulin therapy.

SMBG is essential in making changes to therapy using pattern management.

It is important to educate patients on the following:
- Insulin: action, dose, storage, titration, injection technique and site
- Hypoglycemia
- Driving guidelines
Getting Started with Insulin:

Patient Handout

Insulin Injection Sites

Insulin Pens:
Your pen comes with an instruction book. Please review it to understand how your pen works, how to load the cartridge, and how to prepare your pen for an insulin injection.

Mixing Insulin:
Insulin that is already premixed (pre-filled) needs to be mixed before using. The pen should be tilted 15°, 10°, and 5°, respectively, and checked for a milky-white consistency.

Check Insulin Flow (Prime):
Attach needle. Roll up 2 units and, with pen up facing upwards, push the dosing button. If no stream of insulin appears, repeat with another 2 units.

Giving Your Injection:
After you have checked the insulin flow, put up the dose of insulin to be taken. Insert pen tip into skin at a 90° angle. Push the dosing button until you hear it. Count 10 seconds before removing the needle from your skin to ensure you receive the full dose. With longer needles (5 mm), you may need to gently lift the skin before injection.

Insulin Injection Sites

NOTE: It is really important to change (rotate) where you give yourself insulin to prevent fatty lumps from forming since there can affect how your body absorbs insulin. For example, you can move from one site of your abdomen to the other side, and you can also move your injection site to a different location within each site of your abdomen. Avoid a 2-inch area around the belly button as well as scar tissue.

Proper Use of Pen Tips (needles):
- Use pen tips only once; they are sterile and can become hot or broken if re-used. Boxing pen tips can make the injections more painful. Leaving pen tips on the cartridge may cause leaking, or allow air into the cartridge which may alter the concentration of the insulin.

Safe Sharps Disposal:
Pen tips and needles should be disposed of in a sharps container. Check with your local pharmacy. Many pharmacies supply safe, puncture-proof containers. When the container is full, it is returned to the pharmacy in exchange for a new container. Sharps otherwise should be disposed of in accordance with local regulations.

Diabetes Driving Guidelines
- Prevention of hypoglycemia for all insulin-treated drivers
- Monitor your blood glucose level immediately before and at least every 4 hours during travel. Always carry blood glucose monitoring equipment and test strips for hypoglycemia within easy reach (e.g., attached to the seat).
- You should not drive when your blood glucose level is less than 4.0 mmol/L. You should not begin to drive without having some carbohydrate-containing food when your blood glucose level is between 4.0–5.0 mmol/L.
- Stop and treat yourself as soon as hypoglycemia and/or impaired vision is suspected. You should not drive for at least 45–60 minutes after effective treatment of mild to moderate hypoglycemia (i.e., blood glucose level 2.5–4.0 mmol/L).

Professional Drivers must:
- Carry supplies when you are driving.
- Have a blood glucose monitor.
- Be able to quickly and accurately measure blood glucose levels.
- Use your blood glucose 1 hour before starting to drive and approximately every 4 hours while driving.
- Stop driving if your blood glucose falls below 4.0 mmol/L and do not resume driving until your blood glucose has risen to 4.0 mmol/L or higher following food ingestion.

Across the country, the Canadian Diabetes Association is leading the fight against diabetes by helping people with diabetes live healthy, full lives. Visit CanadianDiabetes.ca to learn more about our community-based network of resources. To help us provide education and services to people living with diabetes, donate today. Your support helps us fight diabetes and ensure that Canadians living with diabetes have access to essential care.

Managing Your Blood Glucose

diabetes.ca | 1-800 BANTING
Sick Day Guidelines

HealthLink BC Guidelines

Sick-Day Guidelines for People With Diabetes

Topic Overview

What happens when you are sick
When you are sick, your body reacts by releasing hormones to fight infection. But these hormones raise blood sugar levels and at the same time make it more difficult for insulin to lower blood sugar. When you have diabetes, even a minor illness can lead to dangerously high blood sugar. This may cause life-threatening complications, such as diabetic ketoacidosis or a hyperosmolar hyperglycemic state (HHS).

Plan ahead
Work with your doctor to make a sick-day plan for you or your child with diabetes. Discuss your target blood sugar goal during an illness, how you should adjust your insulin dose and timing (if you take insulin), and when you need to contact your doctor for help. Also, make sure you know how often to check your blood sugar and your ketone levels. Keep your plan in a convenient place, and include contact information in case you need to reach your doctor at night or on the weekends.

Steps to take during an illness
Here are some general sick-day guidelines:
# Bolus Insulins

<table>
<thead>
<tr>
<th>Insulin Type</th>
<th>Onset</th>
<th>Peak</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolus (prandial) Insulins</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rapid-acting insulin analogues (clear):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Insulin aspart</td>
<td>10 - 15 min</td>
<td>1 - 1.5 h</td>
<td>3 - 5 h</td>
</tr>
<tr>
<td>• Insulin glulisine</td>
<td>10 - 15 min</td>
<td>1 - 1.5 h</td>
<td>3 - 5 h</td>
</tr>
<tr>
<td>• Insulin lispro</td>
<td>10 - 15 min</td>
<td>1 - 2 h</td>
<td>3.5 - 4.75 h</td>
</tr>
<tr>
<td>Short-acting insulins (clear):</td>
<td>30 min</td>
<td>2 - 3 h</td>
<td>6.5 h</td>
</tr>
<tr>
<td>• Insulin regular</td>
<td></td>
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</tr>
</tbody>
</table>
## Premixed Insulins

<table>
<thead>
<tr>
<th>Insulin Type</th>
<th>Time action profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premixed Insulins</td>
<td></td>
</tr>
<tr>
<td>Premixed regular insulin – NPH (cloudy):</td>
<td>• Regular 30%/NPH 70%</td>
</tr>
<tr>
<td>Premixed insulin analogues (cloudy):</td>
<td>A single vial or cartridge contains a fixed ratio of insulin (% of rapid-acting or short-acting insulin to % of intermediate-acting insulin)</td>
</tr>
<tr>
<td>• Biphasic insulin aspart</td>
<td></td>
</tr>
<tr>
<td>• Insulin lispro/lispro protamine</td>
<td></td>
</tr>
</tbody>
</table>
### Insulin Pen Start Checklist

<table>
<thead>
<tr>
<th>Topic</th>
<th>Instruction Date &amp; Initials</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cognitive Assessment</td>
<td></td>
<td></td>
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<tr>
<td>2. Insulin Delivery</td>
<td></td>
<td></td>
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<tr>
<td>• loading</td>
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<tr>
<td>• appropriate mixing</td>
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<tr>
<td>• priming shot</td>
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<td>• dialing up dose</td>
<td></td>
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<tr>
<td>• delivery of insulin</td>
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<td>3. Insulin</td>
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<tr>
<td>• type action time</td>
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<td></td>
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<tr>
<td>• frequency/time</td>
<td></td>
<td></td>
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<tr>
<td>• injection site</td>
<td></td>
<td></td>
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<tr>
<td>• needle length</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• storage/tempetry</td>
<td></td>
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<tr>
<td>4. Return demonstration</td>
<td></td>
<td></td>
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<tr>
<td>5. Hypoglycemia</td>
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<tr>
<td>• signs and symptoms</td>
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<td>• care &amp; prevention</td>
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<td>• treatment</td>
<td></td>
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<tr>
<td>• diabetes identification</td>
<td></td>
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<tr>
<td>6. Glucose Check</td>
<td></td>
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<tr>
<td>• recommend a monitoring schedule</td>
<td></td>
<td></td>
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<tr>
<td>7. Sharps Disposal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Snacks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Driving</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Instructions for oral medications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Follow-up</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• dose adjustments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• All every 3 months</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Insulin Pen Start Checklist Help Sheet

<table>
<thead>
<tr>
<th>Topic</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cognitive Assessment</td>
<td>Insulin pen type to match insulin brand ordered.</td>
</tr>
<tr>
<td>2. Insulin Delivery Device</td>
<td>Loading</td>
</tr>
<tr>
<td>• appropriate mixing</td>
<td>NPH and premixed insulin. Roll 10 times — up to 10 times and visually check that insulin has a consistent color appearance.</td>
</tr>
<tr>
<td>• priming shot</td>
<td>A priming shok is required when changing a cartridge or using a new needle. Typically, it is recommended to use 2 units to prime the pen, however, please refer to the pen instruction sheets from the manufacturer.</td>
</tr>
<tr>
<td>• dialing up dose</td>
<td>Dial-up units of insulin required.</td>
</tr>
<tr>
<td>• delivery of insulin</td>
<td>Inject insulin at a 90° angle in desired injection site when using a shorter needle (0.5 or 6 mm). A 45° angle may be needed if the person is thin or if a longer needle (8 mm) is being used. A proper skin lift should also be used in thin individuals or when using longer needles. Hold the injection for 10 seconds to ensure full delivery of dose.</td>
</tr>
<tr>
<td>3. Insulin (when available, use pre-printed insulin cards. Reference insulin product monograph)</td>
<td></td>
</tr>
</tbody>
</table>

#### Timing of Injection

<table>
<thead>
<tr>
<th>Type</th>
<th>Onset (time quickly it starts working)</th>
<th>Onset (When it is most effective)</th>
<th>Duration (How long it working)</th>
<th>Timing of Injection (When should it be given)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before insulin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rapid-acting analogues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adrenalin / Humulin / Novolin</td>
<td>10 — 15 min</td>
<td>1 — 2 hours</td>
<td>3 — 5 hours</td>
<td>May be given with 1 or more meals per day. To be given 0 — 15 minutes before or after meals.</td>
</tr>
<tr>
<td>Short-acting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humulin / Teno</td>
<td></td>
<td>30 min</td>
<td>2 — 3 hours</td>
<td>May be given with 1 or more meals per day. Should be injected 30 — 45 minutes before the start of the meal.</td>
</tr>
<tr>
<td>Basal insulins</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate-acting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humulin-N / NPH</td>
<td></td>
<td>1 — 3 hours</td>
<td>5 — 6 hours</td>
<td>Often started once daily at bedtime. May be given once or twice daily. Not given at any time specific to meals.</td>
</tr>
<tr>
<td>Long-acting analogues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lentezin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Levendin            |                                        | 90 min                           | not applicable                 | Often started once daily at bedtime. Insulin demins (Leven) may be given once or twice daily. Not given at any time specific to meals.
Fit Canada Injection Technique

FIT Forum Best Practices

FIT Technique for All

1. Inject into a clean injection site using clean hands. Gloves are not required.
2. Gather your supplies, including your pen, insulin and pen needles. If your pen is not pre-loaded, load your insulin cartridge into your pen.
3. If you are using cloudy insulin, mix by rolling it 10 times and tipping it 10 times to ensure that it is a milky white consistency. (Cloudy insulin does not need to be thinned).
4. Choose your injection site. (Injection into the body of your own arm is not recommended).
5. Rotate between injection sites.
6. Rotate within injection sites.
7. Attach your pen needle to both the outer and inner caps.
8. Prime your pen. Dial up a unit and depress the plunger while holding the pen needle pointing up. If drops come out, your pen needle is primed. If not, repeat the steps until drops come out of the top of the pen.
9. (GLP pens only need to be primed the first time you use them).
10. Push down the thumb button completely. Count to 5, slowly. Some may have to count past 10 or for longer if they are novices at insulin injection.
11. Withdraw the needle from the skin and release skin lift, if appropriate.
12. Skil your dose and insert the needle into the skin of a 45 degree angle.
13. Check to see whether your needle is at a 45 degree angle. A 20 degree angle is considered safe using the 30 and 29 gauge needles.
14. Remove pen needle and dispose of it in an approved sharps container. Replace pen cap.
15. Store insulin in use at room temperature. Store the cap tightly closed when not in use. Keep insulin out of direct sunlight. Close the cap tightly when not in use. Check for changes in color, appearance, solubility, and cloudiness, before using. Do not refrigerate insulin in use.
16. Store pen needles and syringes only once.

Supported by BD Medical | Diabetes Care

Johnson & Johnson DIABETES INSTITUTE
Driving Guidelines

Getting Started with Insulin

**Blood Sugars (Hypoglycemia):**

**Symptoms of Low Blood Glucose (Hypoglycemia):**

- Low blood glucose (sugar in your blood) has dropped below your target range (i.e., generally less than 3.9 mmol/L), a condition called low blood glucose or hypoglycemia occurs.

- **What happens, you may feel:**
  - Light-headed, nauseated
  - Tired, irritable, anxious
  - Sad, unable to concentrate
  - Weak, dizzy
  - A numbness or tingling in your tongue or lips

- **If you are experiencing signs of a low blood glucose level,** check your blood glucose immediately. If you do not have time, treat the symptoms anyway. It is better to be safe.

- **If possible,** drink a fast-acting carbohydrate source (containing 15 grams). For example:
  - 1 carbohydrate tablet (preferred choice)
  - 1 tablespoon, or 3 packets of tablet sugar dissolved in water
  - 1 (8 oz) cup of juice or regular soft drink
  - 1/2 (2.5 g of carbohydrate)

- **Blood glucose can happen quickly,** so it is important to treat it right away. If your blood glucose drops very low, you may need help from another person.

- **Causes of hypoglycemia:**
  - Physical activity than usual
  - Tiring on time
  - Less than usual
  - Taking too much medication
  - Drinking alcohol

- **New Driving Guidelines**

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*Canadian Journal of Diabetes*
CDA SMBG Tools

SMBG Recommendation Tool for Healthcare Providers

**Self-Monitoring of Blood Glucose (SMBG) Recommendation Tool for Healthcare Providers**

Basic SMBG requirements (must be met)

The person with diabetes (i.e., a daily member of the home) must have the knowledge and skills to use a home blood glucose monitor and record the results in an organized fashion.

The person with diabetes and/or members of the healthcare team must be willing to review and act upon the SMBG results. In addition, the ACoC recommends:

**A. REGULAR SMBG IS REQUIRED if the person with diabetes is:**

<table>
<thead>
<tr>
<th>SITUATION</th>
<th>SMBG RECOMMENDATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using multiple daily injections (at least 6 times per day)</td>
<td>SMBG ≥ 4 times per day (see page 2-10)</td>
</tr>
<tr>
<td>Using an insulin pump</td>
<td>SMBG ≥ 4 times per day (see page 2-10)</td>
</tr>
<tr>
<td>Using insulin + 4 times per day</td>
<td>SMBG ≥ 4 times per day (see page 2-10)</td>
</tr>
<tr>
<td>Regimen change (e.g., addition of a new drug)</td>
<td>SMBG ≥ 4 times per day (see page 2-10)</td>
</tr>
<tr>
<td>Starting a new medication (e.g., sulfonylureas)</td>
<td>SMBG ≥ 4 times per day (see page 2-10)</td>
</tr>
</tbody>
</table>

**B. INCREASED FREQUENCY OF SMBG MAY BE REQUIRED if the person with diabetes is:**

<table>
<thead>
<tr>
<th>SITUATION</th>
<th>SMBG RECOMMENDATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using drugs known to cause hypoglycemia (e.g., sulfonylureas)</td>
<td>SMBG ≥ 4 times per day (see page 2-10)</td>
</tr>
<tr>
<td>In an institution at risk for hypoglycemia (e.g., long-term care facility)</td>
<td>SMBG ≥ 4 times per day (see page 2-10)</td>
</tr>
<tr>
<td>New anticoagulants (e.g., warfarin)</td>
<td>SMBG ≥ 4 times per day (see page 2-10)</td>
</tr>
<tr>
<td>SMBG ≥ 2 times per day (to avoid and recognize hypoglycemia)</td>
<td>SMBG ≥ 4 times per day (see page 2-10)</td>
</tr>
<tr>
<td>Patients with diabetes and co-morbidities (e.g., cardiovascular disease)</td>
<td>SMBG ≥ 4 times per day (see page 2-10)</td>
</tr>
</tbody>
</table>

**C. DAILY SMBG IS NOT USUALLY REQUIRED if the person with diabetes:**

<table>
<thead>
<tr>
<th>SITUATION</th>
<th>SMBG RECOMMENDATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only needed with type 1 diabetes and SMBG ≥ 4 times per day</td>
<td>SMBG ≥ 4 times per day (see page 2-10)</td>
</tr>
</tbody>
</table>

**Additional CDA resources**

- Learn and log blood glucose levels
- Managing your blood glucose

Self-SMBG Frequency & Pattern Tool

**Executive Summary**

**Full Guidelines**

**Screening & Diagnosis**

**Vascular Protection**

**Blood Glucose Lowering**

**Self-Management Education**

**Team & Organizing Care**

**Special Populations**

**Healthcare Provider Tools**

**Slides and Videos**

**Patient Resources**

**Ressources françaises**

**Self-Monitoring Blood Glucose (SMBG)**

**Frequency & Pattern Tool**

*Use this calculator to determine how frequently your patient should be checking some suggested patterns for monitoring.*

**STEP 1: Frequency**

- Click to edit answer(s)

**What type of diabetes does your patient have?**

- Type 1 diabetes
- Type 2 diabetes
- Gestational diabetes mellitus (GDM)
- Prediabetes

**Is your patient with type 1 diabetes on an insulin pump?**