Comparison of Insulins (Canada)

(Modified December 2022)

This chart compares insulins in regard to duration, usual frequency, and cost. It also provides information on route of administration, stability of in-use products at room temperature, and place in therapy. See our toolbox, *Improving Diabetes Outcomes*, for more information on insulin and injectable diabetes meds.

--Information in this chart is from product monographs (**see footnote a**) unless otherwise specified.--

Insulin, Manufacturer	Duration	Usual Frequency	Formulations/Cost[b]	Stability, in-use, room temp
Rapid-acting: prandial human insulin analogues (rDNA origin). Onset 10 to 20 minutes (*Fiasp* faster.).[1] For **type 1 diabetes**, recommended at each meal as part of an intensive basal-prandial regimen.[1] For **type 2 diabetes**, as part of a "basal plus" strategy[c] or basal-bolus intensive regimen[d].[1] All are given via subcutaneous injection. *Humalog* 100 unit/mL can be given intramuscularly but is not recommended. See chart below for those available for intravenous or subcutaneous infusions (pump). All are clear and colourless.[1]				
Humalog (insulin lispro), Eli Lilly (*Liprelog*, an "authorized biosimilar" made by Eli Lilly, has been approved, but not yet marketed; no cost available)	3.5 to 4.75 hours	One to three times daily.[1] Inject within 15 min before a meal, or within 20 min after the start of the meal.	**100 units/mL**: $34/10 mL vial $67/5 of 3 mL cartridges $67/5 of 3 mL *KwikPen* $71/5 of 3mL *Junior KwikPen* **200 units/mL**: $125/5 of 3 mL *KwikPen*	Vial, cartridge, pen: 28 days Pump reservoir (100 mL/mL): 14 days IV infusion:[2] 48 hours (0.1 to 1 unit/mL in NS)
Admelog (insulin lispro), Sanofi-Aventis Biosimilar of *Humalog*[e]	2 to 5 hours	One to three times daily.[1] Inject within 15 min before a meal, or within 20 min after the start of the meal.	$25/10 mL vial $49/5 of 3 mL cartridges $49/5 of 3 mL *SoloSTAR* pens	Vial, cartridge, pen: 28 days Pump reservoir: 14 days
Kirsty (insulin aspart), BGP Pharma Biosimilar of *NovoRapid*[e]	3 to 5 hours	One to three times daily.[1] Inject 5 to 10 min before a meal, or immediately after the meal.	$46/5 of 3 mL pre-filled pens	Vial, pen: 28 days

Insulin, **Manufacturer**	**Duration**	**Usual Frequency**	**Formulations/Cost[b]**	**Stability, in-use, room temp**
Rapid-acting, continued				
Lyumjev (insulin lispro), Eli Lilly Approved, but not yet marketed	3 to 5 hours	One to three times daily.[1] Inject 0 to 2 min before a meal, or within 20 min after the start of the meal.	**100 units/mL**: 10 mL vial 5 of 3 mL cartridges 5 of 3 mL *KwikPen* 5 of 3 mL *Junior KwikPen* 5 of 3 mL *Tempo Pen* **200 units/mL**: 5 of 3 mL *Kwik Pen* Cost not available.	Vial, cartridge, pen: 28 days IV infusion: 20 hours (0.1 to 1 unit/mL in NS or D5W)
NovoRapid (insulin aspart), Novo Nordisk	3 to 5 hours	One to three times daily.[1] Inject within 5 to 10 min before a meal, or immediately after the meal.	$33/10 mL vial $67/5 of 3 mL *Penfill* cartridge $69/5 of 3 mL *FlexTouch* pens	Vial, cartridge, pen: 28 days Pump reservoir: 6 days.[3] IV infusion: 24 hours in D5W, D10W, or NS.[2]
Trurapi (insulin aspart), Sanofi-Aventis Biosimilar of *NovoRapid*[e]	3 to 5 hours	One to three times daily. Inject within 5 to 10 min before a meal, or immediately after the meal.	$49/5 of 3 mL cartridges $49/5 of 3 mL *SoloSTAR* pens	Cartridge, pen: 28 days Pump reservoir: 6 days[3] IV infusion: 24 hours (details in labeling)
Apidra (insulin glulisine), Sanofi-Aventis	4 hours	One to three times daily.[1] Inject within 15 min before a meal, or within 20 min after the start of the meal.	$29/10 mL vial $57/5 of 3 mL cartridges $57/5 of 3 mL *SoloStar* pens	Vial, cartridge, pen: 28 days Pump reservoir: 48 hours
Fiasp (insulin aspart), Novo Nordisk Formulated with niacinamide for faster absorption.	3 to 5 hours	One to three times daily.[1] Inject within 2 min before a meal, or within 20 min after the start of the meal.	$32/10 mL vial $66/5 of 3 mL *Penfill* cartridge $68/5 of 3 mL *FlexTouch* pens	Vial, cartridge, pen: 28 days Pump reservoir: 6 days IV infusion: 24 hours (0.5 to 1 unit/mL in NS or D5W)

Insulin, Manufacturer	Duration	Usual Frequency	Formulations/Cost[b]	Stability, in-use, room temp
Short-acting (regular): regular human insulin of rDNA origin (*Humulin R*, *Novolin ge Toronto*, *Entuzity*), or pork insulin (*Hypurin Regular*). Onset about 15 minutes *Entuzity*, 30 minutes (*Humulin R* and *Novolin ge Toronto*), or up to 60 minutes for pork insulin. Longer time to onset and longer duration than rapid-acting analogues. For type 1 diabetes, recommended at each meal as part of an intensive basal-prandial regimen.[1] For type 2 diabetes, as part of a "basal plus" strategy[c] or basal-bolus intensive regimen[d].[1] Can be given via subcutaneous or intramuscular injection, or intravenous infusion. All are clear and colourless.[1]				
Humulin R **100 units/mL**, Eli Lilly	6 to 8 hours	One to three times daily.[1] Inject 30 to 45 min before meal.[1]	$28/10 mL vial $55/5 x 3 mL cartridges	Vial, cartridge: 28 days IV infusion:[2] 48 hours (0.1 to 1 unit/mL in NS)
Entuzity **500 units/mL**, Eli Lilly	17 to 24 hours	Two to three times daily. Inject 30 minutes before meal.	$106/2 of 3 mL *KwikPen*	Pen: 28 days
Myxredlin Baxter Biosimilar of *Novolin ge Toronto*[e] Approved but not yet marketed	See *Novolin ge Toronto*	0.3 to 1 unit/kg/day via IV infusion. (For emergencies [e.g., diabetic coma and pre-coma], patients with diabetes undergoing surgery.)	IV infusion 1 unit/mL in 100 mL NS Cost not available.	IV infusion: 25 days
Novolin ge Toronto, Novo Nordisk	8 hours	One to three times daily.[1] Inject 30 minutes before meal.	$26/10 mL vial $51/5 of 3 mL *Penfill* cartridges	Vial, cartridge: 28 days IV infusion: 24 hours (details in labeling)
Hypurin Regular, Wockhardt UK	6 to 8 hours	One to three times daily.[1] Inject 30 to 45 min before meal.[1]	$107/10 mL vial	Vial: 28 days
Intermediate-acting (NPH): human insulin (rDNA origin) isophane suspension (*Humulin N*, *Novolin ge NPH*), or pork insulin isophane suspension (*Hypurin NPH*). For **type 1 diabetes**, may be used as the basal component of basal-prandial regimens.[1] An initial insulin option in **type 2 diabetes**, often as a once-daily add-on to oral agents.[1] As type-2 diabetes progresses, may be used as part of a "basal plus" strategy[c] or basal-bolus intensive regimen[d].[1] Onset one to three hours.[1] Administered via subcutaneous injection. *Hypurin NPH* can also be given IM (faster onset and shorter duration). All appear cloudy.[1]				
Novolin ge NPH, Novo Nordisk	About 24 hours	Once or twice daily.	$26/10 ml vial $52/5 of 3 mL *Penfill* cartridges	Vial, cartridge: 28 days
Humulin N, Eli Lilly	up to 24 hours	Once or twice daily.[1]	$28/10 mL vial $55/5 of 3 mL cartridges $55/5 of 3 mL *KwikPen*	Vial, cartridge, pen: 28 days
Hypurin NPH, Wockhardt UK	18 to 24 hours	Once or twice daily.[1]	$107/10 mL vial	Vial: 28 days

Insulin, Manufacturer	Duration	Usual Frequency	Formulations/Cost[b]	Stability, in-use, room temp
Long-acting: human insulin analogue (rDNA origin). For **type 1 diabetes**, may be used as the basal component of basal-prandial regimens.[1] An initial insulin option in **type 2 diabetes**, often as a once-daily add-on to oral agents.[1] As type-2 diabetes progresses, may be used as part of a "basal plus" strategy[c] or basal-bolus intensive regimen[d].[1] Administered via subcutaneous injection. All are clear and colourless.[1]				
Basaglar (insulin glargine), Eli Lilly Biosimilar of *Lantus*[e]	See *Lantus*.	Once daily at the same time each day.	$78/ 5 of 3 mL cartridges $78/ 5 of 3 mL *KwikPen*	Cartridge, pen: 28 days
Lantus (insulin glargine), Sanofi-Aventis	Median 24 hours (range 10.8 to >24 hours; sampling period 24 hours)	Once daily at the same time each day.	$67/10 mL vial $100/5 of 3 mL cartridges $100/5 of 3 mL *SoloStar* pens	Vial, cartridge, pen: 28 days
Levemir (insulin detemir), Novo Nordisk	6 to 24 hours (dose-dependent; binds to albumin)	Once daily, or twice daily as part of a basal-bolus regimen, with the evening dose administered with the evening meal or at bedtime.	$117/5 of *Penfill* cartridges $120/5 of 3 mL *FlexTouch* pens	Cartridge, pen: 42 days
Semglee (insulin glargine) BGP Pharma Biosimilar to *Lantus*[e]	See *Lantus*	Once daily at the same time each day.	$69/5 of 3 mL pens	Pen: 28 days
Toujeo (insulin glargine), Sanofi-Aventis (300 units/mL)	Up to 36 hours	Once daily at the same time each day. First injection may provide insufficient coverage; may take at least 5 days to see maximum effect.	$86/3 of 1.5 mL *SoloStar* pens $143/5 of 1.5 mL *SoloStar* pens $171/3 of 3 mL *DoubleStar* pen	Pen: 42 days

Insulin, Manufacturer	Duration	Usual Frequency	Formulations/Cost[b]	Stability, in-use, room temp
Ultra-Long-acting: human insulin analogue (rDNA origin). Administered via subcutaneous injection. Consider for patients with severe or nocturnal hypoglycemia on another basal analogue, or with hypoglycemia risk factors,[4-6] or adherence problems. All are clear and colourless.[1]				
Tresiba (insulin degludec), Novo Nordisk	42 hours	Once daily at the same time each day.	**100 units/mL**: $120/5 of 3 mL *FlexTouch* pens **200 unit/mL**: $144/5 of 3 mL *FlexTouch* pens	Pen: 56 days
Insulin Mixes: human insulin analogue (rDNA origin) solution and protamine-crystallized human insulin analogue suspension (*NovoMix 30*, *Humalog Mix 25*, *Humalog Mix 50*). Others are human insulin (rDNA origin) solution and human insulin isophane suspension. Generally, not appropriate for type 1 diabetes due to lack of dose flexibiltiy.[1] Consider for elderly patients with type 2 diabetes due to ease of use.[1] Typically added to oral agents.[1] Given once or twice daily with breakfast and/or supper.[1] Administered via subcutaneous injection. All appear cloudy.[1]				
NovoMix 30 (30% insulin aspart solution, 70% insulin aspart protamine suspension), Novo Nordisk	Up to 24 hours	Typically given pre-breakfast and/or pre-supper,[1] immediately (not more than 5 to 10 min) before the meal, or immediately after the meal.	$61/5 of 3 mL *Penfill* cartridges	Cartridge: 28 days
Humalog Mix 25 (25% insulin lispro solution/75% insulin lispro protamine suspension), Eli Lilly	Up to 22 hours	Typically given pre-breakfast and/or pre-supper,[1] within 15 min before the meal.	$68/5 of 3 mL cartridges $68/5 of 3 mL *KwikPen*	Cartridge, pen: 28 days
Humalog Mix 50 (50% insulin lispro solution, 50% insulin lispro protamine suspension), Eli Lilly	Up to 22 hours	Typically given pre-breakfast and/or pre-supper,[1] within 15 min before the meal.	$67/5 of 3 mL cartridges $67/5 of 3 mL *KwikPen*	Cartridge, pen: 28 days
Humulin 30/70 (30% regular, 70% NPH), Eli Lilly	Mean: 23 hours (range: 18 to 24 hours)[7]	Typically given pre-breakfast and/or pre-supper, about 30 to 45 min before the meal.[1]	$28/10 mL vial $55/5 x 3 mL cartridges	Vial, cartridge: 28 days
Novolin ge 30/70 (30% regular, 70% NPH), Novo Nordisk	About 24 hours	Typically given pre-breakfast and/or pre-supper,[1] within 30 minutes before meal.	$26/10 mL vial $50/5 of 3 mL *Penfill* cartridges	Vial, cartridge: 28 days

Insulin, Manufacturer	Duration	Usual Frequency	Formulations/Cost[b]	Stability, in-use, room temp
Insulin Mixes, continued				
Novolin ge 40/60 (40% regular, 60% NPH), Novo Nordisk	About 24 hours	Typically given pre-breakfast and/or pre-supper,[1] within 30 minutes before the meal.	$50/5 of 3 mL *Penfill* cartridges	Cartridge: 28 days
Novolin ge 50/50 (50% regular, 50% NPH), Novo Nordisk	About 24 hours	Typically given pre-breakfast and/or pre-supper,[1] within 30 minutes before the meal.	$50/5 of 3 mL *Penfill* cartridges	Cartridge: 28 days

a. **Product monographs used in creation of this chart**: *Humalog* (April 2021), *Kirsty* (October 2021), *Lyumjev* (September 2021), *NovoRapid* (August 2021), *Apidra* (December 2021), *Fiasp* (July 2021), *Trurapi* (July 2022), *Admelog* (December 2021), *Humulin* (March 2021), *Entuzity* (March 2021), *Myxredlin* (August 2022), *Novolin ge* (August 2021), *Hypurin Regular* (June 2017), *Hypurin NPH* (June 2017), *Basaglar* (March 2021), *Lantus* (December 2021), *Levemir* (August 2021), *Semglee* (September 2022), *Toujeo* (October 2019), *Tresiba* (July 2021), *NovoMix 30* (August 2021).
b. Wholesale acquisition cost (WAC).
c. "Basal plus" strategy: rapid- or short-acting insulin once daily at main meal or breakfast plus basal insulin.[1]
d. Basal-bolus intensive regimen: rapid- or short-acting insulin three times daily with meals plus basal insuilin.[1]
e. Biosimilar products are not automatically interchangeable with the reference biologic drug. Each province/territory determines interchangeability.[8]

References

1. Diabetes Canada Clinical Practice Guidelines Expert Committee. Diabetes Canada 2018 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada. Can J Diabetes. 2018 Apr;42 Suppl 1:S1-S325.
2. Clinical Pharmacology powered by ClinicalKey. Tampa (FL): Elsevier. 2022. http://www.clinicalkey.com. (Accessed August 16, 2022).
3. Senesh G, Bushi D, Neta A, Yodfat O. Compatibility of insulin Lispro, Aspart, and Glulisine with the Solo MicroPump, a novel miniature insulin pump. J Diabetes Sci Technol. 2010 Jan 1;4(1):104-10.
4. Marso SP, McGuire DK, Zinman B, et al. Efficacy and Safety of Degludec versus Glargine in Type 2 Diabetes. N Engl J Med. 2017 Aug 24;377(8):723-732.
5. Lane W, Bailey TS, Gerety G, et al. Effect of Insulin Degludec vs Insulin Glargine U100 on Hypoglycemia in Patients With Type 1 Diabetes: The SWITCH 1 Randomized Clinical Trial. JAMA. 2017 Jul 4;318(1):33-44.
6. Wysham C, Bhargava A, Chaykin L, et al. Effect of Insulin Degludec vs Insulin Glargine U100 on Hypoglycemia in Patients With Type 2 Diabetes: The SWITCH 2 Randomized Clinical Trial. JAMA. 2017 Jul 4;318(1):45-56.
7. Product information for Humulin 70/30. Eli Lilly and Company. Indianapolis, IN 46285. June 2022.
8. Health Canada. Biosimilar biologic drugs in Canada: fact sheet. August 27, 2019. https://www.canada.ca/en/health-canada/services/drugs-health-products/biologics-radiopharmaceuticals-genetic-therapies/applications-submissions/guidance-documents/fact-sheet-biosimilars.html. (Accessed August 15, 2022).

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