

Insulin

Many jurisdictions are moving towards biosimilar insulins as a cost-saving strategy. These are similar to the reference insulin previously authorized and are not clinically different in safety, purity, or potency. Biosimilars are not technically interchangeable and typically require a new prescription. Individuals generally do well when switching to a biosimilar insulin.

Table 1: Biosimilar insulins (see pages 24 & 25)

reference insulin	biosimilar insulin	comments
glargine LANTUS	glargine BASAGLAR	costs \$20 less per 1500 units than LANTUS
	glargine SEMGLEE	costs \$30 less per 1500 units than LANTUS
lispro HUMALOG	lispro ADMELOG	costs \$15 less per 1500 units than HUMALOG
aspart NOVORAPID	aspart TRURAPI	costs \$17 less per 1500 units than NOVORAPID
	aspart KIRSTY	costs \$20 less per 1500 units than NOVORAPID

Concentrated insulins can be a good option for individuals requiring high insulin doses. This can help improve patient comfort as a smaller volume of insulin is injected. Ensure patients are aware of higher insulin concentration and dosing instructions to avoid critical errors.

Table 2: Concentrated insulins (see pages 24 & 25)

generic / TRADE	concentration	comments
glargine TOUJEO	300 units/mL	↑ concentration means ↓ injection volume. Longer duration than usual insulin glargine; adjust dose only after ≥ 3 days. Currently non-formulary in Sask & full-formulary NIHB.
degludec TRESIBA	100 units/mL 200 units/mL	long-acting insulin with a duration of up to 42 hours
lispro HUMALOG	200 units/mL	costs \$5 less per 1500 units than HUMALOG 100 units/mL formulation and \$13 more than ADMELOG 100 units/mL.
regular ENTUZITY	500 units/mL	high concentration results in an onset similar to regular insulin but a duration similar to insulin NPH. <u>Cannot</u> be combined with other insulins.

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Which prandial (mealtime, quick-onset) insulin should I choose?

- All have the same decrease in A1c.
- All have a similar rate of hypoglycemia.
- Consider cost (see Table 3) & coverage.
- Consider convenience: regular insulin is best taken 30 minutes before a meal, which can be inconvenient for some; prefilled disposable pens can be convenient, although some patients may dislike the environmental impact & prefer reusable pens. See page 23.

Table 3: Prandial insulin costs

regular HUMULIN R	\$64
glulisine APIDRA	\$68
lispro HUMALOG	\$75
lispro ADMELOG	\$60
aspart NOVORAPID	\$77
aspart TRURAPI	\$60
aspart KIRSTY	\$57
cost per 1500 units of prefilled pen	

Which basal (long-acting) insulin should I choose?

- All have the same decrease in A1c.
- Consider cost (see Table 4) & coverage.
- There can be small differences in hypoglycemia rates, which may be valuable for some at-risk patients. See page 24.

Table 4: Basal insulin costs

NPH HUMULIN N	\$64
glargine BASAGLAR	\$90
glargine SEMGLEE	\$80
glargine LANTUS	\$112
glargine TOUJEO	\$112
degludec TRESIBA	\$133
detemir LEVEMIR	\$129
cost per 1500 units of prefilled pen	

How to put this evidence into practice?

- The most effective way to prevent hypoglycemia in a patient is to **change the patient's level of risk**, such as by:
 - improving injection technique (see page 26)
 - reassessing A1c targets (see page 5)
 - dose adjusting insulin for renal function (see page 8)
 - stopping concomitant secretagogues (e.g. gliclazide, see page 18)
 - educating patients on recognizing & treating hypoglycemia (see page 28)
- For strategies on addressing hypoglycemia, see page 29.
- For patients **who remain at high risk** of severe hypoglycemia: (e.g. aggressive targets or previously hospitalized for hypoglycemia)
 - consider insulin degludec **TRESIBA** or insulin glargine **TOUJEO**
 - consider increasing blood glucose monitoring (see page 30) and prescribing glucagon (see page 28)
- For most patients, insulin NPH **HUMULIN N** or insulin glargine **BASAGLAR** are good first-line options.

Table 5: Basal insulin hypoglycemia comparisons - trials usually unblinded; weak evidence

	severe hypoglycemia	any hypoglycemia
glargine 100 units/mL instead of NPH	no change	47.2% vs 55.9%, NNT= 12 over 6-12 months
TOUJEO instead of glargine 100 units/mL	no change	66.5% vs 72.8%, NNT= 16 over 6 months
TRESIBA instead of glargine 100 units/mL	4.9% vs 6.6%, NNT=59 over 2 years	31.6% vs 22%, NNT= 11 over 7 months