Comparison of GLP-1 and GIP/GLP-1 Receptor Agonists

modified January 2025

This chart compares GLP-1 and GIP/GLP-1 receptor agonists (e.g., tirzepatide) in regard to A1c reduction, weight loss, dosing, tolerability, clinical outcomes (e.g., cardiac or kidney benefit), how supplied, cost, and storage. For a review of class **adverse effects**, see **footnote f**.

Drug/ A1c decrease/ Weight loss	**Availability Cost[b] Storage[c]**	**Dosing (subcutaneous injection in ADULTS unless otherwise specified)[c]**	**Comments (e.g., clinical outcomes, tolerability)**
Dulaglutide (*Trulicity*) Indicated for diabetes (ages ≥10 years) A1c: -0.84% to -1.34%[1,a] Weight loss: 0.5% to 2.6%[a,c]	Single dose pen (autoinjector): 0.75, 1.5, 3 (US), 4.5 mg (US) US: ~$2,000 Canada: ~$250 (1.5 mg/week) Store at 2ºC to 8ºC, or room temp (≤30ºC) for ≤14 days.	**Initial**: 0.75 mg once weekly. **Max**: may increase to 1.5 mg once weekly, then by 1.5 mg weekly every four weeks to a max of 4.5 mg once weekly. Max dose is 1.5 mg weekly in **children** 10 to 17 years. **Comparative dose**: see footnote g. **Missed dose**: If <72 hours remain until the next scheduled dose, skip the missed dose. If ≥72 hours remain, administer the missed dose.[c] If ≥3 doses are missed, consider restarting with ≤1.5 mg.[15]	• MACE and kidney benefit.[4,5] See our Infographic, *Diabetes Medications: Cardiovascular and Kidney Impact*, for details. • Discontinuation due to adverse GI effects (1.5 mg): ~1 in 15 patients[3]
Exenatide (*Byetta* [US]) Indicated for diabetes. A1c: -0.7% (10 mcg BID monotherapy)[a,c] Weight loss: -0.3% to 2.8%[a,c]	Sixty (60)-dose pen: 5, 10 mcg (needles not included) US: ~$850 Store at 2ºC to 8ºC. In-use pens can be stored at ≤25ºC for up to 30 days.	**Initial**: 5 mcg BID within 60 min before the two main meals (≥6 hours apart). **Max**: may increase to 10 mcg BID after four weeks. **Comparative dose**: see footnote g. **Missed dose**: skip missed dose **Kidney impairment**: Not recommended if CrCl <30 mL/min. Use 10 mcg BID with	• Discontinuation due to adverse GI effects (10 mcg BID): ~1 in 24 patients[3]

Drug/ A1c decrease/ Weight loss	**Availability Cost[b] Storage[c]**	**Dosing (subcutaneous injection in ADULTS unless otherwise specified)[c]**	**Comments (e.g., clinical outcomes, tolerability)**
		caution if CrCl 30 to 50 mL/min. Use caution in kidney transplant.	
Exenatide (*Bydureon BCise* [US]) Indicated for diabetes (ages ≥10 years). A1c: -0.49% to -0.64% (adults); -0.71% (pediatrics)[a,c] Weight loss: 2% (from baseline [adults]);[24] 1% (pediatrics)[a,c]	Single dose pen (autoinjector): 2 mg US: ~$830 Store at 2°C to 8°C, or room temp (≤30°C) for ≤4 weeks.	For patients 10 years and older: 2 mg once every seven days **Comparative dose**: see footnote g. **Kidney impairment**: Not recommended if eGFR <45 mL/min/1.73 m^2. Use caution in kidney transplant. **Missed dose**: If <72 hours remain until the next scheduled dose, skip the missed dose. If ≥72 hours remain, administer the missed dose.	• Neutral CV effect.[6] See our Infographic, *Diabetes Medications: Cardiovascular and Kidney Impact*, for details. • Discontinuation due to adverse GI effects: ~1 in 22 patients.[3] • Highest rate of injection site reactions among once-weekly GLP-1s.[3] • Requires mixing immediately before injection.
Liraglutide (*Saxenda*) Indicated for weight loss. Weight loss: 2.7% to 4%[23,a]	Dial-a-dose pen: 18 mg/3 mL (pen needles not included) US: ~$1,300 Canada: ~$450	For patients 12 years and older: 3 mg **once daily** (start with 0.6 mg once daily, increase dose weekly by 0.6 mg to goal of 3 mg once daily). For adults, discontinue after 16 weeks if <4% (after 12 weeks if ≤5% [Canada]) weight loss achieved. **Comparative dose**: see footnote g.	• See *Victoza*, below for information on clinical outcomes in type 2 DM. • ~44% to 62% of patients met weight loss goal at 56 weeks compared to 16% to 34% with placebo. • Discontinuation due to adverse effects: ~1 in 11 patients.[c]

Drug/ A1c decrease/ Weight loss	**Availability Cost[b] Storage[c]**	**Dosing (subcutaneous injection in ADULTS unless otherwise specified)[c]**	**Comments (e.g., clinical outcomes, tolerability)**
	Store at 2°C to 8°C. In-use pens can be stored at room temp (≤30°C) for ≤30 days.	**Missed dose**: Skip the missed dose. If more than three days have elapsed since the last dose, retitrate starting with 0.6 mg once daily (US).	
Liraglutide[d] (*Victoza*) Indicated for diabetes. A1c: -0.79% to 1.3% (adults);[1,a] -1.06% (pediatrics)[1,a,c] Weight loss: 2.7%[23,a]	Dial-a-dose pen: 18 mg/3 mL (needles not included) US: ~$820 Canada: ~$340 Store at 2°C to 8°C. In-use pens can be stored at room temp (≤30°C) for ≤30 days.	For patients 10 years and older: **Initial**: 0.6 mg once daily for one week, then 1.2 mg once daily. (Pediatric patients may achieve control with 0.6 mg once daily.) **Max**: may increase to 1.8 mg once daily after one week. **Comparative dose**: see footnote g. **Missed dose**: Skip the missed dose. If more than three days have elapsed since the last dose, retitrate starting with 0.6 mg once daily (US).	• MACE and kidney benefit.[7] See our Infographic, *Diabetes Medications: Cardiovascular and Kidney Impact*, for details. • Discontinuation due to adverse GI effects (1.8 mg): ~1 in 8 patients[3] ◦
Semaglutide (*Ozempic*) Indicated for diabetes (US: CV and CKD risk reduction). A1c: -1.12% to -1.67%[1,a]	Multi-dose pen: 0.25 or 0.5 mg (four 0.25 mg doses or two 0.5 mg doses), 1 mg (4 doses), 2 mg (4 doses [US]) (includes needles) US: ~$1,000 Canada: ~$240 (1 mg/week) Store at 2°C to 8°C. In-use pens can be stored at	**Initial**: 0.25 mg once weekly for four weeks, then 0.5 mg once weekly, **Max**: may increase to 1 mg once weekly after four weeks. After four weeks on the 1 mg dose, may increase to 2 mg once weekly. Target dose to reduce the risk of eGFR decline, ESKD, and CV death: 1 mg once weekly. **Comparative dose**: see footnote g.	• MACE and kidney benefit, including CKD.[8,21] See our Infographic, *Diabetes Medications: Cardiovascular and Kidney Impact*, for details. • Discontinuation due to adverse GI effects (1 mg): ~1 in 10 patients[3]

Drug/ A1c decrease/ Weight loss	**Availability Cost[b] Storage[c]**	**Dosing (subcutaneous injection in ADULTS unless otherwise specified)[c]**	**Comments (e.g., clinical outcomes, tolerability)**
Weight loss : 3.6% to 6.2%[23,a]	room temp (≤30°C) for ≤56 days.	**Missed dose**: if <48 hours remain until the next scheduled dose, skip the missed dose. If >48 remain, administer the missed dose. If two or more consecutive doses are missed, consider starting with 0.25 mg once weekly.[c] Some experts would restart with 1 mg if one or two doses are missed, 0.5 mg if three or four doses are missed, or 0.25 mg if ≥5 doses are missed.[15]	
Semaglutide (*Rybelsus*) Indicated for diabetes. A1c: -0.8% to -1.2%[a,c] Weight loss 1% to 4.1%[a,c]	Formulation **R1**:* 3, 7, 14 mg tablets. Formulation **R2**:* 1.5, 4, 9 mg tablets. *Not interchangeable mg-per-mg. (In Canada: R1 formation is called initial formulation, and R2 formulation is called optimized formulation) US: ~$1,000 (R1)(7 mg) Canada: ~$230 (R1)	**Initial**: 3 mg (R1) or 1.5 mg (R2) once daily at least 30 minutes before the first food, beverage, or other oral medications of the day, with ≤120 mL of water (~half a glass). After 30 days, increase the dose to 7 mg (R1) or 4 mg (R2) once daily. **Max**: After 30 days on the 7 mg (R1) or 4 mg (R2) dose, may increase to 14 mg (R1) or 9 mg (R2) once daily. **Comparative dose** (US: **after the initiation phase**): 7 mg (R1) = 4 mg (R2), and 14 mg (R1) = 9mg (R2). US: patients on *Ozempic* 0.5 mg once weekly can be switched to 7 mg (R1) or 14 mg (R1). Also see footnote g. **Missed dose**: skip the missed dose	• ORAL semaglutide in patients with type 2 DM and CV disease, CKD, or CV risk factors had a neutral CV effect.[9] • Discontinuation due to adverse GI effects: ~1 in 15 patients[c]
Semaglutide (*Wegovy*) Indicated for weight loss and CV risk reduction.	Single-dose pen (autoinjector): 0.25, 0.5, 1, 1.7, 2.4 mg. US: ~$1,350 Canada: ~$420	For patients 12 years and older: 0.25 mg once weekly, increased every four weeks to 0.5 mg, 1 mg, 1.7 mg, then 2.4 mg once weekly. Canada: consider stopping if the patient is not showing progress after 12 weeks on the maintenance dose.	• Reduces a composite of CV death, nonfatal MI, or nonfatal stroke (NNT = 67 patients treated for ~ 3 years) in patients with obesity and CV disease without diabetes.[10] • 67% to 85% of patients met weight loss goal (≥5%) at 52 weeks compared to 30% to 48% with placebo.[13,14]

Drug/ A1c decrease/ Weight loss	**Availability Cost[b] Storage[c]**	**Dosing (subcutaneous injection in ADULTS unless otherwise specified)[c]**	**Comments (e.g., clinical outcomes, tolerability)**
Weight loss: 10.3% to 14.4% (patients without diabetes)[13,14]	Store at 2°C to 8°C. Can be stored at room temp (≤30°C) for ≤28 days.	**Comparative dose**: see footnote g. **Missed dose**: if <48 hours remain until the next scheduled dose, skip the missed dose. If >48 hours remain, administer the missed dose. If two or more consecutive doses are missed, consider restarting with 0.25 mg once weekly.[c] Some experts would restart with 1 mg if one or two doses are missed, 0.5 mg if three or four doses are missed, and 0.25 mg if ≥5doses are missed.[15]	• Discontinuation due to adverse effects: ~ 1 in 15 patients[c]
Tirzepatide[e] (*Mounjaro*) Indicated for diabetes. A1c: -1.74% to -2.47%[1,a] Weight loss: ~7% to 11%. (in patients using insulin)[22,a]	Single-dose vial or pen (autoinjector [US]): 2.5, 5, 7.5, 10, 12.5 (US), 15 mg (US) (vial does not includes needles or syringe) US: ~$1,100 Canada: ~$100 (10 mg vial) Store at 2°C to 8°C. Can be stored at room temp (≤30°C) for ≤21 days.	**Initial**: 2.5 mg once weekly for four weeks, then 5 mg once weekly. **Max**: may increase by 2.5 mg/week every four weeks to a max of 15 mg once weekly. **Comparative dose**: see footnote g. **Missed dose:** If <72 hours remain until the next scheduled dose, skip the missed dose. If ≥72 hours remain, administer the missed dose.[c] If ≥3 doses are missed, consider restarting with ≤5 mg once weekly.[15]	• May delay oral contraceptive absorption. Advise switching to a non-oral contraceptive or adding a barrier contraceptive for four weeks after initiation or a dosage increase.[c] • Discontinuation due to adverse GI effects (15 mg): ~1 in 16 patients.[c]
Tirzepatide[e] (*Zepbound* [US]) Indicated for weight loss, and for sleep apnea (AHI	Single-dose vial or pen: 2.5, 5, 7.5, 10, 12.5, 15 mg (vials do not include syringe or needle) US: ~$1,100	Start with 2.5 mg once weekly, increase dose by 2.5 mg every 4 weeks to target dose of 5 mg, 10 mg, or 15 mg. Target dose for sleep apnea is 10 or 15 mg. **Comparative dose**: see footnote g.	• May delay oral contraceptive absorption. Advise switching to a non-oral contraceptive or adding a barrier contraceptive for four weeks after initiation or a dosage increase.[c] • Discontinuation due to adverse effects: ~ 1 in 15 patients[c]

Drug/ A1c decrease/ Weight loss	**Availability Cost[b] Storage[c]**	**Dosing (subcutaneous injection in ADULTS unless otherwise specified)[c]**	**Comments (e.g., clinical outcomes, tolerability)**
≥15) in obese patients. Weight loss: ~14% to 20% (patients did not have diabetes)[12,a]	Store at 2°C to 8°C. Can be stored at room temp (≤30°C) for ≤21 days.	**Missed dose**: If <72 hours remain until the next scheduled dose, skip the missed dose. If ≥72 hours remain, administer the missed dose.[c] If ≥3 doses are missed, consider restarting with ≤5 mg once weekly.[15]	• Though no specific guidance is available, stopping after 12 weeks if <5% weight loss achieved is reasonable based on guidelines.[11] • 85% to 91% of patients met weight loss goal (≥5%) at 72 weeks compared to 35% with placebo.[12]

Abbreviations: AHI = apnea-hypopnea index; BID = twice daily; CKD = chronic kidney disease; CV = cardiovascular; DM: diabetes mellitus; eGFR = estimated glomerular filtration rate; ESKD = end-stage kidney disease; GI = gastrointestinal; GIP = glucose-dependent insulinotropic polypeptide; GLP-1 = glucagon-like peptide-1; HF = heart failure; MACE = major adverse cardiovascular events; MI = myocardial infarction; NNT = number needed to treat; SCr = serum creatinine

a. **Diabetes indication**: A1c and weight reduction compared to placebo, as an add-on to other diabetes medication (unless monotherapy is specified). **Weight loss indication**: weight loss with lifestyle changes and/or diet. **Weight loss is the amount above that seen with placebo**. Weight loss varies based on lifestyle modification, dose achieved, concomitant medications, etc.
b. Wholesale acquisition cost (US) per month of maximum dose (or dose specified). US medication pricing by Elsevier, accessed January 2025. Canadian cost is wholesale (August 2024). Prices for products that are dosed weekly represent a 28-day supply. Prices for products that are dosed daily represent a 30-day supply.
c. **US product information used in creation of this chart**: *Trulicity* (November 2024), *Byetta* (November 2024), *Bydureon BCise* (November 2024), *Saxenda* (November 2024), *Victoza* (November 2024), *Ozempic* (January 2025), *Rybelsus* (December 2024), *Wegovy* (November 2024), *Mounjaro* (December 2024), *Zepbound* (December 2024). **Canadian product monographs used in creation of this chart**: *Trulicity* (July 2024), *Saxenda* (April 2024), *Victoza* (December 2024), *Ozempic* (March 2024), *Rybelsus* (October 2024), *Wegovy* (November 2024), *Mounjaro* (September 2024)
d. **Liraglutide** is available in combination with insulin degludec (*Xultophy*).
e. **Tirzepatide** is a GLP-1 agonist and glucose-dependent insulinotropic polypeptide (GIP) agonist.
f. **Adverse effects**:[c] (Note that in the US, these medications must be dispensed with a **Medication Guide**.)
    - GI side effects are common during dose escalation (e.g., nausea, vomiting, diarrhea). Resulting volume depletion may lead to acute kidney injury. GLP-1 agonists have been associated with bowel obstruction.[17] Educate patients about the potential for ileus.[20]
        - These GI side effects, and delayed gastric emptying, entail special considerations in surgical patients. See our chart, *Perioperative Management of Diabetes*.

- These drugs carry warnings about gallbladder disease (low risk) and pancreatitis (association unclear).[3,19,21,c] Stop if pancreatitis is suspected, and do not restart if pancreatitis is confirmed. There have been reports of pancreatic cancer in patients using GLP-1 agonists, but current evidence does not support causality.[19]
- These drugs are contraindicated in patients with a personal or family history of medullary thyroid cancer or patients with multiple endocrine neoplasia type 2. They cause thyroid C-cell tumors in mice.
- Rapid improvement in glycemic control is associated with diabetic retinopathy complications.
- Risk of hypoglycemia is low as monotherapy.
- Monitor for depression and suicidal ideation in patients taking these drugs for weight loss. Discontinue if symptoms develop.
- Don't combine with other GLP-1 agonists. Generally, avoid use in patients taking a dipeptidylpeptidase-4 inhibitor (e.g., saxagliptin), as combining these two classes of medications is unlikely to improve weight loss or glycemic control and is not cost-effective.[18]

g. **Comparative dosing based on glycemic efficacy**.[15] Consider a lower starting dose if GI tolerability is a priority.[16]
- exenatide 5 mcg BID ~liraglutide 0.6 mg/day ~semaglutide 3 mg orally once daily
- dulaglutide 0.75 mg/week ~ exenatide 10 mcg BID ~ liraglutide 1.2 mg/day ~ semaglutide 0.25 mg/week ~ semaglutide 7 mg orally once daily
- dulaglutide 1.5 mg/week ~ exenatide 2 mg/week ~ liraglutide 1.8 mg/day ~ semaglutide 0.5 mg/week ~ semaglutide 14 mg orally once daily ~ tirzepatide 2.5 mg/week
- dulaglutide 4.5 mg/week ~ semaglutide 1 mg/week
- semaglutide 2 mg/week ~ tirzepatide 5 mg/week

Users of this resource are cautioned to use their own professional judgment and consult any other necessary or appropriate sources prior to making clinical judgments based on the content of this document. Our editors have researched the information with input from experts, government agencies, and national organizations. Information and internet links in this article were current as of the date of publication.

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