The COMPUS economic model demonstrates that the increased price of insulin analogues, in most instances, is not offset by the decrease in diabetes-related complications and associated cost savings.

Differences in weight gain between long-acting insulin analogues and NPH insulin are modest, averaging less than 1 kg. Weight gain of >5 kg is generally considered to be clinically important. This would equate to 3.5 kg in a 70 kg adult.

The COMPUS economic model demonstrates that the increased price of insulin analogues, in most instances, is not offset by the decrease in diabetes-related complications and associated cost savings.

For patients with type 1 diabetes, use of rapid-acting insulin analogues, when compared with regular human insulin, was associated with incremental cost-per-QALY estimates that are less than widely cited cost-effectiveness thresholds.

Evidence for rapid-acting insulin analogues in patients with type 2 diabetes, or for long-acting insulin analogues in patients with type 1 diabetes, was limited and inconsistent. However, findings for long-acting insulin analogues in patients with type 2 diabetes were more convincing. In all instances, cost-effectiveness estimates exceeded widely cited cost-effectiveness thresholds.

Consequently, routine use of insulin analogues as first-line therapy in all adults with diabetes, particularly those with type 2 diabetes, is unlikely to represent an efficient use of finite health care resources.

For Researchers and Others

Insulin analogues versus conventional insulin in children and pregnant women with type 2 diabetes

Comparisons between long-acting insulins in pregnant women

Research gaps related to the need for well-designed studies were also revealed in the following areas:

- the effect of insulin analogues on long-term microvascular and macrovascular diabetes complications
- potential benefits of insulin analogues regarding quality of life (i.e., increased convenience, reduced fear of hypoglycemia)

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Practitioners may prescribe insulin therapy based upon the “best fit” for the patient. In most cases, practitioners may prescribe the lower-cost regular human insulin as first-line therapy without compromising quality of care.

Are there any clinically important differences between insulin analogues and conventional insulins? When should rapid- and long-acting insulin analogues be used as first-line therapy?

**Insulin Analogues**

**Why focus on insulin analogues?**

Insulin analogues are a class of medications used to treat patients with type 1 and type 2 diabetes mellitus. Insulin analogues are one of the fastest growing therapeutic classes of drugs in Canada. Between 2004 and 2005, insulin analogue prescriptions dispensed by community pharmacies in Canada increased by 17.5% representing more than $181 million.

Some questions exist for consumers, health care providers, and policy makers about the optimal prescribing and use of insulin analogues in diabetes:

- Are there any clinically important differences between insulin analogues and conventional insulins?
- When should rapid- and long-acting insulin analogues be used as first-line therapy?

**Important Terms:**

- **Basal insulin:** Longer-acting insulin that controls blood glucose levels between meals and overnight.
- **Bolus insulin:** Faster-acting insulin that provides the boost of insulin needed to stop the rise in blood glucose levels that occurs after meals.
- **ICUR:** Incremental cost-utility ratio — the ratio of the difference in costs between an intervention and comparator to the difference in effects measured in QALYs.
- **QALY:** Quality-adjusted life-year — a health outcome measure that combines both quantity and quality of life.

**Insulin NPH, cartridge**

**Insulin NPH, vial**

**Insulin glargine, vial**

**Insulin glargine, cartridge**

**Insulin detemir, cartridge**

**Insulin regular, cartridge**

**Insulin lispro, cartridge**

**Insulin aspart, cartridge**

**Insulin aspart, vial**

**Insulin regular, vial**

**Approximate Unit Costs for Insulin Products in Canada**

Costs may vary between regions and over time; consult your pharmacist for exact pricing information.

**Optimal Insulin Therapy:**

**Type 1 diabetes** — Use regular human insulin or rapid-acting insulin analogues as bolus insulin (except in adolescents, use rapid-acting insulin analogues) and use NPH as the basal insulin.

**Type 2 diabetes** — Use regular human insulin as bolus insulin and use NPH as the basal insulin.

**When choosing a bolus insulin...**

In patients with type 1 diabetes requiring bolus (mealtime) insulin, either regular human insulin or rapid-acting insulin analogues can be considered as first-line therapy (except in adolescents).

There is no significant difference between the rapid-acting insulin analogues; therefore, practitioners may choose the lower-cost rapid-acting insulin analogues without compromising quality of care.

**When choosing a basal insulin...**

In patients with type 1 or type 2 diabetes requiring basal (background) insulin, neutral protamine Hagedorn (NPH) insulin should be considered first.

**Practice Implications**

Practitioners may prescribe insulin therapy based upon the “best fit” for the patient. In adolescent patients with type 1 diabetes requiring bolus (mealtime) insulin, rapid-acting insulin analogues may be considered as first-line therapy.

In patients with type 2 diabetes requiring bolus (mealtime) insulin, regular human insulin may be considered first.

**Practice Implications**

In most cases, practitioners may prescribe the lower-cost regular human insulin as first-line therapy without compromising quality of care.

**Practice Implications**

In patients with type 1 or type 2 diabetes requiring basal (background) insulin, neutral protamine Hagedorn (NPH) insulin should be considered first.

*Although the evidence is limited and inconsistent, patients who are experiencing significant hypoglycemia while taking human insulin may benefit from insulin analogues.*