For Policy Makers/Managers and Health care Practitioners

Summary of main clinical and economic findings:

- Overall, the evidence regarding advantages of insulin analogues over conventional insulin in terms of patient satisfaction and quality of life is weak.
- Use of insulin analogues, relative to conventional insulin, in adults with diabetes is associated with modest improvements in glycemic control; however, these improvements were not clinically significant/important.
- Use of insulin analogues, relative to conventional insulins, in adults with diabetes is associated with a reduction in hypoglycemic episodes; however, differences are not clinically significant.
- Differences in weight gain between long-acting insulin analogues and NPH insulin are modest, averaging less than 1 kg. Weight gain of > 5% 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 Research Funding Agencies, Researchers, and Others

The COMPUS insulin analogue clinical and economic analyses revealed areas where data were lacking or insufficient to provide clear direction. Further research is needed in the following populations and comparisons:

- Insulin analogues versus conventional insulin in children and pregnant women with type 2 diabetes
- Comparison of long-acting insulin with NPH insulin in pregnant women
- 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).

Made possible through funding from Health Canada.

The COMPUS Insulin Analogue Project

From Evidence to *Improved Health Outcomes*

February 2009

Project Highlights

This brochure provides highlights of the clinical and economic evidence from the COMPUS Insulin Analogue project, focusing on the optimal use of long- and rapid-acting insulin analogues in Canada.

For additional information, contact the CADTH Liaison Officer for your jurisdiction.

For contact information, go to www.cadth.ca.

All insulin analogue Optimal Therapy Reports and Intervention Tools are also available online.

Canadian Agency for Drugs and Technologies in Health

Agence canadienne des médicaments et des technologies de la santé

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.

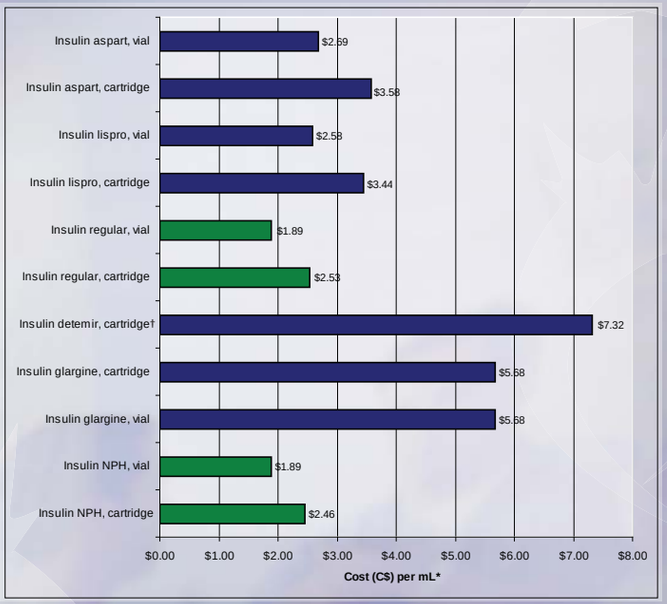
Bolus insulin:
Faster-acting insulin that provides the boost of insulin needed to stop the rise in blood glucose levels that occurs after meals.

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.

For Health Care Practitioners and Policy Makers/Managers

Approximate Unit Costs for Insulin Products in Canada



NPH=neutral protamine Hagedorn.
*Ontario Drug Benefits Formulary / Comparative Drug Index, December 3, 2008.
†Danielle Groleau, NovoNordisk Canada Inc., Mississauga, ON: personal communication, December 9, 2008.

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…

1

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).

Practice Implications

Practitioners may prescribe insulin therapy based upon the "best fit" for the patient.

2

In adolescent patients with type 1 diabetes requiring bolus (mealtime) insulin, rapid-acting insulin analogues may be considered as first-line therapy.

Practice Implications

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.

3

*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.

When choosing a basal insulin…

4

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

Practice Implications

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

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